

Indigenous Knowledge and Climate Change Risks among smallholder farmers: A Case-Study from Southwest Nigeria

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Introduction

As noted by Mwaura (2008) indigenous knowledge can be summed up as the wisdom of a people for survival in their own environment. It is a broad concept that covers all forms of knowledge of a particular community living in a particular area. It is dynamic and continually evolving. Traditional communities rely on traditional knowledge and it is necessary to integrate their knowledge systems with scientific knowledge and emerging technologies (Mwaura 2008).

The word knowledge refers to a universal heritage and a universal resource, which is diverse and varied. 'Indigenous' on the other hand refers to the root, something natural or innate and also an integral part of culture (Odora-Hoppers, nd.). Indigenousness according to Dei, (2002), "may be defined as knowledge consciousness arising locally and in association with the long-term occupancy of a place". The notion of 'indigenouness' he adds "highlights the power of dynamics embedded in the production, interrogation, validation and dissemination of global knowledge about international development". It recognises the multiple and collective origins and the collaborative dimensions of knowledge, and underscores that the interpretation or analysis of social reality is subject to different and sometimes oppositional perspectives. He argues further that 'Indigenouness' emerges from an indigenous knowledge system that is based on cognitive understandings and interpretations of the social and physical/spiritual world (Dei, 2002).

Broadly speaking, indigenous knowledge systems refer to the complex set of knowledge and technologies existing and developed around specific conditions of populations and communities indigenous to a particular area (Bray and Els 2007). These indigenous knowledge systems provide 'an everyday realization that rewards individuals who live in a given locality'. This knowledge according to Ahmed (1994) is composed of people's "do-how", know-how and accumulated experiences over economic, social, cultural, ideological, and belief systems in which it is found. An indigenous knowledge system is characterised by its being embedded in the cultural web and history of a people including their civilisation, and forms the backbone of the social, economic, scientific and technological identity of such a people. As Cajete, (2002:281) rightly points out the accumulated knowledge of the remaining indigenous groups around the world represents an ancient body of thought, experience and action that, if honoured and preserved as a vital storehouse of environmental wisdom, can form the basis for evolving the kind of cosmological reorientation that is so desperately needed. For Nakashima, Prott and Bridgewater (2000) sophisticated knowledge of the natural world is not confined to science, human societies all across the globe has developed rich sets of experiences and explanations relating to the environments they live in. They encompass the sophisticated arrays of

information, understandings and interpretations that guide human societies around the globe in their innumerable interactions with the natural milieu: in agriculture and animal husbandry; hunting, fishing and gathering; struggles against disease and injury; naming and explanation of natural phenomena; and strategies to cope with fluctuating environments (Nakashima, Prott, and Bridgewater, 2000:12).

Meanwhile since the 1970s concern about the consequences of climate change on the global world (Shah, Fischer, and van Velthuisen 2008, Nellesmann et al. 2009, Jennings and Magrath 2009) and the entire human race has continued to be subject of many studies and many position papers (Agrawala and Crick 2009, Gössling, Hall, and Scott 2009, IPCC 2007, Kok et al. 2008). According to Henry (2000) climate change is the result of consistent release of greenhouse gases such as carbon dioxide into the atmosphere thereby causing increasing in the naturally occurring greenhouse effect and ultimately leading to a warmer Earth. Climate change is the result of global warming which is responsible for global changes in climate with severe manifestations in form more frequent storms and flood, crop failures, droughts among others.

