

SENSE: Systemic Enquiry, Norm for Sustainable Equity

Sai Dharani K
sai.dharanik@gmail.com
India

Abstract: *Principled Decision-making* for SDGs is a crucial concern. Despite the importance and the efficacy of various ways in promoting “*Sustainable Consumption and Production patterns*”- SDG12 doesn't have comprehensive *frameworks/methodologies* to accomplish the needed transformation for sustainable growth. Its development is a process and cannot be achieved with one action- *assessment* as presently approached with *The New BellagioSTAMP* guidance principles and SIA tool for 3Ps. In a world with precious resources, *right priorities must be set and implemented*. Such a scenario *needs a holistic strategy* from *design* through *planning* to *implementation* and *evaluation*.

The paper proposes *SENSE - A Systemic Decision-Centric Action Framework and Methodology* to design, plan, monitor, evaluate and map the chosen solution for SDGs in conformity to the *Six Sustainability Dimensions/5Ps*. Based on *Systems Thinking* it seeks to reinforce and balance processes for *sustainability transition* at every outset. Further illustrates *Water conservation and reduction of Fertilizer usage for Agriculture - Rice, India*; the step-by step process of how SENSE allows to focus on the *right set of parameters by whole-of-society* to perform *sustainable actions* for *protection and enhancement of Sustainable Equity or Larger Good – Planet species and resources*.

Keywords: Sustainability- Principles, Dimensions; Sustainable- Equity, action/s, transition, growth, evaluation; SA (Sustainability Assessment); SIA (Sustainable Impact Assessment); BellagioSTAMP (Bellagio Sustainability Assessment and Measurement Principles); SD (Sustainable Development); DMS (Decision-making for Sustainability); DM (Decision-Making); decision-centric; SDGs (Sustainable Development Goals) Six Dimensions/5Ps; SENSE

1. Introduction

“Sustainable development is development that meets the needs of the present without compromising the ability of future generations to meet their own needs”.¹

The Rio+20, 2012² affirmations by global political leaders, success of the MDGs,2015³ and the undertaking of UNSDGs 2030, 2015⁴ reaffirm *SD* (Sustainable Development) as the way forward with focus on *reshaping DM* (Decision-Making) in developed and developing countries alike.

The UNSDGs 17 goals (Sustainable Development Goals),169 targets and 232 indicators set a *Universal agenda* for 2030 towards sustainable development to stimulate action in areas of critical importance for humanity and the planet.

In an increasingly consumption driven world that are straining resources, SDG12⁵ is much more important as it underpins every other SDG, from Zero Poverty to Peace and Justice. Its objective of *sustainable growth*- repeatable, ethical and responsible actions by and for current and future generations places the importance on *DM* as a means to achieve it and should be considered a '*fundamental legal principle*'⁶ towards SD as at '*the very heart of every action lies a decision*'⁷ implied in *sustainability transition*⁸ - Long-term, multi-dimensional and fundamental transformation of large socio-technical systems towards more sustainable modes of production and consumption.

Noting that SD, SDG12 and DMS (Decision-Making for Sustainability) are inherently cross-cutting and inextricably linked to the cause of larger good and that *SDG12* is an ice-breaker for sustainability which transcends positive impacts on the other SDGs.

SENSE through its Systemic⁹ decision-centric approach with *SD as the goal, SDG 12 as the implementer for sustainability transition catalysed by DMS* allows to *strategize solution/s and perform sustainable actions by whole-of society* (individuals, corporations/institutions, governance). As an *Action Framework and Methodology* - addresses the *Strategy and Processes* for understanding and analysing the dynamic perspectives to take informed decisions and implement them.

SENSE → Informed decisions with Systemic Enquiry and Analysis/Assessment + Implementation of Sustainable Actions + Evaluation → **Sustainability transition** → **SD**

2. Current Models

*'The effect of an(impact) assessment procedure may well be that it will mainly benefit future decisions, while having a more limited impact on the decisions which the impact assessment was meant to inform and influence.'*¹⁰

Sustainability practices have seen light in the 1990s as a performance measurement tool in the corporate world. In its purest, most distilled form, the imperatives of sustainability are summed up by just three words: '*Planet. People. Profit*'.¹¹ Commonly known as the *TBL* (Triple Bottom Line)¹² is an evaluation of the outcomes at the end of the implementation process to capture the essence of sustainability by measuring the impact of an organization's activities on the world, including both its profitability and shareholder's value and its social, human and environmental capital.

Ideally, *SIA* (Sustainable Impact Assessment)¹³, Figure 1 is a systematic and iterative process for the ex-ante assessment of the likely economic, social and environmental impacts of policies, plans, programmes and strategic projects undertaken during the preparation of them where the stakeholders concerned participate pro-actively.



Figure 1 - SIA Process

On independent evaluation of how SIA by i) The EU commission services to Policy-making.¹⁴
ii) The students E6 Øst, Norway and the professionals linking two major ski areas, Switzerland¹⁵ was carried, used, its quality and role reflected as follows.

- *Importance for economic impacts* than social and environment impacts.
- *Intangible quantification* of indicators for environmental and social impacts.

- *Inadequacy* in assessment frame, scope and inter-service/stakeholder consultation.
- *Unclear purpose* with focus on competitiveness than integration for objectives.
- *Resources* and *Proportionality* with too much discretion to the project lead and criterion relaxation for assessment guidelines leaving out difficult and long-term environmental and social impacts.
- *Stakeholder representation* inclusion too late in the process after options were determined.
- *Credibility* and *Transparency* as lacking clarity on the links and influence of how SIA influenced decisions.

The above mentioned *Institutional* (appropriate provisions and arrangements for scope and frame of reference) and *Methodological* (procedural and organisational provisions, responsibility and inclusion of stakeholders) limitations of analysis, integration of 3Ps and reporting has not led to proper assessment for sustainability.

