

A Framework for Monitoring and Evaluation of Climate Change Adaptation Interventions

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A Framework for Monitoring and Evaluation of Climate Change Adaptation Interventions

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Abstract

Climate change has become one of the most important global issues of our time, with far-reaching natural, socio-economic, and political impacts. In order to equip the community to deal with the effects of climate changes, various adaptation interventions have been furthered. However, efficacy of these interventions varies in terms of their ability to address specific climate change vulnerabilities of human populations and the natural and economic systems. To understand the efficacy of the interventions towards envisaged climate change results, rigorous monitoring and evaluation of these interventions becomes imperative both for ensuring efficiency, results, cost-effectiveness and sustainability of the interventions. With these considerations, programme logic model can be an appropriate overarching Monitoring & Evaluation Framework. This paper takes programme logic model as the starting point and describes key principles that need to be factored in developing a monitoring and evaluation framework for climate change adaptation projects. The projects draws upon good practices of various adaptation interventions across the globe to propose established guiding principles.

Keywords: Climate Change, Adaptation, Program Logic Model, Monitoring and Evaluation

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Introduction

Global Warming and Climate Change are real. The Stern Report estimates that “if we don't act, the overall costs and risks of climate change will be equivalent to losing at least 5 per cent of global gross domestic product (GDP) each year, now and forever”(Stern 2007). In accordance, the fourth assessment report of Intergovernmental Panel on Climate Change (IPCC) released in 2007 has stated that global warming may have a devastating impact on the climate. These impacts may create challenges on the livelihood generation activities of the world's poorest communities. This may be aggravated by the onslaught of increasing natural disasters like high temperatures, rising sea levels and changing waterfall patterns.

Global regime has planned various efforts for addressing the threats of climate change, categorized as mitigation and adaptation. The projects and efforts which reduce the causes of climate change such as reduction in the GHGs emissions are mitigational efforts. Adaptation is defined as “*Changes in existing policies, practices and investments or the adoption of new policies, practices and investments that support equitable economic development and ensure progress towards the MDGs in the face of climate change and its associated impacts*”(IPCC,2007). An Adaptation Fund has been established by UN which will provide financial assistance to the developing countries in order to cope with the impacts of climate change. Consequently, to establish a possible link between adaptation progress and broader development targets, one possible solution is to map subject areas onto Millennium Development Goals (MDGs).

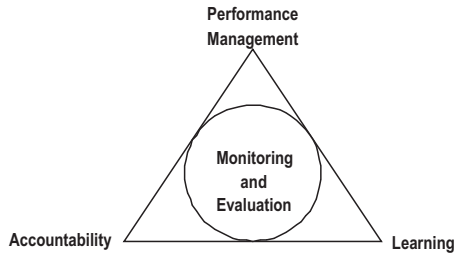
Subsequently, communities have been making preparations in response to variations in climate by using their existing resources and knowledge accumulated in the past years. In this scenario, only indigenous knowledge cannot provide a reliable guide to deal with the potential debacles induced by climate change. Consequently, the efforts to enhance the adaptive capacity and subsequently securing the well-being of vulnerable people will require communities, scientists and policy-makers to join hands and to collaboratively counter the implications of a changing climate along with subsequent reduction in vulnerabilities. This amalgamation needs to be planned in a cost effective manner with an objective to enable people to utilize development opportunities in the context of adaptation and impacts of climate change.

Why Monitoring and Evaluation (M&E) of adaptation Interventions

In climate change context, the first and foremost concern becomes that of assurance of the deliverables. The envisaged results in terms of desired outcomes and impacts should emerge from any adaptation interventions. The task here is to first, continuously track activities, assess deviations and correct course of action; as well ensure that the deliverables are being achieved as desired. Thus, the task here is not more of intervention activity management but more of **performance management**. Whereby requiring managing activities as well as managing on results.

Secondly, climate change is a global phenomenon. Given the scale of the issue and the resources available, it's an ideal case of mismatch. And thus, resources have to be put for the best possible use. More importantly, resource managers need to be **accountable** for the actions and delivery of the results. Thus, accountability assurance in an adaptation intervention becomes an equally weighed concern as is performance management.