There is growing evidence that, as a result of global climate change some of the most severe weather events could become frequent in Africa. At the same time, concerns regarding the reality of climate on the indigenous peoples of sub-Saharan Africa and continued impacts has continued to pose great threat to the African indigenous peoples' livelihoods. While climate change is a global phenomenon, its negative impacts are more severely felt by poor people, poor countries as well as poor and low-income communities around the world. These are more vulnerable because of their high dependence on natural resources, and their limited capacity to cope with climate variability and extremes (Ardenne-van der Hoeven et. al. n.d). For Rayner and Malone, (2001) those in poverty have a higher chance of experiencing the ill-effects of climate change more dramatically due to increased exposure and vulnerability. Also, a lack of capacity available for coping with environmental change is experienced in lower-income and indigenous communities (Smit et al. 1999). Since indigenous peoples values revolves around the concept of territory, it therefore suggests that climate change impacts would be higher on them and their communities. This because indigenous peoples' conceptualization of territory is completely different from the 'western' notion of land; territory embodies a collective, spiritual, and sacred space, independent with nature (Stetson 2012). Crucially, these territories are the main source of indigenous existence, producing food, water and medicine. To illustrate these connections, this main of this study is to examine indigenous knowledge and climate change risks among smallholder farmers (especially from Southwest Nigeria).

Impacts of the Changing Climate in Sub-Saharan Africa

Because climate change is one of the most significant problems facing the human species in the 21st century (O'Brien and Leichenko 2000), it is a key development challenge (Kok et al. 2008, IPCC 2007, Gössling, Hall, and Scott 2009), especially for those still living out the consequences of structural adjustment programs and crippling international debt as they struggle to reproduce the material conditions of daily living for their family. Despite a vocal denial industry, the world's climate is widely understood by experts to be changing at rates that are unprecedented in human history (cf. Thornton et al. (2008). Estimates vary widely, but AR4 (2007b: 30) indicates that if emission of greenhouse gases is not curtailed, the earth's temperature will rise between 1 and 4 degrees centigrade over the course of the 21st century. Without doubt, these changes will evidently have enormous and multiple implications for humankind (Agrawala and Crick 2009). Presenting a social dimension to the global climate change discourse, UNDP (2008) predicts that the impacts of climate change could, by 2080, push another 600 million people into malnutrition and increase the number of people facing water scarcity by 1.8 billion. Climate change accordingly poses an extremely urgent threat to agriculture and food security, particularly in the poor, agriculture-based countries of sub-

Saharan African countries, because of their low capacity to cope with the problem (Nellemann et al. 2009, Shah, Fischer, and van Velthuizen 2008).

Parry, Evans, Rosegrant and Wheeler (2009) in a World Food Programme Report entitled "*Fighting Hunger Worldwide*" predicted that by 2050, the number of people at risk of hunger as a result of climate change is expected to increase by 10 to 20 percent more than would be expected without climate change; and the number of malnourished children is expected to increase by 24 million that is, 21 percent more than without climate change (Parry et al. 2009).

Many of Africa's major economic sectors (e.g. agriculture, forestry, fisheries, tourism, construction, etc.) are sensitive in various ways to weather and climate conditions and large portions of the continent's population are involved, to varying degrees, in subsistence livelihoods making them highly vulnerable to climate and other environmental changes. The climate community has long articulated the maximum 2° C target (that is, an average temperature increase of no more than 2 degree Celsius over pre-industrial levels) as the safe threshold beyond which irreversible, costly and even catastrophic change becomes likely (Vohland, Lucht, and Lotze-Campen 2007). This temperature target implies stabilizing carbon concentration at 450 parts per million CO₂, which in turn means drastic reductions in global carbon emissions.

While impact on climate change on the Climate change is already a reality in sub-Saharan Africa, where impacts are increasingly widespread, and include decreased river flow, spread of vector-borne diseases, and decreased crop yields. The last decade has witnessed prolonged and intensified droughts in eastern Africa; unprecedented floods in western Africa; depletion of rain forests in equatorial Africa; and an increase in ocean acidity around Africa's southern coast (Besada and Sewankambo 2009, Lisk 2009). Vastly altered weather patterns and climate extremes threaten agricultural production and food security, health, water and energy security, which in turn undermine Africa's ability to grow and develop (Lisk 2009), and thus threaten the typical approaches of business-as-usual poverty reduction programs. Ghana's second Poverty Reduction Strategy, GPRS II (2006-09), for example, aimed at establishing Ghana as a middle-income country on the basis of agriculture. Yet its section on challenges to this plan failed even to mention climate change (GPRS II). Droughts and floods are particularly of concern in Africa, where agriculture provides a livelihood for about three-quarters of the population and is mainly rain-fed.