The *New BellagioSTAMP*¹⁶ (Bellagio SusTainability Assessment and Measurement Principles), Figure 2 does not define good practice but is intended as critical guidance to affect evaluation - design, content, process, scope and impact for development, compilation, review and management of assessments.

| | | |
|----|--------------------------|---|
| 1. | Guiding Vision | Deliver Well-being within the capacity of biosphere to sustain it for future generations. |
| 2. | Essential Considerations | Trade-offs and Synergies for Social, Environmental and Economic systems. |
| 3. | Adequate Scope | Geographical scope and Time horizon. |
| 4. | Framework and Indicators | Standardized measurement for comparability. |
| 5. | Transparency | Disclose, explain methods and data. |
| 6. | Effective Communication | Clarity in details. |
| 7. | Broad Participation | Engage and Reflect views of public. |
| 8. | Continuity and Capacity | Adequate response to change. |

Figure 2 – The New BellagioSTAMP Principles

The questions of validity and applicability as per a study¹⁷ of i) How well do existing assessment frameworks align with the BellagioSTAMP? ii) Can the BellagioSTAMP be adopted as a global methodological framework for sustainability assessment at the neighbourhood scale showcased:

- *Need for proper design standards:* Definition for systems, criteria, indicators to assess neighbourhood are yet to evolve as per BellagioSTAMP principles vision, essential considerations, transparency and participation.
- *Conflict in addressing the objectives:* Non- involvement of the stakeholders and ineffective communication in the review and update of the existing assessment frameworks, missed the crucial links to capture and assess local values, perceptions and aspirations.
- *Non-uniformity in measurement units and impact assessment:* Lack of robust scoping mechanisms for assessment and improper consideration for evaluation to measure the performance.

The BellagioSTAMP provided an efficient and holistic analytical framework for reviewing the assessment tools. While the context specificity of sustainability has well been argued in literature, the *transferability of existing frameworks is unrealistic*.¹⁷

SA (Sustainability assessment) is often considered as an ex-ante process aimed to predict future outcomes. However, the distinction between ex-ante (assessment) and ex-post (evaluation) is not always made¹⁸ and with limitations in the assessment procedure renders ambiguous measurement.

3. Why SENSE?

Sustainability is about decisions we make now and how they impact upon the present and future generations. In the development of any plan it is logical to consider the future world within which planning will have to operate.¹⁹

SA being '*value laden*' and of '*political character* in nature²⁰ raises the concerns of transparency, broad consideration and participation, scope framing for ex-ante and ex-post processes to identify and assess the goals and indicators making it difficult to have a standard identification and measurement structure for comprehending the holistic aspects of SD and the growing concerns of the day.

Although SA is an element in the decision-making process, its variability counteracts it to be *the only 'supporting tool'*²⁰ for DMS as the vital sustainability aspects of *interaction* and *integration* aren't being sufficiently configured. *Confining the capability to effective strategy and analysis*, laying an insufficient path that will not be able to steer sustainability transition.

Also it is crucial to understand that *actions once performed cannot be reversed or retrieved* if the outcomes don't turn out to be positive impacts. Accepting that time lost and uncertainties are inevitable, it is *imperative to act on the current unsustainable situation*.

Essentially, perceiving the need to have a robust decision-making strategy as a strong foundation that understands and analyses the problem/s and needed positive impacts, decides on the right solution/s, guides the actions and provides for correct evaluation indicators towards sustainability transition - the crux of SENSE.

4. SENSE

'Sustainability must be made operational in each specific context (e.g. forestry, agriculture), at scales relevant for its achievement, and appropriate methods must be designed for its long-term measurement'.¹⁹

Sustainability from an '*action-guiding power*' into an '*action-generating concept*'¹⁸ of *implementable sustainable actions* is the *basic idea of SENSE with principles of Systems thinking and Decision-centric approaches*²¹.

Systems thinking expands awareness, involves a comprehensive understanding of the mechanisms and feedback effects of interrelated parts or subsystems of a whole system that work together in either a coordinated or uncoordinated fashion to perform a function or decide on a solution.

From an operational perspective, *applying systems thinking to sustainability provides a rigorous way to analyse the potential consequences of human intervention at every stage. It helps reveal how every action taken affects the environment or how impacts on one system can affect others and the larger whole*.²²

Decision-centric approach allows to make informed decisions by putting together and explicitly defining all the required elements for the decision/s to be made. Today, it's the key for innovative and in moment decisions in organizations.

SENSE constructs DMS, Figure 3 as *Strategy and Processes towards decision/s with systemic enquiry and systematic actions*, the key to understand and analyse the situation/s as a whole system (includes internal and external factors that affect the system) for defining - the SD objectives, choices which will be positive impacts for the larger good and deciding on the right solution/s for performing sustainable actions.

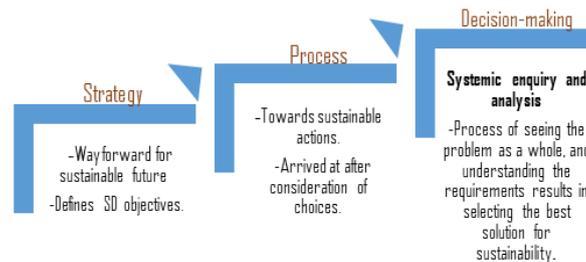


Figure 3 – SENSE DMS Construct

*‘The transition of oneself from an observer of a reality which is considered to be outside oneself [e.g. the traditional role of the scientist] to a participant in the same reality, and then towards being a co-creator of that reality, requires fundamental cognitive and emotional orientation’.*¹⁹

4.1 Strategy

Applying decision-centric approach for DMS by leveraging the *four sustainability principles*⁷ as *rules*, the *Six dimensions*⁷/*5Ps*⁴ of sustainability as *processes* that need to be followed or adhered to by addressing the *three decision-making challenges*¹⁸ to define the data parameters with *people being the drivers of sustainable actions*, fulfils the necessary pre-requisites or checkpoints as a *foundation* to take the *right decisions for sustainability transition*, shown in Figure 4 below;

