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2018 INTERNATIONAL CONFERENCE
ON SUSTAINABLE DEVELOPMENT

September 26-28

Columbia University

Alfred Lerner Hall

New York, NY

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Oral Presentations

Linking Policy, Operations, and Workforce toward Meeting Global Health Goals

Environmental and health impacts of effluents from textile industries in Ethiopia: the case of Gelan and Dukem, Oromia Regional State

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This study focuses on four textile industries (DH-GEDA, NOYA, ALMHADI, and ALSAR) established between 2005 and 2008 in the peri-urban areas of Dukem and Gelan. The objectives of the study were to generate baseline information regarding the concentration levels of selected pollutants and to analyze their effects on biophysical environments. This study also attempts to explore the level of exposure that humans and livestock have to polluted effluents and the effects thereof. The findings of this study are based on data empirically collected from two sources: laboratory analysis of sample effluents from the four selected textile plants and quantitative as well as qualitative socioeconomic data collection. As part of the latter, a household survey and focus group discussions (FGDs) with elderly and other focal persons were employed in the towns of Dukem and Gelan. The results of the study show that large concentrations of biological oxygen demand (BOD5), chemical oxygen demand (COD), total suspended solids (TSS), and pH were found in all the observed textile industries, at levels beyond the permissible discharge limit set by the national Environmental Protection Authority (EPA). Furthermore, sulfide (S₂), R-phosphate (R-PO₄), and Zn were found in large concentrations in DH-GEDA and ALMHADI, while high concentrations were also identified in samples taken from ALSAR and ALMHADI. In spite of the clear-cut legal tools, this study shows that the local environment, people, and their livestock are exposed to highly contaminated effluents. We therefore recommend that the respective federal and regional government bodies should reexamine the compliance to and actual implementation of the existing legal procedures and regulations and respond appropriately.

How can we and should we promote the private sector's contribution beyond "established" global health community

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Mitsubishi UFJ Research and Consulting established "Center on Global Health Architecture" in 2017 and organize the public private collaborative action-oriented research meeting on global health issues. We are aiming to promote the relationship among stakeholders, that is, "break down solios," and take an interdisciplinary approach to create a new and innovative project.

Our prioritized areas are i) re-map private companies which make a contribution to global health and create a new evaluation tool to promote the investment from private sector, ii) advocate and UN procurement and public procurement mechanism in emerging countries to Japanese private companies and iii) promote regulatory harmonization on medical devices/equipment beyond borders and capacity building for regulators and policy makers in LMICs.

Of these 3 focused areas, we are commencing the specific projects on the first 2 items.

- i) We are now starting the re-mapping project of global health contributors, products/services and specific issues. The purpose of this re-mapping is to share the understanding on how diverse the private companies which make a contribution to global health issues and to create the new indices for specific industries/product groups to promote the investment from private sectors. In the last few years, we could see the possible "instability" of public development assistance. It would be really important for us to think about how we can keep or increase the investment on global health issues.
- ii) The World Bank Group (WB) introduced a new procurement framework and regulations called the "New Procurement Framework" in 2015. The most significant change in the New Procurement Framework is the shift from seeking the "lowest evaluated compliant bid" to seeking the bid that "provides the best overall value for the money," which allows the WB to balance quality, cost, and other factors as needed when selecting suppliers with the concept of "Value for Money" and "Life Cycle Cost". By transitioning to the new framework, the WB is expected to play a more active role in contract management of procurements to pursue greater overall value, which lead to the change in UN procurement and public procurement system in LMICs, too. We are providing the information on those new trend for Japanese private companies with "good products, but a relatively high cost" to change their behavior.

■ Website: Center on Global Health Architecture:

<http://www.murc.jp/corporate/virtual/globalhealth>

■ International Conference with Chatham House:

<https://www.chathamhouse.org/event/role-private-sector-global-health-security>

<https://www.chathamhouse.org/event/harnessing-new-technologies-global-health-security>

In addition, our team members are also organizing another PPP meeting on international development and cooperation and held the symposium in Tokyo last February.

■ Related-recommendation paper on international development and cooperation:
http://www.murc.jp/sp/1712/intldevbiz/concept_eng.pdf

How Western Michigan University is approaching its commitment to sustainability through sustainability-core courses

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Purpose: This study investigated the apparent mismatch between intent of the sustainability education policy-makers and the potential of instructors to implement the sustainability education policy in curriculum.

Current situation: Higher education institutions (HEIs) can play a pivotal role in evolving to a more sustainable society. Many HEIs have committed to the integration of sustainability issues into their curriculum by adopting declarations of sustainability. Recognizing the importance with which changes in the education system must be approached, the Association for the Advancement of Sustainability in Higher Education (AASHE) set the goal that by the end of 2010, 10% of all the courses offered in HEIs in the United States will help students understand the concept of sustainability. As per AASHE requirements, WMU has created their own criteria for sustainability-focused (SF) courses which concentrate on teaching different dimensions and conditions of sustainability in different ways and using sustainability as the main lens to teach the course topics.

Problem: Signing higher education sustainability declarations and creating their own sustainability policy does not ensure that the signatory HEIs are successfully implementing sustainability education within their education systems. Many HEIs are not pursuing learning outcomes of sustainability education programs in the category of academics. There are many reasons behind the low endorsement of sustainability education learning outcomes in the curriculum. Commonly named barriers to the implementation of sustainability education policy include: a lack of collaboration among university structures such as faculty and administration instructors' unfamiliarity of sustainability education policy and lack of clear assessment for university's sustainability education policy.

Methodology: This research study aims to inquire whether and how instructors are implementing sustainability education in classrooms and examine the extent to which it follows the "institutional sustainability education policy" and its objectives. Instructors were inquired about their awareness the sustainability-focused status of their course and monitoring of sustainability-focused course for sustainability content. Collective case study with conducted using multiple sources of information: instructor interviews and syllabus. The qualitative study involved 15 instructors of 15 sustainability-focused courses. A priori coding scheme was designed using WMU policy for learning outcomes of sustainability courses, and it was used to code interview and syllabi.

Results: This research signifies that the learning outcomes of sustainability are not fully implemented in any of the WMU courses we studied. According to the responses given by the instructors and learning outcomes information from syllabi, none of the

sustainability-focused courses were following all three criteria of the WMU policy for SF courses. Almost all courses (N=13) were fulfilling the one criteria and 6 courses were fulfilling two criteria. None of the courses fulfilled third criteria. Syllabi showed less representation of sustainability learning outcomes. Less than half (N=7) of respondents were aware of the sustainability-focused status of their course. All instructors(N=) who were aware of the sustainability-focused status of the course, fulfilled at least two criteria for learning outcomes of sustainability in course interview or syllabus. All instructors indicated that courses have never been reviewed for sustainability content.

Key words: Sustainability education, learning outcomes, sustainability policy, mismatch of policy and practice

Linking Policy and Engaging Cross-sector Institutes in Meeting Global Health Goals with Partner Countries - Public-Private Partnerships for TaiwanICDF's Overseas Health Projects

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Official Development Assistance traditionally is provided by official agencies; however, ODA will not be sufficient to achieve the development goals of Agenda 2030. Among stakeholders, the private sector is potentially the most significant source of finance and skills for development. Yet integrating the efforts from cross-sector institutes is a challenge, for which policy intervention will be needed to provide the right incentives. This means that redefining the relationship of social responsibility and sustainable development is critical for ODA to play the strategic role of supporting the transition needs of developing countries.

Taiwan's government has been dedicating its efforts to assist the international society and encouraging the engagement of health institutes as well. As the leaders in Taiwan's health care system, medical centers have been expected to demonstrate a high level of social responsibility, adding on the function of utilizing medical resources and conducting advance research and development in a sustainable way. For appreciating their contributions, the Ministry of Health and Welfare has embedded international health care participation as a criterion to accredited medical centers. As a consequence, around 26 Taiwanese hospitals and medical institutes have proactively and spontaneously participated in overseas medical and health care service.

TaiwanICDF is an official agency for international aid in Taiwan, and meeting global health goals is one of its main priorities. In alignment with the health policy mentioned above, the TaiwanICDF has expanded the scale of its health programs and sought cooperation opportunities with domestic medical centers. So far, nine out of 26 medical centers in Taiwan have built partnerships with the TaiwanICDF to carry out development projects and to produce sustainable impacts since 2013. This paper presents the importance and impact of policy intervention and partnership model of development cooperation abroad. An analysis of the results chain is emphasized to outline incentives and barriers for the private sector to engage in development efforts. Finally, the paper presents some possible steps to bring the partnership model to other sectors and industries in order to include all stakeholders in counting overall contributions and support to sustainable development.

Maternal Health Care Utilisation And Maternal Health Outcomes In Nigeria

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Poor health limits the production capacities of the affected person and their ability to enjoy the good things of life. Hence, improving maternal health care utilisation must be focused on in order to achieve desirable and sustainable health outcomes in Nigeria. Despite Nigeria's commitment to international and regional agreements, Nigeria is one of the countries with the highest rate of maternal mortality in the world. Maternal mortality ratio (MMR) reduced from 1,200 maternal deaths per 100,000 live births in 1990 to 950 maternal deaths per 100,000 live births in 1999. Also, Nigeria account for the second highest maternal mortality rate globally at 14 per cent after China's 20 per cent. Maternal health care utilization, on the other hand, improved between 1990 and 1999. Delivery in health facility and delivery by skilled birth attendants (SBA) increased from 30.9 per cent and 32 per cent in 1990 to 37.3 per cent and 41.6 per cent in 1999, respectively. However, visits to antenatal clinics (at least four) and antenatal care (ANC) by skilled providers reduced from 52 per cent and 57.7 per cent in 1990 to 47.3 per cent and 54 per cent in 1999, respectively. This paper is aimed at examining the effects of maternal health care utilisation on maternal health outcomes in Nigeria. The data for this paper was obtained from the 2013 Demographic and Health Surveys. Recursive Bivariate Probit models were estimated. The paper found that increased utilisation of skilled birth attendant had negative effect on maternal health outcomes in Nigeria. This paper, therefore, recommends that greater consideration should be given to increasing the level of government budget for health. Also, Primary Health Care should be strengthened by government and efforts on sensitising citizens on good health seeking behaviours should be intensified.

mHealth4Afrika - Supporting Primary Healthcare Delivery in Resource Constrained Environments

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The European Commission supported mHealth4Afrika Initiative (www.mHealth4Afrika.org) is validating the co-design of a state-of-the-art eHealth platform focused on strengthening primary healthcare delivery in resource constrained environments.

mHealth4Afrika is collaborating with Ministries of Health (policy), universities, District Health Offices (operations) and nurses (workforce) in resource constrained clinics in Ethiopia, Kenya, Malawi and South Africa.

mHealth4Afrika results demonstrate how the platform will assist primary healthcare facilities to increase:

- (a) quality and impact of care
- (b) frequency of contact (focus on prevention)
- (c) accuracy and quality of monthly aggregate program indicators
- (d) access to educational materials for clinic staff and patients

mHealth4Afrika is a modular, adaptable and extensible framework that integrates

- Electronic health records to store patient history, data collected during visits and associated test results
- Medical sensors to capture a range of readings
- Analytical and visualisation tools to facilitate interpretation and monitoring of patient results, support triage and referrals
- Automatic generation of monthly program indicators

Intervention and control sites in deprived urban, rural and deep rural locations were agreed with Ministries of Health and District Health Offices.

A comprehensive Baseline study provided valuable insights into human resource capacity, practical and technical challenges, equipment and infrastructure related deficits, constraints and training requirements of healthcare workers.

mHealth4Afrika is taking an user-centered design, collaborative open innovation based approach. The Implications of Infrastructure and communication constraints include

- No internet access
- Constraints on power

- Current communication infrastructure will inform the minimum necessary ICT infrastructure required for adoption and replication across clinics
- Need to explore if existing digital infrastructure can be used

Implications related to limited use of technology and low computer literacy include

- Design of User Interface needs to be as intuitive and easy to use as possible
- Need proactive sensitisation and training approach
- Looking at creating a repository of open access electronic health training resources to support continuous medical education

Focused on addressing the needs of end-user communities, mHealth4Afrika leverages a user-centred approach driven by co-creation of features, functionalities and objectives. This was informed by engagement with healthcare workers from 19 semi-urban, rural and deep rural clinics in Ethiopia, Kenya, Malawi and South Africa in relation to needs requirements (November – December 2015). Leveraging an iterative development process, the Alpha platform was designed based on needs requirements from 49 healthcare workers from 14 healthcare facilities across the 4 participating countries (November – December 2016). Necessary inputs were captured to update the beta specification, fine tune workflow, data elements and user interface. Sensor readings were prioritised in consultation with healthcare workers across the four countries. Beta validation phase 1 (July – Oct '17) informed the next iteration.

Based on inputs from needs assessment, baseline study and detailed analysis of standard paper-based registries used for antenatal care informed a specification for preparation and implementation of alpha prototypes and beta platform now being validated.

This consultative, multi-stakeholder cross-border approach addresses and informs Policy, Operations, and Workforce requirements of Meeting Global Health Goals across the African continent.

Gender differences and reflective teaching on reading comprehension Achievement among students with emotional behavioral disorder: Implications for sustainable developmentgozi Obiyo

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Background: The 2012 United Nations Conference on Sustainable Development (RIO+20) developed a set of Sustainable Development Goals (SDGs). Goals four and sixteen which are to ensure inclusive and equitable quality education and promote lifelong learning opportunities for all and provide peaceful and inclusive societies for sustainable development, provide access to justice for all and build effective, accountable and inclusive institutions at all levels respectively. In line with this, the philosophy of Nigeria education according to Federal Republic of Nigeria in the National Policy on Education (FRN, 2014 revised) is based on the development of the individual into a sound and effective citizen. Students with an emotional behavioral disorder (EBD) with reading problems may be disadvantaged. The study set out to find out how this problem can be reduced. Students' rate of learning and comprehension can vary significantly in their environments from those of their peers, ethnic, gender, and cultural groups. This may stem from the content matter to be learned, physical, psychological and cognitive characteristics of the learner and above all, the method of teaching. Reflective teaching was used on reading comprehension achievement of students with emotional behavioral disorder in Nsukka Local Government Area of Enugu State, Nigeria. Particular attention was paid to gender differences among students with emotional behavioral disorder.

Methods: Two research questions and two null hypotheses guided the study. The population of the study was 152 junior secondary school (JSS) II students identified with emotional behavioral disorder. A sample of 35 of the students from four co-educational schools was used for the study. A questionnaire titled reading comprehension achievement test was used to collect data. The instrument was face validated by three experts, from University of Nigeria Nsukka. Content validation of the instrument was ensured through the use of test blueprint. A reliability index of 0.86 was obtained using Pearson's product moment correlation. Data collected were analyzed using mean, standard deviation and analysis of covariance (ANCOVA).

Results: The findings of the study showed that students who were exposed to structured intervention (reflective teaching) achieved higher than their counterparts exposed to unstructured intervention. Female students achieved higher than their male counterparts. Also, male and female students who were exposed to reflective teaching had higher post-test mean on reading comprehension achievement scores than the male and female students of the control group. **Conclusions:** Based on the findings, the researchers concluded that use of reflective teaching be used by teachers for enhancing reading comprehension irrespective of gender differences.

Key words: Gender, reflective teaching, emotional behavioral disorder.

Private sector accountability for women's, children's, and adolescents' health

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The UN Secretary-General's Independent Accountability Panel (IAP) for Every Woman, Every Child, Every Adolescent. Panel members are: Kul Chandra Gautam (Nepal), Co-Chair; Brenda Killen (Ireland); Pali Lehohla (South Africa); Winfred Osimbo Lichuma (Kenya); Elizabeth Mason (United Kingdom); Giorgi Pkhakadze (Georgia); Dakshitha Wickremarathne (Sri Lanka); and Alicia Ely Yamin (United States of America).

The United Nations Secretary - General's Independent Accountability Panel (IAP) for Every Woman, Every Child, Every Adolescent will be issuing its next report on the theme of accountability of the private sector for women's, children's, and adolescents' health in the context of the Global Strategy 2016 - 2030 and the Sustainable Development Goals (SDGs), including universal health coverage. It will be launched during the UN General Assembly in New York in September 2018.

Through its reports available at: <https://iapewec.org/reports/>, the IAP issues key recommendations for action to a range of stakeholders (including Member States, parliamentarians, the UN System, development cooperation partners, donors, civil society organizations and the private sector), identifying critical gaps and promising measures to strengthen accountability for public health globally, based on a careful review of the literature and evidence base, as well as expert and stakeholder interviews. As reflected in the IAP's 2018 Call for Evidence (https://iapewec.org/wp-content/uploads/2017/11/IAPCall-for-Evidence_2018ReportEN.pdf), the focus of this report is on the for-profit private sector in the following areas: small, medium-sized service providers to multinational hospital networks; the pharmaceutical industry; the food industry and other major influencers of health and nutrition (obesity, non-communicable diseases, smoking, breast milk substitutes); private sector contractors in humanitarian settings; and private sector health financiers, for example, Wall Street investors, commercial banks, pension plans, insurance companies. The report will reflect on importance of policy, operations, collaborative action and effective oversight and accountability for accelerated achievement of the global health goals and SDG's more broadly.

The IAP would welcome the opportunity to have a launch or a speaking slot to brief on the report's findings at the International Conference on Sustainable Development and engage with its audience on this critical topic, which is little known or understood but essential in the context of privatization of health goods and services.

Strengthening Health Systems: lessons from developing nation

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Weak health systems are ailing the ability of the countries to achieve sustainable health outcomes. In the current context of global climate, food and fuel crisis, weak health outcomes are also irreversibly linked to non-attainment of non-health related MDGs. The situation is more precarious for developing countries, which are also equal signatories to UN Declaration of Human Rights that guarantees health as a human right. Even after over 6 decades of this commitment, some of the key indicators on health outputs raise basic question on what ails the health systems in even fast developing economies like India. As per the recent report by Ministry of Statistics and Programme Implementation, Government of India, India has definitely come a long way in achieving the MDG's but still lack behind. The MMR at 178 per 100,000 live births and IMR at 42 deaths per 1000 live births in 2012 have decreased drastically since 1990 still facing difficulty in achieving the desired level by 2015. On the positive side, performance on parameters like Under Five Mortality Rate (U5MR) declined to 52 per 1000 live births in 2012, life expectancy rose to 65.4 years in 2011 and overall the health care sector grew from US\$22 billion to US\$60 billion in 2011-12. However, access to basic health care services and health infrastructure in the country left much to be desired.

While design of any health system is bound to be equitable if it recognizes the right to highest attainable standard of health for all its citizens, the challenges are also on the demographic and other development parameters. The design of India's health system had to cater to 1.2 billion populations, almost three quarters of which are in rural areas with poor infrastructure availability. Thus, implementation of any program becomes hard to attain, as the core issue is the disparity amid states. Nearly 400 million people in India live on less than 1.25 US\$ (PPP) per day.

The paper aims to examine the health system in India as an example of a developing nation that is also trying to cautiously talk of reforms, argue for role of enhanced partnership between the public and the private sector to address the issues in financing health system. In the last few years India formulated a guideline on Universal Health Coverage (UHC), under the 12th five year plan of the country. With the new regime of the Government, the promising draft of the National Health Policy 2015 and the National Health Assurance Mission are expected to play a crucial role in moving forward towards UHC. The paper critically examines these reforms and compares it with several other country case studies that have experimented with reforms in health systems. Universal Health Coverage will be taken as an instrument to examine these reforms and draw lessons for better health outcomes and attainment of MDGs.

Sustainability of Societal Peace and the Paradox of Nation Building in Apartheid South Africa and Its Contemporary relevance.

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Although apartheid may have been effectively and substantially ended since 1995, the gullies created by its erosion do not seem to have been filled by the passage of time. Its effect continues to linger on in forms that are reflective of continuing deep divisions within RSA society.

Nonetheless, the politics of black inclusion and societal transformation from apartheid to democracy was a breakthrough in world politics. Prior to this time, all efforts at finding alternate, and lasting solutions to this age long racial conflicts in SA proved abortive.

The peculiar case of South Africa was even more remarkable, not only for existing for 48years unabated, but has received resounding and collective world condemnation among which is that of the United Nation, declaring it, “a crime against humanity”. And with no end in sight, scholars described it as the world’s worst intractable conflict in human history that would inevitably end in a civil war of unprecedented magnitude.

The interesting bit is that when the picture was bleakest, against these dialectical predictions, South Africa in 1995, surmounted this hitherto insurmountable apartheid conflict in a move described as a “miracle”. This is largely because apartheid was eased out without violence and bloodshed but through a series of internally grown mediation and negotiation that ushered in a new constitution and the Truth and Reconciliation Commission to deal with the atrocities of the past but on the fundamental condition of amnesty for full disclosure of human right violations.

The secret behind this resounding success that brought this 48 years intractable conflict to its knees was a set of seven paradoxical elements that were teased out through rigorous philosophical rhetoric. Our interest is to examine these elements against the extent to which such peace were sustainable in the long run.

The Impact Of Water And Sanitation On Childhood Mortality In Sub- Saharan Africa (SSA)

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This study is conducted mainly to analyse the effect of water and sanitation on childhood mortality in Sub-Saharan Africa region. Reducing childhood mortality, increasing access to clean water and better sanitation has been the key issues of international development agenda by including them as one of Millennium Development Goals(MDGs) and Sustainable Development Goals(SDGs). These global issues are very inter related. It's very important to know how and to what extent they are inter related. It's vital to examine the health benefit of improving water source and sanitation(SDG-6) as well as its potential effect in reducing the child mortality (SDG-3 target 2). Given the Sub Saharan Africa (SSA), a region which have a higher child mortality and greatest challenge in access of improving water and sanitation this study will investigate the effect of water and sanitation by analyzing its association with infant and below-five mortality rates in SSA region.

The empirical approach uses longitudinal data sourced from the World Development Indicators (World Bank) for the period 2000-2015. Infant and under-five mortality rates were used as indicators for childhood mortality. To diminish the possible confounding influence of water and sanitation in the child mortality regressions, we use an instrumental variable approach based on Dynamic Panel estimators or the General Method of Moment (GMM). The study finds that in Sub-Saharan Africa region, water and sanitation has a strong impact on reducing both infant and under-five mortality rates. Furthermore, the study finds that public health expenditure and aid all work together to reduce the possibility of infant and under-five deaths in Sub-Saharan Africa countries. These findings call for policymakers to pay a great deal of attention to increase investment in water and sanitation, improving official development assistance(ODA) along with increased public spending on health as these are all important factors that can help to decrease infant and under-five deaths in Sub-Saharan Africa.

Indigenous Approaches to Understanding and Practicing Sustainable Development

Application of Systems Thinking to Identify Principles for Sustainable Climate Change Adaptation among Indigenous Farmers in sub-Saharan Africa.

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The Rio declaration on Environment and Development (1992) and the World Summit on Sustainable Development (2002) are some notable examples of treaties that recognise the immense potential of indigenous knowledge in addressing wicked problems such as climate change. This is largely because indigenous knowledge, underpinned by its unique epistemology, can form a formidable partnership with scientific knowledge to carve out effective and sustainable solutions to address climate-related issues. This is against the backdrop of the growing recognition that indigenous farmers in developing countries have been able to navigate the adverse impacts of climate change, for decades, through an in-depth localised understanding of the ecosystem that caters to their livelihood. In such a delicate time where policy developers are being urged to plug into indigenous knowledge to catalyse the actualisation of the Sustainable Development Goals, identifying the underlying principles that govern how indigenous farmers utilise their bundle of assets when adapting to climate change is crucial. This bundle of assets refers to how they draw on and utilise their financial, natural, physical, social and human assets or capitals to adapt to climate change. This, in part, will ensure that the USD100 billion pledged by developed countries to assist developing countries tackle climate-related issues by 2020 is efficiently utilised to get adaptation right and not amplify existing challenges. This paper draws on an extensive review of the literature from sub-Saharan Africa, complemented by fieldwork conducted in the Delta state of Nigeria. Specifically, this study utilises systems thinking as it provides a valuable lens to holistically capture the ways in which indigenous farmers utilise their bundle of assets, including the interconnectedness and complex interactions at play when attempting to adapt to climate change. The findings reveal that the quest to attain environmental integrity and social culture are some of the underlying principles that inform how they employ their bundle of assets when adapting to climate change. This challenge the status quo in the sense that climate change discourse has, for the most part, been largely constructed as an environmental problem has often been sought to be addressed in isolation with factors not limited to cultural and ethical dimensions, which indigenous communities hold in high esteem. This paper argues that climate change can be made more relevant to policy by contextualizing it within a sustainable development framework, and not treated as a single entity without far reaching consequences that does not transcend environmental issues. The implications for the SDGs, with particular emphasis on both the first and second SDGs, are deliberated upon in relation to the wider theoretical debates revolving around indigenous contributions to the attainment of the SDGs.

Between extractivism and good living: An analysis of the Bolivian indigenous proposal

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At the beginning of the new century the demand for raw materials worldwide has increased in a substantive way. This characteristic may be due, among others, to the growth experienced by the economy of the People's Republic of China and the extractive industries in general. With this growth, there has been a new extractive race in Latin America and therefore a new reconfiguration of dependence of these economies on the world system. This phenomenon has been increased in economies traditionally exporting raw materials such as the Bolivian economy. Bolivia is a country whose insertion into the world economy throughout its life as a Republic and as a Plurinational State, has been determined by the export of raw materials. Its vocation as an extractivist country dates back to the colonial era until it consecrated its productive structure as dependent on hydrocarbons; being currently the export of gas which has allowed it to grow at a favorable rate since 2005 and solve an active social policy, which are supported in the Sumak Kawsay (good living).

The objective of this paper is the analysis of the type of development that the Bolivian economy has been developing since 1985, an economy based on the exploitation of natural resources and that since the arrival of the first indigenous president has tried to anchor its development in the indigenous perspective. Studying the Bolivian case allows us to see two different moments of State participation in the period that is intended to analyze, which will provide us with tools to analyze the different logics of development linked to the same pattern, under the magnifying glass of the ecological economy. This will lead to ask ourselves: Why, in spite of a change in the economic and institutional model in Bolivia, has there not been a change in the productive matrix? What type of development is taking place in Bolivia from the extractive model? And what is the link between the ecological economy, development and good living?

This research will begin with the search and approach to the specialty literature. An attempt will be made to follow the inductive and deductive method in terms of the analysis and systematization of information, as well as being a case study will be informed by an analysis of facts, making use of historical, empirical and comparative material regarding the extractive model in the different economic cycles in Bolivia.

Establishment of legally binding International Legal framework and Policy for Traditional Knowledge Protection in relation to Biodiversity.

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There are currently no legally binding international legislations or guidelines for the protection of Indigenous Traditional knowledge associated with biodiversity. The main mechanism in place for the protection of Traditional Knowledge is the Convention on Biological diversity (CBD) guideline on Access and Benefit Sharing (ABS) Agreement. However, ABS's main focus has been on the commercial application of Traditional Knowledge (TK), undermining cultural and spiritual foundations rather than protect it. ABS treats the protection of TK as intellectual property protection, eroding the understandings of the latter and its need for protection. Furthermore, Intellectual Property laws in place do not protect TK or the cultural integrity of Indigenous Nations or local people.

Hence, a comprehensive protection system that goes beyond the commercialization of knowledge and intellectual property rights is required through international legal instruments such as UNDRIP and CBD, amongst others. Additionally, there is a need to: recognize and clarify community ownership and control of TK from an Indigenous or local perspective; to protect TK and practices; recognize knowledge transmission by alternative cultural mechanisms such as stories, songs, elders and recognize and uphold Indigenous and local peoples' inherent rights. Recognition of future generations and elders as TK holders are crucial in order to halt the erosion of TK. Lastly, the development of strategies and measures for the protection, sharing and most importantly for the formal recognition of Traditional Knowledge systems within Indigenous and local communities, with governments and industries are fundamental.

Biocultural Community Protocols (BCP) is a mechanism that is currently in place in several countries with the aim of strengthening the protection of TK associated with Biodiversity and the use of biological resources sustainably. BCP allows Indigenous and local peoples to assert their rights to self-determination and respond to challenges by the International Regime on Access and Benefit Sharing and allow the latter to better engage with stakeholders. BCP challenges dominant notions on the protection of TK whereby a paradigm shift is required within law systems to recognize Indigenous peoples as drivers of conservation and of sustainable use of biodiversity. BCP can also improve Indigenous and local peoples' participation in co-management of protected areas and Indigenous and Community conserved areas.

Hence, this paper argues that established cultural approaches such as biocultural community protocols, an approach that recognizes and includes Indigenous peoples and their worldviews has the capacity to influence and inform policies related to the protection of TK associated with Biodiversity.

Feeding the world, the nation or the village? Agrarian movements' battle for food provisioning in Colombia

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The current global food system has failed to address some of the most critical social and environmental sustainability challenges of our time. Today, 800 million people remain undernourished (located mainly in developing countries), while two billion suffer from malnutrition and obesity (IFPRI, 2016). Agriculture, forestry and land-use change contributes one-fifth of global greenhouse emissions (FAO, 2016), and the expansion of the agricultural frontiers poses even greater threats to biodiversity than climate change (Maxwell, 2016). All of these challenges must be met in a context in which today's agricultural production needs to double to meet the demand of a growing global population that will reach nine billion by 2050 (FAO, 2009). Academics and policymakers agree that these major challenges require rethinking policies, regulations and academic research in ways that contribute to expand our understanding of food and agricultural systems in sustainable ways (Millstone, et al, 2009; de Schutter, 2014; Gollin & Adams, 2015).

The global agri-food system has also excluded poor and marginalised communities who base their livelihoods on agricultural production and that, despite the unevenness of globalisation, play a crucial role in producing food (Pimbert et al 2001, Thompson & Scoones 2009, Millstone et al 2009). This marginalisation has not only been social and economic but also political. Often, voices, perspectives and practices of these communities have been ignored in decisions that affect food and agriculture at national and international levels. So who represents these poor communities and what are they doing about such outcomes? How have these groups organised and created alternatives to the dominant agri-food system? What can we learn from their perspectives of sustainable food provisioning?

This paper explores Colombia's agrarian negotiations established after the 2013 and 2014 agrarian strikes between the national government and national agrarian movements that include peasant, indigenous and African-Colombian communities. The main questions this paper asks are: what are the competing narratives and their implications for the national food system? to what extent can this negotiation re-shape the debates on food and agricultural policies in sustainable ways? The agrarian movements are contesting the development model implemented by the government based on export-oriented agriculture and cheap food imports. Instead, they are proposing a peasant economy model based on food sovereignty and local food systems to supply the domestic demand. In this context I argue that the social and political recognition of the agrarian movements participating in the negotiations with the government is not only a step forward in the inclusion of the most marginalised rural communities, but a step towards a more democratic debate on food provisioning. The

agrarian movements' alternatives can also open up new alternatives and opportunities of sustainable development in the food and agricultural sectors.

Indigenous Community Energy Plan

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As the world experiences an evolution of energy production, Indigenous communities in Canada have recognized that hard action must be taken to ensure that Mother Earth is protected for the future generations. Energy has become essential to most of our societies survival and development, as capitalist and colonial forces have created a world in which people becomes increasingly dependent on energy every day. Many people view this current energy consumption and demand as unsustainable and believe now is the time where we must begin to transition away from less sustainable energy systems dependent on fossil fuels. Everyday fossil fuels become less financially viable as alternatives begin to emerge, and it is clear their continued use is not compatible with our global emission targets for human survival. Indigenous communities in Canada have, within the energy realm, begun to mobilize and are exercising their sovereign rights to self-determination, which is taking shape thorough the development of Indigenous Community Energy Plans (ICEP). Increasingly more communities are opting to lead and control their source of energy and decisions are being considered at the community level. These plans also take into account Indigenous epistemologies and cultural customs that value land, water and animals in a holistic and interconnected way. Nations recognize the importance of effective management of energy and water to their economy, environment and social harmony and that as time passes so do the needs of the land. The progression of technological advancements, community goals and as the efforts towards alternative energy become varied the need for change within the ICEP will arise. It is for these factors that this document would be a living document that will evolve with the community to ensure that it is always relevant and always serving the community to the best of its ability. The poster develop provides background information on how to create a 'living' plan for the community, describing key components that make an effective and efficient Indigenous Community Energy Plan and outlines key values to be considered throughout the entire process.

8 key recommended steps to create an Indigenous Community Energy Plan have been outlined; Background information, strategic planning, community engagement, energy demand assessment, environmental assessment, future goals for community energy, monitoring and evaluation and resources needs. Effective ICEP's share many features in common: demonstrating clarity of purpose, thorough effort to engage all stakeholders, holistic understanding of energy issues, communication and transparency, clearly outline responsibilities, are regularly monitored, tracked and revised, set realistic goals and tangible points of action, and endeavor to go beyond implementation while educating the community. While there are differences in how ICEP's are formed, implemented, enforced, and monitored there is an overall similarity amongst their

general goals of contributing to energy efficiency, climate change, sustainable development and health and well-being of the community and environment.

Kimeltuwe: Developing intercultural education strategies for Pehuenche communities in Chile

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Kimeltuwe is a project that involves academic research, policy recommendations and a proposal to implement intercultural education in Pehuenche communities in Chile, fostering sustainable development. The research is framed on the fourth Sustainable Development Goal; Ensure inclusive and equitable quality education and promote lifelong learning opportunities. One of the most concentrated areas of Pehuenche communities in Chile (96 percent), is located in Icalma, geographically isolated and considered the 6th more vulnerable municipality in the country, where 60 percent of the population does not have access to education. The consequence of inequalities in this community leads to abandonment of territories by young people and decreasing rates of economic development.

The proposal incorporates elements from The Convention 169 on Indigenous and Tribal People (ILO, 1989) and the Declaration of Indigenous Rights of (UN, 2007) to guarantee the rights of communities to access infrastructure and intercultural education. The project analyses different ways to ensure that their culture is preserved and transferred through generations while the students are participating in “formal” educational systems. The interdisciplinary research developed an educational and also an architectural project through a participatory design process with Trawun Lonko Association. The project considers the field study of the social and cultural aspects in order to design an educational architecture that represents the Pehuenche culture and it is feasible to implement with the existent political structures of the Chilean government.

Shaping the Maya Economy: Human-Centered Design Approaches to Biocultural Innovation

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Maya Leaders Alliance (MLA) is an advocacy organization for Maya people in Southern Belize. In 2015, 39 Maya communities in Toledo achieved a major victory supporting indigenous rights and sovereignty, the Caribbean Court of Justice upheld their claim for land tenure. With ancestral land acquired and protected, MLA and Maya community leadership now concentrates on developing a Maya Economy based on culturally appropriate market strategies. This paper will document the efforts of master-level students studying Development Practice (MDP) in helping investigate the role specific biocultural innovations and culturally rooted market strategies play in supporting the formation of a Maya Economy. Our work will add to the understanding of indigenous practices of sustainable development.

Our team will support MLA in the design of a prototype process for implementation of biocultural innovations, facilitated through human-centered design processes. Biocultural innovations are technologies that emerge from biocultural heritage unique to the Maya people connecting goods or services with human capital. The cohune palm (*Attalea cohune*) and cacao bean (*Theobroma cacao*) are two biological resources central to desired biocultural innovations strategy. Supporting MLA's biocultural innovation design process will require three important elements. First, an understanding of related knowledge. To attain this, we are conducting a literature review to analyze models pertaining to indigenous economies, agroecological systems, and ecotourism. Second, an understanding of context through work with MLA, community representatives, and stakeholders to gain perspectives and gather inputs. To do this we will facilitate focus groups in order to collect data on community perspectives.

Through these strategies, we will assist MLA to rebuild linkages between economy, environment, cultural identity, intergenerational exchange of knowledge, and communities members working together. Our paper will share the process and impressions gathered involving the utilization of biocultural innovations to support endogenous economic development for Maya communities.

The Honourable Harvest: An Indigenous Research Protocol for Sustainable Development

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There is increasing recognition that incorporating Indigenous ways of knowing can positively impact the outcome of sustainable development projects. Indigenous ways of knowing recognizes the local knowledges of the community, are centered around relationships that are mutually beneficial, and are built on respect. Traditionally, there has been a disconnect in how to incorporate Indigenous knowledges and contemporary western approaches. Integration of these worldviews in development projects has the potential to ensure positive outcomes for all those involved. Widely referenced frameworks, such as the First Nations principles of OCAP® (Ownership, Control, Access, and Possession) provide instruction on how to conduct research with First Nations, ensuring recognition of community rights and interests. However, there is not one recognized way of how to respectfully integrate Indigenous knowledges and western methods, especially with regards to research practices and development projects. The Honourable Harvest: An Indigenous Research Protocol for Sustainable Development Practice was created with the intention of outlining an efficient and effective process for engaging in sustainable development research. Inspired by the significant work of Dr. Robin Wall Kimmerer, it is grounded in Indigenous research methodologies, based on the values of respect, reciprocity, and responsibility. The resulting guidelines are a marriage of traditional ways of seeking knowledge and acknowledgement of contemporary academic processes, focusing on relationships to the land, restoring community, and research and ethics. It is crucial to recognize that not everyone has access to traditional knowledges and may need guidance to properly integrate traditional Indigenous protocols within a sustainable development context. This holistic framework outlines nine steps to govern sustainable development, honouring Indigenous knowledge, so that development may be done in A Good Way.

Mainstreaming Gender in Agenda 2030: Interlinkages between Sustainable Development Goals

Best practices for inclusion of gender equality in monitoring and evaluation of rural climate services

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Climate services can be varyingly accessible and usable to farmers according to significant socio-economic differences such as gender. With increasing weather and climate variability, climate services are critical for informing agricultural decision-making and helping smallholder farmers manage and plan for agricultural risk, especially in those parts of the world most vulnerable to extreme weather events and erratic change. However, due to the socio-culturally defined roles, responsibilities, and daily activities that women and men carry out, they can have differing climate information needs and can varyingly access and apply climate information services. Furthermore, considering that women tend to confront significant resource constraints and oppressive socio-cultural norms in comparison to men, climate services can run the risk of exacerbating gender inequalities if initiatives are not taken to assess the differing challenges and opportunities that women and men face to incorporate climate information in agricultural decision-making and livelihood planning.

With this in mind, the paper seeks to contribute knowledge on how to develop monitoring and evaluation of gender equality outcomes in climate services interventions. In this way, the paper responds to the need to analyze the extent to which climate services interventions help reduce relevant gender gaps. After a review of the challenges and lessons learned from the literature on gender-aware monitoring and evaluation in rural development interventions, the paper identifies key questions and concepts related to gender and climate services, with a focus on access and use. The paper then presents a discussion of best practices for gender aware M&E for climate services interventions, drawing from the experiences of the CGIAR Research Program on Climate Change, Agriculture and Food Security (CCAFS) and its partners; from this, the paper develops recommendations for M&E design, implementation, and analysis. Finally, the paper considers how the issues and questions targeted by climate services M&E may vary, depending on whether the intervention's chosen approach is gender-responsive or gender-transformative.

Gender Mainstreaming in Mine Action: creating interlinkages for progress across SDGs

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Mine action is a series of activities aimed to reduce the risks associated with landmines, cluster munitions and other explosive remnants of war. As a response to these risks, mine action prevents the loss of lives and limbs, (re-)establishes safe environments for communities, returns land, housing and infrastructure in support of sustainable livelihoods and accelerates socio-economic development.

Mine action never occurs in a vacuum; it takes place in different social and cultural contexts with gendered power relations. Women, girls, boys and men have different roles and responsibilities which impact on their mobility, exposure to risks, decision-making power, and access to services and resources. When gender is not taken into account, mine action projects can exacerbate inequalities between women and men, and between different groups in communities. Conversely, gender-responsive projects enable all members of a community to benefit from mine action equally.

Concretely, gender mainstreaming in mine action ensures that women's specific needs and priorities are recognised and included in decision-making processes. Gender mainstreaming also enables women to benefit equally from employment opportunities and from access to returned land and resources. When done properly, the inclusion of gender in mine action can be an effective, yet still insufficiently valued, catalyst for transformative change, help reduce inequalities and empower women and girls.

The 2030 Agenda for Sustainable Development and its Sustainable Development Goals (SDGs) help recognise fully and capitalise deliberately on the inter-dependencies of different areas of work and, by seizing arising opportunities, make interventions more sustainable. Doing so for cross-cutting issues such as mine action and gender mainstreaming can multiply progress across many SDGs. Because of its most immediate impact, gender mainstreaming in mine action contributes most directly to SDGs 16 and 5. When being gender-responsive, mine action significantly reduces violence and deaths (16.1), including that against women and girls (5.2), and actively promotes the participation and equal opportunities of women (5.5), as well as their equal rights to resources, control over land and property (5.a).

But most importantly, the inclusion of gender in mine action has “spillover” effects on other Goals. Providing women with equal opportunities to benefit from the results of

mine action, for example, makes a contribution to reducing inequalities (10.3), while hiring women helps reach equal employment opportunities (8.5). In turn, this contributes to all gender and age groups being able to access resources and services equally, thereby addressing poverty for the most vulnerable groups (1.4).

Taking gender inclusion in mine action as a powerful case study, this article aims to demonstrate how gender mainstreaming can create multiple interlinkages between different SDGs and how these interlinkages can effectively unfold their potential on the ground. The article also serves as a call for more deliberate integration and monitoring of gender outcomes in mine action projects.

Linking Gender Equality (Goal 5) with Decent Work and Economic Growth opportunities (Goal 8) through the development of infrastructure (Goal 9) In LAC. Pilot experiences in Bolivia, Paraguay and Nicaragua

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Investment in infrastructure is a crucial driver of economic growth and development. In LAC, annual amount of investments in the sector has averaged US\$ 130 billions between 2008 and 2015 [Ref. 1] . While this amount still falls short when compared with the annual infrastructure spending required to alleviate growth constraints - estimated in US\$ 225-287 billions [Ref. 2] - it represents a significant opportunity for creating jobs and sharing economic prosperity.

Unfortunately, few women benefit from such opportunity. In LAC countries, women represent only 14% of the workforce in the transport sector and 3% in the construction sector. Moreover, low female representation within the construction sector is correlated with high wage gaps for women [Ref. 3].

In this context, the Inter-American Development Bank's (IDB) Transport Division leads since 2015 the implementation of three pilot projects in Paraguay, Bolivia and Nicaragua to increase women participation in the construction and transportation value chains with the objective of achieving equal opportunities in these sectors from a gender perspective.

Each pilot was linked to a sovereign guaranteed loan operation of the IDB: Road Infrastructure program to support development and management of the primary road network (BO-L1102) in Bolivia; Rural Road Improvement program II (PR-L1092) in Paraguay; and Road Integration Program (NI-L1092) in Nicaragua. The methodological approach used in these pilots included the elaboration of a diagnostic of the local context, and a Gender Action Plan permitting a better targeting of beneficiaries and efficiency of interventions. Main actions included: Trainings to women on operation of heavy equipment, road tolls and road maintenance; awareness and communication campaigns; institutional strengthening for gender mainstreaming; and the promotion of internship programs through subsidies to construction companies.

The degree of completion and results achieved varies from one pilot to another as these are being implemented at different speeds. The pilots also yielded several lessons learned which may increase the chances of women participation in the construction sector for future programs.

References:

Ref. [1]: Derived from Infralatam Database

Ref. [2]: Bhattacharya, A., Romani, M., & Stern, N. (2012, June). Infrastructure for development: meeting the challenge. In Centre for Climate Change Economics and Policy, Londres. [www. cccep. ac. uk/Publications/Policy/docs/PP-infrastructure-for-development-meeting-the-challenge. pdf](http://www.cccep.ac.uk/Publications/Policy/docs/PP-infrastructure-for-development-meeting-the-challenge.pdf). Consultado el (Vol. 15).

Ref. [3]: Gender and labor markets in Latin America and the Caribbean (LAC): Women's participation in the construction sector. Granada, Perez, Montes, Monje, Caldo. TRB - Under reviewing for publication.

Menstrual Hygiene Management Monitoring and the SDGs

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Half of the global population menstruates as part of their life cycle. Living with menstruation requires tailored assets (including knowledge), services (including education) and spaces (including safe, private toilets), but these are often missing, impacting negatively on women's dignity, agency, safety and wellbeing throughout their lives. Addressing these needs and building off of the inherently cross-cutting nature of the issue of menstruation will be critical to achieving the full range of Sustainable Development Goals (SDGs). We examine, goal by goal, the extent to which official global SDG indicators provide an understanding of whether women's menstruation-related needs are being met and the potential of additional menstruation-related indicators for assessing achievement of SDG targets. Menstruation is not explicitly mentioned in any SDG goal, target or indicator, and is only explicitly mentioned in monitoring guidance for a few SDG targets and indicators. However, there are clear linkages to poverty reduction (SDG 1), health (SDG 3), education (SDG 4), gender equality and empowerment (SDG 5), water and sanitation (SDG 6), and inequality (SDG 10). Researchers, policy makers, practitioners and enterprises who wish to identify and fill unmet needs in menstruation and its management underutilize the evidence that the existing SDG monitoring framework offers. Similarly, the existing and emerging menstruation-related monitoring that these same actors are pioneering outside the SDG monitoring framework is underutilized for the important insights it can give those looking to understand changes measured in a wide range of SDG indicators, and to plan for concerted and efficient SDG success. Menstruation monitoring and the SDGs are intrinsically related, and monitoring barriers to menstruation management can provide insights into inequalities and human rights impediments that fall along sex or gender lines throughout the SDG framework. Monitoring a range of SDG indicators can aid an understanding of menstruation, and as the indicators are adopted more widely and more data is amassed, the interface will likely become more evident.

Scaling Agency for Gender Empowerment & Strategic Gravidity: A Comprehensive Sexual & Reproductive Health Rights Programme for Ekiti State, Nigeria

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Upon the exhaustion of the Millennium Development Goals in 2015, the United Nations established a new set of benchmarks and targets as part of the UN 2030 Agenda for Sustainable Development. Among these 17 Sustainable Development Goals (SDGs), we sought to wed SDG3 (Good Health & Well-Being), SDG4 (Quality Education), SDG5 (Gender Equality), and SDG17 (Partnerships For The Goals) to bilaterally construct a culturally competent sexual health modality to provide increased knowledge sharing and capacity building for at-risk women and girls in Ekiti State, Nigeria. Globally, an estimated 25 million unsafe abortions are performed each year with 97% of procedures attained in either developing or underdeveloped countries. Nigeria currently sustains restrictive laws surrounding abortion care, with limited investments in family planning and reproductive health services. Ergo, Nigeria endures low contraceptive prevalence coupled with analogous gravidity and parity, which are predictively resolved through dangerous clandestine procedures. These illegal abortions routine lead to complications and profoundly contribute to the inclined maternal mortality rate, which is among the highest in the world. Approximately 3,000 Nigerian women and girls undergo and fail to survive unsafe abortions annually, the majority of which are young primigravidae between the ages of 15 – 24. Foisted against this insight, we designed a comprehensive sexual & reproductive health rights (SRHR) curriculum to be implemented within the Ekiti State of Nigeria. Our portable SRHR education programme is designed for low resource ecosystems with limited infrastructure, is easily scalable with modular programming designed to increase both individual and community awareness concerning sexual and reproductive health rights of women, to secure reproductive health autonomy of women, and to positively influence the plasticity of social norms for female agency in both reproductive health and abortion services. Currently, monitoring and evaluation is underway and will remain a conduit of findings, limitations, and shall inform future community programming needs and efforts.

Women / Energy / Climate: Linking SDG Impacts

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Investing in women through carbon and energy projects can be a highly-effective strategy to achieve verifiable SDG 5 results. While the Agenda 2030 framework offers exceptional opportunities for partners from different fields to collaborate on initiatives at the local level, without an emphasis on verified impacts, SDG claims by developers and funders risk being insubstantial. In order to ensure that promises turn into action, rigorous implementation, monitoring and accountability mechanisms are necessary. Many carbon offset and energy efficiency projects can be optimal vehicles for investments in Gender Equality, as they already incorporate these mechanisms and center on female end-users.

The interlinkage of SDGs 5, 7 and 13 can help mainstream Gender in the Agenda 2030 by overcoming three hurdles: data gaps, marginalized women and inadequate monitoring timeframes. Carbon and energy projects undertake extensive data collection and household interviews, which can be adapted to include gender-specific and gender-disaggregated information, helping to close the data gap. Marginalized populations, such as low-income, rural women, are often left behind by national policies and programs; by supporting improved cookstoves and safe water projects, for example, funders can ensure that their gender-targeted investment is reaching the most vulnerable women. The third hurdle is that effectively empowering women may take years, and project budgets seldom account for this longer timeframe. Carbon offset projects, on the other hand, are already designed for 10-30 year implementation cycles and are therefore well-suited for long-term commitments.

In rural Brazil, a practical application of this interlinkage of SDGs is underway. The project Efficient Cookstoves in Bahia III was developed by Perene Institute and validated by the Gold Standard Foundation (GS). Building on more than a decade's work developing standards and certifying projects that address climate change in a holistic manner, GS recently launched the Gold Standard for the Global Goals, a pioneering standard fully aligned with Agenda 2030. Perene Institute has been implementing GS-certified cookstove projects since 2008, benefiting over 30,000 people and partnering with the private sector to fund the offset of over 140,000 tons CO₂e. By adopting a new Gender-Responsive Framework, Gold Standard, Perene Institute and corporate funders Natura and Itau-Unibanco will take Gender Equality actions in rural development to the next level. Through verifiable actions such as job training and enterprise support for women, time-poverty studies, and equal pay for equal work practice, we will showcase the synergy that arises from investing in women through carbon and energy initiatives.

Breaking Down Silos in Government Administration

America's Goals for 2030

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The Sustainable Development Goals (SDGs), adopted in 2015 by the 193 member states of the United Nations, aim to end poverty, protect the planet and ensure prosperity for all. While the goals are universal, the declaration acknowledges that “each country faces specific challenges in its pursuit of sustainable development.” A unique challenge faced by the United States is the lack of collaboration on the sustainable development agenda by state legislatures—a level of government that is specific to the U.S. and capable of implementing effective, localized policy but has yet to engage fully with the sustainable development agenda. Government and sector silos—known barriers to knowledge sharing and the development of comprehensive sustainable development policies—appear to affect not only U.S. national government but state-level government as well.

In response, America’s Goals for 2030 were developed as a framework and data tool to advance state-level coordination on sustainable development. America’s Goals contextualize the SDGs by honing-in on relevant and accessible issues for the American political landscape. The seven goals are 1. Good Jobs; 2. Affordable Quality Healthcare; 3. Investing in Children; 4. Empowering People Over Special Interests; 5. Equal Opportunity for All; 6. Sustainable Infrastructure, Resilience, and Innovation; and 7. Clean Air, Water, and Energy. The America’s Goals 2018 Index is the first annual report produced by SDG USA and Future Now which compiles state-level data and ranks the 50 states on their progress toward America’s Goals for 2030. Each goal has three targets measured by indicators selected based on relevance, availability, and timeliness of state-level data. The overall state rank was created using the arithmetic average of the 21 individual target rankings.

The index results show that New Hampshire ranks first on progress toward sustainable development while Louisiana ranks 50th. There is geographic clustering, with the top performing states located in New England, upper Midwest and Pacific Northwest. The lowest ranking states are predominately located in the South. However, even the highest ranked states require significant progress to achieve the goals by 2030. Over 300 candidates and elected officials have signed the America’s Goals pledge across all 50 states. The political receptiveness and uptake demonstrates the framework’s ability to foster government adoption of the sustainable development agenda at the state level. The framework emphasizes sustainable development as a U.S. political priority, while the index offers a new data-driven tool for policymakers and civil society to assess and collaborate on sustainable development within and across states—and for the American

public to hold them accountable to progress. Like the SDGs, America's Goals cross-cutting targets, and a bottom-up emphasis on collaboration, encourage silo-breaking collaborations to deepen networks for sustainable development specifically in the U.S. context.

Breaking down silos for national SDG planning

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It is well recognized that effective and efficient planning for national SDG attainment must recognize the interconnected nature of the SDGs. This entails identifying policies that favorably impact more than one SDG, while minimizing trade-offs in which attainment in one SDG diminishes performance in others. To achieve the SDGs planners and policy makers in different government institutions must stand ready to dispense with siloed decision-making and cooperate for integrated planning.

The 17 SDGs with their 169 associated targets and 230 indicators, however, form a highly complex dynamic system that is an impediment to consensus building and policy design. Recognizing this problem, the Integrated Sustainable Development Goal (iSDG) model has been developed to allow planners, policy makers, or researchers from different disciplines to experiment with policy mixes for SDG attainment (primarily, but not limited to, government budget allocation decisions for SDG investment) and to test SDG outcomes through computer simulation. The model covers all 17 SDGs as well as inter-linkages and feedback loops that connect the SDG sectors. The model is developed using System Dynamics a methodology for simulating complex systems that explicitly models the effects of feedback loops, time lags and nonlinearities over medium to long time horizons. The model features an intuitive user interface so that planning and policy specialists do not have to have in depth training in System Dynamics to use the model. The iSDG is designed to support shared learning and policy design by making it possible for users to recursively run alternative policy scenarios of their own choosing, ideally in a facilitated group setting. In this manner policy makers and planners are encouraged to think and act beyond their traditional silos to seek fully integrated policies for SDG attainment. In addition to SDG status, the model tracks SDG expenditures, meaning that users can compare scenarios on the basis of both SDG performance and cost effectiveness. A unique synergy analysis tool allows users to observe the quantitative impacts of policies across all 17 SDGs and to assess the synergies that emerge from various policy combinations. The iSDG thus offers planners and policy makers from all disciplines an experimental platform and bundle of analytical tools to further consensus building and integrated planning for SDG attainment. Currently the iSDG model is being used to develop integrated national and regional SDG policies in more than a dozen countries in sub-Saharan Africa.

Climate change at the local level: Multi-level governance and climate policy implementation by local governments in Melbourne

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Climate change is a complex, systemic issue challenging the fundamental ways in which societies are governed. Local emissions affect the livelihoods of populations world-wide, requiring multi-leveled coordination of action across formal and informal governance networks. In particular, our cities are a crucial arena for sustainable development, decarbonisation, and adaptation. Cities are significant contributors to global emissions, and home to over half the world's population. However, cities are also drivers of potentially transformative action in the face of climate change, through the dense concentration of knowledge, skills, and resources. Yet, despite the recognised importance of integrated urban climate governance for achieving sustainable development goals, this remains largely aspirational in practice. Consequently, this study investigates the extent to which multi-level governance influences climate policy implementation by local governments in Melbourne. As the local level is broadly acknowledged as the implementation scale "critical to the enactment of global climate goals and the creation of sustainable cities and communities", local government is made central to the research focus within the multi-level governance framework. Drawing on in-depth, semi-structured interviews (n=15) with sustainability professionals in five South Eastern Melbourne municipal authorities, alongside discourse analysis of policy documents across local, state, and federal government levels, this research unpacks the challenges and barriers to climate action at the municipal scale. A triangulated approach combining critical review of the current scholarship, analysis of climate policy frameworks at each formal government level, and qualitative interview data from sustainability experts working in local government allows for fulfillment of the multi-level governance framework, whilst maintaining a focus on the perspectives and experiences of those working toward local climate action. A multi-level approach is essential as this study seeks to understand the power dynamics and institutional processes operating within and between formal government levels. It is anticipated municipalities will face vertical and horizontal policy integration challenges, in addition to the recognised constraints of local jurisdictional funding and skilled resources. Greater understanding of such factors demonstrates the need for an enabling horizontal network in order to foster innovative solutions. Whilst siloed government administration is a well understood challenge for climate policy implementation, recent work highlights municipalities as key players in new governance arrangements working to overcome such institutional barriers. Knowledge of the structures and processes operating within and between formal government levels may contribute to more effective urban climate governance, in turn facilitating further breakdown of siloed government arrangements and mitigation of global climate change. In light of this, the current study characterises strategies for advancing improved climate action in municipal authorities, aiming to contribute to the fulfillment of the sustainable development goals.

Euskadi Basque Country Agenda 2030

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Since the preparatory phase of the Agenda 2030, both the UN and the European Commission, have highlighted the role of sub-State governments in its implementation, due to their capacities, resources and specific knowledge and necessities of their citizens. Each territory has to take up this path considering their own circumstances. This is one of the distinguishing characteristics of the 2030 Agenda, its commitment with the territorial dimension and its adaptation at the regional level.

This is why the Basque Government has taken on the universal challenge and commitment to contribute to the achievement of the 17 SDG.

As Lehendakari (President) Urkullu said, “The new Agenda, offers the Basque Country a unique opportunity to build a future project aligned with the challenges of the global scenario and to “ensure that no one is left behind”. Our commitment is to comply with the SDG in collaboration with all other institutions”.

In this regard, the Basque Country is already taking steps to ensure our ownership and the implementation of the SDGs in its territory:

- Raising-awareness and dissemination: communication campaigns, capacity building workshops to the Basque Government’s staff, elaboration of material and translation to basque language.
- Involvement of representatives from different sectors of the Basque society (business, education, NGOs, academia, etc.) in the discussion of the SDGs. Strengthening partnerships with other global, European and Spanish organizations, institutions, regions and international networks, as a mechanism to share experiences and promote our commitment to the 2030 Agenda. Neither the administration, nor private actors or civil society alone can achieve these goals.
- Alignment among Basque Country’s public policies and the 2030 Agenda.

In 2017, it was adopted the Government Programme, highlighting our commitment with the Basque society for the XI legislature, which consists of four pillars, 15 Goals, 10 axes and 175 commitments, to advance in human sustainable development. Our Country Goals can be grouped into five levels, around the 2030 Agenda five Ps: prosperity, people, planet, peace and partnership. In addition, under a governance model based on transparency, constant evaluation and accountability. The Goals and Targets of the Government Programme are inspired by the 2030 Agenda.

Regardless, the Basque Government wants to go further in the achievement of the Agenda. The Euskadi Basque Country 2030 Agenda, which will have been adopted on this April 11th, reflect the level of alignment and contribution of the different government's sectorial policies, objectives and goals to the 17 SDGs.

Euskadi 2030 Agenda, cover the 2016–2020 government programme, linking the 17 SDGs and a 100 of the 2030 Agenda targets to the commitments adopted by the Basque Country, also through 66 planning instruments, 15 legislative initiatives, and 51 indicators. This will allow us to align our public policies with this universal Agenda. In order to become a relevant global actor and ensure our voice is heard.

The SDG's do not dictate what we have to do, they define a context to help us set out our priorities, taking into account our territorial reality.

General Secretary for Foreign Affairs, Basque Government. Presidency

Filling Africa Development Financing Gap: possible Africa-China-West Trilateral Cooperation

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Much of Africa has entered an era of investment-driven as opposed to aid-driven development. Citing president of Rwanda, Simon (2016) maintains that investment (not aid) delivered sustainable development. To reach sustainable development goals (SDGs), Africa's investment needs are massive. In its 2018 "African Economic Outlook," the African Development Bank recommends a focus on smart and catalytic infrastructure development, but also reveals that Africa's infrastructure requirements run to \$130-170 billion a year with a financing gap in the range \$68–\$108 billion. African countries are now seeking financial resources well beyond foreign aid, which opens up opportunities for possible Africa-China-West Trilateral Cooperation.

During the past ten years, OECD donors, international organizations, and NGOs have made progress on cooperating with China and Africa partners. Often framed as trilateral cooperation, existing activities remain small-scale, with little African ownership. Therefore, how to cooperate with China and African partners effectively and how to ensure that this spurs sustainable economic and social development in Africa are pressing questions.

At bottom remains a recognition that African development and ownership must be the focus of any collaborative activities. It also requires a recognition of the diversity of China's Africa engagement beyond aid. Thus, this paper starts with a detailed analysis of China's aid and investment (ODI and Construction Contracts) to the continent, using MOFCOM and SAIS-CARI data. The author points out common pitfalls in understanding China's development finance in Africa. Then, the author presents a comprehensive, multi-dimensional framework of China's investment-driven development finance model and compares it with the traditional global development model or aid-driven model (Brautigam 2011). Our analysis shows that China's investment-driven model lifts two major constraints of African countries simultaneously: infrastructure and financing.

Most OECD donors observe the absence of Chinese participation in aid coordination mechanisms. However, this absence clearly is due to the narrow development finance definition, as opposed to diverse forms of economic collaboration. The second purpose of this paper is to discuss possible Africa-China-West trilateral cooperation in filling Africa's development financing gap through thoroughly considering comparative advantages of partners, within African development priorities.

Levelling the regional and local sustainability performance through integration of the SDGs

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The experiences from implementing the 17 sustainable development goals (SDGs) from the 2030 Agenda increase day by day at different societal levels and in different parts of the world. The SDGs can contribute to a more proactive and holistic sustainability management through operationalizing and integrating already existing sustainability efforts in international, national, regional and local policies, strategies as well as practice. The SDGs call for integrated solutions and a broad systems perspective. This means that even though the regional and municipal organizations are important actors, the interaction between different stakeholders within the geographic zone as well as with other authorities are important. Wide engagement, mutual learning and having a wide systems perspective are important factors in collaborative processes engaging different types of societal actors in different sectors and organisations. This is complex, and to be able to coordinate the actors' different efforts towards the fulfilment of the goals it is important to develop governance processes that recognize and depart from existing collaboration structures rather than developing new ones, and implementation processes should be integrated into existing structures to avoid risk of fragmentation or sub-optimisation.

Several of the SDGs have clear connections to the regional and local levels and regions and municipalities will be important in the process to fulfil the goals. This study analyses the role of regions and municipalities and how they can interact, as well as incentives and outputs for other actors to engage in the regional and local sustainability process, and what the opportunities and challenges are with local implementation of the SDGs.

The aim of this study is to get an overview of existing early experiences from implementing the SDGs in a regional and local context and to get an understanding of which challenges and opportunities that regions and municipalities have experienced so far. This is done through a desktop study in a literature review on localisation of the SDGs. The empirical part of this study focuses the Swedish context as Sweden has claimed to be a forerunner in implementing the SDGs.

The results indicate that although many Swedish municipalities (70 out of 290) have strategies for SDG implementation, they are still struggling with how to operationalise these strategies. They also feel a weak support and guidance from the national level. Furthermore, already existing local sustainability strategies often differ in time perspective and scope compared to the SDG, which means that there is a risk of parallel processes. On the positive side, the municipalities generally see a new boost and general interest for sustainability issues which could level up their ambitions and actions.

The study concludes in analysis of early regional and local experiences from SDG implementation and how local and regional actors can collaborate in order to have a more coordinated and integrated and thereby efficient approach to the SDGs. This contributes with support and knowledge for effective regional and local SDG processes as well as with knowledge to the national level on how to support the regional and local processes.

National Social Investment program: The potential to achieve the sustainable development goal on zero poverty through the Conditional Cash Transfer program in Nigeria

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The Nigerian government in 2016 rolled out a comprehensive National Social Safety Net Programme (NASSP) as part of its Social Investment Programmes. The expectation is that the poorest and most vulnerable Nigerians will get access to social safety nets by 2021 through a US\$500 million International Development Assistant credit approved in June 2016 by the World Bank Group's Board of Executive Directors. The Nigerian government's contribution is \$1.3 billion of its own budget to NASSP which laid the foundation for the establishment of the country's first national social safety nets system.

To this end, the Federal Government of Nigeria established the National Social Investments Programmes (NSIP) in 2016, to tackle poverty and hunger across the country. The suite of programmes under the NSIP focuses on ensuring a more equitable distribution of resources to vulnerable populations, including children, youth and women. Since 2016, these programmes combined have supported over 4 million beneficiaries across the country. One of the programmes i.e. the Conditional Cash Transfer programme directly supports those within the lowest poverty bracket by improving nutrition, increasing household consumption and supporting the development of human capital through cash benefits to various categories of the poor and vulnerable. The support is conditioned on fulfilling soft and hard co-responsibilities that enable recipients improve their standard of living. This study examines the potential of the Conditional Cash Transfer programme towards achieving the sustainable development goal on poverty reduction, hunger and related social concerns. Strategies for identification of beneficiaries given that Nigeria is a country of over 180 million people are presented, as well as the challenges, and lessons learned so far. This is among the first programmes on the African continent to approach the implementation of the sustainable development goals from a collaborative and holistic perspective given the inter-connected nature of the goals and their implication for development.

Requirements for the regionalization of global sustainability indicator concepts

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Sustainability indicators are among the central pillars of the functional perspective of sustainability management, dealing with the question of how sustainable development can be measured. The formulation of quantified and terminated objectives in the form of indicators is an important instrument for sustainable analysis, political decision-making and the binding effect of a sustainability strategy. Studies on successful sustainability strategies have shown that the good governance criteria of integrated perspective as well as vertical integration and continuous monitoring and evaluation are of particular importance. In the context of good governance criterion of vertical integration the aspect of regionalization and coherence is of special relevance. At the same time, interdependencies and thus composite sustainability indices play a central role in an interlinked view of the sustainability dimensions.

This paper discusses the requirements for the regionalization of global and composite sustainability indicators. The concept of planetary boundaries according to Rockström et al. (2009a, 2009b)* and footprint indicators (ecological, resource-related, etc.) are examined as illustrative examples for the adaptation to the subnational level. The planetary boundaries show the resilience of the earth in nine indicator ranges. Humanity should act within these process limits, since exceeding these limits entails a risk for future generations. The environmental footprint indicators are comprehensive indicators that take into account the environmental impacts of domestic production and consumption.

The state of North Rhine-Westphalia, Germany's most populous region and one of the most important conurbations in Europe, is regarded as a case study. With its high energy and resource intensity and high emissions of industrial greenhouse gases, the state of North Rhine-Westphalia has great potential and at the same time, a great need to make a contribution to sustainable development.

The paper presents the opportunities and limitations of various calculation approaches in the context of the regionalization of global and composite sustainability indicators. The analysis results are summarized in a gradual regionalization concept that can be adopted by other subnational governments, both from a regional and urban area. The results can thus contribute to the (further) development of sustainability strategies at subnational levels of government and contribute to increase the comparability and coherence in a multi-level system.

*Rockström, J. et al. (2009a): Planetary boundaries: exploring the safe operating space for humanity. In: Ecology and Society, Issue 14, No. 2, Article 32

Rockström, J. et al. (2009b): A safe operating space for humanity. In: Nature, Issue 461, No. 7263, p. 472-475

Silos or integrated policy making? An analysis of national institutional approaches to implementing the 2030 Agenda

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Implementing the 2030 Agenda poses new challenges to political institutions and processes. An integrated implementation of the 17 Sustainable Development Goals (SDG) and their 169 targets will require innovative governance approaches at the national and local level in order to exploit synergies and mitigate trade-offs between the SDGs. Against this background, a new strand of research has emerged around the institutional preconditions for integrated SDG implementation. Several assumptions drive this research: Institutional reforms to break down silos in government administration is considered of crucial importance, as well as the adoption of mechanisms to ensure the effective alignment of national and sub-national policy agendas and participatory processes to ensure meaningful and active participation of civil society stakeholders.

However, in many countries, the implementation of policies pertaining to sustainable development continues to be characterized by sectoral approaches and clearly delineated ministerial responsibilities. Furthermore, subnational levels are often excluded from the institutional implementation regimes and the implementation of the 2030 Agenda is perceived as a top-down process whereby the SDGs will passively trickle down to local and regional governments. Similarly, thus far only few countries engage non-state stakeholders along all the stages of sustainable development processes.

Considering that deep institutional transformation will be necessary to coordinate the achievement of the SDGs, it is necessary to gain an understanding about how national governments interpret the call for enhancing policy coherence for sustainable development and which factors drive governments' institutional choices related to the 2030 Agenda process.

To this purpose, the proposed paper analyses the Voluntary National Reviews (VNR) submitted by 65 countries to the UN High Level Political Forum (HLPF) in 2016 and 2017, in conjunction with these countries' political context and institutional frameworks (regime type, form of state organization, cabinet structure etc.). Drawing on the pertinent literature in public administration and public policy, in a first step, the analysis will focus on the different institutional and procedural approaches for SDG implementation brought forward by national governments, including:

The proposed institutional set-up for the horizontal coordination, planning, and monitoring of SDG implementation across sectors and institutions

Institutional mechanisms to ensure effective vertical policy integration in the planning,

implementation, follow-up, and review of the SDGs across different levels of government

The adoption of mechanisms to engage non-state stakeholders in SDG implementation

Institutional efforts to support the alignment of the 2030 Agenda with other national strategies such as national development plans and national sustainable development strategies

In a second step, the analysis will describe identified patterns of relationships between national political-institutional contexts and proposed approaches for SDG implementation and come forward with explanations of the causal relations underlying these patterns.

Multi-stakeholder Partnerships for SDG Implementation at national level

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This paper provides a preliminary review of the international policy and academic literature on multi-stakeholder partnerships (MSPs) for sustainable development. The aim of the paper is to develop an evidence base that can be drawn on for devising best practice recommendations for government-led MSPs which are likely to be important as a tool for implementing the Sustainable Development Goals (SDGs) at national level.

We first trace the origins of the view dominant in UN circles that stakeholder engagement is a prerequisite for sustainable development and delineate two broad channels for engaging stakeholders – public participation in decision making and partnerships for sustainable development. Focusing on partnerships, we outline a variety of definitions and typologies that can be found in the literature and argue that the relevant typology to be used depends on the intended use. Much of this research has focused on identifying lessons learnt and success conditions necessary for MSPs, yet many gaps in our understanding remain. Turning to the UN experience with MSPs, we document the growth of UN-led partnerships for sustainable development (known as Type II partnerships which seek to implement Type I agreements i.e. policy agreements and commitments made between governments). We outline guidelines proposed for their implementation and the development of UN infrastructure to support the MSP approach. We then examine the case of Ireland's Voluntary National Review (VNR) and argue that there appears to be a sizeable knowledge gap on how to design government-led partnerships for SDG implementation at national level.

We conclude by arguing that government-led partnerships with a focus on national SDG implementation, which we call Type III partnerships, have been largely overlooked in UN circles and represent the logical next step in the chain of partnerships for sustainable development that can help to translate the political commitments found in Type I agreements into action. We argue that many of the guidelines developed for Type II partnerships could be applied to Type III partnerships but that more research is needed to devise specific recommendations on how partnerships of this type could be designed and implemented in future.

State of the Environment Reporting framed by the UN SDGs

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The independent Commissioner for Environmental Sustainability in Victoria, Australia designed a process for reporting on the SDGs at a sub-national level through State of the Environment (SoE) reporting. This is the first attempt in Australia to measure the environment against the SDGs framework and ultimately recommend actions to Government to improve social and environmental outcomes. The inclusion of SDG indicators in the Victorian SoE Report is ground breaking.

The project was not only an exercise in improving SoE reporting – it was part of a broader reform agenda to challenge conventional reporting and raise awareness of emerging international best practice. Engagement with decision makers, academia, Government, industry and community leaders prompted a broader understanding of the SDGs and their applications, engaging those involved in a wider story of social and economic development.

Working in this way encouraged a view of the whole and cut across bureaucratic silos. It became clear that a model of reporting was going to be required that went beyond the technical application of a measurement framework and embraced the importance of creating meaningful narratives. This was not easy. Developed in parallel with National processes, the project provided a real opportunity for co-creation and co-design with the stakeholders and data custodians involved

In short, cracking the nut of implementation in government at a sub-national level for environmental reporting.

The Methodology

The project involved a seven-phase process that began with an initial mapping of existing indicators to the SDGs. The resulting segmentation was then interrogated in a Roundtable Discussion with a group of trusted experts, before broader engagement with a diverse range of data-custodians.

A further workshop was conducted with data custodians and broader stakeholders to prioritise candidate indicators, and ultimately establish the final set of indicators for inclusion in the SoE. The workshop focussed on getting people together around a common purpose (SDGs and SoE), meaningful engagement (co-creation, co-design,

co-dissemination of knowledge) and polling to assist in prioritisation (direct engagement).

The use of adaptive management techniques throughout enabled the project to alter direction and incorporate new knowledge as it emerged; creating broad “buy-in” from stakeholders and initiating the development of contemporary approaches that will increase the utility and accessibility of the data.

The initiative is now collecting and collating data against socio-economic indicators and the SDGs for the first time and findings will be presented in the Victorian 2018 State of the Environment Report to be tabled in Parliament by March 2019. The report and the Commissioner’s recommendations will influence the Government’s policy and management settings. The Government must respond to the recommendations within 12 months.

Hence the outcome delivers much more than a narrative. This project is about introducing a pathway to measure Victoria’s environment – its state and derived benefits - through socio-economic indicators mapped against the SDGs framework - thereby hard-wiring change in the system of government and gradually impacting society.

Towards Understanding the Level of Communication between Water-Energy-Food Government Organizations in San Antonio

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San Antonio has one of the most rapidly growing populations of all cities in the United States. The city is also witnessing the rapid growth of its energy development in the neighboring Eagle Ford Shale play, and increasing agricultural activity in the areas surrounding the city. These growing municipal, energy, and agricultural sectors compete over common water, land, and financial resources in the area. Despite the tight interconnectedness between resource challenges, we know little about the levels of communication and coordination between San Antonio officials that make decisions that affect the management of water, energy, and food systems. Without sufficient communication, the region's future could be subject to competing resource allocation strategies and policies that result in unintended negative consequences. This paper identifies the current levels of communication between San Antonio's water officials and the officials at energy, food, and other water institutions in the San Antonio Region. Different factors that may impact and improve that level of communication are considered. The overarching research questions in this paper are: "What level of communication exists among water different institutions, and between water, energy, and food institutions in San Antonio?" and "What role could the awareness to future water challenges, and participation in engagement activities, play in improving those levels of communication? In other words, do water, energy, and food institutions really operate within "silos" in San Antonio? A questionnaire, titled "Water Management in San Antonio," was mailed to 289 public water officials in San Antonio Region, as defined by Texas water planning regions L and K. We conclude, based on 101 survey responses, that the frequency of communication between and among water officials at different water and planning organizations is higher among those who reported participating in stakeholder engagement activities. We also conclude that there is not enough evidence to suggest that attending stakeholder engagement activities improves the frequency of communication of water players with food and energy players. On the role of concern regarding future water availability in the region, there is not enough evidence to allow us to conclude that people at water institutions in San Antonio would have a higher frequency of communication with other water, energy, and food players, as a result of being more concerned about future water availability. The creation of an institutional policy environment that incentivizes increased levels of communication, coordination, and cooperation is needed. This could be partially achieved through mandating integrative planning workshops and forums that bring representatives of different resource domains to the same table to engage in dialogue around differing viewpoints. Such activity would facilitate better understanding the reality of the resource challenges

facing the region and of the innovative cross-disciplinary and cross-institutional solutions needed to ensure long term sustainability.

Which silos first? Analysing the Italian case through the study of Tuscany Region's government

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This paper proposes a public policies analysis of the Tuscany region's government (Italy) during the current legislature with the aims of (1) selecting the stronger silos, at the regional level, preventing the achievement of the SDGs and (2) proposing a possible solution of multilevel governance in order to comply with policy coherence in elaborating a national strategy for the Sustainable Development. This bottom up approach (from local to national level) wants to launch the idea that concrete initiatives can start from territories and local administrations, breaking down silos-thinking, thanks to the involvement of different departments in local projects, with the allocation of funds in an inter-sectorial perspective. As a matter of fact, this paper first proposes a framework for the matching of policies with SDGs based on the methodology of the Manifesto Project [Volkens, A. et Al. (2017): The Manifesto Data Collection. Manifesto Project (MRG/CMP/MARPOR)] and second identifies the "strong silos" to be broken on the basis of the low level of department differentiation in the allocation of funds. More precisely, we aim to investigate whether a relationship between the local government's intentions as stated in the manifestos and its actual commitment over spending programs exists. Evidently, the policy agenda is not only about what is being discussed by political actors and their electoral purposes, but also about what they actually do once in office, where a number of institutional factors and political dynamics intervene. In the second part the paper focuses on the relationships between the regional and the national level assessing coherence with the national strategy for the Sustainable Development as described in the Voluntary National Review presented by the Italian Government at the High Level Political Forum 2017. Finally, through a survey conducted among the members of the cabinet and the council of the Tuscany Region, we test how a new model of governance based on hybrid committees within the regional policy making process [Patrick Paul Walsh. "Implementing the UN 2030 Sustainable Development Agenda in Ireland: A Case for Hybrid Sustainable Development Parliamentary Committees." *Irish Studies in International Affairs* 27 (2016)] could be possible and relevant for implementing the Agenda 2030.

Breaking Down Silos in Universities: Imaginative Interdisciplinary Approaches to Sustainable Development Research, Education, and Practice

Circus: Experiential Education in Circular Economy

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What is Circular Economy? That seems to be the question that lingers across business schools, suitability and environmental programs, and a word that keeps popping up in the corporate space. Various definitions exist, from Ellen MacArthur's look beyond the current "take, make and dispose" view, to cradle-to-cradle initiatives and B-corporation labels. However, the question remains – how do we teach it? More importantly, how do we get students who move on to become leaders in the corporate, government, and NGOs spaces to practice it?

According to Circle-Economy, it is important to find a common language – a definition- and address the seven elements: prioritize regenerative resources, preserve and extend what is already made, use waste as a resource, rethink the business model, design for the future, incorporate digital technology, and collaborate to create joint value. In order to translate those elements into classroom learning a program with similar features and an experiential learning platform will provide development in areas of research, education, and practice.

This is a case study on Circus - The Circular Economy Project at Saïd Business School, University of Oxford. This program is a new and disruptive multi-university platform to strategically seed, support and scale innovation and entrepreneurial energy that can accelerate a deeply needed system change - the transition to a circular economy.

This platform is designed to provide students, entrepreneurs (those building new businesses) and systempreneurs (those focused on innovating at a systems level by building new policies, new strategies, new models) with access to an integrated package of knowledge, networks, business building tools, and financial and non-financial support. It channels student, alumni, business and practitioner energy, activate academic research, coordinate innovation infrastructure, and mobilize networks to bring together the best thinkers and doers to this project.

The integrative and innovative approach to learning-by-doing in a circular economy is the future of integration and implementation. This study focuses on the launching of the Circus in the interdisciplinary, cross-departmental approach with expansion to a multi-university platform. The study presents a collection of survey data,

reflections, and interviews with various stakeholders in the academic and practitioner spaces. The study provides frameworks and recommendations for implementation and integration of circular economy topics in academia and outlooks for future growth of the Circus project.

Developing the Sustainability Faculty Learning Community at SUNY New Paltz

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How to address the needs of faculty who want to bring sustainable development content to their classrooms but aren't sure how to do it? How to meet the demand of Millennials and Generation Z who are looking for sustainable development classes and majors as they shop for colleges? How to create a program on campus that promotes interdisciplinary work among faculty and staff and is cost-effective and palatable to the higher-ups who require strong ROI of any new initiative?

Working off the Piedmont Project model established at Emory University, a few dedicated faculty members at SUNY New Paltz created just this sort of program—the Sustainability Faculty Learning Community—which now in its second year has found both success and growing popularity on campus.

Faculty and teaching staff members of all levels apply to participate in the year-long program (becoming campus-recognized Sustainability Faculty Fellows in the process) during which they receive basic training in sustainable development and introductions to other teachers from across departments and schools with similar interests.

Fellows are required to produce at least one revised syllabus for a regularly-taught course that is newly-infused with sustainability content. The highlight of the program is a 2-day winter retreat during which participants undergo concentrated training in sustainable development issues, reflect on their own course development with respect to sustainability (as defined by the U.N. SDGs), and meet and develop relationships with local community and organization leaders relevant to the cause.

There is a small remuneration for participants who complete the fellowship, and in some cases, fellows have created entirely new courses based on newly-acquired sustainable development content. Interdisciplinary collaborations on developing team-taught courses are also encouraged as ideas cross-germinate during the fellowship.

This presentation will describe the SFLC development process from the inception of the idea in 2015, to delivering the proposal to the various organs on campus who needed to sign off on its creation (Sustainability Committee, Provost's Office), to recruiting and engaging participants and effective assessment after the completion of each year's activities. Results with respect to overall effectiveness of the program and benefits yielded as reported by fellows will be discussed, as well as future considerations regarding how to improve the community activities and leverage the network-effects of the growing body of fellows, past and present.

Conclusions include effective strategies in proposing and creating a similar program on any college campus, in particular at institutions that do not have much money to spend. Approached intelligently, this program requires neither a large institutional investment

nor does it create a body that prescribes any specific teaching content—it simply leverages demand that is already present on campus but that has not often been tapped.

Few opportunities exist for faculty to escape their silos, and in fact, most traditional academic incentives are designed to keep instructors well within the boundaries of their respective disciplines. Systems thinking informs us that the most pressing problems demand interdisciplinary collaboration, and the Sustainability Faculty Learning Community is one cost-effective way to provide opportunities for such collective work on campus.

Earth Hacks: A University Hackathon to Generate Interdisciplinary Solutions to Pressing Environmental Problems

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Hackathons, time-intensive events focused on solving real-world problems, are becoming an increasingly popular approach to rapidly generate solutions to various problems and promote creativity and innovation. Their prevalence both on college campuses and within corporate settings is increasing, with variation in timeframes and participants. While traditional hackathons began in software engineering, in recent years the scope of subjects covered by hackathons has started to increase. Even with the expansion of hackathons, participants still remain primarily those within or entering the field of software engineering. With some prospective thought and planning, the hackathon concept can be applied to a diversity of problem areas and concurrently attract participation from individuals of diverse backgrounds and expertise to create interdisciplinary solutions to problems from a variety of fields. Here we present a case study of the process of designing and implementing Earth Hacks, the first environmental hackathon in the state of Virginia, dedicated to generating interdisciplinary solutions to pressing environmental problems. We discuss the ideation process and organizational structure of Earth Hacks, as well as strategies to make the hackathon itself an environmentally friendly event. We also detail the multidisciplinary approach we integrated into Earth Hacks from the onset of the planning and ideation process, as well as how we structured judging criteria to be able to take into account the multidisciplinary nature of the projects. We also share some lessons learned after successful completion of the first Earth Hacks event. Along with the case study, initial thoughts on establishing an organization and/or set of instructions in order to be able to have Earth Hacks events at other universities across the world is presented. We believe that hackathons can be a powerful tool to advance the Sustainable Development Goals and hope to be able to create a global community of student leaders dedicated to breaking down barriers in tech and applying their skills to solving environmental problems.

Educational Partnerships for Innovation in Communities

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Universities are often viewed as ivory towers and fountains of knowledge tasked with producing professionals capable of applying themselves to solve societies' concerns. However, a number of teaching approaches are siloed and focus on dissemination of theories lacking in real world opportunities. As a result, new entrants to professions lack the necessary skills and confidence to apply the knowledge they have acquired. On the other hand, local governments who are key partners in realizing development goals are often facing bureaucracies, lack of resources, necessary capacities and innovation needed to solve emerging sustainability concerns. As an attempt to cure this state of affairs, the Educational Partnerships for Innovation in Communities, pioneered at the University of Oregon has quickly started to spread across the globe with pilots in Nairobi, Lusaka and Durban. The aim of the model is to create a lasting partnership between universities and local governments in an attempt to address a community's most pressing sustainability concerns. Existing university courses across different faculties are matched to current concerns presented by the local government. Students, with the help of faculty are then given a chance to work on solutions to these problems as part of assessed course work. The result is a multidisciplinary approach where different academic disciplines engage in a specific issue over an academic calendar year, students experience real world learning opportunities and local governments benefit from refreshing innovative ideas in a cost-effective manner. This paper seeks to explore the lessons that have been learnt so far with the EPIC model, document the experiences of the ongoing pilot programs with an aim of developing a concise guide for universities and local governments interested in promoting partnerships and innovative learning approaches .

Higher education response to the energy sustainable development goal: Case of University of South Africa

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As the world continues moving along the sustainable path and upscaling technologies towards efficient and alternative technologies in managing energy and carbon footprints, higher education institutions have joined the band wagon. This paper emerges from a lived experience of an academic who put in place a roadmap for addressing environment and sustainability matters (inclusive of energy efficiency, alternative energy and carbon management) within a university set up in response to the United Nations 2030 Agenda for Sustainable Development. Specifically, the paper narrows down to Sustainable Development Goal 7 dealing with ensuring access to affordable, reliable, sustainable and modern energy for all. Through action research and the case study approach, the paper documents procedures and processes leading to the finalisation and subsequent implementation of the University of South Africa (Unisa) Energy and Carbon Policy developed by the author in its totality. Three cycles informed by the action research model and philosophy emerged namely: the development and approval by management of a Unisa roadmap that proposed to have the university address environment and sustainability matters along the lines of progressive corporates entitled, Green Economy and Sustainability Engagement Model (Cycle 1: 2013-2014); seeking outside partnerships and funding to develop the Unisa Energy Master Plan as well as local development of the Unisa Energy and Carbon Policy (Cycle 2: 2015-16) and finally, ongoing projects implementation and scaling up that includes energy efficiency and solar installations (Cycle 3: 2017 to date). As indicated herein, the paper presents details of the Unisa Energy Master Plan as well as the Unisa Energy and Carbon Policy that embrace eight focus areas, among them: energy management system requirement, energy planning, energy efficiency, renewable energy, carbon management, green procurement as well as competence and training. In terms of energy efficiency, Unisa has initiated projects to install individual energy meters to all its buildings with the view to continuously monitor, report and verify its energy use and carbon management. The author recommends the Unisa model to other higher education institutions in South Africa and beyond. Unisa is a dedicated and comprehensive Open Distance e-Learning institution with over 4,000 employees and hosting in access of 400,000 students annually. Most of Unisa's brick and motor infrastructure is located in Pretoria, Johannesburg and other major cities across South Africa.

Integrated Approach for Sustainability: a campus as a living laboratory experience

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The EDS Institute is developing a new integrated approach aiming to facilitate collaborations between different disciplines and help to integrate practical skills and key competences needed to solve concrete development problems and to foster the transition to a closed and cyclic system. The EDS integrated approach builds on the most recent knowledge mobilization frameworks in the field: the concept of planetary boundaries (Rockström et al., 2009), the concept of “social floor” (Raworth et al., 2012), the Sustainable Development Goals (UN, 2015), and Key competencies in sustainability, KCS (Wiek et al. 2011).

Despite the broad consensus and robustness of the scientific knowledge on which these three frameworks are based, they are not sufficiently known beyond the multilateral agencies, development cooperation and environmental sciences. In order to facilitate their diffusion and their appropriation by all the disciplines and actors involved, the interdisciplinary and inter-scalar approach EDS integrates these three frameworks in a diagram as a tool that will be presented and explained in this communication.

The proposed approach illustrates and acknowledges that the complexity of interactions between SDGs is the main challenge of the 2030 Program. Various international research teams are currently studying the interactions between the different SDGs and their impacts on policy research and analysis to support a coherent program implementation strategy (Nilsson et al., ICSU, 2016, Dodds and Bartam, 2016). While the targets of some SDGs are fully compatible and even have a multiplier effect, others may be incompatible and therefore force the identification of innovative solutions to solve real problems related to governance, development and the environment. From this point of view, each of the elements can be exploited and analyzed in a variety of training and research activities.

This approach allows for training activities in which participants are invited to identify links between existing initiatives and the SDGs, improve their initiatives by seeking to maximize their impacts across the framework and formulate new initiatives and projects. For the first year of implementation of this approach (2016-2017), researchers and student members of the Institute, staff university members, governmental organizations as well as representatives of civil society, have participated in a series of major co creation activities. They diagnosed the campus situation and imagined innovating solutions for a “Campus as a living laboratory” through operations, teaching, research, and community services. In the second year (2017-2018), the experience has been

systematized and partnerships have been developed in order to extend the approach to other scales of intervention. The approach has been tested in another cultural context, that of Senegal, which validates its transferability and usefulness as a tool for raising awareness and ownership of the SDGs. This communication presents the results of the first year of implementation of the integrated approach and the main lines of multidisciplinary research and collaborations that are emerging from this experience.

References

United Nations, Sustainable development goals,
<http://www.un.org/sustainabledevelopment/sustainable-development-goals/>

Raworth, K. 2012. A safe and just space for humanity, Oxfam Discussion Paper, February 2012

Rockstrom, J. et al. 2009. Planetary boundaries: exploring the safe operating space for humanity. *Ecology and Society* 14(2): 32. [online]
URL:<http://www.ecologyandsociety.org/vol14/iss2/art32/>.

Wiek, A., Withycombe, L. & Redman, Key competencies in sustainability: a reference framework for academic program development. *C.L. Sustain Sci* (2011) 6: 203.

Wiek, A., Kay, B. 2015. "Learning while transforming: solution-oriented learning for urban sustainability in Phoenix, Arizona", *Current opinion in environmental sustainability*, New-York : Elsevier 16:29–36, [online] www.sciencedirect.com

Integrating Core Sustainability Meta-Competencies and SDGs Across the Silos in Curriculum and Professional Development

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Debra Rowe, president of the U.S. Partnership for Education for Sustainable Development, is known to challenge us to go beyond educating students with conceptual knowledge; to develop student capacities to become agents for systemic change. This means putting into the classroom the subject of values, attitudes, behavior, and ethics. Elly Engle and Peter Buckland at Penn State University Sustainability Institute have proposed five sustainability meta-competencies for sustainability: system thinking, temporal thinking, interpersonal literacy, ethical literacy and creativity/imagination. For the practitioner, this means experimenting and assessing different ways to integrate these proposed meta-competencies into curriculum. This presentation provides examples using guided inquiry with peer to peer learning with team wiki projects, case studies, SDGs, and reflection essays using Digication ePortfolio, Blackboard and self-assessment exercises and instruments. We present some interesting comparisons of the New Ecological Paradigm – Revised instrument metrics and the Sulitest Sustainability Literacy self-assessment before and after the course for classes and individuals. Limitations of these instruments and alternative quantitative and qualitative instruments will be discussed. A faculty development workshop template for sustainability across the curriculum with the sustainability meta-competencies and SDGs has been developed from this experience and an Association for the Advancement of Sustainability and Higher Education (AASHE) inter- and multi-disciplinary bioregion workshop template. Experience with a new pilot sustainability and SDG literacy workshop template for higher education non-faculty staff professional development will also be presented for discussion and to exchange experience or participants with other initiatives.

Paul Bartlett has a background in environmental research, pollution prevention, and working with contaminated communities. He worked under Barry Commoner, a pioneering ecological scientist-activist for ten years at his research institute. He has served on United Nation Task Forces for the Convention of Long Range Transport of Air Pollutants (LRTAP) and Arctic Monitoring Assessment Program (AMAP) expert working groups. He is presently engaged in collaborative research on chemicals of emerging concern and educational epistemic cognition of ecosystem science.

Interdisciplinary Approaches and Action: Teaching and Transversalizing Sustainability at The Centre for International Programs and Sustainability Studies, Universidad VERITAS, Costa Rica.

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Universities can be very silo-ed and stiff spaces, academically and systemically speaking. Departments and teaching fields are fragmented, academics compete, and administrative and managerial hierarchies are culturally and institutionally embedded. All of these states are obstacles in the way of the appropriate and much needed action to combat the current environmental, cultural, and economic challenges. Universities are at the forefront of sustainability and should be preparing students to confront development needs and prepare the skills and knowledge to shift toward sustainable development, but traditional institutions and persistent internal practices do not match the shape, style and functions of those being called for by sustainability, those needed to change course. The opportunities stimulated in the search for sustainability offer a chance to be creative, practice fluidity, explore the fusion of fields. Interdisciplinary approaches, teams and sustainability tools are being called for. Among the few emerging tools for sustainability is the tool of transversalizing which serves well within this multi-crisis context where multi-disciplinary approaches are a must.

Transversalizing can bring a whole institution and a variety of teams under a shared umbrella of sustainability and united in its overarching challenges. The idea of transversalizing is still rather new, concepts and practices remain rather slippery and abstract. Educators for sustainability are struggling to find examples of successful transversalizing of sustainability through processes, spaces and knowledge, however some successful and worthy examples are coming to the fore. This paper, along with reinforcing the definition of transversalizing for sustainability, will discuss the advancing examples of interdisciplinary approaches and their adoption of transversalizing techniques. The discussion of the University Veritas (.V) in Costa Rica and its recent experiences in opening spaces for interdisciplinary action and transversalizing sustainability will highlight emerging successes and limitations. Interdisciplinary and multidisciplinary approaches have been adopted in the work of 1) the Centre of International Programs and Sustainability Studies (CPIES), 2) the BioCentro multidisciplinary team designing an academic campus for sustainability studies and participatory approaches, 3) the BioMol team searching for interdisciplinary and participatory research platforms, 4) the application of the 7-SesALLs transversalizing tool stimulating interdisciplinary initiatives, filling gaps in sustainability knowledge and seeking spaces for creative action for ALL, and lastly 5) the experiences of the multidisciplinary team leading the design of the new Bachelors in Management for Sustainability. The CPIES has been at the heart of this shift, striving for sustainability throughout its work, transversalizing through its courses, encouraging teams to evolve and extending its mission throughout the university. The driving philosophy behind the emerging strength and confidence in experimenting with interdisciplinary approaches for sustainability at the CPIES department is that the SDGs specifically call for action, and we all have a right and responsibility to get involved. CPIES is clear that universities

have a lead role in providing platforms, and that jointly as educators and administrators, as a university community, we should not shy from this challenge. Celebrating their story will hopefully help consolidate their inspiring and pioneering work in interdisciplinary initiatives transversalizing for sustainability.

Laudato Si As a Framework for Sustainability Education

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Arguably, the 17 Sustainable Development Goals (SDGs) represent a dramatically different way of examining, defining and approaching economic and social development. They are, if anything, an emphatic statement that the idea of economic development and progress needs to encompass the effects each will have on all aspects of society, the environment, and even business. Furthermore, because the goals themselves are highly interconnected, the interconnectedness of especially the societal and environmental (and even business) effects the goals will engender also need to be considered. Few will argue that the study of sustainability generally recognizes that the issues involved are complex and interconnected, however my contention is that the way sustainability is taught does not approach it as an interconnected whole. Rather, it tends to address just the specific components of sustainability, such as climate change, poverty, gender equality, etc. Even colleges and universities which have taught sustainability for quite some time are struggling with how best to introduce interconnectedness into their sustainability curricula. One significant reason for this is that the disciplines related to sustainability have tended to be taught in silos, and that those who teach in the disciplines just have not been trained to think in an interconnected way.

What is needed, therefore, is something that can help break down the silos and this discipline-specific way of thinking and be used as a framework to embrace the interconnectedness inherent in sustainability. But just embracing interconnectedness is not enough, because if one agrees that achieving the SDGs will result in a different way of assessing or thinking about economic and social development, then how sustainability is taught has to keep that different way of assessing and thinking in mind. So this new framework also will have to be compatible with that new way of thinking. My argument is that such a framework exists in Pope Francis' Laudato Si, which describes the pursuit of sustainability in the context of its social, environmental and business elements, and in essence outlines a better, more equitable, peaceful and sustainable world. My paper will examine how components of Laudato Si can be used to create a sustainability education framework, the outcome of which will be the creation of a truly interdisciplinary, results-oriented curriculum.

Leveraging a new generation committed with impactful interdisciplinary projects for the Sustainable Development Goals

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Newton has the record of being an University community engaged. Students practices from the Health Institute, Law and Business Institute and Engineering Institute are for providing specific services for local poor communities. In 2016, the scenario was of a solid routine of practice, disconnected with local needs, serving more the university interests than society challenges. This was reflecting in our 400 professors, used to the same teaching and projects at same courses. The 11,000 students would rather have a deep professional identity than a cross-disciplinary approach to professional training. Newton needed then a new drive to reframe the university role in leveraging the next generation engaged in solving today's biggest challenges.

Based on a fundamental drive of fostering in our students a global awareness and a sense of local impact, the transdisciplinary approach of sustainable development became the link of all institutes, areas of knowledge and programs.

Newton became the first university in Brazil committed with the UN Sustainable Development Goals with implemented strategies in three aspects:

- 1) Fostering the agenda culture among students, professors and staff;
- 2) Creating partnerships with the city hall, SDSN local chapter, NGOs and industries to support the implementation of the agenda;
- 3) Impacting local communities with interdisciplinary projects.

The implementation process started with a cocreation with professors and staff, leading to the university board and student engagement. The achievements so far are:

- 1) All teaching, research and outreach programs and projects, from 2017, were committed with at least one of the Sustainable Development Goals and with one of the challenges described at the Belo Horizonte Strategic Plan, the city hall plan of action for 2030;
- 2) 48 scientific researches were funded by the University based on the new agenda;
- 3) Over than 135,000 people were impacted by the outreach programs in the city in 2017;
- 4) 14 Innovation Centers became interdisciplinary projects platforms;
- 5) Students and professors engagement in outside the classroom projects doubled in one year of the implementation, reaching 8,000 hours of activities;

- 6) First international awards for interdisciplinary projects: Stanford Design Challenge for Longevity and FAB13 international Fab Lab Conference, when Brazil for the first time in thirteen years presented projects;
- 7) Newton became the first partner of the City Hall in implementing the city strategic projects for 2021.

Mars and SDG: applying SDG to Mars research station Habitat Marte

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How Sustainable Development Goals (SDG) can be inspirational to universities and society reflect about the creation of self-sustainable habitats? It is possible affirm that sustainability is a key-issue in self-sustainable habitats in operation in space or Mars, or just in Earth. This research developed by the Space Science Mission 2 (January, 2018) considers how the operation of Habitat Marte can achieve the SDG.

Based in Brazil, the Mars analog research station Habitat Marte operates in the city of Caiçara do Rio do Vento, a rural area in Northeast semiarid region, activities of Science, Space, Sustainability, Technology, Engineering, Math (S3TEM). Because of the water scarcity, the Brazilian Mars research station operates one confined mission by month when happens Intravehicular Activities (IVA) and Extravehicular Activities (EVA), occurring different kinds of research and operations. Habitat Marte born as a project from the Industrial Engineering Department of Universidade Federal do Rio Grande do Norte(UFRN) accepting graduate and post-graduate students from Mechanical Engineering, Agronomy, Biotechnology, Physics and Geology.

The semiarid of Brazil has been affected by 8 years severe droughts related to climate change effects. The Habitat Marte can be an unique opportunity to evaluates how the development of self-sustainable habitats concepts can be applied in arid and semiarid environments. Related to the operation of some Sustainable Development Goals, some actions can be mentioned: Goal 1: lectures and trainings with Habitat Marte alumni to support communities fighting against poverty, highlighting social technologies that had been developed and in operation at the research station. Goal 2: Operates the BioHabitat greenhouse to develop new sustainable agriculture skills and be responsible with meals consumption. Goal 3: Operation of safety protocol, stimulus of physical exercises and healthy meals. Goal 4: Invite schools, universities, educators, students and society in general to visit the Habitat Marte, in order to arouse interest in science and technology; operate post-simulation lectures to present the results; share results and congress. Goal 5: Girls empowerment through science and showing opportunities of scientific careers. Goal 6: communication and Education about save water. Goal 7: use and installation of solar panels. Goal 8: organize debates about how knowledge about space and Mars can promote good scientific, work and employment opportunities. Goal 9: Identify how the research done in Habitat Mars can generate innovations and new products and evaluate with the participation of the other members of the mission, opportunities to create new products. Goal 10: Enable participation in international meetings to present papers and exchange experiences. Goal 11: Encourage research results on social technologies, organic agriculture and water management to be applied in cities and communities. Goal 14: zero tolerance for stream pollution. Goal 15: waste recycling; Goal 16: it is crucial for the future of Habitat Marte establish partnerships with national and international institutions to search new areas of research and development.

Considering the innovative approach of Habitat Marte to promote Science, Space, Sustainability, Technology, Engineering, Math (S3TEM) it is possible identify a useful approach to build new competencies associated with Sustainable Development Research, Education, and Practice.

Moving beyond the rhetoric: on interdisciplinary research practices for Sustainable Development Goals

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Background -- In the hope that combining knowledge and methods from different disciplines could result in strikingly new perspectives and greater scientific advances, interdisciplinarity appears on the science policy agenda of several funding agencies, governments and universities. Sustainable Development Goals (SDGs) are no exception, as interdisciplinary approaches are being favoured to scale up research for a more sustainable world. Building on the Millennium Development Goals (MDGs) and on the principle of “leaving no one behind”, the SDGs were adopted in 2015 and shall be met in 2030; a fast approaching deadline. Researchers and universities are at the core of the strategy to meet the SDGs and the need for these actors to cross disciplinary boundaries is perceived as crucial for tackling societal challenges, especially where natural and social sciences are intermeshed. No one discipline can capture the depth and complexity of research objects associated with the SDGs. Therein lies a call for interdisciplinarity. Beyond the rhetoric, what about the reality as our academic institutions – culturally and structurally – do not encourage overlap between disparate fields? Whereas articles about the importance of interdisciplinarity abound, empirical evidence substantiating the value of its practices remains limited, at best conflicting. This is partly due to the complex nature and the polysemy of the concept of interdisciplinarity, which remains difficult to define and measure.

Research question -- What is the current portrait of research on the MDGs/SDGs and the level of interdisciplinarity associated with it in comparison to research worldwide?

Methods -- We address this challenge by looking back at research with bibliometric analyses. Querying the Web of Science Core Collection of Clarivate Analytics from 2000 to 2017 (20,697,834 scientific articles), we retrieved 4,134 scientific articles mentioning the Millennium/Sustainable Development Goals. Each article is assigned to one of 14 disciplines and one of 143 specialties of the National Science Foundation

classification. We used the state-of-the-art diversity indicator Leinster-Cobbold that reflects the three attributes of interdisciplinarity: variety, balance and disparity.

Results -- Our results suggest that research associated with the MDGs/SDGs can be anchored in a more interdisciplinary 'references-to-outside-disciplines' basis (the fraction of paper references pointing to work in other disciplines), especially in biology and biomedical sciences, chemistry, physics and mathematics, earth and space, in comparison to the research worldwide. By mapping cocitations and collaboration networks, the results illustrate further how the various actors at the discipline and the institution levels are brought together and do actually attempt to break down silos to advance research for a more sustainable world.

Conclusions -- While the polarization of disciplinarity versus interdisciplinarity continues to fuel the rhetoric, this study sheds light on the reality of a vibrant interdisciplinary web of scholarship. By helping universities, researchers and policy makers understand and appreciate the panorama and the current dynamics of SDGs research, this preliminary analysis and the examples provided may offer insights on practical solutions and actions to move forward on the 2030 Agenda.

Keywords -- Interdisciplinarity; Sustainable Development Goals; universities; interdisciplinary research; bibliometrics; diversity indicator; 2030 Agenda.

New approaches to implement Sustainability Science – a Case of University of Helsinki

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Universities are experiencing a growing trend to redefine their strategies and organizations along the lines of sustainability. University of Helsinki is one of those universities committed to sustainability. However, the process of building the structures for sustainability research and education is a continuous process and requires breaking down the existing disciplinary silos. In our presentation, we will demonstrate that the sustainability transition in the University of Helsinki, was made possible by several internal and external processes related to research profiling and educational reforms, which created windows of opportunities for the emergence of sustainability science.