Finally, climate change interventions cannot be considered as stand-alone local interventions. With an iterative and experiential approach being adopted in climate change intervention, every intervention is essentially a learning project. What works and what doesn't work, what would work in a given context, how the practices and learning can be factored into design of interventions in different context are the questions that very adaptation in looked up for. Therefore, learning from the interventions becomes crucial in shaping other interventions with similar considerations.



With these considerations, M&E becomes the most critical function of climate change interventions, given the acknowledged and accepted objectives of M&E- **Performance Management, Accountability** and **Learning**. Aligned to the three interrelated objectives, M&E of adaptation interventions becomes quintessential. Such expectations from a climate change adaptation interventions are justified in totality.

Program Logic Model

With the considerations of M&E, the programme logic model presents one such alternative. The Program Logic Model illustrates how program activities will affect change. It graphically creates a roadmap for understanding how program resources are used to implement key strategies and activities and how their implementation contributes to expected short and longer-term outcomes (McCawley). Added to this, the model draws logical linkages among program resources, activities, outputs, audiences and outcomes related to specific problem or situation. The elements of logic model (Wisconsin- Extension) are:

INPUTS: resources, contributions, investments that go into the program.

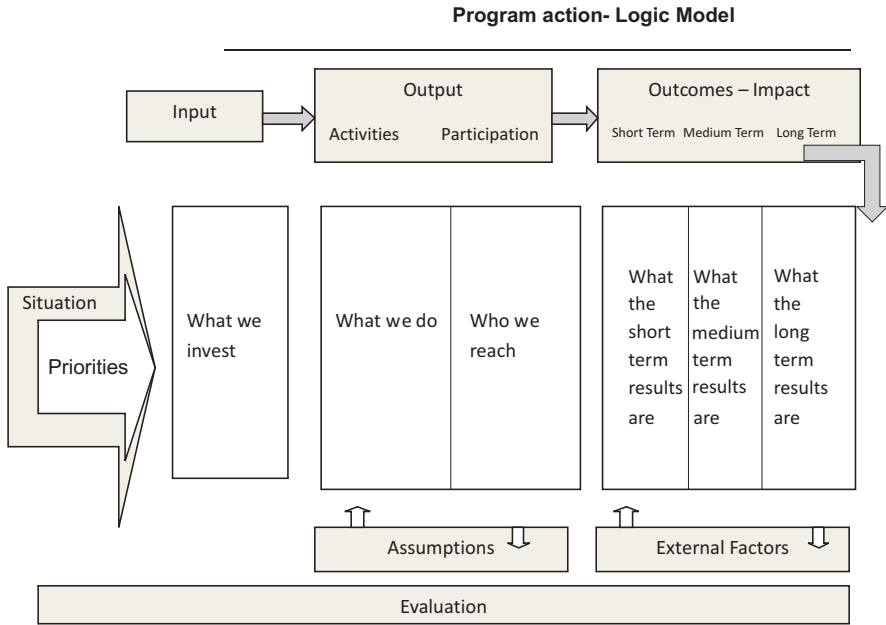
OUTPUTS: activities, services, events and products that reach people who participate or who are targeted.

OUTCOMES: results or changes for individuals, groups, communities, organizations, communities, or systems.

Assumptions: the beliefs we have about the program, the people involved, and the context and the way we think the program will work.

External Factors: the environment in which the program exists includes a variety of external factors that interact with and influence the program action.

Figure 1: Elements of Logic Model



Source:(Taylor-Powell)

For an adaptation project, the intervention logic can be best explained by the logic model.

For example:

Inputs	Process	Results	Outcome	Impact
Money Staff Technology	Soil and water conservation activities	Enhanced agricultural productivity Improved water availability	Improved drought coping capacity	Reduction in poverty

Each of the levels in the hierarchical model is classified by measurable indicators and therefore is ideal for being employed for M&E.

Program Logic Model and M&E

When the programme logic model is employed, all the M&E gets aligned to the model. Further, all the aspects of expectations from M&E in a project gets aligned to the model. The levels of Input-Process-Output become the domain of monitoring; while outcomes and impacts becomes the domain of evaluation.

Inputs	Process	Results	Outcome	Impact
Monitoring			Evaluation	

Further, the model sufficiently addressed all the concerns that are there in assessing efficacy of an adaptation intervention.