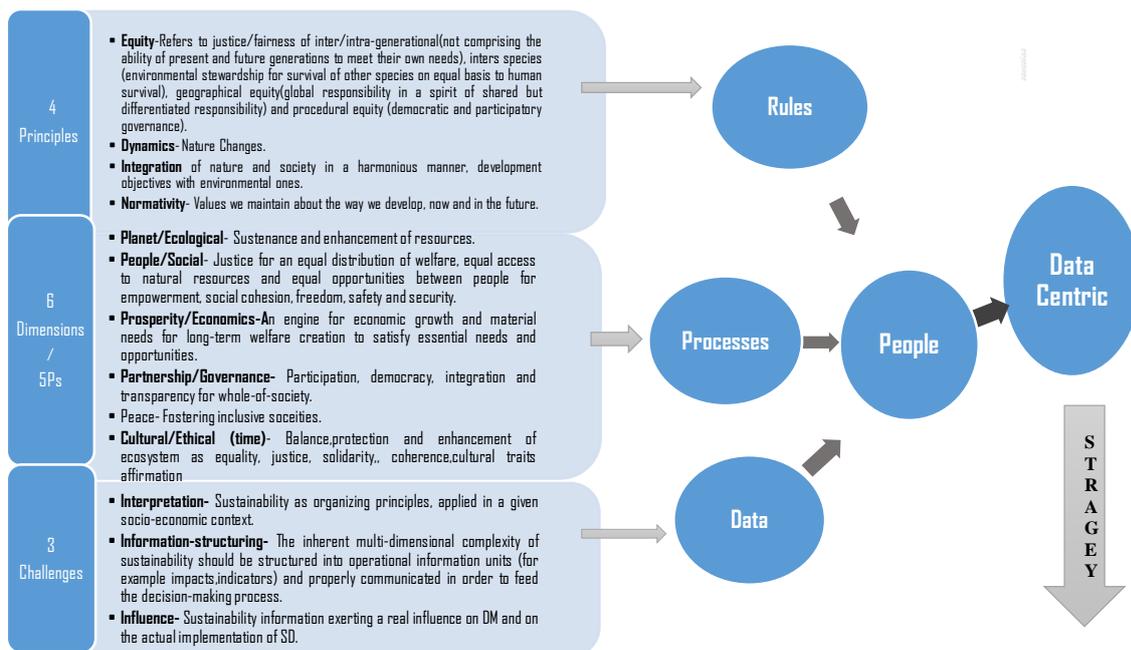


Figure 4 – SENSE Strategy

4.2 Processes

Systems and decision-centric processes go hand in hand. The *Strategy*, Figure 4 feeds *Systemic approach-The Design*²³, Figure 5 as depicted below and helps analyse the *processes* - *Problem-framing* that contributes to the *Solution-oriented* which seeks and analyses for the present and future needs and decides on the required sustainable action/s for *Implementation* followed by the *Evaluation* for impact assessment as a *holistic approach* towards SD.

Every stage of the systems approach is linked and iterative, best understood and carried out by systemic model Logical framework or *Logframe* (LF)²⁴ - widely used for development and social projects as systemic thinking descriptive and analytical project handling framework that helps strengthen project design, implementation and evaluation.

As a series of connected propositions- LF, Figure 5 reflects *SENSE Strategy and Processes* as a *one-page summary* by presenting *key information* in a *systematic way* towards effecting *sustainability transition*.

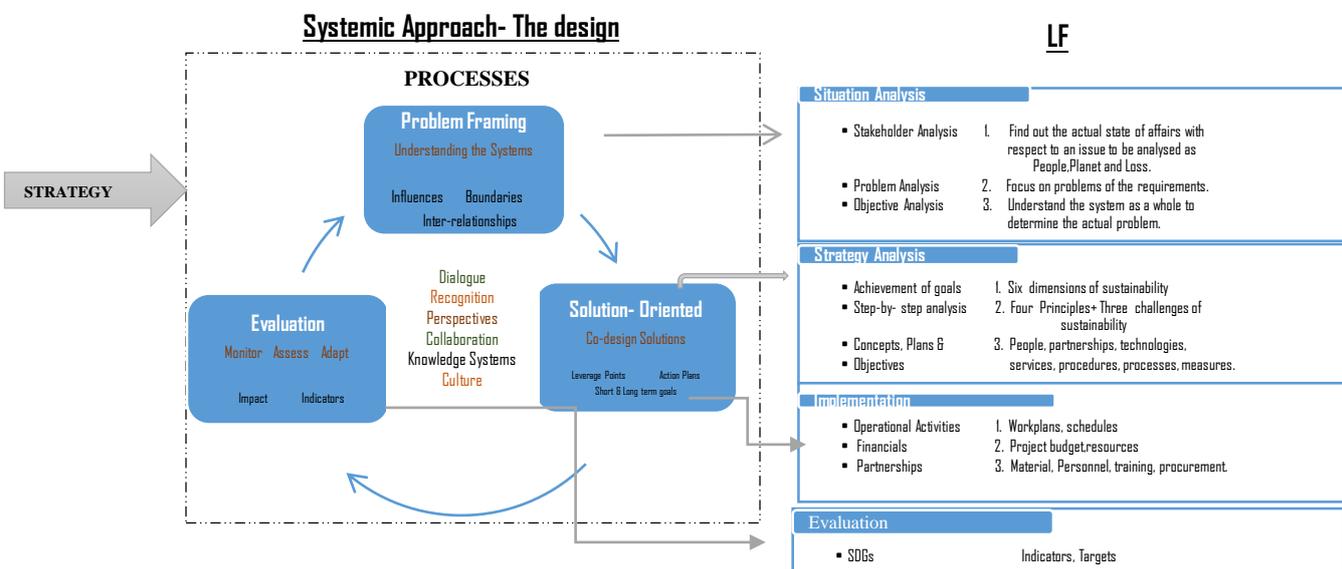


Figure 5 - SENSE Processes

5. SENSE: Action-Framework and Methodology

Systemic Enquiry, Norm for Sustainable Equity purpose is of an *Enabler* for *Sustainable Development* as *prime* for a *just society* whose core lies in the *protection and enhancement of the larger good* (*Planet species and resources*).

SENSE as a *holistic approach* for *sustainability* is a *Systemic Decision-Centric* decision-making, implementation and evaluation (ex-ante and ex-post) *Action-Framework and Methodology*. Its basic aim is to understand, analyse, assess, map and strategize the best practical decision/s or solution/s to zero-on the actions for *sustainability transition*.

It allows to break down the complexity for *SDGs* with *systemic enquiry* systematically. Any concern/subject/theme at the individual, corporation/institution, policy, local, national and international level can seek *sustainability transition* by *logging into SENSE*.

SENSE as a *one-page action summary* conveys the required sustainable actions to be performed and evaluated for SDGs²⁵ as represented below in Figure 6.