As a result of this process, sustainability science, as a new discipline and a transdisciplinary approach is being increasingly foundational in the practices of research and education. In the field of education this is manifested through the first master's program in sustainability science in Finland - MSc Programme in Environmental Change and Global Sustainability was initiated in Sept 2017, and already next year it was the most popular program in the international application round. In the field of research, the Helsinki Institute of Sustainability Science, HELSUS was established as a joint unit of six faculties – creating a completely new institutional structure to operate across the faculties and disciplines. This was facilitated by a massive accelerator grant that enabled the recruitment of ten totally new professors in the field of sustainability science for four years, however, with the university committing to full tenures by re-directing resources from non-prioritized fields to sustainability science. In order to enhance the societal impact of the research conducted at the university, structured policy dialogues were initiated with the Prime Minister's office, including regular monthly sessions that feed directly to Finland's process of implementation of Sustainable Development Goals. In the field of sustainability operations, the UHEL is committed to sustainability-led changes. UHEL's pathway to sustainable campuses is highlighted by means of two main projects: renovation of an old office building into an informal space of dialogue, brainstorming, innovation, and experimentation (Think Corner), and as a step towards a decreased carbon footprint, the erection of a solar power plant. Furthermore, actions have been taken to promote bicycling, re-cycling as well as improve to heat recovery of the electric substations.

We will show that all these processes are interconnected and conclude that both, the positive push of external funding and strong internal support for transition, contributed to cross-disciplinary sustainability transition in the university, which has an established

tradition of rigid faculty lines. This transition resulted in a structure that enables university to take an active role in solving the sustainability problems and implement the SGDs together with the society.

SDG in universities: the study of UFRN in Brazil

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Universidade Federal of Rio Grande do Norte (UFRN) is an institution of 43,000 students, 5,500 professors and more than 200 courses. Was decided during 2018, by the president Ângela Paiva, the adoption of Sustainable Development Goals (SDG). In Brazil, is very important one university lead the process of adoption of the SDG, sharing examples and presenting strategies to guide other universities to follow the same path. The UFRN can be the university leader of group to invite other academic institutions to adopt SDG. The UFRN is part of a league: ANDIFES. In this group will be also encouraged other universities to adopt SDG. Brazil presents more than 2,400 institutions of higher education. The universities can be seen an important environment to research and establish strategies to promote the SDG. It is also very important the participation of students in the process of implementation of the Agenda 2030. This research was done by post-graduate students invited to reflect about actions related to SDG possible to be done by UFRN. A committee evaluated the following proposals of SDG actions to UFRN: SDG 1: Empower poor communities to pursue power in decision process, plan and implement activities to combat poverty. SDG 2: Promotes actions to reduce food waste in university restaurant, stimulates family farmers and urban farming as food suppliers. SDG 3: Encourages physical activities for academic community, better communicate the actions to support health and adopt new healthy restaurant menus with balanced meals. SDG 4: promotes and manage the graduate and post-graduate courses considering the improvement in terms of education quality. SDG 5: Stimulates the equal treatment between all member of the academic community. SDG 6 and 14: Continues the operation of Sewage treatment plant and invest in new clean technologies to reuse. SDG 7: program of energy efficiency and a program to use renewable energy. SDG 8: keep a close contact with the market to identify better jobs opportunities to UFRN students. SDG 9: Promotes innovation and technology transfer to the market. SDG 10: Establish a fair treatment between all UFRN students and support popular movements. SDG 11 and 12: Promote more debate and research about sustainable cities and search to apply sustainable guidelines to UFRN campuses. SDG 13: Develops a manual of best practices. SDG 15: Improvement of recycling activities. SDG 16: Engage the academic community with the decision process. SDG 17: Develop Triple Helix strategies strengthening ties integrating university, economy and government. In this research was possible identify a useful approach to build new competencies associated with Sustainable Development Research, Education, and

Practice in Brazilian universities. Many considerations related to SDG can be applied to international and global academic institutions.

Sustainable innovation in the digital transition and disruptive technologies age

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Nowadays, global sustainability is the pressing need to address. It is becoming a definite and urgent priority in different government's socioeconomic strategies and development plans. The crucial challenge of sustainability though is the reconciliation between the socio-economic development goals and the awareness of the importance of protecting ecological planetary boundaries. This, therefore, demands an understanding of the complex and dynamic interactions between natural, economic and human systems, which are equally important and interdependent.

Universal problems such as climate change, energy, poverty, emerging diseases, often affect and involve several highly interconnected components in a dynamic and uncertain environment, requiring coherent approaches able to tackle complex problems under multi-vision reflections and to provide cross disciplines tools and models. Thus, new effective approaches should be undertaken where silos between disciplines, sectors, academia, industry, and society are broken.

This paper highlights a holistic approach to sustainability innovation, drawing principles from a large reflection towards a renewal for the next six years of our Quebec Strategic Network, an interdisciplinary research group across Quebec and Canada, involving researchers in health, humanities, sciences, and engineering. It contributes a novel research model, which aims to define a transdisciplinary-centered sustainable innovation. It leverages on recent technological advances and takes into account the current transitions and significant national and global trends in sustainable and economic development. The primary objective is to set up a key mechanism and concepts, such as; collective intelligence, innovation practices, co-design, and co-thinking, favoring inter-sectorial and transdisciplinary collaboration.

The effective integration of knowledge and skills relevant to sustainability requires close research collaboration that transcends disciplinary and geographic boundaries. It should encompass different types of knowledge in different sectors, including academia, industry, government and civil society to be ready to understand and manage multidimensional and dynamic environmental, economic and social complexities. As an

essential tool to tackle such complexities, technology is bound to play an increasingly central role in enabling global sustainability and break the silos between different sectors. In this context, we propose a model organized in five axes: (1) Evaluation, qualification, and measurement of sustainability development; (2) Operationalisation and steering; (3) Integration and governance; (4) A transversal and a catalyst axis containing enablers; and (5) Sustainability operationalization in strategic sectors and organizations.

This new paradigm will help to improve our ability to perform our research strategy and achieve our aim to (i) respond to the emerging significant issues of transition towards a green and sustainable economy, ii) offer models and effective tools under an evolving and cross-sectoral approach, iii) push the boundary of innovation to build a sustainable ecosystem that actively supports the eco-social prosperity and quality of life of our communities, and iv) generate high-level transdisciplinary knowledge on sustainable development operationalization.

The Latin American university and the SDGs: A contribution to the construction of Transformative Innovation

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Innovation has generated expectations as a crucial factor in the generation of value and competitiveness for organizations and as a means for nations to achieve growth, wellbeing and development. However, its results seem contradictory: although there has been evidence of an increase in the competitiveness of innovative companies and in the economic growth of certain developing countries, the major problems faced by the global society show worrying signs of persistence and, even, aggravation. In this context, the concept of transformative innovation, which seeks to direct the emphasis of innovation towards the construction of social welfare and human development, emerges as an alternative to competitive innovation. On the other hand, it is well known that innovation occurs in a systemic context; the university, as a fundamental actor within this system, is called to play a decisive role in redirecting innovation towards transformation, considering the commitment that this institution has to society by its very nature. The aim of this paper is to contribute to the understanding of the relationship between the Latin American university and the new paradigm of transformative innovation, in the achievement of the Sustainable Development Objectives (SDGs), with the goal of proposing recommendations so that the transition between paradigms of innovation are led from within the university. For this purpose, an exploratory research study with an interdisciplinary approach was conducted. The study included a systematic review of the literature, a bibliometric analysis, and the consultation of experts of Transformative Innovation Policy Consortium (TIPC) led by the Science Policy Research Unit (SPRU) of the University of Sussex, England, in the framework of a research process carried out in Medellín, Colombia. Main results point to the implementation of teaching, research and extension processes, with a transformative approach; that is, processes in which the principles of the theory of transitions, as well as those of the Sustainable Development Objectives (SDG's), are incorporated into the mission of the university, without neglecting the needs of the market, but focusing on the development of innovations of a transformative nature, such as social innovation, inclusive innovation, innovation at the bottom, innovation under the radar or frugal innovation. These types of innovation contribute to the transformations of the socio-economic, cultural, political, cognitive and environmental conditions of the marginal communities, excluded from the lucrative markets. Likewise, they permit contributing to the achievement of the Sustainable Development Goals of humanity from the spaces where knowledge is generated.

Keywords: Transformative innovation, sustainable development objectives, SDGs, university, Latin America, SPRU.

Collaborative Arts & Culture to Help Achieve the SDGs

(Re)Crafting Sustainability Through the Creative Industries: Perspectives from the Global South

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The global North offers abundant evidence of the varied and compelling benefits of the creative industries. Countries such as the United States of America, the United Kingdom, and Italy among others, have documented research and data on the value chain of the creative and cultural industries, and underscored their contribution to their respective GDP. These sectors are not only major drivers of the economy, but have demonstrably contributed to sustainable livelihoods, and alleviated a number of predicaments such as unemployment, gender inequality and inertia on the part of youth populations. The same cannot be said about the global South. In spite of the diversity in resources, cultures, and histories that exist in the global South, the riches and innovativeness that come with the creative industries remain largely untapped.

Strategies for the development and management of the creative industries, their associated resources and activities are interrogated in this presentation. Particularly, the presentation examines ways of managing African-oriented values, tenets, and cultural capital resources within the backdrop of the UN 2030 Agenda for Sustainable Development. Case studies from Botswana and Southern Africa are used to corroborate the arguments and propositions made in the presentation. Botswana is one of the UN Member States that adopted the 2030 Agenda for Sustainable Development, and has enthusiastically started implementing the goals and targets. In February this year, the SDGs Implementation Roadmap was launched. The Roadmap indicates pathways of coordination, monitoring, and resource mobilization, among others. What this presentation does is to articulate strategic priorities for the implementation of the Sustainable Development Goals that are the most relevant and urgent for the region, and how these could be advanced through the creative industries. Illustrations are drawn from Botswana and South Africa predominantly, but these are indicative of the Southern African Development Community (SADC) region.

Art as Policy: the Blued Trees Symphony

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Could art work with law to provide an alternative model for sustainable environmental justice policies? Might we redefine boundaries between art, science and environmental policy to achieve sustainability? This paper will track the trajectory of practice, research and the establishment of legal standing in The Blued Trees Symphony project by artist Aviva Rahmani. In 2018, a Mock Trial at the Cardozo School of Law in New York City organized by A Blade of Grass explored that possibility. In 2015 The Blued Trees Symphony was launched to propose an alternative model, taken from artmaking, to fossil fuel extractive systems. The goal was to conflate copyright and Earth rights legal policies, resulting in a redefinition of policies intended for the public good. The legal framework relied on the original intention of copyright law developed during the French Revolution, to protect the SPIRIT of art. At the invitation of private landowners, installations were created in 1/3 mile increments of the corridors where proposed natural gas pipelines would cut down many thousands of mature trees for the profits of corporations but at the expense of local people. The original painted trees were marked with vertical sine waves of non-toxic moss-growing casein paint and ultramarine blue pigment, linking canopies, trunks and roots, to the earth and the local watershed, making the marks integral with the local habitat and permanently affixed to the lifetime of the trees. The marked trees were notes in one movement of a work-in-progress for a discursive five-part operatic symphony score. Miles of trees were painted in a scored, synesthetic, aerially conceived pattern mostly across the eastern United States that was also performable as music. Between 2015- 18, teams organized across North America to paint trees, and individuals participated by painting lone trees as a Greek Chorus. In New York State, the first measure overture was painted for a proposed pipeline corridor 30 miles from New York City and 105' from an ageing, often failing nuclear plant. Despite copyright standing and a cease and desist notice to the Spectra Corporation, the company destroyed that initial work with little notice. The second movement was based on observing a toxic contamination site, Newtown Creek, and speculating that the entire state would become a toxic site if the natural gas companies were allowed to complete their work. The third movement developed a libretto based on the legal narratives. The coda was based on the 2016 American Election. Until recently, hundreds of painted trees were untouched in Virginia and West Virginia. But in April 2018, companies there ignored the rights of property owners to due process and began indiscriminately cutting down trees on private lands, despite on-going protests, to make way for pipelines. Cutting the trees occurred with the support of officials whose campaigns had been financed by the corporations. The legal premises to protect this work in the future were litigated in the Mock Trial to illustrate how case law might be established at other sites to resist corporate ecocide and establish a benchmark for further legal discussion. The aesthetic motivation was to celebrate the beauty of the trees and their function in protecting planetary life vs. the struggle between fossil fuel corporations and communities trying to save their lands and watersheds. When complete, the five parts of the symphony will represent conflicting themes of human

expansion and habitat dependencies, urbanism and rural systems. A final form will include the music-sound composed from the habitats, in which the trees become soloists, singing aria requiems to their martyrdom. This project is a crossover between environmental sciences, law, music, performative and visual art. It aims to draw attention to how the law lags present environmental urgencies, and show how art can present an alternate model of interdependence with other species.

What's Law Got to Do With It? Legal Preparedness for Delivering the SDGs

Collaboration between MEAs and the SDGs: Mainstreaming sustainable development along global environmental conventions

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Sustainable development has been an overarching international goal for almost three decades. In 2015, with the adoption of the Sustainable Development Goals (SDGs), a new pathway emerged for concrete strategic actions. However, as countries embarked on the process of implementation of these seventeen goals, many of which are environmental, questions emerged about how the SDGs were to interact with existing similar commitments from other governance mechanisms such as international environmental agreements. Specifically, environmental conventions—on chemicals, biodiversity, climate or wetlands—exemplify existing frameworks of international goals to which countries have committed. The question is then, how the two global frameworks can coexist, and the extent to which the conventions are incorporating the SDGs in their operations. The paper articulates this process, reflecting on how environmental conventions are mainstreaming the SDGs, and the lessons that the process of implementing the conventions can provide for the new sustainable development agenda. Using data from the UMass Boston Environmental Conventions Index, the analysis shows how existing information from the conventions and their implementation contributes to the monitoring and fulfillment of the SDGs, and how the conventions can build on their achievements to contribute to sustainable development, including their capacity to monitor, assess, and attain the related global goals. The analysis illustrates how any new stage in the process of defining international goals needs strategic definition so as to boost the motivation of the actors involved and their capacity to undertake the necessary measures, minimizing structural constraints, and ensuring implementation.

Dreaming of Paris: Making the Paris Agreement Enforceable through International Arbitration

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Climate change is the most complex transnational issue that the world is facing today. The Paris Agreement is the most comprehensive climate change agreement ever reached. However it does not have an enforcement mechanism. This research intends to show that arbitration will be one of the main ways that the Paris Agreement will have effect by exploring the development of the field and the scope of how it may operate in future.

This paper will focus on the scope of climate change and arbitration, with a view to assessing the efficacy of arbitral proceedings in the practical enforcement of the Paris Agreement. The paper begins by canvassing the various ways in which climate change disputes have arisen under the tripartite system of international arbitration: commercial, investor-state and inter-state. A normative assessment of the benefits versus disbenefits of resolving climate change issues via arbitration will follow. The paper then moves to canvass the forerunners to the Paris Agreement, namely the UNFCCC and the Kyoto Protocol. With a focus on their treatment of arbitration as a dispute resolution mechanism. It will be noted that the major criticism of both included their lack of enforceability. The paper will then introduce the Paris Agreement, both in terms of the scope of what it covers as well as what it hopes to achieve. In particular noting that there are several novel areas covered in it, including mitigation. However, akin to the Kyoto Protocol and UNFCCC agreement, the Paris Agreement suffers from a lack of enforcement mechanisms. The paper will then suggest how arbitration can, and should be a tool with which the Paris Agreement can be implemented. Through first assessing the obligations and implications of the Paris Agreement for states, investors and private contracting parties. Before exploring the impact of using arbitration methods to quickly and speedily resolve conflicts, particularly in the areas of clean energy and investment. The paper concludes with what further areas of further research are needed to employ arbitration as the Paris Agreement's 'silver bullet'.

Exploring regulatory safeguards for equity in the non-motorized sector in African megacities

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Non-motorized transportation (NMT) also known as active transportation and human powered transportation is a low-carbon mobility option increasing accessibility, creating livelihoods, and improved quality of life in cities. Africa will hold a quarter of the world's urban population by 2050 accounting for 60 % of her people. The urban poor make up for the majority where they endure deprived standards of living. Unsustainable transport planning that prioritizes motorization and road expansion exacerbates the urban poor's access to economic opportunities and basic services, while promoting high exposure to air pollution and risk of traffic fatalities. Despite NMT being the most used means of transport in many African cities, poor and inadequate infrastructure, safety and health of users, and congestion are key challenges. The principal aim of the study is to investigate if the current transport regulatory framework prioritizes equity in the NMT sector. This on the premise that i) the current infrastructure in African megacities does not adequately cater for NMT, a preserve for the low-income residents thereby making them bear a disproportionate burden in accessing socio-economic activities ii) Africa's fastest growing cities are rapidly increasing their greenhouse gas emissions from rapid private motorization and the urban poor are one of the most vulnerable to the adverse climate impacts in cities iii) 76% of the Nationally Determined Contribution (NDC) Under the Paris Climate Agreement includes mitigation pledges from the transport sector, yet NMT, a low-carbon option remains underexplored.

Law And Sustainable Development: Exploring The 21st Century's Development Mystries

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Sustainable development epitomizes an egalitarian, prosperous, inclusive, just and free society. It has gained traction in literary and practical terrain, and is undoubtedly poised to transform the world. The post-Stockholm dispensation has created a significant pro-sustainable development scholarship. Notwithstanding, a plethora of ingredients to sustainable development, and the relationship between law and development has attracted robust attention. The rule of law for development movement has caused a stir, and divergent academic opinion. The swift development of New Institutional Economics (NIE) has resulted in seminal scholarship on the matter. There has been emphasis on ensuring that the rules of the game i.e., institutions, are designed to drive inclusive growth and prosperity. Amaceglou and Robinson have strongly opined that there is a relationship between law and sustainable development. They examined why some countries prosper and others fail, and reached a conclusion that institutional architecture matters. A close analysis of Trubeck and Brewer also reinforce the above assertion. The emergence of law in society, it can be argued, was out of a desire to oil the wheels of commerce, and regulate society. Pogge has lamented the manner in which international law has contributed to massive global poverty. The World Bank's World Development Report highlights the rationale and contribution of law to development. Further, Fukiyama has emphasized the importance of law to development. It will be argued that law is a precondition for development to occur. Law is the vehicle upon which resources can be evenly and justly distributed in society; rights secured, and provides a platform for action. Both developing and developed countries must conduct a thorough assessment of their laws, and take practical efforts to eliminate all harmful practices to spur sustainable development.

Realizing the Right to Food and Nutrition through South-South Cooperation: A Rights-Based Technical and Knowledge Assistance for School Meals and Smallholder Farming Programmes

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The Agenda 2030 propelled the discussion for repositioning the United Nations development system and its member states to effectively realize fundamental human rights. The fulfillment of these rights requires that everyone enjoys as a minimum set of subsistence rights: adequate food and nutrition, clothing, housing, and necessary conditions of care. Specifically concerning the right to food and nutrition, which has been translated into SDG 2, the UN recognize that more than two billion people are food insecure and malnourished. Nearly six million children die of malnutrition and related diseases every year. Violating the right to food and nutrition may impair the enjoyment of other human rights, such as the right to health, education or life.

The right to food is binding for states that have ratified and recognized relevant international legal instruments. However, for this right to be effective within a state, national legislation must reflect this right in such a way as to make it applicable – such as through national programmes and policies. Experiences of several countries have shown that governments can be held accountable for not ensuring the effective exercise of the right to food and nutrition through hard and soft-law provisions. Note is taken of the Brazilian case, country that has protected the right to food and nutrition through its Constitution and several laws, and by applying this right through national strategies, plans, policies, and programmes – such as school meals and smallholder farming.

International epistemic and technical communities recognize that the Brazilian legal framework and its applicable institutional framework on the right to food and nutrition has been an inspiration and a tool for other developing countries to realize the same right. Our article qualitatively explores how the UN, through the WFP Centre of Excellence against Hunger – a Global South Technical and Knowledge Hub on Food and Nutrition Security – has assisted Kenya and Benin to develop debates around their own national legal instruments and related applicable institutional tools to secure this right. Our framework of analysis is based on two major conceptual and empirical studies we have conducted across the African Union, and is also based on the WFP Centre's Impact Evaluation Report. We have synthesized an overview on these two African countries' contexts, in which legal and institutional frameworks can be incorporated through South-South cooperation.

For that, we have presented an overview from 2011 to 2017 of the international and national legal and institutional environment in which the right to food was developed in

Brazil, Kenya, and Benin. Then, we have analyzed the Brazilian school meals and smallholder farming programmes as two important means for Brazil to apply and realize its soft and hard law on the right to food and nutrition. Subsequently, we have isolated which elements of these two Brazilian programmes reflect aspects of the right to food and nutrition and how they were multiplied through the WFP Centre of Excellence to Kenya and Benin. Then, we have evaluated how this kind of assistance could have influenced national discussions for right to food and nutrition in the two African countries. We have compared the findings from these countries to the elements of the Brazilian legal framework. Finally, we have evaluated the extent to which the Brazilian experience has inspired and affected these two countries via South-South cooperation.

The Fate of Customary Tenure and Shifting Cultivation in Myanmar's Land Tenure Reform Process: An Analysis of the Legal Framework of Land Governance and Its Effects on Upland Ethnic Minorities

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Myanmar is currently undergoing a triple transition: From an authoritarian military regime to democratic governance; from a centrally controlled economy to a market economy; and from more than sixty years of armed conflict to peace in its frontier border areas.

Myanmar is a multi-ethnic state with 135 officially recognized ethnicities. The uplands are home to ethnic minority groups like the Chin, Kachin, Pa-O and Naga. These groups had been administered semi-autonomously during the colonial era, and largely left untouched by the passing military regime. Recent ceasefire agreements have facilitated the incorporation of the country's uplands. This leads to an inevitable societal transformation offering new livelihood opportunities for some and increased challenges for others.

The Burmese government follows a strategy of market integration and value chain development through a focus on paddy rice and selected 'boom crops' (e.g., rubber, palm oil). The incorporation of the uplands seeks an allocation of the frontier lands to domestic and foreign investors.

This strategy is accompanied by a land tenure reform process since 2012. On the one hand, the Farmland Law (2012) and the so-called Vacant, Fallow and Virgin Lands Law (2012) weaken customary tenure systems and facilitate large-scale land acquisitions. These laws must be read together. They are designed to cause a shift from swidden to permanent agriculture, and from common to private property regimes. The main purpose of the Farmland Law (2012) is to create a private property system through the issuance of so-called 'land use certificates'. The main purpose of the Vacant, Fallow and Virgin Land Law (2012) is to allocate non-registered land to investors.

On the other hand, the recently introduced National Land Use Policy (2016) strengthens customary tenure systems and restrict large-scale land acquisitions. This policy is designed to guide decision-makers in the development of the country's first ever National Land Law, as an overarching framework for all other land laws.

These laws and policies are added onto a complex and ambiguous legal framework of land governance with over 70 stacked laws and policies as well as fragmented decision-making authority over them.

Achieving the Sustainable Development Goals is only possible with inclusive development sensitive to the needs of the most vulnerable people. Regarding land governance, this requires adopting a pro-poor oriented development approach sensitive to the livelihoods of those communities to whom it is addressed.

This research analyzes secondary data and the National legal framework of land governance. In addition, it draws upon primary data from two field trips conducted in Nagaland, Myanmar in September 2017 and March 2018 to investigate the livelihoods of one of Myanmar's upland ethnic minority groups. The research provides insights into the land tenure reform process of a country in transition, and the inevitable challenges and opportunities involved and faced by the public and private sector and local communities. Finally, it provides policy recommendations relevant to the context of many Southeast Asian countries and beyond.

Water Hazards, Environmental Justice, and Advanced Biofuels

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My article addresses the nexus between environmental justice and rapid onset water hazards, looking specifically at access to energy and diversity of the energy portfolio in responding to extreme weather events. Access to energy impacts the ability of low-income, minority, and indigenous groups to handle natural disasters, exacerbated by ongoing climate change. My work anticipates efforts at resiliency in light of water hazard events in the Global South with a focus on Puerto Rico, Pakistan, and the Philippines – all three of which are strategic military installations for the United States Department of Defense. Frontline communities are most vulnerable to water hazards and the impacts of climate change. This article considers legal mechanisms for climate change adaptation and energy accessing response to catastrophic water hazard events. This article looks at what is involved in the UN Disaster Risk Reduction Task Force

Opportunities of Marine Natural Capital for Sustainable Blue Growth

An Analytical Review of Institution and policy to Contrive Integrated Ocean Governance for Sustainable Blue Economy in Bangladesh.

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Bangladesh is a promising country in respect of Blue economy, which is also serious threat to the ocean and its ecosystem if not managed properly. The proper planning and co-ordination is the greatest challenge for Bangladesh to formulate and successfully implement a highly effective ocean policy for blue economic development. The main objective of the research is to ensure the sustainability of marine ecosystem in respect of economic, environmental and social growth in Bangladesh while extracting marine resources, minerals and getting benefit from ecological goods and services. The purpose of the study is to conduct gap analysis between legal regime and governance practice of Bangladesh with international law and other developed nations. The study also opted to evaluate the opportunities and challenges of implementing the national and international laws on emerging ocean and coastal issues in Northern part of Bay of Bengal. The expected outcome of the research is identifying the threat of ocean with the growth of Blue economy in Bangladesh and the capacity of laws and Governance to mitigate that threat. The final output of such huge work is the solution approached on sustainable use of the ocean and coastal area through law and governance. The study on ocean governance in Bangladesh is highly challenging with plenty constraints which will also contribute into the global ocean knowledge.

Metrics and frameworks for assessing Sustainable Urban Development

A comparative measurement of Standard of Living: using images at different levels of abstraction as alternative to Government Survey

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Key lessons from Millennium Development Goal (MDG) to Sustainable Development Goal (SDG) are the requirements of quantitative measurement of the outcome indicators and necessary data for it. Traditional methods of data collection like questionnaire-based surveys or Census are periodical and are conducted once in a 5-10 years' time.

On the contrary, a huge amount of unconventional data like high-resolution satellite imagery, household images are being used for the measurement of SDG indicators e.g. Poverty. Anna Rosling has launched the "Dollar Street" project which uses images of household items to understand the standard of living of people. UN Global Pulse and Sustainability Lab at Stanford have used satellite image data to predict poverty. However, these alternative datasets are not without respective problems. Satellite imagery can use a limited number of features necessary for the prediction. Access to household item images in large scale is challenging as it involves privacy issue.

In this research, we are analyzing images captured from outside of the household to extract necessary features for poverty prediction. We are also using household item images, satellite images and traditional survey method to compare the relative advantages/disadvantages of these different methodologies.

However, it is much easier to obtain images of the households from outside using the ordinary camera (we used high-resolution camera inbuilt in the cell phone) and we could collect a large number of such images deploying our survey team. Using "transfer learning" images from "ImageNet" platform were used for the training of the captured images. We also classified images from "ImageNet" and "Dollar Street" to create an index for the standard of living. We observe that household images are quite accurate in predicting the standard of living.

Our measurements using outside the household image comes close to the standard of living estimation with images of household items taken from inside. Simultaneously, we observe that the estimation using outside the household image comes close to the measurement from survey data. We also validate that the idea proposed in "dollar

street” to be quite realistic as the living index created from the images of inside household items are matching with the findings from the primary questionnaire survey.

Big Earth Observation Data for Sustainable Urban Development

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With more than half of the world's population, urban areas plays a vital role in implementing the Sustainable Development Goals (SDGs). Crucial to the success of the SDGs and particularly the urban SDG (SDG 11) will be well-developed monitoring and modeling capabilities. In the development of indicators for sustainable urban development, earth observation has demonstrated its unique value as a source of reliable, spatially detailed and updatable information for the extent, form, structure, and change of urban areas. Harnessing the power of state-of-the-art earth observation data and technologies, this study highlights the value of data derived from earth observation for the urban SDGs, including SDG 11.3, SDG 11.5, and the associated indicators. Two of the data sets used in this study are the Global Man-made Impervious Surface (GMIS, <https://doi.org/10.7927/H4P55KKF>) data, which is the first global 30-m impervious surface data set, and a 30-m building height and volume data set of England (<https://doi.org/10.7910/DVN/NUDZG>), which is the first country-level three-dimensional building structure data set. We investigated the use of these data for gauging urban SDG progress and monitoring selected indicators. First, leveraging the GMIS data set, we developed spatial maps of SDG indicator 11.3.1 for the entire India during 2000-2010. Second, we proposed a new urban compactness score based on satellite-measured 3D urban structure. This score measures the spatial concentration of built space, which is directly linked to the urban energy efficiency and SDG 7.3. With this compactness score, we show empirical evidence of the energy efficiency advantage of compact urban design in England cities. Finally, in response to SDG 11.5, we prototyped a new index of urban vulnerability based on the exposure of building volume to natural disasters. Compared to population-based urban vulnerability indices, this index provides a direct measurement of buildings and infrastructures at risk and has a great potential in areas without up-to-date population data. In summary, we provide a glimpse into what earth observation could contribute to the implementation of the urban SDG and the monitoring of its indicators. In the context of SDG monitoring capacity development, earth observation also faces great challenges, including ensuring data reliability, updating data regularly, and coping with heterogeneous data sources.

Exploring SDGs in Six BC Cities: Aligning SDGs with Local Government Plans'

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Building on the initial mapping work of the United Nations' Sustainable Development Goals (SDGs) carried out by the University of British Columbia's Sustainability Initiative (USI), a partnership was launched amongst the University of British Columbia Sustainability Initiative (USI), Pacific Institute for Climate Solutions (PICS), the British Columbia Council for International Collaboration (BCCIC) and the City of Kelowna to investigate British Columbia (BC) cities' sustainability planning objectives and progress in in context of the SGD.

The lack of leadership and clear guidance from the Canadian government on SDGs has left subnational governments and groups unsure of how to benefit from, utilize and report on progress towards achieving SDGs. The Brookings Institute (2017) has indicated that Canada is failing to make progress on many SDGs, and in some cases—or example SDG 11: Sustainable cities and communities—is “moving backwards” on achieving SDGs targets. Yet cities and communities throughout British Columbia have been planning around a sustainability agenda, monitoring and reporting their progress, locally and provincially, towards a more sustainable future for almost 20 years. How is it, from a national perspective, they are falling behind?

Through assessing the alignment of six BC cities' official community plans (OCPs) with the SDGs, this report finds that there is positive policy alignment with many SDGs, but also common gaps that need to be addressed. The project also investigates a city's implementation and monitoring on progress towards sustainability goals, and how its community-determined indicators relate in intent to the SDGs and their targets and indicators.

The work demonstrates how city plans connect to global goals, provides an example of bottom-up SDG relevant planning and monitoring initiatives that currently exist, and explores how an SDGs framework might benefit cities on measuring and monitoring progress and in communicating sustainability ambitions and achievements nationally, and with the world.

How urban sanitation data standards will improve data collection, sharing and analysis to enable and track progress on SDG 6.2.

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By 2030, 3.2 billion people will be living in cities without access to proper sanitation. Over the last 10 years there has been significant investment in new toilet technologies to meet the needs of underserved communities. These new innovations often do not need sewers, reduce water usage or reclaim valuable nutrients from human waste. Despite these advances, there has been no change in the proportion of people globally without access to proper sanitation. In 2017, the World Bank reported that this is in part because poor data has led to an ineffective allocation of resources across the sanitation sector.

Gather was launched in 2016 as a research project to understand what was preventing the expansion of sanitation services in low income communities. We conducted interviews with 100 professionals across a broad range of organisations providing sanitation services across east Africa and south east Asia. Our research revealed that a lack of quality data on urban sanitation was making the sector less effective, efficient and collaborative than it could be. We also noticed an acute need for the sector to better track its progress in providing sanitation for people living in cities and achieving Sustainable Development Goal 6.2. We discovered that organisations providing sanitation services in low-income communities were collecting large quantities of data on their own operations, but that there was no mechanism to share and analyse this data to better understand the current state of sanitation across cities. We concluded that a sector-wide response needs to include behaviour change in the collection, sharing and use of data.

In 2017, we tested two approaches to learn about data collection and data sharing. Our methodology was built on a collaborative approach to systems change. We listened to the experiences and needs of the sanitation providers we had interviewed, and we also engaged with experienced partners in the fields of data collection and data sharing. First, we mapped shared sanitation infrastructure in Mathare in Nairobi, Kenya. We wanted to understand the costs and challenges of collecting, curating and analysing sanitation data. Second, we focused on the creation of a data sharing platform. We wanted to understand what was needed for sanitation providers to share the data they were already collecting, so that it could be analysed and the insights shared with sanitation providers and funders. Both approaches revealed the need for a sector-wide data standard for urban sanitation data. Without a data standard, it is impossible to collect and share data so that it can be analysed to identify where investment is needed to expand sanitation services.

A data standard will ease the burden and cost of data collection on sanitation providers by simplifying the data they need to collect and share and reducing duplication of efforts. Standardised data, accessible through a data sharing platform, will allow organisations across the urban sanitation sector to work more effectively, efficiently and collaboratively to provide sanitation to people living in low income communities.

Italian Cities SDGs Composite Index. A Methodological Approach to Measure the Agenda 2030 at Urban Level

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The Italian Cities SDGs Composite Index is a tool for policy analysis and dissemination of sustainable development at local level in Italy. Structured into several dimensions representing 16 out of 17 sustainable development goals adopted by the United Nations at the end of September 2015, the index merges 53 available economic, social and environmental elementary indicators into a single composite dimension, highlighting geographical and demographic heterogeneity within the Country.

The high dimensionality of the index requires the check for latent implications due to the multivariate distribution of the data. It is indeed mathematically proved that not only heterogeneous variance among indicators plays a central role on the aggregated value, but also the degree of correlations among them. With this aim, Principal Component technique has been applied to identify the latent structure of the data, clustering both indicators within goal and the goals themselves. The weights attached to the indicators have been set in such a way to favour the ones that are statistically independent of each other and to penalize, conversely, those that are correlated; the same approach has been applied for deriving the weights among goals. In this way a balanced structure of the data is guaranteed.

Measuring Progress Toward the Sustainable Development Goals in Urban Contexts in Colombia

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The current project seeks to develop a sustainable process for collecting city data that correspond to the Sustainable Development Goals (SDGs) and construct a tool to enable cities to measure and track their development progress. A baseline study was conducted in mid-2016 on the 35 municipalities that make up the 19 chapters of the *Cómo Vamos* Cities Network (RCCV), managed by Fundacion Corona (FC) in Colombia. FC has worked to understand the state of Colombian municipalities in regard to SDG indicators applicable at the local level, in addition to identifying information gaps on local data.

After the baseline was published, FC partnered with Columbia University's School of International and Public Affairs (SIPA) in order to revise the findings of the baseline study and identify key performance indicators for each SDG, establish goals, and identify alternative data sources. During this process, the organizations engaged in desk research to develop a benchmark study of global SDG localization efforts that are being developed at the national, regional, and local levels in order to isolate the critical variables for localization processes to be successful, including raising awareness, diagnostics, strategies and plans, monitoring and evaluation, and taking action. Based on the results of the benchmark analysis, FC and SIPA developed a prototype of an SDG measurement tool that will allow FC to assess the level of SDG localization in each city, and measure the progress of each city in relation to the selected indicators and goals.

Once developed, the prototype was further tested through a series of on-the-ground workshops with city planning technical staff across six cities—including Bogota, Cali, Cartagena, Manizales, Medellin, and Quibdo—, as well as through one-on-one interviews with public and private organizations working on SDG localization in Colombia. Through these exercises, the tool was further revised and improved, resulting in a second version that is ready to be tested with mayors, and consequently implemented.

The efforts that FC and SIPA are undertaking to measure the progress of Colombian municipalities in localizing the SDGs complements the efforts of SDG implementation of the Colombian National Government, which has primarily been focused on the national and regional level. This has left cities and municipalities without clear implementation

steps, creating an important opportunity for this project to contribute to obtaining information on the state of local development for 20.05 million Colombians (41% of the population).

The process itself presents a relevant case study for SDG localization at the city level. Moreover, some of the preliminary findings include critical local data gaps, especially related to the environment; a stakeholder analysis of the main actors working on SDG localization in Colombia and their roles; key variables that enable certain localization projects to stand out among their peers; how the process of selecting goals and indicators can be carried out at the local level; and which data points are most relevant for Colombian cities.

Monitoring 25 years sustainable urban development with the Land Use Efficiency indicator; perspectives from the Global Human Settlements Layer

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The surge of sustainable urban development challenges at the world polity level during the Post-2015 Development Agenda process and the consolidation of specific goals and indicators for sustainable urban development leave no room for gaps in urbanization knowledge, information and reporting.

SDG 11 aspires to “Make cities and human settlements inclusive, safe, resilient and sustainable” the salience of an explicit urban goal necessarily stems from the recognition that human society has become predominantly urban. The understanding of the process of urbanization and the capacity to monitor the progress in meeting the SDG pack require a wealth of open, reliable, local data and a fully-fledged Data Revolution. New sources of information, like Earth Observation, Big-data and gridded geospatial data can offer support to transformative policies with a new generation of information that are: planetary and multi-temporal in coverage, fine scale in detail, open and free in access.

It is in the above framework and auspices that the European Commission - Joint Research Centre has developed a suite of (open and free) data and tools named Global Human Settlement Layer (GHSL). The GHSL maps the human presence on Earth sourcing information back to 1975 and up until 2015 and delineating built-up areas, population distribution and classifying settlement typologies.

The GHSL information on the progressive expansion of built up areas in cities and their demographic changes serve as baseline data to quantify the Land Use Efficiency, listed as indicator for SDG 11 (11.3).

In the paper we present the profile of the the Land Use Efficiency on the planet of cities across the circa 10,000 Urban Centres in the year 2015, and its change since 1990.

The paper demonstrates the different patterns of urban development, in particular the settlements where concentration of people prevails over expansion of built-up areas (positive degrees of land use efficiency), versus the others in which the growth of built-up areas is not associated with population growth. The study is planetary and multitemporal in coverage demonstrating the value of well designed open and free, fine scale geospatial information on human settlements.

Our interactions with space: For a human-centric framework for assessing sustainable urban development

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The world is urbanising at a rapid rate and with this come the added challenges of congestion, infrastructure and housing shortages, underscoring the need for effective and inclusive planning of services and spaces. By 2030, it is anticipated that 6 out of 10 people globally, will be urban dwellers . Given this, the need for accurate and timely measurement of achievement of targets pertaining to urban development become all the more important. Further, for urban planning authorities, there is a need to develop a comprehensive framework for analysis against which approaches can be benchmarked.

Singapore's Liveability Framework developed by the Centre for Liveable Cities is one such measure, which aims to provide urban planners and city authorities with a lens through which to analyse the liveability and sustainability of their cities. Composed of three major outcomes – competitive economy, sustainable development, and a high quality of life, and two key components related to institutions, the framework can be adapted and replicated to suit other country contexts.

There are competing views on what 'sustainable urban development' comprises of, and definitions vary between societies, and even individuals. However, in view of Sustainable Development Goal 11, Sustainable Cities and Communities, there is value in developing universal metrics adapted to different scales through which assessments can be made, by adopting a citizen participatory approach, guided by common principles, and removed from political agendas. People make cities and therefore, they are a vital component of the sustainable urban development narrative. Design of spaces must be human-centric, in that it should be catered to and reflective of our needs. This paper argues for the need for metrics to assess sustainable urban development which are human-centric and reflective of the changing dynamics between humans and the built environment.

Spatial urban sustainability metrics and indicators guiding urban design and planning interventions

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Urban sustainability metrics and indicators have been developed with the intention of assessing relationships between the multiple entities of the urban system. The development of these multidimensional metrics and indicators have been encouraged as of higher value when shifting from measuring performance to guiding urban design intervention. However, in LEED ND and other widely recognized urban sustainability rating systems, multidimensional metrics and indicators are only half of the overall pool. As a consequence, in adopting these assessment systems designers often need to undertake additional urban analysis in order to guide future sustainable developments. Grounded in a content analysis of nine existing urban sustainability rating systems, this article proposes a selection of relevant multidimensional metrics and indicators and their implementation in a real-world project, a new smart city called Union Point (Massachusetts). This study establishes the ground for future research on developing existing multidimensional metrics for the benefit of urban design and planning interventions.

Sustainable Urban Development Assessment of Northern Tehran Suburbs The case study of Shemiranat County in the Greater Tehran Area

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Introduction

The Index of sustainable urban development aims to quantify the concept of sustainable development and evaluate the sustainability trends at a regional level. For this purpose, the conceptual framework of sustainable development addressing environmental sustainability, economic prosperity, and social equity has been suggested for sustainable development assessment purposes.

This research seeks to answer to what extent the process of urbanization has been green during 2007-2011 in Shemiranat county located in northern Tehran. To this, the research measures, and monitor sustainability score at both settlements, and county level in a five-year period.

Methods

This research has been carried out in Shemiranat county, a suburban area located in the distance of 35 kilometers from the northern City of Tehran, an Iranian capital in the Greater Tehran area (GTA). The county has a share of 6.3 % from GTA's area, and benefit from 0.3% share of the metropolitan population. It also has 47 towns, and villages combined. The county is a home to "Iar" national park, and 61 percent of its area is located in a conservation area, however, the county has been exposed to several external environmental challenges that have attacked its environmental sustainability in recent years.

In order to measure sustainability, an Index of Sustainable Urban Development has been calculated for both the county and each of the 47 settlements. Moreover, to monitor the sustainability trend in a specific time framework the calculations has been taking place for two statistical intervals in 2007, and 2011. The conceptual framework consisting of 19 quantitative sustainability indicators in three dimensions have been defined to measure the sustainability score for this assessment. Also, further analysis is conducted to seek the correlation between indicators, and the final index of Sustainable Urban Development.

Results & Conclusion

A composite Index of Sustainable Urban Development for Shemiranat county shows that although a few villages had progression in sustainability score, the total county's final index has declined relative to 6% in a five years period. Therefore, the process of urbanization is categorized as an unsustainable urban development despite the county's preservation characteristics in the greater Tehran area. In addition, the

settlements are ranked due to their final index of sustainable development. Sustainability monitoring reveals that the sustainability score for 20 villages got improved, 12 towns remained the same, and the sustainability score for 15 settlements got deteriorated during 2007-2011.

Last but not the least, the spatial pattern analysis shows that at 5% significance level, there is a spatial pattern which towns and settlements with lower sustainability scores are concentrated in a particular spatial cluster.

Keywords: Urbanisation, Sustainable Development Index, Sustainable Development Assessment, Sustainability score, Shemiranat county

Transforming Australia: SDG Progress Report

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One of the key elements of the Sustainable Development Goals (SDGs) is that they provide an evidence-based framework of targets and indicators to enable monitoring of how countries are progressing on sustainable development.

Such a framework can help governments and other stakeholders identify areas of poor performance where actions should be targeted, and can provide a way of ensuring accountability for assessing progress in implementation. It is also an important communication tool on the SDGs and sustainability.

For these reasons, the first Australian SDGs Summit, in September 2016, identified the need for a cross-sectoral assessment of how Australia is currently performing against the SDGs as one of the highest priorities for advancing SDG implementation in Australia.

In response, the Monash Sustainable Development Institute teamed up with SDSN Australia, NZ & Pacific and the National Sustainable Development Council – a collaborative body of experts across government, business, research and civil society – to produce “Transforming Australia”: the first comprehensive assessment report of how Australia is performing against the SDGs.

The report, which involved over 30 experts, first identified SDG-related indicators that are relevant to Australia, including both official UN SDG indicators and other important local indicators. In all, 144 indicators spanning 85 SDG targets and all 17 SDGs were selected for further analysis. Using 2000 as a starting year, the team then used trends in the data and other approaches to assess whether Australia is on track to meet the targets by 2030. The report assigned a “traffic light” rating of progress to each of the indicators, as a quick visual indication of progress. A narrative summary of the results for each of the goals also included. Finally, the results were aggregated into cross-cutting themes that provided an overview of how Australia is going and what this means for our future.

The report was developed into a dynamic and engaging website that allows people to explore these different aspects of the SDGs and get both a high-level view of the results

and drill down to specific data sets. It is being launched on 5 September and is available at www.sdgtransformingaustralia.com.

The report shows that Australia is performing relatively well in health and in quality education, however, the results for reducing inequality and action on climate change are poor and Australia has a considerable way to go to achieve the other goals. Highlighting these and other results, the report will form an important and reliable evidence-base for a public conversation about Australia's future and help contribute to making Australia a better and more sustainable place.

This presentation will discuss the process by which the report was prepared and lessons learned from which others wishing to undertake similar processes for other countries might benefit. We will also discuss what the results show and their implications for Australia.

Ensuring Public Engagement and Accountability for Sustainable Urban Development

A Model for Civic Engagement to Facilitate Sustainable Development in Los Sitios, Habana, Cuba

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Dhanya Rajagopal

Every day the streets of Habana are filled with people who possess tremendous amounts of knowledge ready to be directed to sustainable development. The opportunity is to guide the energy using knowledge from academia to formalize the networks of knowledge. Like the domino players in the streets, the challenge is to identify to create match with enough dominoes to create a win. In the same manner, communities within Habana need to identify how to sustainable develop their neighborhoods. To date, the yet to be defined element is how to gain the trust of Cubans who have lost faith in the existing civic organizations. This report examines the challenge of creating, by way of re-branding and marketing, a model for civic engagement that will facilitate sustainable development. Research on this subject matter was gathered during a ten-day site visit to Habana with a close examination of the Los Sitios neighborhood, a sub section of Central Habana. Additional research included a related research literature review, feedback from CUJAE professors who have been working in the neighborhood for seven years, and panels with Cuban experts such as sustainable development researcher Gina Rey, economist Ricardo Nunez, and urban sociologist Carlos Garcia Pleyan. The visit to Habana was made possible by collaboration between Pratt Institute and CUJAE, the school of Architecture in Habana. Using these aspects, the report focuses on the potential to reinterpret and utilize existing organizations within the Cuban model to earn trust from residents in the Los Sitios neighborhood. The key research findings show the potential to include existing structures such as the Consejo Popular, CDR, FMC, CAP, and Community Centers. A review of their mission statements reveals progressive ideology to tap into and channel towards sustainable development. However, the research shows that first organizations must update the connections between each other as well as between themselves and the community. This process of updating will build trust that can be used to support sustainable development efforts within the neighborhood. The role of CUJAE, Pratt and the existing organizations will be to support local leaders and build connections between organizations. The updated model will strengthen the story of the neighborhood, unify and make the vocabulary used to describe civic engagement accessible to residents, and identify culturally relevant ways to engage residents that merges the power of the

Cuban Revolution with the 21st Century. The result will be a new collaborative model between existing institutions. If successful, future analysis on the civic engagement process should evaluate how successful rebranding efforts can be applied to the sustainable development in other neighborhoods of Habana and across Cuba.

Engaging Community Hearts, Minds and Spirit for Sustainable Development

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Public engagement and accountability are critical for achieving sustainable urban development. However, without the right process, the right structure, and an appropriate leadership approach, they will be of little value.

Achieving sustainable development in this extremely complex arena, involving myriad organizations, each with its own culture, priorities and operations, and multiple goals, is exceedingly challenging. Leaders must understand the structural barriers to and requirements for goal implementation in this environment if they are to succeed. Results of research into successful goal implementation in such a complex arena can guide leaders, donors, advocates and implementers to greater success.

Two case studies revealed elements of successful implementation in such complex arenas. The first was research into The Denver Partnership, a public/private partnership dedicated to wise development of the city's rapidly-growing downtown (Coe, 1986, 1988). Previously home to pawn shops and bars, followed by rampant development, the City seemed slated to become a traffic-clogged, unlivable chaotic mess, as many western US cities. Thanks to the efforts of certain leaders, the downtown became a vibrant, exciting place to live, work and play. The process was not without hiccups but as implementation improved, the city progressed. Our research produced a framework for successful implementation that we called "open focus" (Coe, 1986). The framework was later modified to incorporate powerful principles of structural dynamics discovered by Robert Fritz, author of *The Path of Least Resistance* and other books (1986).

The second case was quite different: application of the open focus framework to communities in the project, *Communities Engaged in Social and Economic Development of Albania (CESEDA)* (Coe, 2016). Albania, one of the poorest countries in Europe, suffered from extreme neglect following the fall of its Stalinist-type dictatorship. Virtually everything was in disrepair. Albanian citizens had no experience with self-help. Although non-governmental organizations (NGOs) committed significant resources, their outside-in, top-down efforts did little to stimulate internal change or build capacity. However, using the open focus approach, the public-private partnerships in the CESEDA project made fifty-eight significant improvements in their communities and significantly improved their capacity.

Leaders using this approach engage the hearts, minds and spirit of communities to energize, mobilize and then sustain motivation and action to move consistently forward toward the goals (Coe, 2017).

The success of these communities suggests that this approach to leadership and implementation has the potential to improve significantly the implementation of sustainable development goals.

Environmental Justice and Participation for Communities in Southern India

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The goal of this Social Sciences and Humanities Research Council project is to understand the distinctions and implications of decisions made by the high court Green Benches and environmental tribunals in India, and how they are impacting the wellbeing of impoverished communities. India has experienced significant and fast economic growth, and with this has come environmental concerns. In attempts to mitigate these concerns the courts in India have attempted to remedy the situation in a democratic way. However, there appears to be a gap in what the courts are deciding and the best interests of those that it impacts, which is what this project seeks to understand. The focus is specific to water resources, and access to water, such as dismantling of water bodies for construction, obliteration of rivers and canals, water pollution, and encroachments. The approach utilized to gain this insight is done by analysis of legal cases and policy documents and literature, then by consulting with communities and marginalized stakeholders to get first hand testimonies. Seeing as India has experienced such significant growth and is developing at a very fast rate even in rural areas it is important to understand how to protect the environment as well as the communities that depend on the environment, thus the research will make clear if there are gaps between court decisions and communities best interests. If it is found that the green bench is making decisions that benefit development but not the environment or the community then this is a clear gap that needs to be addressed. Additionally, giving voices to the communities that are impacted by development and environmental decisions is another main goal. The decisions made in regards to development for India need to be done in a manner that include participation of stakeholders and this project will give input into if this is happening or if not, how to create a pathway to enable this to happen, because without the input of the stakeholders true sustainable development is not happening.

Internal Migration and Urbanization: A Case Study from Semi - arid Regions of Pakistan

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The study analyses the determinants of urbanization in semi-arid regions and the role of institutions in dealing with the issue. Focusing mainly on three semi-arid districts of Pakistan, i.e. Mardan, Faisalabad, and Dera Ghazi Khan (D.G Khan), the study draws on qualitative information gathered through the in-depth interviews of rural to urban migrants and key stakeholders. The push factors described by majority of urban respondents in all three districts are mainly economic, i.e. lack of employment and business opportunities in rural areas. Few respondents considered death of family members/relatives, conflict with other tribes and lack of health facilities as significant push factors behind their decision of migration. Although socio-economic factors were the primary cause of migration, climate change was not considered a direct reason. Nevertheless, a few respondents agreed that climate change had indirect effect on their decision to migrate. The pull factors are almost common in all three districts. These include better employment opportunities, proximity to their village and access to basic facilities such as educational institutions, hospitals, road and transport networks, sanitation amenities, etc. in the cities. The urban migrants faced a number of issues as a result of their migration particularly in terms of lack of proper accommodation, inaccessibility to clean drinking water, guarantor issues, finding employment or setting up business, and lack of information about public services. This has further exacerbated the situation vis-à-vis congestion of the cities as well as an increase in slum settlements. According to development authorities, major reasons for unplanned urbanization and slums creation were lack of internal migration monitoring policy and coordination gaps between service providers and authorities concerned. Furthermore, stakeholders emphasized the need for immediate attention for overall agriculture sector development, including climate resilient and agriculture smart policies to lower the push factors of migration in rural areas.

Keywords: internal migration, urbanization, climate change, slums, planned and unplanned urbanization, development.

Public awareness and knowledge about seawater desalination and its impacts on the environment: Gaza strip, Palestine

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Purpose: The research tests public awareness and knowledge in the coastal area in Gaza strip, Palestine focusing on the residents who live in Dier Al balh city (where the first seawater desalination plant had constructed) about seawater desalination and its impacts on the environment. The study investigates how socio-demographics, motivational factors, and information use shape public awareness and knowledge.

Method: Data was collected using a survey from a random sample of residents in Dier Al balh city in Gaza using criteria's McNeill. This research followed the similar method used in previous studies of testing public awareness about desalination, marine life, and impacts on the environment. The study assessed three indicators to examine people knowledge and awareness. These indicators are Public awareness of desalination, and impacts on the environment; People personal knowledge of desalination and the impacts on the environment; and Factual knowledge of desalination and the impacts on the environment.

Result: The results of the research were: Both personal and factual knowledge about the desalination and its impacts on the environment were low, with only three of thirteen factual questions answered correctly by more than 45% of respondents. Furthermore, It was found that people who were more connected with their place showed high awareness. Besides, information resources record a low relation with personal knowledge and awareness and more low with factual knowledge.

Conclusion & Recommendations: Knowledge is a strong tool; it transfers special conscious to behavioral abilities, facilitating a great number of tasks. Thus, Knowledge raising calls for the establishment of a dialogue through which people will reach the policies makers, and the official will convey to the people what the government is doing to protect the environment. The research recommends investigating more variables that could form people awareness about seawater desalination since their new technologies have just entered Gaza. Moreover, it recommends increasing media role to raise people knowledge, by making a useful campaign that targets the different society spectra and not just focusing on one layer. Also, the study encourages the government agencies to increase its efforts and be more effective in dealing with the environmental issue since the results showed quite weak connection between people and government agencies.

Social and Environmental Accountability Mechanisms at the United Nations

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Social and environmental accountability and grievance redress mechanisms are at the core of ensuring sustainable urban development. This applies to private sector companies and to international organizations alike. The United Nations (UN) has started to introduce the tool in some of its agencies in 2015. The decision, however, was not connected to the social or environmental footprints those UN agencies have had on their beneficiary communities, as it has been the case with the World Bank's Inspection Panel. The decision was connected with some of those agencies donor funds decision to require their partner organizations to have social and environmental safeguards, including accountability mechanisms, in order to qualify for their financial support.

As those redress mechanisms at some of the UN agencies have been introduced fairly recently, there are no studies conducted on the social and environmental standards they are based on, i.e. their policy basis as well as their structure, operations and effectiveness.

The research tries to fill this gap and establishes criteria of effectiveness based on the analysis of World Bank and Development Financial Institutions social and environmental accountability mechanisms as well as reviews of relevant studies. It combines the mentioned analysis with the analysis of 20 expert interviews from 13 different organizations to understand the levels that the principles described in the policy documents of the identified UN institutions are being implemented.

Based on the expert interviews and the desk research conducted in the scope of the current research, it was revealed that despite very well-developed policy bases, 6 out of 8 identified UN agencies' social and environmental accountability mechanisms were not living up to the standards described in their own policies.

Despite being independent mechanisms with very detailed social and environmental standards, strong policy bases and clearly stated commitment to institutional compliance and dispute resolution, in case of the majority of the mechanisms, there was a gap between the written commitments and implementation; the majority of the mechanisms were not visible and had poor accessibility standards and have not accepted any cases. The lack of political will, funding and human resources as well as the absence of a connecting link between those mechanisms make the majority of the social and environmental accountability mechanisms operational on paper only.

Strengthening community engagement: promoting the SDG in condos

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Condominiums can be an important arena to apply Sustainable Development Goals. The condominiums it is a consolidated model of housing promoting comfort and safety for the residents. New kinds of social ties were developed in this kind of community organization. Considering the millions of people living in this sort of organization, it is emergent consider how the Sustainable Development Goals (SDG) can be applied. Initiatives of education can share SDG awareness that can be shared in other organizations creating a sense of sustainable society.

The research considers how the Sustainable Development Goals can be applied to condos. This study was based in the condominium Residencial Vila Verde in the city of Natal, Rio Grande do Norte State, Brazil. The condominium presents 4 tower buildings of 19 floors presenting 296 residential units.

Related to poverty avoidance, the condo will develop lectures on conscious consumption, in small stores of the neighborhood, influencing the local economy; Contract of service providers in the area; partnerships with garbage processing social organization to recycling waste destination. Associated with the Goal 2 (Sustainable agriculture) and Responsible consumption (SDG 12), it is proposed a weekly fair for organic produce from local farming communities; Incentive to planting vegetables at home and creation of the community garden of Vila Verde. Related to good health, some initiatives are possible: Installing fitness equipment; To promote the practice of physical exercises (water aerobics, dance, functional training, yoga, etc); sports championships between residents and neighborhood; Installation of playgrounds and holiday; Submit monthly health and wellness reports to residents.

Related to promote quality education, it is suggest create a "Reading Space" to stimulate reading; Create a kids space with video library in the building; Foster the library of the condominium with donations of books by the residents; Encourage the continued study of condominium residents and employees, for the latter reserving 1 hour per day for study; Promotion of courses and lectures in the condominium facilities. About save water (SDG 6), it is suggested implement rainwater collection and storage

system and reuse of the water of the swimming pools for the garden of the condominium.

Associated with save and clean energy and innovations (SDGs 7, 9 and 11), it is suggested the use of solar panels, the change all the bulbs of the condominium by LED lamps and use a systems of building automation to monitor water and energy consumption with activation of control systems. Related with economic growth (SDG 8), it is viable promote the business fair with the residents selling services and products and keep updated the business opportunities board. It is also suggested plant more trees (SDG 13 and 15), Committee for conflict resolution and enforcement of penalties (SDG 16) and promote integration among neighborhood condominiums by sharing sustainable development objectives by helping each other to implement them (SDG 17). The next step of the research will be pursuing to apply the SDG in condos, considering the city of Natal (Brazil) as the locus of action-research methodology.

Sustainable cities and communities: the case study of Natal - Brazil

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The aim of this research is to diagnose the city of Natal, capital of Rio Grande do Norte State, Brazil, as a sustainable city. Natal is the capital and largest city of the state. The city presents a population of 862,044. The Natal Metro Area presents 1,485,505 inhabitants. Natal is the eastern capital in Americas. Natal was considered a case study as Human Smart and Sustainable City from the observation of some key-issues: 1) 60% of geographic area is environmental protected. One of this green areas is the Parque das Dunas with 1172 hectares, characteristic of sustainable city profile; 2) existence of public parks: Parque da Cidade and Parque das Dunas; 3) some elements of green infrastructure (walkability areas, bike lanes and drainage ponds); 4) an urban innovation ecosystems, operating the Municipal Council of Science and Technology, being the only municipality of the state that has a policy of innovation; 5) large number of educational institutions (Universidade Federal do Rio Grande do Norte-UFRN, Instituto Federal de Educação, Ciência e Tecnologia do Rio Grande do Norte-IFRN; Universidade do Estado do Rio Grande do Norte-UERN, Universidade Potiguar-UnP and other higher education institutions); 6) organizations of environmental control and inspection; 7) invitation for a citizen engagement and participation in the process of decision-making; 8) the case of Natal as a platform for citizen-driven; 9) Initiatives to encourage a creative and innovative community-driven and enhancing co-design and co-creation; 10) actions related to a new digital economy; 11) business incubators and the technological parks (Inova Metrópole - Incubadora de Empresas do Instituto Metrópole Digital, ITNC – Incubadora Tecnológica Natal Central, Incubadora de Empresas Empreende UnP da Universidade Potiguar – UnP and inPacta - Inovadora em Processos Acadêmicos, Científicos e Tecnológicos Aplicados and Incubadora TECNATUS) and 12) a sharing economy under development. Considering all initiatives developed in Natal, can be seen components of a Sustainable City.

The Power of Photography in the Hands of Community Stakeholders

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Jane Jacobs once said in her book *The Death and Life of Great American Cities*, that “cities have the capability of providing something for everybody, only because, and only when, they are created by everybody.” When it comes to Urban Development, there are no greater advocates than those within the communities who work, play, educate, raise and live there. And this new world of technology has opened up new and exciting pathways to engage with communities like never before. This paper proposes altering a technique used by design researchers when they want to understand how users work with products. This method is called Users Picture Interview, and it’s basically engaging a user in a conversation about the photographs they have taken of their activities. The benefits of using such a research method are that it builds empathy with the user while capturing their point of view, grounds the conversations with artifacts, promotes learning in context and often reveals unexpected results. So what would happen if you put a camera in the hands of various stakeholders throughout a community with the intent of finding out how they interact with it? Its new name becomes Multi-Person Picture Interview, and it’s a powerful tool used to gather insights into the workings of any given community. You gain insights into the main players, the resources available both formal and informal, what the various members believe is needed to improve their communities, and where the “heart” of any community is located. The given community for this paper was the Cincinnati Homeless Community. This was a summer-long project that put cameras in the hands of various stakeholders, from police to social workers, to the homeless themselves to see how these varying members navigated their community. It allowed frank discussions to open up about a wide range of community aspects, be they good or bad, and where improvements big and small could be made. This tool has the ability to extend to various aspects of public engagement and accountability and can be an ongoing tool to understand how, in real time, people are choosing to utilize a community. For Urban Development to become sustainable, it must be able to sustain its communities, ergo it must study and engage within its communities.

Urban praxes and stakeholder engagement for public network strategies. Ecomuseo in Rome vs Superkilen in Copenhagen.

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The aim of this research is examining the critical role of municipal government in the complex framework of urban changing processes. The multiple problems affecting such an issue arise from the variety of stakeholders, along with their variously intensive degree of participation and involvement due to the fragmented institutional roles and powers. This may lead to notable contradictions between the map of the artistic endowment of a city on one hand, and the map of community engagement on the other. This chapter focused on a case studies analysis between Rome and Copenhagen, such as Eco-Museum "Ad Duas Lauros" and Superkillen. Within the many dilemmas and weaknesses presently exerting a strong impact upon the future orientation of suburbs areas, a suitable response can be provided for by an unconventional interpretation these suburbs through public art. In such a respect the experience of the Urban Eco-Museum "Ad Duas Lauros" and Superkillen are carefully examined due to their manifold role generated by their nature of powerful narrative device of the identity, from history to future horizons, of an area that can appear as a patchwork of suburban, creative, popular, partly neglected and partly gentrified, where the challenge of an emerging and multicultural society can only be played through an inclusive, participatory process focused upon versatility rather than upon selection. Policy implications for urban governance based upon the fertilization of stakeholders' views and desires are finally elaborated and discussed.

Keywords: sustainability, regeneration, social engagement, urban sustainability, cultural heritage, public administration.

Why people matter: Moving from rhetoric to practice in public engagement

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In 2017, the owner of a private ranch in a fast-growing small town in Kenya was killed. Attacked by communities that surround his fast growing 'little city'; a community that has felt left behind; forgotten and whose rights on access to natural resources seem to have been infringed upon, at least according to the community. Climate change impacts, resulting in severe and extreme droughts led to diminished resources for communities that live side by side with the rich sprawling privately run commercial property.

"Numerous attacks have taken place in drought-stricken Laikipia region in recent months as armed cattle herders searching for scarce grazing have driven tens of thousands of cattle onto private farms and ranches from poor quality communal land", BBC.

When development is happening at this pace, in an environment where there is a glaring difference in the access to water and land, how can investments by the private sector ensure that there are social contracts with communities, and that the environment in its management of water and land use are equitably shared?

The Partners for Resilience Alliance, led by the Netherlands Red Cross society is working with governments, communities and the private sector to find amicable and collaborative ways that the three sectors can jointly work together to ensure that there are incentives for all parties during investments.

PfR applies an approach called integrated risk management that brings together various principles on civic engagement, climate and ecosystem management for effective investments: -

1. The business case for resilience- Recognizing from a Development/Humanitarian actor's perspective that the private sector's primary interest in investment is from a business perspective, and thus, sustainability issues in Development dialogues must provide clear business cases and show business value. With this recognition, PfR asserts that putting local communities at the centre of business plans provides incentives through a healthy, economically secure society that can provide labour force, knowledge on local social issues, build trust within the community and become allies and offer solutions through indigenous structures on contested community perspectives on investments.
2. Climate risks and enterprise risk interface – there is increasing evidence that companies are moving towards implementing more environmentally responsible policies in communities where they have business interests. This is mainly directed at protecting capital assets including human capital that sustains supply chains.

Companies recognize that when tensions rise in communities where they have businesses, their capital assets suffer. In the Kenya case, not only assets were lost, but sadly human life was lost; Government lost investor confidence and the community itself lost opportunities for companies to further invest. The complexity with the Kenya case in question is the convergence of several issues on how climate risks interface with the company's finances, human resources, the need to comply with social norms, and the enterprise risk that saw company assets destroyed by a community-turned hostile because of what appears to be inequality in access to resources.

While huge financial investments for companies lie in mitigation, there is an opportunity that can be optimized for engagement on community resilience through addressing vulnerability to climate risks or negative business impacts (e.g. CO2 emissions, deforestation, disaster response).

3. Public Engagement and Accountability- to address some of the risks mentioned above, there must be a robust system for public engagement to facilitate accountability of all systems. In development, and particularly from an investment perspective, engagement of communities at all levels of investment- at planning, during implementation and after (through feasibility studies) must remain core in the Sustainable Development discourse. Communities are at the frontlines of interacting with businesses, and regulatory frameworks designed to hold all stakeholders accountable are only as effective as far as community knowledge exists on those instruments. Without this knowledge, sometimes interpreted by civic organisations, communities can be left in the lurch and accountability systems fail, especially in states with weak governance systems. As

4. PfR has a unique skill in mobilizing communities on issues of climate risks, ecosystem management and community resilience, has built confidence with communities through work done with local civil society organisations, collaborates with governments on developing risk reduction policies, and thus links to dialogues with the private sector and connects the three worlds of community, private sector and governments.

Urban Metabolism and Minority Pulse: An Education and Awareness Campaign Targeting Minority Groups

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The Sustainable Development Goals (SDGs) have set the 2030 agenda to transform our world by tackling multiple challenges humankind is facing to ensure well being, economic prosperity and environmental protection. However, the attainment of the SDG agenda will greatly depend on whether the identified synergies among the goals can be leveraged to all members of society including minorities. In contrast to conventional development agendas that focuses on a restricted set of dimensions, this study use the SDGs as a common language to educate the most vulnerable members of society through a number of tailored based solutions, educational criteria and interdisciplinary approaches. The study was developed in three phases through a collaboration between the Department of Architecture and Urban Studies at Politecnico di Milano (POLIMI) and Metabolism of Cities, (NPO). The pilot first phase consisted of a campus-wide awareness initiative at POLIMI advocating for the creation of an interdepartmental network of students, researchers, and professionals studying sustainability issues which took place between April-May 2017. In the period between June-July 2017, the second phase of the study was implemented through a number of community-based workshops and educational programs targeting minority groups. The third phase, of the policy guideline toolkit expect to assist education institutions and academia in developing minority tailored methodology replicated solutions. As a part of the slogan 'no one should be left behind' this study design a set of methodology, tailored criteria to educate and develop awareness on themes related to climate change policies, resource consumption behaviors and environmental effects with reference to SDG 12 and SDG 13. Target minority groups includes people with disabilities, children, elderly, students and academics, refugees and homeless, LGBTI+, and women. The study aim is twofold: (i) a methodological description and replicable approach of minority targets; (ii) an example guide explaining how to use and implement components. The replicable policy toolkit contains a set of tailored methodology actions, information on target populations, key considerations, and policy implementation recommendations.

Climate Change Adaptation in Coastal Towns and Small Cities

A Tale of Two Barrier Islands: Shishmaref and Miami Beach: Actual and potential adaptations and the SDGs

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Worldwide there is a very large (and unknown) number of small coastal cities and towns (CTSCs). Relatively little has been done to study their needs for and costs of adaptation (Major and Juhola, 2016). Moreover, the significant issue of linking small coastal towns and cities to the SDGs has not had the attention that it deserves. Two case studies discussed here are Shishmaref, Alaska and Miami Beach, Florida. They are both barrier island communities in the US, but are very different in wealth, needs, and impacts on the SDGs. These cases were identified in the course of developing a typology of CTSCs (see earlier work by Lehmann et al., 2018).

Shishmaref is an Inupiat (Native American) community of 600 people off the mainland north of the Bering Strait. Because of erosion due to current and future climate change, the only practicable long-term solution to maintaining the community is relocation to the mainland. Approved by voters in 2016, relocation would cost (2004 estimate) at least \$US 180 million. Funds have not yet been identified.

Miami Beach, across a bay from Miami, has a land area of 7.1 mi² (18.4 km²) and a population of 92,000 (2016). The population grows significantly during tourist seasons. Miami Beach already experiences serious flooding and the city administration is well aware of rising sea levels from climate change. Using primarily its own funds, the city has a US \$400+ million adaptation program of raising roads and installing water catchment basins and pumps to deal both with current flooding and rising sea levels.

Impacts on SDGs both locally and for national reports will differ in these two case studies and in others, indicating the need for detailed analysis in working with the SDGs. For example, climate adaptation in Shishmaref would impact not only SDG 11, Sustainable Cities and Communities, and SDG 13 Climate Action, but will impact nearly all of the SDGs relating to poverty, health, nutrition and education. Adaptation in wealthy Miami Beach will have considerable impacts on SDGs 11 and 13, but relatively fewer impacts on other SDGs. In considering potential impacts on SDGs at regional or national levels, the impacts of adaptation in Shishmaref would need to be scaled up by

including other settlements of the same type, whereas the larger impacts from Miami Beach can be identified separately or as part of the Miami metropolitan region.

An important next step should be a collaborative effort to identify the SDG targets and indicators (United Nations, 2016) that adaptation of CTSCs is likely to impact to a significant extent. Once a consistent set of targets and indicators is identified, reporting on the impacts of climate change adaptation on these can be a regular part of managing climate change adaptation in CTSCs.

References

Lehmann, Martin et al. (UCCRN Case Study Docking Station Team), “Annex 1: UCCRN ARC3.2 Case Study Docking Station: Overview and Methods,” in C. Rosenzweig et al., eds., *Climate Change and Cities: Second Assessment Report of the Urban Climate Change Research Network*, Cambridge: Cambridge University Press, 2018.

Major, David C., and Sirkku Juhola, “Guidance for Climate Change Adaptation in Small Coastal Towns and Cities: A New Challenge,” *Journal of Urban Planning and Development*, DOI: 10.1061/(ASCE)UP.1943-5444.0000356 (2016).

United Nations, 2016, Report of the Inter-Agency and Expert Group on Sustainable Development Goal Indicators (E/CN.3/2017/2), Annex III, Revised list of global Sustainable Development Goal indicators.

Adapting Coastal Towns and Small Cities to Climate Change: Assessing the Scale of the Challenge

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Coastal cities face many impacts from climate change, such as sea level rise, storm surges, flooding, erosion, and salt water intrusion. Major cities such as New York and Copenhagen, which have access to significant finance and expertise, have taken the lead and developed adaptation frameworks. In contrast, small coastal towns and cities (urban areas with less than 100,000 people) often have limited information about local climate change impacts, and lack the financial resources to develop appropriate adaptation measures. While steps for climate change adaptation are being taken in many countries at the national level, such strategies for adaptation do not necessarily translate into action in coastal towns and small cities.

To advance adaptation in coastal towns and small cities, a number of knowledge gaps need to be addressed (Major and Juhola 2016). Four priority areas for research are identified: estimates of the number coastal towns and small cities worldwide likely to be impacted by climate change; initial estimates of costs for adaptation for these settlements; focused, practical adaptation guidance for small coastal settlements; and guidance for national and external funding agencies.

This paper will present the current progress on first of the four priority areas mentioned above. Global spatial datasets, such as the Global Human Settlement (GHS) Grid (European Commission et al. 2015), SRTM30 and ASTER elevation data, are used, along with a classification methodology developed to identify coastal small towns and cities. Consequently, the number of coastal towns and small cities around the globe can be estimated, and classified further based upon some of their physical, economic, and demographic characteristics.

This research will inform research on the remaining three priority areas, which will involve collaboration with local governments, and with the Urban Climate Change Research Network (UCCRN), and includes developing further the work that has been outlined in the 2nd Assessment Report on Climate Change and Cities (ARC3-2) (Rosenzweig et al. in press). The outputs of this research will inform and assist coastal towns and small cities address their coastal adaptation needs.

This paper will contribute to the conference objectives by highlighting the interdisciplinary knowledge gaps that should be addressed to support and further

enhance adaptation policies and implementation in coastal towns and small cities around the world.

References

European Commission (2015): European Commission, Joint Research Centre (JRC); Columbia University, Center for International Earth Science Information Network - CIESIN (2015): GHS population grid, derived from GPW4, multitemporal (1975, 1990, 2000, 2015). European Commission, Joint Research Centre (JRC) [Dataset] PID: http://data.europa.eu/89h/jrc-ghsl-ghs_pop_gpw4_globe_r2015a

Major, D. C., & Juhola, S. (2016). Guidance for Climate Change Adaptation in Small Coastal Towns and Cities: A New Challenge. *Journal of Urban Planning and Development*, 142(4), 2516001. [http://doi.org/10.1061/\(ASCE\)UP.1943-5444.0000356](http://doi.org/10.1061/(ASCE)UP.1943-5444.0000356)

Rosenzweig C., W. Solecki, P. Romero-Lankao, S. Mehrotra, S. Dhakal, T. Bowman, and S. Ali Ibrahim

(in press): ARC3.2 Summary for City Leaders. Urban Climate Change Research Network. Columbia University. New York.

Community Development in Maputo Special Reserve, Mozambique

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Following a 17-year long civil war, Mozambique has had a long road to recovery. Poverty and governance have been monumental challenges for the country, especially given the damage the war caused to the natural environment. Much of the population live in rural areas that are either agricultural or forested land. Their livelihoods often depend or center on their natural environments.

This summer, I will be working with Peace Parks Foundation (PPF). As an international organization whose founding members include Nelson Mandela, PPF's mission is to ensure the conservation of biodiversity hotspots that span national boundaries. These transfrontier conservation areas (TFCAs) are incredibly important in protecting unique ecosystems, expanding ecotourism, and supporting local communities so that they can live more sustainable lives.

My work this summer will focus on Maputo Special Reserve, a relatively small park that falls in the Lubombo TFCA. This reserve suffered immensely during the civil war and has struggled to combat species loss and wildlife crime. PPF's presence there has helped build the strength of local institutions to deal with these issues through the frame of sustainable development. A part of their work has been to work with local indigenous communities to promote sustainable livelihoods, become integrated into the growing ecotourism industry, and provide alternatives to reliance on the fragile ecosystems.

This summer I will be conducting interviews and focus groups with local communities to help evaluate these ongoing projects. Using a buen vivir approach, I will delve into indigenous communities' relationships with their natural environment, their attitudes towards conservation efforts in Maputo Special Reserve, and their suggestions for improving the PPF community development projects' effectiveness. By using an appreciate inquiry framework, I hope to not just list the many challenges these communities are facing, but to highlight the ways in which these indigenous people support conservationism. I hope that through participant observation, I can glean more about their long history in the area, which makes them unique and invaluable sources of knowledge and perspective about the natural environment. I hope to channel some of this to PPF so that they can adapt their projects to serve this conservation area better- the people and the wildlife.

My presentation will provide an overview of PPF's ongoing projects and display the findings of my 3 months of field research (May – July 2018). I will highlight the importance of including indigenous communities in the conservation of their homelands as well as make recommendations for how this can be done more effectively.

Dolores after the tornado: community governance, environmental challenges and adaptations in Southwestern Uruguay

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The natural and built environments of rural communities of southwestern Uruguay have recently experienced significant transformations due to climate change and intensification of agriculture. Community governance can influence how communities respond to challenges created by natural and anthropogenic changes on community natural and built environments. Based on semi-structured interviews with key informants, participant observation, and digital spatial analysis (between 2003 and 2016), this article studies structural changes and community governance for adaptation to recent environmental challenges and natural disaster events in Southwestern Uruguay. Using the case study of the small town Dolores, this article explores community governance in collective decision-making processes and post-disaster housing challenges and solutions. Social and political capitals facilitated local mobilization and access to outside resources for adaptation after the community experienced drastic environmental challenges. Recommendations center on political capital as a key component for small rural communities to overcome dependency of outside resources and to reclaim and improve natural and built environments while strengthening multi-level relationships for adaptation.

Effects of localization on perceptions of storm surge risk depicted in model driven semi-realistic visualizations

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Coastal communities face uncertain but growing risks from storm surge and sea level rise (Romero & Emanuel, 2017), leading engineers and coastal managers to devise novel model-based tools to assess and visualize potential coastal hazards (Fenech, Chen, Clark, & Hedley, 2017; Spaulding et al., 2016). Landscape and urban planners and climate communicators have demonstrated that visualizations, including semi-realistic visualizations depicting storm surge like those considered in this research, may play an important role in localizing and making these impacts seem tangible to local communities (Sheppard, Shaw, Flanders, Burch, & Schroth, 2013). Questions have been raised about potential backfire effects, such the potential that risks that are difficult to depict visually will be discounted in favor of risks, such as sea level rise, that are easier to depict (Moser & Dilling, 2011). There are also concerns regarding the ways in which dramatic visualizations may distort viewer perceptions of probability and uncertainty (Kostelnick, McDermott, Rowley, & Bunnyfield, 2013). The extent of these effects, however, is uncertain due to long standing research gaps as to how semi-realistic visualizations shape risk perception (Bostrom, Anselin, & Farris, 2008; Kostelnick et al., 2013), and emphasis on practical applications of visualizations rather than basic research (Sheppard, 2005).

A quantitative survey (n = 735) was conducted to address these issues and better understand the effects of localization as expressed through place recognition and indicators of affective response. The purposive sampling method employed was designed to maximize differences in degrees of familiarity and relationships to the place visualized. Results reveal powerful effects of place recognition, and effects of affective response. Where personal stakes are high, however, (e.g., persons who recognize and live in a depicted community), these effects are in many cases associated with the discounting of risks and decreases in stated perception of risk. Numerous respondents reported feeling safe or safer (e.g., due to their home being located outside of the surge zone), confirming predicted backfire effects.

More generally, results suggest how place recognition and affect influence risk perception by altering perceptions of consequences. Graphic and representational decisions associated with the depiction of consequences are shown to potentially alter and undermine risk perception. These results give new importance and urgency to guidance by climate communicators regarding transparency as to inputs to models that underly visualizations (Schroth, Pond, & Sheppard, 2011), and other steps that affect the perceived authority and believability of visualizations.

Referenced works

- Bostrom, A., Anselin, L., & Farris, J. (2008). Visualizing seismic risk and uncertainty. *Annals of the New York Academy of Sciences*, 1128(1), 29-40.
- Fenech, A., Chen, A., Clark, A., & Hedley, N. (2017). Building an adaptation tool for visualizing the coastal impacts of climate change on Prince Edward Island, Canada *Climate change adaptation in North America* (pp. 225-238): Springer.
- Kostelnick, J. C., McDermott, D., Rowley, R. J., & Bunnyfield, N. (2013). A cartographic framework for visualizing risk. *Cartographica: The International Journal for Geographic Information and Geovisualization*, 48(3), 200-224.
- Moser, S. C., & Dilling, L. (2011). Communicating climate change: closing the science-action gap. *The oxford handbook of climate change and society*. Oxford University Press, Oxford, 161-174.
- Romero, R., & Emanuel, K. (2017). Climate Change and Hurricane-Like Extratropical Cyclones: Projections for North Atlantic Polar Lows and Medicanes Based on CMIP5 Models. *Journal of Climate*, 30(1), 279-299.
- Schroth, O., Pond, E., & Sheppard, S. R. (2011). Integration of Spatial Outputs from Mathematical Models in Climate Change Visioning Tools for Community-Decision Making on the Landscape Scale. *DLA-Digital Landscape Architecture*, 246-255.
- Sheppard, S. R. (2005). Landscape visualisation and climate change: the potential for influencing perceptions and behaviour. *Environmental Science & Policy*, 8(6), 637-654.
- Sheppard, S. R., Shaw, A., Flanders, D., Burch, S., & Schroth, O. (2013). Bringing Climate Change Science to the Landscape Level: Canadian Experience in Using Landscape Visualisation Within Participatory Processes for Community Planning *Landscape Ecology for Sustainable Environment and Culture* (pp. 121-143): Springer.
- Spaulding, M. L., Grilli, A., Damon, C., Crean, T., Fugate, G., Oakley, B., & Stempel, P. (2016). Stormtools: Coastal Environmental Risk Index (CERI). *Journal of Marine Science and Engineering*, 4(3).

Increasing resilience through intense science-practice collaboration in a coastal urban region

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This paper describes how a process of co-creation / transdisciplinary collaboration (Van de Ven & Johnson 2006) between an interdisciplinary team of scientists and of practitioners of different fields (urban and regional administration, harbor related economy, urban politics) of the urban region of Rostock worked (Deppisch et al. 2015). Rostock is located in the North-Eastern part of Germany, at the Baltic Sea and has around two hundred thousand inhabitants.

Here are presented the results of this collaborative process which mainly consisted of a commonly prepared prospective scenario planning process. This transdisciplinary process lasted for three years and dealt mainly with current and future climate change impacts on the coastal town of Rostock (ca. 200.000 inhabitants) and with ongoing and future land-use developments as well as interdependencies of both. The process not only focused on the city as such, but also took into account the wider suburban region and interdependencies between the city and its surroundings. This was also reflected in the stakeholders involved. The main outcomes of this science-practice collaboration were a new actor's network and an urban concept of climate change adaptation adopted by the City Parliament.

The guiding thinking behind the process was based on social-ecological resilience thinking and how to deal with non-linear as well as uncertain developments in order to reach a future sustainable urban development (Deppisch 2018). The process is reflected in its strengths and weaknesses in order to reach that aim as well as in its so far practically implemented and institutionalized outcomes.

Thinning sea ice and thawing permafrost: Climate change adaptation planning in Nome, Alaska

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As global greenhouse gas emissions continue to rise, climate models forecast further increases in temperature, more extreme weather events and a rise in sea-level. While risk to coastal communities in the far north is clear - with climate impacts occurring there more rapidly than anywhere else on Earth, planning for climate change adaptation remains a low priority for local government officials. Though this area of study is growing, empirical (key actor) research that critically investigates local-scale stressors and the decision dynamics around why and how communities incorporate planning for climate adaptation into policy and practice is still underrepresented with respect to small communities.

Located on the southern edge of the Seward Peninsula, Nome, Alaska is becoming increasingly vulnerable to thinning sea ice and thawing permafrost. In an effort to contribute to the literature, the proposed paper aims to explore these key climate stressors impacting the small coastal community, and to discuss the extent (e.g. embedded v. appendage actions) and nature (e.g. reactionary v. anticipatory) of adaptation planning.

As the intent of the research was to be investigative and probing, it included semi-structured interviews with a range of purposively selected local government decision-makers. For example, managers that could speak to governance around adaptation plan conception and development; planners that could address how implementation was incorporated into land use planning, transportation planning, infrastructure and utilities planning; as well as other key community (e.g. Mayor) and State officials. This method facilitated creation of rich context specific narratives, grounded in individuals' experiences around local climate change. Analysis of strategic planning documents was included in order to triangulated findings, and initially to help guide the research protocol.

Broadly speaking, this study sheds light on local scale climate stressors, and contributes to the literature by exploring decision dynamics around community adaptation plan/ policy conception and action implementation. Further, as Nome's experience is not unique, this study may provide decision-makers in other communities that have a similar set of climate related challenges, with insight into how to move forward with a climate adaptation program.

Climate Change Adaptation and Resilience Building in Agriculture

Advancing Climate Smart Agriculture accross the world

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In 2015, WBCSD Climate Smart Agriculture (CSA) Working Group (WG) members put forward a shared Statement of Ambition on CSA for 2030 which built on the WBCSD's broader Action Plan to 2020. The overall ambition is to:

Make 50% more food available and strengthen the climate resilience of farming communities whilst reducing agricultural and land-use change emissions from commercial agriculture by at least 3.7 Gt CO₂ eq/year by 2030 (50%). By 2050 the target is to achieve a 65% emissions reduction.

To support this, the CSA WG prioritised four action areas to address the most critical issues, and which most need collaborative action to address. These sit alongside actions taken individually by members, and incorporate key cross-cutting themes like gender:

1. Building smallholder resilience
2. Scaling-up investment in CSA
3. Improving Businesses' Ability to Trace, Measure and Monitor CSA progress
4. Implementing Agriculture-driven Zero Deforestation and Land Use Commitments.

These efforts cannot be achieved alone and WBCSD works together with a number of global partners to realize its ambition.

CSA is critical for realizing a 1.5 degree world and can only be achieved through effective partnerships and an improved enabling environment. The level of ambition across the private and public sectors needs to increase and governments and companies should increasingly look to set quantified science-based targets for the land use sector to drive progress and finance.

WBCSD's Statement of Ambition is expressed according to the three pillars. A stocktake of historical progress from 2010 to 2015 was measured by combining company-level measurement and monitoring efforts with data from external sources, such as SDG indicators. The purpose of this is to assess where progress stands under each of the three Pillars, and to inform collective and individual country action going forward.

- Productivity: trends indicate that we are on track to produce enough food to meet the demand for 50% more food by 2030. More holistic data is also needed on the inputs, throughputs and outputs of the food supply chain to properly assess the sustainability of the increased food production.
- Climate change resilience, incomes & livelihoods: the most widely reported indicator is total water use, which grew on average from 2010-2015. Companies need to work towards collecting more quantitative information on resilience to allow for the better assessment of this pillar, including activity data (e.g. training) and outcome indicators (e.g. incomes).
- Climate change mitigation: global direct agricultural emissions and company Scope 1 & 2 emissions both increased during the 2010-15 period, although companies did demonstrate some progress in reducing the intensity of their own operations. Harmonized indicators and further reporting is needed for Scope 3 emissions and data on post-production activities.

Our efforts to measure progress can be improved over time by: encouraging and building the capacity of companies to integrate CSA metrics into regular monitoring and evaluation protocols; sharing these monitoring and evaluation efforts across value chains and landscapes; facilitating transparent disclosure; and helping the uptake of decision-support tools for CSA to help boost CSA

Assessing Communication Channels for Scaling-up of Climate Smart Agriculture among Smallholder Farmers in Northern Uganda

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The challenge of climate change could result into low productivity and poverty by smallholder farmers are linked to lack of information and knowledge on climate, and low adoption of technology. In Uganda, agriculture is rain-fed and therefore susceptible to weather fluctuations. Communities and farmers are diverting to other small-scale business which poses a threat to food security, income generation and improved livelihood. The practice of climate-smart agriculture (CSA) is essential in order to enhance the country's capacity to realize its adaptation and resilience. The CSA practices promoted in Nwoya, Uganda are row planting, inter-cropping, mulching, minimum tillage and improved variety.

Purposive sampling methods was used to select three sub-counties in Nwoya district of Northern Uganda; Anaka, Purongo and Alero. These sub-counties were investigated to underscore the effectiveness of knowledge and communication skills pertaining to CSA. The sample size consists of nine farmers, five focus group discussion (male and female) and three resource personnel, all beneficiaries of CSA demonstration and gender survey project. In-depth interviews were conducted to elicit responses. Data analysis and reporting involved transcription of field notes and video documentary.

It was observed that climate change affected the farmers negatively in terms of food security and this was due to lack of adequate technical know-how and lack of climate service information. However, the study identified knowledge gap in term of adequate training for the smallholder farmers and appropriate information in implementing CSA practices effectively. In addition, it was observed that the mass-media (radio, mobile phone, newspaper, bill board) and inter-personal (government extension, farmer's organization, NGOs, agriculture service, agriculture fairs, demonstration, family, neighbours, existing knowledge) communication channels were used by farmers. The most accessible mass-media communication channel was radio while the most accessible inter-personal communication channel used by farmers was neighbours.

The study suggested that there should be a better understanding of those who are vulnerable to climate change and tailor adaptation to produce regular CSA information and communication materials for key stakeholders to support and inform policies, planning and agricultural advisory services. In addition, developing practical and applied

training materials and packages for training on CSA will help to strengthen CSA knowledge and information sharing networks/forums.

Keyword: Information, knowledge, climate smart agriculture, income and food security.

Assessing IFAD Value Chain Development Programme on Productivity and Income of Smallholder Farmers' in Obafemi-Owode and Yewa North Local Government Areas of Ogun State Nigeria

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Smallholder farmers are faced with the challenges of low productivity, poor access to market, poor processing technology, and vicious cycle of poverty. The International Fund for Agricultural Development (IFAD) intervention focused on agriculture using a value chain approach to enhance market access and increase productivity growth and income of smallholder farmers.

This study, therefore, assessed the effect of the IFAD VCDP on the productivity growth and income of smallholder cassava and rice farmers in Obafemi-owode and Yewa North of Ogun State, Nigeria. The VCDP provided input supports, agrochemicals, land development and preparation, agricultural processing and equipments and market interventions which are requisite value addition techniques. The beneficiaries of these supports are farmers in the different enterprise units (producers, processors and marketers).

Ogun State is one of the benefitting States of the IFAD Value Chain Development Programme (VCDP) in Nigeria. It comprises a traditionally agrarian population of cassava and rice staple farmers. Data were collected using structured questionnaires and focused group discussions. The sample size comprised 329 respondents made of 227 farming households in Obafemi-owode and 102 in Yewa North Local Governments Areas of Ogun State. Data analysis involved use of descriptive and inferential statistics.

Results revealed that the VCDP has contributed significantly to the productivity growths and income of smallholder farmers in Obafemi-owode and Yewa North of Ogun State, Nigeria. It also led to enterprise development, value addition and marketable surpluses. The study also identified the challenges confronting the VCDP, and opportunities for scaling up of the programme in Nigeria.

Keywords: Smallholder farmers, Value chain, Cassava, Rice, Income

Assessing the Water Quantity and Quality in the Upper Tana Catchment of Kenya: A case study of Embu and Kirinyaga Counties

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Climate change is presently a major driver of poverty as well as vulnerability of natural resources and poses a threat to livelihoods that cannot be ignored especially by poor countries and communities as they make efforts to end poverty and achieve sustainable development; therefore reducing the effect of climate change by building the adaptive capacity of communities to deal with the various levels of change especially in natural resources management is key in building resilience.

The availability of water in adequate quantity and quality for agriculture and other domestic activities is a necessary condition for sustainable development however, research has shown that Kenya is a water scarce country and this impacts on the social and economic development goals. The Upper Tana catchment in Kenya is home to 5.3 million people and the water the area provides is of critical importance to the Kenyan economy. It fuels one of Kenya's most important agricultural areas and provides half of the country's hydropower output but recently, the catchment has been affected by climate change which called for conservation efforts.

This study seeks to assess how the Upper Tana Natural Resources Management Project (UTaNRMP) has improved the quality and quantity of water in the Embu and Kirinyaga counties of the catchment. It does this by first developing a Water Vulnerability Index (WVI) to assess water resources in the Upper Tana Catchment and the Water Resources Users Association (WRUAs) as a community based organization in promoting water resources

Quantitative and qualitative data were captured through a representative sample of 421 households which was administered based on a randomly stratified sampling using the river basins in the counties with the aid of well-structured questionnaire. Focused group discussions as well as key informant interviews were also conducted. Data was analysed using descriptive and inferential statistics. Frequencies for the responses for the assessment of water vulnerability were categorized to form the sub-components of WVI such as resources, access, capacity, environment and use.

Results indicate that within the study areas, there are variances in the WVI of each county depending on the land, water-related livelihoods and also in relation to different

socio-demographic characteristics. It also shows that the WRUAs are key in the conservation of water resources in the catchment as they are made up of water users, riparian land owners, non-consumptive members and other stakeholders who are formally and voluntarily associated for the purposes co-operatively, sharing, managing and conserving a common water resource. The WRUAs have improved accessibility and availability of irrigation water, but still face a challenge of inadequate accurate data and knowledge as well as involvement of all stakeholders.

Key words: Water scarce, water vulnerability index, Upper Tana catchment, water resources users association

Assessment of Climate Variability, Post-Harvest Losses and Household Food Security in Kayonza District, Rwanda

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Attention shifted to addressing postharvest losses after the 1970s food crisis. But once food commodity prices fell, no one seemed to care. Now postharvest loss is gaining attention again given the blow that climate change is dealing with farmers' harvests across the world. Climate change is causing changing rainfall pattern, prolonged dry spell, flooding, soil nutrient loss, desertification, and invasion of pests and diseases. The smallholder farmers are susceptible to high losses during harvest and postharvest handling because of lack of postharvest technologies and management skills. Sub-Saharan Africa is witnessing worsened food insecurity because of its low preparedness to climate change. This is a region that is predicted to add an additional 1 billion to its current population by half this century. How then does Africa feed Africa? The Climate Resilient Postharvest and Agribusiness Support Project (PASP) was initiated by the International Fund for Agricultural Development and Rwandan Ministry of Agriculture and Animal Resources in 2014 to build the resilience of smallholder farmers to climate change, reduce postharvest losses and increase their income in 12 districts in Rwanda. Using a questionnaire, Focus Group Discussions and Key Informant Interviews, the study assessed the contribution of PASP to reducing postharvest losses and food insecurity among selected maize, beans and milk farmers in Kayonza District in the Republic of Rwanda. The results indicate that majority of the farmers cultivate 20-3000 kg of maize and 10-1000 kg of beans on 2 ha or less area of land and lose averagely 153 kg of maize and 100 kg of beans. Dairy farmers sampled owned between 2 and 30 cows, produce between 5 and 60 litres of milk and lose averagely 4.5 litres of milk. While many of the farmer cooperatives have received trainings and built infrastructures to increase their resilience, some still experience losses on-farm and off-farm. Farmers experienced climate variability in the form of droughts and invasive pests which affect their productivity. We found also that not many of the farmers have received training on irrigation and so have not adopted this to adapt to climate change. 50% of the farmers sampled in Kayonza District were food secure, 16.3% are food insecure without hunger and the rest were food insecure with hunger which may be connected to the serious drought that hit the district the last season. We conclude that since climate change impacts affect agriculture in many ways and at different stages, it is important to design solutions that can address all of these impacts together.

Keywords: Climate variability, Postharvest losses, Food security, Adaptation, Rwanda.

Assessment of the Effect of Rural Enterprises Programme's Business Development Services on Rural Livelihoods and Empowerment of Micro and Small Enterprises in Atwima Mponua and Kwabre East Districts of the Ashanti region of Ghana

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Micro and Small Enterprises (MSEs) are usually the core and key drivers of economic growth, innovation and job creation in an economy. They are the backbone of developing countries and majorly contribute to their gross domestic product. According to the government of Ghana, about 70% of enterprises are micro to small-sized and it is estimated that nearly 40% of Ghana's gross national income is attributable to informal sector activity. The Rural Enterprises Program (REP), sponsored by the International Fund for Agricultural Development (IFAD), Africa Development Bank (AfDB) and the Government of Ghana is part of Ghana Government's efforts to reduce poverty and improve living conditions in the rural areas. One of the major components of this program is "Access to Business Development Services" which comprises of Training, Counselling, Credit, Marketing Platform and Regularisation of Business.

This study focused on MSE beneficiaries of these business development services in the Antwima Mponua and Kwabre East districts of the Ashanti region of Ghana. These districts are a part of the third phase, (REP III) of the program in Ghana with a duration period of 2011 to 2019. The essence of the study is to determine the difference that these business development services have made to enhance the livelihoods of these MSEs and to determine the level of empowerment of beneficiaries prior to and after the business development interventions.

Primary data were gathered through the use of structured questionnaires, key informants were interviewed and in-depth interviews and focus group discussions were held. The Five Domains of Empowerment (5DE) sub-index of the Women in Agriculture Index (WEAI) were also employed. The study elucidates the effect of the Business Development Services on the rural livelihoods and empowerment. It clearly revealed that the MSEs had significant improvement in their means of livelihoods. Many of the MSEs also had improved levels of empowerment.

Keywords: Micro and Small Enterprises, Business Development Services, Rural Livelihoods, Empowerment

Climate Change Impacts on Agricultural Trade: A Fifty-year Evaluation

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It has been argued that climate change affects crop yields and prices, and can potentially alter permanently production and trade patterns in agricultural markets. The impact of climate variability on regional agriculture trade and its sub-sectors has not been thoroughly explored yet. This study assesses the impacts of temperature and precipitation on agricultural exports; first at a world aggregate level and then, by agricultural sub-sectors, geographical regions and economic levels. We use data for 67 countries covering the period from 1962 to 2014. We control for national income, comparative advantage in resources, technology and productivity, climatic zone differences, national agricultural policies, and trade membership. We use Prais-Winsten panel corrected regressions to produce estimates for six agricultural sub-sectors (grains, oils seeds, fruits and vegetables, tropical crops, livestock, and dairy), differentiating among eight geographical regions (US-Canada, Latin America, Central America, EU-15, ETE-Central Asia, Africa, Asia, and Australia-New Zealand), and higher-income and developing countries.

Findings suggest that over the period considered, increases in both temperature and precipitation have a significant impact on agricultural exports at all levels. In particular, rising temperature significantly reduces agricultural exports from Asia and Africa while it benefits Australia-New Zealand. Exports of grains, oil seeds, livestock, and dairy are found significantly vulnerable to temperature changes. Estimations further suggest that developing economies, in particular the lower-middle income and low-income economies, face a larger reduction in agricultural exports due to increases in temperature. While precipitation shows no significant impact on agricultural exports at the aggregate level, it evidences some sensitivity towards oil seeds in the sub-sectoral estimations. Exports particularly from Latin America and Asia appear significantly vulnerable to increased levels of precipitation. Similar to the temperature impacts, precipitation shows a large negative effect on exports from developing countries, in particular, the lower-middle income and lower-income economies.

This paper provides a detailed evidence that agricultural exports patterns are vulnerable to variations in climatic conditions. The findings are consistent with more limited earlier studies on agricultural production. This study's estimates could be used in further projections considering climate change as a determinant of agricultural production and trade.

Keywords: Climate change, Temperature, Precipitation, Agricultural trade, Regional trade, Developing countries.

Effect of IFAD Value Chain Development Programme on Economic Welfare of Smallholder Rice and Cassava Producers in Anambra State, Nigeria

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Anambra State is one of the six (6) States in Nigeria participating in the Value Chain Development Programme (VCDP) implemented by International Fund for Agricultural Development (IFAD) and Federal Government of Nigeria (FGN). The main objective of this study was to determine the effect of VCDP on smallholder producers' economic welfare (income and other services). The VCDP which is in line with the government's vision for agricultural development, is focusing on supporting cassava and rice smallholder farmers in Anambra State by strengthening farmer organizations through building their capacity to take advantage of existing market opportunities and overcome constraints along the value chain. It was hypothesized that availability of resources and boosting local production of rice and cassava through the VCDP would be very important to improving economic welfare of smallholder farmers.

Primary data were collected through well-structured questionnaires. A total of 358 respondents were randomly sampled and interviewed. Data analysis involved the use of descriptive statistics (means and frequencies) and inferential statistics (analysis of variance).

The results showed that VCDP has significantly led to the improvement of economic welfare of smallholder rice and cassava farmers in Anambra State. The State contributed to the level self-sufficiency in rice production and economic diversification policy of the Federal Government of Nigeria.

The study also found improvements in various aspects of farmers' economic welfare such as productivity growth, income, physical and financial assets, and access to market and social services since their involvement in VCDP. Recommendations focused on the strategies for improvements of the VCDP in Anambra State, Nigeria.

Key Words: Value Chain, Productivity, Self-sufficiency, Economic welfare.

Effectiveness of knowledge and skills development program on improving productivity of Smallholder Farmers' Organisations: A Case of Post-Harvest handling of Fruits and Vegetables in Lushoto, Tanga, Tanzania.

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The challenges of food insecurity and poverty in the East African Communities and Sub-Saharan Africa as a whole is a big threat to the fulfillment of the Sustainable Development Goal 1 and 2 which aim to have a world with no hunger and zero poverty. Lushoto District in the Tanga region of Tanzania is popularly known for farming of fruits and vegetables because of the mountainous terrain that it is, with bottom level farmlands suitable for growing vegetables all year round.

This study then seeks to assess the effectiveness of the deliveries of knowledge and skills development programs in improving the productivity of smallholder farmers who are classified by farm ownership of less than five acres of farmland per household. The study identified the post-harvest handling skills acquired and its effect on productivity, including quantity of crop loss after harvesting, and income of farmers.

Quantitative and qualitative data of a representative of 255 beneficiaries were captured through interviews with the aid of structured questionnaires. The quantitative data were analyzed using descriptive and inferential statistics. Qualitative data were also gathered through focused group discussion and in-depth Interview.

Results indicated that post-harvest handling skills of fruits and vegetables were acquired during the training which in turn had significant effect on decreased post-harvest loss of fruits and vegetables. The acquired skills also led to improved farmers' income as there was reduced post-harvest loss.

The challenges encountered by the effects of the training on improving the smallholder farmers' productivity were analyzed and climate change especially drought was identified, and recommendation for further training on how to be resilient to climate change by the farmers was given.

Keywords: Knowledge, Post-harvest loss, Productivity, Income, Climate resilience.

Exploring the growing degree-day of tea under the influence of climate changes in Taiwan

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Tea, being destroyed by Boston Tea Party in Massachusetts in 1773, spark of the Opium War about the middle of the 19th century, and one of the most desirable drinks and beneficial economic crops all over the modern world, has been hugely impacted by climate change, in which mean surface temperature has increased at the rate of 0.74°C and 1.4°C during the past 100 years globally and regionally in Taiwan respectively (Liu, 2015) during its cultivation. With meteorological modification of the growth prediction model relating to the growing degree-day (GDD) formula of tea, the opportunity of insight into more accurate harvest dates of tea under the influence of climate change in Taiwan is assumed to be close at hand. Data can be categorized into two sections in which the first refers to the dates of events operated by the managers of tea plantations from previous studies of Tea Research and Extension Station in Taiwan; and the second indicates meteorological observation data including temperature, in particular. Methods such as statistical means of the evaluation of coefficients of variance for the worldwide GDD formula and curve fitting approaches are utilized as analyzing tools. Regions of tea experiments and meteorological observation all locate in Taiwan. Practical values of a more accurate model for harvest of tea in Taiwan exist for the reasons listed below: risk management or risk control for probable damage from frost and snow during spring or excessive warmth during winter, proper workforce arrangement in tea plantation, advance preparation for manufactural processes, subsequent marketing strategies and positioning of product identities, and the most importantly, the resilience enhancement and consolidation of tea industry in regional Taiwan.

Keywords: tea (*Camellia sinensis* (L.) O. Kuntze), growing degree-day (GDD) formula, temperature, climate change, Taiwan.

Reference: Liu, C. M., 2015. Global Environmental Change (in traditional Chinese).

Farmers Labs: Learning for the climate change adaptation of Cacao Farming

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National Plan for climate change Adaptation (RAN-API) of Indonesia involves the agriculture sector as one of the vulnerable industry. Cacao is one of the important commodities in Indonesia since the country produces about 15% of the world's cacao beans and ranks third in terms of international production statistics [1]. Over 90% of the cacao area is owned by smallholder farmers as important actor in cacao supply chain [2]. This paper demonstrates practical vulnerability assessment framework and methodology on cacao value chains as potential vulnerable sector. The vulnerability assessment was conducted in cacao plantation area in Jembrana Regency as one of dry areas in Bali, Indonesia. This vulnerability assessment uses the potential correlation with climate variability of temperature and precipitation as exposure and cacao production as sensitivity with qualitative adaptive capacity suggestion. Findings of the study found that the low precipitation in the last 20 years has been affecting the optimal harvesting of cacao smallholder farmers are very vulnerable to climate change due to their low adaptive capability. Therefore, appropriate adaptations are needed for farmers. Some suggested adaptations are providing irrigation, starting on Good Agricultural Practices (GAP), introducing drought resistant varieties, and practicing agroforestry. This study also suggested to increase the adaptive capacity of smallholder farmers through introducing microfinance for the cacao farmers.