Method

The main technique employed for data gathering in this study was interview. I chose an interview method that was unstructured, informal, in-depth and open-ended (Clarke 2002) to encourage participants to freely express themselves as well as help me in facilitating my conversation with the participants. The interview was conducted between late April and May 2014. In all, a total of 17 interviews were conducted with 2 focus group meetings with the participants took place in their houses and on their farms or locations such as an elder's residence. To protect participants' identity and ensure anonymity, I deleted all names and assigned pseudonyms known only to myself.

In setting up the interviews, I was particularly moved by the understanding of all the participants, with regards to welcoming me into their homes and farms. From the point of agreeing to participate in the study up till the interview, I also got the sense that the participants were impressed with the focus of my study, perhaps because my research's placed premium of indigenous knowledge as an important core in the protection of the future of our planet and humanity. Questions asked focused on how indigenous farmers (men and women) explain, interpret and cope with climate change, indigenous practices in relation to their lifestyle and adaptation processes regarding climate change. In order to able to ask follow-up questions and tell it like it is, I followed (Hollway and Jefferson 2000) principle of using respondents' ordering

and phrasing. This principle involves the interviewer carefully listening and noting the words and phrases used by interviewees, without offering our own interpretations (Clarke 2002).

Results

The patterns of the participants' narrative followed the ordering of the question asked. The pattern of their narratives revealed four major patterns or strands of discourse.

Explanation and interpretations of climate change

Whilst participants appear or present themselves as ignorant of the phenomenon of climate change at the outset of the interview, their responses demonstrate the contrary. Perhaps what is responsible for this is because their understanding of weather or climatic issues is not limited to just a phenomenon like climate change. What is clear though is that their indigenous understanding of weather and climate is rooted in their indigeness and traditional ecological knowledge and interpretations. Virtually all the participants explained that the weather has changed and that it is not like it used to be in the days of their ancestors. I observed further that in some way all the farmers interviewed believe that the changing weather and variations is linked to the alterations of the seasons and by implication reduced rainfall, which can be connected to reduced harvest. For instance, most of the responses, I discovered reflect the commonly held views of the participants regarding changing climate. For instance, (notes from the interviews)

A male named kukoyi aged 50, who is a palm tree farmer when discussing the issue of alterations of season and reduced rainfall, said that "rain doesn't fall as much these days, it used to be much more than we have now previously. Although, palm tree does not require as much rain still it requires some watering the palm for hydration and good palm kernel yield and harvest".

"Another old farmer identified simply as Memudu in his 70s, in his response pointed out that he observed that the sun more intense these days, thereby the days hotter than normal when compared to when he was young, also noted that yield has reduced drastically in the present days. He did not fail to connect the incidence heat, reduced and yield from the palm kernel yield."

The above comments are typical of other responses during the interview. Meanwhile, in another instance, climate change explanations are presented in relation to weather and not climate.

A woman identified as Ramat when asked to explain whether the low yield is connected to infrequent and reduced rainfall. She responded the "land is dying and this why our palm trees are not bringing fruits like it used to before but she didn't seem to see any correlation with the reduced rainfall".

Bushiratu, an indigenous woman who is into palm oil making believed that inconsistent rain and hotter weather is responsible for low yield in palm kernel per farm and this is responsible for the low production which she presently experiences.

The patterns of response in the section speak to what scientific terminology for climate change is being too up there beyond the consciousness indigenous communities. In other words, people may understand climate change from annual weather variations and not from climate itself.

Coping with the Risks associated with climate change

The views that the risks associated with climate-induced changes and weather variations could be dangerous and severe are closely related to how the local populations interpret or explain the climate change phenomenon. Risks associated with climate change are therefore not alien to the smallholder farmer visited that participated in the study. For example, risk such as

droughts and violent storms, torrential rains and flooding, topsoil, high temperature are known risks common to the farming community. Response to all these myriads of climate stress will require adapting via physiological, behavioural, and cultural and indigenous technological responses.