SENSE (Systemic Enquiry, Norm for Sustainable Equity)

| | | | | | | | | | |
|-------------|-----------|--|---|--|---|--|---|--|--|
| FRAMEWORK | STRATEGY | Theme: Subject of concern | | Need: 3P | Vision: Sustainable Growth | | | | |
| | PROCESSES | Phases | Status-Quo | Sustainable Outset | Nature's Rhythm | Action Plan | | Implementation | Evaluation |
| | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| | | Problem Identification | Ill-Effects | Positive Impact | Solution/s | Short Term (6m) | Long Term (6m-2yrs) | Organizational Support | SDG Mapping |
| | | Subject of concern; Status,Facts, Requirements. | Internal and external problems for subject of concern. | 6 Dimensions/5Ps for sustainability transition. | Sustainable practices that can implement 6 dimensions/5Ps. | Changes in actions towards sustainable actions. | Sustainable actions as a norm. | Systems/ Stakeholder Identification Finances | Targets/ Indicators |
| METHODOLOGY | | <p>Introduction</p> <p>Comparative analysis of the best vs followed present scenario, practises. (Local focus)</p> <p>Requirements for the theme to be presented with output analysis for best and present practices. Finance being constant.</p> | <p>People Well-being insecurities.</p> <p>Planet Bad effects on climate and species.</p> <p>Loss Unexpected problems. Financial concerns internal/external influences.</p> | <p>People/Social Welfare and Justice.</p> <p>Planet/Ecological Enhancement and Sustenance of resources.</p> <p>Prosperity/Economics Economic growth.</p> <p>Peace Fosters inclusiveness.</p> <p>Partnership/ Institutional/Governance Whole-of Society.</p> <p>Ethical(Time)/Cultural Balance, Protection, enhancement of ecosystem and culture.</p> | <p>Solution/s</p> <p>Value Proposition</p> <p>Articulate/ Define solution/s</p> | <p>Risk Diversification</p> <p>-Remedial steps to counteract problems of the present practices with immediate effect.</p> <p>Value Provision</p> <p>-Immediate solutions for betterment towards 6 dimensions/5Ps</p> | <p>Sound Practices</p> <p>Towards a fully developed sustainable model for solution/s as per Nature's Rhythm phase.</p> | <p>List the concerned to work and team up with.</p> <p>Financials</p> <p>Budget Allocation</p> <p>Financial Projections (3 years as safety net)</p> | <p>List SDGs as per Sustainable outset impacts with indicators.</p> <p>Their present status for the concern.</p> <p>Target of the indicators presented as per SDGs.</p> |

Figure 6 – SENSE Action Framework and Methodology

5.1 SENSE: Action- Framework

The Framework in Figure 6 above refers to the *Strategy and Processes that leads to holistic actions for sustainability.*

With Sustainable growth as the vision, prime criteria being for the larger good and understanding the concern as a whole sets the strategy for SDGs.

Scoped for SDG12 with the 17 SDGs indicators as both the evaluation and/or scoping benchmark²⁵ seeks realistic aspects for holistic impact and on-ground performance through systemic enquiry and analysis as depicted in Strategy, Figure 4 and Processes, Figure 5.

The lean process (identify, understand, analyse) works for continuous betterment in every phase and passes through each with improvements as an iterative process that allows to decide the solution/s for sustainability.

5.2 SENSE: Methodology

SENSE Methodology depicted in Figure 6 is a *step-step by process* from Strategy to Processes towards sustainability transition.

SENSE → Informed decisions with Systemic Enquiry and Analysis/Assessment + Implementation of Sustainable Actions + Evaluation → **Sustainability transition** → **SD**

Both, Framework and Methodology of Figure 6 are explained in detail below;

- **Theme** states the *subject of the concern* by the user that would impact different SDGs, which could be:
 - A *whole system*. Examples: Agriculture, Sustainable Transportation, Energy Systems.
 - One of the *requirements* of the system. Examples: Water, fertilizer for agriculture, Electric Vehicles for public transportation, Renewable Lighting, sustainable procurement of raw-material/s for a product.
 - One or more of the *17 SDGs*^{4,25} their specific target/s or indicator/s like Child Mortality Rate, Reduction of CO2 emissions.
- **Need** defines the theme /subject of concern by addressing the *3Ps* (People, Planet and Profit) as *validity towards sustainability*.
- **Vision** defines for *sustainable growth* of the subject/theme.

If the need doesn't tick for 3Ps and vision isn't for sustainable growth, then the theme in contention isn't an option that seeks sustainability and is to be reconsidered.

Examples: War as a solution to curtail or gain something is a loss to the 3Ps and doesn't tick to move ahead but negotiation does, increasing production or usage of pesticides doesn't but natural fertilizers for soil fertility and climate protection does, soft drinks for taste does not but tasty fortified drinks for health and sustainable consumption does, Financial products only for consumption don't but for increasing consumption and production cycle that empowers people towards sustainable growth will tick for 3Ps.

Once the Theme is set it progresses from *design* through *plan* to *implementation* and *evaluation* defined as *six phases* - *Status-Quo, Sustainable Outset, Nature's Rhythm, Action Plan, Implementation* and *Evaluation*; divided into *8 Processes* *Problem Identification, Ill-Effects, Positive Impact with Six Dimensions/5Ps, Solution/s, Short Term (6 months), Long Term(6months-2years), Organizational Support* and *Financials* and *SDG Mapping*.

The *first phase* **Status-quo** pursues to analyse the problem/s in 1st and 2nd Processes.

1. **Problem identification**/1st Process introduces the theme, depicts facts of the present situation, compares with the best practices from across the world with focus for local adaptation in real numbers/data/images to the possible extent. Most importantly, *defining the requirements* and *influences* which makes up the theme allows for holistic scoping. Examples: Raw materials, incidents/scenarios. These requirements with Finance being the constant will be the drivers that give a clear cut understanding of where the actual problem lies and what needs to be done towards sustainability. Data, facts and figures are to be gathered from respective authentic sources - World bank, OECD, sdgracker²⁶, news and on-field surveys, reports. In case of no available data, requirements defined will allow to track the problem.