We found that farmers labs as an education platform for adaptation for farmers. This idea is based on the creation of a new area setting, adapted as agriculture laboratory or farmer field school, to place mix strategies of environmental education and learning for sustainability. The strategies are also combined with the whole system approach to cooperation among stakeholders. The area existence will be derived from the government or financial institution support, as part of the NGO programme and cooperation with existing farms. The system within the area will be managed by (youth) NGO, with active participation from the farmer's side, to shape and adjoin flexible goals. This idea is a win-win method, to work with the farmer's cooperation in building resilience in cacao farming.

How Food MNEs Promote Climate Change Adaptation and Agricultural Resilience Building

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Climate change has, and will continue to, have a profound effect on agriculture. Not only is climate change affecting what can be grown and where, but how frequently and in what quantities. And climate change does not care who is behind agricultural production or where they live. Small farmers and large agricultural companies alike will have to adjust to the changing climate conditions that affect their ability to grow viable crops. Unfortunately, those who have the most to lose from not being able to adjust to climate change are the small farmers, particularly those in developing countries. Of course, it is not just farmers who are at risk because of climate change; as food production suffers and the availability of food declines, everyone stands to lose. Sadly, it is those at the lower end of the economic spectrum – in developed as well as developing countries – who stand to lose most. So, given the risks climate change poses to agriculture, it behooves those involved in it to, if they have not already started, develop ways to be resilient as they adapt to climate change.

But it is not just agricultural producers who have to figure out how to be resilient. Those who purchase what agriculture produces, particularly large food-oriented MNEs, also need to be concerned, as agricultural producers are major elements of their supply chains. It is likely, then, that these large food-oriented MNEs are key promoters of climate change-associated resiliency strategies in agriculture. And, because the agricultural producers in their supply chains encompass both large, industrial-like farms and small, local farms, the resiliency strategies these large food-oriented MNEs promote can benefit both types of producers.

This paper will examine what a few select large food-oriented MNEs are saying about climate change-related resilience building in agriculture, with a focus on (a) what they are doing to protect their supply chains and (b) how they intend to support their suppliers to become more resilient. In addition to comparing and contrasting the different approaches the select large food-oriented MNEs take toward resiliency, the paper also will attempt to evaluate the strategies with respect to their likely impact on the agricultural producers themselves, especially small farmers in developing countries.

Linking Smallholder Farmers to Markets Enhances Productivity Growth: A Case Study of Rice Farmers in Ghana

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Smallholder farmers are the major players in agricultural production and food supply systems in Africa. However, poor access to market limits their productivity growth. This brings into focus the need to support smallholders to become less subsistence-based and more entrepreneurial by tailoring production to market forces.

Agriculture is one of Ghana's most important economic sector, employing almost half the population on a formal and informal basis and accounting for about 20% of GDP. The multiple challenges faced by smallholder farmers in Ghana pose major obstacles that prevent them from integrating into rapidly evolving national and international markets, which contributes to sluggish growth and lingering poverty in the rural sector. This is especially seen in the rice sector as it is estimated that about 66 percent of Ghana's domestic demand for rice is satisfied through importation from China, USA, Thailand and other nations whereas local production only satisfies about 34 percent of total demand. In the 2016 market year, it was discovered that 689,000 metric tons of milled rice was imported into the country to satisfy the increasing local demand of the commodity. This action has posed serious challenges to local smallholder rice production, making it uncompetitive in local markets.

This study assessed barriers to formal market participation by smallholder rice farmers, identified the factors that influence the decision of these farmers to participate in agricultural output markets, and recommended effective strategies to improve market access among smallholder rice farmers in Ghana. Purposive sampling technique was employed to select rice farmers in the Volta and Greater Accra regions. The study was conducted in Aveyime of North Tongu district, Weta and Afife of Akatsi South district and Asutsuare of Shai-Osudoku district. The sample size is made up of randomly selected 400 smallholder rice farmers. Data were analyzed using descriptive and inferential statistics. The results revealed that farm-level, social and economic factors enhance smallholder farmers' productivity and market access.

Keywords: Market access, Productivity, Smallholder farmers, Rice.

Participatory Assessment and Adaptation for Resilience to Climate Change

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Climate change and its effects on agriculture present a major global challenge to livelihoods. Agricultural adaptation and resilience to climate change are still poorly understood in the context of economic development, in part due to their complexity and paucity of data. Within the aim of achieving Agenda 2030, resilience and adaptation to shocks and stresses have gained importance. However, measuring and providing meaningful, action-oriented and empowering recommendations remains difficult. This is mainly due to strategies needing to be context-dependent, data intensity for analysis to truly empower people to become more resilient.

Traditional monitoring and evaluation tools are often costly and are not well placed to account for and assess complex, multi-dimensional dynamic livelihood attributes, such as resilience and coping mechanisms. While these approaches may be accurate in measurement, they often fail to empower respondents to take action. Approaches that have been developed recently range from econometric assessments using few quantitative indicators (e.g. RIMA) to fully participatory approaches (e.g. Christian Aid's BRAPA). Other approaches attempt to incorporate both quantitative assessments of resilience with a participatory approach that asks the interviewee for their own opinions and assessments of resilience (e.g. SHARP, which the co-authors co-developed).

While these approaches have merits, their drawbacks include a requirement for a large amount of information, significant time to administer the survey and data analysis burdens. They also tend to be time dependent, needing a baseline and endline to assess change. They typically fail to capture how farmers are actively addressing specific shocks and stresses or what lessons can be learned. Given these limitations, an opportunity exists to review alternative approaches and develop alternative tools.

Our approach and tool, PAARC – Participatory Assessment and Adaptation for Resilience to Climate Change, attempts to build on these tools. Rather than looking at the user as helpless in a challenging environment, PAARC helps to understand how users make conscious decisions to adapt and withstand specific shocks and stresses such as flooding, drought and conflict, which can require contradicting coping strategies. We aim to then further connect knowledge-holders whose farms have similar agro-ecological conditions and challenges, to better target knowledge-sharing between food producers, ultimately improving learning and resilience. This allows for the connection of the power of artificial intelligence and big data with (traditional) knowledge and

competences presently being used by farmers to surface potential actions to improve resilience. This is enabled by advances in technology (sensors, voice recognition, phone availability, as well as computational agroecology), which offer new opportunities to more easily and cheaply collect data (e.g. soil quality through sensors) as well giving access to marginalised groups' (e.g. illiterate people) views and knowledge.

Here we present our innovative approach to assessing and improving climate resilience through the PAARC tool. The methodology is presented with an emphasis on the unique approach to overcome existing assessment challenges. The paper then outlines how this approach can lead to empowering, action-oriented participatory approaches for agricultural communities to improve their resilience through discussions and knowledge-exchange.

Role of Warehouse Receipt System in Enhancing Smallholder Producers Access to Credit Facilities from Financial Institutions

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Access to credit has been a key challenge to the majority of smallholder producers in most of the African countries. The use of warehouse receipt system for stored produce as collateral for accessing credit can enable smallholder producers to access loans from financial institutions, while allowing them to postpone their sales when prices are low particularly during harvesting period. Access to credit can lead to increased investment in the agricultural sector which in turn will result into increased production and productivity for smallholder farmers, stimulating economic activities in rural area and bring about positive change to the rural populations due to increased incomes.

This study seeks to assess the relevance warehouse receipt system on the smallholder producers in accessing credits from financial institutions, timeliness of the credit issuance and measuring the level of participation of the financial institution in warehouse receipt system.

Qualitative and quantitative data of a representative of 339 respondents from four farmer groups were taken through interview with the aid of structured questionnaires and focus group discussion. Qualitative data were gathered from the financial institutions directly involved with the warehouse receipt system through key informant interview. The quantitative data were analyzed using descriptive and inferential statistics.

The result indicated the importance of the warehouse receipt system to the smallholder producers as its adoption increases their access to credit facilities, market period extension, marketing price, household income and reduction in post-harvest loss.

The lack of access to improved technologies has posed a difficulty for the financial institutions in disbursing credits to smallholder producers on a timely basis. The participation of the financial institutions were placed on the average level because financing a warehouse receipt system requires huge funding and the institutions are limited with funds.

Keywords: Credit, Warehouse Receipt System, Financial Institutions, Smallholder Producers

Scaling-up Sustainable Development Initiatives: A Comparative Case Study of Agri-Food System Innovations in New York, Senegal, and the South of Brazil

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To effectively implement the 2030 Agenda for Sustainable Development, decision-makers at different levels of government worldwide will have to get a handle on three key challenges: learning from Global North and South initiatives in tandem, taking stock of social innovations alongside technological fixes, and nurturing grassroots sustainable development initiatives next to, or in place of, top-down corporate and government projects and interventions. Current scientific literature and grant-making institutions have often reinforced the compartmentalized fashion in which we learn and draw policy lessons from North/South, social/technical, and bottom-up/top-down sustainable development initiatives, including local food system innovations. The strategic levers for global sustainable development lying in-between are thus left out. This paper addresses this omission by concurrently examining North and South American sustainable development initiatives in the domain of city-regional food systems through the prism of theories of socio-technical transitions.

Our analysis provides insights into how grassroots innovations in profoundly different socioeconomic and geographic contexts are driving system-wide transformations and transitions toward climate adaptation, resilience, and sustainability in the agri-food system. New forms of agriculture and alternative urban-rural linkages developed in the New York metropolitan region are examined together with innovations put forward by the Brazilian Landless Movement (MST) and the Ecovillage Movement of Senegal. We focus specifically on how the former is delinking from agribusiness and transitioning to agroecology, and how the latter is constructing alternative forms of grassroots sustainable development, drawing from West African village life and new green technologies. We discuss the implications of these transitions for multiple domains of sustainable development and different SDGs, with an emphasis on the relationship between ecological and public health and social equity. The joint analysis of the two cases offers also lessons on the key factors that have enabled grassroots innovations to scale up as well as the unique features of each transition pathway. The findings of this paper would be of value to scholars, government officials, and community groups engaged in transitioning agri-food systems to sustainability and interested in the processes of change that have allowed budding innovations to stabilize and scale up.

Trading Soils for Ceilings: Comparing the Resource Intensity of Vertical Farming to Conventional Techniques

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Vertical farming concepts have gained interest from the investment community since Dickson Despommier's 2009 article in *Scientific American*, receiving \$652 million in capital funding in 2017. Many existing soil-less vertical farming ventures tout resource conservation as a key value proposition over conventional farming techniques. Vertical farming has been identified as a potential component for future urban resilience and is represented in resilience-based initiatives like the Rockefeller Foundation's 100 Resilient Cities initiative and the Ellen MacArthur Foundation's Circular Economy 100. However, the total quantity of produce remains inconsequential compared to conventional farming. This study does not aim to refute any claims of proponents of vertical farming, but if the technique becomes of significance in the food system, it is worthwhile to understand the resource trade-offs compared to conventional methods that could better inform urban policy and planning.

This study develops a model for estimating and comparing the resources required to grow an equivalent quantity of leafy greens between the two methods. This model assumes a hypothetical scenario, "What if an entire neighborhood's production of lettuces and leafy greens could be replaced by locally-grown, vertically-farmed lettuces? What would the impact on land use be? On water? On energy?" This first requires a method for estimating the current annual lettuce production for a single neighborhood using demographic data. The neighborhood used in this study is the South Bronx in New York State, which contains the largest produce distribution center in the United States and is a likely destination for conventionally-grown produce.

With the South Bronx as a setting, the results of the model show a stark trade-off between land use and energy consumption; vertical farming requires just 2.8% of the land area but twenty times the energy to yield the same quantity of produce. A carbon footprint analysis further examines the impact of the two farming techniques on overall greenhouse gas emissions. Location becomes important for this analysis as a majority of lettuces grown in the United States are from one county and must be delivered to market via refrigerated truck, which requires energy to deliver in a market-ready form. In this analysis, vertical farming techniques release nearly fifty times more carbon dioxide per pound produced, which runs counter to the resilience claims of vertical farmers. Since much of the energy used in vertical farming is electricity, the greenhouse gas emissions for each facility is dependent on the fuel mix of the electricity provider (assuming each facility is connected to the local utility grid). This has two implications; the greenhouse gas emissions of each vertical farming facility is highly dependent on location, and that these facilities have an opportunity to decouple from the grid and minimize its carbon footprint by including more renewable resources.

Koronivia Joint Work on Agriculture: Proposals on Methods and Approaches for Assessing adaptation, Adaptation Co-Benefits, and Resilience

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The United Nations Framework Convention on Climate Change's (UNFCCC) COP23 Decision on Agriculture enshrines the Koronivia Joint Work on Agriculture (KJWA) (decision 4/CP.23). Through decision 4/CP.23, the UNFCCC requested both the Subsidiary Body for Scientific and Technological Advice (SBSTA) and the Subsidiary Body for Implementation (SBI) to jointly address matters related to the KJWA between the UNFCCC Conference of Parties (COPs) 24 and 26. The deliberations will take place as organised around workshops and expert meetings whose agenda is outlined in the KJWA. The first set of submissions from the UNFCCC Parties and observers were due by 31 March 2018 in preparation for the 48th Session of the SBSTA/SBI that took place mid 2018 in Bonn (SB 48). This paper quarantines itself to teasing out emerging proposals from the submissions by UNFCCC Parties and observers on topic 2(b) of the KJWA. Topic 2(b) focuses on methods and approaches for assessing adaptation, adaptation co-benefits and resilience. The topic is part of SBSTA/SBI 50 that will take place in May 2019 and as such limited submissions are publicly available. Using the document and critical discourse analysis methods, the findings are that, while methods and approaches are emerging under topic 2(b), these are dominated by agroecology, organic, agroecosystems and ecosystems-based approaches. It is also emerging that monitoring and evaluation is a key element, while there is a need to address both the hardware and software of climate adaptation and resilience in the agriculture sector that will bring up methodologies surrounding community participation.

Keywords: climate adaptation, agreement on agriculture, UNFCCC, methodologies, Koronivia

The performance of financial cooperative societies and networks in provision of products and service to rural communities – A case of Same Kaya SACCOS, Tanzania

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Rural microfinance services are essential for development interventions particularly for small holder farmers in Developing Countries. Most financial institutions regard low income earners as too poor, thus making it difficult for them to access loans and other financial services. According to research, many rural dwellers are not financially served by formal structures and about 40% of the populations in Tanzania are still excluded from the Financial System (World Bank 2017). The reluctance of the banking sector to reach out to these rural dwellers highlights the importance of cooperative societies. Cooperative societies enable development of rural business and land ownership because they increase access to affordable loans; increase household income, ownership of household assets and enterprise assets; encourage relationships; develop self-esteem and increase interdependence. Recognizing this, the Tanzanian post-colonial government attempted to use the cooperative movement to achieve inclusive socioeconomic development. Although this was not entirely efficient, it enabled small holder farmers to participate in production and marketing cooperatives, thereby creating better markets for their products. There are currently over 10,000 cooperative societies in Tanzania, with about 5,918 savings and credit cooperatives (SACCOS).

This paper therefore analyses the performance of SACCOS, financial products and services offered, as well as their effects on household incomes. The study was conducted in Same district of Kilimanjaro region, Tanzania. Data was collected through survey questionnaires distributed to members as well as key informant interviews. In-depth interviews were carried out among management staff of cooperatives. A sample frame of 4,900 members was identified; purposive sampling technique was employed to select 600 loan members, after which simple random sampling technique was implemented to collect data from 306 members. Stratified method was also adopted to conduct in-depth interviews with management staff of the cooperatives.

Results indicate that cooperative societies have a direct effect on household incomes. Studies showed individuals who had been in the cooperative for longer periods had considerably higher income profiles. The flexible loan recovery period and low interest rate also provided better satisfaction to members than formal financial institutions.

The findings of this study are relevant to enlighten policy makers to take active steps towards supporting rural microfinance institutions. Having identified the central role cooperatives play as a determinant of growth, there is a need for governments and private institutions to pay special attention to provide the right environment for them to

thrive. Increase in efficiency of cooperatives could cause ripple effects in terms of increased household incomes, better education, food security, ownership of assets and consequently, poverty reduction. This is vital in achieving economic growth and development and will serve as a step in the right direction towards achieving the Sustainable Development Goals.

Key words; Microfinance, cooperative societies, rural finance, development

What are the Factors Influencing Livelihoods Diversification and Afforestation in the Upper Tana Area of Kenya?

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Kenya is considered to be a low forest country with a forest cover of 1.7% which is significantly lower than the internationally accepted threshold while deforestation in the country's water towers is estimated at 50,000 hectares annually, with a consequent yearly loss of over USD 19 million. This paper assessed the factors influencing afforestation and the contributions of the Upper Tana Natural Resources Management Project (UTaNRMP) to livelihoods and environmental sustainability.

Quantitative and qualitative research methods were adopted for the study. The representative sample of 421 households was randomly selected and interviewed with the aid of a well-structured questionnaire. Focused group discussions and key informant interviews were also conducted. Data were analyzed using descriptive and inferential statistics, including chi-square, analysis of variance, and regression-based analyses.

Results revealed that afforestation in the catchment area has improved and the presence of Community Forest Associations (CFAs) has led to increased forest cover in most of the forests as areas initially destroyed have been rehabilitated and there has been enhanced species regeneration for instance in Gatere forest, 20 hectares of land has been planted with indigenous trees species with a survival rate of 85%. The project has also led to improvement in the level of mutual accountability, conservation awareness and learning. Communities have embraced new sources of income like ecotourism and beekeeping. Njukiri Muungano CFA in conjunction with Kenya Forest Service has established an ecotourism attraction facility. Also, Meru Forest Environmental Conservation and Protection (MEFECAP) CFA have received 150 energy saving stoves from the programme and now use an average of 3 pieces of firewood to make a standard meal which is a reduction from the initial 10 pieces used thus 70% savings in wood fuel through the use of energy efficient stoves that saves time and do not emit smoke. Tree nurseries establishment has generated employment opportunities to local people as both men and women household heads have an average of 47% assets as compared to the baseline report of 32%. Similarly, less than 5.5% of the households indicated no hunger in the last 3 months as opposed the baseline report of 12% and the poverty level reduced from 34% at baseline to over 27%. Results also revealed that social and economic factors significantly influenced livelihoods diversification and afforestation in the catchment area.

Overall, the UTaNRMP has contributed significantly to livelihoods diversification, increased level of afforestation, enhanced community-based mutual accountability and learning as well as ensured environmental sustainability. However, there is the need to put in place a sustainable natural resources management framework for enhancing a sustainable balance in afforestation and livelihoods in Kenya.

Keywords: Climate change, Agricultural livelihoods, Afforestation, Adaptation, Environmental Sustainability.

What is the Effect of Adoption of Innovative Rice Processing Techniques on Profitability and Empowerment of Smallholder Rice Processors? Case Study of IFAD Value Chain Development Programme in Niger State, Nigeria

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This study assessed the impact of the adoption of innovative rice processing techniques of International Fund for Agricultural Development (IFAD) Value Chain Development Programme on profitability and empowerment. The study analyzed the socio-economic characteristics of the adopters of the modern rice processing technique, determine their net returns, empowerment, and the identified the constraints faced by these rural poor households. A random sampling method was used to select 424 respondents from five participating local government areas in Niger State, Nigeria. Descriptive statistics, logit regression, ordinal ranking and women empowerment index were the tools of analysis. The study showed that education, access to credit and link to market access had the highest relative contribution to the disempowerment index, 70% of the respondents do not have autonomy in decision and income. The study showed that the average age of the processors is 37 years and about 54% of the respondents have informal education hence affects market access. About 70% of the respondents do not take decisions on production activities. The study reveals that education, autonomy of production, access to credit, and market linkage enhanced women empowerment in Niger State. Therefore, efforts should be made to prioritize these indicators and link the processors to the market for profitability.

Keywords: Empowerment, Market Access, Logit, Adopters, Rice Processing

Economics and Demography of Natural Disasters

Effects on Regional Population caused by the Kobe Earthquake Damages and Reconstruction Projects

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The 1995 Kobe Earthquake was an urban epicentral earthquake of magnitude 7.3, and it brought about six thousand people dead. Also, over one hundred thousand dwellings were completely collapsed and many reconstruction projects such as city redevelopment were conducted. After twenty years since the earthquake, social economic data had been accumulated, and the quantitative analysis method had largely progressed. Data maintenance of the grid square statistics had also progressed and provision for research has started. The government statistics are usually totaled by city level. There are the data quality problem such as mergers of cities and differences in a size. By the grid square statics, the reliability problem can be circumvented. The empirical analysis about social issue has been progressed. Many accurate policy analyses are conducted by scientific method such as using panel data or quasi experiment.

In this paper, we obtained the grid-square census data of wide Kobe area every five years gathered in the period from 1985 to 2005, and prepared a panel data. The first and second terms of these data were gathered before the Kobe earthquake, and remaining data were gathered after the disaster. The information about the housing damage and reconstruction projects was given to each grid-square from previous research. Also, the original index about population structure developed by cluster analysis was also given to each grid. Using the constructed panel data, time-series analysis about regional population following Kobe earthquake has conducted. The data analysis will visualize the effects of disaster damage and reconstruction projects toward local population. Furthermore, this research tries to clarify relationship between prior regional trends and disaster reconstruction situations. This empirical research method will be applicable to the Great East Japan Earthquake and Tsunami Disaster of 2011. It will lead to evaluation of the huge reconstruction projects in Tohoku region. And it will be useful information at the time of reconstruction planning after the future massive disaster like anticipated Nankai Trough Earthquake.

Exposure to floods and earthquakes in Europe: demography variability in daily and seasonal cycles

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The analysis of natural disaster risk is hardly complete without assessment of potential or effective population exposure. Population exposure is a major component of disaster risk, and for many hazard events, especially those extreme or above a certain magnitude, can be a major determinant of impacts. Human activities (work, study, leisure) create wide fluctuations in population distribution at a variety of spatio-temporal scales. These dynamics can greatly modify the patterns and assessment of population exposure, particularly for rapid onset hazard events such as earthquakes, tsunamis, and floods. However, the lack of data on population spatio-temporal dynamics, frequently limited the risk analyses to residential population exposure with few exceptions for small areas and case studies. This could result in a decision-making bias at several stages of the emergency management cycle with possible dramatic consequences on impacts.

In the context of ENACT (ENhancing ACTivity and population mapping), we produced for Europe (EU28) a set of seamless nighttime and daytime population density grids at 100 m for each month of the year, taking into account human activities and induced major daily and monthly variations. We created these spatio-temporal grids by obtaining and merging official statistical census data (resident, workers per activity class, students, tourists) at regional level with geo-spatial data from conventional sources (e.g. Corine Land Cover) and non-conventional data (e.g. Booking.com, OpenStreetMap, TomTom, TripAdvisor.com). We validated such grids and we will make them freely available to the public.

These grids represent a significant advance in risk assessment; they open the way for a consistent and detailed analysis of the daily and seasonal variations of population exposure across 28 countries inhabited by more than 500 million people. By combining these population grids with the most recent hazard data on seismic and flood hazard, we are able to map and quantify variations of population exposure, to study their spatio-temporal patterns, and identify potential daily and seasonal exposure hot spots. In particular, we show (i) how schools cycles and tourism seasonal patterns could modify the current reference exposure; and (ii) how nighttime exposure could strongly misrepresents daytime exposure.

Although most useful as risk assessment baseline, such population grids can benefit the Disaster Management cycle in all phases and promise to considerably improve natural hazard risk assessment models.

Long-Run Growth Impacts of Natural Disasters and the Connection to the Spatial Pattern of the Natural Hazard

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Natural disasters are known to have devastating immediate impacts. However, the long-run impacts of natural disasters on economic productivity are not yet well enough understood and some studies have even suggested positive impacts. Hsiang and Jina (2014) argue that the inconsistent results in the literature might be due to not sufficiently taking into account the physical nature of the hazard. They provide a comprehensive study of the long-run growth impacts of cyclones and find significant sizable negative impacts, but they do not consider other types of natural hazards. This study finds comparable impacts on growth for the natural hazard of earthquakes. In particular, the results suggest that an average (non-zero) exposure reduces GDP per capita by 1.9% 8 years later. Additionally, the inherent spatial patterns of the different natural hazard types are found to have important implications for the spatial aggregation approach. A panel dataset of country-year observations of earthquake shaking and economic variables from 1973 to 2015 is constructed for this study and the random within-country variation of shaking over years is exploited to identify the causal effect of earthquakes on economic growth. A comparison with an approach that uses magnitude, reveals that using actual shaking data is crucial to identify the impacts of earthquake exposure. Unlike the findings of Hsiang and Jina (2014) on cyclones the results here suggest that the impacts on growth are primarily incurred by low and middle-income countries and that high-income countries are potentially even able to experience positive “building back better” effects. Moreover, impacts are primarily driven by (local) high intensity events and not by spatially large exposure to lower intensity shaking. This study concludes that different natural hazard types might require systematically different approaches in how they are integrated in a quantitative model to study impacts, due to the geophysical differences between them.

Migration Response to Tsunami Risk: Evidence from Nankai Trough Earthquake Predictions in Japan

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Large natural disasters cause catastrophic impacts on affected areas, claiming countless human lives, destroying homes and local infrastructure, and devastating economic activities. In 2011, a magnitude 9.0 earthquake and its subsequent tsunami struck northeastern Japan along the Pacific coast, resulting in a loss of nearly 20,000 human lives. In response to this catastrophic event, the Central Disaster Management Council (CDMC), which is a governmental committee for disaster management planning, released the latest report on the estimated damages from the next Nankai Trough earthquake in August 2012. The Nankai Trough and its underlying fault are the major source of the future devastating earthquake in Japan. The new report includes the estimated tsunami height for each municipality, which was updated from the previous one released in 2003.

We exploit the release of the CDMC's updated tsunami prediction as a natural experiment, and identify the causal impact of tsunami risk on human migration across municipalities in Japan. Moving to alternative locations is a form of risk mitigation strategies. People can out-migrate from risky areas or in-migrate into safer areas to protect themselves from the potential risks of disasters.

Our empirical analysis is based on the municipality-to-municipality migration flows taken from the 2010 and 2015 census of Japan, covering both before and after the release of tsunami predictions. The Japanese census is conducted every five years and collects information on the respondent's place of residence both at the time of the survey and 5 years before, allowing us to use detailed migration flows across municipalities. With over 530,000 migration flow observations, we found that higher tsunami predictions can increase the outflow from the municipality and decrease the inflow into the municipality, particularly among younger population. Our empirical findings are robust to the inclusion of various controls such as demographic and socio-economic characteristics, unobserved municipality-level fixed effects, and the impact of 2011 Tohoku earthquake. Further empirical analysis suggests that migration responses are weaker in municipalities by which extensive disaster prevention activities have already been undertaken in advance.

Natural Disaster Risk and the Distributional Dynamics of Damages: a Global Analysis

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Literature on climate change and extreme events has found conflicting and often weak results on the evolution of economic damages related to natural disasters, even if climate change is likely to bring about an increase in their magnitude (Van Aalst, 2006, IPCC 2007, 2012). These studies usually focus on trend detection, typically by means of mean regression techniques on yearly summed data. Using EM-DAT data (which we geolocalize entirely, so to recover cell-based climate information through spatial-matching), we enrich the analysis of natural disasters' risk by characterizing the behavior of the entire distribution of economic (and human) losses, especially high quantiles. We also envisage a novel normalization procedure to control for exposure (e.g. number and value of assets at risk, inflation), so to ensure spatial and temporal comparability of hazards. We document a rightward shifting and a progressive right-tail fattening process of the global distribution of economic damages both on yearly and decade aggregated data, by means of moments and quantiles analysis and non-parametric kernel density estimations. Rise in economic damages appear to be particularly dramatic in case of big storms (as well as, on the spatial dimension, in tropical and temperate countries). We further analyze trend evolution more formally by means of quantile regressions. We find that upper quantiles of human losses tend to decrease globally over time, mostly due to adaptation to storms and floods, with extreme temperatures killing more people nowadays. We also document a worrying polarization between rich and poor countries. For what concern economic damages, whatever the set of controls, we provide evidence of a substantial increase in the upper quantiles of the damage distribution, at an increasing pace along quantiles. Such estimates might be even conservative, given the nature of biases possibly affecting the dataset. Moreover, results show that mean regression would systematically underestimate the real contribution of the right tail of the distribution in shaping the trend itself. In this view, we claim that our results explain anemic results in trend detection, with mean behavior palely reflecting meaningful changes in the right tail.

The Effects of Dust Storms on Economic Development

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Dust storms are a fact of life for populations residing in semi-arid environments and can result in a variety of immediate and long-term impacts. Reports have included evidence of people suffocating due to airborne dust, transport networks being disrupted and leading to traffic accidents, as well as increases in asthma attacks. However, there have been no studies that have linked dust storm activity to macroeconomic outcomes. I find evidence that economic growth in West Africa is reduced by 7-10% per standard deviation increase in AOD after 3 years. Agricultural yields decline on average by 3%, with some crops showing much larger declines. Households are found to respond to these shocks by allocating labor away from agriculture and into home enterprises. I use the recently-developed MERRA-2 Reanalysis of Aerosol Optical Depth (AOD) to measure dust exposure. Since AOD is sensitive to other aerosols beyond dust and could be affected by local economic activity, I instrument local AOD using AOD observed over the Bodele Depression of the Sahara Desert, the primary dust source of the region. The effects found here could contribute to low levels of economic development in the region, and indicate that dust storms should be considered an important part of geographic endowments alongside other climate indicators.

The Protection Effect of Constitutional Human Rights during the Natural and Manmade Disaster, 1970-2007

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In the past ten years, a series of papers by myself and others has demonstrated that introducing a wide variety of human rights provisions into national constitutions lead to the improvement of their implied outcomes in the real world. The literature finds that the introduction of a right to education, health, and environment into national constitutions is associated with increases in PISA scores, reductions in child mortality, and increases in access to improved water sources and sanitation without changing the composition of government's budget allocation for each sector. These pieces of evidence suggest that governments restrained by constitutional human rights, on average, work harder toward the realizations of these human rights in peace time, but no study up to today has examined how bounded governments restrained by constitutional human rights behaves during the emergency situation? Using the data from Matsuura (2013) and EM-DAT, this paper examines the protection effects of constitutional right to health on population health outcomes when natural and manmade disasters strike. We found that child mortality is less likely to increase when natural and manmade disasters strike in countries whose government is restrained by constitutional human rights.

Clean and Affordable Energy as a Keystone for Sustainable Development

A Proposed Solar Energy Efficient Sustainable Street Light System: Case Study University Of Nigeria, Nsukka

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Illumination of streets at night is a very important concern in society, as this could go a long way to prevent, or curtail to a large extent the rate of crime during dark hours. Although it has a strategic importance for the economic and social stability of a developing country, the amount of energy that is consumed by the streetlight systems is large. Ten to thirty per cent (10 to 30%) of the total energy supplied in a country is consumed by streetlight system. Street lights are heavily dependent on energy whose costs run into billions of dollars annually. The great consumption rate is mainly due to the primitive form the streetlight systems take, they tend to have a single controlling source, ON and OFF with a single light intensity (full beam) when turned ON, and are left fully ON all through the night. These features do not give room for flexibility of control leading to great energy waste. On a number of occasions these street lights are left ON during the day too, increasing the amount of energy consumed due to manual operators. The problems of Nigeria's power sector are numerous, with increasing power tariffs and frequent power cuts and exorbitant bills. The total amount of electricity generated in Nigeria is less than 6GW. It is therefore not possible to use even 15% of this generated energy; diesel generators are therefore used to power the street lights increasing the Carbon footprint. An insight is therefore made to as much as possible look for an alternative but steady source of power. Solar electricity is one possible way to overcome the erratic power supply by installing solar streetlights. Using the University of Nigeria as a case study that uses conventional lamps for lightning requirements this work discusses the current energy consumption rate of the streetlight system compared with the amount of energy generated. It is estimated that the University consumes about 350,000KWh of energy annually on streetlights alone with an annual cost of about N 9 million, roughly \$30,000. An energy efficient system that maximizes the solar potential by using solar powered LED (Light Emitting Diode) street lights, introducing sensors to turn the lights ON and OFF; reducing the illumination by as much as 40% by introducing motion sensors is therefore proposed. By partitioning the University into sectors, the number of panels and battery storage is also reduced considerably making the system more economical. This system has a twofold advantage, reducing the cost to the University as well as exploit the renewable energy available thereby reducing the Carbon footprint.

A Sustainable Solar Power System for the University of Nigeria, Nsukka using Micro Inverters.

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Nigeria is faced with a number of problems in the power sector, where about 50% of the population currently live without electricity, leading to a majority of 77% of the population relying on alternative power sources. These power sources are fuelled by petrol or diesel leading to a rise in the Carbon footprint through its emissions. In Nsukka, the average power consumption of electricity is about, 19,000 KW/hr., out of this the University of Nigeria consumes about 3,000KW/hr., though only a fraction of this power is supplied from the local power provider resulting in load shedding. The University due to a special agreement is given special consideration and receives a majority of this power with minimal load shedding paying as much as about \$100,000/month. This deprives the local industries of power during the day, leading them to use alternative power sources thereby increasing their cost of production and making a negative impact to the environment through the carbon emissions. Harnessing solar power is a viable cleaner energy source where the economic and environmental impact of the solar powered system clearly reduces the carbon footprint, leading to virtually zero emission, clean and green sustainable system. However, the cost of this system is immense, with a major cost being storage with an estimated rate of \$400 dollars per kilowatt hour (kWh). Taking this into consideration a design to set up a solar farm for the University using micro inverters is proposed that would be able to provide AC power during the day. Here, each panel, has its own micro inverter attached to the back side of the panel. The panel still produces DC, but is converted to AC on the roof, and is fed straight to the electrical switchboard. AC electricity is sent to the switchboard where it is directed to the various circuits and appliances in the University at the time. Any excess electricity produced would be sold to the electricity grid. The main objective is to reduce the Carbon footprint, as the power from the generation companies no longer required by the University during the day could be used to supply the local industries reducing their overhead cost of production while also being less dependent on fuel generators. The huge cost of power bills to the University would also be reduced, since the load is more during day, where the increased load of air-conditioning and lab equipment would be compensated. This system will ensure that the University over a period of time would eventually be self-sustaining in terms of its power needs producing a clean sustainable energy system.

Addressing Renewable Energy Conundrum in the DR Congo: Focus on Grand Inga Hydropower Dam Project

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The DR Congo is a resource-rich country with a major energy potential. Nevertheless, it has experienced a severe energy crisis. Most of the population does not have access to electricity. Also, the energy deficit has hampered the country's economic development, notably in the copper-cobalt belt of the ex-Katanga province. With the World Bank's support, the Government liberalized its energy sector in 2014. It opted for promoting the development of renewable energy, especially the Grand Inga hydropower dam project. Such an infrastructure project aims to ensure access to affordable, reliable, sustainable and modern energy for all. In this regard, it is in line with the Sustainable Development Goal (SDG) 7, one of the 17 SDGs of the UN 2030 agenda for sustainable development.

The paper analyzes key orientations of the country's energy policy. It examines the Grand Inga hydropower dam project with a capacity of 40,000 MW, which is estimated at USD 80 billion. The large-scale infrastructure includes the Inga 3 dam (a first phase), which will mainly provide electricity to mining companies in the ex-Katanga province and South Africa. The development of the Inga 3 dam is confronted with political, geostrategic, and financial challenges, notably the suspension of the World Bank's funding in 2016. Meanwhile, the energy sector remains under high pressure in the DR Congo facing political instability and insecurity in the eastern provinces. Given the development of climate-friendly technologies, especially the electric-mobility, the downstream companies have plans to secure cobalt from the DR Congo. However, mining companies of the copper-cobalt belt might fail to respond to the need of the downstream companies due to the lack of a reliable and affordable energy supply

Policy recommendations suggest that further transparency in implementing the Grand Inga project is required for restoring donors' confidence and improving the electrification process, while the country continues to strive for political stability and sustainable development.

Applying Systems Thinking to Integrate Sustainability in PPPs for Mini-grids: Bukuya Mini-Hydro Case Example

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A key challenge in the electrification of rural communities using renewable energy mini-grids is to create a technical, business, and community solution which not only offers long-term sustainability, but also works to improve the skills and economic prosperity of the impacted communities. This challenge is further complicated by the need to ensure the affordability of electricity, while at the same time lowering the demand for direct economic assistance and incremental financial instruments needed to support mini-grids.

The opportunity to overcoming this challenge is highlighted through the practical use of a systems thinking approach to improve the sustainability of the electricity supply, and the livelihoods of the impacted communities, through developing and implementing a Public Private Partnership (PPP) for a renewable energy mini-grid. The approach focuses on addressing the following seven key system parts (or concepts): inclusive and unbiased stakeholder engagement, electricity demand and affordability, electricity generation and distribution system, PPP business and financial model, increasing household income generation, capacity building, and governance & transparency. Each key system part is addressed by causal loops which influence the household, community, and national levels.

In focusing on the seven system parts, this approach has the potential to contribute to achieving the Sustainable Development Goals (SDGs) at the rural community and national levels. Specifically, by addressing Gender Equality (SDG-5), Clean and Affordable Energy (SDG-7), Decent Work and Economic Growth (SDG-8), Reduce Inequalities (SDG-10), and Partnerships for the Goals (SDG-17).

This systems thinking approach is highlighted through the actual efforts used to implement a PPP for the Bukuya Mini Hydro Project located in Ba, Fiji. Which is the first known PPP in Fiji for providing small scale electricity services via a mini-grid. This example highlights the specific challenges faced by small island developing states in providing affordable access to electricity in rural areas, and presents the means used to address these challenges through an innovative PPP framework model developed through systems thinking approach.

Acknowledgements:

The PPP for the Bukuya mini-hydro power project was carried out under the Fiji Renewable Energy Power Project, supported by the Green Environment Facility, United Nations Development Programme, and the Government of Fiji (Department of Energy). The PPP was implemented through the joint efforts of the villagers of Bukuya, Tabalei, and Natabuquto in Fiji, the Bukuya Mini Hydro Power company, the Bukuya Rural Mini Hydro Co-Operative, Siwatibau & Sloan, and Grue & Hornstrup.

Breaking down silos: simulating consumer investment decisions in the multi-actor UK retrofit system

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With energy use in UK domestic buildings accounting for nearly one-third of the country's total final energy consumption (Department for Business Energy and Industrial Strategy, 2017), there is a consistent interest in systems analysis research on the barriers and drivers to domestic building retrofit. The differences in how actor groups perceive and overcome retrofit barriers in the UK residential sector have been highlighted in previous research, and the importance of understanding them in creating robust policies and incentives has been highlighted. The purpose of our research is to identify, quantify and model actor-specific barriers and drivers to the uptake of energy efficiency measures, considering interactions between actors in the sector. This paper will focus on the conceptualization of an agent-based model (ABM) which seeks to simulate these barriers and drivers, and is integrated into MUSE[®] (ModUlar energy systems Simulation Environment), a technology-rich, global 28-region simulation model of long-term energy transitions being developed at Imperial College London.

The purpose of this ABM is to simulate the adoption of energy-saving technologies by resident agents, considering their relationship with different actors in the retrofit system, including their peers. The decision to adopt is simulated as a deliberative decision-making process, based on the Theory of Planned Behaviour (Ajzen, 1991). Within this process, the impact of agents' interactions with their peers on their decision is simulated by incorporating subjective norm constructs (descriptive and injunctive norms) into the decision-making process. The impact of agent's relationships with other actors in the retrofit sector is simulated by assigning a level of exposure to and trust in these actors (such as public authorities, landlords and energy companies), thereby simulating the likelihood of the actors having an effect on the agent's decision to adopt a retrofit measure. These interactions of agents with their peers and with actors in the sector thus affect the decision of an agent to adopt a retrofit measure, in addition to the effect of the agent's characteristics (such as risk aversion and socio-demographic characteristics) and the characteristics of the technology (capital cost, availability of financing, payback period etc.).

The purpose of incorporating interactions into the agent decision-making framework is to represent, as realistically as possible, the heterogeneity of residential consumers in the UK retrofit sector. Once developed, it is hoped that the ABM will be able to support policy-makers and industrial actors in understanding how the interactions within the retrofit sector affect consumers' propensity to invest in energy-saving measures, thus

identifying the gaps and opportunities for incentivising uptake of retrofit. Conceptually, this model aims to break down the “silos” within which decision-making for retrofit uptake is assumed to occur, and provide a better picture of the complex interactions within the sector, leading to improved design and delivery of policies and programmes to increase energy efficiency in the residential built environment.

References

Ajzen, I., 1991. The Theory of Planned Behavior. *Organ. Behav. Hum. Decis. Process.* 50, 179–211.

Department for Business Energy and Industrial Strategy, 2017. *Energy Consumption in the UK*. London.

Challenges in the sustainability of hydroelectric projects and energy access in the Brazilian Amazon.

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Despite the environmental and ecological importance of the Amazon region, today it is considered the epicenter of hydropower development in the world, given its great hydroelectric potential. Hydropower development continues to represent a practical solution for achieving SDGs at local and national levels in Brazil. The participation of the Amazon in the generation of energy continues to increase, from 2015 to 2018 it represented approximately more than half of the constructed energy infrastructure, surpassing other sources such as wind, solar, biomass and thermal energy. One of the key development challenges in the Amazon region is the general lack of access to basic infrastructure services, such as electricity, in many growing urban areas, which are the fastest growing in Brazil. This lack of access contrasts to the large amounts of power generated at hydropower plants recently built in the Amazon, and distributed through the national grid. This paper will present the main sustainability challenges of two hydroelectric projects in Brazilian Amazon in ensuring access to affordable, reliable, sustainable and modern energy for all, as defined in the UN Sustainable Development Goals (SDGs). In Brazil access to electricity is considered a citizen right, and it is being implemented mostly through grid expansions from the government led program Luz Para Todos (Light for All). In the Amazon, the grid expansion model is not a cost-effective measure to meet electrification. The high costs of expanding the SIN to reach low-income communities located at the end-of-the line has made off-grid energy systems common solutions to energy access. Diesel fueled generators continue to be one of the main energy sources for these communities, which in this case are living close to a hydropower plant. The paper will give emphasis to sustainability challenges in energy provision by hydropower projects, based on infrastructure assessments made with the Envision® rating system methodology to two hydroelectric plants operating in the Jari river, and in the Madeira river. In addition, the paper will include input from findings from field research done in these hydroelectric plants located on Jari River and the Madeira River as part of the Harvard Brazil-Cities Initiative.

Demystifying sustainability: a more proactive approach to electrifying the global south

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Coinciding with drives towards clean and sustainable energy access for all, renewables have been repeatedly identified as instrumental in bridging the widening energy access gap, especially for off-grid rural communities in sub-Saharan Africa (SSA). Yet their development is not without issue. This research paper takes a critical stance towards the “renewables is best” narrative by examining the electrification policy for off-grid homes in rural South Africa and the rollout of solar home systems (SHS).

In analysing the performance of the SHS, we first model and simulate the potential output of SHS across locations in selected provinces in South Africa. Next, we model and simulate the typical performance of our proposed hybrid generation scheme (HGS), which advocates for a centralized generation scheme consisting of solar photovoltaics (PV), battery/storage and, perhaps controversially, a backup diesel generator. Our HGS also incorporates a modified genetic algorithm (MGA) - an artificial intelligence (AI) tool for the direct load control (DLC) of high energy devices like cookers and pressing iron. For both cases, the results obtained are (1) used in generating a comfort-Duration plot and (2) critiqued using the energy justice framework developed by Sovacool and Dworkin (2015).

We find that across most provinces, the SHS in the first scenario performs poorly and further exacerbate poverty for households while contributing negatively to their quality of life (QoL). This is due, largely, to their inability to counteract the negative impact of weather stochasticity. Further, we show that the SHS in the first scenario fails to guarantee sufficient electricity and energy mobility for most households (important indices for development). In contrast, our second modeled scenario using the proposed HGS is shown to guarantee sufficient electricity for all households and energy mobility to a greater extent. The proposed HGS is also shown to be cleaner, cheaper and sustainable than the “all renewables” option with the potential of reducing carbon emissions by over 70% in addition to significant reduction in consumer energy costs.

While we concede that the proposed HGS might be unconventional, the results obtained necessitate a thoughtful and global reconsideration of what should constitute sustainable development and electricity access, especially for the global south. Furthermore, our results provide insights for policymakers working towards tangible definitions of what constitutes “sufficient electricity” at the minimum “necessary level”. In so doing, we help establish a benchmark for future off-grid electrification exercises.

Energy Access, Climate Change and Water Use: Synergies and Trade-offs

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Clean and affordable energy is central to the 2030 Agenda for Sustainable Development and in particular to climate change mitigation. On the one hand, SDG 7 calls for ensuring universal access by 2030. On the other hand, SDG 13 invites to take urgent action to combat climate change and its impacts. Energy production and use account for around two thirds of global greenhouse gas emissions and sustainable energy systems are essential in achieving a low-carbon economy and reducing emissions. In order to mitigate the risk of climate change, it is crucial to reduce energy consumption (Target 7.3) and improve the mix of energy sources in favour of renewables (Target 7.2), or in favour of less carbon-intensive fossil fuels. Nevertheless, universal access to energy (Target 7.1) could limit the options for achieving climate mitigation strategies since energy access can be achieved through both renewable and traditional energy generation systems.

Indeed, should universal access to energy be achieved by 2030, global energy-related CO₂ emissions will rise by 0.7% and final energy consumption would increase by 7% (IEA, 2011). Sub-Saharan Africa (SSA), the region with one of the highest energy poverty rates, would contribute to the global share of energy-related CO₂ emissions by 3%. Moreover, since global energy consumption is projected to grow by one third by 2035 (IEA 2013) this would lead to an increase in the global water use. All types of energy generation consume water either through their process of accessing the raw materials or operating and maintaining the power plants. However renewable energies, especially wind and solar, have the lowest water footprint. Sub-Saharan Africa (SSA) is subject to extreme climate variability and it is the region with the highest water stress level, which implies increased water scarcity and serious consequences on energy security and supply. Therefore, the move towards clean and sustainable energy not only would contribute to climate change mitigation, but also could reduce water consumption (biofuels excluded).

Understanding the interlinkages between water, energy and climate plays a crucial role in delivering sustainable outcome and assisting communities in their collective efforts to implement the SDGs. The analysis investigates interlinkages among the Goals with a focus on SDG 7, SDG 6 and SDG 13 starting from the perspective of universal access to energy (Target 7.1). Results show that although access to energy may seemingly counteract climate change mitigation, providing universal access to energy is expected to have a small impact on global CO₂ emissions. Results also show that if developing nations may overcome technological lock-ins and develop their energy infrastructure based on sustainable energy systems, this counter-effect would be minimal compared to the benefits in terms of water saving, social inclusion and economic development.

Energy Generation in the Canal Irrigation Network in India: A Case for Integrated Spatial Planning

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Recent research in several countries has found that the energy intensity of agriculture is increasing. In some cases, the direct-energy input for on-farm operations has risen over 80% due to increased water pumping and mechanized field operations. In a number of these places, energy supplies are inadequate and energy costs are high – there are severe shortages and frequent outages in some areas. There is an urgent need to expand both the sources and reliability of energy and off-grid small-scale hydropower and solar systems can serve a valuable niche in energy supply. It has low operational costs, compared to small diesel-powered systems, for groundwater pumping, agricultural operations, and other local applications. There is an extensive canal irrigation network in India, consisting of thousands of kilometers of constructed channels and distributaries which divert water from rivers to farms for irrigation purposes. These canals cut across district and state boundaries, crossing many energy-starved regions along their paths. In India, these large-scale canal networks provide a unique opportunity for renewable energy generation on (or along) the canal that is yet to be realized, while simultaneously providing a number of secondary benefits.

In this paper, I develop a planning framework for energy generation using the Upper Ganga Canal in the State of Uttar Pradesh as a case study. First, I explore and quantify the generation potential from solar photovoltaic, hydrokinetic electric power (using the flow of water), hydropower (using head difference), and hybrid generation (a combination of hydropower and solar PV). Then, using a corridor development framework, I assess the local demand of canal contiguous villages, using spatial analysis to study the spatial distribution of the supply gap. Thirdly, I propose appropriate typologies of service, which include variations of grid-connected and off-grid options, depending on local need and local generation potential, which can provide a high marginal impact for unelectrified and under-electrified regions. While this paper focuses on the specific case of the Upper Ganga Canal in Uttar Pradesh, my general framework should be broadly applicable for canal corridors across South Asia, and other regions where there are large-scale irrigation networks.

Energy needs for adaptation: what can we learn from Paris Agreement's NDCs?

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This paper provides new evidence on the energy needs for adaptation, shedding light on the critical role of energy access as enabling condition for adaptation, highlighting the potential tensions with mitigation as well as the linkages with sustainable development goals.

Energy services, including space heating and cooling, refrigeration, water pumping, water treatment and supply [1], provide a critical margin of adaptation across all sectors of the economy. By 2050 people could demand up to 17% more energy only for coping with a warmer climate [2]. The upshot is that adaptation will be an increasingly important driver of energy demand, becoming a key determinant of future energy needs that has been largely overlooked by the literature. Existing studies have emphasized the role of energy as a keystone for sustainable development [3] and for decent living conditions [4], while how energy services enable human systems to adapt to changes in climatic and weather conditions remains an understudied question that we address in this paper.

We rely on the NDC documents Parties have submitted to the UNFCCC within the context of the Paris Agreement to understand national preferences regarding future climate action. Based on this analysis, we assess what are the major energy services needed to adapt to climate change, with the goal of defining a framework connecting adaptation, mitigation, and sustainable development through the energy requirements of adaptation actions.

We first identify the adaptation priorities that can be classified energy-based adaptation solutions either because energy-intensive or energy-saving. We then relate these options to the SDG indicators, providing a framework for, 1) monitoring the potential energy requirements of adaptation and for 2) evaluating how adaptation to climate change can facilitate progress towards sustainability.

Our analysis identifies a set of 23 key adaptation options linked to energy use that are most often mentioned in the NDCs. They pertain to 5 major sectors, namely water supply (e.g. desalinization, water conveyance and treatment), energy demand for residential services and buildings (space heating/cooling, water heating), infrastructure (multipurpose dams, electrification, transport), food (food storage, thermal comfort for livestock), and medical services. Among these, 16 actions can be considered energy-using, while 7 options are energy-saving. Several countries explicitly acknowledge the potential trade-offs between mitigation and adaptation and specify that the energy services for adaptation will be based on renewables sources. Overall, most adaptation

options relate to three SDGs, SDG6 “Clean water and sanitation” (70%), SDG2 “Zero hunger” (60%) and SDG7 “Affordable and clean energy” (40%). Clear linkages also emerge in relation to SDG9 “Industry, innovation and infrastructures”, SDG1 “No poverty” and SDG3 “Health and wellbeing”.

Through a bottom-up approach based on countries’ priorities as stated in their NDCs, we contribute to define energy services for adaptation. By identifying the relationship between energy services for adaptation and different SDG indicators, we highlight how countries’ adaptation plans can promote the achievement of several sustainable development indicators.

[1]Fell M.,J. (2017). Energy services: A conceptual review, *Energy Research & Social Science* 27 (2017) 129–140

[2]De Cian E. and Sue Wing I. (2017). Global Energy Consumption in a Warming Climate, *Environ Resource Econ* pp.1–46

[3]McCollum et al. (2018). *Environ Research Letters* in press
<https://doi.org/10.1088/1748-9326/aaafe3>

[4]Rao, N. and Pachauri, S. (2017). Energy access and living standards: some observations on recent trends. *Environ Research Letters* 12 (2)

Energy, emission and cost savings impact assessment of adopting energy efficient lighting in Enugu, Nigeria.

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The benefits of the use of energy efficient lighting systems are well established in literature. However, due to the lack of local data, the potential and benefits of switching to efficient lighting in Nigeria has not been studied. Based on data collected from a household survey, this paper assessed the environmental performance, economic and energy savings impacts of replacing incandescent bulbs with compact fluorescent lamps (CFL) in households in Enugu, Nigeria. The author conducted a survey of 384 households in the case study area and gathered information on key household socio-economic characteristics, equipment type and use patterns. The survey identified the number of light bulbs and the distribution of the prevalent wattage groups of the incandescent light bulbs in the surveyed households. Due to the irregular nature of the data, a weighted average was calculated and a proxy value of approximately 60 W was determined. The proxy power rating is imperative for calculating the baseline unit energy consumption for lighting in the surveyed households and in identifying the ideal CFL replacement for the incandescent bulbs. A 15 W CFL produces same lumens as a 60 W incandescent bulb and thus, will provide adequate replacement. With key parameters and features for comparison clearly stated, the paper calculates energy savings from replacing 60 W incandescent bulbs with 15 W CFL lamps and adopts the life cycle cost method to determine electricity cost savings when an estimated average of four incandescent bulbs per household are replaced with a corresponding number of CFL bulbs. The result shows that the use of CFLs present good opportunities for savings in household's energy consumption and energy costs. Based on a social discount rate (SDR) of 4.25 % and an average of 4.8 utilization hours per day, the simple payback period is 2.3 months. The result of the sensitivity analysis reveals that, both the bulb retail cost and electricity price have considerable effects on the payback period. The high retail price of CFLs in the local market (when compared to incandescent light bulbs), the proliferation of substandard CFLs and lack of end-user's awareness on their economic benefits could be seen as the major barriers hampering adoption of efficient lighting appliances. Considering the predominantly natural gas based electricity generation in Nigeria, an estimated annual emission savings of 127.5 KgCO₂ is possible per household per year.

Evaluation of the CDA as an instrument to access financing experience Paraguay Inclusive Project

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El Proyecto Paraguay Inclusivo (PPI) representa un importante esfuerzo en el impulso de la agricultura familiar. Su apartado de Planes de Negocio Articulados desarrolla las capacidades organizacionales, empresariales y productivas de pequeños agricultores e impulsa su vinculación con empresas agroindustriales. El proyecto resulta oportuno para reforzar la seguridad alimentaria y superar la pobreza.

En comparación con otros proyectos de alianzas productivas en América Latina, el PPI se distingue, entre otras cosas, por utilizar los Certificados de Ahorro (CDA) como instrumento para facilitar el acceso de los agricultores al crédito.

La mayoría de los proyectos de alianzas productivas en la región proveen recursos a las organizaciones para la constitución de un fondo rotatorio. Este fondo, administrado de manera interna a la organización, tiene la intención de facilitar el crédito para capital de trabajo entre los miembros. Si bien existen casos de éxito, los fondos rotatorios reconocen como limitación la no vinculación con las instituciones financieras.

En contraste, el PPI provee a las organizaciones con un fondo de garantía, el cual, al constituirse en certificado de ahorro, puede utilizarse como respaldo para la obtención de crédito en alguna institución financiera. Estos recursos son no reembolsables para las organizaciones, sin embargo, están condicionados a utilizarse únicamente como garantía de crédito durante un periodo mínimo de cuatro años.

El CDA tiene tres beneficios potenciales 1) Eliminar una de las principales barreras al crédito; la falta de garantías convencionales 2) Impulsar el apalancamiento financiero, permitiendo acceder a fondos mayores de aquellos que se dejan en garantía 3) Crear una relación entre las organizaciones y bancos que se traduzca en acceso al crédito tanto en el corto como en el largo plazo.

A pesar de su gran potencial, los CDAs no están logrando los resultados esperados en el PPI. Con cifras a marzo del presente año, 32 de las 50 organizaciones con planes de negocio solicitaron un fondo de garantía. De estas 32 organizaciones, 17 obtuvieron un crédito. Aunado a ello, el apalancamiento financiero ha sido bajo, en promedio, el valor del certificado de ahorro dejado en garantía es casi igual al valor del crédito obtenido de las instituciones financieras (Gs 78.5 por Gs 75.6 millones).

En el marco de la presente investigación, se identificaron y analizaron los factores que viabilizan u obstaculizan el funcionamiento del certificado de ahorro como instrumento de acceso a financiamiento. Estos factores fueron agrupados en tres categorías 1) Capacidades organizacionales y financieras de los productores 2) Condiciones y disponibilidad de servicios financieros 3) Monitoreo y acompañamiento. La

investigación rescata los aciertos y desaciertos del PPI en estos componentes y da recomendaciones con miras a la segunda etapa del proyecto; a comenzar en el 2019.

Exploring the economic impact of renewable energy on grid: Diminishing marginal revenues and increasing abatement costs

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With an increasing threat of climate change and a need to de-carbonize, renewable energy is expected to play an increasingly important role in the portfolio of electricity generators in the U.S. The benefit of renewable resources differ considerably across geography and over time. We know resource availability varies between locations. However, it is equally important to account for variation due to the nature of the grid.

In this paper, we explore the difference in economics and the cost of carbon reduction for wind and solar generation across the US. In order to account for differences in economics, we account for technological progress, heterogeneity in renewable resource and electricity value. To assess the cost of carbon reduction, additionally, we analyze time- and location-varying emissions displacement. In treating the economics and carbon benefits of wind and solar as dependent from the electricity system they are placed in we find that wind and solar generators have diminishing marginal revenue. This leads to a rapid deterioration in their economic viability. Similarly there is also a reduction in marginal emission displaced leading to an increasing carbon abatement cost.

We simulate a buildout of renewable generators across 13FERC regions. The economic capacity of each region is determined by the point when marginal revenue equals zero. We find that economic capacity of the grid varies between FERC regions. This variation is determined by LMP, demand and generation. Adopting solar with our current grid system looks to be a very expensive option for carbon mitigation both today and in the future when it has become much cheaper. The rationale of solar has to come along with plans for the grid. Regional decisions on priorities for renewable adoption sometimes tend to overlook the region specific benefits and cost of that technology

Our results reveal that learning rates have a greater impact on solar energy than on wind. However wind, which is currently cheaper than solar is expected to remain so, such that the most expensive wind will remain cheaper than the cheapest solar. Economics of wind and solar will not change drastically without new grid setup. Cost of carbon abatement through wind generation ranges from -\$4/Ton CO₂ in NYISO to \$40/Ton CO₂ in South West Power Pool. The same for solar range from \$48/ton CO₂ in SOCO (Georgia) to \$200/ton CO₂ in CAISO.

Extracting Power: How the Geopolitics of Rare Earths and the Clean Energy Transition Sustain Traditional Global Power Relationships and Unnatural Capitalism

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Every day, people around the world use products made with rare earth elements, yet these materials are largely unknown outside of niche academic or industry fields. Modern life is structured around usage of these critical elements. They are essential for our smart phones and computers, cars and lights, intercontinental ballistic missiles and spacecraft, solar panels and wind turbines. We live in a minerals-dependent world; with dependence, comes power. Where rare earths are extracted and processed, who bears the environmental burden of their development, who turns them into high-technology, and who reaps the reward of that technology is politically and economically constructed. Rare earths are a unique vehicle to consider the competing hegemonies of global powers as expressed in mining, knowledge acquisition, and technological innovation. As the clean energy transition scales up, with clean energy technology beholden to rare earth geopolitics and markets, broader questions around power of access, use, and distribution of these raw materials will become increasingly important.

A rare earths-focus grounds the sustainable development conversation in an oft-overlooked component of clean energy: mining and raw materials. Climate change has brought a new urgency to the need for low- and no-emissions technology, with environmentalists, policy-makers, and industry-leaders recognizing the needed shift away from carbon dependency. However, moving full speed towards clean energy technologies without assessing underlying power dynamics of raw materials extraction means the same economic and power structures of carbonized development strategies will be replicated in a no-carbon system. This is a reinforcement of the center-periphery model, a theory that seeks to explain center, or developed, states relationships with periphery, or developing, states. Clean energy technology reinforces power (in the form of low- and no-emissions energy) for center-states and sites of environmental degradation (in the form of mining and extraction) for peripheral states; the periphery supports the “clean” development of the center.

This research takes a political ecological approach to connect political and economic power dynamics of rare earth elements’ extraction and processing with the clean energy transition. This paper aims to explore the following inter-connected research questions: First, what are the geopolitics of rare earths and how does extraction advance states’ development strategies and nation-building narratives? Second, how does so-called sustainable development via the clean energy transition deepen center-periphery power dynamics?

Like “rare earths,” which are not geologically rare, “sustainable development” and “clean energy revolutions” have taken on misnomers. These technological fixes, via deployment of clean energy technology, to environmental degradation, address greenhouse gas emissions while neglecting localized exploitation. Raymond Bryant and Sinéad Bailey, in their primer on political ecology, note that “technical fixes” to environmental issues typically lead to failure because environmental problems have political and economic roots. By understanding the geopolitics of rare earths and clean energy technological development in this light, environmental challenges associated with climate change challenges and solutions must be refocused as political and economic challenges and solutions. Clean energy technology is, by extension, a technical fix for environmental issues that reinforces preexisting political and economic power structures.

Harnessing Clean Energy Projects in Mexico: The Case of the Jalisco 1 Solar Plant and the LED lighting in Zapopan

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Thanks to the energy reform approved by the Mexican Government in 2013, the energy market in Mexico, including renewables, was open to private investment for the first time after decades of being under the sole property of the government. This started a potential energy revolution that, if managed correctly, could allow the introduction of large-scale clean energy projects that are financed with both local and foreign capital. However, after four years of its implementation, renewable energy projects are still insufficient in the country, mainly due to the lack of attractive contracts and operational costs. Nonetheless, there are positive examples that are important to review to identify what are the main actions they have been undertaken to make the projects successful, as well as to understand what is needed to make them scalable and replicable.

In this context, the present paper provides a summary of the evolution of the renewables market in Mexico after the reform, together with a detailed description of the main challenges and opportunities; followed by the case study of Fortius Eletrcomecanica, owner of one of the largest solar plants in Mexico who has genuinely harness the clean energy potential in Mexico, and one of the leading partners of one of the largest concessions done outside of Mexico City to replace the street lights of Zapopan - one of the wealthiest municipalities in Mexico - with LED lighting.

Launched in April 2016, the Jalisco 1 solar power plant – the name given by Fortius to its first energy plant – is already working at full capacity (8MW) generating 14 GWh/year. In turn, this has helped reduced emission by 10 tons of CO₂e, as well as to provide clean energy to 16,000 households. This was possible thanks to the support of the federal and state government, which included a power purchase agreement, and has further incentives the expansion of the plant with the objective of doubling its capacity. Furthermore, for the Zapopan project, Fortius joined Power Illuminare to establish an 18-year energy saving performance contract with the municipal government that included the replacement and O&M of 70,000 street lights. 虫犢

Multi-Stakeholder partnerships to deliver on the SDGs in the Mont Kenya region

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A significant share of the population in the Embu County, Republic of Kenya, relies on energy inefficient stoves to meet their cooking needs. This puts unsustainable pressure on the biomass resources, which account for 68% of Kenya's national energy requirements. This case study highlights the lessons learned from activities conducted in the past 5 years in Embu County, and aiming at promoting more sustainable cooking practices through the adoption of efficient and affordable cookstoves. This paper aims at illustrating how result-based financing mechanisms can be used to structure multi-stakeholder partnerships and develop positive impact programs that contribute to the Sustainable Development Goals. The first section illustrates how innovative private-sector collaborations can be set-up to "Mobilize additional financial resources for developing countries from multiple sources", thus contributing to the 17.3 SDG Target of the 2030 Agenda. It also illustrates that "breaking down silos" requires careful partnerships design. The second section discusses how result-based financing mechanisms can be used to foster such collaborative actions to achieve SDGs. The process used for developing impactful projects is described through the presentation of the measuring, reporting and verification (MRV) mechanism applied to a case study located in the Mont Kenya region: the Hifadhi-Livelihoods project, a 10-year cookstove program developed and funded by the Livelihoods Carbon Fund, in partnership with EcoAct and Climate Pal.

Participatory identification of key factors in the implementation and development of microcapitalization plans in six indigenous communities of Paraguay

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Se estima que la población indígena en Latinoamérica está cerca de los 42 millones de personas (8,3% de la población en AL) (Banco Mundial, 2015). Este porcentaje equivale a 522 pueblos indígenas, distribuidos principalmente en países como México, Perú, Guatemala y Bolivia (80% del total), y en menor proporción en países como El Salvador, Brasil, Uruguay, Argentina y Paraguay. Un rasgo particular de este grupo poblacional es que representan el 14% de las personas en condiciones de pobreza y el 17% de personas en pobreza extrema de la región (Banco Mundial, 2015; Unicef s.f).

En Paraguay, la población indígena representa un 2% de la población total del país (115.944 personas), y se distribuye en 13 de los 17 departamentos (Ramos, 2014). Integrados por 19 pueblos indígenas, habitan en 493 comunidades de las cuales 86,2% posee personería jurídica (Naciones Unidas 2015). El restante de la población está asentado en propiedades particulares o no regularizadas legalmente, ya sea en proceso de reconocimiento o no por parte del Estado paraguayo lo cual favorece las condiciones de vulnerabilidad con la constante amenaza de ser expulsadas de sus tierras (Rehnfeldt, 2010).

Como muestra el III Censo Nacional de Población y Viviendas para Pueblos Indígenas del Paraguay (2012), en los últimos 10 años se presentan mejoras en servicios básicos*, aunque aún persiste una brecha entre el acceso a servicios por parte de las comunidades indígenas rurales y las no indígenas (e indígenas urbanos). Adicionalmente, de las actividades económicas desarrolladas por las comunidades indígenas paraguayas el 80,5%, están centradas en el sector primario siendo su principal rubro de subsistencia las actividades agrícolas.

Aunque la mayor parte de las comunidades están asentadas en áreas rurales (91%) (DGEEC, 2013), se han enfrentado con limitaciones en sus territorios relacionados con el derecho sobre sus tierras, siendo despojados, en muchos casos, para el establecimiento de grandes monocultivos que históricamente han contribuido al elevado índice de deforestación que se presenta actualmente en el país (Gonzáles, 2004), limitando los medios básicos de subsistencia tradicional de estas comunidades:

“La mayoría de las comunidades guaraní están sobrepobladas, más allá de la capacidad productiva de la tierra que detentan. El 70 % de las comunidades tienen menos de 20 ha por familia, que es el mínimo de hectáreas establecido por la Ley 904 de Comunidades Indígenas”. (Rehnfeldt, 2010, p. 4)

Frente a la situación de vulnerabilidad de este vasto conjunto de población, el Fondo Interamericano de Desarrollo Agrícola (FIDA) ha puesto en marcha en el año 2013 el

Proyecto Paraguay Inclusivo (PPI) con el objetivo de “contribuir a incrementar los activos, los ingresos y calidad de vida de los agricultores familiares campesinos pobres y población rural pobre...”. Dentro de este proyecto existe una consideración especial por atender las problemáticas de las comunidades indígenas, para lo cual se diseñaron Planes de Microcapitalización para Comunidades Indígenas (PMCi), los cuales se inician en el año 2015. Estos planes tenían como objetivo crear Alternativas de planificación productivos que permitan alcanzar la seguridad alimentaria necesaria a nivel comunitario y familiar (SAN, s.f.; MAG, 2016).

La elaboración de los PMCi se realizó de manera conjunta entre las comunidades indígenas, el Instituto Paraguayo del Indígena (INDI), el PPI y la consultora Alter Vida. Estos planes consisten en proyectos comunitarios de desarrollo elaborados de manera participativa que financian iniciativas a partir de los diagnósticos de cada comunidad.

Luego de más de dos años de ejecución de este proyecto, y en vistas a mejorar el impacto del mismo, se torna necesario analizar con detalle cuál es el estado de situación de las comunidades indígenas en las cuales se ejecutó dicho proyecto, y más específicamente interesa conocer cuáles han sido los factores que han viabilizado o inhibido el alcance del PPI en estas comunidades indígenas y cuáles son los cuellos de botella que es necesario resolver para tener un impacto más eficaz. Esto permitirá hacer un análisis que brinde una perspectiva para mejorar el acceso y la inclusión de las comunidades indígenas en cadenas productivas ya trabajadas por el PPI o en cadenas más relevantes para las comunidades indígenas (artesanías, turismo rural, etc.).

En vista a esta preocupación, se plantea este proyecto de investigación que busca analizar el desarrollo de los planes de microcapitalización en las diferentes comunidades indígenas beneficiarias.

* Los cuatro servicios básicos analizados en el censo 2012 en comparación con el año 2002 fueron: recolección de basura (4,7% a 5,2%), energía eléctrica (9,7% a 31,2%), agua corriente (2,5% a 15,1%) y baño moderno con pozo ciego (1,1% a 3,8%). En cuanto a la tasa de analfabetismo, esta disminuyó de 51% al 37,6% en los últimos 10 años.

Working Paper: Experiences and Opportunities for the use of Blended Finance in Clean Energy

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The combined challenges of affordable energy access and climate change present major needs for clean energy investment. The Paris Agreement and United Nations' Sustainable Development Goals, negotiated in 2015, represented an inflection point for moving from talk to action in order to address two of the world's most important challenges. The objective is clear: mobilize investment to meet the goal of limiting global warming to, at most, 2 degrees Celsius while also bringing electricity to the more than 1 billion people globally who do not yet have access to it.

Within developing economies, there are significant opportunities to increase investment in clean, affordable energy: by 2030, non-OECD countries are projected to increase demand for electricity by 63 percent from 2014 levels (OECD, 2017a). This nearly 7,000 terawatt hours of additional demand represents 85% of the expected global demand increase for that same time period (IEA, 2016).

Many developing economies already offer strong environments for investment. Countries including Mexico, Chile, Thailand, Peru, Malaysia, and China, among others, offer strong institutions and favourable policy environments, which are reflected in high sovereign investment-grade ratings. This paper looks at what is needed to unlock investment opportunities in developing economies that are still catching up.

We evaluate, by geography and clean energy sector, the most significant opportunities for impact on both climate change and energy access per dollar invested; the risks and barriers that prevent investment; and how blended finance could be deployed to address investor needs. We find that the greatest opportunities for blended finance in clean energy are in Sub-Saharan Africa and South and East Asia, with a subset of eight countries alone offering more than USD 360bn in investment potential in clean energy by 2030.

We find significant investment potential in large, relatively mature geographies, such as India and South Africa, which offer strong renewable energy policy environments and a wide variety of investment opportunities.

We also find opportunities in smaller countries in which grid-connected projects in hydro, wind, solar, and geothermal can be diversified via global and regional investment

vehicles; and the distributed generation market, particularly in countries with large populations lacking access to energy, through corporate finance and securitized assets.

Even though clean energy costs have come down significantly in recent years, risks and barriers remain in these countries and are preventing investment. The top risks identified in our research are off-taker risk, currency risk, policy risk, and liquidity and scale risks. In addition, many early stage projects and clean energy companies face barriers in accessing financing.

We looked at 75 blended finance initiatives in clean energy, diving in depth into a subset of them, to understand how barriers are currently being addressed and remaining gaps. As clean energy closes the “viability gap” with fossil fuels, there is a gap between the investment risks and barriers addressed by earlier blended finance initiatives and those cited by investors as most important to address. There is also a gap between the types of instruments needed and those offered: risk mitigation instruments, such as guarantees and insurance, are less frequently offered than direct investment. Finally, the limited scale of blended finance initiatives – both through direct investment vehicles as well as indirect blended finance via risk mitigation – likely limits the participation of many investors.

Changes to how blended finance is deployed could increase its success in supporting global goals and mobilizing private investment. We recommend the following:

1. Blended finance efforts should focus on the highest impact opportunities. Our analysis identifies markets in Southeast Asia, Sub-Saharan Africa, and South Asia that have high relevance for climate change mitigation and energy access and broadly conducive environments for private sector investment, yet ongoing needs for blended finance;
2. Developers of blended finance initiatives target the most commonly cited risks to private investors.
3. Blending finance should be deployed to support initiatives that are ripe for expansion, as risks can remain even after a successful pilot; build sustainability through technical advisory services and supporting networks that generate new ideas and partnerships; and improve efficiency by streamlining approval processes.

Globalization, Value Chains and Decent Work

A Fourth Industrial Revolution that empowers SDG 2030 : Exploring the Development-Technology Nexus in quest for Inclusivity

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The Fourth Industrial Revolution characterized by pervasive automation, rise in use of artificial intelligence, 3D printing, advanced materials, advanced energy exploration and recovery, more cloud and supercomputing, the internet of things and ubiquitous use of internet to conduct a host of daily activities have started to profoundly impact the day to day lives of those living in both developed and developing economies. New development in neuro-technological brain enhancements and promising developments in the field of genetic engineering will alter the human narrative forcing societies to ponder on what it means to be human.

FIR has fostered an environment that allows technological advances to be made everyday. By the time the SDGs are scheduled to be met i.e.2030 – technology would have moved forward at an unprecedented pace, each advancement having an impact on the 17 SDGs. The simple use of Uber – the ride sharing application has already put some people into work and some out of work impacting SDG 1: No Poverty and SDG 8:Decent Work and Economic Growth. Use of mobile phones to conduct host of financial activities to bring a large number of previously unbanked population in the developing world into the formal financial sector will impact Goal 4: Quality Education, Goal 5:Gender Equality and Goal 10: Reduced Inequalities.

On the other hand,from a development perspective, combinations of high internet penetration, low education levels, and high levels of poverty can facilitate an environment of technology-driven inequality. Countries that lack free flow of information can, in the long run, experience a lack of digital entrepreneurship thereby impacting their ability to be included in other digital economies. The repute of technology to be a good equalizer may not also hold true if automation and AI puts people out of job and if technology can only be afforded by people above a certain income level.

Acknowledging that FIR and SDG are moving in tandem, this paper will explore:

- How emerging technologies can help governments, industries and societies in reaching the SDG targets.
- How prepared are governments in the developing world to manage the disruptions in their development agenda brought forth by technology.
- How to better utilize technology enabled platforms to address the funding gap in SDGs.

- How to support developing countries at risk of losing large number of jobs from automation.
- Role of policymakers in creating pathways to utilize technology to reach the SDGs.
- What policies and programs are needed to bridge the digital divide that risks being widened in absence of a well thought out strategy. A strategy that while unleashing the next generation technological wonders makes a conscious effort to make it pervasively inclusive.

Achieving Decent Work in a Globalised Value Chain: A New Governance Model for Informal Economies

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Globalisation evolved in the late 1970s when neoliberalism took shape as a dominant economic policy. Driven by companies' desire to become more competitive and reduce costs, a decline in trade barriers accelerated outsourcing and subcontracting operations to developing nations. Although this form of capitalism has arguably improved access to goods and services, provided employment opportunities and upgraded overall living standards, it has dramatically made supply chains ever more complex. A myriad of social issues regarding the notion of 'decent work' has been pertinent in a globalised value chain. Workers in these developing nations have been exposed to hazardous conditions, unfulfilled promises of macroeconomic improvements and exploitative work arrangements particularly at the lower tiers of the commodity chain. Low levels of technical education and weak institutional structures to enforce regulations further exacerbate the situation.

One of the key obstacles that needs to be brought to the center stage is transparency among informal structures. In some Bangladeshi garment factories for example, informal economies that manifest themselves as core socio-political structures have been found to deprive workers of their rights such as fair income and safe working conditions. Exploitation of such 'invisible' labour at lower tiers typically goes 'off the radar' due to immense lack of traceability. Furthermore, global labour governance today is predominantly based on voluntary and self-regulatory standards, with emphasis on compliance through market mechanisms that primarily affect formal businesses only. As some of these standards are set at rudimentary levels and neglect informal businesses, few would argue that current regulations enable sufficient transparency to guarantee decent work.

Therefore, a new governance model is suggested; one that requires commercial organisations across different tiers in the supply chain to declare current labour conditions without fear of judgement. It fundamentally aims to help employers increase financial competitiveness while ensuring social sustainability, not to force a tip in balance that only favours employees. Rather than demonise or punish non-compliant informal economies at face value, the model essentially incentivises improvements with recognition and capacity-building. Such engagements will also facilitate sharing of key tools to the lower-tier suppliers including the Social Accountability (SA) standards and ISO 26000 series. Subsequently, a transparent stream of information sheds light on intricate issues such as workers' compensation, gender bias, immigrant status and entitlements. Resistance is bound to be faced because the opacity of information remains an intrinsic characteristic that defines the 'success' of a global production network. Nevertheless, the governance model essentially focuses on transparent, pragmatic solutions without dwelling too much on problems or assigning blame. This

solution principally aligns with the UN Sustainable Development Goals at the nexus of Goal 8 (Decent work and economic growth) and Goal 17 (Partnerships for the goals).

Building a sustainable and inclusive value chain network in the Andean camelid textile sector

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The global fast fashion industry is the second most polluting industry in the world and rife with labour exploitation. Only activities in the agricultural sector are more water consuming than those related to clothes production. The environmental and social unsustainability of the current fashion industry model motivates many stakeholders to advocate for its change. This paper will examine how an alternative approach to textile production can transform the industry into a source of aid for the development of previously disenfranchised rural communities by integrating SMEs into the global economy in a sustainable way. We argue that in a traditional linear supply chain local producers, especially those in rural areas, are disconnected from the global market, leaving them vulnerable to exploitation, commercial disconnect, and underdevelopment. Thus, we propose a holistic value chain network approach that would lead to the development of strategies entailing close collaboration and synergy of all the parties involved, leading to a fair, transparent and technology-driven market. In this paper, we present a case of sustainability in the Andean camelids textile sector through Animaná, a B-Corporation, and Hecho por Nosotros, an NGO. This integrated approach working at every step of the value chain network contributed to artisans not only having access to market prices and best practices, but also easily adapting to changing demands in the (luxury) market. Value is added and retained at the local level. We argue that academic expertise as well as financial, governmental, and institutional support and integrations are crucial to cultivate a self-reinforcing cycle. The experience of HxN and Animaná can be applied to other textile industries and can help formulate recommendations for policy-makers, businesses and the civil society on how to overcome the challenges that tag along the sustainable fashion industry.

Can International Tourism Investments provide Decent Work and Sustainable Development?: Results from a Natural Experiment in Honduras

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Tourism is the first or second source of export earnings in 20 of the world's 48 Least Developed Countries (LDCs), and in the past 20 years the industry has grown more quickly in emerging and LDC economies than in OECD countries (UNWTO, 2016). Noting this, The United Nation's World Tourism Organization (2015) has suggested that tourism can be a driving force behind improvements in pursuit of all 17 of the United Nation's Sustainable Development Goals. The ability of tourism to deliver on such promises has been subject to debate, however. Some have argued that large economic benefits of the industry will inevitably stimulate improvements in all dimensions for local populations and investors alike (Croes & Vanegas, 2008). Others have suggested that such benefits can be achieved only by purposeful corporate social/environmental responsibility initiatives and/or substantial community involvement in investment, planning, and operation (Medina-Muñoz et al., 2016).

Much of the disagreement regarding tourism development impacts results from methodological difficulties. Generally, local community benefits are calculated by applying multipliers to industry estimates of capital inflow, and adjusting for expected leakages along the value chain. Alternatively, surveys of local employment and/or multidimensional development indicators may be undertaken after a tourism project has been in place for some time. Both of these methods have weaknesses. Value-chain/leakage models do not take direct measures of local impact, while ex-post impact surveys do not incorporate baseline data from which impacts could be imputed.

To avoid such methodological difficulties, I conduct a natural experiment in measuring local sustainable development impacts of a cruise tourism project in Honduras. I measured the multidimensional community impacts of a large tourism project by comparing a baseline survey of multidimensional development indicators done before the initiation of the tourism project with a second survey undertaken 16 months afterward. I also compare these data with those gathered in control communities that were not subjected to the economic influx of the tourism project.

Despite the large size of the economic injection represented by the tourism investment (approximately equal to 30% of the original economy of the area), I find no evidence of local benefit. Specifically, I find a lack of improvement in employment, a decrease in food security, a decrease in the ability of local people to provide for their necessities, an increase in perceived political corruption, and a negative environmental impact. The results support the conclusion that employment and other sustainable development

benefits cannot be achieved via international investment in tourism in absence of community control, benefit-sharing and environmental protection programs.

Corporate Sustainability in the Age of the Sustainable Development Goals

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For the SDGs to be achieved, the private sector's causal role in sustainable development challenges has to be addressed (Kourula, Pisani, & Kolk, 2017; Kumi, Arhin, & Yeboah, 2014; Pogge & Sengupta, 2015; Scheyvens, Banks, & Hughes, 2016). At the same time, companies' unique capabilities in, for example, innovation, developing new business practices, and mobilizing financial resources, can deliver on sustainability objectives, such as those defined by the SDGs (Hajer et al., 2015; Lucci, 2012; Porter & Kramer, 2011; Scheyvens et al., 2016; United Nations Global Compact, 2017). Thus, companies are not only seen as part of sustainable development's problem, but also of the solution (Kolk & van Tulder, 2010). This position is reflected in the 2030 Agenda for Sustainable Development: "We acknowledge the role of the diverse private sector, ranging from micro-enterprises to cooperatives to multinationals ... in the implementation of the new Agenda" (UN, 2015:10).

The call on companies to reduce negative and increase positive impacts on sustainable development is as timely as it is urgent. Concepts and theories that address the role of companies in sustainable development have become part and parcel of international business research (Hahn, Figge, Aragón-Correa, & Sharma, 2017; Starik & Turcotte, 2014). However, most studies ask why companies would engage in corporate sustainability and what is in it for them, rather than investigating how a company impacts sustainable development (for discussions, see e.g. Hahn et al., 2017; Kolk, 2016). In doing so, the business case for corporate sustainability – following a win-win paradigm - has been frontloaded in extant research (Hahn, Figge, Pinkse, & Preuss, 2010; Van der Byl & Slawinski, 2015). These efforts have been valuable for legitimising corporate sustainability research (Van der Byl & Slawinski, 2015). But because such studies are predominantly linearly focused on corporate and industrial effects (Whiteman, Walker, & Perego, 2013), research following the business case for sustainability implicitly ignores the interactions of companies with the social-ecological systems in which they are embedded (Williams, Kennedy, Philipp, & Whiteman, 2017). It remains silent on the fact that win-win scenarios might not materialise and that trade-offs and even dilemmas between corporate impacts on financial and societal ends have to be navigated (Hahn et al., 2017, 2010; Hahn, Preuss, Pinkse, & Figge, 2014; Margolis & Walsh, 2003; Van der Byl & Slawinski, 2015). Given that the status quo of corporate sustainability is unsustainable (Lozano, 2015) there is a need to go beyond the business case for corporate sustainability (Dyllick & Hockerts, 2002) and thereby 'beyond business as usual' (Scheyvens et al., 2016).

This discussion does not necessarily mean that companies are unwilling to effectively address sustainability issues if it is not directly in their financial interests. It

could also imply that companies find it difficult to understand their impacts on sustainable development, which may be positive, negative, or neutral, and which may affect today's as well as tomorrow's generations in different geographic locations (Hahn, Pinkse, Preuss, & Figge, 2015; Slawinski & Bansal, 2015). Ambiguity can arise in understanding sustainability issues, in comprehending the implications of these issues for organisations, and in delineating ways to respond to these issues (Sharma, 2000). Hence while one challenge for companies to contribute to sustainable development is to better understand impacts on the social-ecological systems in which they are embedded, a follow-up challenge is to articulate how corporate sustainability policies that contribute to sustainable development could look like (Hahn et al., 2017).

This paper explores how the SDGs can inform corporate sustainability policies. We aim to answer two questions in specific: i) which SDGs are most relevant for companies to engage with throughout their value chains? And ii) what can corporate sustainability strategies for the SDGs look like? We apply an interdisciplinary approach that builds on recent advances in sustainability sciences. It recognises that there are complex interactions between a company and the SDGs, as well as among the SDGs themselves. Taking these interactions into account is critical for increasing corporate contributions to sustainable development. We capture these linkages in a framework that we call the 'company-SDG nexus'. This framework helps companies identify which SDGs are most important, or most material, and it informs corporate sustainability policies. We introduce three archetypal SDG policies: mitigation, activation, and maximisation.

Getting it right: A new economy for South Africa

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In the first decade and a half after the fall of apartheid, economic growth in South Africa accelerated. By the mid 2000s it even exceeded 5% per year. Although the unemployment rate deteriorated from 16.5% in 1995 to 30% in 2003, employment rebounded from 2004 and by 2007 the rate had fallen to 21%. But then in 2008/9 the global financial crisis happened, and in 2011/2 the commodity price boom ended. Economic growth in South Africa collapsed and unemployment began an unrelenting upward march, exceeding 26% in 2017. Why did the economy stagnate? The first democratic government in 1994 inherited an underperforming economy with a broken labour system. Apartheid's labour system comprised a labour market that, up to the mid-1980s, suffered from the stifling effects of race-based job reservation. It also comprised the bantu education system and the bantustan and influx control system which limited the movement of blacks between the cities and the bantustans – while job reservation meant that the bantu education system saw no need to prepare blacks for semi-skilled and skilled jobs. Within its first three years the first democratic government introduced new labour legislation that modernised the South African labour market. The bantustan governments were abolished (although traditional chiefs were left in place) and the fragmented, race-based education departments were merged into a single nonracial education system. But, as the numbers in this book indicate, these reforms did not bring work and prosperity. This book attempts to explain why. Although the democratic government introduced labour market reforms, two essential components of apartheid's broader labour system are still in place – if not in name, then certainly in effect: the bantustan and bantu education systems. Unresolved tenure rights in the former bantustan areas and low quality education, particularly in township and rural schools, continue to deprive people of the opportunity to improve their lives. The labour market, though reformed after the fall of apartheid, is also unable to provide work for everyone who wants to work. In the book I argue that to support economic growth and job creation South Africa needs much higher levels of investment; reform of land tenure to secure better livelihoods for the 32% of its population living on communal land under the control of traditional chiefs, and much better education to increase the employability of its youth.

Pathways to Generative Urbanism in Africa

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Recently work in urban geography has begun to conceive of cities as socio-technical systems. In this paper we extend this perspective to argue that while this is true, cities as socio-technical systems can be disaggregated into production, consumption and infrastructure regimes. The nature of these regimes, their multi-scalar relations with outside actors and places, and the nature of inter-regime couplings substantially influence whether generative, parasitic or splintered forms of urbanism emerge. This paper explores this theorisation through application to African contexts asks whether or not the BRI is likely to promote this. We argues that BRI presents an opportunity but that in order for more generative forms of urbanism to emerge states and planners need to promote the development of production regimes through activist state policies which foster multiple axes of strategic coupling between relevant actors and synergistic inter-regime couplings.

Policy Diffusion and the Fragmentation of Environmental Regulations in Asian Countries

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To capture the global effect of policy diffusion, which occurs in some countries, but not others, the universe of diffusion situations needs to be addressed. This paper argues that regulatory diffusion to follower jurisdictions can be classified into three types: diffusion, non-diffusion, and partial diffusion. It examines why some environmental regulations diffused across several, but not all, Asian countries, resulting in the diffusion and non-diffusion of regulations. This paper also shows that even when countries adopt innovative regulations from other jurisdictions, original regulations are modified and different provisions are adopted. Modified provisions create the partial diffusion of regulations. Diffusion, non-diffusion, and partial diffusion of environmental regulations are analyzed using case studies of three environmental issues: the regulation of toxic chemicals in products, hazardous waste management, and emissions trading schemes for greenhouse gas emissions. These are analyzed across 13 Asian countries. Using these case studies, this paper demonstrates that the three types of regulatory diffusion occur owing to differences in the causal factors underlying adoption among countries.

Spillover Effects of Global Value Chains for Sustainable Development

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Emerging global development trends indicate that many developing countries are able to achieve robust economic growth through Global Value Chains (GVCs). By specializing in specific aspects in the production chain-ladder based on comparative advantage, firms in developing countries tends to gain access to global markets, irrespective of whether they have capabilities for the whole production chain. Related to the GVCs phenomena is the increase in foreign capital inflows in the form of Foreign Direct Investments (FDI) into developing countries, which grew, on average, by 16.4 percent per year between 2001 and 2016, thereby exceeding investments in advanced economies during the same period by more than twice (UNCTAD, 2017). The positive relationship between FDI and GVCs provide a basis upon which developing countries, especially LDCs, could take advantage to nurture value-adding production to gain competitiveness towards achieving sustainable development.

Economies of many developing countries are characterised by weak manufacturing production capacity associated with low levels of technological production input. Given the competitive global economic landscape, developing countries will do better by gradually building a value-adding production chain that harnesses domestic resources but also leveraging on global production interrelationships vis-à-vis GVCs. In this context, vibrant ecosystem of Small and Medium scale Enterprises (SMEs) is crucial for creating opportunities for global technology spill over that blends FDIs with domestic resource utilization to transform economies from low to high levels of value-adding production activities.

Leveraging GVCs into activities of SMEs will enhance capacity utilisation, as SMEs tends to use more of domestic raw materials. By the GVCs-SMEs productive interrelationships, the SMEs sector will expand to produce more goods and services to satisfy basic needs of the domestic economy as well as feeding intermediate products into GVCs. The resultant expansion of activities of SMEs will create more employment opportunities to help in addressing the perennial challenge of unemployment and poverty reduction. Over time and as SMEs mature, it could lead to entrepreneurship development along with SMEs transforming into big enterprises to form the bedrock of industrialization and economic transformation. Through learning-by-doing, this could provide opportunities for new ideas and improved methods of production to bring about technological progress, economic transformation and sustainable development.

The paper draws inspiration from the analytical intuition of the potentials of GVCs in stimulating expansionary value-adding activities that could form the bedrock strong, inclusive economic growth and springboard for sustainable development. Based on this inspiration, empirical analysis of global GVC landscape is conducted to establish a

relationship between GVCs and domestic value-adding economic activities with focus on the role of SMEs.

Technology and Market Access Improve Livelihoods for Rural Ethiopian Beekeepers

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WEEMA International, an NGO that organizes community-based development programs in Ethiopia, has been working with rural beekeepers since 2013 to improve livelihoods by increasing the profitability of honey production. Ethiopia is Africa's largest honey producer by a substantial margin, and the 9th largest honey producer in the world. Despite high overall output, per-capita productivity among Ethiopian honey producers remains persistently low due largely to the fact that more than 95% of beekeepers continue to use traditional hives and apiculture techniques rather than more efficient modern alternatives. Consequently, Ethiopia's current annual output of nearly 55,000 metric tons of honey represents just 11% of the Ethiopian government's estimate of national honey production capacity. Improving the efficiency of rural honey production will result in increased yields and incomes for many of the 1.5 million people directly involved with beekeeping in Ethiopia. Indirectly, ensuring a profitable and self-sustaining honey industry will improve prospects for growers of pollinator-reliant cash crops such as coffee, oilseeds, legumes, and flowers—four major crops which together account for more than 50% of Ethiopia's total exports. A well-managed and resilient bee population will help ensure the future viability of these and other crops, providing vital stabilization to Ethiopia's agricultural sector and the 82 million people it now employs. To establish an indicative model of successful transition to an improved rural apiculture system, WEEMA has spent the last five years working directly with communities in Ethiopia's Southern Nations, Nationalities, and Peoples' Region (SNNPR), an area home to 14.9 million inhabitants, 13.4 million (89.9%) of whom live in rural areas. After an initial community needs assessment, WEEMA defined and implemented targeted interventions designed to increase local beekeepers' income. These interventions consisted of: 1) training beekeepers to use modern apiculture techniques and equipment, 2) supplying upgraded hives and other equipment necessary for producing higher-quality honey, and 3) establishing and supporting local honey cooperatives. The third intervention was the product of recommendations made by graduate students from Columbia University's School of International and Public Affairs (SIPA) who researched honey production in Ethiopia and visited WEEMA project sites in early 2016. WEEMA's field staff have collected empirical evidence as well as anecdotal testimony that highlights program successes. Ongoing evaluation of program performance to date indicates that training and supplying beekeepers results in increased net income from honey sales, an effect that is compounded when beekeepers sell their honey as part of a producers' cooperative. However, this effect is diminished by short-term challenges including technical issues with hive management, problems with unit standardization of honey storage, and high input costs associated with producing at a smallholder household level (as opposed to community enterprises benefiting from economies of scale). Longer-term challenges include integrating rural honey production into larger markets, both domestically and internationally, as well as various threats posed by climate change. This presentation will outline the approach and results of WEEMA's

beekeeping work since 2013 and discuss the implications of our experience with respect to further efforts to improve rural livelihoods through similar interventions.

The Dispersion and Diffusion of Clean Technologies using machine learning methods

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We trace the dispersion of clean technologies through specialized regions located around the world. By applying machine-learning techniques to patent data, we are able to measure this in a novel and comprehensive manner. To date, this approach to innovation mapping is not yet done in patent literature. Machine learning techniques allow us to examine many millions of environmental technology patents, and to visualize these results with powerful mapping outputs. Finally, we show how diffusion of technologies depends to a large extent on local climate policies, but also a mix of intellectual property and institutional capacities.

The Effect of Land-Based Investments in Developing Countries on Likelihood of Deforestation

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The purpose of this study is to examine the likelihood of deforestation across fifteen developing countries – Brazil, Central Africa Republic, Cambodia, Cameroon, Congo, Colombia, Democratic Republic of Congo, Equatorial Guinea, Gabon, Indonesia, Liberia, Malaysia, Mexico, Mozambique, and Peru – according to different use of natural resources and land-based investments. With the rising demand of natural resources in tension with environmental preservation efforts, large-scale land acquisitions and their effects are crucial to study.

The likelihood that an area will be deforested depends on not only whether the area is located inside a concession area, but also other surrounding factors, such as proximity to waterways, roads, and urban areas. The factors considered in the study are delineated in Table II. To account for these external factors, a covariate matching approach similar to a recent study assessing the effectiveness of protected areas in preventing deforestation and a study that measured the effects of large-scale land acquisitions in Cambodia on the country's forest loss. This approach matched the covariate distributions of data points located outside of and within each type of concessions for each country. After matching the distributions, areas directly affected and unaffected by concessions were compared to assess the effect of land acquisition on deforestation. To track gains and/or losses in forestation, the land was divided into pixels, with each pixel representing land 30m x 30m. Pixels in protected areas were not considered, and areas that were located in more than one type of concession were also not considered. For each pixel, distance from the nearest road, waterway, railway, urban area (defined as areas with population density greater than 300 people per km²), and forest edge were determined, along with the pixel's slope class, soil suitability, and district area. To match the data points located within and outside of concession areas, the "Matching" package was used in R. To account for the possible hidden bias, the sensitivity of the results was found via the Rosenbaum Sensitivity test and McNemar's test. The overall methodology for this study was based on Davis et. al, 2015 study "Accelerated deforestation driven by large-scale land acquisitions in Cambodia."

Considering the broader implications of deforestation, the study also assessed leakage. Leakage is the phenomenon in which areas surrounding protected regions undergo deforestation at a significantly different rate than areas farther from the protected regions. This occurs as people and corporations relocate to immediately outside of protected areas due to the restricted access to resources.

Across the 15 countries, there were 9 different types of land concessions: economic, DUATs (right to land), palm oil, wood fiber, mining, forest moratorium, plantations, logging, and forest concessions. In total, there were 33 land concessions granted by countries, 16 of which (48%) had differences in deforestation rates compared to its counterparts. Such differences were significant at the $\alpha = 0.05$ level. Examining individual countries, Democratic Republic of Congo, Equatorial Guinea, Gabon, Mexico, and Mozambique (5 out of 15 countries) did not have any significant differences in deforestation rates across land and non-land concessions across all of their land-based investments.

It is important to examine the effect of large-scale land acquisition policies and various land concessions on deforestation rates because each country in this study has different requirements of concessions, policy enforcement, foreign involvement, and environmental actions. This study provides insight as to what forms of land concessions have the least impact on the environment.

Towards safe and secure work for women in Bangalore, India: “Forward March”

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Sustainable Development Goal (SDG) 8 requires that stakeholders “protect labour rights and promote safe and secure working environments for all,” and especially for those who are most vulnerable, such as migrant women. Estimates suggest that one in every seven garment workers in India are raped or forced to commit a sexual act in the workplace. The Sexual Harassment in the Workplace Act intended for factories to establish sexual harassment committees within their facility to prevent sexual violence against female workers, but is in reality rarely enforced. In Bangalore, where approximately 145,000 women are employed in the garment industry earning about 7,000-8,000 rupees per month, garment labour unions play a significant role in enforcing sexual harassment legislation, advocating for minimum wage increases, and educating workers about their rights. This is particularly significant given that 80% of Bangalore’s garment industry is comprised of women, many of whom are migrants from rural Karnataka and Tamil Nadu or are otherwise in precarious employment. However, management in the Indian garment industry is known to demoralize attempts at collectivization in an environment where female workers are vulnerable to violence, sexual harassment, and poor working conditions. This research explores the innovative union model employed by the Garment Labour Union (GLU) in partnership with Munnade Social Organization, women-led grassroots organizations that have been successful in organizing garment workers who are otherwise unlikely to join unions because of inadequate time to participate and fear of violence or punishment.

Through primary interviews with local garment unions and non-governmental organizations (NGOs), this research analyzed patterns in the design and delivery of GLU and Munnade’s services that contributed to the success of their programs. Success was defined by high membership attainment and retention rates as well as increasing enrollment rates in optional services within GLU. Pre-union organization through microfinance groups, holistic approaches to services, and coordination with NGOs improve the degree of service provision, the accountability of the union and further, play an important role in increasing trust between workers and union organizers. Together, the organizations offer domestic counselling, legal representation in domestic violence and labor cases, subsidized child care, and microfinance groups. Munnade’s work shows that in order to promote safe and secure workplaces, NGOs must engage with women’s needs outside of the workplace in order to increase participation in advocacy and other union activities. Developing innovative approaches to unionization in the garment industry, that integrate the service provision typically not included in union models, has the capacity to overcome political, sociological, and legal barriers to improvements in working conditions.

Understanding Youth: Skills And Decent Work In Tanzania

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Africa's population, currently at 1.2 billion, has grown dramatically over the past four decades, with youth making up more than half of the total population. The total unemployment rate in sub-Saharan Africa is relatively low at 7.2 %, yet the continent suffers the highest youth working poverty rates globally at almost 70 percent.

Tanzania features similar demographic pattern to most sub-Saharan African countries and is not immune from the unemployment problems and challenges of securing decent jobs for the youth. Tanzania's youth almost doubled from 4.4 million in 1990 to 8.1 million in 2010 and is predicted to reach 11 million by 2020. The country's relatively low unemployment figures for youth between 14-25 or 15-35 are 6.5 percent and 9.9 percent, respectively mask differing unemployment pattern between rural and urban areas of Tanzania. The educated youth in urban areas are more than 6 times (13 percent) more likely to be unemployed than a rural youth (2 percent). Tanzania's agriculture sector generates 69% of the employment and accounts only for 31% of the GDP. Therefore, the jobs that are within the agriculture sector, which is plagued by low productivity, are mostly of poor quality in terms of return/income endemic with under-employment.

The government is pitted against these realities and required to come up with effective policy instruments to alleviate such barriers to growth and sustainable development. The incumbent national development strategy of Tanzania which is themed "Nurturing Industrialization for Economic Transformation and Human Development" has clearly stipulated provisions for country's aspirations to industrialization and for productive and decent employment with a focus on youth and women. Yet the African Pulse Report argues that economic transition from agriculture to manufacturing in Africa will be relatively slower compared to other world regions. Thus, countries like Tanzania needs to equip its work force with the required technical and life skills not only for the industry sector it aspires for, but also for the agriculture sector which might endure as a leading sector in terms of employment for some foreseeable time. Foundational cognitive skills (including literacy and numeracy) and socio-emotional skills are said to improve the technical and technology adoption skills of youth who transition to the agriculture sector. However, currently the agricultural extension programs fail to offer such training which could provide decent work to the youth and improved agricultural productivity. The planned research with Irish Aid in Tanzania intends to:

- Examine the macroeconomic and national level policies vis-à-vis youth economic empowerment and decent work
- Map various programs that are implemented by development partners on building the livelihood and skills of rural youth, compare with government policies
- Identify barriers and opportunities that exist for rural youth to establish decent employment and identify factors peculiar to females

The research will make use of primary data (including key informant interviews with relevant government officers and development partners working on youth skill development) and secondary data from Research on previous skill development program impact surveys. The analysis will be qualitative and quantitative. The quantitative analysis includes descriptive and simple econometric analysis.

The research will be hosted by Irish Embassy Tanzania and there will be link with Research on Poverty Alleviation (REPOA). The supervisors will be Dr Susan Murphy and Professor Padraig Carmody from TCD and Dr Niall Morris from Irish Aid Tanzania.

Poster Presentations

Linking Policy, Operations, and Workforce toward Meeting Global Health Goals

Addressing NCDs through localized training for healthcare providers on brief interventions for lifestyle changes

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Background

Noncommunicable diseases (NCDs) were recognized in the 2030 Agenda for Sustainable Development as a major challenge for sustainable development. The post-Soviet nation of Kazakhstan has suffered from the burden of NCDs (Kulkayeva, Harun-Or-rashid, Yoshida, Tulebayev, & Sakamoto, 2012), despite the Ministry of Health's efforts to promote healthy lifestyles.

A rapid assessment by the World Health Organization identified the communication between patients and their providers as an area in need of strengthening. Patients often blamed their deteriorating health on the poor quality of care and provider neglect rather than on their unhealthy behaviors and non-adherence to provider recommendations.

Description of Project

After conducting focus groups with both patients and providers (doctors and nurses) in two pilot provinces, the results were analyzed and used to inform the design of a communication skills training for providers. The training was customized to the local needs and practices of healthcare communication in Kazakhstan, specifically NCD patients in need of lifestyle changes.

Following a pilot test of the training, full training sessions were carried out in the two pilot provinces. The trainings proved to be successful according to the pre/post test analysis of patient centeredness. On-site observations were conducted six months following the trainings, revealing barriers to implementing the communication skills due to misunderstandings and low self-awareness. Despite the continued challenges, providers reported improvements as a result of their increased efforts in communication and counseling. The training was further customized based on the results of these visits to address the areas still in need of strengthening.

The final stage of the project included conducting training in the regional areas that served the rural populations. By this stage the training was finely tuned, particularly in building trust and effective counseling on health behavior changes for NCD patients.

Discussion

This training was successful at improving provider communication and counseling NCD patients because the design was informed by local stakeholders, including both providers and patients (Kreps, 2012). Providers can be effective at contributing to lifestyle changes through counseling patients on behavior change due to their positions as health experts (Lundahl, Kunz, Brownell, Tollefson, & Burke, 2010; Donoghue, Patton, Phillips, Deluca, & Drummond, 2014), especially when their counseling skills incorporate motivation identified by the patients themselves (Miller & Rollnick, 2002).

Messages aimed at promoting healthy lifestyles outside of healthcare interactions may not be successful if patients are not first convinced of their role in managing their lifestyle. This knowledge as well as motivation can and should come from their interactions with their providers.

Conclusion

Communication and counseling skills can be learned which in turn improves patient health (Gysels, Richardson, & Higginson, 2004; Kreps & Maibach, 2008). Existing healthcare systems contain protocols that create frequent interactions between providers and patients needing to change health behaviors. A sustainable approach to addressing the rise of NCDs is to strengthen the communication of those already involved in patient care who then strengthen their patients by empowering them with behavior change skills and motivation.

References:

- Donoghue, K., Patton, R., Phillips, T., Deluca, P., & Drummond, C. (2014). The effectiveness of electronic screening and brief intervention for reducing levels of alcohol consumption: a systematic review and meta-analysis. *Journal of medical Internet research*, 16(6).
- Gysels, M., Richardson, A., & Higginson, I. J. (2004). Communication training for health professionals who care for patients with cancer: a systematic review of effectiveness. *Supportive Care in Cancer*, 12(10), 692-700.
- Kreps, G. L. (2012). Translating health communication research into practice: The importance of implementing and sustaining evidence-based health communication interventions. *Atlantic Journal of Communication*, 20(1), 5-15.
- Kreps, G. L., & Maibach, E. W. (2008). Transdisciplinary science: The nexus between communication and public health. *Journal of Communication*, 58(4), 732-748.
- Kulkayeva, G., Harun-Or-Rashid, M., Yoshida, Y., Tulebayev, K., & Sakamoto, J. (2012). Cardiovascular disease risk factors among rural Kazakh population. *Nagoya journal of medical science*, 74(1-2), 51.