Mathew Hunjonu a male farmer aged 60 explained “in the beginning we used to lose so much as result of flooding which used to wash off farms and damage our crops. But now we have learnt to apply knowledge from our historical past because we believe that the present weather scenario is not new. It must have been experienced by our fore fathers in their time”

Another farmer Isola I his 50s, during one of the two focus group meetings said, because severe rainfall and violent storms, “I have learnt to make ridges on my farm to control the impact of erosion and run-offs. In addition, I now plant in between tall trees that serve as windbreaker and erosion control because the tap root of the trees help to hold the soil together”

Alimatu, a widow tomato farmer and mother of three in her early 40s admitted she used to think that the problem will fade away until she realised that she need to device other methods of protecting her from the scorching occasioned by the periods of very high temperature. She explained that since then her realization she has been placing dry grasses and twigs tents over her tomatoes. Although she adds that the situation means she has to do double the work she used to do on her farm.

Shehu, a vegetable farmer in his early forties, explained, “my farms are always waterlogged during rainy season and since vegetables don’t like too much water I used to lose my farm to water. But now I have crated troughs and thorough paths on vegetable farm, as I have been to reduce drastically my net loss. In the dry season, my vegetable farm depends on water from man-made pond I built on my farm. This has been my survival strategy”

Discussion and Conclusions

This research examined smallholder farmers’ narratives about climate change. There is no doubt there are a number of limitations to this study. Most importantly, the samples used are selected from small local community and not representatives of local population in southwest Nigeria. Another limitation is that data collected was limited to short period of about four week-five weeks. The third limitation of this kind of study lies in its subjectivity which is not strange to studies of this nature as Gould (1986) pointed out; subjectivity in research of this type is unavoidable. These limitations, does not however remove the merit of the findings in this study.

Within the focus of the study, there were two patterns that emerged from this ethnographic work. First is that indigenous people of the local community are not informed about the scientific discussions and policies regarding climate change. This can be seen in their narratives given the consistent discussion of weather. Whilst this is obvious, one fact remains that their explanations are grounded in discourse of climate change. My findings indicate a general low-level understanding of the climate change phenomenon but this low-level understanding can be improved if information is made available to available to those farmers who are more susceptible to impacts of climate change so they can be clearly aware about details of climate change. In relation to coping with the risks of climate change it is very obvious that the farmers have, however, developed a wide-range of reactive management strategies to manage climate risks.

While these have potential to address future climate-related risks and opportunities, there are limits to adaptation, and an increase in the frequency of extreme events may exceed their adaptive capacities. Considering the fact that, future frequency and intensity of extreme events is expected to change as both climatic means and variability change(IPCC 2001).

Another fact that emerged from this study shows that farmers are also generally not unaware and/or unconcerned about climate change, which could constrain opportunities to adopt long-term climate change adaptations. While the farmers believe they have been able to cope with climatic risks there is the likelihood of increases to the risk in form of large-scale flooding and loss of topsoil due to erosion as well as heat waves and droughts which are all capable of increasing the risk of losses of crop yield and forage quality (Fuhrer et al. 2006). A risk that was not identified by the participants in their narratives is health-induced risk impacts on agriculture. According to (Bezabih, Chambera, and Stage 2011) one potential consequence of climate change is a change in the distribution and incidence of malaria, which in many tropical countries remains a major cause of illness and death and it important to note that many of the prevalent human diseases are linked to climatic fluctuations(Martens et al. 1995).

In concluding section, this paper identifies a couple options for promoting peace-building and international understanding among indigenous peoples of Africa.

- Little and ineffective interactions between stakeholders and indigenous peoples in decision making process. It is apparent that there is insufficient knowledge management of the concerns of the indigenous peoples especially in relation to helping them to share and apply information. More research is needed towards leading a more supporting role in knowledge sharing between dominant culture and indigenous communities
- Researchers should explore more researches into the problems of indigenous peoples and their communities. This research outputs no doubt will add value to policy and decision-making in manners that will engender a greater understanding with and among the indigenous communities about the topical environmental issues, as it affects their livelihood and sustainability of their environment.

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