2. **III-Effects/2nd Process** identifies and articulates the problems for present practices as **People facing well-being insecurities** like unsecured job/income, health problems, lack of education; **Planet** and species disturbed due to climate change, strain on resources and **Loss** faced due to bad practices and unexpected incidents. Enlisting them accordingly gives the actual reality of the status that needs to change.
3. Once the *III-effects* have been identified, the *second phase* seeks for the **Sustainable Outset/3rd Process** where *positive impacts* are to be listed as per the **Six dimensions of sustainability/5Ps** (refer Figure 4 and 6 for explanation) based on local needs/necessities for the larger good and those that are reverse or opposite to *III-Effects*. These needed and required impacts would chalk out the best solutions for sustainability transition.

Recognising the problems from the requirements, unforeseen circumstances and understanding the needs or positive impacts for Six Dimensions/5Ps lays the foundation for sustainability transition to identify the required sustainability solution.

4. The *third phase Nature's Rhythm/4th Process* will define the best practical solution/s that can accomplish the *Sustainable Outset* impacts of Six Dimensions/5Ps. Also depicts the *Value Proposition* of the solution/s and articulates the different tasks of the solution/s that need to be implemented for SD. The already implemented best practice elsewhere could be a/or part of possible solution. If there are two or more best practices that could be adapted, a comparison of both will be analysed based on the Six Dimensions/5Ps of sustainability for a better alternative according to the local conditions and situation/s or the solutions could be worked out in collaboration as necessary.

With the to be done sustainable actions enlisted in Nature's Rhythm, the *fourth phase Action Plan* is divided as 5th & 6th Processes;

5. **Short-term/5th Process** are tasks to be accomplished within 6 months' by focussing on **Risk Diversification** where remedial steps are taken to counteract problems of the present practices/*III-Effects* along with **Value Provision** which seeks for immediate solutions towards betterment of *Six Dimensions/5Ps*. These are small changes that can be implemented right away to change the course towards sustainable actions.
6. **Long-term/6th Process** – With 6 months-2 years as the time frame for **Sound Practices** towards a fully developed **sustainable practical model** as per *Nature's Rhythm* solution/s which could be replicated for sustainability transition.
7. Then comes the fifth phase, *Implementation/7th Process* where Organizational/ Stakeholder partnerships and support systems will be identified along with minimum of 3 year financial projections (as safety net) and budget allocation for tasks to be implemented on-ground towards Sustainable Outset Impacts.
8. The final *sixth phase, Evaluation/8th Process* maps to specific SDGs indicators²⁶ according to and by the *Sustainable Outset Six Dimensions/5Ps* impacts. By **specifying/mapping the targets** and the **indicators** of UNSDGs which are the ultimate goals to be achieved and comparing them with present status in real numbers gives the gap or goal that is to be achieved for sustainability, serves as both ex-ante assessment towards setting the goals and ex-post evaluation for outcomes measurement. Examples: SDG indicator 8.1.1 GDP present status is 5.8%, Target is 7%, Gap 1.2% is the goal and actions need to be strategized and directed towards achieving it. If the targets don't have the present data for any indicator, specifying the SDG indicator and marking the present status as 0 and setting a target (helpful as a marker for data & future use) gives the realistic values of impact assessment and evaluation for realizing the goals effectively.

5.3 SENSE: Approaches

Once the *Theme, Need and Vision* which could be SDG specific or a particular concern that would impact SDGs have been defined and ticked to go ahead into the SENSE methodology, there are **3 ways to approach for sustainability in SENSE**, used as needed.

1. **Step-by-step process** from *left to right* as explained in 5.2 SENSE Methodology, Figure 6 and depicted below - to understand the problem/s in 1st and 2nd that helps identify the positive impacts/needs in the 3rd which determines the sustainability solution in the 4th to be chalked out in the 5th,6th for implementation with the 7th and evaluation in 8th. Can be used when problem is not straightforward and needs guidance to find what or where the real issue. Examples: Reduction of agricultural expenses, side effects due to new batch of lifestyle products released into the market.



2. **Goal Oriented:** Starts with the processes 1 and 2 for understanding and analysing *Status-Quo* followed by the 3rd *Sustainable Outset* defining positive impacts as per *SixDimensions of sustainability/5Ps* which would address or map to the 8th *SDG Mapping* to focus on the specific indicators that aims for the 4th *Nature's Rhythm* to zero-on the right solution/s continued by the 5th & 6th *Action-plan for 7th Implementation* as the image below. Good way when the problem and the positive improvements needed are clear. Example: Rainwater harvesting for household water usage, sustainable production of a particular product that needs a strategy to implement.



3. **SDG Specific:** Starts with process 8 *Evaluation* to clearly identify the specific indicator/s which will be the subject of concern followed by 1st & 2nd *Status-Quo* to understand the present problems of the indicator/s for addressing the needed changes as per 3rd/*Sustainable Outset SixDimensions/5Ps* leading to the 4th *Nature's Rhythm* for the sustainable solution/s to be planned in the 5th and 6th *Action Plan* and implemented with 7th. Apt for working towards a specific indicator of SDGs, social work.



6. SENSE Ag (Agriculture)

SENSE Ag depicts how to take charge of transition towards sustainable practices for *Water conservation and reduction of Fertilizer usage for Agriculture, Rice India*.

Water usage for agriculture in India accounts to 80% with Fertilizer/hectare at almost 1500% more than required. It is important to seek *sustainability transition for Rice cultivation, India's staple and highest cultivated crop at more than 50%* to effect some real changes for SD in India as a whole.

SENSE Ag has a concern for the theme but needs clarity and direction for the solution, adopts first of the three approaches for sustainability as a step-by step process from left to right.