Lundahl, B. W., Kunz, C., Brownell, C., Tollefson, D., & Burke, B. L. (2010). A meta-analysis of motivational interviewing: Twenty-five years of empirical studies. *Research on social work practice*, 20(2), 137-160.

Miller, W. R., & Rollnick, S. (2002). *Preparing people for change*. Motivational Interviewing.

Ministry of Healthcare and Social Development of Kazakhstan. (2014). Strategic plan for 2014 - 2018 of Ministry of Healthcare and Social Development

http://www.nationalplanningcycles.org/sites/default/files/planning_cycle_repository/kazakhstan/2014-2018_gg_na_angl.pdf

Augmentation of Universal Health Coverage in India

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Universal Health Coverage (UHC) ensures every citizen with quality healthcare services, without suffering financial hardships. UHC in India was formally introduced in the 12th Five Year Plan in the form of High Level Expert Committee Group (HLEG) Report that encompasses a model proposed. With India spending less than 1% of GDP on Public Health, Prime Minister Narendra Modi's government during the Budget speech of 2018 announced the introduction of the world's largest government funded healthcare program of approximately US \$179 million. The successful implementation of National Health Protection Scheme (NHPS) or 'Modicare' would cover 500 million people. With the new 1% health and education cess empowering the poor common man with specialized treatment with premiums at approximately US \$16.47 per family, the Union Government has set the stage by increasing the federal health budget by 11.5% for 2018-19. This study on 'Augmentation of Universal Health Coverage in India' would encapsulate the genesis and evolution of UHC internationally and nationally, subsequently understanding the existing shortcomings of the Healthcare System of India. Consequently, it would comprise of deep-dive analysis and suggestive measure for effective implementation of the proposed NHPS model of UHC in India.

Informing Policy Decisions on Safe Water Access: A Study of the Biosand Filter in Rural Colombia

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Access to safe drinking water is an important issue in many parts of the world, and many different approaches are used to help communities gain and maintain safe water access. In rural areas of Colombia, bio-sand filter technology has become one of the preeminent techniques for point-of-use water purification, with an estimated 20,000 people using such filters throughout the country. Installation and training around the biosand filter technology has been a strictly private sector endeavor, but has a new potential to be included in public funding. The Colombian government is at an important turning point in deciding what type of water filtration technology to support in an expanded effort to provide safe water to its citizens.

This study of biosand filter use comes at a crucial moment for safe water access in Colombia. In 2016, after decades of internal conflict, the Colombian government and the Revolutionary Armed Forces of Colombia (FARC) guerrilla group signed a peace treaty which, in part, attempts to address the needs of neglected communities in the rural sectors of Colombia. As outlined by the peace treaty, the water quality standards have been amended, thereby making less-sophisticated water filtration systems – such as biosand filters - eligible for government funding. Allowing public funds to be used for point-of-use water filtration technologies will allow households across rural regions of Colombia to have improved access to clean water and will contribute to improved health and well-being. Our study of filter adoption and sustained use supports this process.

Our team will explore the nuances of household decision-making around use or abandonment of the biosand filter. This necessitates developing an understanding of the social and cultural elements that are embedded within these household decisions. Through an analysis of two different filter implementation strategies and household-level acceptability of the filter in these regions, we will provide insight to various stakeholders to inform decisions about the potential for nationwide expansion of the filter technology.

Our findings will contribute to our clients' report to the government to inform its decision about funding the continued installation of the biosand filter. This is a significant opportunity to inform current policy on a national level in a way that will have an important impact on Colombia's efforts to work towards the sixth Sustainable

Development Goal, to “Ensure availability and sustainable management of water and sanitation for all”.

Potential Role of Intellectual Property Law & Policy in Achieving Global Health Goals: An Analysis

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Innovation based advances in technology are the main driver of the rapid growth of global economy. Innovation can play a pivotal role in the achievement of Sustainable Development Goals (SDGs). This study acknowledges the role of innovation in the realization of SDGs. Achievement of certain SDGs requires the direct contribution of innovation. These SDGs include zero hunger (SDG2), good health and well-being (SDG3), clean water and sanitation (SDG6), affordable and clean energy (SDG7), decent work and economic growth (SDG8), sustainable cities and communities (SDG11), and climate action (SDG13). Innovation can assist in realizing certain other SDGs like no poverty (SDG1), life below water (SDG14), life on land (SDG15). Technological innovation can be directed toward achieving sustainable development goals through a deliberate, goal-based interaction of public and private R&D efforts. This paper focuses on the potential role of patent law and policy in achieving global health goals. Good health holds a central role in sustainable development as it enhances the ability of a community to develop human capital, undertake economic activities, and attract investment. Provision of universal public health is an indispensable requirement for sustainable development and it deserves to be a priority as this is a matter of basic justice and human rights. This study seeks to answer the following research questions: To what extent can the current innovation system help in achieving health-related SDGs? What are implications of the current innovation system for poorer and middle-income countries pursuing health-related SDGs? What can be possible alternate innovation models for achieving global health goals? What steps can be taken at the international level to harmonise technological innovation policy with the UN's Sustainable Development Agenda 2030, especially, global health goals?

Social Investment Programme in Nigeria and its Implication on SDGs: An Assessment of the school feeding programme in Ogun State.

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The School Feeding Programme is, one of President Buhari led federal government Social Investment Programme targeted at children especially in primary school to tackle poverty and improve the health and education of children and other vulnerable groups. The Nigerian Demographic and Health Survey DHS 2008 report estimated that 12% of children in Nigeria are not living with one or both parents. Thirty nine percent of children ages 5-14 are engaged in child labor. Approximately 40% of children do not attend primary school, and as many as 40% of children may have been trafficked.

The 2008 Situation Analysis and Assessment of OVC in Nigeria reported that 17.5 million children could be categorized as Orphans and Vulnerable Children and an estimated 7.3 million had lost one or both parents. This was before the emergence of Boko-haram in the north Eastern part of the country which became prominent in 2009/10. Other emerging conflicts which includes strives between Farmers and Fulani herdsmen in the north central, agitation for breakup in the south eastern and the increasing rate of militancy in the south-south of the country. In fact, it is estimated that more than 32 million children have lost parental care and could be classified as vulnerable. The need to reposition Nigeria and set her on track towards the attainment of the sustainable development goals necessitated the quest to have in-depth understanding of the school feeding programme in Ogun State which has the capacity to attract the most vulnerable population back to school.

Method:

The study was conducted using secondary data and key informant interview. A total of 25 stakeholders which include staff of the State Universal basic education, Ministry of Education, and school heads and Non-governmental organizations were interviewed. They were selected through snowballing and they gave their informed consent before they participated in the study.

Result:

The study revealed significant increase in the number in school enrollment and retention rate, creating opportunities with multiplying effect. However it shows that there are no corresponding investments in other school infrastructures especially human resources. Furthermore the study reveals there is no coordination among stakeholders towards the attainment of a specific goal.

Conclusion:

The Social Investment Programme in Nigeria has a potential of accelerating Nigeria's quest to attaining the SDGs by 2030. All investment from all stakeholders should be coordinated to prevent wasted and improved reporting. Sustainability of the programme will require community engagement and investment.

Keywords: SDGs, Vulnerable children, Education, Orphans

Supply chain analysis for the Peste des Petits Ruminants vaccine in the Karamoja Region to improve vaccine availability and reduce logistical costs

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Peste des Petits Ruminants (PPR) is a disease that affects goats and sheep. Currently targeted for eradication by 2030 as it is one of the causes of food insecurity and economical loss among pastoralist communities and livestock owners. Challenges in the eradication program are of interdisciplinary nature and wide in range such as different social and gender dynamics of livestock owners among different cultures, achieving sustainability of the project by providing vaccines to livestock owners at a price they are willing to pay, and logistical challenges such as poor infrastructure and remoteness. The Livestock Systems Innovation Lab at UF has an ongoing project for PPR vaccination in Uganda and Kenya where approximately one million goats are to be vaccinated. A supply chain analysis of the distribution methods could improve the vaccination coverage and reduce the cost, thus making it more accessible for livestock owners and improving the efficacy of vaccination programs. The PPR eradication strategy faces many challenges and this project would focus on the following:

Remoteness: Karamoja is a remote area in northern Uganda with poor infrastructure. Strategic location of distribution centers, storage facilities and other infrastructure in the distribution network is key in order to increase availability and reduce costs. Constraints such as the lack of a reliable electrical grid and security must be taken into consideration. This information would also be used to generate a transportation model to improve delivery.

Poor availability of the vaccine: Uncertainty on the demand for the vaccine difficult forecasting. Without adequate forecasting methods there is a higher risk of holding a sub-optimal amount of inventory, which leads to increased costs and poor availability. Gathering data to determine optimal inventory at each stage of the supply chain is one of the objectives that could help improve availability.

Coordination in the Supply Chain: Assess the communication and data sharing between supply chain actors. Identify ways to improve communication channels to guarantee reliable data from all levels in the supply chain. This would also allow to design a model of the supply chain in order to propose a redesign if needed. Such models have been previously used to propose improvements in the vaccine supply chain of African countries.

Sustainability Design Criteria : Review

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Need - Presently every year ,sustainable indicators are proposed in every aspect earth science. The list of indicators is growing exponentially.In order to measure sustainability using these indicators, efficacy needs to be assured.

Goal- the goal of this article is to review the indicator metrics along 30 dimensions and provide a methodology for sustainable indicator design

Originality- This is the first article to review 200 sustainability papers for the indicator design metrics

The journey towards SDG 3: next stop Mozambique

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When the international community adopted SDGs 3 'Health and Well-Being' in September 2015, it embarked on a long and tortuous journey, with the commitment of achieving by 2030 a world where the right of health is universally fulfilled. While the goal is set, national Governments, aid agencies and donors, the academia and civil society, are struggling to put in place the most effective means for its achievement, namely policies, operations and workforce.

I myself embarked on this journey full of twists and turns, which brought me to Mozambique, a country where the burden of diseases such as malaria, tuberculosis and HIV/AIDS is still one of the highest in the world and where over half of the population lack access to essential health care. There, the magnitude and urgency of the challenges towards the achievement of SDG 3, seemed to me a pressing call to action.

More concretely, in my study I investigate the impact of a community-based health care intervention called Health Brigades (Brigadas Moveis) on the health status of rural population in one remote district in Southern Mozambique.

In order to do this, I have put together a new and unique panel dataset covering the 2013 -2017 period, which includes variables at district and community level describing: a. activities implemented and outputs produced by the Brigadas Moveis project in areas such as malaria and HIV testing, undernutrition detection in children below 2, children vaccination, pre- and post- natal care and health and nutrition education and; b: health indicators in the same areas of interest (malaria and HIV/AIDS, maternal and children health, immunization and nutrition).

Using rigorous econometric techniques which exploits a Difference in Differences design, I test whether any variation exists in population's health status before and after Brigadas Moveis's intervention, in districts where the project has been implemented and districts where it has not. During the fieldwork I am about to start in Mozambique in cooperation with the NGO Medicus Mundi, which has been supporting the Government of Mozambique to implement Brigadas Moveis for almost ten years, I will have the opportunity to collect additional quantitative and qualitative information to better assess the performance of the project and its impact on population's health.

At the end of my research in early September 2018, this project will provide new knowledge, backed by sound empirical evidence, on the effectiveness of community – based health care services on people's health, which I hope could inform policy and program design and decision – making processes at various levels, from the host NGO, to the Mozambican Government and potential partners and donors

To conclude, this study aims to contribute to the debate on the way in which evidence – based policies, effective and sustainable operations, and trained and committed health workers can be linked to improve the quality and quantity of health care’s provision. As such, I hope my research could be considered a small step forward in the long journey towards the achievement of SDG 3.

Understanding the Role of Water Management Education on Water Quality Outcomes in Potou, Senegal

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The sixth Sustainable Development Goal (“SDG”) calls for access to water and sanitation for all. Access to clean water has significant implications for global health outcomes. 663 million people today still don’t have access to “improved water sources.” Specifically, the sixth SDG called for access to “improved water sources,” and this rhetoric has been used by the UN in its assessment of reaching the sixth SDG. The definition of “improved water sources” still may include fecally contaminated water from piped systems, creating a large discrepancy between those who have access to water, versus those who have access to safe, non-contaminated water (Onda et al. 2012). Thus, estimates of those without clean water in 2010 can reach 1.8 billion people.

The Millenium Village Project (“MVP”) is an initiative developed by Millenium Promise to achieve the SDGs in some of the poorest, rural communities in sub-Saharan Africa. One of the first Millennium Villages was started in the north-west region of Senegal, called Potou. While access to water has increased dramatically since the conception of the project, there has still been significant issues with water quality in Potou. Nearly 90% of households in Potou have individual faucets, but most are faced with excess iron (80%). While the WHO has noted iron cannot be consumed at levels high enough to cause adverse health effects, iron may be an indicator or another water contaminant which may have adverse health effects, such as arsenic.

Localized water management, however, have been encouraged by educational and operational initiatives. Potou has 50 primary schools, where education programs have implemented on water and sanitation, specifically regarding pathologies related to water, faecal danger, the health of the living environment and other aspects of the school environment.

Additionally, filters for iron have been previously delivered at health posts, schools, and individual households. However, most of them no longer work or are no longer used. Thus while there have been initiatives through the operational levels of water management, these have not been linked to increased access to clean water, and thus improved health outcomes.

This research will consist of a mixed methods approach to understand the role does water quality education play in water quality outcomes both in Potou. Both quantitative and qualitative methods will be used to assess the water quality and assess the water quality education surrounding iron contamination in Millennium Village Potou, Senegal. Water quality measurements and surveys will be done in both households and schools across the six districts. These surveys will be supplemented with semi-structured interviews with school principals and health ministry workers in order to understand the current initiatives and education surrounding water quality management on the national,

community, and household levels, in order to understand operational initiative gaps for meeting global health standards for clean water.

Using Fine Arts to Educate Young People on HIV/AIDS, STIs Prevention including their Sexuality Health

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Issue:

Lahore is the second largest city of Pakistan and the provincial capital of Punjab. Lahore is also a major industrial city where migration from rural to urban areas is at its peak. A large number of migrated people belong to religious minorities who migrated from different parts of Pakistan to earn their livelihood and have settled in the small villages surrounding Lahore due to the over-population in the city area.

Although, Lahore is considered to be the most advanced city with all the necessary facilities available, but still the people particularly the young people living in the villages surrounding Lahore are deprived of many basic needs including education, health services, information regarding HIV/AIDS including sexual and reproductive health, recreational and entertainment activities etc

Project:

The project aims is to be aware and make aware young people living rural areas about HIV Prevention and their Sexuality Rights through Arts. The activities of the projects are;

Conducting Painting Competitions in Lahore to access the knowledge, Attitude, and Perception of Young people particularly women about Sexuality and HIV/AIDS

Educating young people particularly women of 10 schools and 5 Colleges of District Lahore about gender, sexuality including HIV/AIDS, mode of Transmission and Prevention through 1 Day training sessions

Results:

1. 1000 young people of “Lahore” got an accurate education about Gender, Sexuality rights, and HIV/AIDS.
2. 800 young people volunteered to be part of these HIV/AIDS training sessions and recommend their school administration to continue these sessions and or made it part of their curricula.

Lesson Learned:

Young people loved arts activities so HIV/AIDS education should be integrated into their art class curriculum of schools and colleges to ensure accurate information about Gender, SRHR and HIV/AIDS for young people.

Indigenous Approaches to Understanding and Practicing Sustainable Development

Accounting for African Indigenous Knowledge and Approaches to the Understanding and Practice of Sustainable Development Governance

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The period leading to the turn of the New Millennium was filled with a global flurry of engagements aimed at addressing international development policy bottlenecks. This led to the Millennium Development Goals (MDGs) that multiple development actors would focus upon globally, regionally, nationally and locally for fifteen years starting the year 2000. Experiences gained from the global concerted efforts aimed at delivering for the MDGs became an essential building block in designing the post-2015 international development agenda. For the particular case of Africa, the heterogeneous dynamics of local socio-economic development that is both competitive and sustainable posed a major challenge for policy actors and researchers alike. Africans in many communities are faced with multifaceted challenges in pursuing possibilities to attain the ideal of sustainable development. Indigenous knowledge and approaches of development are significant in addressing deficits in areas such as endemic food insecurity bundled with unsustainable rural agricultural development, non-communicable diseases and poor healthcare services, competitive local legislation bottlenecks for investments, planning urban development and local institutional governance systems. African indigenous knowledge debunks popular tendencies and approaches to development rooted in Western-Style Systems, standards, resources, expertise and problem-solving methodologies. Like any other set of indigenous ideas, African Indigenous Knowledge is suited to provide local communities with a considered basis for problem-solving strategies that naturally give them a competitive edge. In practice, sustainable development is home grown. We cannot import or export it to other societies. From the practice of African Indigenous Knowledge, this paper argues that drawing from local applicable realities of sustainable community development governance in Makueni County in Kenya, the understanding and practice of sustainable development in Africa will on the long-term benefit from a matrix of looking within coupled with critical endogenous capabilities development for indigenous institutions of knowledge growth necessary for sustainable development. The huge collection of African Indigenous Knowledge is an essential component and an addition to the international pool of knowledge on sustainable development issues. This is unquestionably far important a resource for cross-fertilizing and enriching both our understanding and practice of sustainable development processes to be underutilized on the long term. Active collaborative actions between local and global knowledge centres is necessary to embed the mix of cultural endogeneity within the wider process of sustainable development.

Key Words: African indigenous knowledge, sustainable development governance, practice of sustainable development, local ecosystems for knowledge production, collaborative action for sustainable development

Ambassador SDG: ludic approach to achieve the Sustainable Development Goals at the local level Amazonian remote areas

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The Amazon is a key region for the future of our planet: it houses the world's largest reservoir of biodiversity, surface freshwater and terrestrial carbon stocks. The Amazon also plays an important role in the dynamics of global water cycle. Given current trends of anthropogenic pressures and the planet boundaries, the Amazon is a region of strategic global importance. It is too big to fail. Moreover, it is house of innumerable women and men, from diverse indigenous and riverine ethnicities, that are not related and do not make sense that its lives have been impacted by the current business as usual (BAU) trajectories, and to address them, international agreements have been placed to change and stop it. However, they are not considered in the development of international mechanisms.

To bring this sense and empower them on subjects like Sustainable Development Goals (SDG) and Paris Agreement, the Ambassador SDG was established in 2018, that aims to train youths and adults as “multipliers” of the SDGs - through a methodology of recreational teaching developed in relation to reality of local Amazonians – to localize and achieving them in the local level.

The project, implemented in 2018 as a pilot in two State Protected Areas in Amazonas (Juma and Uatumã), has different phases, such as the training period, monitoring period and evaluation and lessons learned period. The training period has the goal to teach on three distinct modules, and each one has a goal and purpose. The first module teaches subjects as climate change, Anthropocene, sustainable development, geopolitics and economic growth, all based on their comprehension related to the SDGs. The second module presents an adapted business model canvas (called as action plan), to give them the sense of teamwork and their importance as local implementers of change, and participants have to develop a project based in a change they want to see in their community and its relation to SDGs. The third module is a feedback on their action plan and is develop skills on leadership, activism and communications. The methodology used during the hole project is playful and inclusive (as dynamics, quizzes and games), considering that can it be taken to different publics and people get closer to difficult topics if they are lived instead of imposed.

The project is implemented by Sustainable Amazonas Foundation (FAS) - a Brazilian non-governmental organization, non-for profit motives, of state and federal public utility – in partnership with the Amazonas State Secretary of Education and community local

leaders, because they strengthen the participation of youths since they will be the decision makers of the future.

As expected results, the project is focused on decentralize "knowledge" about SDGs and 2030 Agenda to foster new linkages from riverine people, transmit the importance of youths and their role as implementers of the process and aware people that SDGs are a cross-cutting and day-to-day theme.

By far, the project has been raising the importance to discuss international agreements and its implementation impacts with residents of remote areas, once they are the firsts that suffer with climate change and have no voice in decision processes that should be participatory and inclusive.

Assessment of Sanitation Development in India- How is the country progressing towards sustainable development goal?

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Introduction: India disproportionately bears the burden of open defecation in spite of growing allocation of fund and several institutional efforts including Swachh Bharat Mission, which has created public rhetoric nationally as well as internationally. A large share of households in rural India still lack basic sanitation facilities and hence the members are forced to practice open defecation.

Objective: The study endeavours to examine the existing anomaly between meagre sanitation productivity and enhanced resource allocation in rural sanitation in India. The study attempts to develop an instrument to monitor the regional performances (state and district wise) across India.

Methodology: The paper applied data exploratory method that fetches out existence of spatial inequality and economic inequity across the nation. The extent of inequality and inequity are measured through appropriate measure of dispersions, including Gini index. Moreover, inconsistency between the social expenditure and sanitation output calls for efficiency analysis. To quantify the level of efficiency of the districts in translating social spending in to sanitation coverage and usage, non-parametric data envelopment technique (DEA) has been applied to identify best-in-class performers. Finally, the main thrust of the paper is to construct a regional sanitation performance index that premises on three dimensions of performance: efficiency, equity and equality. The paper utilizes a decentralized approach to investigate on existing inequity and inequality issues in sanitation access within and across regions of the country.

Findings: Efficiency analysis reveals huge potential of India to attain a far higher sanitation access and usage with the given flow of social spending. The study unfolds the fact that India is suffering from dual burden of spatial inequality and economic inequity. While the regional divergence in sanitation access escalates, households from lower income group increasingly construct toilets in comparison to their higher income counterpart even within the same region, originating a paradox in sanitation access in India.

Conclusion: The performance index has the potential to be served as an instrument to monitor and evaluate regional performances on sanitation and to inform investment decisions for targeted improvement. The index can be utilized as “future proof” for evaluation of regional performance towards attainment of Sustainable Development Goal (SDG) in the field of sanitation. This index is a useful tool for policy watch as it

clearly identifies the best and the worst performers by allowing fair comparison among them.

Boko Haram Insurgency, Environmental Protection and the Sustainable Development Goals in the North-east Region of Nigeria Bem Japhet Audu, PhD
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Over the years, there has been a global campaign to sensitize on the serious adverse impact of armed conflict and military activities on the environment. This is because modern weaponry, troop movements, landmines, hazardous military waste, and the destruction of forests for military use are a few sources of harm to the environment both during armed conflict and peacetime military activities. This oftentimes results in even greater humanitarian and environmental harm; with serious implications for the health and well-being of civilians and ecosystems alike. Environmental degradation is increasingly being recognized as one of the most significant challenges of the 21st century and its effects are being felt worldwide. Both domestic and international legislations have been inadequate in mitigating the impact of military activities. It is against this background that this paper examines the impact of armed conflict in the north-east region of Nigeria where government forces are engaged in armed conflict with Boko Haram insurgents as well as its impact on sustainable development. The paper argues that the Boko Haram insurgency, apart from the fact that it had diminished the likelihood of meeting the Millennium Development Goals and targets in the North-east region of Nigeria, it has also continued to impact negatively on the SDGs. There have been cases of deliberate pollution of rivers and other sources of water, and widespread damage to industrial, water and power facilities. Using primary and secondary sources of data collection, the paper concludes that continued attacks by armed groups and intensive bombing from government forces have potential repercussions for public health and the environment. Also, the conflict has led to population displacement which has created an environmental impact, both in Nigeria and in neighbouring countries such as Cameroon, Niger and Chad. This massive influx of refugees continues to impact on air quality, water quality and biodiversity. The paper provides details of the environmental destruction wreaked during the armed conflicts and argues that the existing legal regime for the protection of the environment during armed conflict requires substantial modification. It puts forward the view that though it is inconceivable to impose an absolute ban on environmental damage during military operations, strengthening and clarifying the existing laws protecting the environment in times of conflict, and enforcing environment-friendly practices among military forces could go a long way in protecting natural assets of our earth. And, even though customary international law is yet to develop to a point where adequate protection is provided for the environment in times of armed conflict, this paper posits that armed conflict causes environmental harm and puts further obstacles in the path of sustainable development, with negative impact on security, development, environmental and human well-being. This requires the apt response of governments, international community and

non-governmental organizations in ensuring the that the north-east region of Nigeria meets the sustainable development goals.

Keywords: Boko Haram Insurgency, Environmental Protection, Sustainable Development Goals, Nigeria

Community immersions as experience-based, indigenous learning in management studies: A South African case study

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Community immersions provide a lived experience of a social context. In executive education, community immersions concretize managers' understanding of the social challenges inherent in a globalized context. This is crucial if business is to play a prominent role in developing indigenous, contextually responsive solutions to sustainable development challenges.

This paper uses the lens of experience-based learning, (Kolb, 1984; Bergsteiner, Avery, and Neumann, 2010) to explore the role of community immersions in management education, and how community immersions help foster indigenous understanding and solutions to sustainable development. The paper extends existing scholarship on the significance of immersions as an experience-based learning tool in management education. More importantly, the study uses the lens of a complex, historically segregated society such as South Africa, to highlight the opportunities that exist for collaborative action across all stakeholder sections to develop solutions that are informed by indigenous, contextual understanding of the challenges and threats to sustainable development.

Purpose

The purpose of this paper is to explore the pedagogical significance of community immersions seen through the lens of experience-based learning theory to foster indigenous understanding and practice among executive leaders. Conference participants will understand how community immersions in executive education can provide experience-based understanding of local community contexts and, in turn, drive collaborative actions to bridge the social gaps resulting from globalization in complex, historically segregated and economically isolated social contexts.

Literature

It is important to understand how executive managers in South Africa are able to gain new perspectives about the context in which they operate, and to shift their original perceptions of the "other". Summarising the critiques of Kolb's (1984) experiential learning model, Bergsteiner and Avery (2014; p. 264) suggest that Kolb pays insufficient attention to: "... reflection (Boud, Keogh, and Walker, 1985); culture-based differences

(Anderson, 1988); context and emotion (Boud, Keogh, and Walker, 1996); whether learning occurs merely as preferred learning modes (De Ciantis and Kirton,

1996); the theoretical foundation of learner types (Garner, 2000); other learning processes such as information assimilation and memorisation, (Smith, 2001); and the role of context and educators' limitations.”

Immersive, experienced-based learning in executive education, therefore, creates dialogic spaces for deep reflection, and development of indigenous understanding of social challenges to sustainable development, (Lui, 2017). Immersions also facilitate learning on emotionally laden topics such as race, access, redress and economic development in a complex society such as post-Apartheid South Africa, which can unlock collaborative solutions for sustainable development.

Delivering African solutions to Promoting Ghana's Small and Medium Enterprises (SMEs) in the 21st Century

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Western solutions to organization and business management in Africa have largely been discredited as inappropriate to local communities and African staffs, paralleling criticisms of neoliberal economic policies implemented in African countries. Yet searches for local solutions promoting SMEs in Africa have been fraught with difficulties. Using the Postcolonial Theory such as Raewyn Connell's rethinking of social science through Southern Theory and methodology informed by Linda Tuhiwai Smith's decolonizing methodologies and indigenous research the study concluded that the search for what constitutes 'indigenous' is problematic since 'indigenous' knowledge is not an artefact to be preserved but part of a dynamic. Hence it is subject to change and global influences particularly in the age of social media. Yet local or indigenous knowledge informs the way entrepreneurship is conducted, the nature of employment in the SMEs sector, the way enterprise relates to the local economy and the way economic wellbeing is constructed; and, often may be at odds with official policy, rather than working in tandem with it.

Designing Downtown Commercial Districts for Sustainability

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This paper discusses how the sustainability design of Central Business Districts and urban downtown locations can positively spur local economic vitality and increase value of the built environment. These practices refer to the ways that architects and urban planners can improve local physical environments through the use of three basic sustainability design principles: complete streets; green infrastructure; and mixed use development. Complete streets are design constructs that lead to greater walkability and the use of alternative transportation modes; green infrastructure refers to the use of green space as a biophilic design feature that correspondingly addresses flooding and stormwater emissions that protect water quality; and mixed use development as a land use and zoning tool that integrates residential and commercial design in downtown locations, enhancing greater liveability. This paper analyzes three community case studies of Business Improvement Districts (BID's) in New Jersey, USA, to demonstrate how the use of sustainability design has increased tax revenue for local governments; added to the amount of green space in these downtown locations; and increased sales volume for local business. Business Improvement Districts (BID's) are legal, not-for-profit associations that are created to enhance and develop downtown commercial districts. Two of the communities selected for study have BID's that have incorporated sustainability design into their improvement strategies, while the third has not. The paper concludes that sustainability design effectively improved the performance of the BID's along three dimensions: local property taxation revenue for local government sustainability; amount of green space that fosters personal health sustainability; and increased retail volume which enhances business sustainability.

Donor Aid and Livelihood in Ghana

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With a case study of National Forest Plantation Development Programme (NFPDP) in communities in Dormaa, this paper examines the role of foreign aid in promoting livelihoods of rural farmers in Ghana. The past five decade has witnessed significant inflows of donor assistance from the international donor community to support rural livelihoods and agricultural productivity. However, for over fifty years of consistent aid flow to Ghana, donor assistance has not fared as expected to improve farmers' livelihoods and agricultural productivity. Using the Access theory as analytical framework, the authors tried through empirical data to understand how access to and security of rights to land affect the utility of development aid for farmers' livelihoods. The data reveals that farmers' rights to their lands are threatened by economic and political power of other actors with stakes in farmers' lands, such that farmers at all times attempt to find alternative livelihoods, even with development aid. Thus, the study concludes that when their major assets are threatened, farmers do not necessarily seek to sustain current livelihoods. Rather, they constantly seek alternative ones, a finding that should inform sustainable livelihood analysis to better understand farmers' perspectives and meet their expectations about their own livelihoods.

Effectiveness of Paddy Consortia (Platform) In Enhancing Smallholder Producers Access To Market ,A Case Study Of Sengerema Distric,Mwanza Region in Lake Zone,Tanzania

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Agriculture remains a major source of revenue for the United Republic of Tanzania, contributing more than a quarter of the country's GDP while employing up to 80% of the workforce. (WEF, 2016). It has a high potential to contribute to poverty reduction and economic development. The sector is however dominated by smallholder farmers whose productivity and income remained stagnated due to many challenges, of which is poor knowledge of market mechanisms and how to link with buyer groups to sell their produce/products.

To address this challenge particularly among paddy (rice) farmers in Sengerema District in Nwanza Region, a market linkage approach known as consortia (platform) model is being employed. This study intends to investigate the effectiveness of this approach (consortia platform) by identifying the benefit or support derived by the smallholder paddy farmers and also ascertain the change in productivity leading to improvement in level of sales and profitability as a result of their involvement in the platform.

The methodology to be employed is Experimental and Control variable, so as to establish a causal relationship between intervention of the consortia platform and outcomes on productivity and income of smallholder farmers before and after their membership of the consortia platform. Quantitative data shall be gathered from the randomly selected sample from the population of the smallholder farmers through the use of structured questionnaire, (close and open-ended). Key Informant Interview (KII), Focused Group Discussion (FGD) will be used to gather qualitative data from the operator of the consortia platform and other stakeholders.

The result is still a work in progress; it is however expected to bring about improved market opportunities and increased value addition for the famers. This will ultimately result to increased incomes of the smallholder producers. These benefits will primarily result to: (i) improved access to markets and information; reduced transaction costs, reduced post-harvest losses, enhanced food safety, improved product quality and increased producer (farm gate) prices, increased output and productivity and improved economies of scale.

The policy implication of this would be; effective functioning of producer and marketing groups, sustainable management of consortia platforms by all stakeholders. There will be more coordinated approach through which farmers, processors, retailers, and others

in the supply chain would continue to work together while looking at production activities within the context of the whole supply chain. These will ultimately lead to poverty reduction and improved standard of living for the people.

Effectiveness Of Programme Results Framework In Monitoring Implementation Of Market Infrastructure Projects In Manyara, Tanzania

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Manyara is one of the Regions in Tanzania that is benefiting from the Marketing Infrastructure Value Addition Rural Finance support Program (MIVARF) implemented by International Fund for Agricultural Development (IFAD) and the Government of Tanzania. The main objective of this study is to assess the effectiveness of Programme Results Framework in Monitoring Implementation of Market Infrastructure Projects. The construction of the Market infrastructure facilities in Manyara Region is identified as one of the ways to increase productivity thereby, reducing food insecurity and as a result leads to increased income among the farmers. MIVARF which is in line with Government of Tanzania's vision for Agricultural development is focusing on reducing rural poverty and accelerating economic growth on a sustainable basis through enhanced rural incomes and food security in Tanzania, in other to achieve the objective; Results Framework has to be formulated with strong indicators.

Primary data were collected through Structured Questionnaire method, Phone interview method and FGD- Focus Group Discussions. The study covered two selected IFAD/MIVARF infrastructure projects in Manyara region and 384 questionnaires were distributed to both beneficiaries of the Market infrastructure projects and the service providers using the Multi- stage random sampling. Data analysis involved the use of descriptive statistics (mean and frequencies) and cross tabulation.

The results showed that Results Framework has helped in planning and monitoring of the infrastructure facilities and the infrastructure facilities has significantly led to the increase in farmer's income.

The study also revealed the planning capacity of Results Framework in market infrastructure project and knowledge gained will form basis for Recommendations focused on how to further plan for the infrastructure projects for sustainable food security, which leads to enhanced rural income in Tanzania.

Key Words: programme results framework, market infrastructure facilities, Income and Food security.

Energy and Sustainability Transition Management: The case of Community Renewables in Nigeria's Rural Areas Electrification.

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The transition from one energy system to another has been analysed by many researchers especially in the context of developed countries. Community renewable energy transition in rural areas is largely under-researched, particularly in developing countries. This study developed a model based on indicators from transition theory and concepts to assess the transformative potential of the processes and governance approaches to community renewable energy in accelerating energy and sustainability transition in Nigeria. The exploratory research adopted a case study strategy to analyse the governance approaches to community renewable energy in rural areas. In addition to documentary evidence, data was primarily gathered by interviewing 24 relevant actors in the Nigerian electricity industry. The result of the study revealed the setting of arena to bring stakeholders to a round table with the aim of identifying the challenges facing rural communities and drawing a long-term vision for community renewables. However, the study discovered the non-involvement of some important stakeholders in the process. The study contributes towards current attempts to operationalise transition theory and concepts for the assessment of an on-going socio-technical transition.

Ethnic learning of sustainability development through literature

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Sustainability is the pattern of economic growth in which resources use aims to meet human needs while preserving the environment so that these needs can be met not only in present, but also for generation to come. There are several literary texts available since the ancient times like Vedas which have remarkably mentioned the rules of dealing with environment for the human. According to the indigenous concepts of Vedas and Upanishads, the Universe consists of five basic elements (The Pancha Mahabhuta). Natural resources and especially trees were worshiped before their use rather than just deployed for human requirement and without any concern for environment like in today world. They have recognized the importance of maintenance of seasoned cycles that are likely to get altered due to climate change owing to inappropriate human actions. Vedas teaches us to wisely utilize the three elements which are varied, visible and full of qualities such that water, Air and plants & herbs. They exist in the World (Prithivi) from the very beginning. Stories written on environment shows the functional and educational view of literature. We can underline this by using ethical literates on sustainability. Through these literatures, we have identified the role and importance of beliefs in sustainability development and to sensitize the mankind towards environment.

Keywords: Indigenous, Civilization, Ethics, Sustainability, Vedas

Future of a country: Context based education model for girls in mining regions of the Democratic Republic of Congo

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Between international and regional actors, it is vital to rethink the place that Africa has occupied in the past century, and role that it has played; but most importantly it is imperative to analyse and suggest practical strategies that the continent can apply to be competitive and subsequently achieve the Sustainable Development Goals. One of the areas which require much attention in building strong and economically viable communities is the area of education for girls in underprivileged communities.

This paper, which is a case of indigenous approaches to understanding and practicing Sustainable Development, reflects an ongoing effort that our NGO, Lueur D'Espoir, is developing in providing effective education for girls in rural and mining regions of the Democratic Republic of the Congo through what is locally known as the provision of “the context based education system” as a pre-requisite for sustainable development and long term economic and livelihood sustainability.

This paper is part of an ongoing research project on economic growth in the Democratic Republic of Congo (DRC). It presents some findings from a general assessment on mining activities and education for girls, but most importantly the finding and project challenge scholars and policy makers on ways to ensure sustainable development for local communities through effective and relevant education model which is sensitive to social, cultural and traditional need of the indigenous communities.

In fact, for decades the education system in the DRC, especially in mining regions, was designed and implemented based on economic interest of foreign and national investors. Being a predominantly natural resources dependent country, the DRC was characterized by education system which was aligned to create a workforce that would serve the market and not capitalize on human development. Unfortunately, such political economy strategies did not allow the country to develop and girls in rural communities were the most marginalized. It is within this perspective that this project intends to create a shift in socio-economic development approach that will match the education model and the natural resources in communities.

This paper will summarize some key finding from data collected; the paper will also look at the implication of mining policy on education and its consequences on girls' education and sustainable development goals.

In conclusion, from the data collected and policy analysis, the finding shows that economic growth and sustainable development in the DRC can be achieved if governments implement context based education system by diversifying the curriculum, making it more relevant to local context and including girls as one of the targeted

population for access to quality education; especially in regions where natural resources exploration is dominant. There must be synchronization between economic activities and skills development for girls within each region.

Investing Statistical Knowledge Using Comics for Sustainable Statistical Literacy

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In Indonesian Education system, the general knowledge about statistics has been given to people since in basic education level through mathematics subject. However, Indonesian common public are still lack of awareness on official statistics used by government as basic of public policy development. A lot of people often misinterpret the poverty statistics and most of them could not distinguish the use of seasonally adjusted data and its original data. Therefore, BPS (Indonesian Statistics Office) needs to promote comprehensively all statistics produced to public, not only about the way of interpretation but also the calculation methods.

BPS experienced with various statistical promotion instruments, such as in info-graphics and video-graphics. But recently, BPS considered comics utilization as an improvement way of promotion. Comics are often involved in the literacy program because it could transmit a sequence of story using very simple words and fun visualization. BPS believed if comics could be an effective media of delivering statistical knowledge.

BPS conducted its first trial for promoting seasonally adjusted GDP as a new official statistics. The project was called “seasonal adjustment comics”. These comics were disseminated through social media (facebook) in collaboration with BPS’ bureaucratic reform program. Social media is proven as influential social marketing, it could reach out many more people within a short time and with a minimum cost. Meanwhile, bureaucratic reform program are considered as powerful vehicles to promote new products of changes and reforms, as it has high power of enforcement. BPS created Bureaucratic Reform facebook fanpage to fulfill its social responsibility on statistical literacy extensively.

Seasonal adjustment comics uploaded through BPS’ Bureaucratic Reform facebook fanpage could reach out more than 5500 people within two weeks. Most of them conveyed positive responds and in general they said if understanding statistics becomes much easier using comics. The collaboration of comics, social media, and bureaucratic reform program was truly a breakthrough method of statistical literacy for common people.

The on going BPS’ comics project is “Making sure everyone cares of Sustainable Development Goals (SDGs)”. This project aims to rise public awareness on sustainable development in their domain. It encourages people to understand what SDGs is, why Indonesia commits to achieve the goals, and what people need to do as contributions for achieving the goals.

Creating comics for statistics education is an enormous challenge. It requires a capability to arrange a statistics story board and to transform scientific words into daily spoken words. This paper will reveal the experiences of BPS in creating comics for sustainable statistical literacy completely.

Monitoring Development Sustainability through Sustainable Community Indicators

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The Sustainable Development Goals (SDGs) is both a continuation to the Millennium Development Goals (MDGs) and also an improvement from the addition of 'means of implementation' to achieve the goals. SDGs also recognize countries should have their own ways to achieve the goals. In this regard, Thailand, through its well-known 'sufficiency economy philosophy' (SEP) invented by the late King Bhumibol Adulyadej, has been offering a rather unique path to attain sustainable development. The SEP path involves (a) shaping personal attitudes and behaviors and (b) setting procedures or protocols for development projects or programmes. In this paper, we developed a system of indicators that captures the first component--the personal attitudes and behaviors--of sufficiency economy philosophy as possessed or practiced by Thai people, as well as a set of ultimate development outcome indicators, using data from well-designed, nation-wide household and community surveys. We then analyze how practicing sufficiency economy philosophy is associated with development outcomes, where we find positive correlation between the two groups of indicators. We also suggest method to link the findings to international concept of sustainability and how the indicators might be used to help monitoring and evaluating area-based development projects/programmes.

Ngilin, Panagusok ken Dadduma Pay: Indigenous Knowledge and Preservation of Gold in a Traditional Small-Scale Mining Community of Northern Philippines

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A number of studies have been made about small-scale mining in the Philippines but little is known about the life ways of the locals centered on this mode of survival. While large and small-scale mining entail health issues, there is also a need to know how traditional mining, indigenous knowledge and other practices lead to sustainability. The objective of this study is to examine certain ways of life that revolve around small-scale mining and how mining has either become beneficial or detrimental to the locals. The purpose is to show that certain practices emerge out of certain modes of survival and how rituals and knowledge systems lead to the preservation of some local resources. Qualitative methods were used for this study. Key-informant interviews were made with local officials as well as women involved in small-scale mining. Interviews were also conducted with the former town mayor and another local as part of triangulation method. Secondary data, videos and recordings, and pictures were also utilized for a richer data. Certain indigenous knowledge indeed results to preserving gold as a precious resource in the community. On the other hand networking is a must to ensure survival especially with the increase of population in the area. Challenges have emerged though like forest denudation, respiratory and kidney illnesses. These remain in the locality as results of small-scale mining, the large-scale mine abandoned years ago and usage of chemicals like cyanide and mercury. Indigenous knowledge, rituals and networking exist so that the locals can thrive. The task at hand is the transition toward a more tenable way of extracting resources or perhaps a resurgence of how things were done before.

Keywords: Indigenous Knowledge, Rituals, Health, Network, Sustainability, Traditional Small-Scale Mining

Onse pamodzi: the role of partnerships in addressing socioeconomic vulnerability in Malawi

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One of the most uncompromising challenges in the design and delivery of public services involve the participation of the citizens and communities. Such relational features of public administration and management remain hotly discussed and debated as to whether, and to what extent localized community stakeholders create further public value.

There are two main paradigms that shape today's debates on public service delivery. The first one, New Public Management (NPM) markedly emphasizes service inputs and outputs; its coordination mechanism focus mostly on market or neo-classical contracts. On the other hand, an emergent paradigm called New Public Governance (NPG) focuses on service processes and outcomes with trust and relational contracts as mechanisms. As service delivery outcomes have always hinged on such types of mechanisms to meet social targets, unfortunately, much of theoretical and empirical literature addressing such issues fall short of recognizing specific and contextual differences. In fact, the literature base set within the context of developing countries are very scant.

In this light, how do such paradigms above improve our understanding of public service improvement? How can the public sector and the communities in general, be more responsive to development goals? In this respect, our proposal pushes to advance our conceptualization of public services through the co-production lens. We essentially aim to frame public service to be process-driven, inherently relational and involving multiple actors. These may also involve citizens at different levels which are embedded within different phases of the service cycle. Our scientific contribution is spelled out in two ways: first, our choice of empirical setting of a developing country in East Africa allows us to understand how communities respond to environments of high levels of resource constraints and cope with exogeneous shocks (i.e. droughts, disasters, epidemics, etc.); second, we are interested in adopting a multi-period and nationally representative survey of communities and households. Such strategy allows us to surface the salient cross-sectional, as well as time-varying contextual factors which are likely to influence communities' ability and impetus to co-produce.

We propose to adopt the Malawi Integrated Household Panel Survey (MIHPS), a longitudinal survey from 2010 to 2016 tracking households and communities. While geared mainly towards analyzing trends in poverty, socioeconomic and agricultural activity, the survey also documents community responses to exogeneous shocks, resources mobilized, and partnerships taken. Moreover, the survey captures communities' ability to collectively problematize social development needs. As an ongoing exercise, we are mainly adopting a descriptive (if not an econometric approach), in analyzing the typologies of co-production activities performed in response

to community exigencies. In connection to the relational approach mentioned in this proposal, we also aim to illustrate patterns of co-production partnerships, the corresponding levels and service phases involved. While our context-driven approach is paramount, our project provides theoretical contribution in terms of understanding how certain types of co-production activities are carried out within constrained environments such as Malawi.

[1] Note: “Onse pamodzi” means “all together as one” in Chichewa, Malawi’s predominant language.

Role of Indigenous Skill Development in Achieving the Sustainability Agenda: A Case-Study on Sustained Adoption of Decentralised Off-Grid Solar Applications in Ladakh, India

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Access to clean and affordable energy, especially in developing nations has gained global acceptance as one of the strategic means to achieve Sustainable Development Goals. Nonetheless, in India, over 300 million people live with no access to electricity and around 800 million depend on traditional fuels for their cooking and heating needs. In that light, decentralised off-grid solar applications are argued to be the most efficient and effective solution for the country's pressing energy poverty. However, the success of the said technology is invariably measured for its technical, financial, and political feasibilities albeit the relevance of indigenous skill for its long-term acceptance remains under-theorised. To that effect, this paper attempts to evaluate the factors influencing sustained adoption of decentralised solar applications in Leh, Ladakh – an isolated region in northern India endowed with 300 days of sunshine and highest global solar irradiance of 1,200 W/m². With specific focus on indigenous skill development and an efficient feedback mechanism, the study proposes a new conceptual model based on the Innovation Decision Process by Rogers' and Kaplan's contextualised to decentralised solar applications. The evidence suggested toward a transition from abstract knowledge to actionable (indigenous) skill in facilitating sustained use of decentralised off-grid solar applications. In-depth interviews with the village community, representatives of government and non-governmental organisations, community leadership, companies and the youth technicians voiced the pressing need to integrate capacity building initiatives at different skill levels in tandem with an accountable and functional maintenance feedback loop. The interplay of skill, feedback and the factors of motivation, experience, and knowledge varied with the changing nature of the off-grid application, while the contextual factors pertaining to remote location, dwindling government support, cultural and lifestyle misfit, and climatic condition held equal precedence for all solar applications. Nevertheless, of the six precursors of sustained innovation adoption, skill development stands out as the only controllable and scalable factor that can be integrated in to a broader agenda of sustainable development through resolved policy intervention and support.

Rural Households' Understanding and Adaptations and Cultural Manifestations of Sustainable Development Goals in the Lake Region of Kenya.

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Sustainable Development Goals, as lofty as they are, if not properly communicated and understood by the majority of the people who are supposed to be the beneficiaries, may not achieve the intended goals.

With 74% of her population living in rural areas, the understanding, adaptation and cultural manifestations of Sustainable Development Goals among rural households in the Lake Region of Kenya become imperative.

This study hopes to use a blend of quantitative and qualitative research methods to ascertain the level of understanding of Sustainable Development Goals among these rural households. In addition, cultural practices which align with the intended goals will be explored. Focus group discussions, Key Informant Interviews and questionnaires will be administered in Homa Bay, Kindu Bay and Usenge communities chosen through purposive sampling.

The outcome of this study can be scaled up to help domesticate and give cultural manifestations and understanding of Sustainable Development Goals to other rural areas in Africa and beyond.

Sustainable Development and Climate Resiliency of Sidi Slimane, Morocco from an Islamic perspective

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Morocco's contribution to carbon emissions is 78.9 Mt CO₂e; 53 percent of which comes from energy emissions, 14 from agricultural emissions, 7 from industry emissions and 4 from waste emissions (Friedrich, 2017). These are minute amounts in comparison to the top ten contributors. Despite Morocco's low contribution, it has been greatly affected by climate change. The question Morocco needs to be asking is how it will help its population not just survive but thrive in the face of climate disruptions. For Sidi Slimane, an urban center economically dependent on the agricultural lands surrounding it, the question of adaptation and resilience is pressing. Sidi Slimane's agricultural sector has been affected by floods, droughts, extreme cold and hot weather. Sidi Slimane's urban area has a very basic economy, suffers from environmental degradation and a lack of social services. Their sustainable development plan for 2017-2022 does not address climate adaptation and does not adequately respond to the needs of the people.

Sidi Slimane needs to leapfrog into a resilient future. This paper explains how Islamic principles can encourage sustainable development and climate resiliency moving forward by building off the religion, culture and the environment of the people. "The only way for true independence, true liberation, claims Fanon, is to reclaim and reconstruct one's own history and reject all influence of the colonial past" (Bahij, 2012, p.21). Many Moroccans replicated themselves in the guise of their former occupier and in doing so lost their ancestral knowledge of their land, the value of their religious tradition and history, the strength of unity and an indigenous vision for the future. Reclaiming the future of their development means reconnecting with what was lost, building on current capacities and strengthens, and innovating to forge a new future based on communal values and vision. The recommendations elaborated in the paper above provide concrete approaches to returning Sidi Slimane to the balance that was before the colonizers and creating economic opportunities that will produce self sufficiency, reinvigorate the city with a meaningful direction and carry them through the tough time that is to come ahead.

Sustainable development solutions from the global ecovillage network of Africa

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African communities across the continent; that are members of the global ecovillage network of Africa GEN Africa* are in an endeavor to overcome the environmental degradation, poverty, malnutrition, conflicts, unemployment, low life quality, poverty and all contemporary challenges. African communities while embracing their indigenous cultural heritage and traditional wisdom can offer local solutions to global challenge. They are living laboratories to create and test tools, methods and technologies for integral local development.

In this paper I will showcase solutions from ecovillages* across African countries in Egypt, Senegal, Ghana, Cameroon, Nigeria, DRC Congo and many more African countries that I have chance to accompany them in their sustainable development journey through my roles in the global ecovillage network of Africa GEN Africa*. We work through education and training to raise awareness, empower and disseminate sustainable practices.

- In Egypt; Sekem has 40 years of sustainable development towards a future where every human being can unfold his or her individual potential; where mankind is living together in social forms reflecting human dignity; and where all economic activity is conducted in accordance with ecological and ethical principles.
- In Ghana; communities use rainwater harvesting systems to ensure water availability for local communities. They use clean cooking technologies to reduce exposure to smoke by women in kitchens.
- In Kenya; there are sustainable energy solutions such as biogas, solar systems and biomass gasification to improve community livelihoods. Ecovillages uses agro-ecological solutions to ensure food sovereignty for communities.
- In DRC Congo; through Ecovillage Design Education EDE they build capacity of community leaders with tools to bring change to communities.
- In Senegal; the government embraces the ecovillages approach and consequently have a national plan to transform 14000 indigenous traditional villages to ecovillages.

African communities through the ecovillage movement seek aligning with SDG goals through balance between their indigenous culture and the 4 dimensions of sustainable developments as perceived by gen Africa and through Permaculture design principles.

*An ecovillage is community using participatory design processes to integrate the ecological, economic, social and cultural dimensions of sustainability into a whole systems pathway towards a regenerative future.

*GEN Africa Is the regional African network of the Global ecovillage network GEN promoting social resilience, environmental protection and restoration of nature through the concept of ecovillages as models for sustainable human settlements. GEN Africa actively supports the development of ecovillages and networks in all parts of Africa.

Key words: Africa, Ecovillages, GEN, GEN Africa, Indigenous, Cultural heritage, Sustainable development, SDGS

The role of small-scale agriculture in poverty reduction

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Primary agriculture is an essential activity that ensures a supply of raw food material. This research study examined small-scale agricultural projects and their role in poverty reduction with particular reference to Cezwana area in Jozini, South Africa. Small-scale agriculture plays an important role in development in this area, not only in terms of income generation, but overall regional economic growth. The agricultural sector has significant potential to transform the Jozini economy. The study examined the possibilities for small-scale agricultural development in Cezwana area and drew on the relevant literature as a framework to understand the agricultural sector in relation to the strategies employed by the government to develop smallholder farms. While it is acknowledged that policies have been adopted to promote food security by ensuring a steady supply of raw food materials to the manufacturing sector, and to create jobs and income, the sector's potential has yet to be realized. In order to assess the status-quo of small-scale agriculture in Cezwana area and its effect on poverty reduction, data were obtained from Cezwana Youth Cooperative Limited, Zamani Gardening, Isiqalosethu Gardening, and the Department of Agriculture (DoA) in Jozini Local Municipality. The study identified the major factors that constrain the development of small-scale farming and indeed the overall agricultural sector in Jozini such as the neglect of agriculture arising from dispersed zones, inadequate infrastructural facilities and extension services, a shortage of labour, a decline in the quality of land due to climate change, a lack of project management, and policy inconsistency, etc. It recommends the provision of supportive facilities to farmers, as well as transparent extension services, price stabilization and prioritizing and building small-scale agriculture to ensure that this sector takes its rightful place in South Africa's economy and contributes to poverty reduction.

Key words: Small-scale agriculture; Poverty

Mainstreaming Gender in Agenda 2030: Interlinkages between Sustainable Development Goals

Advancing Sustainable Fulfillment and Protection of Rights to Work in the Perspective of Gender Justice: A Study Case on International Slum Upgrading Project in Indonesia

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The idea of slum upgrading is two-fold. The Government often emphasize slum upgrading as a way to equating urban development by providing basic physical and social infrastructure to all citizen. On the other hand, with no proper adjudication, the society group that has been excluded from the benefits urban development will be the victim. These happens in Indonesia National Slum Upgrading Project (NSUP). This mid-term project of the central government of Indonesia aim is to provide access for citizens to optimally utilize cities' resources and opportunities. However, with 0% slums in 2020 as the goal, forced evictions are inevitable. Jakarta Special Region only had forcedly evicted more than 6 settlements in just a year. Under the perspective of gender mainstreaming, women as part of the affected group are becoming victims of victim by the policy. Women in Jakarta's informal settlements work in or nearby their neighborhood. Some forms of works undertaken by them includes informal works, and domestic works. Differ from women, men who are majority in formal works will not necessarily eliminate their work as they are relocated. Furthermore, the deep rooted patriarchal values in informal settlements oppress the voice of women, excluding them from the family decision making causing them helplessly accept the eviction. The project will create changes that cause women workers to lose their work. This socio-legal research, with feminist legal and critical urban theory approach, will critically analyze how law should positioned women workers in urban development through this project, and sustain the equality of the sexes. Indonesia as the first state to implement the idea of slum upgrading under the SDGs era, will set the standard for this project to be implemented by other states. Therefore, this research will also accentuate the urgency of sustainability in the implementation of gender justice perspective on slum upgrading projects for the global scale.

Coping Strategies to Food Insecurity in Southern Nations, Nationalities, and People's Nationalities (SNNPR) of Ethiopia: A Gender View.

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Ethiopia is recognized as the country with the highest growth and economic performance in sub-Saharan Africa. However, globally it remains one of the least developed countries with the greatest economic challenges (IFPRI 2017). With a 92 million people population is the second one highest country in the sub-Sahara Africa (IFAD 2015). In Ethiopia, the economy is based mainly on agricultural production. 82 million people work in agricultural production. Most of them are classified mainly as "smallholders" and generate 95 percent of the national agricultural production. Despite the great agricultural potential, Ethiopia lives in a permanent scenario of food insecurity (IFPRI 2017). The availability of food is determined by climatic, geographic and economic factors. In the African context, many of the agricultural productions generate low yields due to the lack of trained personnel and resources. In 2017, the Global Hunger Index classified as "SERIOUS" the situation in Ethiopia (IFPRI 2018). In spite of the multiple efforts that are made to guarantee food, there are still gaps that must be reduced. An example, the 2011 Horn of Africa drought left an estimated 4.5 million people in need of emergency food aid (IFAD 2015).

Facing a scenario of food shortages, families adapt their lifestyle to available resources through temporary or permanent mechanisms known as coping or adaptation strategies (Davis 1995). Families know the pathways to follow to mitigate proximate stress. Coping or adaptation strategies act as indicators of stress and level of food insecurity in which people live. For this reason, the purpose of this research is to identify and classify the coping strategies used by families in southern nations, nationalities, and people's region (SNNPR) of Ethiopia. For this study, data was collected in 2014 from a randomized sample in twenty zones of Ethiopia. Overall, 11,243 people (women) responded to the 400-item survey. Data was analyzed using descriptive statistics. Preliminary analysis explores the potential strategies adopted by families and their long-term and short-term implications. The results could potentially be used to identify appropriate and timely solutions in future research and implementation of projects interventions that promote food security in the region.

Female Autonomy: A comparative analysis of male and female headed households

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This study aims to provide a comparative reflection on women's subjective autonomy in male and female headed households in rural Pakistan. It also explores the changes in female autonomy that arise as a result of male-out migration, and thus the related change in household headship. For this purpose a total number of 95 households from semi-arid region were randomly selected and interviewed. We interviewed females to understand their perception about their autonomy, control over lives and their role and responsibility under both male and female headship. In this regard available economic opportunity, educational status and role and responsibilities of both male and female headed households were analysed. Study found that in patriarchal society the overall extent of female autonomy is limited, but females of the female headed households are comparatively more autonomous than that of females of male headed households. It concludes that, education can play a significant role in providing autonomy to female lead households in decision making.

Implementing the 2030 Agenda: Building Partnerships to Achieve the Interlinked SDGs

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It is well settled that development, peace, security and the environment are interlinked. They are all parts of the same puzzle and must be treated as such to achieve the Sustainable Development Goals (“SDGs”) [A/RES/71/243]. One cannot look at one SDG without considering the ripple effect and synergistic nature of these goals. Indeed, in adopting the 2030 Agenda for Sustainable Development the United Nations and its Member States embraced an ambitious, aspirational agenda and committed themselves to working together toward “leaving no one behind” [A/Res/71/243]. The transformational nature this Agenda, requires new ideas and/or redeployment of sound structures, tools and conceptual frameworks to make achievement of the SDGs a reality. This is especially important as we see the nature of conflicts changing: violent conflict within nation states expanding, creating a refugee and migrant crisis of unanticipated proportions; Climate Change, chaotic climate patterns and its impact on people, places and scarce natural resources are just some of the challenges we are facing today. In this fragile environment, it is more important than ever before that we abandon silos, work across borders and support those tools, programs and partnerships that are designed to meet these challenges.

But with out peace, the other goals are doomed to be more of an aspiration than a reality. The UN has recognized this and is in the process of reviewing its Peace Building Architecture. For these reasons, this program will focus on the interlinkages of the SDGs and Peacebuilding with an emphasis on prevention and sustainable peace and highlight some of the partnerships, initiatives and research that can inform approaches and best practices in this area. Since the research has shown that when women are involved, especially at the highest levels, there is a significant increase in the achievement of resolutions and that the agreements achieved are more sustainable over time, this program will also highlight the partnerships that are forming, especially in the form of capacity building and the formation of global networks of women mediators as well as the potential for Multi-Stakeholder Partnerships to help achieve the SDGs.

Overcoming Taboo: Improving Access to Job Opportunities for Women in India

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Due to the lack of education and financial resources, many people residing in India face difficulties when it comes to finding jobs. Women specifically have a more difficult time as they do not have equal opportunity as men. With the ongoing discrimination, it has been reported that India has a below the average score for gender gaps. Minimizing such gender gap in India is essential in the context of sustainable development goals (SDG). SDG 5 stated on the UN aims to “achieve gender equality and empower all women and girls.” Goal 5 targets specifically towards ending “all forms of discrimination against all women and girls everywhere.” To attain this goal, social taboos against women in India should be better understood to overcome such issues to help improve better access to job opportunities for women. Many taboos currently existing in India prevent women from taking part in society. For example, people in India regard menstruation cycle ‘impure,’ limiting women’s access to any resource they need during that time period. During this time, women are not allowed to go out into their towns, which naturally prevents them from finding a full-time job. This research is conducted to see how social taboos can impact women when trying to look for jobs, and what potential solutions exist to prevent discrimination resulting from such taboos. Possible solutions include educating students starting at an early age about common taboos, and how they are many times inaccurate. To conduct this research, data will be collected in the Bhopal area of India with a non-profit organization that mainly works with vocational training for women. Also, a survey targeting people residing in India, regardless of age and gender, will be done to find out perception towards Indian women.

Poor People's Organization in ecologically critical regions, a gateway for sustainable development

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Bangladesh is the case of booming development and growth among the least developed countries. It has made remarkable progress in many social and economic indicators like reduction of under-five children and neonatal deaths, maternal mortality and increases women and girls education rate and access to women in many public spheres which have a spell over impacts into economy and productivity. Therefore country has been a steady growth (annually above 6%) since 2006.

After independence NGOs have a significant role to empower poor, women and other marginalized communities in Bangladesh. In their community development strategies building people's organization like the formation of Co-operative like Village Organization, Self Help Group and Credit Borrowers Groups have found successful for delivery NGOs at the doorsteps of a community. However, there are many challenges to make those people's organizations sound and stable for a long period of time but still, there is no substitute for such People's organization when there is designed such community based social development programs. Oxfam in Bangladesh has started its flagship program called REECALL (Resilience through Economic Empowerment, Climate Adaptation, Leadership and Learning) in three regions which are ecologically critical areas like - water inundation area, riverine island area and prone to cyclone areas. Therefore people those who live in below the lower level of the poverty line (less than 2.25 USD per capita) they are more vulnerable due to geographical contexts.

This study was conducted during July to September in 2015 to explore the rights and entitlement situations of marginalized and poor communities live in ecologically critical areas. There was applied a mixed method to collect both qualitative and quantitative data where 100 respondents were selected randomly for structured interviews from three intervening clusters of three regions with supplemented by purposively selected six groups while two from each region and fifteen case studies proportionately.

Study results revealed that formed Community-Based Organizations (CBOs) of poor and marginalized people's had a very significant contribution to the enhancement of raising voices of extremely poor, particularly among women to claim their rights and entitlement. It was found that though they belonged a lower level of an economic category 79% of the respondents were literate. Respondents opined that community became capable in multiple ways to combat natural hazards like plinth raising, increased improved water and sanitation sources and savings scheme were some major initiatives. People who were engaged with these groups they were more

influenced to prevent social evils like protect child marriage, increased their access to participate in local government's decision-making process as they were empowered to meet with higher officials of local government's, keeping their cell phone number and claimed their rights and entitlement from top representatives of local governments.

Bangladesh has very lacked in resources to attain SDGs targets while a transparent and accountable governance system can have a better development plan and its implementation to bring the expected impacts by optimum use of limited resources. Therefore empowerment of poor people is pivotal to ensure their rights and entitlement and make the duty bearers more accountable and transparent. So Nurturing the poor people's organization could be a gateway to make the development journey a steady and sustainable.

Post-arab-spring and post-2015 agenda: women rights losses, liabilities, drawbacks and the way-forwards

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This presentation is an attempt to address major turmoil in the aftermath of the so-called arab spring (2011-2015) that have shaken the acquired gains in women rights and women equal and equitable access to education, opportunities, employments and political visibility and representativeness.

Women acquisitions of full access to educational, professional, financial, legal and political means and opportunities were at the center of the Millennium Development Goals (2000-2015) even though it was there very little room to assess theses acquisition since the MDGs were criticized for being highly diplomatic and mainly of political nature, add to this that the monitoring was not reported to meaningful differentials with gender being the most relevant to real positive impact if ever!

The post-2015 UN Agenda, with its 17 Sustainable Development Goals (SDGs) and their 169 targets and 232 indicators, is clearly putting women' "rights and roles" specificities at the core of its focus and interest. Gender Mainstreaming is inherent in most of these SDGs, in their Targets and Indicators. There is no doubt that the conceivers and builders of the 15 years process of Agenda 2030 have all the good will and best intentions as it shows in the Interlinkages between Sustainable Development Goals.

The biggest fear of deception, as it was shown and expressed towards the MDGs over 2000-2015, is that the Agenda 2030 will be implemented ONLY BY and IN those countries that needed the least: the West Europeans, Scandinavians, North Americans, Japanese, Australians and other OECD and opulent and wealthy countries and people.

The striking examples come from arab spring countries that their infrastructure, whether in material or human or economic terms, have been devastated and turned upside downs. The heaviest prices were paid by Muslim women in Tunisia, Libya, Egypt and most of all Syria and Yemen.

The author, Tunisian by birth culture citizenship and rearing, will address the negatively evolving events and state of affairs in the life of Tunisian Women over 2011 to 2017.

The presentation will study the 2018 current state of 1956 pro-women Legislation that have given Tunisian girls and women all (but equality in inheritance) the same rights tools means of choices education advancement and visibility.

A standalone issues will be addressed: what is the 2018 state of mongamy that has been legally enforced since 1956, the same for the right of court divorce, freely acces to

modern contraceptive use, freely access to safe and free abortion services Why should women despite their better educational achievement are being discriminated to obtain employment etc etc ...

An attempt will be made to also investigate women acquisitions in Libya, Egypt, Syria and Yemen that have been lost or denied with the arrival of political islamists that have in mind to prone sharia and deny to women the basic modern rights of expression visibility services choices and identity!

The Role of GCC Women in closing the Gap to realise the SDGs

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The future of the Gulf Corporation Countries (GCC) – (Saudi Arabia, Bahrain, Qatar, UAE, Kuwait and Oman)- lies within the diversification of their economies.

The GCC have been Oil dependent –energy sector- for decades, and the non-oil private sector remained relatively small providing a limited source of growth and employment. With the Oil being an exhaustible resource, the need to develop new sectors to replace the oil and gas industry is vital. Therefore, the prosperity of these countries lies at the intersection of economic diversification and building local capacities.

In September 2015, the (GCC) Countries adopted the United Nations Sustainable Development Goals (SDGs), alongside 193 Member States of the United Nations.

They pledged to work towards achieving these goals and providing a better world for the people by overcoming the critical problems facing humanity and the planet. The GCC has encountered dramatic transformations post the discovery of Oil. Though, considered to be wealthy with some of the highest

GDP's in the world, this did not hinder these countries from problems of poverty, poor health, and major environmental degradation; the exact problems the SDGs address.

This paper examined two important key areas for realizing the SDGs that are inline with these countries national strategies and visions. It addressed economic transformations and inclusive growth development strategies and policies from a socioeconomic perspective on the broader level; and the impact of women in creating synergies between economic, social and cultural objectives in the community, on the other. This research explores the positive relation between women and the growth of economies and societies arguing that women have an indispensable role in synergizing development and inclusion among societies. The research into the SDG elements are fairly new and thus, not much information has been published on evaluating the current position of the GCC countries and the newly established SDGs of the United Nations. However different organizations and entities have now began to work on evaluating the SDGs against these countries policies and create desirable measures for outcome, but these institutions are only working towards assisting these countries in realizing and achieving these goals from a macro-level. What is missed is the micro-level measures that are country specific, which to date are far from being materialized generally, let alone from a gender perspective, specifically. So, how can we close the gap?

Breaking Down Silos in Government Administration

Accelerating Impact: Leveraging Best Practices in Strategic Planning and Collaboration to Create Profound Progress

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There are abundant pressing problems in this world requiring substantive, keenly effective solutions. Many are doing their best to do great work to affect needed change and progress. However, rare are examples that optimally cultivate the kind of collaboration needed to maximize the collective knowledge, wisdom, and energy of interested parties to truly drive powerful progress and impact. Without meaningful, fully invested, collaboration-centered solutions, grounded in data and innovation, we will continue to lag behind our potential, putting our world - communities, vulnerable populations, and our environment - at risk due to our inability to convene and execute in the best possible ways. Now more than ever, we need unique solutions leveraging research, technology, and best practices to make the kind of progress critical to realizing significant outcomes such as those articulated in the United Nations Global Goals.

This paper provides an overview of applied best practices and lessons learned in twenty-five years of practical experience in defining, driving, demonstrating, and expanding impact for social good. It includes methodologies and techniques drawn from strategic planning, collective impact agreements, and performance measurement, intentionally interwoven to maximize human organizational potential, individually and collectively. Moreover, it presents integrated evidence-based practices grounded in neuroscience, psychology, and appreciative inquiry, and informed by the collaborative methods of the Institute of Cultural Affairs and others. The proven result is optimizing and propelling intended impacts well beyond past efforts. Case studies will be presented to demonstrate this case, including a statewide strategic planning collaboration of over sixty stakeholders making great strides in addressing the opioid crisis, and a group of over fifty stakeholders convening to create an time-sensitive medical emergency system to improve outcomes for those suffering from trauma accidents, heart attacks, and strokes in rural areas.

We must ask ourselves, “Can we afford to wait or hope for the best?” Given the negative consequences to our communities and world population, this paper argues the answer is a resounding, “no.” We can do better.

Antecedent Determinants Influencing The Collaboration Between Federal Government And Local Government In Malaysia

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The good governance in federal and local government demands that people work together to achieve vital and cross-cutting goals. Unfortunately federal and local officials lament of the persisting problem of silos in their governments which hinders the achievement of these goals. The key problem with silos is that it causes the participants to focus insularly on the specific mission contained within their own agency. Although silos may not be eradicated, at the very least, government should be structured to ensure that people working in various silos are collaborating, communicating and pursuing broader goals together which will negate the need to create superagencies. The collaborations between public agencies are necessary for the delivery of good and services to the people and expanding knowledge in this area will benefit the society. Hence, this study sought to identify the antecedent determinants that influence and improves the collaboration outcomes between the Federal and Local Government in Malaysia by empirically testing the Ansell & Gash contingency model of collaborative governance. Three broad based theory namely transformation leadership, resource dependency and theory of collaborative advantages were used to underpin the conceptual framework which had eight constructs namely transformational leadership (idealized influence, individualized consideration, intellectual stimulation, inspirational motivation), resource dependency (funding, skills and expertise, geographical coverage), collaborative governance for planning, monitoring and feedback, relationship capital (trust, commitment, communication) and interdependence (task, goal, reward). This was a quantitative study, based on large scale survey conducted among Malaysian Federal Government and Local Government, in particular, the Ministry of Urban Well Being Housing and Local Council. The data were analyzed using both SPSS and Smart PLS 3.0 adopting structural equation modeling. The finding revealed that transformational leadership and resource dependence both had positive relation with relationship capital and interdependence and all these constructs had positive influence towards improving the star rating and inter-organizational learning of local councils. Contrary to the study prediction, collaborative governance did not moderate the relationships between the constructs. Instead, a post-hoc analysis found collaborative monitoring and feedback mediated the relationships of the independent (relationship capital and interdependence) and dependent (collaboration outcome) variables. The findings from this study provide new insights on how federal and local government can build bridges and overcome silo governance to improve the delivery of infrastructure programs, promote public health, manage solid waste and ensure effective utilization of public funds for the benefit of its people.

Breaking down silos in public policy making: The role of citizen engagement

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Good governance and sustainable development are indivisible. That is the lesson of all our efforts and experiences, from Africa to Asia to Latin America. Without good governance -- without the rule of law, predictable administration, legitimate power, and responsive regulation -- no amount of funding will set us on the path to prosperity.

- Former United Nations Secretary General, Kofi Annan (1997)

The link between good governance and sustainable development is backed by clear evidence from the academic literature as well as contemporary country experiences. Open, transparent, participatory and inclusive institutions are a crucial factor in creating and sustaining the necessary conditions for sustainable development.

Governments and public institutions are consistently called upon to place citizens at the center of policy-making, not just as a target recipient or client, but also as an active agent that contributes ideas and insight to programs and projects. The objective is to develop policies and design services that effectively respond to citizens' needs, and are relevant to their individual circumstances.

Citizen engagement is a means through which governments and public institutions can implement inclusive and participatory policies that enable all segments of population to shape and contribute to the decisions that affect their lives.

Governments can rely on the steady development of Information and Communication Technologies (ICTs) to connect more actively with citizens and engage them in the public affairs and development arenas. Crowdsourcing and social media are samples of platforms that offer an opportunity to foster such active citizen participation and inclusiveness by:

- Opening and democratizing the processes of public policy making and public service delivery so that citizens can contribute their insights and ideas to solve national, regional, and local issues that affect their daily lives.
- Providing a better understanding of citizens' demands and expectations so that services and policies respond effectively to relevant circumstances.
- Establishing development priorities based on citizen insights and recommendations.
- Fostering social innovation by opening up possibilities for all members of society to contribute their ideas and solutions, regardless of their gender, age, race, religion, geographical location or any other background factor.

Without the active engagement, inclusiveness and participation of all citizens, development goals such as poverty alleviation, the generalization of basic education, or the assurance of gender equality can hardly take place and even if they do, they will not be sustainable.

Breaking silos in fragmented bioenergy governance

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Biogas is a type of bioenergy that is generated from agricultural waste. It offers a cleaner energy source for household to reduce the firewood usage which harms the environment. This research aims to study architecture of its biogas governance in Indonesia.

The result found that most of biogas programs for household coming from several ministries. However, there are no valid numbers about the amount of biogas digesters in those biogas programs. The Indonesian government has several voluntary biogas programs from Ministry of Energy and Mineral Resources (ESDM), Ministry of Environment and Forestry and Ministry of Agriculture (Kementan). MEMR provides the biogas program as part of their renewable energy program. KLHK promotes the biogas program for the community surrounding the forest to prevent them using the firewood from the forest. Kementan has the biogas program that is combined with their integrated farming program as the practice of climate-smart agriculture. The Kementan has started the bioenergy development program including biogas in the rural area across Indonesia since 2006. The program mainly focused on the data mapping of potential energy generation and creating the pilot project in rural areas. Biogas installations under government-led programs were provided with full subsidy. However, the problem is the absence of coordination and integration among those programs. It causes limited cooperation among them. All these programs come with different approaches and various types of installations. It reflects that the biogas policy architecture in Indonesia is fragmented and not integrated into a single framework.

The problem with fragmentation in the biogas programs is that this situation could lead to conflict. Strategies in Indonesia's bioenergy policy are not unified and there is no support from strong institutions. This incoherence may be caused by the exclusiveness of particular institutional actors, which can lead to ineffectiveness of the biogas programs. This fragmentation could be a problem, not only for the sake of national policy coordination and its evaluation but also for international policy. The fragmentation can cause double counting for greenhouse gasses emission reduction.

From 2009, some biogas programs have started to work together with BIRU (Domestic Biogas) program. This program was established by Hivos-NGO and SNV-development organizations, in partnership with ESDM. Beyond voluntary approach, BIRU program has started dissemination of biogas with a market-based approach. BIRU is supported by international financing power, sufficient knowledge resources and professional actors. BIRU development seems to affect the degree of fragmentation and it may change the configuration of regimes into polycentric. Polycentric governance is a potential governance structure that can solve the challenges in the deployment of biogas use and production.

Climate change at the local level: Multi-level governance and climate policy implementation by local governments in Melbourne

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Climate change is a complex, systemic issue challenging the fundamental ways in which societies are governed. Local emissions affect the livelihoods of populations world-wide, requiring multi-leveled coordination of action across formal and informal governance networks. In particular, our cities are a crucial arena for sustainable development, decarbonisation, and adaptation. Cities are significant contributors to global emissions, and home to over half the world's population. However, cities are also drivers of potentially transformative action in the face of climate change, through the dense concentration of knowledge, skills, and resources. Yet, despite the recognised importance of integrated urban climate governance for achieving sustainable development goals, this remains largely aspirational in practice. Consequently, this study investigates the extent to which multi-level governance influences climate policy implementation by local governments in Melbourne. As the local level is broadly acknowledged as the implementation scale "critical to the enactment of global climate goals and the creation of sustainable cities and communities", local government is made central to the research focus within the multi-level governance framework. Drawing on in-depth, semi-structured interviews (n=15) with sustainability professionals in five South Eastern Melbourne municipal authorities, alongside discourse analysis of policy documents across local, state, and federal government levels, this research unpacks the challenges and barriers to climate action at the municipal scale. A triangulated approach combining critical review of the current scholarship, analysis of climate policy frameworks at each formal government level, and qualitative interview data from sustainability experts working in local government allows for fulfillment of the multi-level governance framework, whilst maintaining a focus on the perspectives and experiences of those working toward local climate action. A multi-level approach is essential as this study seeks to understand the power dynamics and institutional processes operating within and between formal government levels. It is anticipated municipalities will face vertical and horizontal policy integration challenges, in addition to the recognised constraints of local jurisdictional funding and skilled resources. Greater understanding of such factors demonstrates the need for an enabling horizontal network in order to foster innovative solutions. Whilst siloed government administration is a well understood challenge for climate policy implementation, recent work highlights municipalities as key players in new governance arrangements working to overcome such institutional barriers. Knowledge of the structures and processes operating within and between formal government levels may contribute to more effective urban climate governance, in turn facilitating further breakdown of siloed government arrangements and mitigation of global climate change. In light of this, the current study characterises strategies for advancing improved climate action in municipal authorities, aiming to contribute to the fulfillment of the sustainable development goals.

Ecotourism and Biodiversity Conservation in National Parks in Brazil and USA - A Management Approach

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National parks in a developed economy (USA) and an emerging economy (Brazil) were studied. The objectives were to measure management strategies in national parks under different levels of management intensity and public use, and to measure the effect of public use on biodiversity of national parks. We sampled five national parks in the state of Rio de Janeiro (Brazil) and seven in the state of Maryland (USA). Rapid Assessment and Prioritization of Protected Area Management (RAPPAM) Methodology, developed by the World Wildlife Fund, was used in the study. An additional series of questions was developed and included in the survey questionnaire that focused on ecotourism (public use). Preliminary results from Brazil and the USA indicate that 92% of park managers believe biodiversity and natural features of their parks are being maintained with the current level of public use. Eighty-three percent reported that tourism contributes to environmental education of visitors. Tourism was reported as an economic benefit to park operation and maintenance in 75% of the parks. For 60% of Brazilian parks and 43% of parks in the USA, tourism was reported to aid in decreasing illegal activities such as poaching, deforestation, and setting of fires in the parks. Biological importance and socioeconomic importance factors ranked higher in Brazil than in the USA, but tourism importance was 12% lower in Brazil than in the USA. Three management gaps, dealing with vulnerability, legal security, and infrastructure, were noted between Brazil and the USA. Park managers in both Brazil and the USA believed that more tourism research was needed to assist park management efforts. Based on park manager responses, a higher level of economic development did not reduce biodiversity in the parks sampled. To maintain biodiversity with increased economic development and public use, we believe the following are needed: Adequate park personnel, including law enforcement staff; adequate financial resources; and capability to limit public use if necessary. Based on the findings we believe a different management approach could be used considering tourism in Protected Areas as an ally for biodiversity conservation and local socio-economic improvements, especially in Brazil.

Empowerment 2.0: Social Media For Rural Development In Indonesia

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The role of social media has been explored to engage public dialogue that aligned with the Sustainable Development Goals for participatory development. As one of the global leaders of social media active users, Indonesia is still struggling with digital divide in rural areas. The research examined social media practice of prominent village movement Gerakan Desa Membangun (GDM) and villagers in rural Banyumas Regency, Central Java.

Using comparative ethnography, the research compares practice in Indonesia and findings from UCL Global Social Media Study in Northern Chile to explore social media role in rural communities and impact in digital divide and civil society movement. Since most of the studies on social media in Indonesia focus on urban areas, this research would like to fill in the gap of knowledge of social media use in rural development as initiated by the villagers themselves.

GDM established the internet in rural Indonesia to create a greater impact on rural development. They worked on Pemberdayaan 2.0 (Empowerment 2.0), the programme to train villagers to acquire the skill sets needed to use ICT, including social media for promoting rural potentials. Together with the Ministry of Communication and Informatics volunteer group, they organised Lingkar Belajar Desa Membangun (Village to Develop Study Group) to help rural development using an ICT approach, like building a village website using the free domain “Desa.id”. GDM initiated 1,000 free village websites in 2013 with the commitment that each village website must be active with village related contents, like open government data and village potentials.

Regarding current national politics, the GDM movement relates to Indonesian Law 6 of 2014 or Village Law which gives village government the authority to establish access to information through the Village Information System to improve development planning, public service delivery, and monitoring. As Miller and Slater (2000) explained about the technological change of the Internet, social media creates “expansive potential” that gives novel aspirations on what they imagine. GDM uses communication and an information technology approach to optimise Village Information Systems.

The comparative study of social media in the rural community of Northern Chile from UCL Global Social Media Study become discussions to understand the worldview of Indonesia and the dynamics of social life with latest communication technology. In comparison, social media at the Northern Chile site, Alto Hospico, is used as a place to “perform identifications and challenge conceptions” of real citizenship, from marginalised perspectives of the country (Haynes 2016, p. 181).

The findings show the social media role in knowledge exchange, visual images, community building, and capacity building in local government, healthcare, agriculture, disaster risk reduction, also advocacy. The study found that the rural development initiatives need to reflect on additional factor to thrive, like village awareness or encouragement from the beneficiaries. The foundations of social media impact can also be less related to the theory on what it supposed to occur than the broad of local and conditional factors.

Encouraging STEM and SDGs: actions of Fapern, Brazil.

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The Rio Grande do Norte public state organization Fundação de Apoio à Pesquisa do Rio Grande do Norte, or just Fapern (www.fapern.rn.gov.br), during 2018, is searching an innovative approach breaking down silos in how the operations of encouragement of science and technology are developed in the state territory. Based in limited resources, the organization had developed creative approaches emphasizing the diffusion of quality education.

Science and technology can be an important spark to new youth careers and future. FAPERN had developed in Brazil actions supporting Sustainable Development Goals (SDG) related to Quality education (SDGs 4), Clean water and sanitation (SDG 6), Decent work and economic growth (SDG 8), Industry, innovation and infrastructure (SDG 9) and Life on land (SDG 15).

This research deeps focus in actions developed by FAPERN to encourage the interest in Science, Technology, Engineer and Math (STEM) in public schools. The activity is strongly connected with the SDG 4, Education of quality. FAPERN released a public call to support low income students of middle public schools (50 projects and 250 scholarships). This initiative helps to spark the interest for STEM and academic careers.

During April 19 and 20 2018, was also organized The IV FAPERN Congress where more than 60 papers were presented showing the research results associated to Sustainable Development. Research were associated with water scarcity, clean technologies to better water efficiency use, among other topics. Scholars supported by FAPERN did many researches presented in IV FAPERN Congress.

The FAPERN, during April 2018, also participated of the event Campus Party with 60,000 attendees, where was presented the project Habitat Marte (www.HabitatMarte.com), a Mars analog research station in the countryside of Rio Grande do Norte State where is developed different researches associated with SDG.

To encourage the Goals Life on land (SDG 15), Decent work and economic growth (SDG 8) and Quality education (SDGs 4) was also organized by FAPERN, 9 workshops about Sustainable Construction and Social Technologies. The public were teachers and students of elementary, secondary public schools and universities. The workshops happened in Nucleus of Research in Engineering, Science and Sustainability of Semiarid (NUPECS).

Considering all the elements presented, it is possible identify the impact in students life by FAPERN, the actions related to support STEM can be also seen as a strategy to reduce inequality (Goal 10) and poverty (Goal 1) and also promotes decent work (Goal 8) related to helps the engagement of students with academic careers.

Garbage in, Garbage out: Deconstructing Institutional Silos through Data

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Institutional silos are a frustrating and often costly issue for any organization from academia to government to corporations. Silos create institutional/office politics, limit productivity, impede achievement of goals, and inhibit the retention of good employees. Although institutions and their leadership bemoan the issue, many silos still exist. Research conducted has provided volumes on the causes of silo mentality but few solutions that do not create new bureaucracy and silos in the process. The research conducted investigates the application of systems theory to understand the causes of institutional silos and posits the utilization of data and technology and disruption to deconstruct silo mentality. The theory is applied in practice in the form of a case study of a line ministry and how through information sharing and collaboration some institutional silos slowly broke down.

Gender Differences of Citizen Participation at the Local Governance: A Case of Vietnam

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Recently, citizen participation has been largely considered as an important objective of improving democracy and government decision making in Vietnam. In the context of Vietnam with 63 provinces that has different proportions of gender, based on Public Administration Performance Index Survey data (PAPI), this study found that in Vietnam, citizens in provinces that have higher proportion of male often less participate in local governance than those in provinces that have lower proportion of male. Thus this research will answer the question “why Vietnamese women more active participate at the local governance than men?” and explore what factors impact on citizen participation at the local level in Vietnam between female and male; which enhance them to more actively participate in local governance. Applying qualitative approach through in-depth interview, this study found that four diverse perspectives on enhancing citizen participation among female and male at the local governance including civic knowledge; the trust of citizens; implementation of suitable policies of local government; the role of NGOs. Additionally, there are two key reasons leading to the fact that Vietnamese women highly participate in citizen participation at the local level. Firstly, women play the main role in family financial management, which highly contribute to voluntary contributions- one of four sub-dimensions of the concept “citizen participation”. Secondly, in Vietnam, women are deeply prone to be interested in small issues at the local governance whereas men are keen on big issues at national and international level.

Key words: citizen participation, gender, women, local governance, PAPI, Vietnam

Government sustainability reporting - a lack of rules and audit procedures

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The design of a sustainability strategy in accordance with good governance criteria includes monitoring, evaluation and reflective further development of the sustainability strategy. Monitoring and evaluation include progress reports, indicator reports, external evaluations and peer reviews. Reflective further development is understood as the continuous questioning of decisions in a multi-level system. Accordingly, sustainability strategies can be understood as iterative learning processes that should be regularly reviewed and further developed. Continuous sustainability reporting makes it possible to support sustainable development in the long term by documenting the status of implementation and identifying potential for optimization.

This paper examines over 55 sustainability reporting formats at the level of the European Union and the Federal Republic of Germany and its federal states, which have been published since the beginning of reporting in 2001. In this context, the general requirements for continuous sustainability reporting and its monitoring are discussed. Recommendations for action for continuous sustainability reporting and the design and assurance of an independent and recurring review of targets and indicators are derived. Good practice examples are presented from the comparison of similarities and differences, as well as do's and don'ts for the two phases of preparing and publishing sustainability reports.

Rules and regulations can be helpful for the preparation of sustainability reports as well as the assurance of a uniform audit according to fixed principles. A further analysis concludes that although there are numerous good governance criteria for developing a sustainability strategy, no specific and generally accepted rules (guidelines, guidelines) and testing or certification standards for sustainability reporting could be identified as part of sustainability strategies at government level. The situation is different in the area of sustainability reporting in companies (CSR reporting). Due to a lack of legal regulation, a large number of regulations and auditing standards exist that have been developed by various organizations. This paper emphasizes the importance and necessity of a specific and generally accepted set of rules and audit procedures for government sustainability reporting and presents the first possibilities for formulating and establishing such a set of rules and audit standards.

How do regional organizations in the United States understand sustainability?

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Sustainability has been argued as a confusing, vague, and even a contested concept--implying that different individuals and organizations have different understanding of the concept of sustainability. This article sheds light on the topic by investigating the term from regional organizations' perspective. This study raises the question: how do regional organizations in the United States understand sustainability? To answer this, the author considers 40 Regional Intergovernmental Organizations (RIGOs) representing the largest metropolitan regions in the U.S. RIGOs consist primarily of general-purpose municipal and county governments, they speak for the region, and they intervene in a substantial variety of policies and issue areas. These organizations include Regional Planning Councils, Commissions, or Districts as well as Councils/Association of Governments. With the help of qualitative content analysis on data from these regional organizations' websites, planning documents, annual reports, and other published materials, this study demonstrates that RIGOs understand regional sustainability in terms of four dimensions: environmental, physical, social, and economic dimensions of sustainability. The study also analyzes a number of definitions of regional sustainability from different RIGOs to demonstrate that "community" and "temporal" considerations are also important from many RIGOs' point of view, in addition to four dimensions of sustainability.

Integrated Policy Experimentation for Sustainable Development -- Breaking Down the Silos of Local Governments in China

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Sustainable Development explains the central concept for our age, and the Sustainable Development Goals (SDGs) activates the ever most ambitious policy experiment for human-beings. Partnership for implementation is a crucial challenge for achieving SDGs, where fostering collaborative action among levels of governments is of prime importance. This is worthy of special attention to China and the US, that aiming to be pacemaker for sustainable development yet impeded by complex administrative regime for implementation. However, the link between central policy design and political recentralization for local level implementation is inadequately discussed in extant literature. We argue that an integrated policy experimentation model has been widely applied for policy innovation and isomorphism in China, and it helps breaking down the silos of local governments. Policy experimentation have become a staple of public policy research. The distinct policy process on sustainable development, covering different departments and levels of governments, provides an ideal case allowing researchers to examine and develop the theoretical framework of collaborative governance. Especially, the paper challenges the classical theory of fragmented authoritarianism by a joint comparative research on the policy experimentation of sustainable development between China and the US. Based on in-depth field researches and interviews with multi-stakeholders, the study analyses on the case of policy pilot zones for sustainable development, including the SDGs Pilot Zone in China and the Sustainable Cities Initiative in the US. The decentralization of policymaking and policy implementation during experimentation create incentives for local governments to act as representatives of local interests, rather than as mere agents of the central government. A distinct integrated policy experimentation model, which is composed of official mobility, steering group and expert participation, is novelly illustrated by this study. The findings help affirm the effectiveness of Chinese government in facilitating policy innovation and integrating the incentives of local officials with centralized policy design. It also forms a model for achieving sustainable development in China and provides insights for other countries.

Performance-base planning for urban mobility and sustainable development: A systematic approach to cross-sectorial integration and governance

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When mobilizing resources, often there are challenges for planning and financing for urban mobility and asset preservation. Possible lack of coordination among a diversity of government agencies in the areas of transport, land use, environment and social has been a concern. Often, funds are placed into different categories and program areas such as road assets, road safety, congestion, transit operations for National Agencies and Municipalities. They are frequently disconnected from each other and the strongest program gets the majority of funds.

Transport asset management has achieved success in solving some of these challenges. However, this methodology is asset-centered. The traditional transport planning based on asset preservation and the movement of vehicles has let significant social, environmental and economic costs in terms of road accidents, greenhouse gas emissions, congestion, pollution and noise. New people-centered business processes are needed to change this “business as usual approach” of infrastructure development.

Land use and socio-economic characteristics of the population are key elements when planning for urban mobility. Even though poverty and social exclusion are multidimensional issues, research has found consistently transport as a barrier to employment. Single mother’s transport is a second barrier only to childcare as obstacle for employment. Issues of social exclusion and transport induced poverty have been found in both Global North and Global South.

Moreover, neglecting the connection of land use and transport has created the urban sprawl that we see today. Compact and mixed-use developments reinforce its ability to reduce Vehicle Mile Travel (VMT) and CO2 emissions. Strategic investments for public transport systems can transform the built environment. However, they require significant political commitment, plans that are sustained through time, mobilization of considerable transport infrastructure investments, and cross-sectorial integration.

To resolve this conundrum, a new business process for governance is proposed. It will use as a case study the government of Costa Rica. To integrate transport, land use and asset management three steps are necessary: (1) Align the government stakeholders at horizontal and vertical level (national and municipal); (2) Develop the technological tools or models to implement the Sustainable Development Goals (SDGs) into transport performance measures to prioritize public transport projects, mobilize financial resources and monitor to achieve targets towards 2030; (3) Create strategies for

capacity building across sectors, civil society and political parties to sustain these plans through time.

This paper will focus on the relationship of aligning government stakeholders to break the silos in harmonization with technological tools that will support the decision making of public transport infrastructure investments. The alignment of government stakeholders will be proposed from a systemic approach involving the Strategic Direction (SDGs), Analysis (Modeling and forecasting), Programming of Investments, and Monitoring Results; where sustainable transport indicators are not limited to monitoring progress, but for planning strategic investments. A key input to business processes are data needs and will play a role into aligning government stakeholders to break silos in government. This business process aims to align sectors to provide more efficient, integrated and accountable institutions to deliver projects connected with the SDGs.

Policy, Politics and Poverty: The World Needs to Break Traditional System Silos, Fostering Innovative Solutions to Thrive

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This paper presents the ending extreme poverty concept at global level, inspiring how to break the traditional administration silos at the international level in relation to International development and local administrative participation, bringing new innovations in policy and politics of global development issues, enhancing the participation of local administrators as per the Global thoughts. From Rio summit to sustainable development, from sustainable development to right to development, and from right to development to millennium development goals, the world has seen a great failure of the implementing agencies on making complete success to their target of achievement. Intellectuals think that, United Nations is bringing new and attractive terminologies only to raise fund for their own survival and not to do anything. Now, the inspirational idea of Sustainable Development Goals to end extreme poverty by 2030 seems illusionary too, if we analyze the presentation done by economist David Woodward at United Nations Conference on Trade and Development (UNCTAD). He has argued that it will take about 207 years for everyone currently living on less than \$5 per day to break above that line—the minimum necessary to achieve normal human life expectancy. Presently, more than 60% which is more than 4.1 billion of world population, live less than \$5/ Day. There is a stay increase of number of people going hungry since 1990 that is more than 35% of world population. Homelessness is a biggest problem, even for the highest GDP country of the world, USA. Between 1990 and 2010 there was an increase of 371 million people living on less than \$5/day. But still there is a ray of hope. This article will discuss how the will power if implemented wit fully can bring a great success and make all the mathematics that speaks against it wrong. The gap of rich and poor can be decreased not magically but logically by bringing innovative policies, breaking the administrative silos at international, national and local level. The politics of bringing end to the poverty will be reality, if we can foster the new mentality of global citizenship to thrive our global goals.

Propelling Local Government Units Towards Adoption of the CDD Strategy: Community Participation for Progress and Empowerment

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Kapit-Bisig Laban sa Kahirapan-Comprehensive and Integrated Delivery of Social Services (KALAHI-CIDSS) is one of the poverty alleviation programs of the Philippine Government being implemented by the Department of Social Welfare and Development (DSWD). It uses the Community-Driven Development (CDD) approach, a globally recognized strategy for achieving service delivery, poverty reduction, and good governance outcomes. KALAHI-CIDSS has now become the National Community Driven Development Program (NCDDP). that seeks the reduction of poverty, addresses the lack of capacity and resources at the local level and the limited responsiveness of local governments to community priorities vis-a-vis their participation to the local decision-making process towards their own development.

KALAHI-CIDSS advocates “empowerment of local communities through their involvement in the design and implementation of poverty reduction projects and improved participation in local governance.” The Community Empowerment Activity Cycle (CEAC) is a core technology in engaging community participation and capacitates communities on project management skills, resulting in increased confidence in engaging with local governments in periodic dialogues.

The program’s theory of change assumes that effective participation of community members in a barangay (village) in implementation will allow the villagers to address their priority development needs. Community participation, assumed to bring rural areas to the progress they envision, ensures that the community-based subprojects they select and implement reflect local needs and that services delivered are of good quality. The citizen participation in KC-NCDDP increases accountability and transparency in governance providing communities with the power to demand from elected officials and from local governments. This unique engagement of local governments with community residents through the CEAC facilitates institutionalization of participatory, transparent, and accountable principles and practices into the planning and budgeting processes of local government units (LGUs). KC-NCDDP convergence elements guarantees that the process will eliminate duplication and wastage, allows complementation of investments, reinforce existing planning and coordinative mechanisms in the national and local governments and decentralize decision-making.

Pulling Out Prematurely: Donald Trump and the Paris Agreement A cross-country comparison of climate change narratives in legacy media

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Climate change is one policy arena where science and cultural beliefs are deeply intertwined. In some countries (the United States especially, and the United Kingdom to a lesser extent), this intersection is expressed sharply along political partisan lines. Drawing on narrative policy theory, this paper looks at the way in which we make sense of this entanglement in the form of stories that we tell as social groups, relayed by the media and influential public figures. Tracing how these different narratives emerge and influence policy is of key importance for climate science communicators.

Using the example of President Trump's announcement in June 2017 that the United States would be leaving the Paris Agreement, I analyse the narratives that are deployed by the governments of three countries (the United Kingdom, France and Germany) to react to the same policy event, as well as, assess the extent to which these stories are adopted or contested in legacy media.

I first conduct a narrative analysis of the speeches made by heads of states to identify the range of characters, types of plots, and narrative themes employed to react to President Trump's announcement. I then compare these official narratives to those disseminated in the media, through the analysis of 124 press articles published in daily newspapers in the weeks following the announcement. I find that, despite the united front presented by France, Germany, and the United Kingdom in their determination to pursue coordinated climate policies at the international level, the very relevance of nation states as the main actors of climate change mitigation is challenged in the press through the emergence of alternate stories about the role of cities, communities, or businesses as translators of scientific knowledge into political action.

Relationship between innovation policy and the Objectives of Sustainable Development: Results from a bibliometric analysis

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Innovation despite the fact that has generated economic growth in developing countries, has not contributed to the solution of global problems such as climate change and social inequality, on the contrary, it has worsened. The above questions to competitive innovation and that innovation must respond to these problems. In addition to this, the policy of innovation, it is a tool that can facilitate this change, but only have been in force two policy frameworks. The first associated with the financing of R&D and the second focused on fostering innovation systems to strengthen business innovation. Therefore, it is necessary to reconsider the policy of innovation, in such a way as to respond to the challenges that group the Sustainable Development Goals (SDGs). Which are a universal call to the adoption of measures to put an end to poverty, protect the planet and ensure that all people enjoy peace and prosperity. With this in mind, the transformative innovation policy, which is envisaged as a paradigm shift with high impact on the solution of social and environmental problems not resolved by traditional innovation policy. The objective of this research was the realization of a conceptual approach to the subject, seeking to contribute to the building of a theoretical framework that seeks to understand the relationship between innovation policy and the SDGs. The methodology used was based on a systematic review of literature supported in a bibliometric analysis. As a result, it was identified that there is an interest in the scientific world by analyzing the relationship of innovation policy with the challenges of sustainable development, as well as a recognition of the role that has this policy in order to achieve a transition to a more sustainable society. In addition, it highlights the existence of a large number of papers on energy innovation policies that are being developed in Europe, which can be inferred given that the countries that lead the productivity of the subject are Europeans and North Americans. Finally, it is suggested that Latin American countries must lead a transformative innovation policy that points to SDGs as the fight against poverty, peace and prosperity, bearing in mind that the region has high levels of inequality and socio-political conflicts.

Strengthening Institutional Mechanisms for Climate Adaptation and Natural Disaster Risk Reduction in the Sahel

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A semi-arid belt below the Sahara stretching from Senegal to Eritrea, Africa's Sahel region has experienced recurring extreme weather patterns such as droughts, which last for decades and have impacted crops and livelihoods of an estimated 100 million people. The extreme weather conditions in the Sahel are further exacerbated by degrading land conditions, rapidly growing populations and widespread poverty. Climate variability and change in the Sahel is significantly impacting agriculture and land use, ecosystems and biodiversity, human settlements, and health and water resources. Furthermore, the high uncertainty and unpredictability of the climate variability in the Sahel, including severe droughts and heavy rainfall render the design and implementation of adaptation policies difficult. For example, in the western Sahel region, changing rainfall patterns are driving a southward migration of pastoralists into lands formerly occupied by sedentary farmers, resulting in a major source of conflicts in the region. This conflict has in part contributed to the destruction of farmlands and cattle, with adverse implications for food and human security and slowed economic growth in the region. The complex geopolitical nature of the Sahel region comprising of more than ten countries and multiple dominant ethnic regions presents an additional challenge for institutions to adapt and respond to extreme weather events. A better institutional setup dedicated to disaster risk reduction can help prepare millions of people to adapt to an increasingly unpredictable climate future.

Academic institutions, international organizations, and especially governments at various levels all play important roles in increasing resilience of communities. There is, however, a lack of mechanisms and platforms that can connect the knowledge and information contained in silos to facilitate more coordinated and efficient responses to severe weather events and climate change by communities and institutions. Our research focuses on several countries in West Africa and aims to accomplish the following objectives: (1) Map the current migration patterns and the most vulnerable populations in the drought and flood-prone territories; (2) Map the best indigenous practices and arrangements that local communities have been using to increase resilience and adaptation to the harsh and changing climatic conditions; (3) Identify the specific gaps and weaknesses in the current institutional setup related to early warning systems, disaster risk reduction around severe weather events, such as heavy rainfall, flash floods, and sandwinds (4) Map the current intra-national and international institutional setup and best practice for rapid disaster response coordination. The results of the research will be used to propose a design of an institutional setup in the West

African Sahel region on local, municipal, national, and regional levels to address climate adaptation through disaster risk reduction, manage early warning systems, and coordinate rapid disaster responses. This would be achieved by incorporating formal and informal channels, building upon indigenous best practices, and recommending technological solutions.

Sustainable Local Resource Mobilisation in Ondo State: Breaking down internal boundaries in Ondo State Signage and Advertisement Agency

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Aggressive Mobilisation of Local Resources (MLR) has been identified as a key avenue for developing nations to obtain critical finance for sustainable development within the SDG years. However MLR is limited by many factors which include over departmentalisation and existence of internal boundaries within government organisations, as applicable to the Ondo State Signage and Advertisement Agency. Departments are silos within government offices. Issues and human resources are trapped within these structures to the extent that appropriate team cannot be created to deal with specific issues as they emerge. The result of this is that government agencies do not operate at peak level, and those saddled with revenue generation cannot perform optimally. Hence financing of sustainable development projects and programmes becomes difficult. There is therefore an urgent need to change the bureaucratic and operational architecture of government agencies. This study therefore documented the effect and impact of a flat operational structure which involved the use of task team rather than working through departments, on three key organisational indices of revenue generation, staff satisfaction and client satisfaction in the Ondo State Signage and Advertisement Agency, Nigeria. The study revealed that there was a significant improvement in revenue generation and a marked positive change in client satisfaction. While majority (92%) of the low to middle level officers were observed to embrace the change positively, up to 35% of the top level officers were not satisfied with the new operational model. The outcome of this study therefore suggest that reduced dependence on internal boundaries in government agencies improves efficiency.

The efficiency of Bolsa Familia Program to advance toward the Millennium Development Goals (MDGs): a human development indicator to Brazil

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Eradicating poverty and promoting human development are very persistent and deeply rooted challenges in our society, that consequences affect the lives of millions of people. One of Brazil's great efforts to combat poverty and social inequality was the implementation of the Bolsa Família Program (BF) in 2003. Present in all Brazilian municipalities, Bolsa Família is considered the largest income transfer program with accompaniment in the area of health, education and social assistance of the developing world. At a cost of 0.45% of the Gross Domestic Product (GDP), the program serves more than 13.5 million families, or more than 46.5 million Brazilians, who represent approximately 23% of the total population. Due to its social relevance, the objective of this article is to measure the efficiency of the Brazilian Federative Units in converting investments in the BF for the achievement of the Millennium Development Goals (MDGs), in the period of 2004-2014. We applied the Data Envelopment Analysis (DEA) - Slack-Based Measure (SBM) model with variable returns of scale oriented to the output, where the inputs used were public expenditures on Bolsa Família Program and GDP per capita and the outputs were average income of the poor, Gini index, school attendance rate, maternal mortality rate, infant mortality rate and life expectancy. Overall, the results demonstrated that Brazil has made progress in achieving the Millennium Development Goals. The efficiency scores were high, evidencing the satisfactory performance and contribution of the Bolsa Família Program for the promotion of human development in the country. On the other hand, it is identified the need to increase investments destined to the BF, since if the efficiency levels are high, there is little scope to expand its performance, without changing the inputs. Moreover, to promote human development, it is important to combine public policies in the medium and long term, as well as to increase social spending to build a solid structure that promotes human development and improves the quality of life of Brazilians.