Results: Have all the outputs been delivered? What is the achievement in the outcome?

Efficiency: How well the inputs have translated into Outputs?

Effectiveness: How well the outputs have transformed into outcomes

Sustainability: What is the contribution to the impact?

This explains the sufficiency of the programme logic model in addressing M&E questions in adaptation interventions and therefore is framework that may be employed for anchoring M&E function in such interventions.

Principles for adaptation project evaluation

Evaluation of any study for adaptation to climate change fits well with the programme logic model. Different approaches have been adopted for evaluation and to deal with risk and uncertainty. Review of methodology of various studies addressing climate change has helped to embark the issues that need to be addressed to tackle the challenges. It provides information to improve decision making during evaluation of projects. Based on the review the following principles get underscored as key principles guiding evaluation of adaptation projects:

Technology: The use of GIS and Remote Sensing has become widely acceptable and important in projects related to coastal zone management, water resource management, disaster management and natural resource management projects. GIS technologies needs to be embraced in various activities like site selection, monitoring and to determine the amount of time gap between when changes take place and when results can be seen and also to gauge the effectiveness of the project.

Role of technology in evaluation of climate change adaptation project gets highlighted by the study conducted for evaluation of “Water Quality Objectives for Santa Ana Basin Water bodies Study” to integrate basin wide watershed planning and water quality program management efforts with the regional board and work plan (Force, Wolosoff, Don, Dan, & Tracy). The study employed GIS and other tools to describe spatial relationships between the past thirty year's data and surrounding features. In addition, MS Access was used to assess compliance by comparing actual data with the established recreation (REC-1) for one key indicator, fecal coliform and for future indicator i.e. Escherichia Coli. These fields helped in symbolizing sampling locations in the GIS model. Thus, the approach helped in highlighting factors which were responsible for disproportionate occurrence of exceedences of water quality objectives for bacteria and rainfall data accounted for spatial variability. It could then reason out that high priority to water management is essential to adapt to climate-induced changes in water sector for sustainable development. In other words, “Water is the eye of the climate management storm” (IPCC, 2007) which can be managed with the use of technology.

Innovative: The project should use some innovative tools to make the project stronger. Two studies have incorporated UNDP Vulnerability Reduction Assessment Scorecard as tracking tool (UNDP, A Guide to Vulnerability Reduction Assessment) and participatory and experimental M&E provisions. As evaluation of adaptation is a relatively new field with few precedents. Innovations would facilitate experimentation and iterations such that new methodologies could be evolved.

Attribution: Climate change risks and impacts from those associated with stresses or drivers are difficult to decouple. Narrative information along with mix of Quantitative and Qualitative indicators can help in linking projects to social or institutional processes. This helps in making improvements in policymaking, planning and in estimating the institutional and human capacity that support adaptation to climate change. Thus, it is quintessential to attribute the observed results to the adaptation intervention thereby explaining and validating the cause-effect relationship.

Attribution as a key principle of adaptation evaluation gets underlined in the study conducted by Vattenfall on evaluation of “Impact of North American buildings on environment” to show sustainable construction could be a fast, cheap path to cutting global carbon emissions(Cooperation). It has been accounted here that insulation, water heating, and lighting system in buildings is three of the top five solutions to abate CO₂ at marginal cost. The study also shows that a wholesale change in the building industry could reduce North American CO₂ emissions to pre-1990 levels. Thus, use of renewable technologies including small hydro, wind, cogeneration from biomass technologies, solar and geothermal is the need of hour and lot more is to be done by individuals to ensure a safe future. In addition to this, engineers need to work with municipal planners and infrastructure asset managers to determine appropriate levels of services that anticipate climate change impacts to precisely determine the cause of climate change.

Effective: The evaluation of the intervention should be effective in comprehensively answering all the key questions in an evaluation. A good balance of indicators of process, outputs, outcomes and impact needs is requisite maintained; as well as indicators that cover the evaluative criteria of coverage, effectiveness, sustainability and replication.