SENSE (Systemic Enquiry, Norm for Sustainable Equity)

| Status-Quo | | Sustainable Outset | | Nature's Rhythm | Action Plan | | Implementation | Evaluation | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|--|---|--------------------|------------|-----------------|---------------------|------------------------|----------------|------------|-----------|--|---------|------|-----------------|--------------------------------------|-----------------------|---|--------------|--|-------------|-----|---------------|--------|-------------|-------|-------------------|--------|-------------------------|------------|------------------|-------|---|---|---|--|--|---|-------|-----|-------------------|--------------------|------------|------|---|----------------------|--|--|-------|------|----|-----|------|----|-----|-----|------|-------|-------|----|-------|-----|----|-------|-------|-----|-------|-----|-----|-----|--------|--------|-------|---------|---|-------|-----|-----|-------|------|------|-------|-----|-----|-------|-----|-----|-------|-----|-----|-------|---------|---|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Problem Identification | Ill-Effects | Positive Impact | Solution/s | Short Term (6m) | Long Term (6m-2yrs) | Organizational Support | SDG Mapping | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| <p>1.3bn population, 50%(2018) dependent, contributing to 16% GDP.</p> <p>Rice staple 2nd highest produced @ 20% world rice production.</p> <table border="1"> <tr> <th>Output-t/ha</th> <th>Land%</th> </tr> <tr> <td>W: 4.6</td> <td>30.4</td> </tr> <tr> <td>B:AU: 10</td> <td>47.6</td> </tr> <tr> <td>IN: 3.8</td> <td>60.4</td> </tr> </table> <table border="1"> <tr> <th colspan="2">Practises</th> </tr> <tr> <th>Present</th> <th>Best</th> </tr> <tr> <td>-Water Flooding</td> <td>SRI (System of Rice Intensification)</td> </tr> <tr> <td>-Chemical Fertilizers</td> <td>-High yield, Management of Soil fertility, Weeding, Water Methods</td> </tr> <tr> <th colspan="2">Requirements</th> </tr> <tr> <td>1.Land- 1ha</td> <td>1ha</td> </tr> <tr> <td>2.Yield: 2.6t</td> <td>6t-12t</td> </tr> <tr> <td>3.Seed-50kg</td> <td>7.8kg</td> </tr> <tr> <td>4.Water- 15000ltr</td> <td>600ltr</td> </tr> <tr> <td>5.Fertilizer- 165kgs/ha</td> <td>10.5kgs/Ha</td> </tr> <tr> <td>6.Finance- \$300</td> <td>\$275</td> </tr> </table> <p><small>*W-World B-Best IN-India FAO, 2017</small></p> | Output-t/ha | Land% | W: 4.6 | 30.4 | B:AU: 10 | 47.6 | IN: 3.8 | 60.4 | Practises | | Present | Best | -Water Flooding | SRI (System of Rice Intensification) | -Chemical Fertilizers | -High yield, Management of Soil fertility, Weeding, Water Methods | Requirements | | 1.Land- 1ha | 1ha | 2.Yield: 2.6t | 6t-12t | 3.Seed-50kg | 7.8kg | 4.Water- 15000ltr | 600ltr | 5.Fertilizer- 165kgs/ha | 10.5kgs/Ha | 6.Finance- \$300 | \$275 | <p>People</p> <p>Low output Low quality of food, health and life. Unsecured Future- Poverty trap.</p> <p>Planet</p> <p>Climate Pollution</p> <p>Loss of arable land, soil infertility High water & fertilizer usage. Burning of crop residues</p> <p>Loss</p> <p>High input costs Low value Farmers finance dilemma Bad crop Climate Disasters</p> | <p>People/Social</p> <p>Good quality food. Improved health and well-being. Empowerment for farmers. Fulfilment of basic necessities on own. Equality, safe and secured living.</p> <p>Planet/Ecological</p> <p>Sustaining natural resources: water, soil. Reduced use of chemical fertilizers. Climate pollution reduction Interspecies protection.</p> <p>Prosperity/Economics</p> <p>Income support and increase for farmers. Reduced dependency for basic needs. Economic growth.</p> <p>Peace</p> <p>No conflict for natural resources.</p> <p>Partnership/Institutional/ Governance</p> <p>Whole of society engagement with government support.</p> <p>Ethical (Time)/ Cultural</p> <p>Securing future generation's well-being so that they don't have to struggle for basic needs. Increasing soil fertility.</p> | <p>Sustainable agriculture</p> <p>Involves the production of food, fibre, or other plant or animal products using farming techniques that protect the environment, public health, human communities and animal welfare.</p> <p>Zero budget farming,</p> <p>Precision techniques</p> <p>Farmer finance options</p> <p>Quality Inputs</p> <p>Agricultural marketing & value</p> <p>Waste Management</p> <p>Risk Management</p> | <p>Risk Diversification</p> <p>Technology intervention -Soil test -Water test -Weather information</p> <p>Crop selection /rotation</p> <p>Water storage /Irrigation</p> <p>Drip irrigation</p> <p>Water recycling /reuse</p> <p>Nutrient Management</p> <p>Crop storage facilities</p> <p>Value Provision</p> <p>Finance options</p> <p>Insurance products</p> <p>Minimum support price value for crops.</p> <p>Minimum cost agriculture</p> | <p>Sound Practices</p> <p>Practising eco methods -Fertiliser from agriculture waste locally.</p> <p>Renewable energy for needs.</p> <p>Robust water, fertilizer techniques with Precision farming, zero budget models implementation.</p> | <p>Precision farming education and practical training (NPOs/NGOs).</p> <p>Crop management.</p> <p>Water management.</p> <p>Waste management.</p> <p>Remote Data sensing systems database.</p> <p>Agro facilities - Marketing value - Insurance - Finance</p> <p>Financials</p> <p>Agriculture Budget</p> <table border="1"> <tr> <th>Spend</th> <th>R&D</th> </tr> <tr> <td>Best Malawi 16.4%</td> <td>South Africa 3.06%</td> </tr> <tr> <td>India 5.4%</td> <td>0.3%</td> </tr> </table> <p>Budget increase per hectare.</p> <p>Minimum support price.</p> | Spend | R&D | Best Malawi 16.4% | South Africa 3.06% | India 5.4% | 0.3% | <table border="1"> <thead> <tr> <th colspan="3">SDGs Present Target%</th> </tr> </thead> <tbody> <tr> <td>8.1.1</td> <td>5.8%</td> <td>7%</td> </tr> <tr> <td>8.4</td> <td>3.5%</td> <td>2%</td> </tr> <tr> <td>8.5</td> <td>\$2</td> <td>\$10</td> </tr> <tr> <td>2.1.1</td> <td>15.2%</td> <td>7%</td> </tr> <tr> <td>2.1.2</td> <td>15%</td> <td>7%</td> </tr> <tr> <td>2.2.1</td> <td>38.4%</td> <td>15%</td> </tr> <tr> <td>2.2.2</td> <td>21%</td> <td>10%</td> </tr> <tr> <td>2.3</td> <td>\$1620</td> <td>\$3240</td> </tr> <tr> <td>1.2.1</td> <td>No data</td> <td>-</td> </tr> <tr> <td>1.2.3</td> <td>15%</td> <td>30%</td> </tr> <tr> <td>1.2.1</td> <td>3.5%</td> <td>1.5%</td> </tr> <tr> <td>1.1.1</td> <td>21%</td> <td>10%</td> </tr> <tr> <td>1.2.2</td> <td>29%</td> <td>15%</td> </tr> <tr> <td>1.2.2</td> <td>53%</td> <td>27%</td> </tr> <tr> <td>1.3.1</td> <td>No data</td> <td>-</td> </tr> </tbody> </table> | SDGs Present Target% | | | 8.1.1 | 5.8% | 7% | 8.4 | 3.5% | 2% | 8.5 | \$2 | \$10 | 2.1.1 | 15.2% | 7% | 2.1.2 | 15% | 7% | 2.2.1 | 38.4% | 15% | 2.2.2 | 21% | 10% | 2.3 | \$1620 | \$3240 | 1.2.1 | No data | - | 1.2.3 | 15% | 30% | 1.2.1 | 3.5% | 1.5% | 1.1.1 | 21% | 10% | 1.2.2 | 29% | 15% | 1.2.2 | 53% | 27% | 1.3.1 | No data | - |
| Output-t/ha | Land% | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| W: 4.6 | 30.4 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| B:AU: 10 | 47.6 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| IN: 3.8 | 60.4 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Practises | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Present | Best | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| -Water Flooding | SRI (System of Rice Intensification) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| -Chemical Fertilizers | -High yield, Management of Soil fertility, Weeding, Water Methods | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Requirements | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1.Land- 1ha | 1ha | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 2.Yield: 2.6t | 6t-12t | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 3.Seed-50kg | 7.8kg | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 4.Water- 15000ltr | 600ltr | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 5.Fertilizer- 165kgs/ha | 10.5kgs/Ha | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 6.Finance- \$300 | \$275 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Spend | R&D | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Best Malawi 16.4% | South Africa 3.06% | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| India 5.4% | 0.3% | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| SDGs Present Target% | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 8.1.1 | 5.8% | 7% | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 8.4 | 3.5% | 2% | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 8.5 | \$2 | \$10 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 2.1.1 | 15.2% | 7% | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 2.1.2 | 15% | 7% | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 2.2.1 | 38.4% | 15% | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 2.2.2 | 21% | 10% | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 2.3 | \$1620 | \$3240 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1.2.1 | No data | - | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1.2.3 | 15% | 30% | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1.2.1 | 3.5% | 1.5% | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1.1.1 | 21% | 10% | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1.2.2 | 29% | 15% | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1.2.2 | 53% | 27% | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1.3.1 | No data | - | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