Tropical Strategies for the SDG Action

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The current ideological, economic and institutional crisis in Brazil demands a radical improvement on the quality of Brazilian politics. This article defends that, despite the decadence of recent scenarios, an inspiration for achieving the United Nations' Sustainable Development Goals in the Global South can come from grassroots political experiments conducted by Brazilian peoples, having as its ultimate goal to address social-environmental problems via policy approaches. This article reflects upon the research findings of two Independent Studies conducted at Columbia University in the years of 2016-2017, with the guidance of Professor Adela Gondek. The research covered 11 case studies, including documental research, geospatial data, literature review and over 35 hours of interviews with politicians, artists, rural workers. A choice was made to interpret social-environmentalist movements strategies as social technologies and as such, possible of being customized, enhanced and repositioned to address new challenges. The lessons learned by Amazonian people in the search for sustainable development are then debated within a management approach, in order to contribute for new policy approaches for Brazil, and for the world, in the decades to come.

Breaking Down Silos in Universities: Imaginative Interdisciplinary Approaches to Sustainable Development Research, Education, and Practice

Amplifying the Indigenous Voice to Protect the Amazon River Basin: A Case Study of University-Community Collaboration in Ecuador's Amazon

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The Amazonian Rainforest region is one of the most bioculturally diverse places on Earth and is a home for many communities. The Amazon must now combat human and climate induced-impacts and those who call the rainforest home are on the front lines. Ecuador's Universidad Regional Amazónica Ikiam seeks to address freshwater microbial hazards and develop solutions for human and environmental health through the creation of a UNESCO Category 2 Natural Science Institute. In partnership with the Master of Sustainable Peacebuilding program at University of Wisconsin-Milwaukee and other international higher education institutions, Ikiam will develop a framework for sustained university-government-community engagement and citizen informed science.

Approximately half of the population in all six of Ecuador's Amazonian provinces identifies as indigenous, with two provincial populations being more than two-thirds indigenous. This represent an enormous opportunity for community integrated conservation and citizen science. The interdependence shared between the Amazon river basin and the populations that reside in it, creates a unique opportunity to capture data about the ecohydrological health of the Amazon watershed. In collaboration with the Confederation of Indigenous Nationalities of the Ecuadorian Amazon (CONFENIAE), the Coordinator of Indigenous Organizations of the Amazon River Basin (COICA) and the leaders of the Waorani, Shuar and Achuar Nationalities, Ikiam can provide the knowledge exchange that is necessary for indigenous communities to take part in scientific monitoring of water quality and more broadly, to increase our collective capacity to monitor the ecohydrology of more remote parts of the Amazon river basin. This capacity building requires an approach that spans disciplines from the sciences to the humanities, to develop sustainable strategies that are affective in addressing the needs of the Amazon river basin, logistically possible in remote areas of the rainforest, and most importantly, community-led and culturally appropriate.

The strategies that emerge from the collaboration with local communities, local governance bodies and institutions of higher education will inform the management of the freshwater resources of Ecuador, the Amazon Basin, and more broadly across the Latin American and Caribbean region.

Automating Open Source Data Collection and Mapping Corruption to Combat Illicit Wildlife Trafficking

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Data science has given organizations new opportunities to tackle illicit wildlife trafficking - a \$20 billion industry - and its intersection with corruption. However, the industry's clandestine nature presents unique challenges for any analysis. In our project, we analyze datasets and global news coverage to develop a robust understanding of Illicit Wildlife Trafficking.

Since corruption and illicit wildlife trafficking are hidden from the public view, such data are not available, and each of the available data sources is insufficient on its own. For example, current measures of corruption are generally reported at the national level, do not reflect the specific forms of corruption that are most relevant to IWT, and tend to be heavily dependent on experts' perceptions of corruption. We thus strived to integrate numerous datasets and resolve gaps between them with three complementary methods:

- Analyzing structured datasets,
- Visualizing global media coverage,
- Mining unstructured open-source text.

Using relevant data, we developed an approach for overlaying disparate data sources. Sources collecting data on seizure incidents gave us the opportunity to map a subset of law enforcement activity and identify immediate trends. By mapping these data alongside legal trade, populations of endangered species, and available information on corruption, we identified potential hotspots for IWT and inconsistencies between data sources.

We found it difficult to establish universal correlations between populations of endangered species and other data—large elephant populations are not necessarily associated with more seizures. We distinguished several categories of countries in our analysis, those with possible areas where corruption hinders law enforcement against IWT, those with many poaching incidents and seizures; and those with many seizures, despite small indigenous populations of endangered species.

We attempt to fill in remaining gaps using media coverage. The Global Database of Events Language and Tone monitors web-based news sources globally. One of its products identified approximately 63 million articles that it tags as being relevant to any one of the various themes related to this project (corruption, poaching, etc.). Using GDELT, we were able to generate indices capturing the intensity of media coverage related to core issues by country, and by day, and conduct statistical analyses with them. Notably, by mapping the intersection of coverage on corruption and poaching at the article level, per country and per day, we were able to largely replicate the results

presented by conventional datasets on corruption and IWT. Numerous countries linked to more coverage of corruption and poaching discussed in the same context—a potential measure of corruption tailored to IWT—were also highlighted by our analysis of conventional data sources. However, this measure picked up additional countries that may be hotspots for corruption’s intersection with IWT but were not identified as notable by structured datasets—including Guinea-Bissau, Swaziland, Sierra Leone, Liberia, and Equatorial Guinea—worthy of further exploration as they represent geographic gaps in traditional data collection.

Since GDELT fails to capture incident-level data, as articles may discuss background information without specific incidents and still be tagged as relevant, we automated the generation of incident-level data through text analytics applied to these articles identified by GDELT as they relate to wildlife trafficking specifically in two principal phases. One used human-tagged articles as pertaining to various topics to train a data mining tool to infer the presence or absence of those tags in other articles. However, there remained a fundamental limitation—is there a single location or incident that should be associated with an entire article? We responded to this limitation by developing a second approach that worked with sentences within these articles that referred to a location—what we called “geo-parsed sentences.” Those sentences could be associated with points on a map, and often pertain to a specific incident, which we identified using keyword searches. Some describe seizures, others arrests, poaching, etc. The goal of this text processing is to serve as a force-multiplier for resource-limited staff, allowing them to recreate the work of thousands of work-hours within days.

Thus, in our attempt towards imaginative interdisciplinary approaches to sustainable development research, we truly broke down conventional silos and took a step into the landscape of big data and its role in tackling the link between corruption and IWT as we laid the groundwork for resolving gaps in information that has previously been uncollectible.

Beaking Down Silos in Higher Education in Nigeria using the 4C's for Achievement of Sustainsble Development Goals

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Higher education is facing huge challenges in meeting global tasks related to Sustainable Development Goals (SDGs). The seventeen (17) goals are expected to be the focus of the higher education curricula for the attainment of sustainable development by 2030. Curriculum Development process has been a feature that has served for generations and will continue to be essential in the 21st Century world. The 4C's, which are the 21st century skills encourage students to collaborate, communicate, create and critically think, such that they can translate soft skills into hard skills in the workforce, creatively synthesize information and work in teams with diverse colleagues. This appears to be unrealizable because higher education is compartmentalized (in silos). Higher Education function in disciplines, departments, and schools with little or no collaborations. The use of multi-disciplinary approaches that will cut across departments, schools, disciplines and faculties but function as one entity geared towards meeting the challenges associated with the sustainable development goals is the focus of this study. The 21st century teaching and learning skills encourage the use of 4C's: communication, collaboration creativity and critical thinking, and lead to translation of soft skills into hard skills. Faculties across the disciplines are expected to develop how to use 4c's in their teaching to articulate teaching strategies, classroom activities and assignments that can be adapted across disciplines to attain equity, diversity, and inclusion for focused learning objectives. The objectives of the study are to determine how the 4C's will promote the integration of the 17 SDG's in higher education curriculum and the extent it will help to break down silos that occur in higher education.. Four research questions will guide the study:

1. To what extent will the use of communication skills in integrating the SDGs in the curriculum break down silos in HE?
2. To what extent will the use of collaboration skills in integrating the SDGs in the curriculum break down silos in HE?
3. To what extent will the use of critical thinking skills in integrating the SDGs in the curriculum break down silos in HE?
4. To what extent will the use of creativity skills in integrating the SDGs in the curriculum break down silos in HE? The study will be carried out in South -East geo-political zone, Nigeria. The population will consist of all the faculties in the various types of higher education. 250 faculties will be purposively sampled. A structured questionnaire and focus group discussion will be used to collect data that will be analyzed through percentages, frequencies and means. The audio tape will be transcribed using Nvivo software. Based on the findings, recommendations, to be disseminated to key quality assurance bodies, on how to break down silos in higher education, will be made.

Becoming a Social Organism: Action Research Turns Environmental Research Into a Sustainable Act

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“What is the impact of my work on the environment”? asks designer and educator Victor Papanek in the first chapter of his revolutionary 1995 book, *The Green Imperative*. Papanek’s words drive my teaching every day and lead me to question the meaning and purpose of contemporary sustainability research in education. I will present my research, a case study that takes place at Shenkar College of Engineering, Design and Art in Tel-Aviv, where I teach. The research is inspired by David Orr’s approach that “all education is environmental education” and by Fritjof Capra’s holistic view that life is a complex system that integrates organisms, social systems and ecosystems. I will show how an ordinary qualitative research study evolved into Action Research involving a group of twelve faculty members, who, by sharing their sustainable ideas, projects and curricula raised awareness of ecological and social issues through the power of art and design.

The goal of the group was to prepare collective work for an exhibition on environmental issues, however through the creative process - meetings, acting, connecting and sharing - we gave birth to a new social organism that had a transformative effect on the members as teachers and individuals. Inspired by interconnected system methodology, the work of the group brings enlightenment to the personal power and creativity of each individual along with the unity that has been formed. The Action Research of this transdisciplinary artistic act reflects and creates a sustainable transition in terms of human ideas, by collaborating, networking and interacting between themselves and their environment, and meets the social-environmental challenges of our time with academic tools. It suggests a new approach towards contemporary social research in sustainability science, and on Papanek’s behalf, new ideas on how to empower individuals to make sustainable change in their research, education and practice.

Breaking the silos between cities and research: Building up science in cities to drive action on the SDGs

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There is a critical need for science and research to help build solutions to the world's sustainability challenges. What is the role of science and research in elevating local actors to heights where their strength can have a rippling effect on a global scale? Effective implementation of the SDGs requires governments and stakeholders to work across sectors, governance-levels, time frames and geographies. Early implementation of the SDGs has illustrated that countries are working to align national strategies, adapt institutional frameworks and shift policies to achieve the SDGs. However, it also illustrates that policymakers are struggling to manage and leverage goal areas and to operationalise an integrated implementation approach. Contributing to this struggle, is the fact that not enough is known about, for example, interlinkages, trade-offs and synergies between thematic focus areas of the SDGs, and, systematic understanding of the state of the art science, and research findings at the local and regional level as it pertains to the SDGs. There is currently a great need for science, research, and technology to support national governments by contributing to strengthening and supporting science and knowledge infrastructures at the local and regional level to drive science to impact and to drive localization of the SDGs. What knowledge structures do we need to put in place so that local actors can have a rippling effect on a global scale? How can local and regional actors leverage science and research in their favour to design maximum-impact cross-cutting solutions to tackle the SDGs? This paper proposes solutions on how to better link science and local governments action towards achieving the SDGs by connecting researchers network with cities network to foster a new area of international cooperation between both actors.

Bridging the Gap in Local Experiences of SDG Implementation: Reflections from a case from Antioquia (Colombia)

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In Antioquia –an economically region of Colombia- it has developed Antioquia Sostenible, a cross-sector alliance with the purpose of serving organizations as an open space of learning and articulation on sustainability and the Sustainable Development Goals (SDGs). This is led by private organizations, including private foundations of the business sector, business associations, think-tanks and universities. This initiative has been acknowledged by UNDP Colombia has “the most relevant initiative of SDG localization in the country”.

In 2016, its first-year, Antioquia Sostenible developed five Cycles (Seminars + Intensive Creative Workshops), in which were involved more than 400 individuals and 60 organizations. In these cycles a guiding vision to 2030 was co-created, reflecting the priorities of the region using the SDGs language. Also, Antioquia Sostenible has traced five lines of action: 1) Governance and multisector participation, 2) Working path at a subregional level, 3) Open data platform, 4) Academic hub and 5) Pilot project at south of Valle de Aburrá (Aburrá Valley).

‘Academic hub’ working line is looking to create a common agenda between local universities, bringing scientific knowledge from natural and social sciences, serving to the achievement of the vision to 2030. This line of action is still under development and face the challenge of breaking down silos inside and among universities.

This paper has three objectives. First, to present Antioquia Sostenible as a practical experience for achieving the SDGs at local level. The case is described using primary information derived from interviews and participant observation: the author is a member of the lead team of Antioquia Sostenible. Second, to reflect on the current and potential role of universities in the development of Antioquia Sostenible, within the working line ‘Academic hub’ and in relation with the others lines. And third, to explore whether ‘knowledge brokers’ are one potential solution for bridging the gap between universities and experiences such as Antioquia Sostenible.

To address the last topic the conceptual framework of Magnuszewski, et.al (2010) is used. This “conceptual framework for science-policy barriers and bridges” argues that Knowledge Brokerage may affect the policy process at different stages through different interactions: exploiting the body of scientific knowledge, distilling relevant scientific knowledge, reframing policy problems, redefining information feedback, challenging dominant (and often unconscious) individual mental models, and facilitating the generation of research questions. This framework is adapted for the particular case of Antioquia Sostenible and the context of the SDGs.

Children and Youth as agents of social and environment change in sustainable education action research cycle: an ICT based cybernetics framework

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Introduction

The education institutions has been the prima facie and building blocks of knowledge economy. The mark of the industrialization since 1800's brought rapid economic growth and swelled the economies globally. The period post 1960 contributed from rural to urban shift with focus on silo approach for economic development. The lack of university research practices to promote sustainability education led to failure in addressing the complex issues of socio-cultural, emotional and environmental domains.

Purpose

The social and environmental problem exists in a society backgrounds to most educations steps. Though text based learning about these pressing social and environmental problems takes place through regular formal education but quality education through interdisciplinary approach over these issues is vital for sustainability and simultaneously for Sustainable community development. The paper recount the experience from dual perspectives of teachers, children and youth through cybernetics driven ICT based education action research cycle. The personal and the socio-contextual factors for orientation would be considered. The in-depth analysis of the feature and factor of the human and non-human natural and man-made world for positive, negative and neutral emotions would be underpinning factor to establish the relation to sustainable education action research cycle. This would lay foundation for quality education grounded on emotions, instincts, humour, suspense, metaphors and ability to think critically about the problem for cognitive development. The environment and social settings in university / school differ with countries so does the latchkeys to solve these unique and complex problems. The societies are driven by economic foundations those don't drive knowledge economy, thus many ICT based projects disrespect the local adaptability of solutions. The working-level local domain experts understands the so called these acute local problems.

In this paper, I propose an ICT driven pedagogical framework that combines Children and Youth as Agents of Change (CYAC), which combined with constructive educational practices to promote quality education over social and environmental issues among school and university students. The framework connects the bridge from schools to university and over the issues coming from local to global context. The sustainability of various systems consisting of subsystems like technology, education, nature partly create or destroy their own foundations when they respond to these novel selection, ranging from local to global. The key indicators of the Global Schools Programme (one of the SDSN Youth programmes) embracing informal education would be equated against the cybernetics approach through the pedagogical framework for CYAC to

evaluate the existing ICT based problem solving methodology for transformative education. It would also be explored how the various pedagogical domains namely mathematics, environment can identify the interdisciplinary link among the feature-factor relations between oneself and environment, thereby establishing foundation to sustainability research education.

Recommendation

The cross university / schools 'Knowledge Commons' platform would enable the cross-border communication among teachers, children and youth to share the common resonating values on socio-cultural, emotional and environmental values through the ICT driven platform over the social and environment complex issues.

Collaborating to Educate Women Religious in Africa: The Role of Tailored Higher Education in Achieving the Sustainable Development Goals through Ministry

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Many countries in Sub-Saharan Africa are wrought with conflict, uncertainty and a lack of vital resources. In order to reach their vast potential, these countries are in desperate need of qualified, ethical leaders that can bring about positive change. One group that is purposely leading their communities to such change, is Catholic African women religious. These women work tirelessly to meet the needs of their communities through their ministries in education, healthcare, and social work, with many sisters focusing on pertinent issues such as ecological preservation and human trafficking, to name a few. Often, these women lack the necessary educational qualifications and leadership skills that could make them even more successful in their endeavors. For these reasons, the African Sisters Education Collaborative (ASEC) was formed to support the sisters in fulfilling their roles as leaders in their communities.

ASEC grew from collaboration, solidarity and global sisterhood among Catholic sisters in the US and in Africa. Initiated in 2013, one of ASEC's programs, Higher Education for Sisters in Africa (HESA), facilitates access to higher education for women religious in 10 African countries, leading to enhancement and expansion of their ministries. To deliver HESA, ASEC collaborates with the Conrad N. Hilton Foundation and college/university partners to provide financial and academic tools to ensure quality education for sisters. HESA's work directly influences the UN Sustainable Development Goals (SDG), especially related to education and gender equity. In addition, through obtainment of degrees in varied areas, sisters are working to address all 17 SDGs. We will discuss HESA in the context of the SDGs, highlighting the work of sisters at the community and global level, as leaders for sustainable development in countries where socio-cultural norms often limit women from accessing education and leadership.

Comparison of sustainable lifestyles of university students based on cultural characteristics in different geographical regions

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Sustainability has become one of the major issues that has to be taken into account in universities worldwide. In this paper, environmental sustainable lifestyles of university students in Turkey and selected East Asian University were assessed. SWOT analysis based on social aspects was carried out as a first step for comparison. In detail, cultural and traditional behaviors of the students was assessed in terms of sustainable life style by a questionnaire based survey. The answers were analyzed by using SPSS (Statistical Package for the Social Sciences). The results of sustainable lifestyles, road-map for future sustainable campus program together with challenges based on regional characteristics are presented in the study.

Developing a Deliberate Institutional Sustainability Structure: Swarthmore's "Ecosphere" and Community-Wide Engagement

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Universities are on the one hand large, bureaucratic institutions and on the other centers of pioneering research and projects. This duality makes pilot programs that are successful at a university of high interest to peer institutions as well as those outside of higher ed. Sustainability is one area within which small initiatives starting at the scale of an individual university have been expanded to the private, public, and civic sectors. Moreover, sustainability efforts at the university-level are inherently cross-sectional internally: covering a multitude of domains (campus energy, waste, etc.), involving varied populations (students, faculty, staff, local residents, alumni), and drawing on a multitude of academic departments.

Swarthmore College has become a leader in sustainability among higher ed institutions and within its local community. Its students initiated the first fossil fuel divestment campaign in 2007, a campaign that has since spread far beyond the College's borders - recently counting New York's move to divest public pension funds and sue several oil companies among its achievements. The still-young Office of Sustainability launched an innovative internal carbon pricing model in 2015 (the second in higher ed; winning a 2017 International Sustainable Campus Network award), and has since worked to encourage not only other universities but also a range of municipalities to follow suit. And many of its students and employees have been engaged since 2016 in an effort to institutionalize a campus-wide compost system and achieve an ambitious Zero Waste goal.

The sustainability efforts at Swarthmore have been deliberately collaborative as well as steeped in both the SDGs and the literature on behavioral change and community action. This poster presentation will review a two-fold, multi-year process that has impressively furthered sustainability at the College, and that we feel is replicable in broad strokes in other sectors. First, the institution underwent a process to organize a sustainability governance and reporting structure, now called the "Swarthmore Ecosphere". Second, the Office of Sustainability launched (in close partnership with the President's Office, Environmental Studies, and several other departments) three educational programs whose intention is to activate a large swath of engaged community members. 1) The President's Sustainability Research Fellowship is a competitive program that matches students with on- and off-campus mentors to pursue a significant sustainable development research project through a year-long, integrated course plus internship. 2) The Green Advisors program is a paid, student peer mentorship program that also staffs the College's compost management needs. 3) The Sustainability Advocates program is a volunteer opportunity for faculty and staff to

pursue departmental sustainability projects and to develop sustainable development course material.

This poster presentation will review the structure of the Swarthmore Ecosphere and the Office of Sustainability's three hallmark educational programs, using waste management as a highly successful example that has recently been lauded as a model by local municipalities and civil society organizations. It will also make a case for the scalability of a deliberate institutional sustainability structure that aims to engage all community members through a set of carefully assembled options.

Eco-Schools Leadership Initiative

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Environmental education throughout the country is highly sparse, especially with the numerous changes and budget cuts within the education sector. Due to this, many, if not most, students are unaware of the critical state that the environment is currently in. The term “climate change” is thrown around but in reality most of the people using it, do not have a clear idea of what it really means. Therefore Virginia Commonwealth University student Mashaba Rashid started a program to help bridge this gap of knowledge.

Eco-Schools Leadership Initiative (ESLI) is a program where college and high school students educate elementary school students about different environmental topics. ESLI uses interactive and engaging techniques to get young students passionate and interested in combating environmental problems. ESLI originally started in 2013 where Mashaba would lead monthly sessions she created at a local elementary school in her hometown. The feedback was positive and she could tell the students were understanding the material that she was teaching. She continued these sessions all the way until the end of her Senior year of high school. One thing that she struggled with was getting ESLI into other high schools so during the summer of 2015, she decided to hold a conference open to all high school and college students to spread the word about ESLI and to recruit interested people who could start their own branches. The National Wildlife Federation in Reston, VA was kind enough to host their event and ESLI recruited a number of people to hold workshops showcasing the different lesson plans that they had created.

Currently ESLI has 7 chapters at different high schools and colleges across Virginia and has held three annual conferences at the National Wildlife Federation. There are approximately 60 college and high school volunteers and 300 students who have benefited from the program. There has been a breadth of impact because every ESLI lesson provides a chance for both the children and everyone in their social circles to learn about the environment.

This is a unique project because of its sustainable model that allows the program to expand and continue even as the founding leaders graduate. For example, all resources for running an ESLI program including an ESLI starter packet and curricula are online. In addition, more people are positively impacted than just those who decide to join an ESLI chapter. Both ESLI volunteers and interested teachers can use our website's environmental lessons. Also, family and friends of the children are influenced as the kids learn and teach their own community about the environment. This enables the positive impacts of ESLI to multiply exponentially.

Mashaba's goal was to essentially help spread knowledge to the older students who lead the sessions as well as the younger students who attend the lessons. This way, everyone will be gaining awareness and an understanding on what is going on in the world and how they can work to help solve these problems.

Education, Societal Paradigms, Science-Policy Interfaces and the Transition to an Ecosystemic Model of Culture

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Trying to solve localized problems without addressing the general phenomenon is a conceptual error. To face the problems of difficult settlement or solution in the world, science–policy interface should overcome conventional public policies, segmented academic formats, market-place interests and mass-media headlines, which accommodate people to the prevailing order, instead of preparing them to carry meaning, purpose and life-enhancing values (relational and ontological), to the individual and collective projects of life.

Evidence shows that the current paradigms embedded into the political, economic, social, cultural and educational institutions, favour the dominant political-technological-economical establishment, associated with a perverse system of production and consumption, energy squander, deforestation, mining expansion, hazardous wastes, pesticides, pollutants, degraded and violent urban centers, global climate change, diminishing biological diversity.

Anthropogenic views do not distinguish between the whole of the human beings and the destructive action on nature and culture of the political-economic establishment; power asymmetries should be considered, that confer to a small and privileged part of the world population the decisions about the destiny of the entire mankind. Offsetting proposals only mitigate a situation here and there, but do not address the causes of the problems continuously re-created within the system (like corruption that involves state capture).

Instead of taking current prospects for granted and project them into the future (exploratory forecast), the definition of desirable goals and the exploration of new paths to reach them (normative forecast) is posited in view of a set of values, norms and policies that prioritizes socio-ecological objectives and human well-being, the quality of natural and built environments and the aesthetic and ethical values linked to a moral and cultural meaning of the existence.

Given the dynamic field of events encompassing the forms of being in the world, the transition to an ecosystem model of culture encompasses heterogeneous attributes, behaviours and interactions of individuals and the dynamics of the systems in which they live (institutions, populations, political, economic, cultural and ecological background), that could add positive or negative value to the environment, equity and the interactions between people and ecosystems.

An analytical, ecosystemic framework to identify and deal with the problems of difficult settlement or solution in the world is posited in the publication below (please see link), in view of a transformative change of the current paradigms of development, growth,

power, wealth, work and freedom embedded at institutional, cultural, economic and political level, encompassing four interwoven dimensions of being in the world (intimate, interactive, social and biophysical).

The proposal extends to environmental problems, quality of life and the state of the world a larger conceptual framework that includes ontological and epistemological issues, in view of the isomorphy and transfers of concepts, laws and models in various fields, enabling groups and individuals in the socio-cultural learning niches to develop new action pathways, empowering people to explore new scenarios and information relevant to achieve new outcomes.

Enhancing academic integrity towards achieving the sustainable development goals on education and poverty reduction

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The International Center for Academic Integrity (ICAI), which works to identify, promote, and affirm the values of academic integrity among students, faculty, teachers, and administrators, defined academic integrity as a commitment, even in the face of adversity, to five fundamental values: honesty, trust, fairness, respect and responsibility. Academic dishonesty, including plagiarism and other forms of cheating, is a challenge to academic integrity and a growing problem for universities, most significantly as a threat to quality in respect of learning, teaching and research. A wide range of issues have been identified in literature and studied in relation to academic dishonesty. Among these are the varying motivations driving students' academically dishonest behaviour. Statistics related to cheating in college consistently identify greater than 50% of college students engage in dishonest academic conduct. This study examined strategies to enhance academic integrity towards achieving the sustainable development goals (SDG) on education and poverty reduction. This is important, as education is a key factor to reducing and preventing global poverty, which explains why the United Nations and many countries around the world are beginning to realize its importance and significantly investing in it. Successive programs prior to the SDGs were in agreement that making education available to 100 percent of people around the world is one way to ensure that poverty declines. High quality education promotes good health, drives economic growth, and empowers women and girls. Academic integrity has the potential to promote a higher standard of research, creativity, innovation, and originality in thinking, which are essential towards finding solution to some of the complex challenges confronting humanity, prominent among which is poverty. The implication of academic dishonesty for education and poverty in Africa is scanty in literature. Fifty questionnaires were administered to university teachers with 80% response rate. The implications of their responses for Nigeria's effort towards achieving the sustainable development goals are discussed.

Environmental education principles for sustainable development goals

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The Industrial Revolution transformed manufactured production system with the use of machinery. Education was directed to understand the use of technologies to increase the efficiency of the production system. The “Technological education” was established, having wide support in the results coming from the production of consumer goods. The teaching-learning process is a pillar of the construction of social habits, serving as a replicating environment of socially accepted beliefs and behaviors in a locality. Understand the “Principles of a new education” is necessary to structure the pillars for a knowledge focused on sustainability, could help the discussion of an inclusive, fair and balanced society, with less impact potential and use of natural resources, under the focus of the Sustainable Development Goals. “Traditional education” is focused on a list of contents, that are identified in the syllabus of the discipline. “Education for Sustainability” requires an (i) articulation of several areas, focuses on environmental issues in eco-culture training, and can provide increased knowledge, change of principles and improvement of qualities, being a basic condition to (ii) promote better understand about the environmental limits and a way to structure a cleaner production. In this context, (iii) the teaching-learning process must integrate the environmental theme in all disciplines, besides using formal and informal methods as effective means of communication to increase efficiency and effectiveness in rethinking global reality, becoming (iv) more complex in the face of social issues that promote interaction and dialogue, for eco-citizen training. This education has to have (v) emancipatory content, where the dialectic between form and content implies individual and collective changes, global issues, structural and conjunctural, economic and cultural. The people involved in the process acquire new knowledge, (vi) develop critical vision about values, establish skills and behaviors that allow them to make responsible decisions regarding society, the environment and the future. It’s known that one of the main pedagogical tools is (vii) the theory previously discussed in the classroom, associated with practical factors of individual experience, visualization and experimentation as a formative support, which may aid in the process of internalization and change of values. In order to achieve this objective, (viii) the experimental activities should have as fundamental characteristics multiple formats, reflection on the truth content of acquired knowledge, association of theory with practice, non-standardization of scientific procedure steps, respect for the influence of external factors and problematization, overcoming the contradiction between educator and learners, because only in this way will there be the possibility of building a (ix) relationship based on the dialogue of knowledge in which the joint growth of the individuals involved is indispensable. The dialectical reference to education takes place in a social-historical perspective, being conceived as (x) an individual and collective process of constitution of a new social consciousness and of reconstituting society through the rearticulation of political relations, (xi) acting in the integral education of all those involved in the process, teachers, students, technicians, family

and community. This could be an initial list of Enviromental Education Principles for Sustainable Development Goals.

Environmental education in protected areas in Brazil: how to succeed? A case study about an urban protected forest in Rio de Janeiro state

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Environmental protected areas around the world have the common goal of protecting ecosystems and natural resources. In Brazil, they also have the purpose of returning to people the benefits of investments in environmental conservation. In that way, Brazilian government has guidelines for leisure and informative activities in protected areas, such as environmental education. However, governmental entities of environment recognize that success in communicating ecological impacts of those areas and engaging society's participation in environmental conservation remain as challenges to effective environmental education programs. The Environmental Protection Area of Engenho Pequeno (APAEP), in São Gonçalo city, Rio de Janeiro state, is a small Atlantic Forest remains area in a populous urban center. The municipality has more than 1 million inhabitants and serious socio environmental issues. This study aims to identify the types of visitation activities at the Environmental Protection Area of Engenho Pequeno and to discuss the area's potential for environmental educational practices with elementary schools. The methods included analyses of successful cases of environmental education programs with schools in protected areas in Brazil. Also, interviews were conducted with the APAEP's employees and with respondents of the Municipal Secretary of Education. Schools visitations are infrequent at the protected area of São Gonçalo. The activities are not regular and are usually developed by the same teachers and institutions. The practices conducted by the local employees as environmental education practices with elementary students are ecological trails, medicinal plants workshops and, less frequently, planting of seedlings. Visitations by the population are usually related to religious activities and trails. The municipality's government does not have an education program focused on the environmental protection area. Therefore, this study expect to reinforce the social and ecological relevance of a protected forest as the APAEP in a complex urban context and to reinforce the investment in sustainable management and environmental education programs at the municipality's protected area as a strategy towards the sustainable development of São Gonçalo. The literature background was based on references in pedagogy; communication; and environmental education in schools and in protected areas in Brazil.

Key words: environmental education, protected area; urban forest; sustainable development

Framework For Practicing Sustainability Science At Local Level And Its Continuous Generation: A case of building local government and community capacity to address social impact of environmental changes in Indonesia

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Practicing sustainability science (SS) at local level and its continuous generation is one of the key component to provide innovative solutions to sustainable development (SD). This aspect were not get sufficient attention in the past so that transition toward sustainability in development were not satisfactorily achieved. The “act locally” component of SD were not sufficiently addressed. This paper presenting a result from an applied research initiative in Indonesia to develop framework for practicing and associated continuous generation of SS by taking specific focus on building local government and community capacity to address social-impact of environmental change. Specifically, the applied research initiative tried to piloting framework to deal with SD problems in the form of livelihood declining (poverty) and degradation of land and forest. The aim is integrating livelihood improvement and rehabilitation degraded land and forest. The results of the research indicated that an interdisciplinary and integrated approach involving all major SD stakeholder in a Quadruple Helix Model, indicated a positive results for transition toward sustainability.

Keyword: sustainability science; sustainable development, livelihood improvement, land and forest rehabilitation; and local institutions.

From textbooks to glaciers: Using the world as our SDGs classroom

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Presented by Karl Knotoff

In this presentation, we will use The GREEN Program's (TGP) unique experiential education model as a case study for progressing the SDGs while breaking down university silos. Participants will discover the elements of how TGP was ranked 2017's Best Education Abroad Provider by the World Youth and Student Travel Confederation, and how our short-term, accredited, and career-focused model successfully embeds sustainable development curricula (ESDs) in universities around the world. Participants will also learn how to get their home institutions involved in Education for Sustainable Development (ESDs)

The GREEN Program (TGP) is an experiential education program for young leaders in sustainable development. Created for students, by students, TGP has introduced a new model for education abroad—driven by a desire to provide purposeful, hands-on industry exposure at a fraction of the time and cost. As members and a Global Schools Ambassador for UNSDSN - Youth, our short-term, accredited, sustainability-focused approach creates truly transformative experiences for students around the world—unlocking doors to governmental, public, and private facility access, exclusive tours, and unique place-based experiences.

TGP's model is shifting the culture from mass education to niche, and specialized education - focused on purposeful-travel, educational travel, and talent curation. We have created more conscious and tolerant students, travelers, and global citizens, and have created trust and relationships within local communities.

We've raised the bar for existing systems within higher education to help provide more educational value within a fraction of the time and cost.

A snapshot of how The GREEN Program is changing a culture:

- A program model that was created by students, for students
- Our philosophy is that seeing is believing, and experience is power
- Short-term, high impact, accredited curricula (8-10 days)
- Career focused, experiential education model
- Our participants represent 52% women in STEM
- Interdisciplinary approach and enrollment
- Teaching entrepreneurial frameworks and systems thinking
- Integrating facility visits and tours focused on or around sustainable development (renewable energy facilities, nuclear facilities, local food production / organic farms, etc.)
- "Learn global, act local" philosophy: 95% of GREEN Alumni stay involved in local sustainability efforts after their GREEN program

Our partnerships with universities around the world allow our students to have a truly authentic experience by learning from local professors, experts and government officials. TGP redefines the classroom by enabling one-of-a-kind experiences like studying the effects of climate change on the top of our world's glaciers.

We allow students to maximize their winter, spring, and summer breaks by providing them with a fulfilling educational abroad experience within just 10 days. We don't want students to choose between a job, internship, or a study abroad experience- we want them to do it all. In fact, 99% of GREEN Alumni say that TGP has refined their purpose professionally, personally, or academically. Alumni often credit TGP for helping them attain careers at companies such as General Electric, SpaceX, Tesla, Boeing, NASA, NREL, and more.

In addition, we've created a talent curation service for corporations and scholarship fund for disadvantaged, underrepresented, and underserved students. Our goal is to break down key barriers to education abroad and increase diversity in the workforce. We—along with our fiscal sponsors, 501c3 non-profit partners, hiring partners and donors—believe in investing in conscious travel and education to provide a global support network for our next generation to achieve sustainably-focused career goals.

How can the Re-Solve Scaling Tool contribute to assessing the impact of Education for Sustainable Development initiatives?

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Current and future sustainability challenges continue to illustrate an increasing complexity and graveness regarding climate change, environmental degradation, public health risks, social instability and inequity. At the end of 2015, the United Nations (UN) therefore adopted the Agenda 2030 with 17 sustainable development goals (SDGs) and emphasized education as a powerful tool and driver to help attain these SDGs. By ensuring an inclusive quality education and promoting life-long learning opportunities for all, education for sustainable development (ESD) can contribute to realising the agenda.

Many sustainable solutions were initiated during the Decade of ESD (2005-2014). When UNESCO launched the Global Action Programme (GAP) on ESD in 2015, the emphasis was put on scaling ESD activities in order to boost sustainable solutions initiated during the Decade. The aim of the Re-Solve scaling tool is to facilitate a reflective and iterative process for scaling ESD. Based on educational research, the Re-Solve scaling tool enables a continual process for stakeholders to reflect and self-evaluate existing ESD actions and projects. Using the tool, stakeholders can define visions, strategies and actions to accomplish their desired vertical, horizontal, functional, or spontaneous scales. Another purpose of Re-Solve is to create a shared language around the scaling of ESD to improve collaboration across diverse backgrounds, traditions and practices, as well as among multiple stakeholders when it comes to scaling ESD.

The Re-Solve scaling tool has the capacity to contribute to all SDG's, targeting SDG 4 with its clear focus on how to successfully and efficiently scale social and technological innovations for learning for sustainable development in all areas of society. Each Re-Solve scaling process has its own unique dynamics requiring insights into the local context and active involvement of relevant stakeholders. Thus, Re-Solve transfers the ownership of the scaling process from external or initiating stakeholders to internal or recipient stakeholders to ensure that the scaling process is ethically viable, democratic, and sustainable.

Interdisciplinary and imaginative environmental education practices in Brazilian Federal Institutes

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The Federal Institutes of Education, Science and Technology are fundamental on promoting Sustainable Development and Environmental Education for building viable alternatives to face the environmental crisis and social transformation. According to the law that instituted the Federal Network of Education, Science and Technology, the institutes must be committed to socioeconomic development on what pertains to its benefits to society. On that sense, this paper brings to light interdisciplinary educational practices for environmental education that happened in the first 10 years since the foundation of the Federal Institutes. We conducted a survey of the environmental education projects cataloged by the institutes on the Project Management System (SIGProj) between years 2009 and 2018, resulting in a total of 352 projects. These projects were verified for their practical, interdisciplinary and imaginative aspects, being selected to be in the scope of this paper only the ones that relate to those aspects. The result was 14 projects selected. The collected data was organized in analysis categories, resulting in a map of the projects and the interdisciplinary and imaginative environmental education practices on Federal Institutes. We observed that environmental education practices are still mainly conducted following traditional models, tied to conservative education schools of thought, focused on solving their campuses' and society's environmental issues through research activities. We also observed that interdisciplinary and imaginative environmental education practices use playful, sensory, artistic and "gamified" strategies as a way of promoting environmental educational processes, organizing occasional actions and mobilizing the academic community. From analyzing these results, we better understand the interdisciplinary and imaginative environmental education processes developed by the Federal Institutes in those 10 years since their foundation. We realize these institutions went through a time of building their environmental educational "identity" in the first 5 years since their foundation, needing to close the gap between their institutional rhetoric and their educational practices. Later on, we observed that the institutes established a series of practices where interdisciplinarity is a tool to make the environmental education process and sustainable development more effective.

Keywords: Environmental Education, Higher Education, Professional Education.

MANTOVA2050. Re-identifying the Industrial Heritage Sites: The Engine for the Historical City's Future Landscape.

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MANTOVA2050 starts as a master thesis aiming to suggest a future scenario for the city of Mantua, a UNESCO protected historical city in Italy, which nowadays has to face many complexities inherited from the last decades. The project is focusing specifically on the left bank of the Inferior Lake where the petrochemical implant and the former refinery are located since the sixties.

Mantua is a special case not only for its outstanding universal value of culture, but also for its natural asset: the territory belongs to multiple protected natural reserves, with no exception of the industrial area. An area, which hosts the partially inactive and heavily polluted productive core of today. The contamination affects land, sediments and ground water and spreads beyond the boundaries of the chemical settlements, including residential areas and protected natural parks.

The challenges to face are multiples: (1) to solve the heavy contamination issue which must be faced by public and private actors together; (2) to reconnect the historical city center to the residential multicultural suburbs intervening both on physical connections and social dynamics; (3) to enhance the industrial heritage of the city of Mantua, reading the productive settlements not as a threat but as potential new spaces for the community.

What the study-project suggests is a future scenario for the development of Mantua where the leading role is played by the Industrial Site, recognized as heritage. The ambition is to trigger a re-identification while the productive settlement is still partially active. On the one hand, the masterplan organized into chronological phases, which can be revised and adapted in time, establishes a new hierarchy of connections and new relations between spaces at the territorial scale. On the other hand, the actions describe how the local interventions must be realized and which are the devices to be used in the design at the human scale.

Therefore, the contamination issue is solved through biological remediation, the currently disconnected ecological corridors are restored, the city's neighborhoods are reactivated. The regeneration process is permeating the industrial patrimony: either the production lots are converted into environmentally sustainable manufacturing areas, focusing on the quality of the working space, either they are invaded by nature and transformed into new spaces for the community. Making the industrial heritage now active and living.

The most revolutionary intervention interests the ex-refinery and petrochemical implants which are completely transformed. The emptied tanks are invaded by trees and art pieces, they are preserved and refurbished to host sport and social activities. Families explore the pipes' labyrinth which becomes the backstage of community events. The built environment shades and transforms into a green park.

Cities still face today the difficulty of their governance to manage simultaneously all aspects of urbanized territories in a synergetic way. Mantua is seen as pilot site: using a multidisciplinary approach from environmental to social aspects, MANTOVA2050 project attempts to blend the demands of the future industry with the historical city and its contemporary identity.

Narrative sustainability: The importance of story and the need for an articulated vision of “the good life” worth sustaining

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Narrative is becoming increasingly critical for sustainability practitioners as the climate crisis continues. This paper will argue that we need to develop an image of human flourishing worth sustaining before we can work out the nit-and-gritty of how we're going to get there, especially in the face of climate change. We need to more deeply consider the stories we are living out vis-à-vis our actions and behavior, and we need to ask whether or not the commitments and values we maintain (often implicitly) are commensurate with true sustainability practice and the possibility of climate change mitigation.

We need to be attentive to our storytelling because we are fundamentally “storied” beings. We live and breathe stories; we are narrational creatures. They give us meaning and a sense of purpose. Whether articulated out loud or embodied implicitly, we all subscribe to stories which give us some understanding of “what it means to be human,” and we more-or-less behave accordingly. Such grounding stories are sometimes explicitly religious: including narratives of creation, fall, and redemption. These narratives can also be philosophical or economic in nature: American capitalism, Hegelianism, Marxism, and its variants: all tell some kind of story of humanity, including where we're going and how we'll get there.

Whether we know it or not, we absorb these meaning-making stories into our lives and our individual and collective consciousness. Stories from our culture matter because they orient us to pursue particular goods, to maintain particular ethical commitments, and to recognize particular conceptions of beauty and justice. Importantly, the stories and myths told in our cultural milieu often affect us even when we do not explicitly accept or acknowledge them. Philosopher James K.A. Smith writes, “To be human is to be... a creature whose... form of life is... primordially shaped by what one loves as ultimate... [for] we are the sorts of animals for whom things matter in ways that we often don't (and can't) articulate”

Whether expressed explicitly or left unspoken, I would add that these ultimate loves constitute commitments to stories. Stories captivate our attention, not only cognitively in our heads, but by the gut, and in our hearts. Regarding climate change and other challenges of sustainable development, we are in need of a meaningful narrative which can (1) make sense of the human ability to dramatically affect the natural environment around us; (2) inspire us to imagine a common, sustainable future, and (3) equip us with a vision of how it is that we'll get there. We need to stretch our imaginations by telling a new story with new values—or perhaps by retelling ancient stories and reclaiming values millennia old. Whatever such a narrative looks like, whether ancient or modern, it

needs to provide us with a sense of where we come from, where we ought to go, and how we should act so as to move forward.

This paper will explore the necessary conditions of a robust 'narrative sustainability'.

Overcoming Challenges for the Student Group: Interdisciplinary Perspectives on International Development

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Interdisciplinary Perspectives on International Development (IPID) is a student group at the University of Minnesota. Our mission is to engage ideas, build professional networks, and address global challenges. IPID has gone through many challenges and changes throughout its history, but today IPID is a platform for discussion, debate, and learning about international development. Current members range from graduate students at the Humphrey School of Public Affairs, Comparative and International Development Education, the School of Public Health, and the Interdisciplinary Center for the Study of Global Change. IPID originally started with graduate students at the College of Education and Human Development and the Humphrey School of Public Affairs who shared a common interest in international development issues. Students across disciplines recognized a gap at the university for students to learn, grow, and discuss salient development issues.

The current role of IPID at the University of Minnesota is to encourage professional development and foster international development research. IPID has partnered with the Humphrey School of Public Affairs Career Center and local NGOs to facilitate professional networking. These events allow students in Minnesota to increase their professional network. Additionally, IPID is the primary facilitator of a yearly research symposium focused on international development. This space provides students the opportunity to present their research and teach others about current development issues.

Since its inception, IPID has faced many challenges including membership fluctuations, mission focus, and professional goals. IPID was created and has been sustained by graduate students at the University of Minnesota. Students are typically only in school for two years, and the rapid turnover of student participation makes it difficult for students to create a sustainable mission. Despite these challenges, IPID has continued to lead the university's work on international development.

Propaganda for conservation! Environmental education as an advocacy tool for sustainable forest management

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Environmental education is one of the strategies to address environmental issues and sustainable development in the world. In Brazil, it is part of education legislation to engage elementary schools in discussing the ecological crisis with students. Yet, the practices still have to go beyond the school walls. Literature shows that most environmental education school programs in that country still lack substantial connection between theoretical debates about ecology and practical actions, such as protected areas conservation. Brazil has the highest biodiversity level in the world. Around 18% of its terrestrial territory is in natural protected areas, locally identified as conservation units. Most of those units are administrated by governments in municipal, state or federal level. The federal government stipulates strategies to approach citizens to those natural areas, such as participative councils and environmental education. However, the implementation of those strategies is not satisfactory. This paper aims to discuss how environmental education can be an advocacy tool for nature protection and sustainability in a stakeholder's network for participative sustainable management. The Environmental Protection Area of Engenho Pequeno (EPAEP), in São Gonçalo city, in Rio de Janeiro state, is a conservation unit in a dense urban area that struggles with anthropogenic threats. It is administered by the municipality government and lacks plans of governance, community participation and education. The methods of this paper included a case study about the EPAEP. The discussion also considered other case studies in Brazil and abroad for comparison and analysis of successful strategies in environmental education programs for management and decision making. Field work and interviews were conducted with the protected area's employees and respondents from the Municipal Secretaries of Environment and of Education. Results showed the primarily stakeholders to be considered in a network program for participative management, including government, schools, local and nearby residents and religious groups.

Key words: environmental education; advocacy; sustainable management; forest; conservation

Science Communication: A media studies and science department collaboration for effective sustainable use, development and management of the Okavango Delta

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Countless research has been done on the Okavango Delta. The state of the art information that exists speaks to the imperative impotency to conserve the delta. Thus there is scientific evidence that supports the assertion that any threat to the rivers in Angola and Namibia is a threat to the delta in Botswana.

Research undertaken by scientists based at ORI has resulted in a myriad of content on topics like flooding frequency and plant dynamics in the Okavango Delta, biodiversity values and ecosystem services, climate change and biodiversity management in Ngamiland, community based natural resource management and its application in the Okavango Delta, challenges of managing biodiversity in the Okavango Delta, land management, tourism and sustainable development, and agriculture in the Okavango Delta to highlight a few. However, this information scarcely reaches politicians and citizenry of countries that share the river basin.

Hence well-meaning efforts to end poverty by introducing and promoting economic diversity and growth by Angola and Namibia have had Botswana and international scientists on their feet over the last five years. Scientists fear that Angola and Namibia's agricultural and hydroelectric ambitions will be the end of the Okavango Delta. Scientists are of the view that if the basin is not well managed and conserved, the delta will dry up. Hosting of migratory birds, fishing, molapo farming, tourism, and upstream development on the side of Botswana will be a thing of the past. To evade the impending doom, scientists have urged the Botswana government to offer Angola and Namibia incentives that will give them reason to desist from implementing initiatives that will disturb the delta.

Activities by the two neighbouring governments are unfortunately not the delta's only threat and the scientists' only worry. Botswana's mining activities, and the expansion of the tourism sector around the delta, population growth within the area and the swell in development among other factors, will be fatal to the delta's lifespan in the long run if not well managed.

To this end this paper will examine how poor science outreach by ORI scientists has contributed to the current status of the delta. It will investigate the effectiveness of science communication in general in influencing positive conservation efforts of the Okavango Delta's ecosystem. It will also look into the possible reality of having the Media Studies and Science departments of the University of Botswana joining forces to communicate scientific knowledge, methodology, processes and practices in the Okavango Delta. This interdisciplinary approach is expected to determine the level of

science communication literacy that communities within and along the Okavango delta possess, and launch creative science communication campaigns. This paper will weigh the willingness of both the university's departments to collaborate towards this cause rather than work in silos.

Keywords: science communication, Okavango Delta, conservation, biodiversity, ecosystems, environment

Student Eco Fashion Show

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Mainstream fashion is the second largest polluting industry. Therefore, Eco Fashion Show hosted by my students from Eco Art and Design class (the course I developed) and myself, hoped to raise awareness of environmental problems (many caused by mainstream fashion industry) and to provide some ideas for solutions. As stated in the Show's brochure, everyone can make a difference and lower their individual fashion ecological footprint by making good choices. Beside t-shirts with environmental slogans, the audience was able to see at this show wide variety of eco fashion styles designed by my students, from old clothing died with natural, non-toxic dyes (such as coffee, green and black tea, blueberries, beets and turmeric), to cut-out old dresses, pants, and shirts transformed into fashionable scarves, hats, and shirts, to interesting found objects clothing applications and jewelry. This show not only drew in large college community audience to rethink their fashion choices, but also inspired students to create a larger eco fashion event to be held at the college every year, that includes student eco fashion workshops, clothing donation, and film screening.

Sustainable Primary Education: A Proposed Village Education Model for India

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Objective: UNESCO Sustainable Development Goal number 04 advocates “Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all” i.e. all people should complete free school education by 2030. The authors proposes a model which would have three specific goals like, i) enhancing enrolment and retention ii) micro planning of school management iii) fiscal management for bringing improvement in the quality of primary education in any rural set-up.

Method: The researchers proposed a pilot-cum-action research in India to demonstrate the efficacy of this model through the formation and execution of ‘Village Educational Committee’ (VEC). The VEC would be comprised of key members of the village community (Sarpanch, Headmaster etc.) whose job is to initiate and exercise primary education policies, coordinate among different stakeholders and integrate the three major domains i.e., Government, school management and village community along with external agencies to make it viable, effective, sustainable and to explore the opportunities for skill development and employment.

Results: As the model is being implemented, the results can be analysed only after the initial tryout phase (mid 2018). Monitoring/evaluation would be done for examining the efficacy of this model.

Conclusion: This research work also looks at the impact of Indian socio-economic factors and constraints like poverty, gender-based stereotypes, lack of awareness among people and gives a comparative study whether they continue to act as impending factors towards achieving the intended goals of the proposed sustainable education model in India.

Key words: Sustainable Primary Education, Village Education Model, Rural Schools, India.

Technology For Educational Reforms: How To Change Teacher Resistance In Using Technology Into Teacher Resilience

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To compete in the twenty-first century, countries need to be competitive in the global marketplace. Education is the key to establish and retain the world's competitiveness. Educational reforms and the development of innovations into education have been a goal of the U.S. Department of Education for several decades. For instance, policy makers call for a shift toward providing students with the opportunity to be involved in meaningful tasks that emphasize communication, social interaction, critical thinking, creativity, collaboration, and reflective thinking skills. Providentially, many research studies proved that technology can enhance students' twenty-first century skills and practices, which can stimulate educational reforms. Further, many educators have showed positive significant outcomes of educational technology use in learning. For example, (Kessler, 2017; Terrell, 2011) found that the effective and efficient integration of technology could transform traditional classroom environment to student centered, where students collaboratively work with the teacher to achieve individual, pair, and group learning objectives.

Nevertheless, the probability that technology will be adopted and used efficiently and effectively by teachers is low; this is the case even though many education institutions continue to spend large amounts of money on updating hardware and software. According to the literature, this low probability often stems from the lack of professional development on why and how to use educational technologies.

In this session, I will present an innovative model for teacher professional development with the use of technology that is inspired from Rogers' Diffusion of Innovation Theory. I developed this model to understand the decision making process that teachers need to go through in order to convince them to adopt technology. The model would also help facilitators and policy makers understand the process behind diffusing educational technology in low tech areas. In return, this would help policy makers in achieving a better educational reforms when they know how to understand their teachers' innovativeness and how based on that, they would convince them to adopt technology to meet the twenty-first century needs and skills.

This model for teacher professional development fills a gap in the education technology field. It offers a strategy that consists of two stages to be considered when implementing technology professional development. Each stage in the strategy was designed to address key issues acknowledged in Diffusion of Innovations Theory, yet was effectively renovated by the researcher, the presenter of this session. In the first stage, persuasion "why", knowledge "what" and practice "how" are the key issues that were addressed. More details on how to explore the why, what and how will be shared during the session. The second stage sustains teachers' development with the use of technology

through creating an enabling environment or community of practice for teachers to grow with the use of technology. Three interrelated factors should work together to achieve this second stage. Both stages constitute the essence on which the model is based upon. Implementing the idea of this model effectively would contribute in bridging the technology gap between high and low-tech areas here in the United States and elsewhere. The model is accepted for publication in SYSTEM Journal, one of the prestigious journals in the education field. It will be published in Fall 2018.

The case of Anahuac University (Mexico) interdisciplinary approach to Sustainable Development Research, Education and Practice

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Purpose

The case study pretends to demonstrate how sustainable development initiatives can be incorporated into research projects, educational programs and practices in universities. The study initially analyzes different approaches that universities around the world have made to diversify the types and forms of learning: integrated syllabus, inter-faculty classes by related schools, conferences, virtual classes, interactive practices with companies, and case studies to improve the learning environment.

The goal is to demonstrate that interdisciplinary approaches can work to raise more awareness in university directors, professors and students of the importance of sustainable development goals for their professional development.

Many foreign and national companies in Mexico have begun to incorporate more sustainability goals, as well as the new GRI Measurements, ISO Sustainable Approvals, and World Compact Guidelines into their operations. and require qualified personnel in these areas. It is crucial to teach new ways to measure social, environmental, and economic impacts at all levels. Universities are the source for research material on the subject and can provide qualified graduates to manage these new areas in the private and public sector in Mexico.

A case study will be made of the Anahuac University in Mexico who has incorporated many sustainability and social responsibility subjects to its bachelor level economic courses, as well as in the postgraduate curricula. The university has created in recent years Social Responsibility programs at the bachelor, masters and PhD levels. The project will also study how the different schools of the Anahuac University, particularly the Economics and Business School, the School of Sustainable Engineering and the School of Social Responsibility, have incorporated interdisciplinary approaches. The main idea is to analyze how the different schools include sustainable development and social responsibility concepts to the main economic and finance department curricula, to increase professors and student's awareness on the subject. The objective is to break the traditional silos in these fields.

The Role of Student-Led Organizations in International Development

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Engineering sustainable solutions to the world's injustices requires an intricate network of stakeholders all brought together by a similar vision. These stakeholders include humanitarians, industry professionals, academics, financial backers, and, most importantly, the community members who are exposed to these injustices on a daily basis. Information regarding both the needs of the community and the implementation methods of proposed solutions can easily get lost as it ricochets between parties. Furthermore, project sustainability falls into a state of jeopardy when community relations with relevant parties, as well as proper lines of communication are not maintained.

Concurrently, universities the world over are becoming home to service organizations which allow students to take an active role in international development projects. These organizations are uniquely situated to allow for remediation of the aforementioned shortcomings in the development information chain. At Clemson University, the student organization, Clemson Engineers for Developing Countries (CEDC), has developed a program model which allows it to serve as a nexus for domestic and international stakeholders alike.

Founded in 2009, CEDC began by assimilating into an existing partnership between the domestic organization, the Episcopal Diocese of Upper South Carolina and the international NGO Zamni Lasante. The purpose of this partnership was to provide technical expertise needed to repair and renovate a water system in the village of Cange, Haiti. Along with both industry professionals and Clemson faculty advisors, CEDC students provided engineering consultation and construction oversight on what would become the first chlorinated municipal water system in Haiti.

Over the past nine years, CEDC has evolved in response to the necessity for a go-between for funding partners, academia, researchers, and those within communities seeking aid. This growth has been accomplished primarily due to CEDC's internship program which utilizes student interns as field engineers and allows for sustainability of a long term, trusted relationship between CEDC and the people of Haiti's Central Plateau. Additionally, this sustained presence has enabled for a proper understanding of community capabilities and an appropriate context for developing solutions in tandem with the community.

University-wide response to the Well-being of Future Generations (Wales) Act

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The Well-being of Future Generations (Wales) Act of 2015 is the first of its kind in the World, where the well-being of future generations is considered at the heart of Welsh Government decision making. The Act ensures Wales will make a positive contribution to the achievement of the UN's global Sustainable Development Goals (SDGs), through its seven SDG or Well-being Goals (WbGs). It is still early days for the Act, however it is important that Welsh universities respond to the Act and put in place activities that support staff and student engagement through learning, teaching and research activities. In this paper, student and staff focussed activities lead by the University of Wales, Trinity Saint David (UWTSD) and its Institute of Sustainable Practice, Innovation and Resource Effectiveness (INSPIRE) are presented and discussed in detail, including how this work feeds back into wider delivery of global SDGs.

Using structured dialogue to break down disciplinary silos

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The theory and practice of sustainable development gives rise to many challenges, not least, how to achieve effective communication among the various disciplines involved. The absence of effective communication can lead to a lack of mutual understanding. In a given development initiative, we might wonder whether the different actors involved share an understanding of the concepts of development and sustainability? Do they coordinate their thinking about the impact of decisions on the communities that are the principal beneficiaries of their work? We submit that structured dialogue about these and other issues that undermine deep, mutual understanding within and across disciplinary departments, and other entities at universities can improve the effectiveness of sustainable development efforts. We also believe that academics can and should be allies with development professionals.

Within and across disciplines, there is a need to generate a space for critical reflection and dialogue about the values and beliefs that influence development decisions. This dialogue can support identification of potentially damaging differences and enhance communication by enabling colleagues to see the development landscape through each other's eyes. The Toolbox Dialogue Initiative (<http://toolbox-project.org>), an example of engaged philosophy, offers an innovative, concrete, and tangible approach to critical dialogue that can help in two ways. First, it can generate a space for critical dialogue within disciplines about issues that matter to them; second, it can enable discussion and analysis of specific concerns that afflict those working in the research, teaching and practice of sustainable development, such as conflicting assumptions, power dynamics, implicit biases, ethical issues, and epistemic injustice. Rooted in philosophical analysis, Toolbox workshops enable cross-disciplinary collaborators to engage in a structured, reflexive dialogue about tacit assumptions that constitute the worldviews which frame their practice.

The Toolbox Dialogue Initiative (TDI) is a US National Science Foundation-sponsored effort based at Michigan State University that offers a philosophical yet practical enhancement to cross-disciplinary, collaborative research and practice in the form of dialogue-based workshops. The Toolbox Dialogue Initiative has conducted more than 260 dialogue-based workshops on five continents, involving more than 2500 participants. This presentation will offer an introduction to TDI, and share some experiences to date. Our claim is that TDI is an imaginative interdisciplinary approach to

breaking down silos for those working in sustainable development research, education and practice.

Youth Climate Leaders Program Empowers Youth to Tackle Climate Change

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Climate change, like white walkers from the 'Game of Thrones' television series, is something too big, complex and out of our daily lives' concerns. To really understand it, one must see and feel it for oneself. Therefore, to build the next generation of climate leaders, we have designed a unique experience: one trip around the world to learn more about climate change in theory, understand it in practice, and work on hands-on projects with other young people.

This first pilot will have three main components: (1) a 40-day immersion in Paris, France, and several cities in Kenya for 20-35 people from all over the world; (2) three-month tailored field placements from September to November; and (3) a one-week trip to the 24th session of the Conference of the Parties (COP 24) to the UNFCCC in Katowice, Poland. At each destination, participants will meet with key local organizations, universities and community leaders. They will also have free time to experience the country and connect with each other, building lasting relationships and a community of climate champions.

During the week, participants will work part-time on a common group project and attend lectures about climate science, international cooperation, climate finance and other topics at which Youth Climate Leaders (YCLs) must excel. Given that practical and academic knowledge is not enough to foster leadership, the program also includes individual and collective coaching to help YCLs to discover more about themselves, and put their knowledge at the service of others. They will then be ready to go back to their countries, or explore other ones, to work on climate change mitigation and adaptation issues. The organizers will build partnerships with a series of organizations worldwide to ease the relocation of YCL alumni, who will be part of a living community of practice.

Our mission directly contributes to SDG 13 (climate action). We will also explore the program's links to other SDGs through our academic curriculum and country visits. Our work has a direct impact on quality education (SDG 4), employment opportunities (SDG 8) and partnerships for the Goals (SDG 17). This year's group project will focus on sustainable agriculture (SDG 2) and land use (SDG 15). We will support Endezeza, a non-profit organization seeking to promote human and community development through education, empowerment and sustainability, in scaling its 'Sustainable Primary School' program in partnership with reNature Foundation, which helps farmers to change their production method to a sustainable agroforestry system. Planting onions (yes, onions!) in the school yard already generates sufficient income to ensure free food and education to 250 students from the Primary School of Mugae (Meru County, Kenya), and allows to invest in other improvements in the community.

With this group project, YCL participants will have the opportunity to see their impact at the local level, and to support Endeleva in replicating its model in other regions through global partnerships. The group project contributes to the achievement of our main objective: to empower young people worldwide to have a global impact on climate change through their integrated local activities.

With the YCL program, we want to shift the image of young people as “leaders of the future” to the “leaders of today.” Our main goal is to empower a diverse group of young leaders from all over the world with leadership and entrepreneurial skills to be used right now to address climate change. Young people today are more concerned about sustainability and climate change issues than previous generations, but that does not mean that their behaviors and lifestyles are in accordance with the beliefs they hold on those topics.

Since the program involves participants from different countries who will travel a lot, the carbon footprint from transport emissions is a concern. To offset it, at the end of the program, we will calculate the amount of CO₂ released, and offset it by planting trees in partnership with Plant-for-the-Planet, an international foundation that organizes tree plantings led by children and young. Additionally, we will only provide vegetarian meals at our events and, whenever possible, use bicycles to commute. In that way, we will not only promote sustainable transportation and meals, but also invite YCLs to “walk the talk” and lead by example.

Collaborative Arts & Culture to Help Achieve the SDGs

Art and education - comic book language to dialogue with young riverside communities

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The comic book "DICARA friends - Against Global Warming", aims to serve the teenagers and young Integral Development Program for Children and Adolescents in the Amazon Riverside (DICARA), from the Sustainable Amazon Foundation - FAS.

The project aims to address SDG 3 (Good Health and Well-being), 11 (Sustainable Cities and Communities), 12 (Responsible Consumption and Production) and 13 (Fight against climate change), in a young language for the riverside communities of the protected areas of the State of Amazonas - Sustainable Development Reserve (RDS) Uatumã, RDS Juma and RDS Amanã.

It is necessary to dialogue with the youth about climate change and global warming, who this affect life in the Amazon, and how the pollution generated by human practices, including the uncontrolled burning of the small farm, influence these processes. The most important thing is to empower the riverside youth so that they know their rights and duties, with regard to land use, and how it contributes to the maintenance of the standing forest.

In this sense, the comic book addresses issues such as management plans form the Protect Areas, gas and tree life cycles, as well as practices such as the production of firebreaks before burning (aceiros), the selection of capoeiras and abandoned areas for planting and agroforestry systems for crop optimization. For a smooth and didactic dialogue, the idea is to arise as a playful tool of storytelling.

The material was able to express the true caboclo lifestyle, with its speech, its objects, its flavors, challenges and customs. From the details of the houses to the local types of fruit, the whole composition was thought from a riverside context for the adolescents to recognize themselves in the narrative.

In addition to entertainment, the expectation is that the content of comic book can be used and exploited mainly as a didactic resource for adolescents, because the intention is that these are multipliers of knowledge in their own communities. There are many possibilities of use: rounds of conversation, theater, poetry or music production.

Synopsis: After being sad to lose the açaí crop of his family, Kaka will live with his friends, Ana and Joca, adventures that will make them know more about the impacts of

the human activities in the climate of the planet and how the fires production can be made in a more sustainable way (aceiros). Dona Maria and Seu Raimundo (Ana's grandfather and uncle) will share with the children knowledge of the past and important future practices along this journey, with Tonho, the Kaká Jabuti, a faithful mascot of the story!

Education in Art: Recovering the possibility of experience.

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In a world running at absorbing speed towards globalization and standardization of behaviors, Art educational processes are oasis for recovering the possibility of experience. Let's understand experience as a realm where the individual or a community develop affections, feel intensities and get profound perspectives regarding existence.

Colombia is a country with an extremely robust network of artists and Art Schools. Art schools are places for the development of sensibility and critical viewpoints.

This oral presentation will address some experiments in Art educational processes in Colombia (of which I've taken part as a professor and facilitator -- one of them the ENEA - Encuentro nacional de estudiantes de arte - national gathering of art students, led by Claudia Supelano, Professor of Universidad del Tolima) and will examine (through the gaze of a fraction of the whole system) the role Art and Art education may play in Colombia in terms of sustainability, highlighting the fact that critical perspective and sensibility are the basis for sustainable social structures.

Conserving Cultural Landscapes through Sustainable Tourism in Cinque Terre

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The intensification of mass tourism is causing extensive degradation of natural and cultural landscapes throughout the world. Cinque Terre, Italy, an area of exceptional scenic value and cultural heritage, has been declared a national park in order to mitigate effects of unsustainable tourism and other wicked sustainability challenges. Whilst evidence suggests that national parks effectively enhance environmental sustainability, anthropologists have highlighted the potentially perverse outcomes of top-down policy on social and economic sustainability. The strong interlinkages between the United Nations' Sustainable Development Goals highlight the fundamental need to breakdown silos in order to meet individual targets. The tourism industry has the potential to generate sustainable livelihoods whilst reinvigorating local cultural identity if managed appropriately through interdisciplinary collaboration. Drawing upon the triple bottom line paradigm as an analytical framework, the aim of the present study was to assess the sustainability outcomes of national park designation in Cinque Terre. Concurrently, it sought to draw upon community consultation techniques and conduct a stakeholder analysis in order to design a sustainable tourism project that complements the environmental objectives of the national park whilst increasing community engagement, diversifying local livelihoods, and protecting the unique cultural landscape of Cinque Terre. Data was collected via field-based ethnographic approaches (observational research; community interviews). A metric based on Harding's principles of sustainability was developed to evaluate findings. Results indicate that whilst the national park is meeting environmental objectives through reforestation and biodiversity conservation, it is failing to promote income diversification. Thus, it is likely to expedite rural-to-urban migration and subsequently compromise social sustainability. Social sustainability is further impacted by a dearth of policies to redress the impact of mass tourist arrivals. Stakeholder analysis indicates that sustainable tourism has the potential to attenuate development tensions. The proposed program would introduce ticketed entry into Cinque Terre thereby reducing the overall volume of tourists and diverting tourism income away from multinational tourism providers towards the national park. Built-in financial incentivisation of longer visits has the potential to reduce the disruptive effects of 'day-trippers' and promote cultural tourism. The project would offer tourists a variety of activities designed to increase awareness of sustainable development, including volunteering to restore degraded agricultural land and opportunities to participate in gastronomic events, sustainable living festivals, cooking schools, maker's markets, and farmers markets that capitalise on Italy's existing Slow Food movement, foster local entrepreneurship, and promote cultural continuity. Crucially, it would also ensure equal distribution of benefits from the tourist industry. Visiting the Cinque Terre would become a transformative journey. Cultural tourists would be encouraged to maintain a travel diary in order to reflect and critically consider one's personal impact, as well as the need for sustainable development. Ongoing monitoring and evaluation will be crucial during project implementation. Impact assessment will be a participatory

process to ensure that the community is a key beneficiary in all development initiatives designed to achieve triple bottom line sustainability in Cinque Terre.

Enhancing the travel experience with art and culture

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The Sustainable Development is one of the main global challenges and one of the key factors to include is the rail transport. The rail can be part of the solution to these challenges because of its advantages, as the most sustainable mean of transport. The railways have the environmental lowest external costs referring to transport passengers and freight.

In this context, the railway companies are implementing hundreds of cultural projects all over the world. This presentation aims to show Collaborative Art and Cultural projects at stations in more than 20 countries, its benefits and synergies, all of them related with the Sustainable Development Goals.

- Stations can serve much more than a transportation function; it can be a new scenario for Collaborative Art and Cultural projects
- Stations as a place for community interaction, an option to promote a diversity of cultural activities.
- Stations as a potential culture boundless and sustainability.
- Stations can contribute to policies, strategies and programs to a sustainable cultural development, working together with local, governmental and non-governmental organizations and cultural actors.
- Stations can bring together private companies to participate in these Collaborative Art and Cultural projects
- Stations reutilized and reinvented as Cultural Centers, public libraries...
- Stations as a work of art and as a container of art and culture
- Stations as a cultural icon of the city
- Stations promoting visual and cultural literacy
- Stations with Art and Cultural projects can lead to decrease local vandalism.

The concept of station is changing continuously, evolving and adapting to the new needs of passengers and cities, always to improve this sustainable transport. Artists are invited to take part in construction project teams, as well as, urban planners, engineers, architects, and experts in transport. There are several studies showing the importance of Collaborative Art and Culture in our daily travel experience.

Stations combine the skills of artists with those of railways engineers, transport planners and architects. The aesthetic excellence and the technological innovation working all together to attain the Sustainable Development Goals.

Collaborative Art and Culture have a wider, measurable impact on our economy, health and wellbeing, society, cultural literacy and education.

Start Spreading the News

Submitter: Nic an Bhaird, Máire

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AgroCycle is a Horizon 2020 funded research and innovation project addressing the recycling and valorisation of waste from the agri-food sector. The AgroCycle protocol is to deliver a blueprint for achieving sustainable agri-food waste valorisation addressing the European policy target of reducing food waste by 50% by 2030 while also, contributing to the wave of change that is occurring in China in relation to sustainability.

AgroCycle has identified the relevance of children as global citizens, and as stakeholders in the circular economy conversation and is dedicating a section within their online platform to them, entitled AgroCycle Kids. This is a child centred online resource focusing on translating the scientific concepts of the AgroCycle content into accessible language for use in the primary school curriculum. AgroCycle Kids is inviting child participants to look at the world in which they live through a critical lens. This is current and vital, as experts globally strive for sustainable development. However, to leave this conversation in the hands of adult citizens alone would be futile. Children are change makers, influencers, and they too are guardians of the planet which is merely on loan to all of us.

AgroCycle Kids embodies the essence of the sustainable development goals of the United Nations. This paper will highlight the importance of deliberative democracy in the primary school education system in addressing these goals, while exploring the action research conducted in 3 primary schools in Ireland in order to illustrate for the audience how the content for AgroCycle Kids was developed. The researchers will show the impact of the dissemination of the AgroCycle content by the children within their peer groups and families and how their mindset changed over the course of the bespoke AgroCycle Kids programme. The research was conducted using an arts based narrative, which will be demonstrated to the audience. The AgroCycle mission to reduce agri-waste for sustainable development was shared with youth for the first time in the Irish education system. This research in schools is underpinned by the Froebelian philosophy which emphasises the connectedness between living and non-living things and examines the relationship of humankind to nature. This resonates deeply with many of the sustainable development goals. Although beginning with agri-waste, the research has sparked dialogue around broad waste valorisation and minimisation in many systems. It crossed over into areas in the children's lives, from agri-waste to domestic food waste, to rethinking how we look at 'waste' in general. The action research conducted in schools therefore, has nurtured innovation and creativity skills in the children and their teachers, and culminated in an opportunity for the children to design for sustainability. This paper will start spreading the news about AgroCycle's novel inclusion of our youngest European citizens and their role in the sustainable development movement.

The Moroccan Approach: Integrating Cultural Preservation and Sustainable Development

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Morocco's approach to implementing projects that preserve its multicultural identity integrates opportunities to advance sustainable development. The strategy is to identify ways to not only preserve culturally significant locations and knowledge, but to also advance livelihoods, health, and education. The restoration of the Jewish cemeteries in Morocco, and growing adjacent to them community fruit tree nurseries, provide a vivid example of this model of linking multiculturalism and sustainable development. A different example involving the restoration of the historic mellah neighborhood in Marrakech presents the need to better galvanize community participation. Project experiences in the city of Essaouira will be introduced to help further illuminate themes. Finally, the essay provides recommendations to improve the application of Morocco's cultural-development integrated model.

The primary methodology for data gathering in this essay is direct observation and, in some cases, the author's participation in the cultural and development projects and programs discussed. Community data regarding the development priorities of the residents of the Marrakech mellah was generated through the High Atlas Foundation's (HAF) facilitation of participatory methods, community mapping, and pairwise ranking. (The HAF is a Moroccan-US nonprofit organization of which the author is president.) The cultural-developmental projects analyzed are also considered within the context of Morocco's related national policies and strategies.

In addition, the evaluation of the multicultural projects' efficacy, the opportunities for preservation and development that they present, and challenges that they experience are based on a combination of the author's engagement with these initiatives as well as literature research. The purpose of the essay is to present: (1) the Moroccan model for cultural preservation and recommendations for its improved implementation; (2) the ways this multidimensional strategy unfolds in a Moroccan experience, associated with the High Atlas Foundation in Essaouira and Marrakech; and (3) a pathway for other nations for multicultural action that improves people's livelihoods, education, health, and empowerment.

Morocco offers powerful and exemplary models for sustainable and shared growth, driven by the participatory method. Thankfully, the participatory approach is codified in its laws, policies, and programs. However, it is often a challenge to effectively achieve broad-based implementation in close accordance with the participatory vision that has been set forth to guide such actions. This is primarily because the skills to organize and facilitate local collaborative planning are not well enough dispersed, also existing within an overall system of centralized decision-making, that is in ways improving.

Morocco needs a corresponding management model to advance human development. Central to a new model for implementation is training members of civil organizations, local government, teachers, and local residents—the members of society who interface with communities—in facilitating participatory democratic methods for planning and managing development projects. And here, training is most effective when people learn by doing, through applied experiences.

Tourism potentials of Oranyan Festival and creating awareness on SDGs in Nigeria

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The world has become increasingly competitive, especially in this global spectrum. Everyone goes for the best which becomes a question to be answered by art and culture (tourism industry). This motivates an examination on the celebration of Oranyan festival on how to motivate and achieve the SDGs and its potentials. Urban and rural areas rich in cultural heritage and with a vibrant creative sector are more attractive for businesses. Culture is who we are, what shapes our identity. Placing culture at the heart of development policies is the only way to ensure a human-centered, inclusive and equitable development.

The methodology employed in this study is qualitative and descriptive ethnography. Methods of data collection include participant observation, key informant, in-depth interview and focus group discussion. Tape recorder, notebooks, pen and camera were used as research instruments. The data collected were analyzed using content and interpretive descriptive analysis.

The study found out that Oranyan festival is not all about dancing, singing, eating alone but that which adds values to lives of the local people and community in general. Such values are free health care services, education, gender equality, trade mission and general development that are of benefits the people.

Among others, the study recommended that there should be more publicity for the festival nationally and internationally to attract people into what the festival entails, awareness of SDGs and to see the benefits in other to add more value to the life of the people. It is also suggested that government should put more effort in assisting and promoting the festival in other to achieve the purpose of the cultural festival effectively.

Promoting inclusive and sustainable economic growth through employment in culture and creativity encourages decent work. More so, adequate security assurance should be put in place before, during and after the festival to keep the lives and properties of the people safe.

Key words: Cultural Festival, Health Care, Tourism Potentials, Promotions, Art & Culture SDGs.

What's Law Got to Do With It? Legal Preparedness for Delivering the SDGs

Empowering values-driven innovators for policy change: An Australian University 2018 case study

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Introduction

Core to implementing the UN Sustainable Development Solutions is the recognition of the specific cultural needs of local stakeholders and empowering appropriate policy change. At Monash University, I co-founded a social-enterprise which offers an innovative solution to an escalating ecological problem. The pipeline we constructed to change our societal microcosm offers vital lessons for sustainable impact at large. Our success stems from the fusion of people-focused, values-driven behavioural change, with legal and policy support.

Problem

The UN recognizes a global need for change in human behaviour to perpetuate a sustainable and socially equitable planet. All seventeen SDGs aimed at combating world poverty by 2030, demand practical, educational and political actions. I propose that the innovative strategies for change that we adopted at our university, offer a model that can be extrapolated globally. Our project focused on a practical approach to changing consumer behaviour on campus in order to reduce non-recycled waste.

We chose to target the university community's most cherished culture: coffee consumption. We adopted a problem-solving approach to identify a convenient, financially sound and sustainable solution to single-use, beverage container waste. Our targeted stakeholders included users, coffee vendors and suppliers. Through their engagement, we sought to identify drivers of change, parameters of supplier and consumer convenience and financial incentives.

We hypothesised that behavioural transformation could be instigated to reduce non-sustainable waste through a convenient and financially sound approach: exemplified through the specific application to 'takeaway' coffee cups on campus. We predicted successful implementation of change would be founded on generating a people-driven, sustainable community, with a sense of responsibility for consumption.

Methodology

In our university model, through experimentation, failure and learnings we ascertained our metrics, our data, and the accessibility of the solution. The proposed solution struck a balance of shared value for all stakeholders. To accelerate the implementation of this scheme, evidence-based, proof-of-concept was required to secure funding beyond the start-up support secured from our university.

Implications

Our pilot results were resounding: a 75% conversion rate from the single-use to the convenient and sustainable solution. Translation to a university-wide scale up, from the weekly 25,000 cups sent to landfill, a conservative 6,250 will remain. Applying enhanced incentives, infrastructure and subsequent conversion rates, Australia's annual disposable of 1 billion coffee cups in landfill will soon diminish.

This pilot generated more than just a sustainable solution for coffee consumption. It created awareness and a community. While empowering a student body to care and to act, it proved a concept to the regulatory body; that people-oriented change leads to values-based actions. These principles are transferable across cultures, space and time. With a caring community and regulatory and legal backing, goals and milestones are not imposed, they are celebrated.

Recommendations

Delivering the SDGs requires an understanding of the legal, political and cultural sphere. It requires an innovative community: through inclusive incubators, and accelerators. It requires revised curriculums for empowering education. It requires legislated equality for all people. The SDGs require the groundwork for a global network of problem solvers.

Enhancing legal preparedness to effectively address gender-based violence and deliver on SDG 5 and SDG 16

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Legal preparedness, in this paper, includes having comprehensive laws, competent authorities who draft, implement, and interpret the laws, practitioners who provide legal assistance to those who need it, and critical information shared with communities on their rights, laws, and legal systems. While legal preparedness is recognised as an integral component of public health preparedness its' importance spreads beyond that. It is essential for the effective deliverance of all of the sustainable development goals (SDGs). This paper will examine legal preparedness to address gender-based violence (GBV).

GBV can be defined as “any act or threat of harm inflicted on a person because of their gender.” Laws and legal frameworks addressing GBV and ensuring access to justice for survivors of GBV are of paramount importance in preventing and responding to this problem. They are vital to SDG 5: Achieve Gender Equality and Empower All Women and Girls. and SDG 16: Promote peaceful and inclusive societies for sustainable development, provide access to justice for all and build effective, accountable and inclusive institutions at all levels. While accurate statistics on the prevalence of GBV are difficult to find, there is growing consensus that it is a universal and wide-spread problem.

Currently, domestic laws in many countries are insufficient to address GBV. For example, 49 countries lack legislation protecting women from domestic violence. Further, GBV laws are inconsistent internationally. Domestic laws vary in their definitions of forms of GBV, ages of consent, and prescribed punishment and sentencing. While international law provides a more progressive and comprehensive account of GBV than some countries, it is rarely applicable to hold perpetrators of GBV to account.

This paper argues that legal preparedness in relation to GBV needs to be enhanced locally, nationally, and transnationally. It proposes practical solutions for addressing GBV and achieving the related SDGs 5 and 16 at the local and national levels. Firstly, national laws should be critically examined with reference to transnational and international law to assess the adequacy of legislation defining and criminalizing types of GBV. What can different countries learn from each other in their GBV-related laws? Can international law fill the gaps for countries with limited laws addressing GBV? Secondly, the implementation of GBV legislation by competent authorities should be examined at the local and national levels. This can be done through investigating the

numbers and content of GBV-related trainings for relevant authorities (e.g. police officers, prosecutors, judges), numbers of reported GBV cases, how these cases were handled, and conviction rates. Thirdly, the availability, accessibility, and adequacy of legal aid for survivors of GBV should be assessed locally and nationally. Finally, the awareness of communities of their rights and the available legal frameworks and remedies should be measured for example through focus groups in local case study contexts.

This paper seeks to highlight the important role the law can play in achieving the SDGs through providing a roadmap on enhancing legal preparedness to prevent and respond to GBV, a critical component of SDGs 5 and 16.

Entitlements and permits and licences! Oh my!

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This presentation addresses the implication of nuances within policy discourses on cockle entitlements held by fishermen within the inshore fisheries area of The Wash Estuary Embayment, North Norfolk, UK.

Using “entitlements”, “permits” and “licenses” interchangeably is creating problems for fishermen and regulators alike. Lack of clarity regarding fishing rights has practical, operational and management problems for both parties. For example, fishermen are unwilling to engage with the policy process because they are concerned about where and how to fish in fear of prosecution leaving them frustrated with the system. However, involving fishermen in decision making is one of the functions of local authorities.

A broad understanding of an ‘entitlement’ is that it permits a fisher to fish in UK territorial waters up to 200nm. An entitlement to fish in the Wash Estuary Embayment is a permit system based on property rights for aquaculture and naturally harvested fish administered under The Wash Fishery Order (WFO), 1992. The WFO is a regulatory instrument issued to the EIFCA, as custodians, to manage cockles and mussels in the Wash. It complements the Sea Fisheries (Shellfisheries) Conservation Act, 1967, in the sustainable exploitation of fisheries and shellfisheries. Unlike mussels, cockles are ubiquitous and plentiful. As such, the WFO limits the public’s right of fishing for mussels in privately leased lays for aquaculture (several order). A regulating order deploys comprehensive management and licensing schemes for public rights to cockle fish. The Wash combines the two Orders under a Hybrid Order providing management for both cockles and mussels. The Eastern Joint Sea Fisheries Committee (now defunct EJSFC) first configured the WFO in 1992 for a period of up to 30 years - due to expire in 2022.

Through conducting 30 semi-structured interviews with inshore cockle fishermen and the Eastern Inshore Fisheries Conservation Authority (EIFCA) in Kings Lynn and Boston, UK, imply that there are problems stemming from poorly defining entitlements, licenses and permits, hereafter ‘rights’.

The analysis unpacks the meaning of rights within the WFO policy documents; illustrates how fishermen and EIFCA officers work with the current understanding of cockle rights and discusses the implications of this. The evidence highlights the need for clarity on administering fishing rights within policy processes. This research comes at a critical point when the WFO is due for review. There is danger that the Order may terminate. However, if renewed, fishermen have an opportunity to shape how they talk about cockle fishing rights in the Wash for the next 30 years.

Parliamentary Caucuses and Networking: Strengthening the Defenses to Combat Wildlife Crime through Legislative and Policy Reforms

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Effective wildlife law enforcement and prosecution in Southeast Asia requires an optimal legislative and policy environment, which commits to the protection of endangered wild flora and fauna within ASEAN and beyond its borders, and which provides for significant penalties for infringements. Despite the clear need and multiple top-level commitments, strengthening of wildlife laws remains a low political priority in the region and remains side-lined on the legislative agenda. Other laws that are applied to organized crime in drug, human and arms trafficking are sometimes appropriate for organized wildlife crime, but are not being applied as such. By elevating the issue of wildlife crime and wildlife law reform, partners can assist champion Members of Parliament (MP) to gain a solid legal foundation, to fully enforce wildlife laws that will help catalyse a significant shift in the regional trade context. Strengthening relevant laws and their enforcement remains the biggest challenge ahead, but represents a crucial strategy to create effective deterrents for illegal wildlife trade, and dismantle the criminal syndicates behind it. Legislators and policy makers are vital in the fight against wildlife crime, specifically through their support in strengthening national laws, and the development of region-wide regulations. Legislators also decide on budget prioritization for line agencies combatting wildlife crimes, and elevating this issue to a higher level could result in additional funding being allocated across the region to more effectively combat wildlife crime.

Legislation is the most powerful tool to protect, create or sustain biodiversity protection efforts. A well-crafted wildlife legislation also ensures that enforcement actions are well appropriated, inter-agency cooperation is institutionalized, regulatory frameworks are established, and constituencies are consulted. It is the most powerful way to underpin the achievement of a policy.

USAID works with parliaments and parliamentary networks, such as the ASEAN Inter-Parliamentary Assembly (AIPA) to educate and provide research support to develop model legislations in the region. In 2016 and 2017, AIPA convened specialized Wildlife Protection Working Groups under their AIPA Caucus platform, working towards harmonized and strengthen legislative response to combat wildlife trafficking in the region.

Projet de loi Interdisant la déforestation en Haïti

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Legal preparation for the achievement of the SDGs

In Haiti, one of the regular activities that undermine sustainable development is deforestation. Because of the acute level of poverty that plagues the population, 80% of people use charcoal as energy to prepare their food. This subsistence practice encourages the massive felling of trees and this is not without consequences for the environment and the future of future generations. This excessive destruction of forests is at the root of repeated floods, erosions and other natural disasters that are attacking us today.

What legal preparation is needed?

There is no law prohibiting the wrongful felling of trees and no penalties.

To remedy this great scourge that destroys our environment continually, as a student researcher in law, I propose a law prohibiting the systematic felling of trees in cities than in the countryside.

Art 1- In summary this law stipulates: It is absolutely forbidden to anyone to fell trees or induce deforestation for any reason whatsoever.

A penalty of 3 years imprisonment and 10,000 gourdes fine will be required as a penalty to anyone who passes the ban.

After sensitization sessions, a forest policy will be formed to force the application of this law.

This law is not intended to aggravate the situation of the population who must eat at all costs but to make a sacrifice in order to preserve our great common good which is the environment. As a result, another energy will be used to replace the charcoal. Renewable energy that can not only help the current generation survive, but without compromising that of future generations. Until this measure is effective, so that the population can hold, the wood used for charcoal will be replaced by another very special and easy to grow variety. Said in 3 months it will be mature enough to be used.

Only state authorities will be able to slaughter it, provided that it is replaced immediately. This will be an alternative pending the effectiveness of the measure.

This law will be the surest way to reduce the degradation of the environment caused by the systematic removal of trees for personal survival purposes. (Charcoal, board ect ..)

The law is an important and important instrument for achieving the goals of sustainable development. Almost every measure where intervention requires a writing in advance, a clause between the leaders and the directed so that it is not arbitrary and then challenged.

In our case, this law will be a pact between the Haitian State and the citizens. Once this has been promulgated so that no one ignores it, it will clearly explain the clear will of the two parties to protect their environment by ceasing deforestation and submitting to responsible institutions, namely the forest protection police.

Until this measure is fully effective, the State must provide assistance and protection to the most vulnerable and those who live exclusively from this practice.

Through lectures, debates, at the University and in the media, I will raise awareness about the need to adopt this law and put an end to this archaic practice that destroys our forests our environment.

Promoting SDG among Brazilian lawyers: SDG adoption in Ordem dos Advogados do Brasil (OAB)

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The Ordem dos Advogados do Brasil (OAB) regulates the professional practices of all lawyers in Brazil. The organization presents similarities with American BAR Association (ABA). The organization was founded in 1932. In the Rio Grande do Norte State, where the study was done, OAB presents 96 employees and 12.997 affiliates and 59 councilors. As a methodology to create an awareness related to SDG, Sustainable Development were presented and debated with councilors and employees. Then, were evaluated how the OAB would practice the SDG. As results, some actions developed related to SDGs: Goal 1: promoting trainings related with human rights in public schools; Goal 2: in the OAB courses, acceptance of food to be donated to poor communities; Goal 3: Health committee and vaccination campaign; Goal 4: committee to defend the disabled people and campaigns to donate school supplies promoting new education opportunities. Goal 5: actions to promote diversity and tolerance in the law work field and women professional empowerment initiatives; Goal 6: human rights committee; Goal 7: committee to discuss federal, state and municipal law related to energy sector; Goal 8: Courses to develop new skills and promote new opportunities to state lawyers; Goal 9: Control of public actions related to National policy of Solid Waste; Goal 10: human rights committee actions associated to Black Lives Matter Social Movement and society awareness; Goal 11: Operation of environmental committee Goal 12: initiatives to encourage responsible consumption and encouraging the use of electronic documents avoiding prints; Goal 13: studies and seminars done by environmental law committee; Goal 14: debates and actions about pollution and water savings; Goal 15: sustainability guidelines to lawyers offices; Goal 16: Lectures and conferences with cancer patients and family; and Goal 17: public actions to promote social and environmental sustainability awareness. The OAB also promote public calls and audiences to discuss many topics related of sustainable development elements, justice and law. One of this debates promoted was related to water scarcity and strategies and actions to supply. A great challenge is consider how the SDG will be shared among the lawyers community. How SDG will shared and communicated? How would be possible guarantee the implementation of SDG in society? A next step will organize a program of seminars to discuss this topic.

The Age of Globalisation; Repositioning Nigerian Laws for Contemporary Cooperative Challenges

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This study is a preliminary report of findings on ongoing research works which results will come out in volumes. It is at best, the product of a bold attempt at exploring the interplay between cooperative principles and some basic elements of Nigerian law, with a view to providing a lead to further more inclusive research on the interplay of cooperative principles and the entirety on the Nigerian legal system. It seeks to situate principles upon which Nigerian cooperative societies operate, and Nigerian Laws, within the realities of a globalized capitalist economy, and the actualisation of the Sustainable Development Goals ,SDGs.

Cooperative activities have been part of Nigeria since time immemorial. It has played meaningful economic and social roles and contributed in no mean measures to national development. However, recent trends that cuts across various spheres; economic, social, political, national and international, principal of which is globalization has caught the cooperatives unprepared. It took its toll, and made them vulnerable, thus reducing the strength in their relevance. However, Nigeria's poverty and development challenges, a reflection of the failure of government, demands alternatives to governance, which is at best found in the cooperatives, their structures, mileage and wide acceptance across various divides in Nigeria.

Although the cooperative societies enjoy wide and growing acceptability, the contrast is the case in terms of the legal framework upon which they operate. The laws upon which cooperative principles are to derive their legal strength for operations and implementation are rather weak in the face of the fast paced, simultaneously complex, capitalist economy.

Using the research method of description analysis of the relevant statutory provisions and data this study makes three justifiable claims. First claim is that successful cooperatives are built on a synergy of universalist cooperative principles and robust laws. That in practice, the former draws its strength from the latter. The second claim, builds on the assertion of the first, stating that cooperatives exists on the fringes of Nigerian laws, reflecting the notion, though a wrong notion, that exist in the minds of members of the middle and the upper class of the socio-economic ladder, that cooperatives are self help, micro-oriented, charity clubs, meant for members of the lower socio-economic class.

The third claim responds by proposing a universalist cooperative law system, which is to compliment universalist cooperative principles, to produce a standard synergy of cooperative codes of engagement.

Therefore, a discursive attempt is made at repositioning Nigeria for contemporary challenges posed by the twenty-first century, capitalism and globalization, through the use of law to among others, strengthen and expand the scope of cooperative principles and practices. The multidisciplinary nature of the principles of cooperatives on the one hand, coupled with the broad frontiers of law, as a fluid and complex field, means a study such as this, which has the interplay of the two variables as part of its theme, might be limited by scope. Thus this study is primarily limited to the appraisal of statutory provisions as contained in the following statutes;

The 1999 constitution of the Federal Republic of Nigeria (CFRN), Central Bank of Nigeria Act (CBN Act), Cooperative Act, and Companies and Allied Matters Act (CAMA). All as amended.

Having worked on the frameworks of ;Globalisation, capitalism, welfarism, Nigerian Laws, Comparative laws, cooperative principles, cooperative societies, contemporary Nigerian challenges, and sustainable development, this study concludes, by identifying the enactment of a universalist Nigerian cooperative law, and the amendment of other Nigerian Laws to reflect contemporary universalism as an imperative to Nigeria's survival, growth and sustainable development in this Age of globalisation, using the inclusive tool of cooperatives. While recommendation were made towards repositioning Nigerian cooperatives for contemporary, sub-national, national and international challenges by virtue of sustainable legal instruments, all within the framework of actualisation of the SDGs in Nigeria. It is hoped that the outcomes of this study provides a template for other countries of the Global South.

Turning our attention to an international legal enquiry about how to incorporate sustainable development goals into curricula?

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It is widely accepted that Education and Training are the Driving forces of sustainability but we have neglected the importance of introducing compulsory curricula changes by law to foster action and awareness for the sustainable development agenda. Nations should be incorporating the world's most pressing global problems by 2030 in their national curricula and design training systems for educators in order to bring real-world issues into their classroom at every level and in a wide variety of classroom activities or projects.

This contribution aims at mapping the different initiatives that are already jumping off points for teaching the UN's 17 sustainable development goals. There is not anything such as a standard curriculum yet, but the importance of mapping the different plans to render accessible world problems and some incipient solutions by teaching SDGs to everyone has already started. The UNESCO has established learning objectives that could already be integrated. Within the context of Europe, and Asia, we could also gather emerging local, and national initiatives. But, what matters now is concrete national, regional and local action everywhere, possibly coordinated by consensus and advocacy at institutional level enforcing by law such integrated curricula.

In order to achieve this, we need first: (1) exploration about how the concept of sustainable development with all the SDG fits into our legal systems; (2) advocacy and communication activities to stimulate awareness and active participation (among associations of national and local public administrations, public and private universities, research centres, organisations member of international organisations dealing with SDGs, associations of stakeholders working in the field of culture and information) ; (3) memorandum of understanding among all the involved parties and the government; and finally (4) introduction of a policy scenario that offers a strategic plan for educators, educational institutions, schools at every level, research centres, stakeholders, and society as whole. The final result is a well-designed curriculum integrating the 17 SDG.

So, in order to incorporate UN's 17 SDGs into the curricula we need a renovated legal enquiry about global citizenship. Thus, the crucial matter is turning attention to law making and policy matters towards awareness and active participation to achieve improvements in the world's most vital problems. An international agreement on education is needed.

Why is this so crucial? Because as it has already been discussed within the context of climate change that today's societies' problems have at their roots a crisis about disconnection; from nature, from the impacts of our everyday actions and from each other. Initiatives like the Earth charter, or other international tools have proved to be insufficient though. We have learned from those initiatives, and from climate change

governance experience, that quick diffusion and awareness is possible but not enough. Legal actors have a vital role on this, breaking the silos at University level is not enough. The role of law for the implementation of the SDG at every level, as well as on the creation of collective and global awareness is crucial.

Opportunities of Marine Natural Capital for Sustainable Blue Growth

Analysis Physicochemical and Microbiological Evaluation of the Water of Human Consumption in the Municipality of Turbaco – Colombia

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The objective of this work was to evaluate the physicochemical and microbiological quality of the water consumed in the municipality of Turbaco. Samples in nine (9) points were taken and analyzed in situ parameters later laboratory phase, followed by a comparison with current regulations. Physicochemical results showed a turbidity of 1049 NTU, average 102.022 mg

CaCO₃/ L of total hardness, microbiological analysis revealed total coliforms ranged from 10 to 30 and more fecal coliforms point was 21. Based on the study results, it is concluded that the quality of water in physicochemical terms is above the values established in the Colombian regulations, in most sampling points chosen, with the absence of free residual chlorine greater concern and possible deficiencies in the treatment system. This bears some relation to the breach of microbiological parameter total coliforms present in some seasons.

Metrics and frameworks for assessing Sustainable Urban Development

A Strategic Framework For Sustainable Urban Development In Africa

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Urbanization of our society is a going concern which is certain and unavoidable. There is a growing consensus that the urban Sustainable Development is highly needed in several parts of Africa especially in the Sub- Sahara parts of the continent. Modern cities and towns in Africa pose a challenge to sustainability of the environment especially when the population of the inhabitants surpasses certain threshold. Several predictions have been made by various bodies on analyzing the expected impacts of increasing population on Africa environment and the ecosystem. Increased population of city dwellers comes with lot of challenges such as the degradation of the environment, waste production and pollution as well as the various social problems. As a result, there is an urgent need to come up with conceptual frameworks and metrics to provide lasting solutions these challenges in manners that are not only socially and ecologically acceptable, but in ways that present the least problems and consequences to our environment. There are arguments that achieving resource efficient cities is highly dependent on the key thematic areas - building energy efficiency, waste management, sustainable urban transport, water/ waste management and urban ecosystem management; but more importantly, the integration between these sectors and across scales is more crucial in achieving a sustainable urban development.

From the standpoint of sustainable urban development, sustainable cities can be achieved through studying urban metabolism, urban ecology, city carbon and water footprints, the dynamics of city growth and the inter dependencies between social actors, institutions and biophysical systems flows.

The certain areas explored in the paper are the aspect of linking sustainability to aspect of urban development. This paper discusses certain and specific frameworks which focuses mainly on Energy Usage and emissions, water quality, habitat and ecological quality, as well as Equity and health. It also talks about several policies that are aimed at optimizing the benefits of urbanization and reducing the damaging effects that might arise as a result of urbanization.

Keywords: sustainable urban development; Africa; environment

An Assessment Of The Factors Impacting Economic Sustainability In Nigeria For A Sustainable Urban Development.

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Until recently the Federal Government of Nigerian never tried to diversify her economy. The Petroleum sector has been the main financier of the nations revenue. It is believed that this has not had desired effect on sustainable urban development of the nation, because the economic prosperity and development of the nation is still far-fetched. This paper assessed the effectiveness of trade practices and suggests policy options, considering the diversification plans of the government's income-base. Similarly, The quantum of gas reserves in Nigeria has been identified as a potential and viable source of generating additional income, employment, and cleaner energy for the economy, but in harnessing these resources the country should be wary of repeating past mistakes of the oil boom era. So there is need to proffer a sustainable urban development measure to ensure economic sustenance.

The Autoregressive Distributed Lag (ARDL) model was used to assess the effectiveness of trade practices in the oil and gas sector for economic sustainability in Nigeria. Thus, trade components (export, import and their ratio) was explained in the sector, along with other control variables after conducting some pre-estimation tests (unit root and co-integration tests) to understand the properties of the data set. This study employed measure of economic sustainability index proposed by LeBel, and the trade components Data which covers the period 1981-2016 was obtained from the World Bank, World Development Indicators (WDI) database. The output is a research report that contains empirical findings and policy recommendations to manage trade practices in the oil and gas and its associated economic sustainability problem to achieve a sustainable urban development.

Keywords: Economic Sustainability, Trade Practices, Comparative Advantage, Sustainable Urban Development, ARDL time series modeling, Nigeria.

Analysis of the Quality of Waters in Beaches of the Tourist Sector of Cartagena de Indias - Colombia

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The pollution has a very important effect in protecting the environmental quality of coastal marine environments. This work evaluated the environmental quality of the waters of the beaches of Cartagena de Indias, characterizing its quality by means of measurements of physical-chemical and microbiological parameters both "in situ" (temperature, pH, salinity and dissolved oxygen) and "ex situ". (nitrites), nitrates, phosphates, total solids, BOD5, total and faecal coliforms, heavy metals and total hydrocarbons.) The marine and estuarine water indicator (ICAM) of the Institute of Coastal and Marine Research (INVEMAR) was used. The important contributions of the work was the definition of a risk map to identify critical points and areas of vulnerability on the beaches. The results of the study contributed to the evaluation of the environmental status of the beaches of Cartagena, which provides both scientific support and recommendations for formulate an integrated management of these strategic ecosystems.

Assessment Of Good Hygiene Practices Of Hotel Operations And Their Impact On The Safety And Quality Of Hotel Foods In Abeokuta

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Hygienic practices are requirement for safe food production. Hospitality food production has grown and the need to ensure the safety of produced food is imperative. The research ascertained the socioeconomic characteristics, identify the good hygiene practices and assess the safety of the foods in the study hotels. The research adopted the descriptive and relational study approaches and it was structure into field and laboratory experiments. 92 respondents were selected from six hotels in Abeokuta, Ogun State, Nigeria, questionnaires were administered to them for data collection. 18 food samples were purposively collected and immediately brought to the microbiological laboratory for analysis. Serial dilution of the samples were used and 1ml of each dilution were seeded on Plate Count Agar, Salmonella Shigella Agar, Manitol Salt Agar, Potato Dextrose Agar and MacConkey Agar by spread plate method, the media were incubated at 32oC for 24hrs, and 25oC for 72hrs for the Potato Dextrose Agar. The colony counts were recorded and reported as colony forming unity per gram (cfu/g). 54.3% (50/92) were males, 60.9% (56/92) were within the age of 20-30 years, 68.4% (63/92) attained tertiary education, 85.9% (79/92) were Christians, 79.3% (73/92) were single, 82.6% (76/92) were Yorubas and 45.7% (42/92) have worked for 1-5 years. The hygiene practices were good. The microbial load of the analysed foods was within the range of 1.0×10^1 cfu/g for fungi in jollof rice to 1.7×10^7 cfu/g for bacteria in salad. Also at $P > 0.05$, there is no significant association between respondents' socioeconomic characteristics and food safety, no significant relationship between good hygiene practices and food safety and no significant difference in the safety of food across the hotels. The study is vital in essence that it ascertain the hygiene standards in hotel foods and ensure that the food produced is microbiologically safe.

Assessment of Sustainable Urban Development in the Context of Geophysics

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Geophysics is one of the core elements of that is considered in urbanization, it started to take more attention when it comes to sustainable urban development since it is directly related to geophysical properties as well as subsurface investigation, environmental contamination and fate of hazardous substances. There is a crucial relationship between geophysics and sustainability, that should be used to improve environmental sustainability in cities. Thus, a sustainable metric system is created in this paper to assess the cities in the concept of sustainable urbanization by geophysical perspective by considering Sustainable Development Goal 11: Sustainable Cities and Communities. The metric system can be used as a tool to assess the level of sustainability in urban development as well as to determine the areas that need to be developed. The tool was applied to selected mega cities; Istanbul and Ankara and a road-map was created by considering regional characteristics, the results were presented in the study.

Breaking Barrier for Sustainable Growth Index: An Integrated Tool for Assessing Sustainable Development Approaches

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Pursuing sustainable development is adaptive process of learning by doing and it surely benefit from using sustainability indicators (SIs). However, adaptive governance processes may demand more than what these sustainability indicators can currently deliver. Therefore, in response, we identified multiple conditioning factors related to available resources, and possible barriers for sustainable growth in a country to propose a new index, Breaking Barrier for Sustainable Growth Index, and created a dashboard using Tableau software to visualize these interacting conditioning factors.

Breaking Barrier for Sustainable Growth Index proposes an integrated methodological approach to quantitatively assess sustainable development approaches across countries. Three are the main features of this approach: (1) the index considers sustainable growth based on economic, environmental and social indicators simultaneously; 2) the methodology used for the normalization and aggregation of the indicators delivers a unique and comprehensive tool (3) the framework used to compute the indicators allows to provide explanation of multiple sustainable growth paths.

This research highlights the barriers preventing growth, in order for decision makers to take more educated approach. By drawing attention to the barriers preventing growth and single out the countries where the infrastructure is the greatest barrier, the framework is helpful in pointing out key intervention areas, where a possible investment can be highly effective to improve sustainable growth and essentially quality of life. In addition to infrastructure, considering the country's economic, political and social environment, along with the hidden risks, the breaking barriers for sustainable growth index compares and uses these variables along with others to provide a better understanding of how a country can grow by using the natural resources available more efficiently.

Overall, this report displays interconnecting variables and barriers that can affect resources and barriers for sustainable growth. Each variable is gathered from reliable data sources and the most recent data are placed into this index. All data is relevant to creating a better understanding of the barriers that are preventing growth in developing countries. Three country case-studies have been described to illustrate relevance of this approach in understanding and guiding sustainable growth.