Figure 7 – SENSE Ag

- Water and fertilizer are requirements for agriculture and seeing the problem as a whole for rice cultivation is necessary for effective and holistic solution/s. *Problem Identification* depicts Agriculture stats at a glance for Rice cultivation, India, its requirements followed by the best practices for local adaptation with output analysis as per world standards.

Defining the right data²⁷ is crucial, allows for 2 possible solutions here;

- The already stated best practice SRI could be/one of the required solution/s.
- Else, it would aid in arriving at holistic and effective solution/s. In this case the initial concern was to seek sustainable water and fertilizer usage. Moving across we identified other problems in the *Ill-Effects* related to food quality, health, pollution, income as graver concerns that must be addressed as shown for *SixDimensions/5Ps* in *Sustainable Outset*

leading us to *Nature's Rhythm 'Sustainable Agriculture'* as a holistic solution with different choices to be implemented as per the local necessities which would not only set the right path for sustainability transition of *SDG12- Water and Fertilizer consumption and improve production for quality food* but also *aid other SDGs 8,2,12,1* as seen in the evaluation phase of SDGs indicators.

- SENSE Ag broadly depicts as a policy-making construct with **systemic decision-making process as an intervention for sustainability**. Adding to this it can also be seen that it provides for an individual in this case *farmers*, to see what best practices they could follow for eco-friendly, low cost, low-resource usage, high yield and high-income agriculture, possible to do at their level like crop rotation, SRI techniques.
- From a *corporate/social entrepreneur* perspective SENSE Ag presents the different opportunities like technological services, storage facilities, agricultural marketing and management.
- *NGOs or NPOs* could aid in *awareness and training facilities* of sustainable agriculture techniques, help with the different sources that benefit the farmers and aid the decision-making process with their data inputs.
- SENSE Ag *Financials for agriculture productivity* (Nature's Rhythm tasks implementation) as *budget allocation and income increase support sets both production and consumption cycle- SDG12 boosting other SDGs towards sustainable growth of the country*.
- For whole-of-society the *Evaluation phase*²⁸ would be the same SDGs indicators as shown in SENSE Ag but the present status and target would be entered specifically to their case. At the individual level the *SDG 8 Decent Work and Economic Growth* would be how better are they able to manage on their own for basic necessities to start with for a decent living in numbers it would range from 0 to 1,2,3..., income saved previously vs now, *SDG 3 Good Health & Well-being* as health condition improvements. For businesses (starting from individuals to business vertical wise impacts) indicators will be related to *SDG 12 Efficient management of resources* that would also reflect as increase in *SDG 8 farmer's income*, translating to *SDG 1, 2 No poverty and Zero Hunger*. SENSE Ag depicts *SDG 1.3.1 Population covered by Social Protection Cover* and *12.1 Ten Year framework of programs* as no data at national level but at the individual/local level surveys could help with the information for the present status and act as lead to set the future course of action.
- *Evaluation* of SENSE Ag *Action Plan* will take place at least every 6 months to gauge the short term achievements and for improved performance strategies in future. In case the decision taken is not as effective/needs to be changed/updated due to dynamic changes it once again goes through the SENSE iteration with the old and new inputs for effective analysis and strategies towards the set target/s.