Challenges and Coping strategies of urban illegal migrants in Nairobi County, Kenya

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This paper provides an overview of challenges sought by illegal migrants. There is widespread increase of illegal migrants due to immigration pressures and restrictive policies imperfectly enforced by Kenya that result to undocumented migrants. The paper reviews their challenges since their stay is unauthorized and brings into perspective their desirability of good welfare in terms of shelter, food, sanitation and education. The Urban illegal migrants stay in hiding for fear of arrests by the police and possibly being deported back to their countries where possibly the living conditions are much worse than the city. The paper sets in to provide an overview of how illegal immigration comes about and how they end up settling in urban areas under abject poverty in slums and informal settlements. Finally, the paper outlines coping strategies for the illegal migrants and consciously provides an alternative plan of action focused on social survival and uplifting their socio-economic status. There is dire emphasis on need for more refugees Co-ordination and declaration to obtain alien cards hence access and receive support from organizations supporting refugees.

Key Words: Illegal Migrant, Poverty, Coping Strategy, Social Survival

Design Of A Urban Sustainability Index For The Evaluation Of Emerging Cities In Latin America

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Around the world, the sustainable development and sustainable cities concept has become a globally discussion topic during the last few decades. Additionally, the increase of urbanization process, especially in Latin America, one of the most urbanized regions in the world, is a major challenge due to complex, complicated, and chaotic nature of this region.

This high urbanization has promoted the assessment of new type of city: emerging cities, which are intermediate cities where their urban areas, population and economic activities are expected to grow rapidly over their national average. These emerging cities face the challenge to find an available evaluation tool for leading their urbanization process towards a desired status of urban sustainability, due to the lack of a proper urban development plan and the different urban contexts.

Fortunately, national and local leaders have responded to the challenge by making sustainable development a high priority. For that, they have selected urban sustainability indicators for cities, as main elements for communicating the status of the practice and evaluate how successful strategies and policies enforced have been in the attainment of sustainability goals. However, these indicators have not been defined specifically to Latin-America Region, not take into account the participation of the citizens and not include the specific problems of emerging cities.

In order to address this issue, we propose to design an urban sustainability index based on a system of integrated indicators that balance of three dimensions: environmental, economic and social, considers a participative model and the Latin-American context of the emerging cities. The methodological approach includes the review of the literature on existing approaches on emerging and sustainable cities assessment, describing their main aspects, strengths and limitations, and the design of a sustainability index from an integrative perspective through a practical application in urban contexts with citizen contribution, seeking to share different practices, which can be used to guide the selection of indicators of sustainable urbanization plans and improve the effective communication of the status of strategies and policies in sustainability with the inhabitants.

Green-infrastructure and SDG in Natal - Brazil

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The Sustainable Development Goals (SDG) came after a meeting of 150 world leaders where it was decided to carry out a plan of action to end poverty in the world, protect the planet and guarantee peace and prosperity for the people, agenda 2030 for sustainability was the name given to the project which contains the 17 SDG defined in the meeting.

From 17 SDG, this paper addresses goal 11 of sustainable cities and communities: how to make these sites inclusive, safe and resilient. One way found to help achieve this goal is to use the green infrastructure as a tool in the search for improvements in cities and communities. So, with this we have the following question: How to add this technology in common day-to-day services of cities, so that it is a basic requirement in improving urban infrastructure and able to achieve the purpose of the 2030 agenda?

The objective of this work is to diagnose the applicability of the green infrastructure in the city of Natal, capital of Rio Grande do Norte - Brazil, and to identify if the benefits generated contribute to the advancement of SDG 11.

In order to carry out the research it was necessary to observe the actions of the public agencies in relation to the components of the green infrastructure, among them are: sanitation, drainage, catchment ponds, spaces for walking and leisure, public parks and cycle paths.

With regard to sanitation, the city has the goal of being the first 100% sanitary capital in Brazil, works are being carried out and today 74% of the sewage network has already been installed, but for all to be fully functioning it is necessary to finalize the works of the ETE's that are scheduled for completion in December 2018. The drainage services of the city of Natal are integrated with the works of sanitation and paving and have the prospect of carrying out the services in approximately 240 streets of the city by the end of the year 2018. Regarding the catchment ponds, the situation is not the best, some ponds in the municipality need maintenance and cleaning and these services need to be done before the rainy season in the region.

The city of Natal already has some spaces and environments that are intended for the health and leisure of the population, there are places such as the dune park and the city park, and on weekends some areas such as the coastal road and parking arena of the dunes are closed for various outdoor activities. Just like the big capitals, Natal also wants to expand its cycle routes, which in 2017 the cycle plan was to increase another 72 km of cycle paths.

Even though it has been indirectly observed that actions are being taken to improve the city and that these are in accordance with SDG 11. This gives us a diagnosis of the current situation of the city of Natal in relation to green infrastructure and the objectives of sustainable development . From this it was possible to propose actions to be carried out in the city and to create plans of awareness for the population informing the importance of the preservation of the environment.

How Can a City Assess Its Progress Towards Sustainability? Case studies in British Columbia, Canada

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Our mandate at Simon Fraser University's Centre for Sustainable Development is to serve communities by stimulating the study of Sustainable Community Development (SCD), carrying out projects in partnership with communities and agencies outside the university, facilitating effective use of the university's resources in responding to requests for assistance on SCD problems, creating opportunities for professional development experience and programs for SCD practitioners, and establishing working relations with similar centres internationally, particularly in developing countries.

We are also an active member of the UN Sustainable Development Solutions Network and contributed to the United Nations Sustainable Development Goals, particularly SDG11. At the Centre, we have been working in sustainable development frameworks, monitoring and assessment, and decision-support for several years. With our Dutch colleagues at Telos Sustainability Institute, at Tilburg University, we developed the Community Capital Framework and toolkit to assess the effects of decision-making on the natural, physical, economic, human, social, and cultural forms of capital in a community. We have already piloted the framework in a variety of community types – big, small, rural, urban, developed, developing – in North America, Latin America, and Europe.

As a PhD Candidate and instructor with the Centre, my research aspires to advance sustainability theory and practice by exploring the potential of the concept of urban productivity as a conceptual and practical means to holistically operationalize the economic, social, and ecological aspects of sustainable development. By updating the above framework and toolkit, my goal is to contribute to the global discourse on implementing and assessing local sustainability and seek new ways to advance/support the achievement of productive – and eventually sustainable – communities.

According to the literature, a productive community would act beyond minimizing its impact on the natural environment and the resources it depends on; it would pursue regeneration of its wastes and restoration and enhancement of all community assets. Ultimately, in my research I seek to answer this question: does community productivity, conceptually and operationally, have the potential to help communities achieve their own long-term sustainability goals and also contribute to the achievement of the UN Sustainable Development Goals?

Since January 2017, I have been working with two comparable municipalities in the Lower Mainland of British Columbia, Canada, discussing community sustainability planning and assessment, and testing urban productivity indicators and tools to support decision-making, always with the above research question in mind.

Based on my literature review and the two in-depth case studies, I would like to present the importance of assessing the achievement of local community goals and the UN SDGs through a systems perspective, as well as showcase the research and practice results of my case studies.

Sustainable Transit Oriented Development in Private Japanese Urban town

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The 17 Sustainable Development Goals for new universal agenda by 2030, has been decided in September, 2015. They are integrated and indivisible and balance the three dimensions of sustainable development the economic, social and environmental. A/RES/70/1. Among the 17 SDGs, Sustainable cities and communities (Goal 11) one of the target is the sustainable transportation system.

Nowadays the number of cars and their users are increasing, which has high impact on the environment, health and economy. To reduce such impacts and to create sustainable cities, programs on sustainable transportation system have been introduced. Transit Oriented Development (TOD), codified by Peter Calthorpe aiming to reduce automobile dependency and increase public transportation.

The case study area is a private developed urban town, located in the north-central Chiba city of Sakura in Japan. The town Comprises 18,000 residents on 245 hectares of land. The developer started planning the town in 1971, built monorail that encircled the large piece of land earmarked for the development. The aim to build public mono rail transportation service is to reduce the pollution caused by private cars and public buses and to enhance livable, sustainable and efficient life style.

To this end, this paper answers a question on how the privately developed monorail public transport contributes to sustainable city and community development by using Transit Oriented Development (TOD) framework. On the other hand most of new towns and planned communities in Japan were built around the same time, and their facilities are also reaching their sell-by date. However, this development remains vital 35 years after it started. This paper tries to explore how the integrated infrastructure and facilities makes the private town more livable. The town has aged community facility, which is, the developer buys house from the residents, as they get old and want to change to smaller house. The developer sustains the town, through availing residence by considering the social, environmental and economic situations. Moreover the town is integrated with Agricultural practice. In which the farm lands inside the town welcome families and children coming from cities to experience agriculture practice and introduce new recreational paradigm. This paper studies the impact it has on creating environmentally, socially and economically sustainable cities and community. The results and mechanisms can be useful source for developed and newly developing towns in creating sustainable cities and community in the globe.

The 2030 Agenda for Sustainable Tourism Development in Jamaica

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The United Nations World Tourism Organization / UNWTO (2016) positions tourism as having the potential to advance the 2030 Agenda for Sustainable Development. This Agenda aims at transforming the world, focusing on five areas of humanity and planet, specifically people, planet, prosperity, poverty and peace, in order to create a sustainable path by the year 2030. The Agenda posits 17 Sustainable Development Goals (SDGs) with 169 targets which aim to integrate and balance the 3 dimensions of sustainable development; economic, social and environment.

Although the UNWTO sees it fit to position sustainable tourism as a tool for development, to the best of the researcher's knowledge, this has not been collectively statistically examined. Since the UN presents the SDGs as means of improving people and planet, hence, achieving sustainability, it seems plausible to examine tourism within the context of the SDGs. The purpose of this study, therefore, is to examine the role of tourism in achieving the 17 established goals within the 2030 Agenda for Sustainable Development in Jamaica, a developing country that relies heavily on the tourism economy (Sinclair-Maragh & Gursoy, 2015). The research question is: Is tourism in Jamaica able to contribute to the achievement of these goals? The propositions for the study are :

P1: There is a positive and significant relationship between poverty alleviation and sustainable tourism development.

P2: There is a positive and significant relationship between the planet of earth and sustainable tourism development.

P3: There is a positive and significant relationship between prosperity and sustainable tourism development.

P4: There is a positive and significant relationship between peace and sustainable tourism development.

P5: There is a positive and significant relationship between partnership and sustainable tourism development.

The unique contribution of this research is that the 17 SDGs will be analyzed within the 5 Ps frameworks of people, planet, prosperity, peace and partnership and will be used as measures for these factors. Sustainable development will be measured using existing dimensions from the three pillars; environmental, economic and social. The study intends to present a 2030 Sustainable Tourism Development Model which will also be novel. Findings of this study will be useful at the global, regional and country levels as they will show whether or not tourism can assist in realizing the SDGs.

References

Sinclair-Maragh, G., & Gursoy, D. (2015). Imperialism and tourism: The case of developing island countries. *Annals of Tourism Research*, 50, 143-158.

United Nation World Tourism Organization / UNWTO (2016). 2017 is the International Year of Sustainable Tourism for Development. PR No.: PR 16111, 29 Dec 16. Retrieved on January 5, 2017 <http://media.unwto.org/press-release/2017-01-03/2017-international-year-sustainable-tourism-development>.

The Sustainability of the investments in the olympics

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The mega sports event, Olympics, have been held over the world for several decades now and all regions expect a good outcome from this mega event that will either boost them economically or socially. But, the sustainability of the Olympic investments has both positive and negative aspects. The government usually consider this event as a catalyst for socio-economic development, a way to revive the region's culture, build new infrastructure, and also a chance to welcome a lot of tourists from all over the world.

This research is conducted to see if that happens for every region that hosts the Olympics. This research consists the theme of global and local perception of the sustainability of the Olympics. This research is mostly based on primary sources such as articles and researchers that has been done by other professionals. It also includes secondary sources, which are the researchers that other students have conducted about the sustainability of the Olympics. Both primary and secondary sources are used to increase the diversity of the sources which will give a diversity to the answer of the prompt and also to build more credibility by using a lot of sources. The research is divided into two sections, which are global perception and local perception. But because the topic of global perception and local perception was too broad, subdivisions were made to guide the research a bit more in depth. The subdivisions are the effects of the sustainability of the Olympics. It's divided into positive effects and negative effects. In this research, it's expected to find the statistics of the GDP or any economic pieces of evidence of a certain region before and after it has hosted an Olympic. By that, we can see if the investment of several million dollars into the Olympics ended up as a profit or a pathway to the deficit of the region.

Tracking Urban Marine Debris

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In answer to the lack of conferences and side-events that focused in the relationship between cities and ocean pollution during the 2017 UN High-Level Political Forum and the Conference on Oceans, the present paper seeks to, first, summarize the information that exist regarding urban plastic waste and marine debris, including the estimated sources and amount of plastic pollution that is generated by cities and the reason why it ends as marine debris. Through this study, the author can identify the primary variables that affect the amount of marine debris a city produced, including critical economic activities and the relation with different levels of social development.

Furthermore, in the second part of the paper, the author uses UNEP official data, combined by GIS Mapping technology and local demographic data, to predict the amount of marine debris that is emitted into the ocean by any given city. For this, the study uses as core variable the city proximity to the ocean, size of the population, and level of development. Through the prediction model, the research shows that within the Asia-Pacific region – the geographic area that is assumed to be the largest marine debris producer -, Jakarta is the most polluting city regarding the plastic waste that ends in the ocean. Moreover, while the study focusses primarily in the SEA Region and China, it also looks at other individual countries to further assess and compare results.

Through this study, it is possible to understand the economic and social causes of marine debris, as well as how, based on the limited amount of information available, cities are predicted to participate in the marine debris global challenge. Furthermore, it provides a meaningful contribution towards the measuring of SDG 14: Life Bellow Water, specifically indicator 14.1 that refers to marine debris indexes. At the end of the paper, the authors make a call of action to the cities with above-average levels of pollution to take a political stand to reduce plastic waste, prevent marine debris, and start to implement plastic recovery projects.

Use of the environmental violations data applied by a municipal environmental agency in south of Brazil as an instrument of pollution control and urban planning

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The economical development started from the Industrial Revolution of the century XVII, taken root by the Cartesian thought, it has been generating environmental disturbances of great proportions. The ecological movements appeared in the decade of 1960 had great influence in the beginning of the transformation for a thought more holistic view, where the social and environmental subjects should also be considered to reach the sustainability in the human actions. Several agencies, standards and environmental legislations have emerged with the intention of control the activities that have the potential to pollute or that use the natural resources. At present, the new Sustainable Development Goals (SDG) established by the United Nations (UN) in 2015, containing 17 goals of 2030 Agenda, are in force to use by the signatory countries. Among these, stand out the goal 11 – Sustainable Cities and Communities, which have as an important source of implementation the New Urban Agenda (NUA), established in 2016 through the Conference known as Habitat III, held in Quito, Ecuador. In this context, environmental impacts are considered by the NUA as major negative influencers for poverty reduction, with the participation of governments and society being very important in order to create smart and better planned cities. The institute of the environmental licensing, started formally from the National Politics of the Environment in Brazil in the year of 1981, have great importance in the local context, because it makes possible the environmental control of those activities, also used as an instrument of urban planning. The objective of this research was to verify the environmental violations applied by a municipal environmental agency located in south of Brazil, for those activities being operated without the due environmental license, motivated by the lack of environmental information of the local agencies and the necessity to improve the city planning. The data were obtained through documentary research, in which all Notices of Environmental Violations emitted in a period of two years were collected, being compiled, stratified and analyzed under those violations typified by article n. 66 of Federal Decree n. 6514/2008. The results shows that the total number of violations committed, one quarter represented those activities in operation without a license. The results obtained still demonstrate a great vocation of the municipality in secondary services that can cause environmental and urban disturbances. Another result reached is the map of activities being carried out without the permission of the environmental agency, identifying that 44% are in predominantly residential areas, promoting socio-environmental disturbances through the emission of noise, solid waste, dust and wastewater in disagreement with environmental legislation. Such information can be

used for the development of standards and laws of local application, aiming to dialogue with the goals of the New Urban Agenda and the Sustainable Development Goals.

Ensuring Public Engagement and Accountability for Sustainable Urban Development

[Un]Invited Participations and Environmental Justice: Taking Control of the Forest

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Public participation is a key requirement for sustainable urban development and yet, there are still many mechanisms that have failed. This dilemma highlights the following question. What determines the success or failure of a public participation process? One of the ways to explore this issue is by looking at both invited and uninvited participatory processes and incorporating environmental justice elements as an analytical lens. Using Malaysia as a case study, two cases of urban forest development conflict were examined in Peninsula Malaysia. The cases illustrated the interactions between multiple actors and how invited and uninvited participations were constructed within the context of urban forest governance. Application of environmental justice principles within this context highlights the unjust public participation process in a governance system that was supposedly built on the ideologies of sustainability. Observations of the case study and interviews with multiple actors from the civil society, as well as federal, state and local governments showed not only a disconnected perception amongst the actors regarding the role of the public in governance, but also a flawed policy system that allowed no power to the public in decision-making, rendering urban growth unsustainable. The unequal distribution of powers amongst the actors meant that civil society had to resort to uninvited participation to take control of the decision making process. While incorporation of environmental justice principles did highlight the conflict in the current forestry system, the concept itself is poorly developed outside of academia, ensuring that the rhetoric surrounding public participation and engagement challenges in Malaysia remains repetitive. Understanding different mechanisms of invited and uninvited public participation from an environmental justice perspective also allows the identification of distributive, procedural and recognition factors that contribute to a meaningful decision-making process. It indicates the need for equal distribution of financial and political resources and the recognition of public in development policies, which would allow us to move closer towards achieving sustainable development.

Building Community Networks and Accountability: Pilot Program

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An alarming amount of plastic, trash and debris is contaminating and doing great harm to native habitats and the Long Island Sound. In the face of this challenge, there is a growing awareness among leaders that community members must become engaged.

Live Green, a 501 (C) (3) is designed to support and enhance community interests and engage key stakeholders and members of all silos to address the needs of the community as well as the global needs.

We researched the best way to create sustainable and scalable behavior change across silos that would cause community members to make decisions and take actions that would have a positive effect on the greater society.

Live Green created and implemented a Pilot Project with the goal of creating community engagement and to reduce contamination of storm drains, and bodies of water that lead to the Long Island Sound.

We engaged with organizations that had subject matter experts to provide us with the technical support and expertise that we needed.

In the process of implementing the pilot, we engaged with town employees, five local non-profits, 10 businesses and over 100 community members within a 3 month time frame. We completed 3 clean-ups that resulting in reclaiming just over a ton of trash. If this had not been picked up - most of this would have gone into storm drains and into the Long Island Sound. About 75% was plastic.

We did a complete inventory of what we collected .

By facilitating this pilot, we have created an ongoing community conversation. The project is now in demand in other neighborhoods and we can easily scale the program. We are also engaging with Product Stewardship organizations to work on source reduction of trash.

Our goal is to scale this program across the Northeast and beyond, and to create behavior change and trash reduction in communities.

Contribution of Smart Technologies to the Performance of Green Buildings in Social and Technical Aspects

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With the advancement in technology today, the implementation of smart city concept continues to enlarge in several fields such as; security, mobility, education, administration and environment.

In this paper, the effect of smart technologies to the performance of green buildings is assessed in terms of savings in global warming category based on created scenario. Possible savings related to smart technologies in energy saving and water consumption was calculated based on formed scenario on a LEED Gold Certificated green dormitory building. For the social impact, a questionnaire based survey was applied to the university students and the effect of smart technologies on sustainability behavior is analysed by assessing the data in SPSS Programme. The results of technical and social contribution of smart technologies is presented.

Controlling Invasive Species in Seoul's Freshwater Resources

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Historically, the Han River has been of economic, geographic, political and cultural importance to the residents of Seoul, and to Korea in general. In the present day, the river not only provides essential drinking water, but is also a prominent tourist and recreational attraction. Nearby freshwater lakes such as Seokchon Lake and Ilsan Lake are also key resources to local livelihoods, offering fishing and recreational activities. As the city and population of Seoul continue to grow, water pollution has been of prime concern. However, there is another lurking threat to sustainable livelihoods and urban development within the Han River and surrounding lakes: invasive species. Species such as the largemouth bass were initially introduced into the marine environment in the 1960s as a solution to food insecurity and poverty at the time. While that may have offered temporary benefits, the largemouth bass predominantly ate young fish and freshwater shrimp and has continued to affect the food chain and wider marine ecosystem as well as water quality.

Although these invasive species are recognised as a problem, local actions to address this challenge have been slow in progress. This research attempts to understand the central challenge of invasive species in freshwater resources in and around Seoul, and will offer context of the nature and history of the problem. It will also suggest feasible solutions based on success stories in other countries, including the potential of controlling invasive species through collaborative actions that could be possible between fishing groups, key ministries, and research institutes. The research will be done mainly by literature review and also interviews with key experts in local ministries and institutes. Specifically, this research will draw on the perspectives of the people who have worked on this issue and those who continue to suffer from the impact of the problem.

The sustainability of the Han River and nearby lakes greatly impacts the city of Seoul's development, and reacting to the challenge of invasive species is important in the context of attaining the Sustainable Development Goals in Korea. While SDG 15 is particularly concerned with invasive species (target 15.8 specifically seeks measures to prevent the introduction and significantly reduce the impact of invasive alien species on land and water ecosystems), invasive species can affect a myriad of SDGs. Not only do invasive species such as the largemouth bass disrupt the food chain and affect food security (SDG 2) and marine biodiversity (SDG 14), but also negatively impact the quality of water in the Han River and lakes (SDG 6). It is imperative for the city and country as a whole to take action in ensuring the benefits of the Han River and surrounding lakes for generations to come. It is hoped that this research can offer impetus to the priority that this problem needs, and help shed light on the challenge of,

and collaborative solutions needed to respond to, invasive species in water resources across Korea and other countries.

Enabling Community Participation for Social Innovation in the urban development

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This study investigates enabling conditions to facilitate social innovation in the energy sector for sustainable urban development. This research is important to support public engagement for sustainable energy transition for urban development. This research provides appropriate direction for development strategy, including research (and action) gaps for the urban energy actors. This research allows those actors to work further with the result of this study to stimulate the energy transition in urban area. This study uses systemic change framework which recognizes four drivers of systemic change in an urban region: 1. transforming political ecologies; 2. configuring green economies; the 3. building of adaptive communities; 4. social innovation. These drivers are interconnected, and this report focuses on how social innovation can be supported by other drivers. This study used methods of interview and literature review as the sources for data collection in this research. There were interviews with eight experts in the related topic which come from different countries which have experienced social innovation in the urban energy sector. Afterward, this research reviewed related journal papers from last five years, to check the latest development within the topic, to support the interview result. The result found that the enabling condition can focus on one of the drivers of systemic change, which is building communities by increasing their participation, through several integrated actions. This finding can be implemented in two types of citizen energy initiatives which are energy cooperatives and sustainable consumption initiatives. Policymakers have to stimulate policy and governance arrangements that can support the participation. It triggers the systemic change that supports willingness of people to change behavior, become involved, and continue to remain in renewable-energy projects for urban development. This implementation requires further study of its related policy and governance support, to create complete enabling conditions to facilitate social innovation in the energy transition

Engaging Citizens for Accountability to Sustain Urban Development: Examining the prospects of Open Government Partnership in Ebonyi State Nigeria

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Ebonyi State Nigeria is the poorest state in South East of Nigeria, The state capital is located in Abakaliki urban. The Abakliki urban is traced to colonial government that operated there as its colonial administrative headquarter. Besides the long history of serving as governments headquarter, the urban has remained underdeveloped with large concentration of slumps and lacked essential infrastructure desired of an urban center. In the past three years, the government of Ebonyi State has been investing enormous resources to address some grabbing challenges associated with the urban renewal and development of the capital city. The government is reconstructing dilapidated roads as well as opening new ones to provide a good network of roads. Treated Pipe born water, waste management, security and other services that add value to urban life are emerging, but threats of corruption that hinder sustainable development is envisaged if mechanism that ensure engagement of citizens for purpose of enthroning accountability in urban governance in Ebonyi State is absent. It is within this concern that Ebonyi State through Federal Government of Nigeria signed up to the Open Government Partnership (OGP) in July 2016 and has since developed her Action Plan that will among other services contribute to engage the residents of Abakaliki capital city to ensure accountable urban governance. The Open Government Partnership (OGP) is an international multi-stakeholder initiative launched in 2011 to focus on improving transparency, accountability, citizen participation and responsiveness to citizens through technology and innovation. In this regards, we interrogate the prospect and issues in implementation Open Government partnership as co-creation policy with civil society organizations to achieve sustainable urban development in the ongoing renewal initiative of Ebonyi State Government.

Ensuring Public Engagement and Accountability for Sustainable Urban Development: The case of European Union Niger Delta Support Programme (NDSP Water and Sanitation Component) in Nigeria

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Over the years in Nigeria, there has been varying bias and emphasis for physical development and non-concern and neglect of non-physical aspects of development that has largely led to occurrences of ailing constructed infrastructures, poor management, lack of accountability and stumpy sustainable development efforts in most urban and local communities in Nigeria. Reverting this failing sequence will require a drastic paradigm shift involving public engagement, involvement, participation and accountability to bring about remarkable sustainable development strides and achievements.

To realize sustainable development in all desirable aspects and perspectives at any urban towns in Nigeria, the European Union Niger Delta Support Programme (NDSP Water and Sanitation Component) employed bottom-top organization model called Water Consumers Association (WCA) responsible to facilitate the acceptability, ownership and accountability of sustainable urban development water project by the public have been widely promoted since this model places the water users in the center of concern for effective sustainability and encourages their participation for local management, governance and accountability.

These Water Consumer Associations have the sole responsibilities to liaise between all stakeholders in the programme (EU, State and the public), engaged the public for ownership and sustainability of projects in their domains through several methods such as: sensitization meetings, workshops/seminars, town hall meetings, radio jingles, Call-in programmes and press conferences etc and served as management structures in their domain for whatever water project executed by the state in collaboration with the EU.

However, these urban led management organization model called the Water Consumer Association need to be developed, institutionalized and made operational (functional) to guaranty future sustainability of water projects provided for urban cities. In view of this, a Water Consumers Association Development Plan (WCADP) is developed to document detail steps, processes and approaches for the simplest urban-led project management organization for State use for future water projects. This plan served as a guide for supporting public sense of ownership and sustainability of urban development water projects and how to facilitate the process of strengthening institutional capacity for community management, building the capacity of the Water Consumers Association (WCA) on how to plan, take decisions, mobilize resources, operate, maintain and sustain public water projects in their urban cities.

Fostering efficient Public Engagement and Accountability for Sustainable Urban Development: a case study of Lagos as a Mega City in Nigeria

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Lagos is a metropolitan city and an urban center in the Lagos State of Nigeria. It has grown spatially from a traditional core settlement of about 3.85 sq km in 1881 to a metropolis of over 1,183 sq km. The metropolitan area constitutes about 33% of Lagos State, with 455 sq km (Sunday and Ajewole 2006).

It currently stands as the 14th largest urban area in the world with an urban area population of an estimated 11.7 million (Adelekan 2006) and annual projected growth rate of 4.44%, which has a ranking of the 7th fastest growing urban area in the world (City Mayors 2009).

Exploring Lagos' importance in Nigeria's national economy, it is estimated that sixty percent of Nigeria's oil industry occurs in Lagos. (Adelekan 2006, 6). With regards to the shipping industry, 80 percent of Nigeria's imports and 70 percent of exports pass through Lagos ports (City Data 2009).

According to a World Bank Renewal Project, since 1981, the total estimated number of 'blighted-slum' communities in Lagos has grown from 42 to almost 100, due to lack of social services and housing development projects (Adelekan 2006).

Meanwhile, the positive association of urbanization with industrialization, participation and economic growth is well known. Cities provide concentrations of population from which industrial labor may be drawn; they also contain a greater variety of skills and resources than do rural areas. Even more important perhaps, urbanization promotes values favorable to participation, entrepreneurship, and industrial growth. In particular, cities typically tend to favor a propensity to analyze traditional institutions and to innovate and accept change. However, in the relatively impersonal and fragmented setting of urban life, the all-embracing bonds of traditional community systems are difficult to maintain.

Therefore, the role of urbanization in increasing political participation in developing countries like Nigeria is far-reaching. This dislocations accompanying rapid urban growth have led to the politicization of those groups whom they most affect, including both new urban migrants and long-term residents discontented by destabilizing impacts of urbanization.

In general, it seems likely that, once some minimum extent of urbanization is reached, the importance of cities in the process of economic development lies less in their more concentrated provision of human resources than in their role as an agent in fostering those changes in social structure and political and economic values that are essential to

enhancing political participation, entrepreneurial activity, occupational mobility, and thus, indirectly, to economic growth and political change.

This paper discusses the features and position of Lagos City as an urban center in Nigeria and provides some major milestones for urban governance worldwide. It looks at the environmental decision making at the governmental level and evaluates the city based on three factors: transparency; access to justice and citizen engagement which are important aspects of governance as a whole.

The paper also highlights essential actions for environmental democracy and governance and suggests ways for improving governance processes in cities. Linking these governmental-level procedural rights to realities at the community level is essential for sustainable development.

Keywords: Public Engagement, Accountability, Sustainable Urban Development, Lagos City.

Improving Access to Quality Education in Haiti through Educational Technology

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One of the most basic and essential right of all human being should be the access to quality education. Although such essential opportunity may seem easily achievable in many countries, many developing countries still face hardships, including Haiti. Many children in Haiti have limited access to education. Although Haiti's literacy rate was recorded to be below average compared to other Latin American and Caribbean countries before 2010, the statistics changed even more drastically after the 2010 Haiti earthquake. Due to the massive earthquake, many school buildings were destroyed, taking away the already few educational opportunities the Haitian children had. This resulted in a lower percentage of literacy rate prior to the earthquake. To help students in Haiti to gain their most fundamental rights in education, many international private, as well as church schools, were established. The ongoing establishment of these private and non-profit based schools is an extension towards SDG 4, to "Ensure inclusive and quality education for all and promote lifelong learning." One of the major problems that schools in Haiti are facing is being short on teachers and educational resources. To address this problem specifically, the SDG 4 sub-target goal of "substantially increase the supply of qualified teachers, including through international cooperation for teacher training in developing countries, especially least developed countries and small island developing state" by 2030 should be carefully analyzed alongside. This research will include a literature review of the current status of the Haitian education system, and government and public policies that support such system. It will thoroughly address what the most significant factor (such as the shortage of teachers) is preventing children from obtaining the most fundamental human rights in education. One direction from such analysis include using different types of affordable technology when teachers are unavailable. While technology may not be able to replace teachers, education through remote classes (where teachers are elsewhere) will be more affordable compared to bringing and placing quality teachers in all schools in Haiti.

Inclusive Sustainability and Sustainable Development Goals (SDGs): Fat Chance! In Nigeria

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A change is a process through which something becomes different. This definition comes from Oxford dictionaries. Anything that changes is capable of developing especially in human being when they grow. One important thing about humanity is that development stop in human being on the day they dies which means that development in human being has a time bound. Otherwise, development is on-going in non-human being but it can exhibit a static or a flow status. Growth is a process of positive change in size and value over a period of time. Development is not inclusive without a growth. This means that growth comes before development but growth is not a development. In every society, there can be economic, social, political and environmental growth. Not only that, growth can only achieve inclusive development, if there is an inclusive sustainability. An inclusive sustainability in terms of economic growth embrace people, innovation, capital, infrastructure and institution. This means that in an inclusive sustainability, people must have secured good jobs and better carrier opportunities.

In other word, social developments involve basic human needs, wellbeing and opportunities. This involves good nutrition, basic medical care, water and sanitation, shelter and personal safety. Others are access to basic education, environmental qualities, information and communication, personal rights, freedom and choice. All these are supposed to happen in an ideal state or nation. In Nigeria, the World Bank (2017), stated it that the percentage of Multidimensional Poverty Index (MPI) Poor (H) is 53.3% and the average intensity across the poor (A) is 56.8%. However, poverty continues to increase as unemployment rate continue to increase from 10.4% in 2015 to 14.2% in 2016 (Natinal Bureau of Statistics, 2016). Currently, Nigeria continues to face political challenges owing to bad leadership and poor governance. This has made economic policies not to be effective to alleviate poverty. Therefore, drawing an experience from Millelium Development Goals MDGs that ended in 2015 where most African countries did not met up, vision 2030 continue to raise critical questions in the literature whether Nigeria will attain inclusive sustainability and Sustainable Development Goals (SDGs).

This study intends to takes its examination on Kudeti Community, Ibadan, Nigeria by testing if inclusive sustainability and Sustainable Development Goals (SDGs) exists and could be achievable in year 2030.

Keywords: Inclusive Sustainability, Sustainable Development, Poverty, Ibadan and Nigeria

MUSCAH - Mixed Use Shipping Container Affordable Housing

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MpSCAH is a Mixed-use Shipping Container Affordable Housing concept meant to be a community improvement center dedicated to raising up local urban populations through crowdfunded investment and collaboration between the business, philanthropic, and public sectors. MpSCAH is an organization built from entrepreneurship and the forms of this trait that build sustainable, lasting, and thriving communities using the triple-bottom-line philosophy to create a regenerative economy. This mixed-use development concept is built for production rather than consumption; and serves the local economy through new job creation, several types of produce, affordable housing, and public education.

The MpSCAH complex is meant to be an innovation hub providing those in need with the amenities to grow and prosper while benefitting the local civilization. This is done using the STEAM Educational system (Science, Technology, Engineering, Arts, and Mathematics) and the tools for self-development that foster long term habits of success for all. These amenities and tools include: a Technology Lab, an Entrepreneur Uplift Center, and an Education Facility. The concept provides all of this through partnerships with non-profits, local businesses, and tax collaboration with the government. MpSCAH is a concept built to be a sustainable solution to urban housing while also bringing an innovative environmental conservation method to combat climate change and the affordable housing crisis.

The MpSCAH complex is an environmentally friendly development built using the latest in sustainable building technologies for energy savings, maximum yield aquaponic growing techniques, and efficient cost saving modular housing using ISBUs. The project focuses on a net zero energy strategy using geothermal, solar, wind, and water turbines to effectively reduce costs while providing benefits to the local energy supply. The development provides vegetables, seafood, and eggs for the local community to access quality fresh ingredients that provide adequate sustenance for a balanced healthy diet. The site will mostly be constructed using International Standard Building Units also known as ISO Intermodal Shipping Containers; the use of these pre-fabricated steel structures provides green savings using a vast supply of containers available globally while also reducing a lot of the need for new construction, large pool of skilled labor, and a variety of materials, which is often timely and costly. MpSCAH is a concept built using ancient techniques of permaculture blended with regenerative attributes and the modern technologies available to humanity today. These complexes are designed with scalability, connectivity, and sustainability in mind to provide efficient and effective economic activity in the neighborhoods in which they are situated while being applicable to a global framework.

The MpSCAH complex is based on entrepreneurship and the uplifting mindset that comes with the practice of self-awareness. A true community improvement center must

focus on the building up of individuals through small businesses, job placement services,

financial planning and responsible money management, and the aspects that human connection brings to an area. As technology automation and artificial intelligence are replacing people in many aspects of employment, MμSCAH is designed with humans in mind. Focusing on Maslow's Hierarchy of Needs the MμSCAH complex is a concept that intends to solve some of the basic Physiological necessities of humanity while providing support towards the psychological attributes that promote people fulfilling their purpose and becoming the best version of themselves (Safety/Security, Love/Belonging, Self-Esteem, & Self-Actualization). For individuals to truly succeed in their community they must have access to food, water, and shelter, feel safe, accepted, confident, and realize their intended purpose – which in turn prompts that individual to give back to their local economy in some fashion. Ideally the MμSCAH project will eventually eradicate homelessness through encouraging people to become self-sufficient while proactively benefitting the local community and creating a regenerative stable economy that continues to grow and develop in an equitable manner providing opportunities for all.

MμSCAH is founded on the combination of entrepreneurship, environmental conservation, and economic prosperity for all; created through community collaboration towards the benefits of productivity providing experience and education for Human Progress.

Popularizing science among the youth of Jammu and Kashmir (An ethnographic study on the students of Jammu and Kashmir , India)

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The research paper aims to find out the reason why the students of Jammu and Kashmir don't opt for research in the field of science and technology and the factors that are responsible for it. According to research findings in many countries on Sustainability and Civic engagements, the awareness and participation are important segments for optimum goal. In India Sustainable Development is the part of Inter Disciplinary research in which Social science ,Humanities , Management are the important whereas Science is also has its own capacity to develop with sustainable development of the world. Since this research paper deals with the popularization of the science and technology among the youth so the methodology adopted here is a triangulation of both qualitative as well as quantitative research methodologies with the use of survey, ethnography, seminars, debates, photographs and videos along with closed ended questions as well as a open ended feedback of the seminars. Youth involvement in the science promotion is promoted through organizing Science Talent Promotion Scheme and organizing interactive sessions with eminent research experts from the state and across India. The area of study is district Doda in the state of Jammu and Kashmir of country India with a huge potential in terms of education with several big institutes operating from the area. Although more than 1000 respondents were reached but for the purpose of data collection only 300 respondents were selected using stratified random sampling. The analysis of data revealed the fact that all the four factors of economic, geographical, social and political are responsible for the sorry state of affairs in the field of science and technology. The lack of laboratories, youth awareness program and the required infrastructure also plays its part in keeping the state backward in the field of science and technology. The paper also aims to focus on Youth and Science and Technology are the key concept component of Sustainable Development.

Key words: Science and Technology, Popularization, Jammu and Kashmir, Youth, Inter Disciplinary Sustainable development, Awareness.

Public Engagement Under One Man Rule

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14 years ago Mayor Bozbey of Nilufer Turkey decided to include citizens in municipal decision-making. It has been challenging for all involved. Democracy in Turkey consists of voting: we have very high voter participation, even for local elections. And then citizens sit back till the next election. Therefore the public had difficulty understanding that they were being asked to get actively involved in decision-making. Bureaucrats who have traditionally made their own decisions struggled with, and resented, the idea of working with citizens. "We are the subject matter experts. Why are we listening to civilians?" was a frequent complaint.

Bozbey persevered. Neighborhood Committees were established and elections held in each neighborhood, with quotas for women and youth. (2017 Neighborhood Committee elections included a quota for LGBT representation, a daring undertaking in such a conservative country. The initiative was ridiculed by President Erdogan.) Processes were developed to manage the workings of the municipality with the neighborhoods.

Following the 2014 municipal elections, which Bozbey handily won, he strengthened the role of the Neighborhood Committees. They were actively involved in the development of the 2014-2019 Strategic Plan for the city. Furthermore, he mandated that Initiatives affecting specific neighborhoods would only be taken up by the Municipal Council after the Neighborhood Committees reviewed them and presented their position on the initiative.

One example of how this is working came last year when residents asked the Department of Parks to replace the poplar trees in the local park with trees generating less pollen. They were worried that the pollen was aggravating respiratory issues. The Department informed the residents that the issue needed to be reviewed by the Neighborhood Committee before the Department could get involved. The Committee determined that they didn't have the expertise to evaluate the issue. Therefore, they contacted the School of Medicine at the local Uludag University, asking for a report detailing the impact of poplar pollen on the respiratory system. Secondly they contacted the School of Agriculture, asking for recommendations on the type of tree that should replace the poplars in the park. In a series of neighborhood meetings, the School of Medicine reported that poplar pollen was no more of a threat than pollen from the grass. The School of Agriculture recommended pruning techniques that would minimize the pollen from the trees. The trees were saved.

The work of Mayor Bozbey and the citizens of Nilufer is especially noteworthy given of the political environment in Turkey. As Turkey sinks deeper into one man rule under Erdogan, Bozbey is courageously and aggressively pursuing participatory democracy

knowing full well that he is in the cross-hairs of the AKP government, and especially Erdogan.

NOTE: In 2017 the Nilufer Municipality received the European Transformative Action Award.

Sports Diplomacy and the 2018 Pyeongchang Winter Olympic Games and in South Korea

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Marlana Salmon-Letelier

The Olympic Games have long been the pinnacle of athletic excellence and socio-cultural interchange. The processes pre- and post-event have allowed for countries hosting the competition to benefit economically. Potential benefits from these international sporting events include but are not limited to cultural exchanges, economic profit, improvements in infrastructure, and changes in domestic and global diplomacy. There have been several accounts of athletes and countries using the grand stage of the Olympic Games to address political issues within their country or on a global platform. This act or expression of political protest through athletics is known as sports diplomacy. The political effects that resulted from the 2018 Pyeongchang Winter Olympic Games in the Republic of Korea (South Korea) have yet to be studied in depth. This project seeks to capture this historical moment and explores how the 2018 Pyeongchang Winter Olympic Games have influenced the political atmosphere and relationships among the Democratic People's Republic of Korea (North Korea), the Republic of Korea (South Korea), and the United States of America. This paper presents the results of a news and media analysis as well as an analysis of interviews with former South Korean national team athletes, political experts, and politicians in South Korea and the U.S. The study considers the overall political tension between these feuding nations and how it has shifted their interactions both at the national and international stage. Capturing this historical moment and the role of sports diplomacy will contribute to.... [why is this extremely important - how is this filling in the gap on research in sports diplomacy beyond just capturing this new situation].

Sports, Development, and Local Engagement: Case Study of the Pyeongchang Olympics 2018

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Supporting and developing sports initiatives have proven to be cost-effective in making great progress towards meeting international development goals such as peacebuilding, reducing poverty, improving gender equality and access to education. Many times, mega sporting events such as the Olympics have the potential in producing either negative and/or positive economic growth effects for a country. In this paper, we evaluate whether the overall agenda and goals of the Pyeongchang Olympics was well addressed by the South Korean government and supported by its local people by conducting qualitative interviews. This paper will conduct a policy analysis, and utilize data collected through surveys of local people both in and outside of Pyeongchang in Korea prior to the opening date of the Olympics. This paper seeks to evaluate whether the goals and agenda of the sporting event was adequately produced through participation of its local people by understanding their perception of the event to make it an overall successful event for the host country.

The Government's housing policy: the integration of the recently re-lodged population in the new urban poles with special focus on women and youth (Case study: DJELFA Province)

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1- Presentation:

The Algerian government attaches a special interest to the housing problem all over the country. Huge programs are being carried out in this field. Hence, an important overall budget, combined with human and material resources, have been dedicated for this purpose. So far, a considerable success has been achieved. However, the integration policies pursued by the government are being criticized.

As one can easily notice, bringing families, some of them are extended families, from different tribes, areas, economic and social backgrounds together, engenders a new dilemma which the local authorities are obliged to face and to solve. In fact, the problem implies two interrelated issues; slum eradication and urban growth & expansion.

2- Analysis of chosen challenge

The Statistics provided in this filed are quite reliable and which is true for my province (Djelfa) too. When we take into consideration that;

- ☐ 30% of women in slums do not benefit from enough healthcare programs;
- ☐ School attrition problems;
 - ☐ 35% of slum children do not have regular schooling.
 - ☐ 40 % do not get the secondary level.
- ☐ School violence;
- ☐ Lowness of school scores of the pupils;
- ☐ Ignorance of women;
- ☐ Persistence of women in living with traditional ways and unawareness of what they can achieve with nowadays living conditions.

3- Discussion of solutions:

All these elements, put together, have culminated in a very complicated situation which reveals the shortcomings of the government's housing policy, especially with the lack of well-oriented and scientifically-based integration policies and the total absence of applied reliable experiences. The aspired integration of the different categories of society for mid-term and long-term periods can be achieved only when priority is given to women and youth.

My role, as a recently appointed administration responsible is to:

- Bring together in the decision-making process the different actors: government officials, public and private sector, and civil society, and to launch the basis of inclusive and constructive dialogue;
- Increase the efficiency of available structures, schools, worship places, economic establishments;
- Raise awareness using social media and the local media: province radio, electronic sites, and local famous voices, about the need for urgent action.

Studies at HIS will enable me to:

- Master the academic terminology and acquire more recent knowledge of latest theories about urban development studies.
- Use the latest methods of analysis and exposition of facts and data.
- Meet different professionals with different approaches, experiences and solutions.
- Share my experience with others;
- Make acquaintance and have access to a net of experts and practice;
- Make a future studies about the acquired experiences and who knows may be write articles about it.

The Impact of The Lack of Civic Engagement on Developing Societies: Libya

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“Every generation constitutes a wave of savages who must be civilized by their families, schools, and churches” (Judge Robert Bork, 1997)

The seven years I have spent in the United States and the way the cultural and the educational landscapes has impacted me made me a firm believer that humans are born, but citizens are made. Therefore, the biggest concern I have regarding Libya and other societies with a similar context is the obvious lack of civic development that today's children, our future generation, will suffer from and widen the gap between them and the rest of the globe. Being a member of the Libyan society, I witnessed how parents value education and how they compete to help their children to acquire all the basic educational skills, cover school materials and be good in math, science etc. However, when it comes to civic engagement, there is a zero existence of it within the school curriculum and activities, which negatively reflects on the development of the Libyan communities. The 17th of February revolution and the events that followed are the biggest evidence of the absence of civic education that clearly mirrored in our political failure and every effort toward smooth transitioning to democracy. One can simply compare the number of Libyans who voted in July 2012 and the tremendous decline that is shown in 2014 parliament elections. Further, the increase in violation rate, property destructions, savage militias ...etc., are all a clear indication of the missing of civic education and the majority ignorance of the value of civic engagement. Healthy democracy requires constant participation of its citizens. If this practice of commitment and participation to the society were rooted in children from kindergarten, nothing would hinder them from quitting what is learned to be part of their responsibilities toward their society. Should we blame schools for such failure? I would argue that schools play the biggest role in engaging children in civil society, however, from my own perspective, the blame must be shared among the four vital components on impacting our behaviors and thus, our community. Schools, family and mosques play mutual responsibilities in creating a healthy citizen able to embrace democracy or a one who suffers from deficiency in civic engagement.

This session will explore a model for creating global and competitive societies. It is based on John Dewey, and Paulo Freire's criticism of the authoritative educational system that is an anti-democracy system which was the foundation of modern educational system in the US and elsewhere in the 19th and the early 20th centuries, and their embracement of the progressive pedagogy as an alternative to the anti democratic educational mode.

The need for youth involvement in the Sustainable Development Project.

Submitter: Oguche, Divine

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The gathering of youths with great passion towards the advancement of their community and locality at large is of immense importance as it is an avenue for adequate participation in communal and sustainable development project.

It has always been my desire to engage my self in activities that will promote the sustainable development goals in my environment and this can be achieve by attending summit and conferences that are geared towards proffering lasting solutions to the aforementioned.

The gathering will further enable me to teach other like minded youths across the globe on the need for youthful involvement in areas of sustainable development project thereby giving them the opportunity to acquire firsthand informationabout happenings around the globe and the possible ways in which solutions can be reached.

My attebdence in the conference will also give me the opportunity to share my little experience with other great minds as to ways I have been able to achieve some certain success in propagating the sustainable development goals in my immediate environment.

Lastly, I believe that the conference will be an eye opener for attendees and as well a medium to network and be among the chain for a better society at large.

The Oil And Gas Sector And CSR: Environmental Effects And Sustainable Development

Submitter: Makpor, Mercy

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The paradigm shift in the Corporate Social Responsibility (CSR) practices of Oil Multinational Corporations (OMNCs) in the light of a late sympathetic behavior towards environmental change and development in the society is currently becoming a global reawakening. This shift in CSR practices of OMNCs is gradually becoming a willful acceptance on the part of organizations in the oil and gas industry, to exercise advanced accountability for oil and gas activities which have become extremely harmful to the environment. Hence, the extent of CSR practices of these organizations towards the environment and societies, continue to be questioned both locally and globally.

In the light of the above explanation, the study considers OMNCs such as ExxonMobil and Shell from the developed countries' perspective and a national oil company such as the Nigeria National Petroleum Corporation (NNPC) from a developing country perspective. The study investigates the extent and impact of CSR practices of the above-named oil companies. Thus, the first part of the study considers the origin, meaning of CSR and the rationale for CSR practices both in the developed and developing societies. While the second part investigates the extent of CSR practices of the oil companies by putting into consideration the following major issues begging for attention in most societies where these OMNCs are operational: the environment, and sustainable development.

Keywords: CSR, Development, Environment, Oil and Gas Industry.

The Role Of Public Stakeholders In Contributing To Better Urban Development

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Sustainable urban development cannot be realized if the stakeholders involved are not given their due importance. Urban development involves the designing of cities in a manner that is accountable and satisfactory to its citizens. This might include transparency and accountability, equality in justice and the right of the citizens to certain information governing the said locality.

The most important stakeholder is the citizen. For this set of persons to contribute to a better urban development, they should be given the right to participate in key development decisions that affects all the sectors of the system. This is a major problem in Africa whereby ordinary citizens are considered as the underdogs and unworthy to be part of the decision table. Elected officials and governing authorities' should be able to give detailed account to its citizens on their development policies and system management

Another important set of stakeholders are the private sectors, local governance and civil society groups. Their activities contribute to a better urban development. They should be given better working policies and regulations so as to promote their activities which help in advancing the locality, thus giving a better life to the citizens. In partnership with the authorities and citizens, an accountability system can be put in place to cross examine their activities so as to see if it is beneficial or detrimental.

Local authorities should be accountable to its citizens and not work independent of them. This is the case of most African countries. The authorities are considered as those with the knife and the yam. The advancement of an urban area should be completely characterized by a good judiciary system where no one is above the law irrespective of their position and status. Each and every authority should be accessed and brought to justice in case of corruption. Equal rights to law for all. Most areas are stalled in their development because of corrupt officials and practices that are never brought to the justice table.

The authorities should always create systems in place where young people can be drilled to take over from the old folks when they retire from active duties. This will ensure continuity and maintenance of productive projects. Once there is no suitable replacement, continuity is highly affected and development retarded.

It's noted that a community that have both the old and young with no gender bias brings in together a lot of dynamic ideas for a healthy community.

If these things are taken into consideration, the quality of life will be improved and the citizens also will become suitable.

Extract by Mr. Nsame Charles Bawe; Business entrepreneur

The Role of Public Engagement in Peace-building and Security Reform for Better Transformation in the Palestinian Territories

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Local ownership and public engagement (which are directly linked to the SDG of peace and justice and partnership) has been widely recognised as a central feature for peace-building and security reform in the under-fire states like Palestine (UN, 2008). However, there is no academic researches or literature has focused before on the role of public engagement in peace-building and security reform in Palestine. Only limited number of NGOs' reports linked to specific development projects have been conducted in this area with no scientific approaches demonstrated for achieving development considering this feature.

This paper analyses the current status of the local ownership in the urban development process in Palestine by measuring the degree of the society engagement in participation in the formulation of the national development policies, gender responsive political engagement and socio-economic development participation. The study uses semi-direct interview to meet the opinion leaders and decision makers at the local level as well as meeting the NGOs acting as peacebuilding mediators to introduce to their development strategies and evaluate them till this moment. Moreover, the Palestinians are surveyed to see the gap between theory and practice in peacebuilding and security reform in Palestine.

The current division and fragmentation on the political level has impacted the credibility of the local government of Palestine and other peacebuilding actors which affected the public trust and confidence and discourage them to part of the development process. In addition, the traditional international strategies of developing Palestine through NGOs always depend on focusing on deficiencies where local are redefined within their societies instead of focusing on the strengths of the local Palestinians and the indigenous community and support them to find solutions for their own problems. Also, lack of role models and community builders -especially young leaders- who can lead the positive transformation in the society. Theoretically, the more the society is represented, the more stable the strategies of development are likely to be. However, the development strategies and policies are not gender responsive with very limited participation of women (only 2%) in the decision-making level due to cultural and political constraints. Thus, moving toward statehood and achieving peace, all peacebuilding and security actors in Palestine need to revise their approaches and strategies to engage wide range of publics and to be more gender responsive, inclusive, resilient and non-politicised.

Towards Sustainable Urban Development: Evaluative Criteria for Ensuring Public Engagement in Public Private Partnerships Infrastructure Planning.

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Several Public Private Partnerships (PPP) literature sees public engagement at the planning stages as critical to attaining sustainable development outcomes in urban infrastructure projects. Previous research has provided some indicators related to this consideration. For instance previous indicators include: 'community engagement'; 'community-based planning'; 'collaborative community building'; 'citizen participation'; 'civic participation'; 'civic engagement'; 'collaborative participation'; and 'public participation' are used interchangeably in debates about inclusive forms of local governance. However, the literature does not address the evaluative criteria for ensuring public engagement in PPP infrastructure planning. In order to address this question, this paper reviews the outcome literature on PPPs in terms of two key principles of public engagement: inclusivity; and transparency. According to this taxonomy, six processes are examined and the normative patterns stimulating public engagements were reported. The review focuses on the planning and design phases because they offer the greatest potential for influencing project performance. The intrinsic value of institutions (rules) to PPP project outcomes were also presented. The paper suggests that six meta rules-in-form (RiF): scope; position; boundary; information; aggregation and authority rules derived by merging the Institutional Analysis and Development (IAD) framework rules with the observed normative patterns could serve as the evaluative criteria for ensuring public engagement with regards to achieving sustainable development outcomes in urban PPP in infrastructure projects. The paper concludes with a call for empirical research, especially meta analyses and case studies to test the model and to provide data for furthering our understanding of how and to what extent institutions influence public engagement in sustainable development.

Keywords: evaluative criteria, infrastructure projects, public engagement, public private partnerships, sustainable urban development.

Vargem Grande Neighborhood Development: Recommendations For The Valorization Of Local Culture

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The growth of cities has not been happening in a planned way, in order to promote the much-desired fair distribution of well-being in the territory, discarded incessantly in Brazilian legislations. This is the case of Rio de Janeiro and the neighborhood of Vargem Grande. In the last nine years, the neighborhood has gained new land use legislation, called the Vargem Structural Plan (PEU) (Complementary Law 104 of 2009). This law imposed on the region new urban parameters, with the clear goal of contributing to the local growth with a similar dynamic to the neighboring neighborhoods, focus on high buildings and car-oriented which hinders the local culture of Vargem Grande. After a few years of implementation of the law, a process of construction of new legislation is initiated by the public power, more appropriate to the region. The general objective of this work is to contribute to the incorporation of local aspects into urban development projects. Specifically, it intends to identify to what extent the new 'PEU das Vargens' (the law) incorporates the culture in the proposed development for the region. In this sense, it's presented the concepts of development and culture taken as reference in the analysis; the history of the region and the characteristics of its culture; and analyzes the different development projects proposed for the neighborhood, over the years, and their impacts and possible impacts on the way of life and daily practices. To identify the characteristics and culture of the neighborhood, a brief bibliographical and documentary survey was carried out. In this sense, questionnaires were also applied to the population that lives and frequents the region, to understand the vision, the dynamics and the yearnings for the future of the neighborhood. The analysis showed that, like the other legislation on land use and occupation involving Vargem Grande neighborhood, the 'PEU das Vargens' proposes a development model focused mainly on real estate capital gains, to the detriment of the suppression of green areas, swamps and other areas of great environmental importance. The model also undermines the local culture, inasmuch as it proposes infrastructures that are out of step with the current model and that will certainly influence the changing patterns of relationship and socio-cultural and environmental interaction reflecting in the wrong direction for the achievement of SDGs. As an alternative to what was proposed in the 'PEU das Vargens', the Popular Plan of Vargens area was drawn up, which presented new development visions, focused on stimulating local culture, non-motorized and public transports, environmental preservation and social participation.

Democratic Accountability for Financial Irregularities in Local Government: The perspective of the Youth in South Africa

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South Africa has been rocked in recent years with allegations of corruption and ‘state capture’ at the highest levels of government. Corruption, however, is an issue which continues to loom large in all levels of government, be it actual or perceived.

In South Africa, the youth (15-34 years old) account for 37.4% of the population. Such a number can potentially have a powerful say in the sustainable development process in urban areas, where almost two thirds of South Africans live. To do so, however, they must choose to be engaged, and to hold government to account. Unfortunately, voter registration statistics reveal the youth to be South Africa’s most politically disengaged group at the ballot box.

This study combines a quantitative analysis of electoral accountability for financial irregularities in South African municipalities with a qualitative study involving young South Africans. This can help to explain the factors driving (dis)engagement with democratic processes as evidenced by voter registration statistics, and also to help to build a picture of young people’s perceptions of corruption, as well as their trust in elected officials. Utilising interviews with young South Africans (18-29) in two metropolitan municipalities, a snapshot of youth attitudes to engagement, democratic accountability, and their assignment of responsibility for irregularities in local government finances can be developed.

While qualitative research of this nature does not seek to provide generalisable findings, it can nevertheless better inform our understanding youth attitudes to electoral accountability. One of the SDG Goal 16 targets is to ‘ensure responsive, inclusive, participatory and representative decision-making at all levels’; this is cross-cutting across the entire 2030 Agenda. If decision-making is to be representative, then the youth must have their say. It is hoped to provide clarity of purpose to efforts to engage young people in the democratic process, and in doing so, drive accountability to ensure that South Africa’s cities move towards the SDG targets.

As the smallest member of the BRICS countries, South Africa stands at the bridge between the developed and developing worlds, with much progress yet to make towards 2030. Understanding democratic accountability provides a useful starting point from which to tackle deficiencies in youth ownership of the 2030 Agenda, which is vital to ensuring a sustainable future.

A sociotechnical innovation for driving mobility to sustainability in a small rural town

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Peri-urbanization has long been perceived as an anti-ecological development of the city. Car dependency, destruction of agricultural lands, erosion of natural areas are the symbol of the peri-urban development's high environmental footprint. However, the progressive awareness of the sustainable development potentialities of low-density areas (local food network, sustainable rainwater management, etc.) tend to improve the image of peri-urban areas in the academic and political discourses. Although these considerations, mobility remains the main environmental issue of these territories. Indeed, due to the dispersion of services and the trips they are constrained to accomplish in their daily life, the slightest increase in the cost of energy affects the peri-urban inhabitants. Then, economic and ecological reasons explain the progressive emergence of carpooling and proactive policies to make the mobility more sustainable in peri-urban areas.

In this paper, I will present some results of a research about an experimentation called My Anor My Mobility. This experimentation relies on a partnership between the small town of Anor in the Hauts-de-France and WeNow, a Parisian startup that proposes a digital coaching for eco-driving. Through the installation of a small box in individual cars, drivers receive information on their driving habits (fuel consumption, CO₂ production, etc.). This information is daily or weekly sent to the driver via a phone application, accompanied by advices in order to bring him/her to adopt eco-driving practices. The aim of this experimentation is to give the opportunity to 175 households to try the eco-driving box and then to bring individuals to change their driving behaviors and to transform their mobility.

Based on interviews with box users and political actors, this paper aims at showing how this socio-technical innovation change (or not) driving and mobility behaviors. The research is inspired by the multi-level perspective (Geels, 2002), which is a fruitful theoretical framework for analyzing the transformation of a mobility system. However, as some scholars have argued, this approach fails to take into account the role of agents and the relations of power (Farla and al., 2008) and give too much importance to technology (Schwanen, 2017). Hence, I take into account territorial and political issues, socio-economic characteristics, residential trajectories and inhabitants' perception of sustainable development in order to understand the diverse uses of this innovation (resistance, appropriation, playful approach, misappropriation, alternative uses). That is a way to show how this innovation manage (or not) to drive behaviors and the socio-technical regime (in this case: the mobility system, involving political, territorial, cultural, social issues) towards a more sustainable form. Finally, this paper reveals the importance to take into account « systems of practices » (Watson, 2012) in the development of a socio-technical innovation in order to impulse a real transition.

Access to water resource of quality and quantity in contexts of climate change and implementation of SDGs in Senegal: example of the commune of Bambey

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Access to drinking water for all is one of the major challenges of human development in the twenty-first century. According to the United Nations, it is a fundamental right for all.

In Senegal, programs and projects aiming the improvement of living conditions, allowing people adequate access to services of clean water and sanitation are implemented. The Program for drinking water and sanitation of the millennium has been put in place in 2005 by the Government of Senegal in that context. The main objective was to reduce by half the number of people who do not have access to clean water.

Even if Senegal has had positive results in the achievement of the objectives of the Millennium for the development in regard of the water sector, accessibility to water and its quality still poses many problems for its population. The situation presents itself differently depending on the regions.

Located in the center of the country, the commune of Bambey, in Diourbel region, is one of the most affected communities. The region presented drained valleys and some surface water pools formed of temporary ponds fed by the rainwater. The deficit of rainfall and repetitive droughts ended up drying them out.

Water resources in Diourbel are highly mineralized and contain fluorine in proportions exceeding the recommended values of the World Health Organization (WHO). The disastrous effects of climate change on the water resource are getting more tangible. The price of clean water per cubic meter is not in agreement with the water quality of the resource. In the public interest of Senegal, several actions are carried out to find innovative solutions to this water problem. Thus, in 2015, when the international community has adopted the Sustainable Development Goals (SDGs) on the Horizon 2030, several regional workshops and meetings related to SDGs, specific for Senegal were organized by the Ministry of Environment and Sustainable Development. At the end of these consultations, seven SDGs were considered as top-most priorities at the national level with SDG 6, related to water quality and access, at the very first place. Therefore, for an effective implementation of this SDG 6 and to cope with climate change, public authorities and researchers are being mobilized. The objective is to find an appropriate and sustainable solution to the problem.

This communication will put the emphasis on the quality of the water in at the Bambey commune linked to the achievement of SDG 6, in a context of climate change.

An Initiative to Close the Urban Water Cycle Loop in Indian Cities: Case of Kishangarh City, Rajasthan, India

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Water bodies are an important part of any urban ecosystems as they perform significant environmental, social and economic functions. In the era of climate change these urban water bodies prevent heat island effect by regulating the temperature and help the cities to be flood resilient. Indian landscape is dotted with large number of lakes, reservoirs and wetlands. Many of the Indian cities developed around the water bodies or on river banks. But today these cities are facing acute water scarcity; the numbers of lakes in the cities are reducing in an alarming rate whereas the quality and quantity of the water bodies are deteriorating. Haphazard urbanization and in the race for development, these cities jeopardize the viable functioning of ecosystem especially water cycle system. Water bodies in Indian cities are facing issues due to encroachment in the catchment areas around the water bodies lack of drainage networks, lack of waste management, sewer networks etc. Due to disposal of waste in the open drains, results in choked drains ultimately leading to urban floods. The waste is carried off by rainwater run-offs and by flood water to the main streams and contaminate the main water bodies. Besides that the variation in the intensity and frequency of rainfall and unexpected change in temperature also impact the availability and quality of water sources. The distance of the cities from their water resources is increasing affecting the cities expenditure on availing water infrastructure. In such scenario an integrated urban water management provides an alternative, innovative and locally acceptable approaches.

ICLEI – Local Governments for Sustainability (ICLEI), South Asia in collaboration with India Water Partnership (IWP) with the funded support from Global water partnership initiated a project on Integrated Urban Water Management (IUWM) Planning and Implementation that focuses on conservation of local ponds in the city by considering various IUWM approaches. A Rapid IUWM framework is developed under this initiative. This framework is based on IUWM toolkit that was developed by ICLEI SA under Adopting Integrated Urban Water Management in Indian Cities (AdoptIUWM) project funded by European Union (EU). This framework allows cities to build efficient water management system by establishing link between various sectors (water sector and allied sectors like waste water, storm water etc.) and close the urban water cycle loop within the city. The project promotes and advocates closing the urban water loop by considering water supply, wastewater and storm water as part of the same loop and

recognizing the fact that solid waste management should be considered as a part of the same water loop because it impacts the drainage system and quality of water sources.

Activities under the project focus on conservation of ponds in the city through measures for pollution abatement (for liquid and solid waste). As part of this initiative, 500 houses in 2 wards of Kishangarh (ward 13 and 18) have been sensitized on waste segregation to reduce pollution in the natural drain and catchment of a local pond. Municipal officials and sanitary workers were trained on collecting the segregated waste collection and vermi-composting. The project has been able to achieve 80 % segregation at source and a decentralized vermi compost facility with the wards. It has led to an improved environment which, in turn has led to an efficient management systems, improved drainage system, and economic & social benefits for the community as well as vulnerable sections of the society. The project also helped in building community led management system. The project is directly linked with ongoing Clean India Mission to be sustainable. The adoption of an IUWM-based approach also helped the city to work towards Sustainable Development Goals: good health and wellbeing (Goal 3), for clean water and sanitation (Goal 6) and for sustainable cities and communities (Goal 11).

Effectiveness of Community Based Participatory Research on the Educational Support Through Sport: Syrian Refugee Camps in Jordan

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This work studies the role of aid in promoting a sense of self-reliance among refugees and thus reducing the burden on asylum countries. It is thought that asylum countries' increasing acceptance of refugees can increase the number of refugee-related demands. In the case of refugee camps, sports activities have been used to promote life skills education and self-reliance among refugee youth. Recent research about development through sports indicates that aid through sport typically does not include ways to continue the program itself or involve implementers on the field to activities that are the donor countries' responsibility. Therefore, refugees, who are the main stakeholders, cannot subjectively engage in educational activities through sport. Thus, it is possible that aid is not helping to promote self-reliance among refugees.

This paper aims to clarify the effect of Community Based Participatory Research (CBPR) on the educational support provided through sport in order to implement activities that promote a sense of self-reliance among refugees.

The study took place from September 2015 to March 2016 and from March 2017 to September 2017 in the Zaatari Refugee Camps in Jordan, and involved Syrian volunteers who are refugees, Jordanian staff members working in refugee camps, and refugee youths, all of whom used CBPR to implement education activities through sport activities organized by a non-governmental organization. We comprehensively analyzed the whole CBPR process.

When I did that: Even though the members of CBPR recognized the issues in the refugee camp, they could not approach and try to solve the issues because they were pursued by evaluators and inspectors at the beginning of CBPR. However, the members were able to use grassroots methods to implement education activities with a sense of ownership through CBPR, such as sharing education and youth related issues. Consequently, the Syrian volunteer revealed that the sports event, which was organized by the assistance agency, was creating an opportunity for violence and inequality in the refugee camps. The volunteers suggested that the implementer who organized it should establish both proper rules and an environment in which participants could play by these rules.

This study shows that aid organizations tend to implement temporary sports events and evaluate their effect in order to fulfill their accountability requirements to donors. Therefore, activities that have a long-term vision, such as training implementers, are not performed sufficiently. This does not promote refugees' self-reliant behavior, which enable them to analyze local issues and take action even while being extremely vulnerable. Thus, CBPR can create a conducive environment for such a process. It also makes it possible to train staff who can use sports as an effective education tool

local, and develop and continue education aid, which contributes towards fostering a sense of independence and ownership in refugees.

The implications of this study will help to promote strategies to use sports to develop educational activities. The practice of CBPR by the Syrian refugees in the camps is a powerful example that encourages us to take action to contribute to sustainable development as citizens.

Green Growth: Social Impact Analysis of Resiliency/Sustainability Plans

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The terms green infrastructure/urbanism, resiliency, sustainability and the like have become political buzzwords when describing the future of "green" development. The vision of what a "green" city often conjures up images of open green spaces, LEED-certified buildings, roofs with solar, waterfront cafes but where is the space for industrial uses and working class? While it is difficult to find anyone against "sustainability," asking how do define it, the process it is created, for whom and what purposes is more contested. The urban green development movement has created an issue that combines environmental justice, displacement and gentrification: environmental gentrification.

Environmental gentrification is broadly defined as the process whereby efforts to improve urban resiliency/sustainability drive up property values and displace low-income residents. In the USA, green infrastructure projects such as the High Line in New York City, Beltline in Atlanta and the "606" in Chicago have transformed gritty neighborhoods with locally-owned businesses into chain store saturated tourist destinations with rising property values. Similarly, resiliency efforts in areas devastated by hurricanes in the USA such as the Florida Keys (Irma), coastal New Jersey and New York City (Sandy), and Houston (Harvey) have resulted in displacement of low- to middle-income housing with larger, more expensive homes that draw larger a tax base for municipalities.

Although sustainable development should integrate environmental and social justice with economic development, what appears to have happened is economic growth driven by environmental gentrification. Fortunately, there are strategies we can use to ensure that urban areas affected by blight and economic downturn can implement environmental projects without resulting in environmental gentrification. This research investigates how sustainable development can potentially provide communities with alternative ways of thinking about economic development, resource use, and social justice. Additionally, a Social Impact Assessment is suggested to analyze the influence that resiliency/sustainability plans will have on a community.

Mobility Futures: Ethical and Policy Implications of Autonomous Vehicles

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Autonomous vehicles (AVs), also known as driverless cars, have moved from labs to public roads in the last few years. An innovation driven largely by traditional automakers (GM, Volvo, etc.) as well as automotive newcomers (Google, Uber, etc.), AVs present the possibility of a transportation revolution akin to the first mass produced automobiles. The AV manufacturers tell us that AVs will be safer and more efficient than the cars we drive today, with a wide range of benefits for how we live. But a car can also be a 4000-pound weapon, whether by accident or ill intent. We generally accept (or overlook) the danger and risk level of cars today: in the U.S., over 40,000 people die from traffic accidents annually, and over 90 percent of accidents are caused by human error such as speeding, drunk or distracted driving. Globally, over 1 million people die in auto-related accidents annually. Through a legal literature review and structured interviews with transportation policy makers, this paper examines the key policy and ethical considerations of mass AV deployment and provides a framework cities can use to plan for mobility innovation.

South by SEQ: A comparison of flood resilient design strategies between Miami, Houston, New Orleans and South-East Queensland, Australia

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Brisbane and other cities in South-East Queensland (SEQ) make up Australia's most flood-prone urban area. In a region where floods caused billions of dollars of damage only seven years ago, efforts to protect Queenslanders from future events has been slow.

With research funded by a University of Queensland AE Brooks Travelling Fellowship, this paper produces a critical comparison of three American cities with similar ecological, developmental and economic properties. Through the lens of the SDGs, the research outlines several challenges for infrastructural and architectural intervention towards coastal climate adaptation in Miami, New Orleans and Houston in contrast to the limited development occurring in SEQ. With each city having a different approach to coastal climate adaptation, namely infrastructural, property-based and landscape infrastructure respectively, the research presents a constructive opportunity to learn from cities which have made built efforts towards adaptation.

A series of interviews reveal the universal issue of funding and its impact on urban design- namely the prioritising of infrastructure over public amenity; connection between landscape infrastructure across a wider urban area, thus efficacy; and importantly the issue of ongoing funding for maintenance of climate adaptation interventions. Equally a series of architectural analysis revealed the detrimental impact of siloed intervention on public space and city life, for example Miami Beach's \$200M 'Rise Above' initiative where roads being raised up to 3ft are limiting access to spaces adjoining at existing grade. The work, undertaken by the City of Miami Beach's public works department appears to ignore opportunities to improve public amenity along the street.

This paper builds on a long series of research by the author on flood-resilient architectural design undertaken in practice at James Davidson Architect (Australia) and The University of Queensland, including 4 flood-resilient prototype homes built through private architectural practice and a number of research papers detailing the policy, planning and affordability challenges these presented in their procurement. With extensive research and practice experience from the author in the local, state and federal barriers to development in the Australian and US context, the paper demonstrates an opportunity in learning for small to medium cities to adapt to climate change. These lessons showed the importance of a holistic approach- one which incorporates principles of green and blue infrastructure into an overall planning framework encompassing water management, public works, town planning and allied fields such as insurance.

Through this rationale, the paper concludes on a series of findings for each cities' strategy and how they relate under SDGs 9, 11 and 13, breaking down priorities into

comparisons, where the values and pitfalls of each strategy are visualised in a holistic way, demonstrating future gaps between policy and practice to be addressed.

Space Technology for Water Security in Jaipur City of India : A Policy Perspective

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1.Introduction Water security involves protection of vulnerable water systems, protection against water related hazards such as floods and droughts, sustainable development of water resources and safeguarding access to water functions and services. It is primarily concerned with human interventions in water systems. The unplanned growth of settlements and infrastructure development hampers surface water flow and recharge process of groundwater. Another important issue is urban sprawl without considering geomorphologic landscape which causes loss of life and property due to urban flood. The present study investigates the impact of unscientific planning and management of anthropogenic activities in the Jaipur city of India.

2.Objectives The main objective of the study is to understand the anthropogenic activities that have impact on water security of Jaipur city. The study assess the impact on water resources due to changes in urban morphology, encroachments, unscientific land use, haphazard growth of colonies and emergence of slum etc. and suggests management strategy that includes legal and institutional framework to solve the problem.

3.Method The study has been carried out on the basis of remote sensing as well as secondary data. The satellite data have been interpreted to prepare thematic maps mainly land use and water. The maps have been put in GIS environment using Arc Info, MapInfo software. I have used Survey of India Topographical Sheet on 1:50,000 scale and GPS for field survey and collect ground truth for interpretation of satellite data. I have also collected information from online department. In addition, legal and institutional provisions on urban water management have been reviewed and examined.

4.Findings It was found that increasing pressure of population and un-systematic anthropogenic activities have made negative impact on water resources. In early stage, the city expansion was restricted to food hills only and no drainage system was disturbed. As a result, 60 river streams out of total 518 in urban area and surrounding are completely blocked by settlements, and out of 4174 wells and 4703 tube wells, 574 well and 1243 tube wells have been covered by pavement, hence recharging cycle of these wells have negatively affected. There are a number of laws, rules and regulations to protect the water but they are not implemented properly.

5.Significance of the work for policy and practice The study is significant from urban land use planning and management point of view. The study demonstrate , how satellite data can generate urban geomorphic landscape and lineaments map which are important for recharge of ground water. A synoptic view of satellite can help in providing information on the path of wate ways which should be protected and channelized properly to avoid flood situation in the urban area. Base on this information urban land

use planning and policy may be framed for disaster management and water security. The study is useful for urban planner, managers and researchers.

Urban Metabolism and Minority Pulse Squad: A virtual education and art therapy experience on sustainable development solutions in cities targeting children

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In a world of inevitable change and transformation, art therapy and technologies can be used as strategies to achieve the United Nations Sustainable Development Goals (SDGs) by 2030. Through the usage of art, culture exploration, virtual reality, and storytelling to help achieve the SDGs. Through an advocate animation of environmentalism, characters called the Urban Metabolism and Minority Pulse Superhero Flow Squad which stems from a campaign titled the Urban Metabolism and Minority Pulse a collaboration between Politecnico di Milano and Metabolism of Cities to develop awareness to children on natural resource consumption behaviors, climate change policies, and sustainability strategies. The “Squad” uses virtual reality technologies to educate target groups to view sustainable development solutions across the world through an experimentation lens across a sensory multitude ambience experience. Each Superhero (Wind, Fire, Earth, Water, and Feelings) is created by a multitude of flows occurring under the forces of Mother Nature. It is the duty of the Squad to fight for the least representative populations by fighting environmental injustices and inequalities found in climate change and consumption policies.

Climate Change Adaptation in Coastal Towns and Small Cities

A Community Driven Vulnerability Assessment in Syanjga District, Nepal

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Many flood resilience and climate change adaptation projects begin with some version of a vulnerability assessment as a foundation. However, assessing vulnerability is often a reflection of the evaluator's expertise and the resources they are prepared to employ. In the sphere of climate change research, a function of external threats and internal sensitivities is typically used to calculate vulnerability. A methodology utilizing quantitative measures of environmental and socioeconomic indicators naturally follows, conveniently producing the type of measurable, comparable, and often visual evaluations that suit policymakers. While such research has very real merits, its utility within community driven development projects is limited. It is unlikely people see their own problems through a lens of the IPCC frameworks, measuring "the character, magnitude, and rate of climate variation" to which they are exposed. When preconceived indicators of vulnerability are a starting point for a project to launch community involvement, there is little room to measure the risk facing a community's heritage, culture, and social cohesion - factors threatened by either environmental risks themselves or even by the proposed 'solutions' to the vulnerabilities identified.

This research project will serve as a component of the Nepal Innovation Lab's "Andhi Khola Flood Resiliency Project." The Syangja District, the location for this project, is affected by increasing weather related disasters including landslides, debris flows, and flash floods. The project has two primary output goals:

- a. A prototypical, site-neutral community engagement model designed to build a foundation of local input, perception, and knowledge for the design of community landscape-based resilience strategies. This community engagement model explores methods for establishing long-term engagement through youth outreach and stewardship, redirection of destructive labor forces such as gravel harvesting through productive construction and landscape maintenance, and giving community members agency in the design process.
- b. A landscape design in Syangja exploring site-specific applications of resiliency infrastructures within local ecological, cultural, social, and geophysical context. This design will also outline the roles of activities such as youth outreach and local labor within the evolution and growth of the master plan. (Nepal Innovation Lab)

The goal of this study is to produce a place specific vulnerability assessment, using ethnographic research methods to distill definitions of vulnerability, resilience, and adaptive capacity as they are perceived by community members. The findings of this study may contribute to both objectives of the Andhi Khola Flood Resiliency Project.

First it may help inform the development of a community engagement model (project goal #1) by piloting a potential “first step” in establishing dialogue and/or better understanding local perspectives. Further, the study will directly assist in providing insight into the local ecological, cultural, social, and geophysical context for a landscape design (project goal #2). Fundamental questions including (1) who is vulnerable; (2) what makes someone resilient; and (3) what or where is valuable? will be addressed to reflect local perspectives and priorities.

Climate Change Adaptation In Coastal Towns And Small Cities: A Case Study Of Some States In Nigeria

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The pressures caused by anthropogenic activities such as housing development and road construction, oil and gas exploration, economic development and demographic changes, have partly fuelled several environmental challenges faced in the coastal areas of Nigeria. One of these challenges is the flood events which have recently caused damage of properties and loss of lives in the areas. The areas under study in this research are some of the coastal states in Nigeria (Delta, Ondo, Edo, Cross River, Kogi and, Maiduguri) on the incidence of drought, desertification, flood and erosion being adversely affected by climate change and the challenges faced especially recent flooding, erosion, drought and desertification leading to incidence and displacement of citizens, mitigating measures have been proposed to reduce the impact of climate change so as to achieve a sustainable livelihood and future.

This study examined possible mitigation and adaptation measures in coastal towns and small cities, using some states as case study to cope with the impact of climate change. The impact of climate change on the coastal areas is increasing their vulnerability in the security of water supplies and risk to existing infrastructure. It has also resulted in adverse health effects, increased threat to ecosystems and coastal development and runoff from industrial, agricultural and municipal areas, this has also resulted in higher nutrients or pollutant levels in coastal waters.

Proper integration of mitigating flooding, good drainage system into the national policy on climate change and the political will for implementation are effective in climate mitigation and adaptation to ensure sustainable future in coastal towns and small cities and to protect livelihood and food security in the country.

There should also be reliable and current scientific information to enhance knowledge on the dynamics of climate change adaptation in coastal towns and small cities as well as adaptation, the political will to implement adaptation strategies as well as the resilience of the fresh water and coastal waters by avoiding habitat destruction and pollution that could further aggravate stress on the ecosystem.

Climate Change Adaptation in Lagos State Nigeria

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Climate change has now been widely acknowledged as the greatest challenge to sustainable development, especially in developing countries like Nigeria. Coastal states such as Lagos (who has approximately 180km shoreline, predominantly low lying topography, with water bodies and wetlands covering 40% of the 3577sqkm land area) is particularly vulnerable to these impacts which are felt across every sector: water resources, agriculture and food security, land use, forestry and biodiversity, tourism, transportation and human health. Some of these impacts include livelihood loss, pollution of surface and ground water, increased risk of water borne diseases, loss of land to sea, loss of physical infrastructures, displacement of settlements and population, and loss of ecosystem and biodiversity.

Lagos state has consistently high temperatures, with the mean monthly maximum temperature of about 30°C and a mean annual rainfall of 1750mm (with floods occurring at these periods). Recent studies suggested that the expected climate change in Lagos State include a temperature rise of 0.04°C per year until the 2046 – 2065 period; a wetter climate with annual rainfall increasing by about 15cm and a rainy season that will be longer by 2 weeks till the 2046 -2065 period; and an increase in the frequency and magnitude of extreme weather events such as extreme heat days and more violent storms. This puts the mean monthly maximum temperature in the state at the proposed period at 31.2°C -32°C and the mean annual rainfall at 6250mm – 7500mm. if appropriate mitigative actions are not put in place before the period, the entire state will be under water.

This paper therefore reviews the knowledge and awareness of climate change among the inhabitants of the state, the adaptation strategies adopted by those concerned especially farmers, fishing communities, transport commuters and coastal tourism destinations managers as well as the concerted efforts made by government at local, state and federal levels with respect in combating it.

Keywords: Climate Change, Lagos State, Mitigation

Climate change impact on a tropical coastal city: Challenges in adaptation

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The fast growing thickly populated city of Kochi on the Arabian Sea coast of India is becoming increasingly vulnerable to the impacts of climate change. Kochi is one of the cities highly vulnerable to sea level rise. Even a one-metre rise in sea level would pose a massive threat to humans and installations in Kochi. If the current trend continues, 50% of the western part of the city will be submerged by the end of the century. The city is not well-designed to face the challenges associated with climate extremes. Improper drainage results in flooding in almost every monsoon season, resulting in the contamination of water resources and spread of water-borne diseases. Casualties associated with extreme temperature have become common. Changes in the track of tropical storms and large waves threaten the city. Coastal erosion has become a serious issue. Rise in SST and change in coastal circulation has affected fisheries and the poor coastal population depending on this sector. Respiratory diseases are affecting more and more people as a result of increasing humidity together with pollution. Changes in rainfall seasonality have adversely affected the availability of reliable water. Climate change leads to several socio-economic issues in the city such as migration and competition for resources, pricing of water, damage to cultural heritage, setbacks in tourism and spreading of new types of diseases. The city has to immediately implement schemes to reduce its vulnerabilities to climate change impacts that may include redesigning of the city to face climate related challenges, development of suburban areas, relocation of important infrastructure to safe locations and improved public health facilities. Present study analyses the impact of climate change and sea level rise on Kochi and the current policies and adaptation strategies. Guidelines for appropriate strategies for adaptation and impact mitigation have been provided.

Climate Change, Rural Livelihoods Vulnerability and Adaptation in the Coastal Niger Delta, Nigeria

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Global concern on rural livelihoods vulnerability and adaptation have attracted recent scholarly attention at the turn of the new millennium. The Rio+20 Outcome Document indicates that the goals of the SDGs are intended to be “action-oriented, concise and easy to communicate, limited in number, aspirational, global in nature and universally applicable to all countries, while taking into account different national realities, capacities and levels of development and respecting national policies and priorities.” They should “focus on priority areas for the achievement of sustainable development.” Livelihood adaptation encompasses resilience and protection of livelihoods in violent economies. Vulnerability is necessitated by a number of threats to rural livelihoods. This includes environmental or ecological factors such as climate change, coastal flooding sea level rise, land or water pollution, mangrove deforestation. This has been evident in the coastal Niger Delta region of Nigeria. This paper builds on the Marxian political ecology theory as a framework to explore dynamics of deleterious natural resource extraction and ecological implications for rural livelihoods sustainability. The paper adopted cross sectoral survey of rural households in the Niger delta and argues that coastal Niger Delta region is currently experiencing climate change, ranging from black soot in the atmosphere -environmental pollution arising from artisanal refining, sheen on surface of flowing rivers, increasing depletion of the natural resources from the Multinationals and oil resource extraction including mangrove deforestation and decline in forest resources and wildlife, coastal flooding, sea level rise, increased average temperatures and intensity of rainfall. The findings from the study suggest that without action in the form of adaptation and mitigation and natural resource management systems, climate change could result in rural livelihoods vulnerability as there is degradation of soil resources, decrease in crop yield, giving rise to the rural households’ distortions arising from climate related losses .

Keywords; Climate Change, Coastal Vulnerability, Adaptation, Mitigation, Sustainable Development

Disability and Climate Resilience: Kenya's Legal and Policy Framework and experiences from Isiolo

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A policy analysis of the Climate Change Act, the Draft Climate Change Framework policy, the Draft Policy for Disaster Management, the Persons with Disability Act and the Disability Policy were conducted to access disability and climate resilience in Kenya. The aim was to identify how policy specifically addresses PWDs and resilience, their access to information on climate change, participation in planning and decisionmaking, budgeting for targeted programs as well as monitoring PWD-specific interventions. A policy analysis ranking framework was adopted and used for this research.

Results from the policy analysis and interviews and FGDs conducted in Isiolo, a small town in the centre of the country, point to increased recognition of inclusion as a key guiding principle and a key tenet of Kenya's constitution, but policies, strategies and plans fall short of providing specific and targeted interventions for Persons with Disabilities (PWDs) to ensure climate resilience.

Kenya is party to international conventions such as the United Nations Framework Convention on Climate Change (UNFCCC), its Kyoto Protocol and the Paris Agreement; the Sendai Framework for Disaster Risk Reduction; the United Nations Convention on the Rights of the Child (1990); and the UN Convention on the Rights of Persons with Disabilities (2008). Kenya also ascribes to the SDG Agenda 2030 and has infact volunteered itself for national review for progress towards meeting SDGs shoes main rallying call is 'leave no one behind'. Kenya has specifically undertaken to align its development blueprint 'Vision 2030' with the SDGs. All these instruments provide for inclusivity and for countries to develop specific policies and action plans to ensure that the most vulnerable (which include PWDs) are targeted.

In the areas of disaster risk reduction the Government of Kenya is in the process of developing a National Action Plan (NAP) on Disaster Risk Reduction to ensure coordinated action and responses to both manmade and natural disasters (mostly attributed to climate change). In 2016, Kenya piloted indicators to assess progress towards this in Kisumu city which is prone to disasters such as floods on the banks of Lake Victoria.

This paper discusses findings from analysis of the key policy instruments on climate change and disability in Kenya; results from key informant interviews and Focus Group Discussions with Persons with Disability (PWDs) in Isiolo County.

Key words: climate, resilience, disability, vulnerability, disaster, adaptation

Increasing resilience of coastal communities in the Turkish Mediterranean coast

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Alarming impacts of climate change are being observed in coastal areas of Turkey. This is not surprising as Southern Europe and the Mediterranean Basin have been identified among the most vulnerable regions to the impacts of climate change in Europe (IPCC, 5th Assessment report). Impacts are expected to get worse for the coastal areas and marine environment in the Mediterranean basin regardless of the fact that uncertainty remains about the degree of physical and chemical change,

Although direct impact at the local level are harder to predict than global impacts, it is clear that change will happen. European coastal cities along the Mediterranean are preparing to adopt as they are increasingly aware of the risks and the urgency to increase resilience. The question is whether local communities within the coasts of Turkey are aware of this risk and if they are taking any adaptation measures.

The Mediterranean region carries special importance because it has very rich cultural, historical and environmental richness. Although it represents less than 0.8% of the world ocean, 28 % of all endemic species, 7.5% of marine fauna and 18% of marine flora are found in this sea, which makes it a biodiversity hot spot. It is no surprise that the region is highly popular for tourism and is certainly the largest global tourism destination, attracting almost a third of the world's international tourists. The UNWTO estimates the impact of tourism in the world economy as 9% of world GDP, while in the EU it is the third-largest socio-economic sector and has generally remained robust throughout the financial crisis. The Mediterranean sea and its coastal communities are critical in the success of the tourism sector in Europe and in Turkey. The Turkish Mediterranean coast is among the most popular tourism destinations in the country and among European tourists. Thus, the region is highly dependant on tourism revenue which in turn is highly vulnerable to the impacts of climate change.

Most cities along the Mediterranean coast of Turkey is highly vulnerable to climate change. There are numerous antique cities and ruins scattered throughout the coastline. It is a natural museum and laboratory with its rich flora and fauna. Bird and wildlife of the region are very rich due to the richness of freshwater resources. Numerous coastal cities situated in the Mediterranean basin are highly dependent on natural resources for their economic wellbeing yet they are vulnerable to its expected impacts.

Warming of sea water, sea level rise, coastal erosion, acidification, coastal inundation, salt-water intrusion, intense storms, wave damage and heat waves are among the impacts of climate change for the Mediterranean sea. The local population is vulnerable as all these changes have multiplier effects to the economy, environment, social factors

and public health. Climate change may worsen some problems and/or create new ones which need to be assessed.

The study will promote collaborative efforts to work with stakeholders to understand local challenges and to increase resilience of the local population along the coastal zone. For eg, the Antalya project funded by the European Commission focuses on adaptation with the understanding that the impacts of climate change will directly affect local communities. Research findings will be assessed to understand how they can be generalized to the wider Mediterranean region. Primary emphasis while focusing on Turkish coastal cities in the Mediterranean region is fostering collaborative action among local governments, scientists and NGOs while assessing risks and planning to adopt to change. Evidence based studies do not exist in the region.

Marine ecosystem is especially vulnerable to climate change. Sea water temperature rise will effect on the biodiversity as invasive species of the Indo-Pacific origin enter the eastern Mediterranean through the Suez Canal and settle in the area. Some of them, such as lionfish, pose presseure to native fauna and flora. There are harmful jellyfish and sea urchin which sting bathers on the beach. This may result in an impact on tourism in the region. Moreover some fish like pufferfish are damaging fishing nets, thus causing economic loss of the local community. It is critical to assess the impacts on marine species and consequently the local community.

Integrating Infrastructure Resilience into Sustainable Construction Design and Planning in the United States

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Impending climate change and rising sea levels indicate that certain communities in low-lying areas are increasingly prone to flooding. Additionally, increasingly adverse weather events due to an unpredictable weather cycle means that homes in nearly every region in the United States are vulnerable. The U.S average temperature has increased by 1.3°F to 1.9°F since 1895, and is projected to rise another 2°F to 4°F in the coming decades. As a result, changes in very heavy precipitation patterns have been observed across every region of the United States.

The United States construction sector is therefore at the frontlines of disaster mitigation through the anticipation of regional risk, and the incorporation of resilient construction techniques into planning and design of buildings. This research aimed to explore the current role of the United States construction sector in the planning and design of resilient infrastructure, and the extent to which the integration of both resilience and sustainability into construction planning exists. This research also aimed to determine to what extent the construction industry was interested in learning about the integration of resilient infrastructure design concepts, and what boundaries exist for the adaption of design strategies toward more resilient and sustainable infrastructure.

In order to achieve an understanding of current perceptions and integration patterns within the industry, a survey was sent to 150 major commercial and residential construction companies in the United States. The companies surveyed were chosen from every region of the country, and included small, mid-size, and large civil engineering and construction companies. The survey was organized into three main sections: current perceptions of sustainability and resilient infrastructure, access to information, and barriers to implementation. The first of these sections solicited responses regarding to what extent these construction companies and professionals engage with local disaster relief agencies, like the United States Federal Emergency Management Agency (FEMA). Questions in this section also asked respondents to gauge how active they were in learning about weather changes in their regions, and current design and planning considerations for construction projects their companies oversee. The second section of the survey asked respondents to evaluate their access to tools that could inform them of the impacts of weather-related events on their industry, and access to information regarding best practices in sustainable construction planning and design for resilient infrastructure. The third section of the survey focused on the barriers to the implementation of best design practices, like perceptions regarding cost and willingness to develop design techniques related to both resilience and sustainability.

Preliminary results indicate that the vast majority of companies were not engaged with local disaster relief agencies, and did not consider disaster resilience a factor in construction design and planning. In fact, more than 70% of respondents were unable to name one design strategy to incorporate disaster resilience in infrastructure. Survey results showed a strong desire to learn more about how resiliency concepts could be incorporated into design and planning, with more than 87% of respondents indicating that they would be very interested in educational modules that could inform them of best practices to integrate resilient design techniques into construction planning. A lesser number of respondents, about 63% indicated a similar desire to learn about sustainable construction techniques, and only 42% believed that there were overlaps between these concepts. Results also indicated that respondents considered resilient design techniques and materials to be costly to implement, but strongly agreed that there was a need to do so. It is to be noted that respondents in states along a coast, like Florida and Georgia, saw the integration of these techniques as a more urgent need than those survey respondents in land-locked states.

This research further explores the results of the industry survey, and provides recommendations to facilitate the integration of disaster mitigation and resilience into construction planning and design. This baseline data provides a solid theoretical base from which researchers and practitioners can develop learning modules designed to address challenges experienced by civil engineering and construction companies in different regions of the United States. The development and delivery of these modules is anticipated to inform industry of key design and planning strategies for sustainability and infrastructure resilience, and to begin to close the knowledge gap between research and practice.

Leveraging India-Bangladesh relation for Cross-border climate change adaptation in Bay of Bengal Basin

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As the impact of climate change is felt across the border, local or national level policies cannot ensure adequate climate adaptation actions. The need for breaking down silos and facilitating collaboration cannot be more evident than the Bay of Bengal basin where urbanizing coastal areas have witnessed rapid growth and changes over the past few decades. Home to the highest density of poor people in the world, the region is prone to severe natural disasters like cyclones, storm surges and floods. Adverse impacts of climate change particularly sea rise will further aggravate the soil erosion and salinity. Facing similar kind of challenges, rather than working in silos, both the countries would do better in joining hands to form policies and reform the institutional structure for improved management of its coastal areas. However, at the policy level, currently there is little understanding on the various cross-border institutional and regulatory frameworks that can be employed for successful climate change adaptation in the region. Neither of the country in their national policies and action plans for climate change adaptation and mitigation recognizes the cross-boundary implications of climate change and the need for collaboration for joint action. Mutual dependency and reciprocal interests is anticipated to foster enhanced cooperation. Settlement of maritime dispute and of late bonhomie between the two nations has raised the prospect of joint development and implementation of policies and programs for responding to the challenges of climate change through adaptation. Notwithstanding several recent collaboration initiatives on environmental protection, both at bilateral and regional level, there still exists much potential for better integration or mainstreaming climate change adaptation. To this end, the paper diagnoses and critically examines diverse examples of India Bangladesh cooperation and identifies and distills the key opportunities for cross border cooperation among India and Bangladesh in order to jointly address the challenges, needs and possibilities. The discussion of the paper focuses on various aspects of cross-border cooperation for climate change adaptation, particularly in the context of pollution and disaster management of coastal areas. The paper spells out major efforts being undertaken between the two countries in this respect and explores how these interlinked synergies can be expanded for better coastal zone management in respect to climate change adaptation of the Upper Bay of Bengal region. Further by expounding different collaborative actions between the two countries, the paper comes up with a set of recommendations for mainstreaming climate adaptation into policy, planning and decision-making processes.

Low Emission Development for Towns and Cities in South Africa

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In response to the call for abstracts responding to the conference theme Breaking Down Silos: Fostering Collaborative Action on the SDGs, we propose the following presentation. We believe this proposed presentation is directly relevant to three of the conference topics, namely:

1. Metrics and frameworks for assessing Sustainable Urban Development
2. Ensuring Public Engagement and Accountability for Sustainable Urban Development
3. Climate Change Adaptation in Coastal Towns and Small Cities

One of the goals of SDG 11 is to increase the number of cities and human settlements adopting and implementing integrated policies and plans towards inclusion, resource efficiency, and mitigation and adaptation to climate change. In South Africa, progress towards SDG 11 on cities and communities, as well as SDG 6 on water and SDG 7 on energy, is critical to the long-term social, economic and environmental viability of the nation's growing urban and peri-urban centers. In this context, USAID's South Africa Low Emission Development Program (SA LED), launched in 2015, provides an important example of how international development funding can advance national and global goals in sustainable urban growth. SA LED is working with select, disadvantaged municipalities around the country to integrate sustainable development planning, programs and projects. These efforts have resulted in measurable reductions in greenhouse gas emissions while striving to meet a number of other critical goals, including improving urban landscapes, job creation and economic growth. For example, now in its third year of a five year program schedule, SA LED has introduced sustainable "closed loop" fish farming, urban gardens with bio-gas generation for cooking in public schools, and advanced the market for solar home systems by leveraging commercial financing for market development.

As it enters the second half of the program schedule, SA LED is looking at ways to scale its efforts with standardized processes and tools which other municipalities not directly benefitting from the program can use to advance their low emission and sustainable development goals. The presentation will begin with a brief recapitulation of the project activities to date with a focus on the practical outcomes that create social and economic value and thus "buy in" for sustainable urban development among urban policy makers. In the second part, the presentation will tie the activities back to the SDGs in a larger context and assess the potential for replicating and/or standardizing approaches in developing countries with further, targeted capacity building at the

municipal level. Finally, in the third part, the presentation will review the current status of the standardized tools and processes that SA LED is developing in its last two years of operation and assess them for their potential to advance the SDG's goals 11, 6 and 7 going forward.

Offshore reef structures as viable adaptation alternatives for vulnerable and eroding coastal regions

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The shoreline, being an interface between land and sea is a dynamic boundary which shifts over various temporal scales. The shifting of the shoreline boundary landwards, erosion, is of great concern to low lying developed and agricultural coastal regions around the globe. Coastal communities such as those situated in many small towns around the world are at increasing risk of environmental degradation through eroding beaches, which can pose immense threats of inundation in a future of sea-level rise and climate change. With the looming crisis of global warming and sea level rise, it is likely that erosion of the beaches in coastal towns will increase and based on current predictions, shoreline recession may be up to 30 meters. Renourished beaches will be subject to the same conditions as their natural predecessors, continuing to diminish, and therefore they will need to be restored potentially more frequently in the future. In such events, offshore reefs may provide an effective alternative to renourishments or built structures in stabilising the shoreline and adapting to climate change. Assessing the role and effectiveness of reefs in hazard mitigation should inform coastal defence investments for small, vulnerable towns.

This study aims to quantify the effects of an offshore reef and sandbar system on beach morphology and hydrodynamics along a section of the Bellarine Peninsula, Victoria, Australia. This was done through mapping historical aerial imagery from 2009-2018, beach sediment characterisation, and measuring local wave parameters. The beach in the shadow of the reef displayed a mean net progradation of 1.67 m over a 9-year period while seasonal beach rotation was measured away from the reef shadow. Beach profiles demonstrated that the beach is in an overall state of accumulation and the region behind the reef is of shallower slope compared to a modelled equilibrium profile for similar grain sized beaches. The accretion was likely due to the attenuation of destructive wave energy by the reef and sandbar system, which attenuated on average 36.2% of the total incoming wave energy and 19.63% of the significant wave height. While both the reef and sandbar system attenuated destructive waves (mainly short period wind chop) effectively, the reef allowed the passage of longer period (constructive) waves, attenuating 50% less infragravity (IG) waves and 11% less swell waves relative to the sandbar. The results of this study indicate that a submerged offshore reef structure may be a cost-effective and viable erosion management initiative for small scale vulnerable coastal areas. Artificially replicating such a structure in susceptible coastal towns may effectively assist in protecting communities in a future of sea level rise and climate change.

Reconciling Sustainable Mining and Tourism in Partido District, Philippines: Do the Twain Meet?

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This paper has examined the potentials of mining and tourism industries Partido area. Partido district, in the Province of Camarines Sur, Philippines, boasts landscapes and seascapes of exceptional beauty and is, at the same time, richly endowed with mineral deposits. With the huge amount of mineral deposits, the area's natural splendor is threatened by the extractive industry. Using benefit-transfer method, the potential economic values of both industries were calculated for a period of 50 years. The findings showed that mining industry has a potential to generate more than Php700 billion or about US\$14 billion but would result to significant biodiversity loss, lost of forest cover and other significant environmental impacts. Tourism and other associated industries that depend on pristine environmental condition, however, will generate a much lower revenue within the same period, but would eventually exceed that of the mining industry through time.

The findings showed promise in promoting sustainability in the Philippine countryside, especially in areas where mining and tourism have potentials to generate revenues. It does not necessarily mean that mining must be scrapped off in favor of tourism and other biodiversity-dependent industries. At some point these two industries can be both pursued with proper policy support and indepth studies prior to implementation to cushion possible negative effects of any of these industries. The government's effective administrative capability, devoid of any partisan interest, is essential in ensuring success of undertakings along this line. This study was an attempt to find a middle ground for these industries to allow them both to serve their common purpose - furtherance of human life – and flourish in concert with each other with Partido district as a precedent case.

Keywords: Tourism, Mining, Sustainable development, environment

footnote: Partido is the 4th Congressional District in the province of Camarines Sur, Philippines comprising 10 towns, 9 of which are coastal

Understanding and Managing Risks of Climate Extremes: A Local Sustainable Development Action Plan, Quezon City, Philippines

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Cities in Southeast Asian Archipelagos (Philippines, Indonesia, and Malaysia) and Small Island Developing States (SIDS) have been haphazardly developing by constructing roads, buildings, and other infrastructures resulting in distorted natural environment. Further, Climate-related extreme weather events also aggravate the environment, subsequently altering the ecology, creating sustainable development challenges such as local flooding, causing physical and psychological illnesses to those affected, and drought declining water supply and crop production. Indeed, risks emanating from unplanned development and extreme weather events are profound, which call for pressing interventions. Thus, there is an imperative need to take urgent and strong measures in the interest of calibrating an appropriate response to meet the emerging challenges of climate change on sustainable development. The present paper selected Quezon City (QC), Philippines as the pilot Local Government Unit (LGU) and specifically aims on assessing threats of extreme weather events, one of the climate change (CC) variables, on five development sectors of the City: Social, Economic, Environmental, Land Use/Infrastructure, and Institutional; intersecting with seven CC priority areas: Food Security, Water Sufficiency, Ecological Environmental Stability, Human Security, Climate-Smart Industries and Services, Sustainable Energy, and Knowledge and Capacity Development; aligned with the Philippine National Framework Strategy on CC 2010-2022. The gender-sensitive participatory process and Geographic Information System (GIS) were used to collect pertinent data and analysis. The threat levels (exposure & sensitivity to CC priority areas) in the perspective of extreme weather events against the institutional and personnel adaptive capacities were assessed. Results revealed relative vulnerability rating by CC priority areas. Further, the GIS maps showed projected casualties, economic losses per capita, and infection rate if no adaptation interventions were developed. This information allowed researchers to identify challenges and formulate objectives pertaining to each CC priority areas. To overcome these challenges, the researchers developed the QC Local Sustainable Development Action Plan (LSDAP) 2017-2027. The LSDAP comprised of sustainable development sectors and CC priority areas cross-cutting Projects, Programs, and Activities (PPAs) with corresponding budget/agency. The action plan also assigned implementation priority levels (i.e., immediate, midterm, and long-term) to each PPA. The above methodology and LSDAP are flexible and fashioned to be replicated to assess the other CC variables including Change in Precipitation Patterns, Change in Mean Temperature, and Sea Level Rise, among others. They are also very significant in enhancing key areas needed to create CC-resilient SIDS and establish globally-

effective tools as foundations for achieving the Paris Agreement and Sustainable Development Goals.

Climate Change Adaptation and Resilience Building in Agriculture

Addressing Barriers to Climate Adaptation in Least Developed Countries (LDCs) through Microfinance

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In-depth understanding of the societal obstacles that hinder the process could effectively improve and maximize the outcome of institutional adaptation effort. As the Least Developed Countries (LDCs) are the nations which rely most heavily on agriculture and have the highest climate vulnerability, a growing body of literature troubleshoots the barriers of climate change adaptation in the LDCs. It is found that the most commonly found serious constraints that impede the adaptation process are the lack of finances and lack of information in the communities (Shackleton et al, 2015; Bryan et al, 2009, Gerald & Lindsay, 2017). Although many studies support that lack of finance is an overarching issue in adaptation that the LDC people face, documentation of solutions for this problem remains limited. Hence, this study aims to answer the question of Could microfinance enhance the effectiveness of institutional climate change adaptation efforts in the LDCs agriculture sector?

Although the LDCs often receive international or governmental institution financial support on climate adaptation and resilience building projects, the sustainability of these programs relies on the communities' finance availability. It is important to have financial accessibility as ongoing costs of adaptive measures such as crop diversification, fertilisers, infrastructure eventually depend on the farmers.

By using a meta-synthesis review method, this study focuses on reviewing published literature, written in English, on local agricultural community financing, with a focus on the processes, costs, opportunities, challenges and the possibility to generalize such approaches. While microfinance has been considerably successful in Latin America and South Asia, there is still lack of similar success in Africa - the region where most of the LDCs are located. Main opportunities of developing microfinance in LDCs are (i) adding momentum to the resilience building by integrating promotion of adaptive practices with their financial product, (ii) expanding to saving products, (iii) setting up partnership profit-sharing schemes that invest in the poorest households. Limitations of bringing microfinance to LDCs is that (i) some rather short-term products might induce maladaptation and increase the vulnerability, (ii) microfinance might not be able to benefit the extreme poor who do not even have access to agriculture assets, (iii) require institutional support to start off.

More studies and development on potential institutional support on microcredit mechanism are recommended, since microfinance helps the most vulnerable

communities directly, and it would be extremely hard to set up or sustain without initial assistance from institutions.

Perceptions of Climate Change and Adaptation by Smallholder, Highland Farmers in Fiji

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Introduction:

As a small-island developing state (SID) located in the tropical region of the Pacific, Fiji is particularly threatened by climate change and frequently referred to as a “barometer of climate change”. Predicted climate changes for Fiji includes an increase in mean annual temperatures, an increase in rainfall intensity and variability, a decrease in cyclone frequency and an increase in cyclone strength. As mitigation has limited potential to prevent the onset of climate change in Fiji, a focus must instead be placed on climate adaptation and resilience. How this adaptation varies across different communities and different demographic groups will also be examined. This is especially true for the agricultural sector and those whose livelihoods depend upon agricultural production which constitutes a majority of the population of Fiji, in particular, those in highland areas.

This study, conducted alongside the Ministry of Agriculture (MoA), contributes towards the Fiji Agricultural Partnerships Project (FAPP), funded by IFAD. This project aims to facilitate agribusiness and the transition from subsistence farming to farming as a business for rural communities and therefore climate resilience and adaptation are vital for its sustainability and longevity. This study had two major research questions:
What are the perceptions of climate change of highland farmers in Fiji?
What climate adaptive practices are in place in agricultural systems of highland Fiji?

Methods:

The FAPP project area encompasses three provinces and seven districts across the highlands of Viti Levu and targets 2,000 households of subsistence farmers. Six villages from the project area were visited during FAPP extension service delivery. At each village, 20 farmers were randomly selected and semi-structured interviews and questionnaires conducted by the researcher in English. Each questionnaire consisted of over 50 questions and were anonymised before being transcribed. A total of 120 responses were recorded.

Results:

Respondent demographics were varied in terms of age (18-69 years), experience of farming (2-60 years) and years of education (0-23 years) however did not differ significantly between villages. Of the 7 impacts of climate change discussed specifically in this study, farmers reported observing an average of 5, showing that climate associated environmental impacts are already being experienced. However, perceived climate change responses varied and did not always align with meteorological data for the region with the exception of cyclone intensity. Farm management showed a variety of climate resilient practices with the most common being intercropping, tree planting

and crop rotations. Some other practices showed much lower adoption including irrigation, organic fertiliser application.

Conclusions:

The agricultural sector of Fiji must be equipped to adapt to future climate change impacts, some of which are already being felt. While farmers strongly agree that their climate is changing, the specific changes are not well understood or agreed upon. Climate adaptive practices are integral to traditional agriculture in the region which improve resilience but may limit the scope of future adaptation. Future extension services that equip farmers to combat climate changes will be most successful in creating a sustainable and resilient Fijian agricultural sector.

Assessment Of Awareness And Adoption Of Improved Cassava Production Techniques In Ifad Vcdp By Smallholder Farmers In Benue State, Nigeria

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The Value Chain Development Programme (VCDP) is a six-year project of the government of Nigeria funded by the International Fund for Agricultural Development (IFAD). Benue State is one of the six (6) States in Nigeria participating in the VCDP. The main objective of this study was to assess the state of awareness and adoption of improved cassava production technique by smallholder farmers. IFAD, through VCDP is assisting smallholder farmers in Benue State take away the stress of traditional cassava production techniques by using modern improved cassava production techniques while promoting farming as a form of business. It was hypothesized that availability of information and improved cassava production technologies through the VCDP would be very important to improving the level of awareness and adoption of the improved cassava production techniques by smallholder farmers.

Primary data were collected through well-structured questionnaires. A total of 339 respondents were randomly sampled and interviewed. Data analysis involved the use of descriptive statistics (means and frequencies) and inferential statistics (analysis of variance).

The results showed that VCDP has considerably led to increase in the state of awareness and adoption of the improved cassava production techniques while leading to increase in production, yield and income. The State contributed to the level autonomy in cassava production and economic modification policy of the Federal Government of Nigeria.

The study also found enhancements in various aspects of farmers' pecuniary wellbeing such as productivity growth, income, physical and financial assets since their involvement in VCDP. Recommendations focused on the strategies for improvements of the VCDP in Benue State, Nigeria.

Key Words: Adoption, Autonomy, Awareness, Production, Technique, Value Chain

Can Agroforestry improve soil water and temperature resilience in agriculture?

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Conventional agriculture practices have made soil processes in the tropics increasingly vulnerable to extreme weather events, which are predicted to intensify in the face of climate change. In this context, we investigated the potential of Syntropic Agriculture, a successional and process based form of agroforestry, to improve soil water and temperature resilience in agricultural production. During a 30 day period, dynamics in the topsoil layer of 3 land use systems were monitored and compared in the Brazilian state of Bahia. These systems were Syntropic Agriculture (SA), cocoa monoculture (MO) and an unmanaged regrowth forest (RF). Water content in SA was found to be on average 13% higher than in MO, being higher on all days except the first days of rain events. After several days without rain, values in SA also became higher than in RF even though no significant time-average difference could be shown. Temporal mean soil temperature was lowest in RF, intermediate in SA and highest in MO. In the latter it was also significantly more affected by the hour of the day and by wet and dry spells, with potential negative ecosystem implications. System-inherent factors likely responsible for these differences include canopy density and stratification, type and thickness of litter layer, soil organic matter and compaction. These findings show that SA markedly improves soil water and temperature dynamics over MO, and suggest that it is at least as performant as natural succession at restoring a healthy water cycle on degraded soils in the humid tropics. reNature aims at restoring degraded landscapes worldwide with Resilient Agroforestry systems. We're now going to Indonesia and create a showcase for resilience farming to tackle climate change.

Climate change adaption strategies of small-scale farmers in Botswana

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Climate change and variability are increasingly proving to be a cause for immediate concern in Botswana and the world over. Climate change adaptation is considered one of the major techniques to control the impact of climate change and variability. In 2010, the government of Botswana initiated the drafting of the climate change and mitigation policy in an effort to improve agricultural productivity in the advent of climate change and variability. Despite this effort, climate change remains a main threat to all economic sectors, mostly the agricultural sector. However, agriculture is considered the main source of livelihoods for the majority of rural households. There is available information on the impacts of climate change in southern Africa that suggests that Botswana is highly vulnerable to climate change. Moreover, farmers have been compelled, and need to quickly adapt to climate change order to yield better agricultural outputs. Efforts by farmers to adapt to climate change have churned up several challenges that have impeded a smooth transition.

The country is committed to its agricultural development in order to increase agricultural productivity in both arable and livestock production. Moreover, the government aims to increase farm incomes and to make agriculture a sustainable activity. Although, Article 7 of the Paris Agreement recognizes the need to implement adaptation strategies for climate change in order to protect livelihoods, ecosystems and the broader environment, the Article also appreciates that adaptation remains a challenge. Therefore, we need to understand small-scale farmers' awareness and perceptions on climate change and climate variability, as well as the strategies in place to adapt to climate change and climate variability. Currently, farmers practice indigenous adaptation strategies such as growing of crops that mature faster, changing planting techniques, growing of drought-resistant crops and adjustment of ploughing dates. However, small-scale farmers lack the necessary resources and financial support to adequately practice contemporary adaptation strategies. Therefore, the government should empower small-scale farmers with the skill and resources necessary for enabling them to use improved farming systems.

Adaption and building resilience to climate change should be considered urgently, and should be given priority in Botswana. Where there are no necessary and relevant adaptation strategies in place, the predicted climate change and variability are likely to further affect agricultural output and trigger food insecurities, especial in vulnerable households. As a result, it is imperative for farmers to adapt to the changes in climatic conditions and adjust to the seasons in order to yield better agriculture produce as that will boost their socio-economic livelihoods. It is critical to understand the farmers' coping and adaptations strategies and challenges in order to use them as a basis for policy recommendations. Adaptation planning should put into consideration the top-down and bottom-up approaches. In most cases the bottom-up techniques recognizes the local

coping strategies and use of indigenous knowledge for successful adaptation to climate change. Enhancing public awareness on issues of climate change and variability on its adverse effects on agricultural production may help farmers to practice adaptation strategies.

Small-scale farmers need be educated about climate change and variability and its changing aspects. They should also be equipped with technical skills to improve their perceptions regarding climatic variables to enable them to practice the required adaptation strategies at their farms. This role should be played not only by the government but also by farmers associations/ organizations in the rural communities. The enhancement on awareness of climate change and variability issues will be achievable through conducting training, workshops and seminars. The government should support the training of farmers on climate change adaptation strategies and technologies to improve the resilience by the communities. Moreover, the government working with relevant stakeholders should raise awareness on adaptations strategies through organized public campaigns. Sustainable Agriculture could be achieved through integration of adaptations plans at all level of policy development to attain Agenda 2030.

Climate Change, Rural Poverty and Global Goals: Reducing Vulnerabilities and enhancing Potentials in African Agriculture

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The problems confronting mankind today especially in developing countries need to be resolved urgently. Two important considerations involves understanding the main constraints faced and then adopting an appropriate response. Most of these challenges are interdisciplinary in nature and require a collaborative effort. In the African context rural poverty and climate change presents serious challenges to poverty reduction and sustainable development. Despite the negative impact of climate variability globally poor people in Africa are more vulnerable due to their dependence on the agricultural sector and natural resource based products. Furthermore, the agricultural sector is the leading sector in their development prospects in terms of export orientation, growth potential, comparative advantage, poverty reduction potential and sustainability. In addition, most developing countries are dependent on nature based agriculture and on agricultural exports which are mostly rural based. As such climate change affects them significantly in terms water resources, bio diversity and ecosystems making the rural poor people not only important perpetrators of climate change but also significant victims. Furthermore and within the African context, despite several sectors of the rural economy having important potential for growth and poverty reduction they are directly affected by climate change the impact being more pronounced among disadvantaged groups like women making the need to integrate them in all planning initiatives critical. The paper argues that the negative impact of climate variability on the rural sector will have economy wide effects that will affect their sustainability in development and ultimately compromise the effectiveness of sustainable development goals. The agricultural and rural sector will bear the brunt of this given its high profile. The paper proposes a concrete understanding of issues and focuses on the need to reduce vulnerabilities and enhance potentials if global goals are to be met. It proposes a pro poor growth strategy that will not only reduce poverty but also facilitate the transformation of poor people's vulnerabilities into capabilities that will enhance the attainment of global goals. By prioritizing the integration of vulnerable groups into the sector at subsistence level it effectively addresses issues of sustainability.

Climate Migration and Its Obstacles: A Case Study from Afghanistan

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UNHCR acknowledges that Afghanistan is the second largest source country of refugees with one-tenth of its population applying for asylum in 2015 alone. Already plagued with conflict, violence and war, Afghanistan was also ranked second on the 2014 Global Climate Risk Index. This research investigates how climate change has affected food production in Afghanistan and therefore added to the number of Afghan refugees seeking asylum in the United States between 2001-2016.

Four-fifths of Afghans depend on rain-fed agriculture and cattle grazing; the country's main water sources are glacier-fed rivers and rainfall causing Afghans to face many climate risks in securing their livelihoods. In 2017, I collected data on more than 30 individuals to investigate the relationship between climate change, conflict and out-migration from Afghanistan. I reached out to members of the Afghan refugee community living in Maryland, Washington DC and Virginia to learn about challenges created by climate change. The results showed that they faced plenty of hardships in farming over the past 15 years. A consistently recurring theme across interviews was the lack of water available to farmers due to unsustainable water management and the constant occurrence of droughts over the past decade. My results show a strong correlation between livelihood security and climate change, and therefore serves as a case-study for lawyers, policymakers and environmental activists to obtain additional evidence on the close relationship between climate change and outmigration.

This research contributes to the Intergovernmental Panel on Climate Change (IPCC) 5th Assessment Report's plea for more comprehensive evidence, collected across multiple locations, to test theories about relationships between climate change and livelihoods, culture, migration, and conflict. As currently, UNHCR's international protection mandate does not recognize climate refugees.

Climate services to enhance resilience: A case study for the agricultural sector

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The widespread influences of climate on the major agendas (i.e. 2030 Agenda, Paris Agreement, Sendai Framework) mean that provision of climate services can make communities, critical infrastructure, businesses and ecosystems more resilient to climate impacts. The demand for accessible, tailored and accurate services will continue to grow in the years to come driven in part by concerns over climate change and the occurrence of extreme events (such as heat waves, storms, flooding and drought). It will also reflect the need to respond to new human- induced vulnerabilities such as the growth of megacities and coastal developments.

Climate services provide science-based and user-specific information for managing the risks and exploiting the opportunities created by climate variability and climate change. They assist policymakers and decision-makers responsible for climate-sensitive sectors to take practical actions based on the best available climate related information (from climatic as well as other relevant scientific and socio-economic research). In this way, climate services can help society to become more resilient and to cope with the growing impacts of climate change. It is quite intuitive how climate services support the SDGs. Considering our case study, the “Climate proof Strategy Tool” directly impacts SDG2, as it enhances crop yields, SDG6, as it informs water management to improve a sustainable use of water across different crops. Then, connected to SDG2, the service provides information for sustainable production patterns (SDG12) as well as information to combat droughts (SDG15).

Climate services should be the basic knowledge to support adaptation policies and strategies; however their development and mainstreaming their utilization need to identify clear benefits for final users and profits for the providers. Although assessing the societal benefits of climate service appears quite established in literature and there is evidence on it, conversely assessing the profits for the provider is a challenging issue. In this paper we explore the value of information theory to demonstrate that a climate service acquires a value only when it impacts the decision-making process, inducing to better decisions. The value is the first step towards the identification of a business plan to get a revenue stream from the commercialization of the service.

For this purpose, we would like to consider a specific climate service, named “Climate proof Strategy Tool”, which informs water management authorities on future trends in water availability. This tool promotes a climate informed decision making at the water

authority level on how to develop its irrigation system in order to cope with climate change. To assess the value of the service, and consequently the potential mutual economic benefits for both the final user and the private provider, we use the value of information theory in a case study located in the Castiglione district (Romagna, Italy).

Climate-Smart Agriculture: A Strategy to

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The paper takes a look at using climate-smart agriculture as a strategy to increase smallholders' farmer's production and mitigate the dire food insecurity crisis in Liberia. Based on a study from USAID (WFP, 2015 as cited by USAID 2016), about 49% of the Liberian population is considered food insecure. The statistics are astronomically high and requires serious attention. South-Eastern and Western Liberia are identified as the most food-insecure regions in Liberia. Research studies consulted during the writing of this paper established that subsistence farming is the widespread practice in Liberia. Yields from domestic farming cannot meet the demands for food products on the Liberian market.

Infrastructures such as farm to market roads are in poorer conditions especially in the South-Eastern parts of Liberia. Bad road networks result in barriers to food access and increase post-harvest losses.

The agriculture sector has enormous challenges including a deficit in human capital especially in the areas of technology. One essential equipment noticeably unavailable for farmers is a meteorological forecasting technology.

Such infrastructure is very critical for precision farming, especially where climate change has severe impacts on food production. Due to the low capacity of smallholder's farmers to grow more food for supply, Liberia relies on the importation of its staple-rice along with other nutritional products. Amidst the challenges within the agricultural sector, the adverse effects of climate change come as a potential and severe threats to food security. The climate in Liberia has undergone shifts ranging from higher precipitation to warmer weather. The change in climate is not unique to Liberia. Across the globe, the impacts from climatic variability resulting out of human interactions with the earth can be seen. Primary triggers of human-induced climate change impacts are results of deforestation, poor irrigation, inappropriate use of synthetic fertilizers, pollution, industrialization and other environmental degradations.

Many of these issues listed are visible in Liberia. The research paper explores how climate-smart agriculture can be a viable path to scale agricultural production and provides sustainable income for smallholder's farmers.

The methodology considered is a review of secondary data sources, which include annual reports, policy documents and expert opinions regarding climate change, agricultural investments and food security in Liberia. The conclusion of the research paper indicates that the Government of Liberia has been treating agriculture, food security and climate change as separate issues. In spite of the huge investments in the agriculture sector especially from multilateral and bilateral institutions, food insecurity

will continue to persist if the status quo is maintained. A key recommendation in the paper is a need to review and integrate Liberia's agriculture policy, food security strategies and climate change mitigation and adaptation plan to develop a climate-smart agriculture policy.

A comprehensive climate-smart agriculture policy has a strong potential to enhance food security, mitigation and adaptation plans, increase smallholders incomes and crop yields. A CSA strategy considers the private sector as an inclusive stakeholder to mobilize resources and provide access to capital for farmers.

Climate, Conflict and Trust in Africa

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Do features of the Earth's climatic system influence the likelihood of violent conflict among humans? If so, what features of human societies may exacerbate or mitigate such climate-conflict links? Large scale meta-analyses of climate and conflict links, such as Hsiang et al. (2013), suggest that there is a causal link: between climatic factors, like higher temperature and drought; and human responses, like higher levels of violence. This study aims to better understand these links by trying to identify and test the role that trust, and more broadly, social capital, might play in moderating climate-conflict connections in the context of 35 African countries. I consider two, somewhat competing, hypotheses.

First, I expect that, *ceteris paribus*, higher levels of trust between individuals and social capital within a society will be associated with lower levels of climate-related violence. I view social capital as a potential source of resilience for communities, enabling individuals to share resources and support one another in response to damaging weather events, or more broadly, climatic change. Social capital, facilitated by trust, can act as a form of social insurance or buffer (Putnam et al, 1993). If a community finds it easier to recover from shocks, due to higher social capital, then I expect such shocks will leave its members less desperate and less likely to pursue illegal and/or violent means to make a living, such as engaging in theft or joining an armed group.

Second, in contrast, high levels of interpersonal connectivity and trust may enable the overcoming of collective action dilemmas that inhibit inter-group conflict, leading to more large-scale conflict when climate shocks hit (Moscona et al., 2017). Habyarimana et al. (2007) argue that tighter social networks between individuals of the same ethnic group can help them solve collective action problems associated with obtaining public goods. If waging an armed conflict requires overcoming collective action problems, and interpersonal connection and trust can help overcome those problems, then we may actually expect higher trust to be associated with higher levels of inter-group conflict.

Work thus far has employed temperature data from Berkeley Earth's Output datasets, survey responses about trust from the Afrobarometer, and geolocated conflict events from the Armed Conflict Location and Event Data Project (ACLED). Preliminary results indicate that higher temperatures are consistently associated with more conflict events and fatalities, but the effect is quite heterogeneous across the continent. Levels of trust may be one source of that heterogeneity, with higher trust consistently associated with lower levels of conflict in certain specifications.

If trust plays an important role as a social insurance or smoothing mechanism, which limits the rise of violence that may follow from a climate shock, then government officials, NGOs, or international organizations may find it valuable to promote or enhance community building processes that engender such trust. If trust instead has a

nefarious side, enabling the growth of armed groups, policymakers will need to better understand the role that trust plays and seek ways to channel it into beneficial activities, like lobbying for public goods.

Works Cited

Habyarimana, J., Humphreys, M., Posner, D. N., & Weinstein, J. M. (2007). Why Does Ethnic Diversity Undermine Public Goods Provision? *The American Political Science Review*, 101(4), 709–725. <https://doi.org/10.1017/S0003055407070499>

Hsiang, S. M., Burke, M., & Miguel, E. (2013). Quantifying the Influence of Climate on Human Conflict. *Science*, 341(6151).

Moscona, J., Nunn, N., & Robinson, J. A. (2017). *Social Structure and Conflict*.

Putnam, R. D., Leonardi, R., & Nanetti, R. (1993). *Making Democracy Work: Civic Traditions in Modern Italy*. Princeton University Press.

Conservational tillage: A farming method that needs optimising

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Conservational tillage (also referred to as minimum tillage) aims to conserve soil, water and energy resources via a reduction in traditional surface tillage destruction. This farming method, which retains at least 30% of the previous crops' residue (stubble), can theoretically allow for both resilience in the agriculture industry, as well as viably reducing carbon emissions. Current Victorian conservational tillage practices, which were refined during the Australian Government's Carbon Farming Futures initiative, have yielded somewhat mixed outcomes. As a result, the Department of Agriculture still condones traditional farming practices such as 'prescribed burns', as valid and effective. Adequate steps need to be taken by agricultural leaders before conservational tillage can be introduced on a universal scale. Once optimised, the method can be utilised to achieve Sustainable Development Goals; 1,2,3,8,11,12,13 and 15.

This paper will present a case study of farms located 'South of the Divide' in Victoria, Australia. The Draffin family wheat enterprise, located 20 kilometres west of Ballarat, will be primarily examined as it holds typical characteristics of the high-rainfall farms in the region. Findings by the Southern Farming Systems (SFS) will also be referenced to substantiate the paper's conclusions. SFS acknowledges the undesirable environmental consequences associated with stubble burning and thus predicts the practice to soon be prohibited. Farms South of the Divide receive relatively high crop yields and therefore report high levels of associated stubble. This paper will explore stubble retention findings in high-yield farms, as well as suggest avenues for future development.

Stubble retention was found in some years to maintain soil fertility (via increased moisture levels), reduce soil erosion, reduce labour requirements and reduce CO₂ emissions. The Draffin study however, uncovered four main negatives associated with stubble retention in high-yield farms, which are currently offsetting the efficacy of the aforementioned positives. Firstly, there is a major discrepancy between the cost of the machinery required for conservational tillage, compared with conventional tillage equipment. Secondly, stubble retention was found to provide a habitat for; mice, slugs and earwigs, which increases costs (baits) and reduces crop value. Thirdly, herbicide efficiency was found to be reduced in fields with over 10cm of retained stubble, which created enduring yield problems. Finally, every tonne of extracted wheat crop was found to produce a tonne of subsequent stubble, which had to be dealt with (most commonly via burning).

This study will outline areas for development such as; the implementation of straw-fired power stations, subsidies on conservational tillage equipment, increased herbicide research funding and an increase in farmer field days and awareness. These recommendations will ensure conservational tillage can be advanced properly in the

future, which will consequently allow for a reduction in carbon emissions and increased agricultural resilience globally.

If optimised, conservational tillage can potentially be an equitable, accessible and affordable solution for the global agricultural industry.

Dialogues of the Spirit

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Talanoa Dialogues are an actualized and most interesting response by UN, (COP23, UNFCCC) to the necessity of considering programs from an integral, systemic or holistic perspective, in order to coordinate its actions at all levels (Policy, Academic, Private, Communitary), to obtain success, in the París Agreements and limit the emisión of fósil gases into the atmosphere and not surpass two global more médium degrees of temperatures, to 2030.

This transcendent scenario (let's remind that 2°C global rise is considered an irreversible tipping point), could not be meet, if we don't find the way to implement deep and radical transformational changes, in all spheres of our behaviour and mind set.

Therefore, Talanoa Dialogues, are well conceived to deal with the already structural problems poses by coordinate and align people and institutions who, from different sectores and interests, should be meeteed in Adaptation and Mitigation strategies, to adequately face the challenges of Climate Change and accomplish thus, with success the countries NDC, who will signal the road to renovables and low carbón societies, as states the París Agreements.

Notwithstanding, there are two ample scopes of its basement outcomes, currently forgotten, or not made explícit, that in ocasion of this presentation, I'll highlith through their sociological significances:

- 1) The “spiritual” issue. As Talanoa calls for universal participation, it adresses at the same time institutions, organizations and individuals, no matter place on earth, historical origin, religious or political beliefs.
- 2) The “time” issue. In puting together past, present and the future, Talanoa, reshaped from a conception deeply rooted in the anthropological tradition of aboriginal peoples, is the present social seed, of tomorrows global transition to low energy societies.

Effect Of Access To Finance On The Growth And Sustainability Of Rural Micro And Small – Scale Enterprises: Evidence From Rural Enterprises Programme (Rep) In Ashanti Region, Ghana

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The rural Micro and Small – Scale Enterprises (MSEs) play a significant role in contributing to poverty alleviation, providing employment and income generation for the poor in rural areas. Despite the Government of Ghana's efforts in the last 10 years to build more inclusive financial system, access to finance is still the most problematic factor for MSEs' growth in the country (GCI 2017 Report). Access to finance constraints confronting the rural MSEs on both the demand and supply sides are daunting and have resultant impact on their growth and sustainability, thereby limiting their potentials and usage of the accessible financial services.

Ghana's Rural Enterprises Programme (REP) in its third phase has been able to address the financial literacy, capacity building and client discipline required on the demand side to enhance access to finance. However, the lack of commitment and focus on the part of the Participating Financial Institutions (PFIs) is not only threatening the growth of the number of rural MSEs that generate profit, growth and employment opportunities but the sustainability.

This study examined the effect of the access to finance to the growth and sustainability of the rural MSEs under the Rural Enterprise Programme in relation to physical proximity, affordability, length of time and convenience. The study identified successful cases of functioning financial services, the constraints that hinder increased and continued access to finance and proposes policy interventions that could make the services accessible to rural MSEs. The study was carried out in two (2) Districts within Ashanti Region, Sekyere South and Ahafo Ano North using purposive sampling questionnaires, structured interviews and Focus Group Discussions to obtain data from the selected rural MSEs, PFIs and Local Business Associations (LBAs).

Findings from the study indicate that access to financial services in the rural areas led to growth and sustainability of the rural MSEs. However, the high cost of borrowing and lack of capacity or interest on the part of the Financial/non-Financial Institutions to serve the rural MSEs are threatening the continued patronage and usage of the accessible financial services.

Keywords: Access to finance, Financial Inclusion, rural Micro and Small-Scale Enterprises, Growth, Sustainability

Effect of Rural Finance Support Programme on Smallholder Farmers' Productivity and Welfare in Iringa Region of Tanzania

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Lack of finance remains the leading hindrance to productivity growth of smallholder farmers in Tanzania. Yet, the banks are wary in facilitating access to input and production financial services. This study assessed the effect of rural finance support programme on smallholder farmers' productivity and welfare in Iringa Region of Tanzania. The framework developed in this study provides a link between rural financial services, inputs usage and farmers' productivity and welfare using pecking order theory and capital constraint model to underpin these relationships. Qualitative and quantitative research approaches were utilized in the study. A well-structured questionnaire was used to collect data from 420 smallholder farmers (those having access to credit facility and those that do not have access to credit facility) in Iringa Region with the aid of koBoCollect survey data collection tool. Likewise, members of staff of MUCOBA Bank Plc (being the foremost community bank in Tanzania) were interviewed as part of key informants, in examining accessibility of bank credit to smallholder farmers and its impact on their productivity and wellbeing, while descriptive statistics and the logit regression model were employed for the analysis. The findings of this study provide information for developing strategies to improve access to finance thereby reducing poverty and eliminating hunger among the rural dwellers.

Keyword: Rural finance, Smallholder farmers, Productivity, Welfare, Iringa

Effect Of Rwanda Dairy Development Project (RDDP) On Improving Livelihoods Of Dairy Farmers In Rwanda; A Case Of Nyabihu District In Western Province

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The dairy subsector of the agriculture sector in Rwanda is crucial for rural development, poverty reduction, nutrition improvement and food security. It offers a pathway, out of poverty for the large number of households keeping livestock and those who provide services and add value throughout the supply chain. The dairy subsector is the largest segment of the livestock unit in Rwanda, which accounts for 10.5 percent of agricultural gross domestic product (GDP) and also the fastest growing subsector within the agriculture sector. In recognition of the importance of the dairy subsector, the Government of Rwanda has made significant investments by spearheading or collaborating with other organizations on various intervention projects in the industry over the past decade, aimed at transforming it from subsistence to a business-oriented modern sector, capable of meeting the Country's demand for dairy products and producing surpluses for the regional market.

The Rwanda Dairy Development Project (RDDP) is the recent intervention project which aims at increasing the production of milk, reducing poverty amongst the pro-poor rural households as well as improving the livelihoods of dairy farmers, most especially in the rural areas. The study is ongoing and it is guided by five objectives, which are: to examine the effect of dairy farm ownership on improving livelihoods of the dairy farmers in Nyabihu district; to assess the influence of access to credit on improving livelihoods of the dairy farmers in Nyabihu district; to assess the effect of the contribution of Rwanda Dairy Development Project on improving livelihoods of the dairy farmers in Nyabihu district; to identify the best practices in climate adaptation strategies out listed by dairy farmers in Nyabihu district and to examine the effect of climate adaptation strategies on improving livelihoods of the dairy farmers in Nyabihu district.

Purposive sampling was used to select Nyabihu District out of the 12 districts that RDDP covers, 5 sectors were also selected because the 6 available dairy cooperatives are located in the 5 sectors while random sampling will be done at the cooperatives level. A total of 373 sample size was estimated out of the 12,500 dairy farmers currently benefiting from RDDP at the cooperative level, using the sample size calculator. Analysis will be done using descriptive statistics, Chi-square and regression analyses.

RDDP is a new project with implementation less than a year. The study being carried out is expected to reveal the effect of the RDDP on the production of milk, access to credit facilities, access to market, adoption of climate-smart practices in dairy

production, income of dairy farmers and their overall livelihoods while juxtaposing the situation before and during RDDP. The results of the study is expected to influence the policies in the Rwanda dairy subsector.

Keywords: Livelihoods, Dairy Subsector, Rwanda Dairy Development Project.

Estimation of Price Volatility in Agricultural Products Supply Chain in Slovakia

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The aim of paper is to explore, interpret and compare volatility factor in agricultural commodity prices and its impact on the decisions of individual levels of the supply chain in Slovakia. Research will focus on the phenomenon of price transmission in selected agricultural commodities at different levels of the agri - food supply chain in Slovakia and the EU countries.

The key problem of world agrarian food sector is highly volatile agro-food markets and its effect on food security. Within the past decade have been groundbreaking for 2007-2008, which reached rates of most agrarian commodities an historic high. This situation, in addition to weather, production conditions caused the development of biofuel production (reduction in world cereal stocks), which increased demand for cereals, sugar beet and oilseed crops for non-food use. This fact in critical commodities encouraged farmers and their efforts to raise its bid for international and domestic markets. On the other hand, the growing demand for agri-food commodities as a result of economic growth in emerging and developing countries. Prices in European agricultural markets have been increasingly volatile in the last decade. The rise of price levels and volatility of world agricultural commodities since 2006-2008 was followed by increased and more volatile food price levels around the world. This has raised concerns about the potential effect of higher prices on consumers, not only in developing countries but also in the world. Paper will evaluate the velocity and extent to which agricultural commodity price movements affect stages of the agro - food supply chain in Slovakia. Highly volatile food prices, a collapse and extreme increases are not desirable for two reasons: first, it appears that volatile food prices significantly affect the well-being, particularly in low-income population. In research we will provide information about the global food crisis, its trends and challenges. Analyze the evolution of food prices and the impact of various factors on price fluctuations in recent years. Paper deals with globalization, sustainable development, reasons for the food crisis, rising food prices, volatility and economic fluctuations in recent years. Displays the current state of the agri – food market in Slovakia.

Evaluating Rural Farmers Perception, Knowledge and Adaptation Strategies on Climate Change in the Wa West District, Ghana

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Climate change is an issue that has received significant international attention over the past years. According to projections, it has potentially profound implications for future communities especially those in developing countries. Since the knowledge and perceptions of people on climate change can affect the success of implemented adaptation and mitigation options, it is vital for societies to undertake regular assessments to gather this information. The purpose of this study was to evaluate rural farmers' perception, knowledge and adaptation strategies in the Wa West District. The objectives were to identify the perceptions of farmers on climate change, determine the level of knowledge on climate change and the possible adaptation strategies been adopted by the farmers in Wa West District in the Upper West region of Ghana. Data was collected through administration of questionnaires, interviews and desk study. The sample size was (100) respondents and they were from Wechiau, the district capital and Poyentanga a key commercial town. Fifty (50) farmers were randomly selected from each town making a sample size of 100. The target groups used for the survey were solely farmers. Knowledge was assessed by the ability of the respondents to describe the climate change concept if they have heard of it. The study indicated that respondent's knowledge level in climate change was high (86.00%). Many respondents (87%) attributed human activities to be the major causes of climate change. The use of crop varieties, mixed cropping, reducing farm size and changing planting season were the major adaptation methods been implemented by the farmers. A nationwide climate change adaptation measures were among recommendations made to ameliorate climate change impact and to help prevent future food insecurity in Wa West District.

Keywords: Rural farmers, Climate change, perception, adaptation strategies

Gendered impacts of changing ecosystem services in the Bobirwa sub-district Botswana

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Communities living in rural settlements are usually dependent on the environment as a sources of livelihood. These include but are not limited to; agriculture, firewood, wild fruits and vegetables, game meat, fisheries. However, it is estimated that with climate change there will be an increase in global temperatures. Due to an increase in temperatures drought will be prolonged and reoccur in semi-arid regions. This will result in a loss in Biodiversity and hence further impoverishing rural communities. In our study we seek to understand gendered implications of changing Ecosystem services in the Bobirwa sub-district. For communities living in the sub-district land ownership is the most important asset. Access to land enables communities to practice crop production and livestock rearing as part economic generating activities for the household. Our study focuses on ecosystem services provided by the agricultural ecosystem, aligned around water, food and fodder. This is because in all the major ecosystems, agriculture is managed by human to meet daily subsistence. Data was collected through household surveys and focused group discussions, the focused group discussions were divided into two male or female. The Agricultural system in the region seems to be failing to adapt to climate change, particularly subsistence crop production. Households seems to be planting less, this is a result of erratic rainfalls and prolonged drought periods. Subsistence crop production is done by both men and women, but women are mostly engaged. This leads to female led household with less food for most months of the year. Households end up selling their Agricultural land and depend upon government hand outs as a means of survival. Livestock production is done by both male and female but differentially. Large stock (cattle & donkeys) are mainly kept by males while small stock (sheep & goats) are largely kept females. Livestock rearing in the area is highly affected by droughts and disease out breaks such as foot and mouth. Lack of access to markets is also a hindering factor and leads to more losses in livestock rearing. The reoccurrence of droughts in the region makes it difficult for households to adapt to climate change. Although the Botswana government is efficient when it comes to drought relief and food schemes for poorer households, this is an unsustainable way of addressing climate change adaptation. There is an urgent need for the community as large to enhance self-sufficiency and most importantly the women led households. There is a need for the gendered differentiated coping strategies to be mainstreamed in national policies and action plans.

Human Security Dimension Of Boko Haram Phenomenon In North East Nigeria

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The activities of Boko Haram in North East Nigeria are multidimensional in nature. Among these is the human security question, where food and livelihood of people are threatened by the insurgency, kidnapping and bombing by the Boko Haram. The issues of food production, distribution and affordability in the three affected states of North East Nigeria are appalling and a potent danger to the development and even the survival of these states. The study embarks on an assessment of human security in the affected area. It examines the roles and challenges faced by government and non-governmental organizations in the provision of measures to contain the effects of Boko Haram activities on poverty, displacement, malnutrition, livelihood and employment. Primary and secondary data will be employed in this study. Interviews will be conducted with government officials, security agencies and the civilian populace and those internally displaced will be interviewed using the focus group discussion. The study submits that the current efforts of government and other stakeholders are unable to address the dictates of human security and attendant crisis in the North East. The paper identifies and answers questions on corruption, and manipulation of the processes by corrupt officials and sympathizers. The paper also finds out that the consequence of the above factors led to forced migration, increased propensity for youth radicalization and growing underdevelopment and backwardness in the region.

Key words: food security, Livelihood, Human Security, insurgency, Boko Haram.

Impact Of Agricultural Credit On Sustainable Economic Growth In Nigeria

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The significant role of agricultural sector cannot be over emphasized in any nation. It has been the source of feeding of the populace, raw materials for industries and income generation for other developmental activities. As a result, various governments have been making concerted efforts to improve economic growth and agricultural productivity through agricultural credit but rarely one can see any improvement in the sector. It is in line with these fundamental role that this study makes a giant stride to examine the impact of agricultural credit on Nigeria's economic growth . The study employs time series data from publications of Central Bank of Nigeria, Statistical Bulletin, National Bureau of Statistics and internet publication of policy issues on agriculture in Nigeria which spanned from 1985-2016. This study employs the three stage least square analysis as the estimation technique to investigate the variables. The findings shows that agricultural credit is an effective instrument for counter-cyclical agricultural output, non-oil export and GDP stabilization in the Nigerian economy although the value of GDP fell at the end of the period indicating that, such policies deteriorate with time. The study concludes that agricultural credit, interest rate exchange rates were all important in affecting aggregate output in Nigeria. The study recommends that agricultural credits should be extended for development of agricultural production because it has causality effect on economic growth.

Impacts of Climate Change on Agricultural Production and Food Security: A Review on Coastal Regions of Bangladesh

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Bangladesh is severely vulnerable to climate change and its devastation on coastal livelihood and food security has been substantiated. Climate induced hazards will lead to food insecurity directly and indirectly by affecting the coastal biophysical and socioeconomic states. This review article found the potential impacts on coastal agricultural, livestock and fisheries sectors those are the main source of livelihood and food security to coastal people. Furthermore, most of the rural coastal people are hard poor in which women are major in portion and contribute to ensure food security for the entire family. Scrutinizing on 'vulnerability' revealed that it is not gender neutral and socio-economically underprivileged groups and marginal people are invaded disproportionately in which women is ranking in the top of the order. Hence, existing gender-poverty nexus along with socio-economic and political aspects make women more endangered to climate vulnerability and food security. It also found that existing policies and adaptation mechanisms failed to address the influence of powers on marginalize women and growing trend of feminization of food insecurity. In addition, also found the necessity for immediate pertinent caucus before the onset of this imminent concernment by aggregating gender and identified vulnerable groups.

Key words: Climate Change, Food Security, Vulnerability, Gender, Agricultural Production

Impacts of Technology Adoption on Improved Rural Livelihood in Embu and Kirinyaga Counties of Kenya

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This paper assessed the impacts of the technologies adopted on improved sustainable livelihood and the poverty reduction in the Upper Tana River catchment of Kenya. Crop production technologies, livestock technologies and soil conservation technologies were introduced in the Embu and Kirinyaga Counties of Kenya. Quantitative and qualitative research methods were adopted for the study. The representative sample of 421 households were randomly selected and interviewed with the aid of well-structured questionnaire. Focused group discussions and key informant interviews were also conducted. Data were analyzed using descriptive and inferential statistics, including chi square and analysis of variance.

Results from the project impacts assessment report 2017, reveal that poverty level in the project area had reduced from 34% at baseline to 27.14% in 2017 and it was established that 28.8% of HHs had been introduced to use of certified seeds and that 26.64% had adopted the use of certified seeds for the various crops promoted. The project had also introduced a number of technologies including. Livestock production technologies 24.8% of farmers had adopted improved cattle breeds such as: Fresian; Ayrshire; Guernsy; etc. 20.2% adopted improved breeds of goats such: Kenya Alpine and Toggenburg, 19.2% for improved chicken breeds and 14.5% for improved rabbits breeds. On crop production technologies, farmers had adopted the use of certain technologies such as crop rotation (49.7%); IPM (37.1%) and Conservation agriculture (42.6%) and other technologies (51%) such as kitchen garden, weed control, application of farm yard manure and intercropping. The Project used various types of approaches including study tour which was established to be useful a forum for farmers to learn through other successful farmers, for exchange of ideas between the farmers and for technology adoption. In addition, the use of Farmers Field School, Field days and demonstrations was established to be effective tools for transferring knowledge, skills and viable technologies to farmers. Farmers also reported increased yields and improved crop productivity of up to 30% as a result of adoption of soil and water conservation.

Overall the farmers who adopted these technologies have experienced increased crop productivity and improved incomes therefore improving their livelihood. Therefore, it is recommended that agricultural-based technologies should be encouraged to boost rural livelihoods improvement and enhance climate change adaptation in Kenya.

Keywords: Climate change, Technology, Adoption, Livelihoods, Agriculture

In situ assessment of GHG emissions from two livestock systems in East Africa - determining current status and quantifying mitigation and adaptation options

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East African countries currently use Intergovernmental Panel on Climate Change (IPCC) Tier 1 methods to construct greenhouse gas inventories from agriculture. This is a simple method, with a calculation multiplying a locally-gathered activity statistic with a globally-gathered emissions estimate statistic. These calculations are crude and may give inaccurate estimates, and indeed there is some evidence showing a significant discrepancy between IPCC 1 estimates and local emissions studies. Further data is needed to move towards IPCC Tier 2 methods, which include more local data and variables when calculating emissions per head. This project will accurately quantify greenhouse gas emissions from livestock systems in Kenya. Data on emissions from manure will be collected for two different feed systems and the analysis will be carried out in the International Livestock Research Institute (ILRI) in Nairobi. This part of the study will be quantitative using scientific methods – static greenhouse gas chambers will be used to collect measurements of GHG concentration, environmental parameters will be collected alongside this, the GHG samples will be analysed with gas chromatography and chemical analysis will be carried out on manure and other samples.

The policy implications of the food systems will also be explored through interviews. Experts in ILRI, other research institutions, Kenyan civil service and government will be interviewed throughout the three-month period. These will be used to explore current trends and future possibilities for climate change adaptation and mitigation. The need for East African countries to curb future emissions while adapting to the worst effects on climate change presents unique difficulties. For example, some research suggests native Boran steers are less productive than Western breeds such as Friesian cattle, which has led some to propose the introduction of the latter to East Africa for food security reasons. However, Friesian cattle also tend to produce higher emissions, presenting a block to their introduction. Further, the emissions are known to vary by food type, high protein content leading to N₂O emissions being one example, and changing feed will lead to further food security considerations. These are especially important since East Africa food productivity is expected to suffer as global temperatures increase. The scientific findings and the interviews will be used to help fill this gap, and to work towards an acceptable balance between mitigation and adaptation in livestock systems in terms of the trade-off between feed inputs, productivity and emissions.

Komaza: A Micro-Agroforestry Initiative

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According to the Climate Institute, one of the roles that forests play in ecological systems is to mitigate climate change*, whose un-managed consequences can make farming conditions even worse for smallholder farmers in arid and semi arid environments. In Kenya, deforestation is a pervasive phenomenon. Deforestation results from the vicious cycle of poverty, in which smallholder farmers find themselves. In order to create a source of living, farmers cut down forest trees and sell the wood, as a way to participate in the informal markets for timber and charcoal because there is a gap in supply. The recognition of this gap drew a company named Komaza to launch its micro-agroforestry program in Kenya in 2006. Komaza's micro-agroforestry model empowers marginalized farmers to make the most out of their family-owned land. The model is designed to establish collaborations with farmers to build more resilient agroecosystems that are able to withstand the ecological effects of climate change. It is rooted in the method of intercropping multifunctional trees with cash crops. Multifunctional trees not only produce ecosystem services, such as nitrogen fixation, but also many products, such as leaves, fodder, and wood, that can be used for various purposes. The goal is for farmers to earn an additional source of income from the agroecological diversified farming system offered by the model.

So far, Komaza has succeeded in engaging over 6000 smallholder farmers in two counties in ecological zone III (arid/semi-arid land), along the Indian Ocean coast. Owing to this success, Komaza is planning to expand to new counties in central Kenya. Our team has been recruited by Komaza to conduct field research and scoping in Central Kenya. The positive response from farmers and an observed increase in the overall health of the farmlands has motivated Komaza to scale-out and encourage more farmers to adopt this diversified farming practice that has the attributes to meet the farmer's need to maintain productivity and earn a profit alongside. Thus, the end goal is to provide the company with the information required to make decisions with regards to the location of expansion and the modifications needed for the micro-agroforestry model.

We feel that building resilience in agriculture requires the involvement and representation of the primary stakeholders, the farmers, starting from the programs that are directed towards them to policies that are aimed to tackle climate change. To this end, through our research, we will be exploring farmer's local knowledge on agroforestry and their preferred practices, the climate, soil suitability, demand for timber,

demographics and population density, and socio-economic conditions of the prospective counties. Through this information, we will also be assessing whether the micro-agroforestry model that Komaza uses does indeed help in increasing resilience of livelihoods, and in agriculture. This research is going to allow us to collect rich qualitative data from primary sources when we speak to the stakeholders involved in this program in addition to collecting data on agroforestry in Kenya and validating that data during the field experience.

*Bennett, L. (2017, April 18). What Is Causing Deforestation? Retrieved from <http://climate.org/deforestation-and-climate-change/>

Livelihood Trends and Vulnerabilities Among Indigenous Populations in the Andes of Ecuador

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Persistent poverty in rural areas of the world and the lack of success in addressing it highlights the need for quality research focused on understanding what type of intervention/s help rural communities sustainably improve their livelihood security. This paper details a formative assessment, structured on the sustainable livelihoods framework, of the contextual facilitators and barriers to livelihood security in three rural indigenous communities in the Andes of Ecuador. Specifically, it characterizes population and resource trends that play a significant role in the population's ability to adapt to changing climates and make progress towards more resilient livelihoods. Trends involve changes such as migrations and population growth, shifts in natural resource availability, local and national governance, economic opportunities, and access to and use of technology. They can be positive, benign, or destructive and play an important role in the rates of return for the livelihood strategies that are chosen. Trends examined in this paper include livelihood and food production strategies and challenges, food consumption, and the prevalence and patterns of anthropometric typologies including stunting and anemia in children under the age of five. High rates of stunting and anemia are indicators of malnutrition and, in subsistence farming communities, related to issues of decreasing agricultural production and other economic challenges.

Data for the paper comes from a mixed methods study conducted in the Andes of rural Ecuador from September 2016 to January 2018. The communities of Guangaje Centro, Tingo Pucará, and Curinge were selected as the research location due to their rural mountainous location and vulnerability to a wide range of economic, health, and climate issues. The research team conducted eight key informant interviews, 24 interviews with mothers and fathers with children under five years of age, three focus groups, 10 observations, and 111 quantitative household surveys.

Preliminary results indicate that almost all children under the age of five suffer from mild to severe stunting. The population relies primarily on the cultivation of crops such as tubers, fava beans, and barely and raising sheep and other small livestock for their livelihood. They face a range of climate and agriculture-related challenges. The most frequently mentioned is decreasing agricultural production. Participants noted the lack of rain, declining soil quality, and the daily struggle of providing enough food for

themselves and their animals. Because they no longer have agricultural surpluses they can sell, men are forced to migrate to cities to find temporary work to cover household expenses. This significantly increases the workload of the women who remain and forces them to rely on their young children, decreasing the time children spend on education. In some cases, both parents migrate leaving their children fend for themselves and exposing them to potential neglect and abuse. An intervention that focuses on sustainably improving soil quality through agroecological techniques, installing systems that capture and store rainwater and the introduction of appropriate drought tolerant crops could prove successful in breaking the cycle of malnutrition and economic hardship faced by the indigenous populations of the Ecuadorean highlands.

Management regime effect on soil fertility and soil biological resistance in an agricultural region of central Mexico

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Global food production depends on the soil because most of the food is directly produced on this base. However, in Mexico 45% of territory is occupied by degraded soils; and growth of crops is conditioned by the use of fertilizers. A sustainable agricultural system should be the capacity to maintain ecological functions, such as microbial activity, carbon and nitrogen mineralization, and enzymatic activity. Therefore, the intensification of agricultural practices exceeded the capacity of maintaining soil biological functions as availability of nutrients in the soil, reducing soil and crop productivity. The main objective is analyzed the effect of agricultural management and change of fertilization on fertility and soil biological resistance.

This study was developed in the Izta-Popo region, at the intersection of Puebla, Morelos and the State of Mexico, which are the only three states nationwide with more than 50% of their area in degradation. The region is a representative agricultural scenario of central Mexico, and despite having homogeneous environmental characteristics, we identify two principal agricultural management regimes between nearby localities. The traditional regime (TR) is the result of an inherited form of land management and community organization. The intensive regime (IR) is the result of the failed implementation of agricultural practices, such as the introduction of tractor and chemical fertilizers, by agrarian policies that occurred in Mexico during the second half of the 20th century.

The two agricultural management regimes affected differentially the physical, chemical and biological characteristics of the soil, and the magnitude of the effects is related to the intensity of the regime. Soils in IR have greater negative soil biological impacts than TR as soil compaction (bulk density, IR: 1.08, TR: 0.80 g/cm³), soil acidity (pH, IR: 5, TR: 6), lower carbon content (IR: 5.1, TR: 26.5 mg g⁻¹) and Nitrogen (IR: 0.4, TR: 2.0 mg g⁻¹), Carbon in microbial biomass (IR: 83.9, TR: 262.4 µg C g⁻¹) and lower C mineralization levels (IR: 290.2; TR: 668.7 µg C g⁻¹). The evaluation of resistance (Rs) shows that TR maintains basic ecological functions such as C mineralization, metabolic activity of microorganisms, growth in biomass and enzymatic activity associated with C, N and P cycles. The comparison of the values of Rs with a control site (CS) confirmed that the changes induced by agricultural management in TR are not different from a site without management. IR is different from CS and present soil ecological functions loss due exclusively inorganic fertilization and mechanized plowing. The type and intensity of fertilization affects conservation of ecological functions and these functions are modulated by the historical effect of management that has determined the soil characteristics. Finally, we consider that an urgent challenge of issues related to food

production include quantification of the value of goods generated by ecosystem services; costs to conserve the natural resources and biodiversity that maintain ecosystem services, and true costs of different types of agriculture (in environmental, social, and health dimensions) in the intensification decision process.

Monitoring The Implementation, Performance And Outcomes Of Climate Smart Agriculture In The Climate Change Agriculture And Food Security Climate-Smart Villages In Uganda

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Climate-smart agriculture (CSA) puts the challenges of agricultural development at the heart of transformational change in agriculture by concurrently pursuing increased productivity and resilience for food security. Land tenure insecurity for millions of smallholder farmers, including women, declining soil fertility, degraded ecosystems, poor market access, inadequate funding and inadequate infrastructure development continue to hinder agricultural development in Africa. These challenges are expected to be further exacerbated by climate change which has emerged as one of the major threats to agricultural and economic development in Africa.

The proposed research work seeks to assess the different Climate Smart Agriculture practices carried out by the smallholder farmers, assess the performance and implementation rate of the practices and to identify barriers and enabler for wide scale adoption of these practices in order to scale up climate smart agriculture among smallholder farmers in Uganda to improve food security and farming system resilience of mixed crop-livestock. A multi-stage random sampling method was employed to survey 85 households of 154 smallholder farmer respondents in the study area. Data was analyzed using multivariate analysis, tested for significance, percentiles, graphs and an inductive analytical method was used.

The findings are expected to reveal the implementation rate, performance and outcomes of the selected practices for scaling up CSA in Uganda. It will also proffer recommendations on how to maintain and further strengthen the practices in Uganda.

Effect of Use of Innovative Technology on the Productivity of Smallholder Farmers: Case Study of IFAD Value Chain Development Programme in Ebonyi State of Nigeria

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Effects of Use of Innovative Technology on the Productivity of Smallholder Farmers: Case Study of IFAD Value Chain Development Programme in Ebonyi State, Nigeria
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Nigeria's target of achieving economic expansion through agribusiness is confronted by poor value chain development in the sector. One of the objectives of modern agriculture is to reduce to the barest minimum the challenges associated with the value chain system. The International Fund for Agricultural Development (IFAD) intervention is focused on agriculture using a Value Chain approach to enhance market access and increase productivity of smallholder farmers.

This study assessed the effects of use of innovative technology on the productivity of smallholder farmers in relation to cassava and rice enterprises (production, processing and marketing) and performance of the value chain in Ebonyi State, Nigeria. Baseline and mid-line data of beneficiaries in two different communities in the two sampled Local Government Areas of Izzi and Ikwo were analysed using descriptive and inferential statistics. Frequencies for the responses on innovative technology use were categorized to form the extent of impact on the farmers' productivity.

Results indicate that adoption of technology led to improvement in productivity of smallholder farmers. However, innovative technological use in the marketing sector still suffers in structure, conduct, and performance indicators were sub-optimal in the cassava and rice enterprises in Ebonyi State, Nigeria.

Keywords: Smallholder farmers, Technology, Value chain, Productivity, Cassava and Rice Production

Potential Response Of Key Pests And Diseases Of Cassava To Projected Changes In Major Climatic Factors In Southern Nigeria.

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The study investigated the potential response of three key pests and three key diseases of cassava to projected changes in temperature, relative humidity and rainfall in Southern Nigeria (SN). Cassava diseases that have been reported in the region were subjected to a Delphi study to determine the key and most devastating ones, the influence of climate change on them, the most successful cultural methods currently used to control them and finally the appropriate control methods to be used in future due to climatic projections in SN. A total of 14 experts participated in the study. Results showed that the three key and most devastating diseases in SN were Cassava Anthracnose Disease (CAD), Cassava Bacterial Blight (CBB) and Cassava Mosaic Virus (CMV) while the pests were whiteflies (WF), Green mites (GM) and mealybugs (MB). Projected increases in the different climatic factors had different impacts on these pests and diseases. Higher humidity will lead to increases in CAD, CBB, WF and GM but decreases in CMV and MB. Results for temperature show that, projected temperature increase will lead to higher incidence of CAD, CMV, WF and GM but decreases in CBB and MB are expected. On the other hand, CAD, CBB and GM will increase with more rains while CMV, WF and MB will all decrease in the region. Results also show that the appropriate methods to control these pests and diseases in future are through the use of clean cuttings, resistant varieties, roguing, pre-planting treatment of cassava cuttings, intercropping, use of chemicals/bio-pesticides, cleaning and sterilization of tools, modifying planting time, crop rotation, and biological control. This study recommended more research, extension trainings to both staff and farmers and subsidized inputs to allow cassava farmers in SN adopt these control methods.

Keywords: Climate change, Cassava, Pests, Diseases, Temperature, Rainfall, Relative Humidity, Whiteflies, Green mites, Mealybugs, Cassava Anthracnose Disease, Cassava Bacterial Blight, Cassava Mosaic Virus.

Resilience Building in Urban Agriculture in the city of Natal - Brazil

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Resilience building in agriculture in the cities demands different strategies related to create new technical and behavioral competencies. Considering climate change effects, and possible threats to urban food supply, it is important consider new sustainable chains that promote poverty avoidance, zero hunger, healthy food, decent work in the process to promote a concept of sustainable communities and cities. Urban farming it is a strategic topic to be considered by municipalities as a public policy to develop resilient and peaceful communities.

This study evaluates some actions of urban farming in the city of Natal (Brazil). In the evaluation process was possible identify: 1) urban farming it is not a strategic municipal government program; 2) Members of communities or group of people shares some specific spaces to develop actions of urban farming independently; 3) Was consider a great positive social impact to communities when contributes to self esteem and occupation; 4) Some urban farms transformed dune's sand in a fertile soil. The city was developed in a dune soil; 5) urban farms, in general, had used organic fertilizers and use of earthworms. It also important consider that compost waste from the neighborhood would be transformed to manure to be used to fertilize the soil of urban farm areas. 6) Many urban farms are supplying food to communities and economic earnings and work to farmers: Goal 8: decent work and economic growth.

Some schools in the city have created a mutually advantageous project with the support of the city hall, where students and teachers participate in the process of growing organic plants and still benefit from their nutrients at mealtime, which promotes healthy habits among children and still savings on the part of the school that can invest in other sectors. The knowledge obtained in schools could thus be replicated for other situations, or even used in greater proportion so that there could be donation of products.

In addition to encouraging local producers to produce various fruits and vegetables, the government actions should encourage the commercialization of the region's products among its final suppliers, contributing to social development. Planting of fruit trees would also present contribution to urban environment. The search for sustainability produces in any decision a cause and social-environmental contributions, and the social-environmental enterprise that remains in this approach has a good chance of progress.

Rising ecological scarcities and farmer-herder conflicts in Nigeria: Changing the paradigm of policy response

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Disagreements between farmers and herders date back in history. Lately, there has been a dramatic escalation of the tension to involve large-scale killing, wanton destruction of property and widespread internal displacement of people. With close to 3,000 deaths and over 60, 000 people displaced, farmer-herder conflict poses the single most potent threat to the corporate existence of Nigeria attracting a sub-regional submit in search of comprehensive solutions. From drought and deforestation in the northern savannah ecological zone, herdsman graze their flocks down south often feeding on farmlands and inflicting large-scale destruction on crops and related farm produce. Farmers, on their own, typically react through reciprocal killing of cattle to set up a cycle of violent conflicts. While climate change impacts are known drivers of agro-pastoral conflicts, the spate of killing in Nigeria can no longer be explained on this ground alone. With both farmers and herders locked in a world of collapsing ecosystem services, establishment of cattle colonies across the country as a leading policy intervention by government can only aggravate ecological scarcities for farmers and further fuel the crisis. The current study responds to the need to properly understand the dynamics of the conflicts with a view to isolating key etiologic issues, articulating climate-resilient options, depoliticizing causal narratives and advancing new paradigm in policy-based governance of the crisis. It employed a qualitative research protocol conducting a total of 5 focus group discussions covering 200 male participants across 5 randomly selected pastoralist communities in Oyo state. Findings revealed that: current conflicts have elements of criminalities and this is evident in the many unprovoked sporadic killings, farmers and herders have a long history of harmonious coexistence and have, between them, a set of consensual measures to amicably redress injuries to each other's economic interests, existing grazing reserves have been substantially encroached by farmers and charcoal merchants therefore pushing herdsman outward into cultivated farm lands, water harvesting, boreholes and concrete watering troughs, subsistence farming and sparse schooling were the only climate change adaptation strategies acknowledged by the people. Arising therefrom, the study recommends the following policy measures: fencing of existing grazing reserves against predators, continued integration of climate change response into yearly national sector plans, training on climate-risk management, sustained funding of research and development for diversification into drought tolerant fodder species and innovative technology against cattle rustling, strict control of cross-border cattle movement, intensification of funding and monitoring of nomadic education, establishment of Savannah Area Development Authority for more effective coordination of climate change adaptation and mitigation strategies.

Key words: ecological scarcities, farmer, herder, conflict, policy response

Smart Farming: Big Data in Modern Agriculture

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This project aims to develop a software that is able to provide sensitive and useful information to medium-scale farmers about their farm. The purpose of this work is to offer, through an easy user interface, a decision support system that will be descriptive, predictive and prescriptive.

The software will have the capability of connecting to a vast network of sensors already available in the market. It will process a large amount of data that is collected regularly. It will deploy machine learning algorithms to recognize data patterns and generate information that can be used by farmers in making better decisions.

The focus of the study has been divided into 4 main areas of research: main crops on land, fruits and vegetables, beekeeping, and hydroponics. For each application we identified a certain set of sensors and its related software. Both hardware (sensors) and software have been chosen after a thorough economic and the environmental evaluation.

If implemented successfully, this project has a potential to expand to other applications in agriculture and sustainable development. The system can be customized to reflect the differences between the needs of farmers in developed and developing countries.

The purpose of the study is to understand the distinctive characteristics of each farm to maximize the output while minimizing waste, energy consumption, and water usage. More importantly, we focus on reducing the usage of chemicals (fertilizers, pesticides, and fungicides) that has an impact on the environment estimated around \$200-800 billion a year worldwide.

Strengthening of Community-Based Organizations as a strategy for sustainable development

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Community-Based Organizations are usually formed from people at the base of the population pyramid, understood as the sector composed of the lowest socioeconomic levels in any country. The construction of a Community-Based Organization (CBO) through an associative structure can be considered as a tool to achieve sustainable development.

However, organizations faced different challenges such as social, organizational and financial to consolidate and operate in a sustainable way. Once the organizations achieve self-management systems, their productive activity is no longer profitable. In some other cases, organizations can also achieve a successful and profitable business model, but the social and self-management conditions are not enough. The intersection of these financial and organizational factors derives in the autonomy that the CBO can operate in a sustainable way in a timeline. Autonomy means that organizations have the power to act independently and to make decisions about their own actions, welfare and interests. This ability may be apparently inactive in some organizations and then, decision-making lacks the possibility to understand the consequences of their participation in socioeconomic processes, limiting the success of their operation. In contrast, organizations that have identified and worked in critical areas for effective management have a higher level of autonomy.

Some authors have shown that the investment of resources in capacities brings with it the economic dynamism of the territory but this is possible when it is matching by the possibility of local decision-making that allows improving the response of the community. Additionally, they conclude that, in the long term, social capital gains can either facilitate economic development or help to sustain the impact of interventions on these associative groups. International cooperation entities such as USAID or UNDP have proposed tools to assess the status of organizational capacities as a qualitative aspect in the development and success of agriculture based-community organizations.

This article presents an innovative methodological tool that assess financial, reputational and organizational capacities variables and includes the narrative possibility of the Most Significant Change (MSC) technique. This method has as a result the Latent Autonomy Index (LAI), an indicator to assess CBO on the way to externalize the faculty of self-management. The inclusion of multiple variables and criteria in the assessments ensures a holistic understanding of the challenges and strengths of the organization. Recognizing that organizational development is a process, the LAI prediction must serve as a clear cultural and organizational development road map to achieve the autonomy of community-based organizations.

Sustainability of Organic Agriculture Using the Sixth Industrialization in the Philippines: A Case Study of Costales Nature Farms in Majayjay, Laguna

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A lot of people see organic agriculture differently. To some it is a luxurious necessity while to others it is a form of helping the environment and keeping the body healthy. Whatever the opinion is about organic agriculture, it is slowly becoming a trend to a number of countries. It is quickly gaining its momentum in the agriculture sector but still far from its full potential. I believe that the initial step for solving climate change should come from the Agriculture sector and that is why promoting organic/sustainable agriculture is the key in this never-ending battle for climate change. For this industry to be successful, it should have a well-managed and cohesive system. This is where the 6th industrialization comes in. The sixth industrialization is a Japanese management strategy to organic farming wherein it combines all three sectors: primary, secondary, and tertiary, in one farm. The benefits of this strategy are numerous but the main significance of this to climate change is the impact to the environment because it is a zero-waste inhibitor as well as promotes natural processing methods.

The main objective of this study is to see the different challenges affecting the sustainability of a farm in the Philippines that uses the sixth industry. Specifically, it aims to: 1. Identify if Costales Nature farm, a privately owned and certified organic farm in the Philippines, is considered a farm that uses 6th industrialization. 2. Give organic farmers as well as future organic farmers a way on how to manage a farm that uses this method, 6th industrialization.

This study hopes to educate farmers regarding organic agriculture and making them understand the benefits as well as the different misconceptions about organic farming.

Each industry has their own challenges as well as advantages. The social and environmental sustainability of the farm is well documented and the results are positive but due to constraints with data gathering particularly the book keeping of the farm management, the economic viability of the farm still needs further investigation. It was also evident that Costales Nature farms uses the 6th industrialization and that in order for them to manage such a complicated system is having a good management strategy. This is where the "6th industrialization model" comes in. I constructed this model to help the farm owners understand what goes in and out of each sector and how they can monitor them.

Synergizing Climate Change Adaptation and Mitigation in Indonesia: Using Climate Smart Agriculture and Clean Bioenergy to Drive Green Business Development, Policy Engagement, and Increase Resilience among Farmers

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The UN's Agenda 2030 targets the Sustainable Development Goals (SDGs) and drives energy policy in Indonesia. 35% of Indonesian households continue to rely on biomass for energy while energy resources provided by the government and private sector are difficult to obtain in rural areas. Fulfillment of SDG targets requires that those most vulnerable to the impacts of climate change (Indonesian farmers and members of rural communities make up 30% of the population) gain access to sustainable off-grid energy. This project presents a synergistic climate adaptation and mitigation strategy that promotes to use of renewable clean bioenergy and Climate Smart Agriculture (CSA). It includes agroforestry, profitable/resilient crops, value-added supply chains, the utilization of agricultural waste, and clean biogas as potential adaptation and mitigation pathways to address these socio-environmental issues across the Indonesian archipelago. However, barriers and risks to the strategies persist, and the adoption rate of CSA and clean bioenergy remains low.

With funding provided by the European Commission's Horizon 2020 and collaboration through the GreenWin and TRANSrisk research bodies, Sustainability and Resilience Company (su-re.co) has pioneered several mitigation and adaptation approaches. In West Bali and East Nusa Tenggara, su-re.co is leading the implementation CSA strategies and the installation of deliverable biodigesters within rural agricultural communities. Enabling environments were built by working closely with BAPPENAS (Indonesia's Ministry of Planning and Development) and enhancing productive dialogue by connecting researchers and policy-makers. The project aims to address the key risks posed by climate change in three ways; 1) Action-oriented research aimed at developing sustainable green businesses and installing biogas digesters, 2) Quantitative macro-econometric analysis of biogas systems and their diffusion, and 3) The stimulation of policy dialogue aimed at facilitating the inclusion of subsequent research into Indonesia's National Medium-Term Development Plan.

Connecting agricultural activities with renewable energy has the potential to counteract the risks associated with climate change and energy poverty by incentivizing relevant

stakeholders, stimulating green business and expanding sustainable agricultural practices. Combined with support from the National Medium-Term Development Plan, a synergy of mitigation and adaptation measures can solve the energy and climate change issues facing Indonesia's vulnerable agricultural community. Further activities and research to align information required by policymakers with knowledge supplied by researchers are needed as this approach could be implemented in other sectors.

Taking into account climate change considerations in the sustainable management of community forests in the Congo Basin: the case of the DEUK community forest in Cameroon.

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Climate change is the defining issue of our age. It is defining our present. Our response will define our future .

The Congo Basin, which has the highest rates of poverty and food insecurity, will experience a greater vulnerability of populations due to the sharpest contraction of agricultural incomes. In proclaiming the International Year of Forests, the United Nations wanted to celebrate forests, to remind what they bring to humanity, but also to point out that these areas are also increasingly under threat around the world .

The overall objective of this paper is to contribute to the reduction of deforestation and poverty in the Congo Basin. Its specific objectives are: (1) To increase the forest cover and improve the living conditions of the populations bordering the forests; (2) Establish the basic conditions necessary to enable Cameroon to be eligible for the benefits of carbon markets and payment for ecosystem services.

While the results of most of the community forestry experiments conducted so far conclude that the process is so bankrupt that only 1.18% of Cameroon's area is covered by a Community forest regime), and overall areas included in the scheme did not produce the expected effects from the point of view of improving livelihoods and reducing deforestation ; It must be recognized that the issue of the ability of community forests to support economic production that can trigger rural development and eradicate poverty without compromising conservation objectives has rarely been raised. A recent study carried out as part of a doctoral research (Ngoumou Mbarga, 2013) makes it possible to approach this question through the analysis of the forest productivity of four community forests located in Djoum in southern Cameroon . The paper on Cameroon's vision for 2035 reveals that the government is aware of the existence of a number of risks to the country's natural resources, including the possibility of their overexploitation. the Growth and Employment Strategy Paper (DSCE), in its points 119 and 206 on the country's assets and the management of natural resources, states that the exploitation of Cameroon's forests is done sustainably (DSCE 2009).

The stakes are high, since, according to the former Secretary General of the United Nations, Mr. Ban Ki Moon, "the fight against climate change can not be won without the forests of the world".

Thus, we agree with Achim Steiner, the Executive Director of the United Nations Environment Program (UNEP), "that forests are worth more alive than dead, their ecosystem services are worth billions or even trillions of dollars if we can evaluate them

in economic terms. Reduction of Deforestation and Degradation is an opportunity to begin capturing these real values and providing crucial funding to sustain one of the planet's survival systems. "May we be the proactive instruments of this on-going revolution that seeks to place sustainable ecosystem management at the heart of human activity!

The Impact of Access to Agricultural Services on Maize Productivity in Uganda

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The study examined the influence of access to agricultural services on maize productivity in Uganda. It was motivated by the fact there are low maize yields and yet the government has continuously increased funding to the agricultural sector through providing agricultural services to the maize farmers. The study analysed the access to credit services, extension services and access to markets and their influence on maize productivity. Using the multiple linear regression analysis and the Uganda Census of Agriculture 2008/2009 data, collected by the Uganda Bureau of Statistics (UBoS), we found that access to credit services leads to an increase in maize productivity, access to extension services increase maize productivity and access to markets leads to an increase in maize productivity. On the basis of these observations, we recommend that there is need for government to strengthen measures for farmers to access credit through farmer membership groups, VSLs, farmer banks, need by government to employ more extension workers to cover the largely unreached areas at the village levels and the central government should work together with the local governments in establishing maize produce markets in each sub-county in order to reduce the distance farmers take to reach the markets and through group marketing under farmer groups.

To determine the influence of farming practices on food and nutrition outcomes in Potou, Senegal.

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This research, which will be undertaken in Senegal with Millennium Promise between mid-May and late-July 2018, intends to focus on the nexus between agriculture, food, nutrition and health. It is part of an existing project that began in Potou in 2006 under the Millennium Villages Project (MVP).

Potou has a population of approximately 32,000 and is located on the north maritime fringe of the country. It is divided into two sub-zones: (a) the Niayes and (b) the Dieri. The Niayes is a narrow (5 to 10km) strip of land that is densely populated (more than 20% of the country's population lives on less than 1% of the territory), and it is characterised by irrigated commercial vegetable farming and fishing (in some cases). On the other hand, the Dieri is located to the interior and is characterised by rainfed field crops such as peanuts, cowpeas and millet, as well as livestock production.

Senegal relies heavily on cash crops and fishing, both of which are vulnerable to climate change and economic shocks. The country experienced harvest deficits in 2014 and 2015, triggered by recurring droughts and floods, severely weakening food security in northern and central Senegal. To mitigate against such shocks, and in order to maintain and improve food and nutrition security in Potou, Senegal and sub-Saharan Africa, this research aims to identify the components and status of food and nutrition security in both the Niayes and Dieri sub-zones of Potou as well as assessing, monitoring and evaluating the influence of farming practices on this outcome.

Mixed methodologies will be utilised in this research, which will include (approx. 100) questionnaires, (approx. 100) surveys, focus groups and interviews of farmers and other members of the local population, as well as comparisons to existing data that the organisation (Millennium Promise) has collected on over the past 12 years.

Economics and Demography of Natural Disasters

Are Cigarette and Marijuana Complements or Substitutes: Evidence from Nigeria

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Cigarette and marijuana are products consumed through smoking, chewing and other ways. Cigarette is manufactured from tobacco leaf while marijuana is produced from hemp plant called cannabis sativa. Cigarette and marijuana are drugs (Leppanen et al. 2001; Bélanger et al. 2011). This is because they are substances that are inhaled, injected and smoked to induce stupor or insensibility. Studies have argued that the addictive nature of these products has made their prices not to be responsive to change in quantity demand (inelastic). Over the years, little is known whether prices have differential effect on their complementarity or substitutability. Few studies that have worked in this area concluded that marijuana and cigarette are non-complementary. While studies have independently examined the demand determinants and prevalence of cigarette and marijuana use, their interdependence raises critical questions on whether cigarette and marijuana are complements or substitutes. Hence, this area has not received more attention. This study, therefore, examined the demand for cigarette and marijuana in Ibadan metropolis, Nigeria.

The study was anchored on Deaton and Muellbauer's Almost Ideal Demand System (AIDS) Theory. It adopted correlational research design. Motor parks, market places and beer parlours across Ibadan North and Ibadan West Local Government Areas were selected based on relative prevalence of cigarette and marijuana consumption in Ibadan metropolis. Thereafter, a purposive sampling technique was used to administer a structured questionnaire and select 251 respondents. The questionnaire focused on socio-economic characteristics (age, sex, education and marital status) and other variables (such as price of cigarette and marijuana, participation, budget share and quitting) were used. Estimation procedure utilised a sequential three stage hurdles model of consumer decisions: decision to consume cigarette or marijuana; budget share of the consumer; and decision to quit consumption. While the first and third hurdles were estimated using the probit technique, the second hurdle was estimated using Ordinary Least Square (OLS) method. Statistical significance was at $p \leq 0.05$.

The mean age of the respondents was 30; Males were 80.1%, 88.0% had formal education and 55.8% were single. There was significant positive relationship between own prices and demand for cigarette (0.87) and marijuana (0.95). Hence, cigarette and marijuana were ostentatious goods. There was significant positive relationship between cigarette and marijuana demand with their respective budget share at (0.0003) and (0.0004). Cigarette and marijuana were substitutes (0.26). Furthermore, there is a

higher probability that as individual gets older, they are likely to quit cigarette smoking (0.01) probably due to the adverse effect on their health status. However, getting older does not significantly affect decision to quit marijuana use (-0.42). The consumption of cigarette and marijuana were found to substitutes in Ibadan metropolis. Therefore, rather than adopting a joint approach, prevention programmes should target users of the two substances separately.

Keywords: Cigarette, Marijuana, Consumer decision, Ibadan metropolis Nigeria

JEL Classification: I12

Climate-Induced Natural Disasters and Suicide - An Equity Perspective of Mental Health: A Systematic Literature Review

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Background: Natural disasters are projected to increase in frequency, unpredictability, and severity due to climate change. An approximate of 1.5 million people are affected by natural disasters every year. Mental health, particularly suicide, is not a well-researched area in post-natural disaster settings. Globally, over one million people die of suicide each year, and it is the 10th leading cause of death in the US with a disproportionate burden among young adults and minorities.

Methods: PubMed, Scopus, Cochrane, PsycINFO were utilized to conduct a thorough literature review. The studies with suicide rates were included, and other studies with “suicide risk” and “suicidal ideation” were excluded in the analysis phase. 890 studies were identified; including 520 from PubMed, 77 from Scopus, 221 from Cochrane, and 77 from PsycINFO. After removing the duplicates and applying a strict inclusion and exclusion criteria, 7 articles, including Cochrane systematic reviews, were included in the final analysis.

Findings: This review (n=7) found a positive correlation between suicide rates and natural disasters ranging from an increase of 3.8% from heatwaves to 40% after floods. Tsunamis and hurricanes were not found to be associated with an increase in suicide rates.

Discussions: Suicide rates increase in the aftermath of natural disasters. This literature review suggests an urgent need to not only allocate more resources to mental health services, with a more equitable distribution targeting most affected populations, in post-disaster settings but also update the existing programs and policies to better reflect the changing climate and help reduce suicide mortality.

There are unique opportunities afforded by the Sustainable Development Goals to explore mental health and natural disasters and actively translate research into evidence-based policymaking. The SDG number 3 and 9 are particularly important to improve mental health services and decrease disaster risk. The SDG#3: Good Health and well-being, the target 3.4 requests that countries: “By 2030, reduce by one-third premature mortality from noncommunicable diseases through prevention and treatment and promote mental health and well-being.” Furthermore, the SDG#9: SDG-9: Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation. These research findings should be used to support an integrated approach towards reducing suicide mortality in the aftermath of natural disasters while achieving SDGs.

Disaster management in Canada in Changing Climate: Lessons for other countries of the world

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While the debate persist in certain quarters as to whether climate change is real or not, one thing that is incontestable is that disasters knows no boundary when they come. Those who are fortunate could escape with stories, while those who are not so fortunate might become victims. Determined to keeping its people safe, the Canadian government help Canadians and their communities protect themselves from emergencies and disasters related to all kinds of hazards – natural, human-induced and technological – through national leadership in the development and implementation of policies, plans and a range of programs. The Emergency Management Act recognizes the roles that all stakeholders must play in Canada's emergency management system. It sets out the leadership role and responsibilities, including coordination of emergency management activities among government institutions and in cooperation with the provinces and other entities. Responsibilities of other federal ministers are also set out in the Act. In the last twenty years, Canada has experience a number of disasters with huge financial implications resulting from devastations caused by the disasters. In all these, there has been minimal casualty in terms of loss of human lives. As a matter of fact, Canada often emerge from these disasters better and stronger. From the Great Ice storm of 1998 which cost an estimated \$1.49 billion in insured damages, through the Calgary storm of 2010 (estimated at \$500 million in insured damages), the Toronto flood of 2013 (about \$943 million), to the Fort McMurray wildfire of 2016 with an estimated insured damage of \$3.58 billion, Canada emerged stronger. In the face of a changing climate, coupled with the fact that there is no guarantee that these disasters would not strike again, this study examines Canada's approaches to emergency and disaster management with a viewing to highlighting lessons for other jurisdictions/countries of the world.

Improving Economic Avenues for Early Recovery to Natural Disasters: Case of Slum Demographics in Nairobi, Kenya

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Nairobi like other cities in global south is urbanizing rapidly straining infrastructures to provide to growing populations with sustainable transport, housing, education, water, and sanitation among st other social services. Although this this trend is expected, it is unplanned with policy makers being forced to play catch up. In addition to unplanned urbanization, modern day urban dwellers face other challenges including climate change, population growth, disease outbreaks and poverty. For instance, Nairobi's population is growing at a rate of 4% annually largely due to high birth rates and immigrants from neighboring countries that face instability. About a third of the Nairobi population lives in the slums. As populations have been soaring so have the disasters. The current debate in the country is that systems have to be developed to accommodate the expanding influx of middle and lower class whose arrival have recently exposed that natural disasters affect city residents unevenly. Natural hazards particularly hydro-logical (floods) and biological (disease epidemics) have affected the capacities of urban poor demographics to recover because they have either weakened economic avenues or compromised economic opportunities that are necessary for recovery. During this workshop, recent findings of how natural hazards impacts urban poor economies and capacity to sustainable recovery and development will be presented and discussed. Lastly, the study will also give possible solutions for policy makers to challenges identified. The study examines the relationship between two natural hazards prevalent in Nairobi and their effects to various demographics of urban residents during recovery phase after disasters.

Natural disasters and its effects In the environment

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Natural disasters are one of the major problems facing humankind. Between 1980 and 2004, two million people were reported killed and five billion people cumulatively affected by around 7,000 natural disasters, according to the dataset maintained by the Centre for

Research on the Epidemiology of Disasters (CRED) at University of Louvain (Belgium). The economic costs are considerable and rising. The direct economic damage from natural disasters between 1980 –2004 is estimated at around \$1 trillion. The general point is that societal factors affect the impact of disasters. Today, disaster fatalities are, on average, higher in low-income countries and nondemocratic countries.

This article examines whether natural disasters affect fertility—a topic little explored but of policy importance given relevance to policies regarding disaster insurance, foreign aid, and the environment. The identification strategy uses historic regional data to exploit natural variation within each of two countries: one European country—Italy (1820–1962), and one Asian country—Japan (1671–1965). The choice of study settings allows consideration of Jones' (The European miracle, Cambridge University Press, Cambridge, 1981) theory that preindustrial differences in income and population between Asia and Europe resulted from the fertility response to different environmental risk profiles.

According to the results, short-run instability, particularly that arising from the natural environment, appears to be associated with a decrease in fertility—thereby suggesting that environmental shocks and economic volatility are associated with a decrease in investment in the population size of future generations. The results also show that, contrary to Jones' (The European miracle, Cambridge University Press, Cambridge, 1981) theory, differences in fertility between Italy and Japan cannot be explained away by disaster proneness alone.

Research on the effects of natural disasters may enable social scientists and environmentalists alike to better predict the potential effects of the increase in natural disasters that may result from global climate change

Tackling demographic and economic factors to address vulnerabilities and reduce exposure to natural disasters: the importance of collaborative action

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Natural disasters present a growing public health and development challenge for the 21st century. The world has seen an increase in the recorded number of disasters due to factors such as population increase and climate change in recent decades. Natural disasters impacts disproportionately on the poor and marginalized, compounding their existing individual, social and economic vulnerabilities.

Demographic variables – age, gender, education, fertility, mortality, income and migration, for example – are affected by economic fluctuations and thereby result in changes to the economic landscape of societies. Likewise, changes to the economy are affected by demographic variables, and result in changes to the demographic landscape. These intertwined variables are virtually inextricable in the face of natural disasters.

Disaster risk reduction is a critical component of effective sustainable development. To successfully reduce the risks associated with the impacts of natural disasters and to achieve the SDGs, we must work collaboratively across and within disciplines. This requires a thorough investigation of the intersection between economics and demography in the face of natural disasters.

The question of how to best incorporate the various stakeholders and sectors in the creation and implementation of disaster risk reduction practices – from planning to budgeting, resource allocation to distribution, to outcomes and metrics – remains a challenge in practice. A dearth of collaborative action, inadequate data and vague or immeasurable outcomes limit the effectiveness of disaster risk reduction.

This paper illustrates evidence that disasters significantly impact both demographic and economic outcomes and reflects a pressing need for the collaboration among stakeholders to explore realistic, innovative and sustainable solutions. Targeted interventions, including the improvement of data collection systems, would increase understanding of economic and demographic variables in the wake of disasters and advance the effectiveness of disaster risk reduction strategies. Improved disaster response systems would result in the effective and sustainable transferability from disaster to development, comprehensively improving health and achieving lasting change for disaster-affected lives.

Vardha Cyclone A South Indian Flood In Thiruvallur District, Tamilnadu – A Case Study

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Water is an essential resource for the human life if the water is not properly channelized by humans it may create severe damages to us. When we preserve the rainfall we can utilize the water in proper manner or else it affects our daily life. In 2016 Vardha cyclone has severely affected Tiruvallur District, Tamilnadu and created unexpected disaster. The damages such as property loss, life loss due to heavy rain and flood without having proper water draining system has not been made by government. Past two years Tiruvallur and Chennai have been experienced heavy floods due to heavy rains because of Vardha cyclone, a north east monsoon. The flood has disrupted normal life and caused death and physical damages in Tiruvallur and Chennai Districts and it paralyzed the vibrant city's economy. The State Government of Tamilnadu has provided information that the greater Chennai Corporation was worst affected. Approximately 470 people were killed, 12,000 heard of cattle's were lost and lakhs of people were displaced in the State. Besides, around 4.92 lakhs houses got destroyed and damaged in addition to heavy loss of public property. The crop area that got damaged was also extensive measuring up to, 3.83 lakhs hectares. The study mainly focused on causes and consequences of Vardha cyclone and its effects, changes happened in their living standards and psychological problems among the respondents in Tiruvallur District. The researcher has adopted qualitative method by using case studies to collect the details of the respondents. The study mainly focused improper water draining system and mismanagement by the district administration. The study suggests that the government has to take suitable measures in water draining system and has to build new water shed programmes for draining the surplus water in the selected area of the study.

Keywords: Vardha Cyclone, Flood and Monsoon

Clean and Affordable Energy as a Keystone for Sustainable Development

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The usefulness of clean and affordable energy cannot be overemphasized in the pursuit of sustainable development globally, as no country has ever developed without access to reliable and affordable energy, but which may not be clean. The impact of energy on people, communities and nations in terms of economic growth, health, security, food, and education, makes the campaign or call for a clean and affordable makes it a more noble cause in present times.

Despite the utmost importance of energy to mankind, over 1.1 billion people in the world still live without electricity, while almost 3 billion still cook using polluting fuels such as kerosene, wood, charcoal, and dung (World Bank 2015). It is advised that to advance towards universal access to a clean and affordable energy source, countries need to expand electrification more rapidly than demographic growth, using more renewable energy source, if it's to achieve the 2030 goal. Increase in global investment from \$400 billion to \$1.25 trillion need to be taken more seriously to achieve the set target. Private sector participation is of great essence in bridging this gargantuan gap most especially in the least developed countries. Several of these private institutions are using their assets to help fill gaps in private sector finance, focusing on poor and vulnerable communities that risk being left behind in the energy transition

It is of immense importance for Sub-Saharan Africa, which has been identified as the region with the highest deficit of clean energy to brace up and take advantage of abundant renewable energy source. Today there is no technical barrier to providing billions of energy poor with modern, safe, reliable and affordable energy services (Nussbaumer, 2012). The World Bank reckons that significant and sustainable increase of clean and affordable energy supply in sub-Saharan Africa economies could make it be growing by two percentage points a year faster, on average, than they do now. The ripple effects of such growth can foster socio-economic development in rural Africa, creating a thriving job market and improved quality of life for millions of people.

Affordable Clean Energy as a Keystone for Sustainable development

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Zimbabwe is importing power from South Africa, Mozambique and DRC. The average power consumption for a typical household is 11700KW/year and industries consume an average of 0.307million gigawatt hours(GWH).The country is importing 300MW from Eskom(South Africa) and 150MW from Hydro Cahorra (Mozambique) and the rest is produced by local power stations which are managed by the company Zimbabwe Power Company (ZPC) which utilizes hydro and coal power plants.

Zimbabwe has an average population of 13 million of which 60% of the population has no access to electricity. Lack of access to energy dramatically affects and undermines health, limits opportunities for education and development and can reduce a family's potential to rise out of poverty.

The production and construction of a nuclear power station in the country is paramount within the country's development and also to solve energy problems. Zimbabwe have the potential of producing energy using nuclear since they are reserves of uranium within the country along Kanyemba. For nuclear energy to be a strong component of our nation's future energy portfolio, barriers to the deployment of new nuclear plants must be overcome. Plant designs, such as small modular reactors(SMR) and high temperature reactors(HTR) have potential to achieve lower proliferation risks and more simplified construction than other designs. The development of next-generation reactors could present lower capital costs and improved efficiencies. Moreover, sustainable fuel cycle options improve uranium resource utilization, maximize energy generation, improve safety and limit proliferation risk. However, it is important to assure that the benefits of nuclear power can be obtained in a manner that limits nuclear proliferation and security risks, thus incorporating the simultaneous development of nuclear technologies, including safeguards and security technologies and systems, and the maintenance and strengthening of non-proliferation framework and protocols.

Alkaline boosted CO₂ conversion on non-noble catalysts: High performance and overwhelming insight

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CO₂ electro-conversion is a promising tactic towards greenhouse gas issue. Noble metals, such as Au and Ag, appear to have high catalysis towards CO₂RR but at high cost. In addition, most researchers are conducted on 3-electrode cell, avoiding the synergetic effect of anode OER site. Therefore, developing an CO₂ electroreduction reactor with low overpotential but robust selectivity and reactivity at low cost is critical. Here we reported an alkaline flow cell coupled with Group 14 non-noble catalysts, to selectively convert CO₂ to liquid gaseous products at low overpotentials and high reactivities. A comprehensive and overwhelming mechanism study of the boosted performance is also presented, demonstrating the coverage effect of the neutralized species at the interface between the cathode electrode surface and bulk catholyte. Different alkaline concentration scenarios are also studied, revealing the corresponding CO₂-alkaline interactions.

Biogas Production in Botswana: A sustainable alternative to improving energy access and security

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In Botswana, electricity used to be a modern energy service accessible mostly to the rich. Over the past five years access to electricity has become difficult even for those with money as the country itself is not able to produce enough electricity to satisfy population demand. Botswana has two coal power plant stations (Morupule A and B) which have since failed to produce enough electricity for its citizens, hence the country depends on neighbouring countries like South Africa to top up its electricity grid regularly.

That said, this research seeks to investigate the country's capacity to produce biogas as a clean energy alternative and the willingness of smallholder farmers to produce domestic supplies of biogas and sell access to the national grid. It will highlight the ultimate potential biogas production has in improving the lives of locals in the face of climate change. Research will consider the sustainability of biogas as an alternative energy source, and the sustainability and affordability of the infrastructure needed to produce it.

Other than limited access to electricity, this research focus is inspired by the fact that one of the main environmental problems of today's society is the continuously increasing production of organic wastes. In many countries, sustainable waste management as well as waste prevention and reduction have become major political priorities, representing an important share of the common efforts to reduce pollution and greenhouse gas emissions and to mitigate global climate changes. Uncontrolled waste dumping is no longer acceptable today and even controlled landfill disposal and incineration of organic wastes are not considered optimal practices, as environmental standards are increasingly stricter. Production of biogas through anaerobic digestion (AD) of animal manure among other digestible organic wastes, converts these substrates into renewable energy. In Botswana, the biggest contributor to global warming is said to be cow dung. It is an open secret that Botswana has more cattle than it has people – cattle populations stand at an estimation of 3.5 million while that of people stand at 2.2 million. 80 percent of the 3.5 million cattle are kept in community free range spaces while 16 percent of them reside in private ranches. Thus said this paper will find out why efforts to setup biogas production plants in the past failed.

The research adopts a qualitative methodology. This is to ensure that a broad approach encompassing many research techniques can be used, and that accurate results can be shared, and that conclusions can inform recommendations.

Keywords: climate change, biogas, Botswana, clean energy, waste, electricity, environment, farmers

Building the Evidence Base for Women's Entrepreneurship in the Clean Energy Sector

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Globally, one in five individuals still lack access to modern electricity and nearly 3 billion people rely on wood, coal, charcoal, or animal waste for cooking and heating. Recent years have witnessed significant progress in expanding energy access through women entrepreneurs, especially to poor and difficult to reach customers (UN Sustainable Development, 2017). Women's employment in the clean energy industry is economically empowering, enables energy companies to produce better-targeted products and services, and helps sell to female customers in hard-to-reach locations (Fortuna, 2016; UN Chronicle, 2015). Involving women in roles as product designers, manufacturers, and sales agents can contribute to income access, networks, technical knowledge and skills, opportunities, and self-confidence (Shankar et al. 2015). Women also possess power to catalyze clean energy markets because of frequent involvement in energy collection, cultivation, and use (USAID, 2014). Yet, limited data exist on the contribution of women-centric approaches to both expanding access and effective use of clean energy technology and/or energy-based services (Clancy, Oparaocha, & Roehr, 2004).

While women's entrepreneurship is widely held by global policy-makers as important to economic development, very few studies address the exact role that women-led micro and small enterprises (MSEs) play in the energy industry and their contribution to specific Sustainable Development Goals (SDGs). In this research study, we conduct a systematic literature review (Tsafnat et al. 2014) to both understand the scope of current knowledge on gender and entrepreneurship in the energy sector and to assess the quality of evidence clarifying how women's energy entrepreneurship may contribute to key SDGs, including energy access for all individuals (SDG7), gender equality (SDG5), health and well-being (SDG3), poverty alleviation (SDG1), and sustainable economic growth (SDG8).

We utilize a "gender system" theoretical perspective (Elam 2008; Ridgeway et al. 2004; Ridgeway et al. 1999) and multilevel research model as guidance for this review. The gender system is comprised of processes defining males and females as different in socially significant ways and justifies inequality on the basis of those differences. This gender system is formed by gendered social norms, ideals, and expectations dictating roles for men and women; how power is distributed inside and outside the household; and how gendered interactions reflect and reinforce institutional forces. Existing power

and status structures reinforce cognitive processes around gender identity, leading to the social reproduction of existing social norms, ideals, and expectations and related systems of belief and individual agency. Findings from cross-national research on gender and entrepreneurship are highly consistent with the theoretical propositions proposed by this “gender system” perspective. Following the gender system model, we explore barriers and enabling factors at multiple levels of analysis across the ecological framework – from sense of agency at the individual level, to enabling policies at the institutional level – that facilitate female entrepreneurs’ success and contribute to positive economic development. This review presents the state of the science on energy entrepreneurship, contributes to theory development around the potential influence of women’s entrepreneurship in the energy industry, and recommends programmatic solutions that will have direct applicability to practice and policy.

Clean And Affordable Energy As A Keystone For Sustainable Development

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Despite the importance of clean and affordable energy in the 21st century, the clean energy concept is not well embraced in Ghana where all indicators point to the fact that clean energy will reduce the country's dependency on the traditional crude oil source.

Ghana has started experiencing its fair share of climate change repercussions ranging from unfavourable weather pattern leading to famine and desertification in some communities in Ghana. The world has been plunged into series of disasters as results of climate change such as hurricanes and wild fires in various part of world.

The clean energy may be a very huge investment for a country like Ghana to venture into considering the cost, the expertise and the citizen's perception about clean energy.

The sustainable development goal number seven "Ensure access to affordable, reliable, sustainable and modern energy for all" is an obvious project that can better the lives and economic prosperity of the people (locals).

To be certain that clean and affordable energy concept is done well, the Three Approaches that is the Government, Policy makers and the General Populace must understand the benefits clean energy will yield despite the initial cost (example the one district one factory policy of the current government can be realised if energy supply is stable, dependable and sustainable).

The government of Ghana has shown some commitments in the sustainable clean and affordable energy by way of wooing investors into that young industry with tax holidays and incentives that would help investors in the clean energy industry to be able to recoup their investments.

Policy makers and policy think- tanks are doing a collaborative work with government in the direction of clean and affordable energy.

Government through the Ghana energy commission have rolled out policies that prevent the use of second-hand air conditioners and refrigerators.

The populace may not have accepted the new trend of clean and affordable energy concept but the handfuls who are enlightened about the idea are incorporating the concept. Example is installation of solar panels in some residential buildings by property owners and certain companies doing same.

Ghana has many opportunities in clean energy sources example, solar, wind, tidal wave, and mini hydro.

With these sources under consideration, many villages can be weaned- off the national grid thereby reducing its load. The local economy of these villages will be boosted leading to job creation. Clean and affordable energy will bridge the gap between men and women thus; the gender equality in the SDGs will also be achieved. Women will be empowered and children lives and education will be improved.

Government's effort of installing pre-paid meters in all government buildings will be more sustainable if clean and affordable energy like solar panels are centralised and installed in the ministries and agencies to reduce the heavy burden these facilities put on the national grid and further reduction of government expenditure on these facilities.

Clean and affordable energy has many benefits to Ghana ranging from booming economy, at the local and national level, protecting the environment, thereby investing in many other sectors of the economy that will promote the other SDGs.

Despite the many challenges clean and affordable energy concept may face in Ghana, the benefits that comes with are numerous which must be embraced by all.

There are many challenges facing the smooth introduction of clean and affordable energy concept in Ghana both at the local and national level however, the benefits are in two folds which are:

Environmental benefits- where clean energy will result in both domestic and climate activities having positive impact on the environment and

Businesses - practising clean energy concepts will have the opportunity to reverse their negative effects on the environment.

Clean energy will be the only opportunity to uplift people from poverty by way of increasing people's incomes due to job creation it will bring health improvement since health facilities will be improved and above all, ICT as a major tool for effective learning extended to all the regions, towns and villages in Ghana.

Energy is the blood that runs every economy and clean energy is the sure way of running Ghana's economy with little or no negative impact of the environment.

Clean and Affordable Energy as a Keystone for Sustainable Development in Nigeria: the need for Public Private Partnership Policy.

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Since independence, the principal objective of Nigeria's economic development plans by the various governments has been to achieve stability, material prosperity, peace and social progress. Nevertheless, a variety of problems have persisted, slowing the countries growth and development objectives among which are weak leadership, corruption and weak infrastructures especially in the energy sector.

Meanwhile, if there is any single enterprise in Nigeria that has crashed today, perhaps irredeemably, it is the electricity supply in the energy sector which also falls under weak infrastructures problem. It is the major infrastructural challenge that is facing Nigeria governments in her efforts towards sustainable development. Therefore, to achieve a meaningful development, there is need to embark on a comprehensive public private partnership (PPP) program that would focus on electricity infrastructure which is the major issue that concerns the people now.

For example, between 1999 and 2015, Federal Government of Nigeria embarked on aggressive rehabilitation of electricity power infrastructure which was referred to as the “Infrastructure Rehabilitation Reform” to improve power supply for domestic, commercial and industrial users and attract private investments to complement funding by government for the expansion of electricity services to all parts of the country (Lawal, 2008).

The National Integrated Power Project (NIPPs) was also established to boost electricity generation capacity by installing gas power stations across the country (Okolobah,V. & Ismail,Z.,2013). This was followed by the decentralization policy in which licenses were granted to different Independent Power Producers (IPPs). These IPPs generates and sell electricity privately to utilities or the general public (Lawal, 2008).

Later the government enacted the Electric Power Sector Reform Act (EPSRA) (2005) which was a good take-off for public private partnership process, but today power blackout is still a regular scene in cities, towns and villages across Nigeria with its attendant negative impacts on the lives of the people and business productivity.

Also the nation is still confronted with problem of lack of electricity supply which is caused by low investment by the government in domestic energy production, low private sector participation and investment, inadequate policy regulation and institutional framework, transmission and distribution and maintenance challenges. Above all, across the country, insurgency and militancy have damaged or destroyed power stations.

Basically, to address most of these problems the public private partnership arrangement should take cognizance of providing services in the areas of technical know-how, power generation, distribution, marketing and maintenance which are the hallmarks of effective electricity generation. With the population, market, manpower, and the rich economy of Nigeria, if there is political will, I believe, these services can be made available and affordable.

The objective of this paper is to address these issues and challenges confronting Nigeria's electricity energy problem and suggests the way forward so as to accelerate development process that would alleviate the level of poverty in the country.

Clean energy lending model/scheme for Pakistan

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Energy and affordable energy services provide an essential input to economic activity and contribute to social development through education and public health, and help meet basic human need for food and shelter. However, in Pakistan (developing country located in South Asia), approximately one third population (70 million) people, mostly in rural areas, lack access to modern and clean energy.

To cope up the prevailing energy crises, government has initiated various energy projects at macro level, which in long run will help country to combat the prevailing energy gap. However, in addition to above, there is need to introduce energy financing schemes at micro level that will enable indigent people of country to meet their energy as well as financial need. For micro level, researchers claims that Microfinance lending for clean energy holds tremendous potential to reach billions of people with benefits to their health, education and ability to save money.

Keeping in view of above, I have carried out an study to assess the viability of microfinance lending for clean energy in Pakistan. The study helped to envision how clean energy model can be applied in Pakistan and how clients in Pakistan might benefit from similar clean energy products and loan programs. The research covered study of two microfinance institutions in the region that have successfully launched clean energy programs in their respective countries; XacBank in Mongolia, and Grameen Shakti in Bangladesh.

The study is divided into three main parts. The first part deals with Mongolian and Bangladeshi experience in introducing Clean energy products through financial institutions. First, it covers the products used in Mongolia for clean energy lending and the method followed for marketing and delivery of clean energy products. Later in this part, the experiences from Grameen Shakti – the key clean energy lending institution in Bangladesh shall be explained. The portion expounds the method followed by the Grameen Shakti for clean energy lending in Bangladesh. How the bank helped reducing poverty by the means of providing access too clean energy products. In the last, the part explicates the success and failure of clean energy programs in both country.

The second part of research elucidates implementation of clean energy lending in Pakistan. It identifies, gaps remain for Pakistani MFIs to be able to realize the potential of their clean energy programs. The key challenges and opportunities that Pakistan has in the field of clean energy lending.

In the third part, the study highlights the lesson learned from the models of both the countries and posits a clean energy lending model for Pakistan. The model seeks to leverage existing strength in the microfinance and biogas sector while addressing key

gaps that are necessary for availability of clean and affordable energy. In the last, it has also been discussed that how various Microfinance Institutions in the world already benefiting from the carbon program in their respective areas.

Clean energy of biogas for sustainable development in Indonesia

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Twenty-one of Indonesia's population primarily relies upon firewood for cooking fuel. To overcome this problem, the Indonesian government, NGOs and companies established the decentralized biogas programs as cleaner energy source. This paper aims to analyze the socio-political and environmental problem from firewood cooking and to find out socio-political challenges and opportunities for biogas development in rural areas in Indonesia. This paper used literature review method with frameworks of DPSIR and stakeholder matrix. The result found that the firewood cooking adversely affected local wooded ecosystems, deforestation rate and negative effect on human respiratory health. Energy-poor people in rural areas in Indonesia continues to use firewood as their cooking fuel. To date, the governments try to accommodate the energy-poor people through LPG program. However, centralized LPG system makes some remote areas still unreachable by the program. Even in some reachable areas, some people are still preferably using firewood instead of LPG. This dependency of the use of firewood caused the government and other stakeholders established the biogas program as solution. Decentralized biogas system is needed to fit up the centralized LPG program. Thousands of biogas digesters have been installed, however many of energy-poor people still use the firewood. Challenges are found in scheme of the program which is related with the technology issue. Spreading of the program is limited by the government funding and program mechanism. Credit scheme built by the NGO does not work well due to financial condition of the farmers. The biogas program is still not able to replace the firewood use because of three major challenges; 1. Program schemes are still dominated by the government grants. This situation leads to community dependency on the grant, lack of investment and low demand and market in this sector; 2. Many installed digesters not operated due to lack of knowledge and skill of the biogas user about the maintenance and installation of the digester. 3. Low social acceptance from the household. The study suggests that there is an opportunity to improve scheme of governmental biogas program. It must involve more roles from non-state actors.

Clean Energy through Blockchain Technology

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Climate change mitigation and adaptation are parts of the environmental dimension of Sustainable Development. There is a need for more ways to facilitate the direct people's participation on climate change mitigation activities and achievements of the 2030 Agenda's goals. Decentralized and distributed efforts among people could be implemented through a very innovative mechanism of value creation taken from the financial and monetary fields: virtual currencies backed by CO₂ emissions reduction. The most popular virtual currency is the "bitcoin" with its underlying technology known as "Blockchain" (a kind of distributed ledger or database). Bitcoin is not generated by any central bank or national government but from people around the world who offer its hardware capabilities for the functioning of this virtual monetary system where individuals, companies and even institutions can participate actively by holding invested funds in electronic wallets or issuing coins like a typical central bank does (according to specific protocols and requirements to become such an issuer). Thanks to cryptographic algorithms, the virtual currencies can store value and avoid coins duplication or fake money; in the case of bitcoin, for example, it also guarantees the creation of a fixed and limited amount of bitcoins in the future (21 millions of bitcoins units), in a quite similar manner to the limited "world carbon budget" needed to achieve the 2 degrees Celsius temperature target specified in the Paris Agreement (about 61,000 millions tonnes of CO₂e emissions must be mitigated by 2050 according to UNEP and EIA). Some virtual currencies similar to bitcoin have been designed but with a laudable purpose: to achieve positive impacts to the environment, which is quite interesting specially because of the energy consumption's implication of the networking and hardware activities for the functioning of the virtual currencies. Throughout this paper these currencies with environmental purposes are named "e-cryptos". This study focus on the sustainable development goal No. 7 of the 2030 Agenda about clean and affordable energy. It analyzes different e-cryptos created until now and presents a conceptualization of an alternative virtual currency that enables common people to contribute with small CO₂ mitigation actions based on energy efficiency and energy conservation. This proposal is an opportunity to boost and expand the carbon market outside the institutional and big investors sphere to individuals and small communities in order to enable them to take advantage of financial micro-incentives in the fight against climate change thanks to the blockchain technology.

Critical Analysis of Impact policies, variability and regulatory framework for Solar as sustainable energy in India

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India pursuit towards solar energy, upholding solar as tool to trade off coal fired power to build energy rich future has translated the mammoth march to hit target of 100GW by 2022. A performance analysis by a company found that for every megawatt of the solar capacity installed, an average output of mere 19% is extracted. With the current solar tariffs at USD 0.07, the Public-Private partnership is sitting on a solar bubble. The pricing subsidies and high losses (technical and commercial) account for the average loss of a rupee, per kilowatt hour (Kwh). Additionally, with focus only on pricing kilowatt hours and lack of day-of-the-time pricing for bulk procurement during peak hours. On one end, the influx of green energy targets has energized government focus to accelerate capacity addition while on the other is running the growth of competitive intensity at both the market and supply sides. However, the question stands on the Return on Investment and Sustainability with the continuous falling of the solar tariffs. The study tend to analyze why the solar energy is tough to generate in India compared to other countries. I'll try to view it from quartet of challenges:

1. Peak and off-peak variability
2. Location specific potential
3. Higher costs
4. Green Incentives to companies and Small Investors
5. Impact policy and regulatory framework

Techno-Economic and Grid peer impact on Solar implication

The study tries to evaluate the techno-economic, regulatory and policies in India by 2022. The study observes the disproportionately high focus on capacity additions targets based on large scale thin-film solar power plants, it's repercussion on the grid and techno-economic feasibility. The study would observe the high focus on SPV technology and low focus on CSP (Concentrated Solar Power) technology in India.