SENSE addresses the limitations reflected in SIA, transferability of The New BellagioSTAMP principles with **systemic decision-centric approach** as a *decision-making Strategy and Processes- prime criteria being for the Larger good as per the SixDimensions/5Ps* and understanding *the situation of the whole system* as the **lever for setting standards** required for **holistic scoping** and **goal-setting, broad participation and fact verification** for **informed reality, correctness** in presenting **indicators and impacts** as **dual-effect check** for sustainability transition and evaluation towards Sustainable Development.

7. Conclusion

Our Common Future¹ carries a precise and concrete sustainability message, which is mostly neglected. The report points out that sustainable development contains two key concepts:

- “The concept of ‘needs’, in particular the essential needs of the world’s poor, to which overriding priority should be given”; and
- “The idea of limitations imposed by the state of technology and social organization on the environment’s ability to meet present and future needs”.

‘It is important as it prioritizes the basic needs of the large number of people living in extreme poverty and argues that failure to meet (basic) human needs and aspirations does not lie with the environmental capabilities to meet these needs—it is not a problem of physical environmental limits or resource availability—but is due to humanity’s social organization and state of technology—or in other words a shortcoming of human decision making’.

Practices such as The New BellagioSTAMP and SIA are being developed and used since the 1990’s but the required changes towards sustainability couldn’t be transferred as needed and expected due to Sustainability Assessment’s value-laden and political nature posing variability and ambiguity - limiting the scope and confining the capability to effective strategy for identification of goals and evaluation indicators, reflected as gaps in analysis and reporting process for sustainability.

Today, it is foremost to understand that *We are one* (Planet species and resources), connected and only when we work in tandem with the ‘*Nature’s Rhythm*’ can we lead and leave a secure life for our and future generations.

With UNSDGs, data and technological advancements, *Onus lies* on the *human power of capabilities* to turn around the negative effects created by human actions with *robust decision-making for transition to sustainable actions*.

Towards the same, SENSE (Systemic Enquiry, Norm for Sustainable Equity) is an Action-Framework and Methodology – a decision-making strategy *that steers sustainability transition*.

SENSE → Informed decisions with Systemic Enquiry and Analysis/Assessment + Implementation of Sustainable Actions + Evaluation → **Sustainability transition** → **SD**

Key aspects of SENSE are that the ‘*Sustainable Outset*’ or the needed *impacts define decision-making for actions that need to be performed towards sustainability* which is half-problem solved as we *work for the real goals from the start and ‘Evaluating the decisions and impacts’ from time to time* allows for much more robustness in the future.

Most important *advantages* of SENSE are *being able to see the whole system* with *Systemic Decision-Centric approach* to take *informed decisions* that not only paves way for *seeking rightful solutions* but also helps to *clearly identify* the roles of the individual, corporations/institutions, governance to *perform sustainable actions* as a *one-page summary* so that the issues could be solved holistically. *SENSE* for the *whole-of-society* at the local, national and international level particularly for *policy-making* will be the *utmost effector* as *effective policy will make sure that everyone acts* producing real impact in a short time setting things right for the larger good.

For real-world practical usage, SENSE will be available as a collaborative web-tool. It enables to work on themes simultaneously and shared easily for effective solutions towards performing sustainable actions - potentially making it as a *norm for Sustainable Equity*.

References

1. [World Commission on Environment and Development: Our Common Future](#), Report, 1987.
2. [The future we want](#), Official document, 2012.
3. [The Millennium Development Goals](#), Report, 2015.
4. UNSDGs 2030, [Transforming Our World](#), 2015.
5. SDG 12, UNSDGs 2030, [Transforming Our World](#), 2015, Goal 12, 19.
6. Waas et al, "[Sustainable Development: A Bird's Eye View](#)", 2011.
7. Waas et al, "[Sustainability Assessment and Indicators: Tools in a Decision-Making Strategy for Sustainable Development](#)", 2014, 2-5.
8. Markard et al, "[Sustainability transitions: An emerging field of research and its prospects](#)", 2011, 2.
9. Aronson, "[Overview of Systems thinking](#)", 1996-8.
10. Hugé, J et al, "[Impact assessment for a sustainable energy future—Reflections and practical experiences](#). [Energy Policy](#), 2011,4.
11. John Ellington, "[Enter the triple bottom line](#)", 1994.
12. Andrew Savitz, [The Summary](#): How Today's Best-Run Companies are Achieving Economic, Social and Environmental Success – and How You Can Too; THE TRIPLEBOTTOM LINE Book,2006.
13. [Sustainability Impact Assessment: Definition, Approaches and Objectives](#), OECD Workshop on Sustainability Assessment Methodologies, 14-15 January 2008, Amsterdam. SIA,
14. [Conducting Sustainability Assessments](#), OECD Publishing, 2008
15. Laedre et al, "[Determining Sustainability Impact indicators](#)", 2013.
16. Pinter, L., "Bellagio STAMP: [3rd World Forum on Measuring the Progress of Societies](#)", 2009.
17. Adewumi et al, "A review of selected neighbourhood sustainability assessment frameworks using the Bellagio STAMP", 2018. DOI: 10.1108/IJBPA-07-2018-0055.
18. Waas et al, "[Sustainability Assessment and Indicators: Tools in a Decision-Making Strategy for Sustainable Development](#)", 2014: 2-5.
19. Simone Bell, & Stephen Morse, Sustainability Indicators, (earthscan, 2nd Edition, 2008).
20. Sala et al, "[A systemic framework for sustainability assessment](#)", 2015.
21. "About Decision-Centric," Aarsh, [The Decision-Centric Approach – What is it and How does it help us?](#), 2018.
22. Systems Thinking, Tools and methods to support decision-making, Sustainability Concepts in Decision-Making: Tools and Approaches for the US Environmental Protection Agency, (National Academies Press,2014),pg 28.
23. Will Allen & Margaret Kilvington, "[An introduction to systems thinking and tools for systems thinking –Talking about and solving real-world challenges together](#)", 2018
24. UNSO, [Logical Framework Analysis](#), 2000
25. Indicators as per [Global indicator framework for the Sustainable Development Goals and targets of the 2030 Agenda for Sustainable Development](#), 2015;
26. Data for requirements and output analysis; [World Bank](#) , [OECD Data](#) , [SDG Tracker](#)
27. Agriculture Stats; [FAOSTAT](#).
28. [Measuring progress towards the Sustainable Development Goals., SDG 12 Indicators real data.](#)