The study would expand focus on how the country's weak and unstable grid system impacts the overall reserve margin and economics of rooftop solar during non-supply hours.

The developers need to deal with anti-dumping duty on imported solar panels, intra-state network transmission constraints. The poor bids and cost overruns especially due to delays in procurement of necessary land, permits and mismanagement of funds. For developers, the auction have resulted in risks of project delays, possible cancellations and difficulties in sourcing finances and technologies.

Approach

The nexus approach of the market and demand side through the interlink among policy, regulatory framework, aggregate transmission and commercialization, higher costs, projects viability and incentives would be critically analysed against the installed projects and the short and long-term sustainability of the solar as a viable energy would be discussed in the paper.

Recommendation:

The paper would propose recommendations in keeping in view to introduce measures for protecting small investors, shifting to time-of-the-day pricing for bulk supply, introducing smart grids to make demand more dynamic further improving predictions, analysis and measurements through data sharing, improving on transmission congestion, the financing of solar energy through market creation, municipality / utility based models among others would be discussed through the paper.

Economic Development And The Sustainable Challenges: Bioelectricity From Pulp Industry

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The environmental imbalances derived from the current socioeconomic model have made room for new alternatives consistent with sustainable development. In this context, questions about the global capacity to support this socioeconomic dynamic led to reflections and the search for alternatives for a more sustainable development. In this way, forests play an important role in maintaining the biological and climatic characteristics of the planet and additionally generating wealth through the use of forest resources. This research was conducted to show the benefits, value and advantages of biomass energy provided by forest waste and black liquor from the pulping process. This energy source may be able to assist and improve the area's environment in a sustainable way. The present study analyzed the potential of planted forests, bioelectricity production in the pulp mills and the challenges of implanting a pulp industry in the city of Três Lagoas, state of Mato Grosso do Sul, Brazil. Planted forests' potential, energy production in the pulp industries and their impact on the local environment also were examined and studied. This research is meant to describe the characteristics of a given population through bibliographical and documentary means. All the data collected for this study were provided from reliable sources (i.e. official government agencies). In analyzing the data and local information, it is evident that the forestry and pulp industries brought benefits to the population such as employment, increase in income, increase of money flow at local commerce - especially merchants and small retailers, real estate expansion and real estate value. However, it highlights the impact of industrialization on the environment, and the public sector that serves the population that generates those local impacts. It is incumbent on planning to curtail the problems of infrastructure, public health and safety and minimize environmental impacts. In short, sustainable development is a complex process that requires time, since economic and social development shouldn't create environmental imbalance.

Effects of heterogeneity on Marginal Abatement Costs in personal vehicle transportation

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The U.S. transport sector emits 1.9 billion tons of CO₂ annually of which 60% comes from the light-duty vehicles (which includes passenger cars and light-duty trucks), making it one of the largest polluting sectors. There is a wide range of policies such as tax credits and CAFE standards designed to reduce emissions, to increase efficiency in personal transportation, and to support cleaner technologies. However, these technologies are not cost-effective solutions in all the cases, and do not take into account the consumer behavior. In this study we show that the policies to support the cleaner technology variants should consider the varying consumer behavior and their needs, to effectively reduce maximum emissions at the least cost. The Marginal Abatement Cost Curve (MACC) framework can be used to summarize the mitigation potential of different technologies. MACCs are generally constructed for an average consumer in a country. However, each consumer is different with respect to behavior and use of the technology in the same country. Similarly, any consumer in the U.S. uses personal transportation differently which is evident from National Household Travel Survey (NHTS). In this study, carbon abatement is calculated in the U.S. transportation sector, while accounting for heterogeneity. The model accounts for geographic (emissions from different grid mix), behavioral (annual miles driven, and type of vehicle owned by a consumer: car, SUV, van, and truck) and fuel types (diesel, gasoline, natural gas and electric) heterogeneities. In personal transportation, three different technology variants are considered: Hybrid Engine Vehicle (HEV), Battery Electric Vehicle (BEV), and Plug-in Hybrid Electric Vehicle (PHEV). MACCs are constructed by calculating emissions savings and operational costs for each technical variant compared to a conventional vehicle over the lifetime for each consumer, and by keeping the same vehicle type. The operational cost comprises of fuel costs, battery replacement costs (for BEV and PHEV), initial capital cost of acquiring cleaner technology variant, and the salvage value at the end of the lifetime of the vehicle. For each consumer a technology is chosen with respect to 1.) Least MACC or 2.) Least operational cost. The composite MACC is built by arranging MACCs of the best options of each consumer in an ascending order. The model suggests that, if all the consumers replace their current vehicles with their least MACC technology variant, about 1% of the current annual transport emissions will be 'free carbon' savings shown with negative MACC values. Further, in the states such as Kentucky and Wyoming, where the emissions per kilowatt-hour of electricity generation are higher, there will be no emissions savings whereas states like Oregon and Washington will have highest emissions savings.

Electrifying Timor: How clean electricity (energy) can power SDGs in SIDS

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The southeast Asian island of Timor Leste is one that is garnering international attention for its increasing focus on sustainable development. Since gaining independence in 2002, the nation has tried to rebuild its war-torn infrastructure and reinstating essential services for the population. A major concern for Timor, as is for several small island developing states (SIDS) in the world, is rural electrification. Majority of Timor, lacks access to power grids with a typical poor, rural household having little or no electricity supply. The nation is oil-rich, and is largely dependent on fossil fuels for its energy purposes. The reliance on other energy sources, in particular firewood, has adverse consequences for the nation's ecology and environment.

The impact of lack of sustained energy, affects most other aspects of life. Corollary to that, investment in clean energy can trickle down to other aspects of development by powering hospitals, shops, markets etc. However, development in Timor remains crippled due to the limitations of conventional electricity supply options in remote rural areas due to demographic distributions, physical geography environment and climate/meteorological conditions.

This paper will draw lessons learned from other SIDS in the world for a comprehensive clean energy plan for Timor. It will briefly analyze previous strategies, explore the types and scale of energy services required in the rural areas, and will be matched against possible renewable energy options. The analysis will look into the technical, economical, social, environmental and institutional aspects of transitioning into clean energy-driven rural electrification for Timor. The paper will attempt to explain the rationale behind why rural electrification and use of clean energy will translate to faster achievement of SDGs in the country.

The paper will also extrapolate on the impact that lack of access to electricity will have in accelerating the effects of climate change and attempt to discuss applications of clean energy investment in revival of agriculture in drought-prone regions. The potential that clean energy can play in slowing down the most adverse effects of climate change, including desertification, is multifold. The learnings from Timor can be applied in countries like Puerto Rico, Haiti, etc. that are suffering from the effects of climate change, towards building a collaborative strategy for achieving sustainable development in SIDS.

Energy And Sustainable Development In Africa: The way forward

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One of the actions to mitigate the impact of the climate change is the practice of sustainable energy, including improved energy efficiency and reduction of energy intensity and general increase in the contribution of renewable energy in the overall mix. In order to achieve this, there is a need to continually engage in the type of energy production that limits the emission of greenhouse gases into the atmosphere. The current energy production and consumption trend in Africa which is hugely dependent on finite fossils fuels poses great threat to achieving sustainable development goals.

Energy and environment are strongly linked and cannot be separated. Many energy sources are drawn directly from the environment and making these sources sustainable depend largely on effective management of the process of extraction, production, processing and distribution to drastically reduce the environmental effects such as emissions, pollution, water quality use, land use issues, soil degradation as well as the disruption of the ecosystem.

In a bid for most African countries to continue to improve their industrial outputs and production, the major concern so far is solely focused on accessing energy through fossil fuel thereby neglecting the need to be mindful of the environmental effects that arise as a result of carbon emissions that come from these energy productions. There is a huge untapped renewable energy in Africa. Less than ten percent of the region's hydro-power potential has been tapped so far, while wind and solar energy potential are abundant.

There is a growing consensus that one of the best ways to achieving sustainable development is by aligning our economic growth with the green economic development. A simple approach to achieving this is by intensifying efforts on the use of natural sources of energy as against the use of fossils fuels because of the hazards and the damaging effects that it has on the environment. This paper discusses many factors that need to be urgently addressed in order to achieve our set target of achieving clean and affordable energy in Africa.

Keywords: sustainable development; Africa; energy; environment

Energy Forecasting and Prudent Environment: Combats for China as A Driver Seat of Belt and Road Initiative

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The topical research study is the investigation to gauge the relationship among renewable energy, energy consumption, growth, industrial production, population growth and environmental degradation (CO₂) in China, since the inauguration of Belt and Road Initiative (BRI) scenario. The current study strings the period from 1978 to 2017, where the intent of time consideration is based on the Chinese economic reforms that initiated in 1978. Sustainable development Goals (SDG) entice to every nation, to chance on for 17 goals accomplishment in the real-world frame. Primarily, the unit root test employed to check the stationary of on-hand variables, where some variables show at level and others at first difference. The retrieving situation is a fine position to utilize the Autoregressive Distributed Lags (ARDL) bound testing model for disclosing the short-run and long-run association between the variables. In the long run, a negative parameter of ECM expression and its significance endorse the long run cointegration linkage subsisted among the variables. At long-run relationship agriculture value added, industrial value added, energy consumption and economic growth have an adverse effect on the environment, while rest variables have insignificant for environmental degradation. On contrary, in short-run population, economic growth and also have the alarming effect on ecological setting but the renewable energy effectual for the environment at all. In a word, the concentrating study will be a directing indication for Chinese government and policymakers to command the procedures in presence of (BRI) projects for energy demand by especially fixing the renewable energy source (hydro, wind, biomass and solar etc.). Furthermore, water treatment plants adjacent to industries should be embedded for clear-out the polluted water that may harmful to the adjoining societies. Hence, the study implications may helpful for the success of BRI projects in term of accomplishment and projected proceeds achievement within the earmarked time.

Keywords— ARDL, Belt and Road Initiative, China, Combats, Environmental degradation, Economic growth,

Energy poverty and sustainable development

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Overview

This paper reviews the shortcomings in energy systems in the most deprived regions in the developing world: South Asia, Sub-Saharan Africa and East Asia. It reviews the deficiencies in energy systems contributing to energy poverty at national levels and discusses overlooked issues which result in energy poverty at household levels.

Adequate energy services are essential for sustainable development and are crucial for assuring a good quality of life: a fact which has led to increased interest and attention. However, efforts to eradicate energy poverty have not achieved the desired results. The lack of understanding of the problem and inefficient policies are contributing factors to this situation. To address this problem, which the International Energy Agency (IEA) predicts will increase by 2030, a better understanding of the energy systems in the most deprived regions is necessary. In addition, effective energy policies which encourage reliable and affordable energy services need to be designed.

In addition to reviewing the energy poverty issue, using the panel regression methodology, this paper looks to analyse the impact of energy poverty on sustainable economic and social development in developing countries.

Environmental Efficiency and Satisfaction Towards Hybrid bus at Gansu Providence: Analysis of Stakeholders Perception

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With the development of civilization, environment and environment pollution- we are constantly familiar with these two words. The civilization of itself is in the inversion. The whole world is at risk of environmental disaster. And this disquiet further enhances with the man-made disasters to environment. Just as our civilization has flourished with the benison of science, so much of our resources for living have been declined due to the environmental pollution which we have got as the byproduct of science. On the one hand, the average temperature of the Earth is increasing due to the greenhouse effect, on the other hand, the world is in a vicious catastrophic attack by continuous air pollution, population growth, and low landfill, over-cutting of hills, forestry erosion, and the use of over-the-counter warfare. It seems that the world itself has assembled to destroy the resources of the world. However, daily urbanization is directly and far away from the environment and human health. Basically the smoke from the traditional vehicles is making this situation worse. Vehicular fumes, which carry carbon monoxide, nitrogen oxides, hydrocarbons and these gases have both antithetical upon human health and environment. The pollutants in vehicle emissions are known to damage lung tissue, and can lead to and aggravate respiratory diseases, such as asthma. Motor vehicle pollution also contributes to the formation of acid rain and adds to the greenhouse gases that cause climate change. Pollutants emitted directly from vehicles are not the only cause for concern. On warm, sunny days, hydrocarbons react with oxides of nitrogen to create a secondary pollutant, ozone. In many urban areas, motor vehicles are the single largest contributor to ground-level ozone which is a common component of smog. Ozone causes coughing, wheezing and shortness of breath, and can bring on permanent lung damage, making it a cause of crucial public health problems.

On account of the adverse effects of conventional transport on human health and environment, the idea of alternative vehicles was being researched for a long time and as a public transport, hybrid bus was launched at the very beginning of 21st century. Currently Hybrid Bus is the most popular public transport in different cities of the world to keep the environment's foundation fit.

Basically the hybrid bus is a combination of customary interior ignition motor impetus framework with an electric drive framework. Ultra low sulfur diesel is the most widely recognized fuel used to control the ignition motor in hybrid buses, albeit different fuels, for example, gas, gasoline, compressed natural gas (CNG), liquid natural gas (LNG),

biodiesel and hydrogen have additionally been utilized. Hybrid buses are assessed to cut emission by as much as 75 percent when contrasted with conventional diesel transports. Being succeeded China has recently propelled the hybrid bus as public transport as it's one of provinces, Gansu which is formerly the most environmentally polluted city of the world.

This present study is aims at the stakeholders e.g. passengers, drivers, technicians, policy makers perception towards the hybrid bus as the effective key way to reduce the pollution in this particular area along with the satisfaction matters.

Keywords: Environmental Pollution, Hybrid Bus, Stakeholder's Perception.

Establishing a network of associations for energy sustainability in buildings

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The building sector is one of the core ones in terms of energy uses in Italy: in the last decade it was responsible for more than 30 % of all energy use and of a comparable percentage of greenhouse gases emissions. The trend is also growing and expected to grow on a steady pace in the next few years.

In the past decades, however, quality in the construction, performances and global efforts in the sustainability of the built environment were not a priority in the construction efforts in Italy.

Low quality construction characterized by thin envelopes in a cooling dominated country, low efficiency heating, ventilation and air conditioning systems, limited structural properties prone to damage in case of earthquakes, are only some of the features that characterize a significant share of the building stock in Italy. This leads to the compelling need for the retrofit of the existing buildings, that in the energy efficiency sector alone could allow for a potential energy saving that could reach up to 5.7 Mtoe/year [1].

One of the main causes to the current situation is the approach to constructions through opposing domains, without a harmonized and interdisciplinary vision, that is often based on linear building design without a real interaction and feedback between the different consultants that should give inputs to the design process.

The paper describes the efforts and the vision of future interplay that was defined in the AiCARR (Italian Association for Air Conditioning, Heating and Cooling) network for sustainability in buildings, in which several building – related associations in Italy are involved, such as: AIA (Italian Association of Acoustics), AIDI (Italian Association of Lighting), IBPSA Italy (International Building Performance Simulation Association), the Italian Life Cycle Assessment Network Association, ICOMOS Italia (International Council on Monuments and Sites), ASSISTAL (National Association HVAC producers).

The shared vision is to develop a common framework for establishing synergies between the different aspects that characterize the complexity of a building. The network will start in the next months its work on the clarification of the regulations state of the art in all domains covered by the associations members, focusing also on specific topics such as integrated energy auditing from different point of views, e.g. structural, energy, indoor environmental quality, historical, architectural. Expected results of the network are a rise in the know-how of practitioners in Italy as well as the creation of interactions between different actors in the sustainable buildings supply chain.

References [1] ENEA Agenzia nazionale per le nuove tecnologie, l'energia e lo sviluppo economico sostenibile - Rapporto annuale Efficienza Energetica 2016

Global energy Management

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In an attempt to fulfill the immense amount of energy that global society requires, both the optimization of conventional energy processes and the speed up of renewable sources is required. Energy development should address two main strategies: short-term incremental efficiency of traditional sources, and long-term sustainable alternative designs for new renewable developments. In contrast to current trends in which renewable energy is championed and fossil fuel-based energy is going to decrease in the near future, energy generation still requires huge sustainable investments in non-renewable energy sources, without slowing down the market increase for renewable energy.

Due to the growth of the world population, the energy demand will continue on an upward ramp, going from 13,147 MTOE (million tons of oil equivalent) to 17,157 MTOE in the next 20 years (BP). In the United States, the main use of oil is in transportation with 60%, followed by industry with 33% and residential with 19% (BP), which needs time to move into electric vehicles. Even with the best projections of the increase in generation by alternative methods, the consumption of fossil fuels will continue to increase. The current consumption of fossil fuels is 11,232 MTOE with a market share of 85%, forecasting a market share reduction to 77% in 20 years but increasing to 13,243 MTOE. In order to support energy demand, the need to increase world crude production by 15 million barrels per day by 2035 is foreseen. The oil and gas companies that plan to increase production by approximately one million barrels per day require investments in at least 10 projects considered major (BP), which requires integral sustainable management.

Even with having well-known agencies such as Greenpeace (2016) stating that “the great news is the Energy Revolution analysis shows our shift to 100 percent renewable energy faces no major economic or technical barriers”. It does not take into account that nonrenewable energy is a main economic driver of developing countries that depend on it, which makes it a dream that still requires some time. The impacts in non-oil industries are usually in decreasing exports, decreasing the government budget, less public investment, negative effects in confidence and risk rating, disadvantage in exchange rates, currency depreciation, banking weakness, and a decrease in bank intermediation.

All strategies must be accompanied by a gradual change of the mentality of investors and society in general, knowing that a change of economic model takes decades to materialize. Additionally, the development of energy schemes has significant impacts on their capacity for development and sustainability.

Despite the current global social movements that try to slow the oil and gas supply, the evil of pollution has to be addressed from the demand side, as well as having economic

tools to support state budgets. As soon as, and only when technological improvements allow renewable sources to get the most of the market share and states move from oil-based budgets, oil and gas production will start its own extinction.

ICE for fire: Transitioning to Inclusive Clean Energy for cooking in India

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The Sustainable Development Goals (SDGs) aspire to ensure access to affordable, reliable, sustainable and modern energy for all by 2030. This will require transition toward modern cooking fuels such as Liquefied Petroleum Gas (LPG) and electricity. Making clean energy accessible to all has the co-benefits of preventing diseases and premature deaths. However, the latest edition of the Global Burden of Disease exercise revealed that in the year 2016, household air pollution (HAP) was the fourth largest risk factor contributing to mortality and morbidity in India. As per the 2017 edition of the Energy Access Outlook, published by the International Energy Agency (IEA), over 700 million people in India were estimated to be reliant on the inefficient burning of solid biomass for cooking. Consequently, a range of programmes and schemes have been launched by the Government of India to enhance LPG coverage at the household level.

Transitioning to a clean cooking system will be located within the progressive and cumulative transformation of energy ladder comprising of biomass and fossil fuel based cooking systems. Given the slow progress on sustained long term adoption of clean fuel for cooking, shifting to LPG should not be a Hobson's choice for the users/target groups. Rather, there should be a range of real choices in the energy stack with upward compatibility. The paper while analysing clean cooking systems in the context of India adopts a staircase model of governance of energy transition. The study applies the Household Energy Assessment Rapid Tool (HEART), developed by the World Health Organization (WHO), as a guide to conducting rapid situational assessments of a country's readiness to address access to clean energy technologies.

Lack of technical knowledge and awareness among population about clean energy technologies is a major barrier for adoption. Through stakeholder interaction it was pointed out that fear factors regarding explosion of LPG cylinders and fire from electric stoves also acts as a deterrent for adopting clean energy technologies. Further, lack of knowledge and experience in the use and application of clean technologies by policy makers can also lead to barriers in their adoption. Stakeholder interaction highlighted that adoption of clean energy systems not only depends on its technical efficiency but also on its design features ability to match people's preferences. Most of the schemes on clean cookstoves had emphasized only on the technical aspects related to the efficiency and emissions gains achievable. In this regard, the social, cultural and economic suitability of the new stove will determine its continued usage by the user groups. Low cost of fuelwood followed by familiarity and ease of availability are the important factors that discourage people to shift to cleaner cooking solutions. It is observed that the subsidy to LPG of INR 100-120 (less than 2 dollars) is low, considering low income and free access to solid fuels of most household using solid fuels for cooking. There have to be more effective and smarter ways for identifying the best fit technology and the target group for which any particular solution (technologies, financial instruments, and subsidies) will be the apt solution.

In transitioning to clean cooking energy system governance challenges, while not uncommon to any country, seem to be one of the more important barriers to overcome. There is potential to improve household energy and health situation by adopting an approach that is based on generating the necessary evidence through data collection and analysis, as well as building on and learning from existing programmes. The need for awareness generation and information dissemination has been made abundantly clear through stakeholder discussions, as has the need for innovation in financing, service delivery and technology customization. Further, there are regulatory aspects that require addressing as well in the energy space to help drive innovation and social entrepreneurship in improving access in rural areas. Ultimately, addressing institutional silos and coordination issues prevalent in policymaking are likely to have the greatest bearing on outcomes that directly impact household energy and health situation.

Impediments to photovoltaics uptake – Case of Botswana

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Owing to the crises faced by the world over global warming which results in shifts in climatic patterns there's need to curb man's adverse effects to the ozone layer. The main culprit to ozone layer depletion has been identified as by products from energy production systems, hence the need for clean energy systems. Over the years, efforts have been directed at developing clean energy system and despite some positive results in some, adoption by end users is still low. This is despite concerted efforts from various stakeholders like governments, non-governmental organisations, etc. The notion of prohibitive costs of photovoltaics nor longer hold water, as the detrimental effects from non-adoption of clean energy sources far outweighs the initial investment cost of photovoltaic uptake. Owing to this, there is need to speed up adoption of existing renewable energy measures. Since users mindset change cannot be achieved overnight, a step by step approach is deemed necessary, hence the direction of this paper. This paper seeks to review the use of photovoltaic energy in Botswana and identify ways by which its use can be enhanced. This is because Botswana has been identified as one of the world's best candidate for solar energy due to its above average yearly sunlight / radiation exposure. The paper adopts a qualitative approach to data collection. The sample of study was purposively selected to meet the needs of the study and the target area being Botswana's capital city and its environs for easy access to participants. Purposive sampling enables identification of those participants who will be able to provide the required data. The results of which are applicable to people under the same circumstances as those of the study. To ascertain validity and reliability, research tools will be validated through experts in the field.

Keywords: Global warming, ozone layer, photovoltaic, renewable, sustainability

Partnership between farmers, public entities and investors for low-carbon productive forestry development in the basin of the Magdalena River, Colombia

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Planted forests have the potential to contribute to the socioeconomic development of countries and especially rural populations, in addition to providing goods and services for society, including clean and affordable energy. However, due to the various problems and challenges associated with its sustainable management, in a few cases it has been possible to make this potential viable and take advantage of it optimally. This problem is recognized and some measures have been taken, among which it is worth taking as an example the 20x20 Initiative, within which several governments of Latin American and Caribbean countries committed themselves to lead the efforts for the restoration of 20 million hectares of degraded land by the year 2020, through activities such as restoration, reforestation, more productive agriculture, avoided deforestation and improvement of livelihoods, among others.

The Commercial Reforestation Program (PRC) was implemented 15 years ago and is a valuable test of how to address the challenges innovatively to build a Model of Associative Productive Forestry Development, linking landowners as partners in the forestry business with public entities and investors, using a model compatible and replicable way into the typical production systems of extensive livestock farming, which are one of the main causes of deforestation in most developing countries.

The PRC is the oldest forest CDM project, which has already commercialized and redistributed carbon benefits among its partners and is located in the Lower Magdalena River Basin, Colombia; area historically converted to pastures of low livestock production and with great social problems, but with all the characteristics to be productive forest area.

Through the PRC has conceptualized how to address the key factors for the success and sustainability of commercial reforestation in the context described. Those success factors are: i) necessary means of production and their property, ii) expected benefits integral, equitable, constant and low a solid legal framework and iii) phased implementation strategy adaptable to existing barriers and the forestry business concept.

This approach could be successfully implemented to make livestock and forestry use compatible and profitable in our countries, and as a real strategy of sustainable production of wood for different uses, which at the same time generates socioeconomic development and allows the recovery of degraded lands, such as it is proposed by the commitment assumed by our governments.

Prospects of Sustainable Development in land-locked developing countries via renewable energy growth. The Sub-Saharan and Central Asia region case study.

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Land-locked developing countries (LLDCs) are by definition the countries that lack access to any sea, port and face a myriad of challenges due to their geospatial position. Despite being located in different places of the world, they face common problems due to their special geography, that undermine their social and economic development. In order to assist, those thirty two, countries to acquire equal opportunities when it comes to trade and competitiveness, the Vienna Programme of Action was implemented in 2014. Then, as all other member states of the United Nations agreed in a global effort to achieve certain sustainable development goals (SDGs) by 2030. As a commitment to the 7th SDG, LLDCs need to increase substantially the renewable energy share of the total energy mix and ensure modern, reliable and affordable energy services to their population. The greatest progress has been done, so far by Latin American and European LLDCs as they have managed to increase the proportion of the population with access to electricity and minimized the reliance on carbon intensive fuels for household operations. On the contrary, LLDCs of Sub-Saharan Africa (where approximately 500million people lack access to electricity) and Central Asia still have a long way forward in order to achieve this goal. Despite being land-locked, when it comes to natural-alternative sources of energy, both Sub-Saharan region and Central Asia are a step forward. The first, are solar rich countries, as the irradiance deviates from 2000 kWh/m² to 2500 kWh/m² in yearly basis, while the later has strong hydro-energy potential, due to their high latitude terrain and plenty rivers. This paper focuses on micro-grids case study for localized electricity production at low cost in Sub-Saharan Africa and hydro energy potential study for Central Asia. Trying to take advantage of their own alternative sources of energy and gain access to affordable electricity, LLDCs studied, will make a gigantic leap forward, not only achieving the 7th SDG but they will be able to overcome their geospatial barriers and reach overall sustainability by 2030.

Renewable energy growth rate: evaluation of 'goal 7' for sustainable development in sub-sahara africa.

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A few decades ago, the paradigm shift from non-renewable to renewable energy might seems like a mirage. But today, there is an increasing demand for renewable energy sources in order to reduce the negative effects of global warming and energy poverty. Energy production and consumption have contributed immensely to the economic growth of many countries both in terms of foreign reserves from the export of natural resources and source of income for government spending and budgeting. However, energy contributes 60 percent of the global greenhouse gas emission. This mix effects of energy, necessitate the global debate about the transition from fossil fuel to renewable sources of energy generation and consumption. In 2016, the renewable energy production surged. The number of people without access to electricity is huge. However, between 1990 and 2010, the number of persons with access increased by 1.7 billion globally. Arguably, increasing electricity consumption through renewable energy has partly contributed to this development. As the world population increases, especially in the developing nations, and with specific reference to Sub-Sahara countries, the demand for affordable energy will increase. Besides, the greenhouse gas emission impacts on changing climate system will further increase the demand for clean energy. Thus, the need to evaluate the growth rate of renewable energy consumption for necessary policy formulation and implementation. This will lead to the attainment of the sustainable development goal of affordable, reliable and clean energy for all. The new drive to embrace the supply of alternative energy sources through renewable has been slowed in Sub-Africa. This study, therefore, will provide some empirical evidence to the growing demand or otherwise of renewable energy consumption in the region. Accelerating the adoption of renewable energy becomes imperative for the region not only to provide affordable and clean energy but also, provide a veritable medium for economic diversification to reverse the mono-economy structure of most Sub-Sahara nations.

Sustainable Energy Development and women

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Sustainable Development Goals of the UN to be achieved by 2030 and the associated action plans and programs come with the hope and expectation that a large number of issues so critical to equity, access and quality of life on our planet see the desired results. Along with Paris Agreement a roadmap has been created where the onus of responsibility of sustainability lies with each of us and everyone and each step and effort matters. Goal 7 of SDGs is crucial as others when we view our position in terms of Energy Production, Consumption, Distribution, access and pollution. A related and more critical issue is of gender and the role of women specifically in energy development and sustainability. This paper is an effort to highlight this aspect.

Women are critical actors for development. They are often the sole breadwinners and responsible for daily chores in their households. They are also the main energy providers in developing countries since they manage purchases and supplies of energy. Given that women without a sustainable power source spend three hours a day on average collecting non-renewable fuel for cooking and are the first to die from pollution-related illnesses, they are the biggest sufferers from the energy gap. These characteristic features make women's empowerment both a challenge and an opportunity for anyone who wants to ensure a transition to a sustainable social model that bridges the gender gap and ensures achievement of their huge potential, contributing to a reduction of inequalities around the world.

Women's training in sustainable energies always has a positive impact on health, income generation and family well-being. As such, each development strategy should devote a significant part of its vision and means towards improving their skills, knowledge and integration. Companies and economies that have achieved mutual professional recognition between men and women are growing faster and better than others.

Developing skills and innovation in energy areas for women reduces inequalities. Benefitting from sustainable and clean power access frees time to undertake new initiatives and prevent diseases from happening.. Skills training are an efficient answer to reduce health and economic inequalities in developing country.

Freeing up time for professional activity and setting up businesses also means creating local economic structures that are needed for developing economies to better address local development challenges. Women should be among the key perspectives for anyone who wants to reduce development inequalities.

The Access to Energy by Schneider Electric program has supported more than 950 entrepreneurs throughout its existence and trained more than 140,000 people. Access

to Energy BONN, Nov 14, 2017: Sustainable Energy for All along with partners have started the new People-Centered Accelerator - a voluntary partnership led initiative that aims to advance social inclusion, gender equality and women's empowerment in sustainable energy.

The Accelerator aims to gain and improve clean energy access for those who will not be reached by business as usual approaches. The Accelerator will focus on unlocking finance, both private and public, strengthening collaboration and connections between stakeholders concerned with energy, gender and social justice, and increasing women's full participation in sustainable energy solutions.

Through gender-responsive and socially inclusive approaches, the People-Centered Accelerator will also complement ongoing efforts to achieve the Sustainable Development Goals and the Paris Agreement.

Ajaita Shah, CEO and Founder, Frontier Markets, a founding Accelerator partner that supports clean energy solutions in rural India, said: "We must place women at the centre of energy access to achieve deeper, wider impact....."

To coincide with the launch of the Accelerator, a new report - Opening Doors: Mapping the Landscape for Sustainable Energy, Gender Diversity and Social Inclusion - was also released.

The report maps the global landscape of support for women and marginalized groups in sustainable energy across organizations, programs and policy that is already underway, including a focus on the 45 countries that are critical to meet SDG 7 targets. The landscape shows an active –but very fragmented–agenda that provides an important foundation to grow and accelerate action on gender and social inclusion in sustainable energy. To support this, the report provides immediate recommendations that philanthropic donors and development finance institutions can take to enhance the integration of these issues.

Sustainable Production of Biofuels through Bioremediation: A Responsible Innovation Perspective

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With the status of scientific and technology capability today, we have the means for unprecedented power at our disposal. However, as power increases, so does the intended or unintended, new risks can arise producing negative and global impacts through innovation. Technological solutions are emerging rapidly to address the current environmental issues like climate change, global warming, resource depletion and pollution (air, water and land). Bioremediation is emerging as an alternative technology to treat contaminated environment all over the world. The applications of bioremediation are explored not only as a solution to decontaminate polluted environment but also as a means to generate resource for energy production from biomass (agricultural wastes, waste-water etc.).

Von Schomberg (2013), has noted that “the responsibility for the positive outcomes of the use of technologies evaporates once they are marketed (whereas responsibility for the negatives outcomes remains)”. However, there is no formal weighing under public policies of the benefits of particular technologies versus their risks. The study has followed the framework of Responsible Innovation (RI) to map out such factors. The anticipatory measures on the likely or unlikely consequences of biofuels produced though such innovations have not been much explored in the science and technology studies literature. Therefore, the central argument of this paper is based upon the right outcomes and impacts of research and innovation in production of sustainable biofuel via bioremediation. An attempt has also been made to explore the different processes to produce biofuel in general, different processes to pursue bioremediation and how the innovations in this technology cater to the production of sustainable as well as affordable biofuel. The study has deployed survey of literature to find out the existing alternative technologies and different processes to produce biofuel. An integrated approach has been put forward in the form of inferences based on application of bioremediation for biofuel production while taking care of the environment.

The Fixture Between Economic Growth, Energy Consumption and Environmental Degradation in China: An OBOR Prospective

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The research study traces the presence of environmental Kuznets Curve (EKC) in China after launching One Belt One Road (OBOR), counted in (Silk Road and 21st Century Maritime Silk Road). In this study, the nexus between CO₂ emissions, energy consumption, trade openness and economic growth for the period of 1995 Q1 to 2017 Q4 scrutinized through different econometric techniques. The main objective of the study is to gauge the EKC extent and behavior in China after “Going Global Strategy” of China through OBOR. To come across the intent of study in a dynamic and fitting way. ADF, KPSS and PP unit root tests employed to meter the stationarity of the study variables, Vector Error Correction Model (VECM) and Autoregressive Distributed Lag (ARDL) bound testing procedures have employed on the 23 years quarterly ranging data. The relationship between variables propagates that there is U shape inversion relationship existed between CO₂ emission and GDP in long run and it is a sign of actuality of EKC attendance in China. In short run, directional connection sustains by Granger causality grounded on VECM system approach where the short run nexus in bidirectional shape found between energy consumption to growth and unidirectional linkage purported between energy consumption and CO₂ emission. Trade openness also has a significant impression on carbon dioxide CO₂ as well. But the relationship comprehended in unidirectional from GDP to CO₂ emissions in the long run format. The robustness of long-run association also authenticated by using other sophisticated methods like; DOLS and FMOLS for solid validation. VDA and Impulse Response function also portrayed the same fallouts. The results uniformity found from different approaches in consist shape which is the uniqueness of this study. The study results may be obliging for governmental institutions, economic policymakers and many of others. Moreover, current study would have practical implications in term of monitoring pollution (CO₂) scale that may China face in BRI projects future as an outcome. Thus, renewable energy projects in China qualifying the forecasting demand for energy and green investment could surge the advantages form trade and development around the BRI listed countries and else world as well.

Keywords— One Belt One Road, EKC, China, ARDL, CO₂, Granger Causality

The key role of Renewable energy in boosting the sustainable development in Burundi

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Many Sub-Saharan African countries have great potential and diversity of energy sources. But today, these countries are characterized by degradation of natural resources, climate change and excessive poverty. The role of energy being unavoidable in sustainable development, its exploitation and consumption in this region are until now harmful to the environment. Energy consumption is largely dominated by traditional energies (wood, charcoal and vegetable waste, peat, petroleum products) while new and sustainable forms of energy (hydroelectric, solar, wind and geothermal energy, biomass, etc.) are still poorly developed.

Burundi is not spared by this phenomenon as more than 96.6% of energy needs are covered by forest resources today. This overuse of non-renewable energy sources speeds up the deforestation with a number of negative consequences (erosion, soil degradation, water resource depletion, drought, greenhouse gas (GHG) emissions and climate change).

The renewable energy sources are virtually untapped apart from a few hydroelectric sources whose electricity production accounts for more than 90% of the national total. These sources of renewable energy are potentially abundant and once exploited, they could play a key role in boosting the socio-economic growth of a post-conflict country. The example taken from the urban area of Buyenzi does indeed testify to the impact of electric power on socio-economic growth in Burundi. Energy demand continues to grow as a result of the urban population growth and the diversification of a number of income generating activities and services.

Unfortunately, the management of this electrical energy crisis in the study area or in other districts of the city of Bujumbura remains very partial. REGIDESO (the company that supplies water and electricity) organizes selective power cuts which disrupt the normal course of life in the households (insecurity due to darkness, the increase in robbery cases, communication interruption, loss of food products, additional expenses for the purchase of candles and lamps etc.). The use of other types of energy such as thermal power stations and generators by the same company in charge of the production of electrical energy hampers the economy and the environment because, besides being very expensive (over BIF 11,5 billion per month), these energy sources emit greenhouse gases as a result of the use of fuel.

The sustainable solution to address this energy gap is to put in place clearly-defined energy policies for the environment, population growth and sustainable development. It is about controlling the rapid population growth rate in the face of moderate economic growth and limited resources. Ultimately, it will be necessary to develop technologies for

generating and managing electricity based on renewable energy while protecting the environmental resources and emphasizing in the exploitation of hydroelectric energy, solar photovoltaic systems, wind generators, and gasifiers in Burundi.

The presence of SDG in alternative energy generation projects in the state of Rio Grande do Norte, Brazil between 2008 and 2018

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The Sustainable Development Goals (SDG) is one of the largest global initiatives organized by the international community to eradicate poverty and inequality, and to improve economic, social and environmental conditions, combating climate change. Approved at the 70th General Assembly of the United Nations (UN) in September 2015, by the 193-member states, the 17 objectives and 169 goals established cover several topics of major relevance for sustaining social transformation strategies, organized as a guide so that all countries adopt, according to their own priorities, and act in the spirit of global partnership, reaching them until the year of 2030.

Given this, the Brazilian Government has been promoting the commitment of public, social and private spheres through the creation of various bodies, such as the National Commission for SDG and the Parliamentary Front through the 2030 Agenda, adopting local strategies, aligning public policies and improving legislation. Within the scope of civil society, the SGD Universities Network seeks to strengthen teaching, research and extension on the 2030 Agenda and implementation of ODS, while the Map of Civil Society Organizations aims to identify these initiatives. In the private sector, the Brazilian Network of the Global Pact, in partnership with the United Nations Development Program, has been promoting initiatives to strengthen the SGDs in business operations. However, it is observed that the country is walking slowly, especially in the private sector of alternative energy generation.

It is known that Rio Grande do Norte, a state located in northeastern Brazil, is one of the main poles for solar and wind energy generation in the country, attracting several companies and enterprises to the state. Considering the magnitude, impact and importance of these projects, this work aimed to analyze how aligned are the companies of alternative energy generation present in the state of Rio Grande do Norte with the Sustainable Development Goals through the analysis of Environmental Impact Reports (RIMA) presented to the entity responsible of granting the license for the installation and operation of the enterprises in the State, the Institute for Sustainable Development and Environment (IDEMA), from 2008 to 2018.

Through the creation of a database from the individual analysis of each RIMA made available on the IDEMA website, a photograph of the relationship between alternative energy generating companies and the SDG in the state of Rio Grande do Norte was obtained. Considering the 14 projects analyzed, it was able to achieve, as a result, that there is a lack of promotion of the sustainable development goals and that there are

gaps between the goals and the activities and actions promoted by the enterprises. Therefore, it can be concluded that factors such as lack of communication of the SDG, absence of bodies responsible for local development to reach the goals, supervision, among others, are presented as a bottleneck for the State of Rio Grande do Norte to collaborate and develop in a sustainable way.

Globalization, Value Chains and Decent Work

Achieving the SDGs in the textile industry

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The 2030 Agenda for Sustainable Development was adopted by the members of the United Nations in 2015. The set of 17 Sustainable Development Goals (SDGs) place sustainability at the heart of the international development agenda, as per title of the set of goals. The goals are inheritably related, yet important links that exist among sustainable development areas through the social and economic systems are missing. In a similar vein, there is a lack of science-based interaction results, as well as general knowledge on SDGs. This project aims at developing an analytical framework to operationalize the SDGs and linking different aspects of sustainable development through textile industry. Drawing from previous literature, and case studies of social initiatives, we investigate 12 SDGs and their applications through textile industry, setting three outcomes for this study: revealing the potential of this industry to advance sustainable development as a multi-billion, cross-sectional and truly global industry; addressing the issue of lack of information about the SDGs outside the UN sphere, and; participating in a science-policy dialogue on translating integrated science for the achievement of the SDGs. The main finding was that if the right framework conditions and a supportive policy environment are in place, the industry holds great potential for growth, industrial organization, traditions and culture appreciation, development and job creation, as well as sustaining livelihoods of the youth, that takes into account the needs for future generations and adheres to sustainable production manners, all in line with key objectives of the SDGs. Moreover, recognizing links among goals may facilitate real mainstreaming of dimensions that previously suffered from not having strong sectoral anchoring, such as sustainable consumption and production, can help formulating new policies and point-of-departure when addressing complex issues, such as sustainability. We hope this paper finds its place in informing the public about the possibilities of the integration of the SDGs to the industry, from manufacturers to consumers, and from businesses to governments. Even though the ideas presented in these studies stem from the textile industry, we encourage exploring the potential of any cross-sectional, global industry in advancing sustainable development.

Advancing SDGs localization process via web

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The purpose of this research presentation is to identify the practical solutions for achieving the SDGs at the local level. There have been limited efforts in the SDGs localization process in Nepal. So, integrating the theme of globalization, value chains, and decent work to achieve SDGs is very important. The first phase of this research presentation is about literature review of SDGs, globalization, decent work and value chains. The second phase deals with the some of the best practices held globally as well as nationally and locally in Nepal. And, the third phase deals with the practical solution to achieve SDGs locally in Nepal from the researcher's perspectives.

The research presentation identifies developing SDGs data portal by the local youth. Through this data portal, people will be aware of the progress of the SDGs project going in their respective areas, know about the funding size and agencies (which helps in Accountability) and citizen will monitor online and if not progress reach on time, the data portal will even update recommendation from the expert. This project also engages CSO and citizens. This data portal can be accessed through the website. Visitors after selecting the districts; the related data of SDGs project in the website will be displayed. This presentation is clearly relevant to the topic: Globalization, Value Chain, and Decent work. The proposed development of the SDGs data portal will be on the World Wide Web, which will be accessed globally. This will help to share the best practice of the local level globally. The data portal also includes expertise recommendation to improve this SDGs data portal and to add value chain. This proposed task is economic, sustainable and eco-friendly (this project will not emit co2). Young people will also have a freedom to express concerns in the local ongoing development work via feedback sections of the data portal. At last, this research presentation will allow more researchers to work on the localization of SDGs in future.

Assessment of the Performance and Operational Modality of Community Financial Groups in Tanzania.

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The relevance of community financial groups cannot be overemphasized as the need to enhance the accessibility of financial services to the rural poor deserves the highest priority. To reduce disparities with urban areas, easy access to the usage and experience of basic financial services such as insurance, savings and credit needs to be embraced. In 2008 the Bank of Tanzania requested Financial Sector Deepening Trust (FSTD) to support the development of the rural financial services strategy for Tanzania because of the importance of community development to the economy. A major challenge in effecting these obligations is service delivery, members' participation and difficulty in accessing group data. The operational modality of this financial groups majorly centers on how to get government and other non-governmental groups involved. The ongoing study therefore seeks to assess the effectiveness and performance of community financial groups in the provision of services to members.

The study was conducted in Moshi District, Kilimanjaro region Tanzania, a case study of Kilimanjaro Village Community Bank Network Moshi. Data was collected using both quantitative and qualitative technique which include the use of pre tested survey questionnaires, In-depth interview among management staffs of Kilimanjaro VICOPA Network (KIVINET). A sample frame of 5,200 members were identified from 520 groups and through the use of simple random sampling technique 350 members were selected for data collection using questionnaires.

Expected outcome of the study include; provision of detailed report on the performance of the group in providing financial and non-financial services to members, operational modality by getting government and other non-government organizations involved in rural financing and also easy access to credit at favorable interest rates. Most importantly recommendation will be proffered for use to guide policy makers in the future during policy implementation.

In view of this study the importance of community finance calls for a solid partnership between the government, non-government organizations, local communities and members of the groups.

Key words: Rural Finance, Partnership, Community, Development, Sustainability.

Assessment of the Financial Products and Services Extended to Smallholder Farmers: A Case Study of the MIVARF Programme in Iringa Region, Tanzania

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Undoubtedly, one of the major challenges facing smallholder farmers in Africa is the access to financial support to scale up their agricultural production and income. This challenge is also faced by rural farmers in Tanzania who make about 80 percent of the country's population. As part of the efforts to provide solution on the issue of rural financing facing smallholder farmers in Tanzania, the government of Tanzania in partnership with International Fund for Agricultural Development (IFAD) has created the Marketing Infrastructure Value Addition and Rural Finance Support (MIVARF) Programme to contribute to reduction of rural poverty and accelerate economic growth on a sustainable basis.

This study assessed and established the available financial products and services extended to smallholder farmer beneficiaries of the MIVARF Programme in the Iringa region of Tanzania. In addition, the study explored the different financial products and services available to smallholder farmers, examine the profitability and frequency of the products and services on the socio-economic wellbeing of the beneficiaries, as well as examine the consideration of women in the design and access to financial products and services. This study used primary data collected from a field survey in two districts of Iringa region. Data was gotten through a well-structured questionnaire, key informant interview, focus group discussion and observations from beneficiaries and institutions offering financial products and services. The data were analyzed using descriptive and inferential statistical techniques.

The study provides an understanding about the types, access to and cost of financial products and services available. MIVARF Programme has contributed to improvement in the socio-economic wellbeing of the beneficiaries and a better knowledge on the consideration of women in the design of financial products and services for smallholder farmers in rural areas of Iringa, Tanzania. The study will provide recommendations on the way forward for institutions providing financial products and services to smallholder farmers so as to improve on their service delivery and meet with the demands of their beneficiaries.

Keywords: Smallholder Farmers, Financial Products and Services, Rural Areas, Beneficiaries

Coffee Cooperatives in Oaxaca - Tierra Blanca's Value Chain with Chocosol

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Coffee Cooperatives, such as Tierra Blanca, in Oaxaca, Mexico (which I visited in Jan 2018 for two weeks) were formed to replace the transportation, processing and marketing arms of The National Coffee Institute of Mexico, saving farmers from the exploitation of coyotes. They began to share information on organic certification (the price for organic coffee being much more stable than conventional coffee), and decrease their dependence on capital-intensive inputs like fertilizer.

Coffee co-ops have survived not only to replace The Natural Coffee Institute of Mexico and become powerful players in the organic coffee industry, but have also extended their purview to economic diversification, environmental initiatives, and to provide and lobby for social services like school and hospitals. They have come to represent islands of self-determination within a political spectrum that barely recognizes their existence. The model and success of Mexican co-operatives and civic organization has laid the groundwork for some of the most compelling social movements in the world.

Coffee farmers and cooperatives continuously face several challenges to their livelihoods such as pests, disease and fungus, lack of labor & shortages, income unreliability & price fluctuations, and limited resources to value coffee.

Tierra Blanca is fully operated through a 'hand picked' model to increase and reduce risk with their coffee bean yield. This work is completed by the cooperatives members. This is a gentle, intricate, and delicate practice which is highly labor intensive (family and community labor). Their operation is full swing with technologies that they have adopted through intergenerational knowledge being practiced. Tierra Blanca is also slowly incorporating bokashi composting & ag dev technologies from non profits such as Mbi Bin & WWF, within their nursery of coffee plants (and new species of shade grown coffee plants). Which give work and increase yields. The supply chain of Tierra Blanca is dependent on one manufacture, Choco sol - a Toronto based chocolatier. The challenges and opportunities in Tierra Blanca's supply chain reveal cultural perspectives, natural disaster and economics, and needs for more capital/funding opportunities.

Community Development in Maputo Special Reserve, Mozambique

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Following a 17-year long civil war, Mozambique has had a long road to recovery. Poverty and governance have been monumental challenges for the country, especially given the damage the war caused to the natural environment. Much of the population live in rural areas that are either agricultural or forested land. Their livelihoods often depend or center on their natural environments.

This summer, I will be working with Peace Parks Foundation (PPF). As an international organization whose founding members include Nelson Mandela, PPF's mission is to ensure the conservation of biodiversity hotspots that span national boundaries. These transfrontier conservation areas (TFCAs) are incredibly important in protecting unique ecosystems, expanding ecotourism, and supporting local communities so that they can live more sustainable lives.

My work this summer will focus on Maputo Special Reserve, a relatively small park that falls in the Lubombo TFCA. This reserve suffered immensely during the civil war and has struggled to combat species loss and wildlife crime. PPF's presence there has helped build the strength of local institutions to deal with these issues through the frame of sustainable development. A part of their work has been to work with local indigenous communities to promote sustainable livelihoods, become integrated into the growing ecotourism industry, and provide alternatives to reliance on the fragile ecosystems.

This summer I will be conducting interviews and focus groups with local communities to help evaluate these ongoing projects. Using a buen vivir approach, I will delve into indigenous communities' relationships with their natural environment, their attitudes towards conservation efforts in Maputo Special Reserve, and their suggestions for improving the PPF community development projects' effectiveness. By using an appreciate inquiry framework, I hope to not just list the many challenges these communities are facing, but to highlight the ways in which these indigenous people support conservationism. I hope that through participant observation, I can glean more about their long history in the area, which makes them unique and invaluable sources of knowledge and perspective about the natural environment. I hope to channel some of this to PPF so that they can adapt their projects to serve this conservation area better—the people and the wildlife.

My presentation will provide an overview of PPF's ongoing projects and display the findings of my 3 months of field research (May – July 2018). I will highlight the importance of including indigenous communities in the conservation of their homelands as well as make recommendations for how this can be done more effectively.

Contracting Through Design: A Platform For Market Inclusivity

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According to the World Bank, there are currently more than 500 million smallholder farmers working in low and middle income countries around the world. These farmers are often highly underserved by critical services, such as access to education, yet they are expected to participate in complicated global supply chains. They become dependent on contracting agricultural businesses to openly provide necessary explanations and clarifications with regards to any possible contract or agreement they might sign. However, the fact remains that many of those smallholder farmers, lack the appropriate business skills, knowledge of contractual terminology, and basic literacy skills to successfully navigate and be included in a global market system.

The objective of an inclusive market system, as defined by the United States Agency for International Development (USAID), is to “facilitate the process that results in a market system that is: competitive, inclusive, and resilient”. It is a way to add to the value chain model currently in place, and create a space that is more inclusive for vulnerable populations. Many organizations and businesses, both for and not for profit, have attempted to create technology based platforms and tools for more inclusive agricultural markets by fostering trust between farmers and companies or helping to bridge the current gaps in smallholder farmers’ knowledge and understanding. However, these tools for the most part have not addressed the issues of trust, literacy, and contractual agreements in a single product.

With Picture Impact (PI), a human-centered design studio based in Minneapolis, MN, our team will utilize the design thinking process to rapidly prototype, field test, and evaluate an improved agricultural contracting platform in Ghana, West Africa. This picture-based model will be specifically geared towards use with smallholder farmers by the agri-businesses with which they contract and will address aforementioned gaps in design. The hope is that the contracting platform will allow for greater contractual comprehension on the part of illiterate smallholder farmers as well as increased trust between farmers and their contractual counterparts.

Creating trustless networks: corporate transparency to eradicate child labour in the mining industry

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According to a 2012-2016 International Labour Office study, nearly 73 million children are involved in hazardous work all over the world, with almost 32 million of them in Africa. Artisanal mines bring the lion's share of this underage workforce into play, largely due to high metal prices, growing demand and absent education and development opportunities for children in the region.

Businesses have been trying to tackle this issue, investigating their suppliers and introducing responsible sourcing policies. However, metals supply chains are multi-layered and fragmented, complicated by numerous participants and paper-based processes. Even electronic-industry giants recognize blind spots in their supply chains and are unable to pinpoint the end producers for the materials they use. As a result, many of our everyday-use devices, such as mobile phones and laptops, are powered by child labour.

“It is a major paradox of the digital era that some of the world's richest, most innovative companies are able to market incredibly sophisticated devices without being required to show where they source raw materials for their components.” (Emmanuel Umpula, Afreewatch Executive Director)

Multiple companies along the chain enforce information silos mainly due to lack of trust, low level of document flow automation and inefficient processes. All of this makes tracking metal origin and identification of unethically mined metals extremely expensive and unreliable.

Blockchain technology presents a way to break the silos without a requirement for trust among the participants. It fosters collaboration throughout the supply chain among producers, regulators, independent organizations, ports, shipping companies and even consumers. Many of the industry majors are looking into implementing these networks, while their effects and aftermath on society have yet to be assessed. At this stage, it is critical to define the outcome that unified adoption of the technology would have on child labour, potentially avoiding further deterioration of the living conditions of children in artisanal miners' communities.

This paper discusses the benefits and downsides of creating collaborative, trustless networks for supply chains in the context of child labour in the mining industry. It also

touches upon the business-government-consumer-NGO nexus and explores forms of balanced involvement. Finally, the paper addresses social, economic and ethical challenges facing collaborative supply-chain monitoring systems and outlines ways these systems could have sustainable, positive impacts on African communities.

Developing Economies and the Challenges of Actualisation of the Sustainable Development Goals; Exploring the Concept of Retail and Micro Finance (Banking and Insurance) for Better Outcomes

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This paper examines the various development challenges confronting the states of the global South and attempts to situate them within the actualisation of the Sustainable Development Goals. A large number of the states of the global South (or Developing Economies), such as Nigeria, Ghana, Kenya, Uganda, Laos, Vietnam, Guyana, Nicaragua etc, are immersed in different degrees of poverty, and this takes its toll more in the sphere of business and commerce, with multiplier effects that spill into the social and environmental spheres. A combination of poor purchasing power, low production power, unemployment, and under employment culminates into sub-optimal use of resources, thus weakening the capabilities of Small-Medium-Scale-Enterprises (SMSE), which often accommodate the large percentage of the working class through either formal or informal modes. The deficiency created runs through the value chain in all the sectors of the economy where the SMSE are participants, creating a scathing phenomenon, an enabling structure for poverty, (SDG 1), hunger (SDG 2), poor health and poor well-being (SDG 3), gender and socio-economic inequality (SDG 5 and 10), indecent work and low economic growth (SDG 8), low/non-innovative industry and infrastructure deficit (SDG 9) and unsustainable consumption and wasteful use of the environment (SDG 11,12,14,15). This is aside unaffordable and sometimes unclean energy consumption as currently experienced in West Africa (SDG 7), and importantly, weak institutions which on many circumstances provides fertile grounds for, injustice and conflict (SDG 16). Using the normative research method, this work identifies and asserts the lack of an efficient financial service system as a missing link in the value chain of SMSE and one of the root causes of their inability to mature into model firms with capacities to mobilise scattered micro resources, provide decent jobs, compete in economic globalisation and serve as mobilising units and integral contributors to the actualisation of the SDGs in their various countries. Given the above, this study evaluates and now proposes the practicability of a more inclusive, SMSE-friendly financial service system, such as; quality access to micro loans, quality access to micro loans when they act together either as mutual or cooperatives, specialised insurance services accessible to SMSE either they chose to act severally or jointly etc. all at prices and modes of payments which appreciate and compliments their peculiarities, and socio-economic roles.

The study concludes by situating the actualisation of the SDGs in emerging economies within the framework of the optimal utilisation of labour and other resources which resides and are represented by the SMSE, while making recommendations on how to make the most from globalisation within the context of the actualisation of the SDGs through the repositioning of the SMSE and financial sector value chain.

Keywords: Developing Economies, Financial Inclusion, Globalisation, Resources Optimisation, SDGs Actualisation.

Economic diversification drive: Value chain development in improving selected Small Medium Micro Enterprises in Botswana

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Small Medium Micro Enterprises (SMMEs) with proper nurturing and support have potential to reduce unemployment, eradicate poverty and promote economic diversification. Similarly, value chain development in recent years have been widely used in the non-profit-making sector, donors and governments to stimulate and expedite economic growth. Despite the rapid economic growth experienced by Botswana post discovery of diamonds, the country is rife with problems of economic diversification, employment creation, income distribution and poverty alleviation. The paper argues that value chain interventions are necessary for an effective and productive SMME sector. It further shows how value chain development promotes economic diversification amongst SMMEs in Botswana using similar case studies from other countries and suggests policy requirements and actions needed to create a successful SMME sector in accessing market, breaking market entry barriers and creating upward linkages.

The paper conducted a desk review of relevant literature on value chain development and previous reports and evaluations of support interventions offered to SMMEs across the chain. Various case studies of selected subsectors in Botswana were also reviewed to identify opportunities for diversification and sector improvement.

The results show that value chain systems play a significant role in transforming subsectors to produce goods and services demanded by consumers. They further portray economic citizen empowerment to be possible within the SMMEs using the value chain approach because of its ability to improve market access conditions, upgrade opportunities and spreading of risk and benefits within the chain

Economic Impacts of Tourists' Inflow into Rural Areas: A Case Study of Ori Oke Olorunkole, Akinyele Local Government area, Oyo State.

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Tourism is a major tool for rural development in any country. Religious tourism (pilgrimage) can have broader longer-term benefits as a local development agent, for both the visitors and residents, and lead to a sustained enhancement of cultural and art facilities in the region. The aim of the study is to find out if tourists' influx has much effect on the socio-economic and environmental activities in the study area positively or negatively.

This study examined the economic and environmental impact of religious tourists' inflow into Ori-Oke Olorunkole in Akinyele Local Government area, Oyo state. Primary data was used in the course of this study. The primary data was collected through participant observation, unstructured interview as well as the use of a well-structured set of questionnaires (110) which were administered to tourists and rural dwellers. The questionnaire was filled through interview schedule for the rural dwellers and tourist. A total number of ten individuals were interviewed with the unstructured questionnaire.

The descriptive statistics was used in analyzing the socio-economic characteristic of the respondents in the study area while multiple regression analysis was used to analyze the objectives of the study. Based on the socio-economic characteristic respondents in the study area, religious tourism is having a positive impact on the socio-economic activities of the study area as it dictates the socio-economic activities in the study area. Meaning the religious activities is a major driving force for many tourists into the study area.

Also, religious tourism is having a positive impact on the standard of living in the study area. Furthermore, religious tourism has a positive impact on the economic development in the study area and lastly, religious tourism has a negative environment impact in the study area.

Effectiveness of Collective Action in Reducing Transaction Costs for Smallholder Farmer in Tanzania

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Agriculture in Tanzania is an important occupation for over 75% of inhabitants. It is the mainstay of the majority of the households. Paddy, maize and sorghum are the most important cereal crops in the country. Paddy is one of the most cultivated important food grains and is the second most important food crop in terms of number of households, area planted and production volume. As the agricultural sector in developing countries transforms towards commercialization, the smallholder farmers and intermediaries require systems that are responsive to their needs, which include access to markets, market information, market intelligence and effective collective action.

Collective Action (CA) or Farmers' Organization (FO) has become an important strategy for smallholder farmers in developing countries to remain competitive in rapidly changing markets and has been tagged as popular means of reducing transaction cost. It has the potential to improve market access and promote equitable growth by reducing transaction costs, strengthening producer bargaining power, and enabling collective action. Therefore, this study is carried out to show the multifaceted problems of CA, provide recommendations to key constraints faced in reducing transaction cost and to assess the effectiveness of farmer groups in reducing transaction cost for smallholder paddy farmers in Msalala Council, Tanzania. The study also pays attention to the participation of intermediaries as they play a crucial role of sourcing, assembling and bulking of commodities prior to transporting to urban places.

The paper uses transaction cost theory developed by Coase; Williamson; and Ouchi, which focuses on how the characteristics of a transaction affect the costs of handling it through markets, bureaucracies, and other forms of organization. The target population of the study consists of the members of Msalala Paddy Farmers Company (MPAFAC). This study uses cross-sectional survey to gather factual information necessary for decision making on the influence of collective action on transaction cost among smallholder farmers. The mixed-methods approach utilized for the study is Key Informant Interviews (KII) and Structured Questionnaires. Data obtained were entered and analysed descriptively using frequencies, tables, graphs and simple percentages. Mean, median, mode and standard deviation were calculated for continuous variables and Chi-square was used to test for associations between categorical variables and proportions.

The results of the study indicated that fixed and proportional transaction costs distinctly affect the participation of smallholder farmers in markets. The size of farmland, distance

to markets and ownership of transport means, which is linked to proportional transaction costs, influence the extent of farmer participation in markets. The participation of farmers was significantly influenced by gender, experience and supply distance which relate to the bargaining prowess, business networks and per unit transport cost, respectively.

Eliminating sub regional barriers to promote mobility of skilled labor within the Central African Economic and Monetary Community (CEMAC).

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Regional Economic Communities (REC) through the process of Regional integration are increasingly growing economically and building interdependent communities. The opportunities provided by regional integration are enormous and independent states can benefit off policies within of zone off free movement of goods, services and people like the case of CEMAC region. The purpose of this paper is to examine and suggests a mechanism for free movement of skilled labor in the CEMAC region through its regional policy of free movement of people, goods and services, and to highlight the unexploited potential in leveraging such policy mechanisms to develop the regional education sector. This will have implications for national and regional educational policy in areas such as: accreditation of education qualifications, educational systems to show equivalencies between different qualifications across the CEMAC region, standard labor laws governing people who work across the CEMAC region, guidelines that govern work permits for skilled labor with the necessary qualifications working across CEMAC, quality assurance in the Curriculums within higher education systems, an exchange mechanism for skilled labor amongst accredited institutions. In effect, these will respond and promote sustainable development goals both in the field of education.

Research Questions and Methodology

In this paper, I focus on the educational opportunities provided by CEMAC and how this can create opportunities for skilled labor migration within the sub region. The problem statement is: How can CEMAC education policies facilitate and encourage the free movement of skilled labor within the sub region?

The overarching questions I try to answer in this paper include the following;

- Does the free movement of people open opportunities for the movement of skilled labor particularly in Higher education within the sub region?
- How can the movement of skilled labor be leveraged and made part of the regional agenda to promote educational activities within the sub region.

The paper attempts to establish the process and the ideas behind eliminating barriers in the field of education within the sub-region and argues that such barriers of skilled labor in the field of education if eliminated, could boost economic growth, facilitate Knowledge exchange, reduce the effect of Brain drain and promote socio-economic activities within the sub region. This could be done through Setting up tools that respond to national education policies such as adopting and implementing Professional Mutual Recognition

Agreements (GATTS, 2007) within the sub region. These agreements incorporate setting up standardized and accepted certificate formats in education regionally, Recognition of equivalency, recognition and accreditation systems, Reform Curriculums that are recognizable, are there systems in place which can recognize these curriculums.

In developing the paper, I start by situating the study in the framework of educational services and systems in CEMAC, the importance of knowledge as well as the importance of skilled labor movements within the region. I review the literature both globally, regionally and at national environments specific to CEMAC member states. I proceed to presenting my methodology and later exploit the advantages provided by the CEMAC free trade zone and discourse how it can be leveraged to design a framework to facilitate the migration of skilled labor within the sub region.

Globalization value chains and decent work

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As a member of the international community, Nigeria is not shielded from globalization. However, the country is exposed to both the positive and negative effects of globalization. This paper examines the globalization value chains and decent work, which serves as the significant source of employment to the developing countries a case of Nigeria by focusing on effects of Nigerian unemployment rate. It argues that although globalization presents many opportunities, it also exposes developing countries like Nigeria to many new challenges. The paper also suggests ways by which the effects of globalization value chains leading to a decent employment opportunities should be addressed or a way to create more, better and inclusive jobs.

For example, majority of workers, this production system translates into poverty wages, excessive working hours, unsafe workplaces and repression of workers' right to form and join democratic trade unions.

Globalization Value Chains include all of the people and activities involved in the production of a good or service when the different stages of the production process are located across different countries and geographies. As globalization increases, GVCs are becoming more relevant in international production, trade, and investments. And Globalization Value Chains also have an important effect on job creation. Several examples around the world show that GVCs produce a structural transformation that can create more jobs, and these jobs usually have higher wages and better working conditions. Global Value Chains can become a win-win for firms, which enjoy greater efficiency, productivity, and profits while they create better jobs.

Unemployment Rate in Nigeria increased to 18.80 percent in the third quarter of 2017 from 16.20 percent in the second quarter of 2017. Unemployment Rate in Nigeria averaged 10.63 percent from 2006 until 2017, reaching an all time high of 19.70 percent in the fourth quarter of 2009 and a record low of 5.10 percent in the fourth quarter of 2010.

Corruption affects public finances, business investment as well as standard of living. Recent corruption scandals in Nigeria have highlighted the large sums that have been stolen and/or misappropriated. But little has been done to explore the dynamic effects of corruption that affect the long run capacity of the country to achieve its potential.

The 2016 World Bank book Stitches to Riches provides empirical evidence from the apparel sector in South Asia that show how engagement in a GVC can lead to overall structural transformation. The analysis shows that when a country witnesses a 1 percent increase in demand for exports of apparel compared to increased demand in other sectors such as agriculture, there is 0.3-0.4 percent increase in employment. This increases overall welfare as workers move out of agriculture or the informal sector

toward these better paying, higher value-added jobs in which this concept can easily help for more job creation in Nigeria and boosting the economy GDP.

There are some great benefits GVC creates which are female empowerment and employment which reduce the rate of sexual trade in and outside the country. Likewise improving in working standard through participation and creation of better jobs by way of higher wages and better working conditions as the participating economy seeks to comply with global standards on health, safety, and treatment of workers. Introduction of entrepreneurship programs to all institutions and secondary schools likewise primary schools with complete facilities which enables access to training and skills development, which contributes to higher productivity and higher wages. The eventual outcome on the labor market depends on several factors, including the readiness of the domestic labor force to respond to changing global demand, and flexibility of labor market policy to allow for ease of labor mobility.

Dual employment contracts may emerge as firms employ a smaller number of skilled highly paid workers to maintain quality, and rely on a larger irregular, low-skilled, low-paid workforce to remain cost competitive.

GVC can help to restructure individual governments to regulate labour conditions and require more effective labour standard. International conference on sustainable development are in need to address the systematic ways for the solution to the poor labour conditions and promote decent work in the globalization, value chain and a decent work.

Globalization, Value Chains and Decent Work: Extracting Artisanal Cobalt under Scrutiny in the DR Congo

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In a context of globalization, the DR Congo is at the forefront of the climate-friendly technology development. The Electric Vehicles (EVs) revolution has shown the over-reliance of downstream companies, especially carmakers and battery manufacturers, on the Congolese cobalt supply. The DR Congo holds 30% of the world's cobalt reserves in the copper-cobalt belt of the ex-Katanga province, where the Chinese outbound mining investments surged over the last decade, after the implementation of the Sino-Congolese deal on mining and infrastructure in 2007.

The paper examines the geopolitics of cobalt by stressing that the EVs revolution has revealed the DR Congo's vulnerability. The country is not able to supply greener metals, as the mining sector is exposed to environmental and social risks. The industrial and artisanal mining activities ensure the production of most minerals. For instance, 20% of cobalt production depends on the artisanal diggers, who are confronted with human rights abuses, including child labour.

Hence, the traceability of cobalt has become a critical issue to address in the DR Congo, owing to human rights risks in the cobalt supply chain. The e-mobility's development has increased the quest for ethical cobalt. In the past two years, key multi-stakeholders initiatives were implemented to promote responsible sourcing by improving transparency and governance of the cobalt supply chain. On November 14, 2016, the Chinese Chamber of Commerce for Metals, Minerals, and Chemicals (CCCCMC) importers and exporters, with the assistance of the Organization for Economic Co-operation and Development (OECD) set up the first initiative, known as the Responsible Cobalt Initiative (RCI). On November 29, 2017, ten leading carmakers, including Daimler AG, Ford, BMW Group, and Volkswagen Group, launched a second initiative, the so-called Drive Sustainability. Meanwhile, the London Metal Exchange (LME) plans to enforce strict measures to ban cobalt suppliers not respecting human rights in their supply chain.

Findings support that the above-mentioned multi-stakeholders initiatives contribute to improving transparency and governance of cobalt supply chain. Nonetheless, they could lead to a de facto embargo on cobalt mined by the artisanal diggers, as human rights abuses in the cobalt supply chain could entail brand damage. Overall, the DR Congo must restore political stability and state authority to fully benefit from the EVs revolution, after the promulgation of a revised mining code on March 9, 2018.

Green-competitiveness: Impact of Sustainability Index on the FDI attraction of cities and countries.

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Cities and countries must be sustainable and competitive to address the challenges of Climate change and Globalization. However, theories about the coexistence of competitiveness and sustainability have been conflicting. Sustainable development approaches emphasize the competitiveness of sustainable development. Conversely, theories like Environmental Economics (EE) assert that the propensity of a destination to become potential Pollution Haven is key for competitiveness. This study examines the competitiveness of sustainable development for global cities and countries.

The method adopted for the study is regression analysis using secondary panel data between 2004-2014 for 81 global cities and 132 countries. The independent variable, sustainability index is the weighted index of 20 indicators across the 4 sectors viz. Economy, Environment, Enablers and Equity. The sustainability index is generated using Pena's distance method. FDI is the dependent variable as it is considered as the outcome of competitiveness in the era of globalization. The panel analysis is also done separately for the group of African cities.

The evidence from the study supports the sustainable development approach emphasizing the competitiveness of sustainable development for the cities and countries ubiquitously. Panel estimates for the global cities show that the sustainability index of the cities and countries have positive and significant impact on the FDI attraction. Apart from sustainability, resilience comes across as the most important determinant of FDI for cities and countries. Protected forest % have positive impact and indoor air pollution has negative impact on the country FDI.

Estimates indicate varying impact of some environmental variables on FDI. Climate quality (CO₂/capita) shows positive impact on the FDI attraction for cities but it is negatively associated with country FDI. Air quality, Biodiversity and the Sustainable consumption index have a strong negative correlation with FDI attraction of the countries. Thus, the argument of Environmental Economics (EE) relating propensity to pollution with competitiveness may not be true for cities, it cannot be refuted at the country level, especially for African Countries. The existence of Green cities of unsustainable countries effect may be due to the urban policies of simply banishing polluting industries outside the city-boundaries instead of eliminating them.

Keywords: Globalization, Foreign Direct Investment, Climate Change, Sustainability

IFAD/VCDP Analysis on Smallholder farmers productivity and access to socio-economic well-being in Taraba state Nigeria

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Introduction

Nigeria is a country in West Africa that shares land borders with the republic of Benin in the West, Chad and Cameroon in the East and Niger in the North. Food insecurity and hunger are forerunners to nutritional health, human and economic development.

Various value chains have been used to boost agricultural development in different parts of Africa. The value chain in use presently in cassava and rice production in Nigeria is the International Foundation for Agricultural Development (IFAD) value chain which has been in use since 2010. Little work has been done on the effectiveness and achievement of this value chain since its inception in Nigeria. Thus, making it important to determine the effectiveness of the IFAD value chain and gaps that need to be addressed with respect to smallholder farmers in Taraba state, Nigeria.

Objectives Of The Study

The study was carried out to determine the level of productivity and improvement in the socio-economic well-being of the beneficiaries of the IFAD value chain development program among small-holder farmers in Taraba state.

Methodology

The research was carried out in Taraba State Nigeria. A multi staged sampling technique was used whereby 3 local government areas (LGAs) were randomly selected from the 5 LGAs participating in the value chain development programme. ArdoKola, Gassol, and Wukari LGAs were the research areas. Focus group discussion and key informant interview were also carried out among various stakeholders. SPSS version 22 for windows was used to analyse quantitative data and a p-value of <0.05 was taken as significant

Results

There has been increase in income and productivity of smallholder farmers benefitting from the value chain programme. They have also benefitted immensely from various trainings organized by VCDP which has also assisted them in moving from crude method of farming to a mechanized one. Some of the farmers still require more funding to achieve maximal benefit from the value chain program.

Conclusion And Policy Implications

IFAD/VCDP has really helped small holder farmers by giving them incentives, linking them to markets both local and international. IFAD/FGN should bring together all the value chain operators and mediate between its members and financial institution such as the Bank of Industry and Bank of Agriculture. Value Chain Development Programme should be recommended to other Local government areas of the state and to other parts of the country at large to ensure food security.

Keywords: International Fund for Agricultural Development(IFAD), Value Chain Development Programme (VCDP), Smallholder Farmers, Productivity, Socio-economic well-being.

Indian Private Sector Contributing to SDGs Through Sustainable Value-chain Practices

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The sustainable development goals (SDG) set an ambitious agenda in front of the world in 2015. World leaders from 193-member states came together with an intent of addressing the critical environmental, social and economic issues that the world faces today. The SDGs, with specific targets can be attained with collective actions taken by governments, corporates, not for profit organisations and individuals. Especially, the role of businesses will be critical to the success of SDG's as they can leverage on the opportunities presented by the SDGs, deploy the resources required, contribute with their expertise and in turn create shared value for all stakeholders. The private sector, through the opportunities it provides for direct employment, innovation, technology, finance and corporate responsibility can make a significant contribution towards the achievement of SDGs. A timely progress towards the attainment of the Goals is only possible with corporate actions complementing the Governmental initiatives at regional levels.

India is one of the 193 United Nation member states to adopt the SDG and since then Government has aligned its long-term goals with the Global Goals. As one of the fastest growing economies, India is expected to clock a growth rate of 7.1% in FY 18-19 is best placed to navigate the progress towards SDGs.

Supported by encouraging policies for industrial infrastructure development, the Indian Industry is witnessing increased investments across value chains. At the same time foreign investments in the Indian manufacturing sector is going to rise to 2.5 % in the coming 5 years. With the increased influx of funds, the responsibility towards ensuring decent work environment and protecting human rights for a large workforce, is an imperative. Especially with a large unorganised sector and Micro, Small and Medium Enterprises (MSME), there is a great potential of deploying policies and practices which aid achievement of several SDGs. This paper attempts to scan the policy landscape on sustainable value-chain practices in India and reviews the extent to which India's private sector is complying with the law. Through a series of case-studies and secondary research, the paper presents the innovative ways in which the Indian private sector is forging partnerships and fostering collaborative actions on ensuring sustainable practices in the value-chain.

Information and Communication Technologies for Youth Employment in Agribusiness

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Information and Communication Technologies for Youth Employment in Agribusiness
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Information and communication technologies (ICTs) remain the viable solution to challenges faced in agriculture and agribusiness through innovations targeted to improve crop yield, value chain processes, and access to market information and creating employment opportunities in the process.

In many developing countries especially sub-Sahara Africa, minimal deployment of ICTs for agricultural production is seen and this has resulted to poor yield, low income for farmers and limited job opportunities. Although, majority of youths see agriculture and agribusiness as a sector not meant for them, this narrative could be changed if their skill and access to ICTs could be harnessed to contribute to the agricultural and agribusiness sector thereby providing real time employment in the process.

Therefore, this study seeks to identify the levels of ICT skills among youth agripreneurs, investigate the ICT innovations currently been deployed and necessary to improve agribusiness, the extent of youth involvement and contributing factors and investigate the agribusiness value chain processes that could be improved through ICT as well as determine the financial returns ICT can bring along agribusiness value chain.

Data was collected through structured questionnaires, In-depth Interviews, Focused Group Discussions and Key Informant Interviews. Youth agripreneurs currently involved in agribusiness were interviewed individually and in groups to gain insight on the current use of ICT and factors contributing to youth involvement would be investigated.

Data analysis was done using SPSS to draw inferences and develop policy briefs to provide insights to discoveries of the research and to encourage youth engagement in agribusiness and other rural economic activities.

Preliminary findings suggest that ICT is currently being deployed for some certain agribusiness activities but on a very minimal scale. Furthermore, in order to increase food security and provide job opportunities for young people, increase in the uptake and deployment of ICT innovations for agribusiness need to be ensured which this study establishes.

Key Words: Information and Communication Technologies, Youth Employment, Agribusiness, ICT Innovations and Value Chain Processes.

Innovative Entrepreneurship Skills Acquisition And Empowerment In Nigeria

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There is the colonial mentality among the first generation of graduates in Nigeria where there has been a craze for white collar office work alone. In recent times, most Nigeria graduates have faced a lot of frustrations from lack of achieving the white collar jobs so to speak.

The origin of unemployment in Nigeria can be traced back to the oil boom era of 1970s. During this period, Nigerian government and individuals abandoned skills acquisition and its utilization through diversified entrepreneurship practices that have the capacity to boost both individual and the country's economic ego. However, emphasis shifted from entrepreneurship practice to paper qualification which has resulted in increased unemployment, low industrial development, and decline economic growth, with myriad social challenges in the country.

The importance of entrepreneurship skills acquisition cannot be overemphasized. Indeed, for Nigeria to be economically self-reliant, we must necessarily diversify our economy as well as encourage the youth to embrace self-employment through skill acquisition, entrepreneurship, self-reliance and financial empowerment.

Skill acquisition as a means of youth empowerment has caught government's attention in Nigeria for over two decades. This paper is therefore advocating adoption of repositioning the economic development and entrepreneurial drive for job creation, wealth creation and global competitiveness of Nigeria youths and graduates.

Also, we will make recommendations, such as the establishment of entrepreneurship skills acquisition Centres in every nook and cranny of the country to make the programs accessible to the youths. And the recruitment of competent and experienced craft men and women as instructors and facilitators to make these programs more viable and sustainable for effective benefits to the unemployed youths in the country and for economic growth.

Finally, emphasis will be made on adopting: Identification of Training Needs (ITN) based on peculiar demand and supply; periodic evaluation of these entrepreneurship Centres; and seeking for opportunities for empowerment of trained entrepreneurs so as to progressively operate enterprises from start-up to small, medium and large scale businesses.

Private sector SDG implementation: A strategic planning framework

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The private sector as we know it is in a state of flux. Modern businesses now span the globe with value chains that interact with every level of society; trans-national, governmental, community and individual. This ubiquitous reach should enable the business community to be one of the most effective actors in addressing the SDGs but currently, this form of action is limited. This vacuum stems from the complexity of the goals themselves, how can individual businesses identify how to simultaneously work towards so many goals given the diversity of their operations? The private sector requires guidance; tools to aid the modification of their operations and value chains to subsequently address the SDGs. No such tools currently exist.

Currently, all SDG related tools focus on reporting and benchmarking. This results in business operation being compared with the SDGs to determine the level of 'sustainability' the entity is achieving. This form of approach is useful but limited as radical change is needed to achieve the SDGs by 2030 not just slow and incremental change. This research project provides a framework which supports the transformation of business operation and value chains as part of private sector SDG action. The fundamental hypothesis of this project was that all existing SDG tools for business are only applicable in the latter stages of the strategy and decision making process " and therefore unable to have transformative impact " and that a framework to promote SDG action earlier in the process would lead to more impactful results.

In order to validate this approach, a three-stage methodology was utilised. Firstly, an analytical review was conducted of the existing SDG tools for businesses, both academic and consultancy based. Secondly, a 'strategic planning process' was synthesised from the relevant literature in order to gain an indication of the typical decision making process within organisations. Thirdly, a novel SDG framework was produced using the components of the strategic process not addressed by the existing SDG tools identified as part of the analytical review. This framework consists of a variety of components which fall in three broad categories: a 'definition' phase, an 'analysis' phase and a 'strategy selection' phase. The 'definition' phase consists of activities which aid businesses identify which SDGs are directly relevant to their core operation/value chains. The 'analysis' phase provides a process to identify the internal/external effects of addressing these SDGs. The 'strategy selection' phase guides the business through an exploratory process of 'backcasting', identifying the operation/value chain metamorphosis required to achieve the appropriate SDG action.

The framework as a whole is intended to act as a catalyst for the transformational change needed to achieve the SDGs by 2030. The global reach of businesses' value chains could substantially support a more sustainable future but only if given the right

guidance. This project and subsequent framework are certainly not a panacea for this issue but are a useful and practical first step in an otherwise vacant space.

Resilience in Global Value Chain

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A globalized and increasingly digitalized economic system has caused profound and fundamental changes in the way organizations' value chains operate and are managed. At the same time, the effects of climate change, especially extreme weather events and their impact on agricultural production, are introducing new challenges to the continuity and sustainability of global value chains. The ability of organizations to both anticipate and react to those challenges, therefore, will be a determining factor in how well an organization maintains its value chain. This, in turn, will be a determining factor in the sustainability of the jobs these value chains create. The term 'resilience' has been used at the organizational level, to delineate the inherent characteristics of those organizations that are able to respond to or recover more quickly from disruptions, or develop more novel ways of doing business under duress than others. With respect to globalization, presumably the more resilient an organization is, the better able it will be to adjust to the pressures globalization puts on it. Furthermore, with respect to value chains, the more resilience an organization builds into its value chain, the better able it will be, in terms of sustainable progress.

Resilience, however, also applies to an organization's employees. At the employee level, resilience has been used to describe the ability of organizational members to recover from or successfully adapt to problems and adversity. Resilient employees, thus, are valuable employees, and, by extension, are more likely to not be at risk of losing their jobs in the face of organizational adversity. From a value chain perspective, a resilient component of the value chain is, thus, more likely to stay in operation, providing continued employment to its workers.

Resilience, then, is a valuable asset not only for an organization in itself, but also for all with which it is connected. There is, however, a paucity of investigation about how resilience may be linked to sustainable development and how it can potentially be scaled up at a network or system level, such as in a value chain. This paper is an attempt to employ a fuzzy cognitive mapping approach to explore organizational resilience, in the context of sustainable value chains and employment.

SDGx, decent work and gender. The role of labour as agent for change the women's life conditions.

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In the context of 8th SDG (economic grow), it is necessary to create jobs around the world to all its citizens. Work is the key to guaranteeing dignity, and also to avoid poverty. Nowadays, work is undergoing a huge transformation. New phenomena (for example, information and communication technologies and robotics) makes it more difficult to achieve the objective of having decent work and inclusive economic growth in 2030. But now is the moment to offer ideas to transform risks into opportunities for international organizations, governments and companies.

Moreover, there is a sensitive collective which needs special consideration: women. They are half of the total population, but they don't have the half of the resources. The fifth SDG (Gender Equality) must connect to the idea of decent work in order to achieve equality. Decent work must drive towards accessibility to sufficient income in order to avoid discrimination.

There are two ways to ensure decent work for women. Firstly, they must get into the labour market, then to be able to obtain a quality job.

Governments should create employment policies, which assure respect to equality, no discrimination and other fundamental rights. Nevertheless, the main strategy must be to guarantee the correct training. Women need to gain qualifications and skills. Only in this way can they achieve the resources to become independent. The aim is to give tools to women to become employable by companies, and also to create their own businesses.

On the other hand, they must be able to obtain quality employment. Unemployment is not the only problem we find in labour markets. Having a job is neither a guarantee of covering minimum personal and family expenses or of social integration. The "poor workers" phenomena comes up as a new signal of the current times. The generalization of low salaries is having a significant impact on living conditions.

Work must empower women. In accordance with this they must attain quality work. In this part, it will be analysed: the equal rights to economic resources, the entrepreneurship (from getting microcredits to promoting it); the principle of equal pay and equal treatment in order to change working conditions; the goal of breaking through the glass ceiling; and the idea of reconciliation of family and work life balance.

These elements cannot be analysed only in a general way. The pathway to assure a quality job for women is not the same in every case. There are sensitive collectives with special requirements. Factors like migration, disability or age (young and old) must be examined as possible dysfunctions to achieve quality employment. In conclusion,

double discrimination is a very important element which needs to be taken into consideration.

Sustainable exportation: a community-based approach to empower communities in Northern Uganda

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The region of Northern Uganda is inhabited by the Acholi tribe who, traditionally, was a very proud, rich and respected tribe in Eastern Africa. However, with the strong and brutal presence of the Lord's Rebel Army (led by the infamous Joseph Kony) as well as the pressing policies imposed by long-time President Yoweri Museveni, misery and hunger have dominated the area. Although there has been a strong international effort to provide aid, a sustainable solution for all of this has not yet been found.

Not everything is bad, though, as there is plenty to be hopeful for: the area is filled with many valuable natural resources and the locals are motivated to engage in projects, even if voluntarily, to achieve social transformation. All that is needed is to identify which products are most valuable, for which markets they should be provided to and, most of all, to lead the local workforce in such endeavour. Based on this, the community of Nyanya (located in the Kitgum Municipality), with the support of InSpark Lab (a social start-up created in Brazil), decided to create a Community-Based Organisation (CBO) to connect the local products to external markets, handling all of the necessary bureaucracies to do this. After thorough analysis of what could be more sustainable to produce in the area, two main products were identified, based on what is already abundant in the region: shea butter and mango. With this, it would not be necessary to plant more trees and, therefore, exhaust the soil's resources - all that was needed was to collect, process and sell the products that are naturally grown.

Once defining the products, the challenge was then to find external markets to purchase them. With the support of External Commerce students from the University of Brasilia (UnB, in Brazil), one market was selected for each: for shea butter, the focus would be on exporting it to Brazil; for mango, the focus would be on Europe - both would be provided organically, going a great market value. With the support of the Ugandan Ministry for Foreign Affairs, the necessary training was given to the local population, so that the proper certificates for exportation would be acquired. It was decided that the project would start with a pilot of one container of each, to be transported by land to Mumbasa (Kenya) and, from there, to go by sea to the final destination. All of the revenue from the pilot would be used to cover its costs, so there would not be any profits and the final price, for the buyer, was much lower (something needed to be done, to facilitate reaching an agreement with them).

The final challenge was to then organise the local workforce to make this pilot happen. Recruiting the locals was not difficult, as most are unemployed. Processing the products was more challenging, though, as it was the first time doing so for the entire community - especially for shea butter. Through partnerships settled with a local forwarding agent and with importers from the destinations, the logistics of the exportation are also not a concern for the CBO.

Now, all that is left is to collect feedbacks from the buyers and, hopefully, replicate the process on a larger scale, involving more communities, and for a more expensive price - generating profit for the CBO. The idea is to then use this profit to create projects for the local population, which would focus on awareness for social issues such as early marriage, school dropouts and health (HIV/AIDS, malaria), thus generating a more sustainable community through global connections: exporting natural goods from Uganda, through Kenya, with the support of Brazilians, to Europe and South America.

Technology awareness and adoption among Micro and Small Scale Enterprises in Asante-Mampong, Asante-Akim and Ejisu-Juaben districts of Ashanti region of Ghana: A case of IFAD/GOG/AfDB supported Rural Enterprises Programme (REP) in Ghana

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The Micro and Small Scale Enterprises (MSEs) although greatly ignored in Africa is a major factor that influences the economy of a country. It plays an important role in the economies of developed and developing countries. Studies show that there is a comparatively low adoption of technology amongst the MSEs in developing countries which has hindered productivity and reduced ability to compete with their counterparts. The study therefore examines the level of awareness and adoption of technology amongst rural MSEs in Asante-Mampong, Asante-Akim, Ejisu-Juaben districts in the Ashanti region of Ghana and the factors influencing the technology adoption in the same districts. For the purpose of this study, technology will be narrowed to skills training, manufacture of processing equipment and testing and promotion of prototypes.

Primary data were collected from selected districts in the Ashanti region of Ghana by the use of survey questionnaires. Also in-depth interviews and focus group discussions were held as well as interviews with key informants.

The study so far has revealed that there is a low awareness and adoption of technology due to factors such as poor information dissemination, financial constraints and poor monitoring system by the service providers. However, MSEs that have adopted relevant technologies experience improvement in their business performance.

The result of this study will be beneficial as it will inform the decisions and policies made in the future by the Rural Enterprises Programme that will help to improve the promotion and dissemination of technology in the rural regions of Ghana.

Keywords: Micro and Small Enterprises, Technology, Adoption, Ghana.

The solidarity economy and value chains as shared value strategies for the construction of gender equity in the South of Colombia.

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The value chain starts from the complete knowledge of the activity that is carried out, establishing the critical areas, then it must be understood that it is a solidarity organization and what its motivations are. In Colombia Solidarity organizations are an inclusive economy. Solidarity organizations are a set of organizations that, being of private initiative, develop purposes of collective or social benefit. In Colombia, the association is one of the challenges in the post conflict. The common principles of these organizations are free accession, democracy, the absence of individual gain, the development of the natural person and total independence from the State

Value chains and solidarity economy processes are aimed both at generating income women and at rebuilding the social fabric of a population. In this purpose all the interest groups are articulated, from small retailers, suppliers to entrepreneurs who have shown great motivation for the construction of bets for the inclusion woman in the post conflict "(ACI, 2017). If the construction of inclusive bets for populations is critical, it is an additional challenge for women since they have been harmed in adverse power relations of the patriarchy, relationships that may be maintained from their infancy to the moment of their present. Rural women in many cases do not have access to land titles and require immediate assistance, the guarantee of processes that favor study opportunities, technical qualification and access to economic incentives for their agricultural production. Therefore, the shared value approach is key when undertaking inclusive business or associative groups gestated in the solidarity economy. The shared value approach is a cooperation strategy, based on projections in the short, medium and long term. In this process all the actors in the value chain acquire importance, from women, companies that support productive processes and reach consumers. On the one hand, while women acquire accompaniment and development of their productive initiatives; On the other hand, consumers can make a paradigm shift by seeing that women, who were once victims of social and political violence, are now productive women, with the capacity to grow and influence local markets and regional markets.

The aim of the presentation is to introduce a successful experience because in our hands lies the ability to build experiences from communities and for communities, bets built with reference to successful experiences that have developed in the country. The paper is divided into four parts: a) the narratives, stories and challenges of rural women in Nariño (Southern Colombia) b) Solidarity economy and value chains as a bet for the generation of income; c) Gender equity and economic development of women who move to the resignification of their female being, d) Conclusions and recommendations

Towards an understanding of farmer's motivations to participate in Short Food Supply Chains: The case of farmers' markets in Mexico

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It has been widely acknowledged that our current food system is failing to feed the world's growing population. Most recently, the United Nations has recognised the need to develop a more sustainable food system that can help us double the agricultural production by 2030 and thus ensure food security (Sustainable Development Goal 2). Special emphasis is placed on the urgent need to improve small-farmers' livelihoods and their access to land, resources, inputs, knowledge and fair markets. Current agri-food systems are plagued with economic, social and environmental challenges that hinder the move towards food sustainability. Climate change, soil degradation, globalization, population growth, political and economic crises, asymmetric price transmission, changing customer demands and changes in market and supply channel relations, are some of the challenges that farmers are facing worldwide. Such challenges, usually associated to 'conventional' food systems, have attracted attention to food initiatives that are regarded as 'alternative', and are commonly considered to be more sustainable. Under the alternative food initiative umbrella, short food supply chains (SFSCs) hold the potential for creating new shortened relationships between food and society, producers and consumer, and play a key role towards the development of sustainable food networks. However, participating in SFSCs has been found to be challenging for some small-farmers; they can restrict individual competitiveness, require more knowledge and skills and may require additional investment and resources. Furthermore, extensive empirical research on SFSCs has been conducted in places such as Europe and USA, but little attention has been paid to the emergence and challenges of SFSCs in developing countries. Thus, this study aims to fill this gap and add to SFSCs body of knowledge through qualitative research conducted in Mexico. In-depth interviews with farmers were carried out in two SFSCs, specifically farmers' markets, to investigate their experiences and practices. Particular focus is given to farmers' motivations to participate in SFSCs and opinions on the challenges that they face.

Understanding the Correlation of Labor Rights and Economic Growth in China

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Despite the rapid growth of the Chinese economy, many workers still suffer from substantially low wage and lack of adequate labor rights in the country. With the massive population and factories, China has recorded to have one of the highest export rates. To maintain the high export rates (which contributes to China's economy), an excessive number of workers is needed. It became natural for many companies and factories to manage their extensive workers by paying a low hourly wage and cut the cost of personnel expenses. As of 2018, Shanghai has a minimum salary of RMB 21 per hour (approximately USD 3.32). Although a low rate, Shanghai has the highest minimum wage throughout China. SDG 8 works to not only promote sustainable economic growth but to work on sustainable employment and decent work for all as well. One of its target in SDG 8 to "achieve full and productive employment and decent work for all women and men, including for young people and persons with disabilities, and equal pay for work of equal value" by the year 2030. The minimum wage for people in China must be adjusted to fulfill this particular SDG and present equal pay of equal value. To firmly address this issue, a case study will be done to calculate the average working hours and the average wage of employers in China. The correlation of economic growth and labor will also be noted through literature reviews. Interviews will also be conducted with laborers in the larger Shanghai area in China. Different policies and labor rights will be suggested to end extensive work and low wages such as raising awareness of child labor and labor rights, particularly focusing on women. Attaining this SDG in China is critical as the growing GDP may be impacted later in the future due to the low-income workers receive.

Value Chain Analysis of Tea Production in Karongi, Rwanda.

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Tea was introduced to Rwanda in 1952. Today, tea is one of Rwanda's main cash crops. Tea produced in Rwanda includes black tea, white tea, green tea, authentic tea and organic tea.

Rwanda tea is planted on hillsides at high altitude (between 1,900 and 2,500 m), and on well drained marshes at an altitude of between 1,550 and 1,800 m.

Tea in Rwanda is mainly cultivated by smallholder farmers, on total areas of less than 0.25 ha per household. Smallholder plots produce on average the equivalent of 7,000 kg of GL/year/ha while in Kenya they produce on average the equivalent of 23,000 kg of GL/year/ha and in Tanzania they produce on average the equivalent of 18,000 kg of GL/year/ha (FAO, MINAGRI&OCIR THE 2008)

The major problem of associated with tea production in Rwanda is low productivity which implies low yield would be better identified across the value chain of tea production. A value chain approach identifies the various levels and stages required to bring a product or service from conception, through the different phases of production, delivery to final consumers, and final disposal after use.

Smallholder's tea producers in Rwanda faces the challenges of how to increase quantity and how to get better prices for the excellent quality of green leaves they produce. The Government of Rwanda in her National Export strategy (NES) stated that the quality of the Rwandan tea is among the best in the world, but, the yields are low by comparison with other nearby African countries and producing countries in Asia (GoR 2005).

With the world price of tea forecast to decline, except for the price of specialty and high quality teas, low quality and poor productivity will severely hamper the role of the tea sector in increasing exports and reducing poverty and achieving the goals of Vision 2020

Another problem is the issue of Farmers Cooperatives in Rwanda, it has been identified that every tea grower is attached or registered under a cooperative. The farmers and cooperatives are the major actors in improving productivity on the tea sector, directly/indirectly with aid from the factory that does the marketing and processing of the green leaves and the Government of Rwanda that sets prices through NAEB.

This study give answers to the following questions

1. What are the roles and the relationship between each actor along the value chain?
2. What are the factors promoting low productivity? (with regards to the farmers)
3. Does the cooperative have an impact on the tea production?

Data collected was through a mixture of key informant interviews, Stakeholder meetings (one before and one after fieldwork, to share preface findings), field visits meetings with district government officers NAEB (National Agricultural Export Board), cooperative leaders, smallholder tea growers, tea factory managers.

The research included secondary data through key policy documents, reports and other data from government departments MINAGRI (Ministry of Agriculture and Animal Resources), IFAD, and other organisations.

The quantitative approach was used to obtain quantifiable data and produce statistics. The qualitative approach was typically used to collect information that related to judgment, perception, and priorities about an issue.

The data obtained from the field will be analyzed using descriptive and inferential statistics. Descriptively, tables, charts, percentages, averages, frequencies, mean and maps would be used to bring the study to a clear perspective.

The results from the study shows the key actors along the value chain and the interrelationship between the actors, factors affecting low productivity with respect to the farmers and also to measure the impact of the cooperative on the tea production.

In conclusion the study has shown that for productivity to improve in tea production certain issues associated with the yield of farmers and training of best agricultural practices amongst others need to be addressed

Cultivating an Entrepreneurial Culture to foster a sustained, inclusive and sustainable economic growth.

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The team has designed a learning workshop that stimulates an entrepreneurial mindset among adolescents to foster “sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all.”

According to Paul Wolfowitz, a healthy, vibrant and competitive private sector is a key to economic growth and job creation. The vibrancy of the private sector depends on entrepreneurs since they represent 66% of job creation within the Organization for Economic Co-operation and Development (OECD), a global enterprise. Therefore, the future of opportunities among underserved populations lies in the hands of entrepreneurs. This begs the question, how can our cultural attitudes towards entrepreneurship shift from a profit-oriented conception of business to a human-centered one? Several sources define culture as a set of shared values, beliefs, and expected behaviors. However, when an entrepreneurial mindset proliferates throughout society; it nurtures an entrepreneurial culture and stimulates economic growth.

To develop an entrepreneurial culture, corporations, governments, and educators have to create an infrastructure to do so. For that, we must start from education. Also, there is a direct correlation between local quality of education and economic growth. However, education in entrepreneurship is currently a field of study that is disregarded by traditional academia, limiting students' opportunity to excel in this regard. To relieve this pedagogical plight, the team has designed a workshop for adolescents, from the ages of nine to eleven, that aims to foster an entrepreneurial mindset to sustain future economies.

This workshop promotes creativity, environmentalism, and humanitarianism through entrepreneurial education. In tandem with this platform, the team has created a learning curriculum that incorporates the Triple Bottom Line by Design + Culture (TBLD+C) framework. The Triple Bottom Line refers to "people, planet, profit" as three of the four foundational principles for ethical business practice (the fourth being culture).

The workshop is a proposed design solution to foster an entrepreneurial mindset to prepare the young generation to tackle 21st-century challenges. The study presents a workshop with high adaptability and low-cost design which allows implementation

flexibility. It can add value to already existing curricular, online and offline programs, and platforms with a similar mission and vision.

Impact Of Mining Activities At Enyigba Community Ebonyi State Nigeria And Its Environs

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Open cut mineral mining is a major source of air pollution and can result from drilling, blasting, overburden dumps, exposed pits, transportation and removal of waste during refining of ore. Particulate matter is composed of trace metals harmful to human respiratory systems. Dust particles interaction with the lithosphere, hydrosphere and biosphere can cause change of the radiation balance of the atmosphere and earth's surface resulting to changes in temperature of both land and surface waters, with attendant impact on the ecosystem. Its indirect radiative effects such as cloud condensation can modify cloud properties and precipitation. Dust samples from Enyigba Community, Federal University Ndufu-Alike, Ikwo (FUNAI), Ebonyi State and environs and analyzed for trace metals e.g. Ca, Mg, Fe, Zn, Cr, Co, As, Pb, etc as a result of the mining activities within the area. Samples were collected with prewashed 1.0 m² - high density polyethylene (HDPE) containers positioned at different locations within FUNAI and its environs for a period of 4 days, homogenised and digested with HNO₃/HClO₄ and analysed using inductively coupled optical emission spectrometer (ICP-OES). The trace metal concentrations varied from 0.011 – 9.201 mg/L. The order of increase in the concentration of the trace metals were: inner transition metals < second series transition metals < alkali metals < lanthanides < first series transition metals < alkaline earth metals (i.e., 0.545 < 1.122 < 1.184 < 1.716 < 9.201 < 11.822 mg/L). Specifically, the mean concentrations of Hg, Pb, B, Mn, As and Cd of 0.307, 0.060, 3.097, 5.158, 6.220 and 0.050 mg/L respectively in the dust samples were significant and implies that mining activities have effect on the area.

Sustainable development in Ghana's gold mining sector: clarifying the stakeholder perspective

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Using semi-structured interviews and focus group discussions, this study sought to examine stakeholder perceptions, experiences, and competence in assuring sustainable management of Ghana's major gold fields. The investigation was inspired by a synthesis of the United Nation's Sustainable Development Goals (SDGs) adopted by the global community in September 2015, as it places human resource capacity at the center of a sustainability struggle among local and international businesses. Findings of the study entrained two opposing but interesting lessons. On the one hand, the study showed that sustainable development is understood differently by stakeholders within the gold mining sector, which is why gold mining companies employ different approaches to the pursuit of their sustainability objectives. On the other hand, the study revealed that, since mining activities are similar across different mining companies, a common understanding and operationalization of the concept in the country's gold mines is a more practical approach to sustaining mining operations. It further revealed that, to facilitate effective implementation of this second strategy and to ensure its alignment with the SDGs, a regulatory framework is required, and this should be developed based on the input of stakeholders.

Indigenous Approaches to Understanding and Practicing Sustainable Development

Framework for the Localization of the SDGs at Local Assemblies

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In line with SDG 17 which encourages partnership to achieve the 17 goals and SDG 4 which highlights the importance of educating the masses to be aware of the roles and responsibilities as well as the details of the SDGs, the SDGs Hub with support from the Academia (GIMPA) has initiated the novelty initiative christened the Localizing the SDGs Initiative (LSI). The LSI is in accordance with United Nations' and the Government of Ghana's vision to see the implementation of the Sustainable Development Goals (SDGs) at local government and grassroots level before 2030.

Sector and Problem-Opportunity Mapping

Development at the grassroots level has become quite challenging due to the high demand on the already constrained national development agenda of the Government of Ghana. This has put a virtual embargo on the promotion and implementation of the United Nations Sustainable Development Goals of which Ghana is playing a leading role. Therefore MMDAs need to be trained and empowered to develop their localized approach towards the achievement of the SDGs hence this Academic Framework to aid in improving the capacity of MMDAs in Ghana. The targeted beneficiaries include;

1. The Metropolitan, Municipal, and District Assemblies
2. The departmental heads of the MMDAs, the Assembly Council executives and assembly members are the first target representing the Public Sector
3. The non-governmental organizations (NGOs), social enterprises, faith based organizations (FBOs), and Traditional authorities are our second target representing the Civil Society
4. The companies, businesses, professional groups and business chambers or networks domiciled in the MMDAs will be the third target representing the Private Sector
5. The students, school children and youth from basic schools, senior high schools, tertiary institutions and youth associations in the MMDAs will represent the Youth Base
6. The journalists, artists, advertisers, bloggers and writers FM stations, online media channels, publishing houses, printing houses, social media blogs and advertising agencies will be the Visualizers and the Media

Our Statement of Request

The SDGs Hub aims at presenting our academic framework to be considered by the Board for the following reasons

1. To strengthen the position of the framework as a benchmark for local government or assembly capacity building towards the achievement of the SDGs in Ghana from 2018 to 2030
 2. To have our framework reviewed and further developed by interested institutes or entities present at the sessions
 3. To attract and invite interested academia representatives interested in grassroots development in Sub-Saharan Africa to join the SDGs Hub in join our efforts in Ghana
- We believe that this framework would yield the following deliverables before 2030;
1. Resolute Capacity Building Program for MMDAs in Ghana
 2. Empower MMDAs mobilize funds and resources domestically
 3. Increase the culture of data collection, accountability and monitoring & evaluation
 4. Encourage Public-Private Partnership in achieving the SDGs at MMDAs due to their increase level of knowledge.



Launched by UN Secretary-General Ban Ki-moon in August 2012, the Sustainable Development Solutions Network (SDSN) mobilizes scientific and technical expertise from academia, civil society, and the private sector in support of sustainable development problem solving at local, national, and global scales. We aim to accelerate joint learning and help to overcome the compartmentalization of technical and policy work by promoting integrated approaches to the interconnected economic, social, and environmental challenges confronting the world. The SDSN works closely with United Nations agencies, multilateral financing institutions, the private sector, and civil society. unsdsn.org



Association of the Master's in Development Practice (MDP) programs is a network of 38 MDP programs, each committed to a high-intensity program of teaching, research, innovation, and practice that involves all parts of the world. The Global Association arises from a shared commitment to forge a new profession of sustainable development practice that integrates the social sciences, natural sciences, health sciences and management. Intellectual foundational support was provided in the 2008 report of the International Commission on Education for Sustainable Development Practice, supported by the MacArthur Foundation. Numerous universities have or are in the process of designing, introducing, and promoting the new, cross-disciplinary global Master's in Development Practice program. In order to function effectively as the Global Association of the Master's in Development Practice, the Association is guided by bylaws that define its purpose and responsibilities. mdpglobal.org

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