Review of standard framework of public health (America, Public Health Functions Steering Committee, 1994), highlighting the 10 essential services of health demonstrates the use of effective indicators. In this framework, the services been highlighted are: (1)monitoring health status to identify and solve community health problems; (2) diagnose and investigate health problems and health hazards in the community ; (3)inform, educate and empower people about health problems; (4)develop policies and plans that support individual and community health efforts; (5)enforce laws and regulations that protect health and ensure safety; (6)link people to needed personal health services and ensure the provision of health care when otherwise unavailable; (7)ensure competent public and personal health care workforce; (8)evaluate effectiveness, accessibility and quality of personal and population based health services; (9)research for new insights and (10)innovative solutions to health problems. Since, climate change has become a certainty, so the projects need effective indicators to anticipate, manage, and ameliorate the health burdens it will impose.

Baseline Assessment: While assessing change, knowing the reference point is very important. Here the first consideration is to what is the quantum of change and therefore along with the 'after' values, 'before values' are required. In absence of baselines, it is very difficult to delineate the quantum of change incidental to the adaptation intervention. Baselines are thus very critical with adaptation to understand the change taken place due to implementation of project.

Incorporation of this issue had been practiced in a study on “Impacts of Climate Change on Chinese Agriculture” (Edra L Ju Hui, 2005). It sought to understand how climate change will affect agriculture in rural China. Phase I (2001–2004) of this examined the impact of climate change on crop yields. Phase II (2005–2008) built on this work to investigate the impacts of climate change on national cereal production and the cereal quantities available to each person in China. Here, Ningxia's agricultural development goals were identified as the adaptation goals taking into account agricultural features and farmers' sources of income. These were kept same in both the phases to depict the change occurred. Also, different stakeholders have different perspectives and knowledge of adaptation options – some focus on policy and others on technical responses. For this study the adaptation options were classified as 'structural', 'non-structural' and 'high level policy'. The options were then prioritized in terms of cost-effectiveness, practical considerations, adaptive flexibility and knowledge. The next step involved implementation and demonstration. Therefore, the process used to develop framework and strategy for Ningxia seeks to adapt to the effects of climate change.

Normalization: The project's results must not necessarily assess the impact by comparing loss or damage before and after adaptation. Instead results must be assessed against changing hazard profiles. This has been showcased in “Impact Assessment Study of the Orissa Disaster Management Project” involving use of Randomized Control Trial (Lorna Victora, 9-18 December, 2002) . Here, the methodology involved selection of 5 Gram Panchayats (GP) and one control GP to compare disaster preparedness activities without project interventions. This was followed with discussions with the community and implementing agency along with review of documents. Apart from this, the team also observed the preparedness and mitigation activities such as (1) the Disaster Information Center, (2) training of HAM radio volunteers, (3) construction of earthen mounds, (4) mock drills, (5) computer training, (6) safe but cost-saving building construction, and (7) technology demonstration units. Further, discussions on operational issues, opportunities and constraints in sustainability were done. This methodology thus ensured formulation of response plan for emergency situations and did not assess the loss or damage because of the interventions undertaken.

Quantification: To ensure effective M&E, quantification of indicators is essential and appropriate targets should be set. Where quantified data are not available, qualitative data should be used. In principle, all indicators presented as part of the common M&E framework are quantifiable. Quantified targets are indicative estimates, based on past experience and expert judgment. A standard approach is to use benchmarks established in past programme reporting, evaluation and studies. These indicators should be used appropriately in the right context than limiting the information they provide.

SMART Criteria: The indicators should comply fully with the SMART criteria (specific, measurable, achievable and attributable, relevant and realistic, time-bound, timely, track able and targeted).

Conclusion

Climate Change will result within this century in unacceptable adverse impacts globally, especially on poor developing countries. Efficient policies and programmes can thus be designed that would protect the communities from climate risks and enhance livelihoods as well. This calls for development of robust M&E frameworks for the projects as well rigorous implementation of M&E functions. Given the concerns of performance management, accountability and learning associated with the climate change interventions, programme logic model offers one such alternative. By employing programme logic model as M&E framework, the concerns of results, efficiency, effectiveness and sustainability can be sufficiently addressed. Further, development of M&E systems and protocols in climate change adaptation needs to factor in technology, innovation, attribution, effectiveness, baseline referencing, normalization, quantification and SMART criteria as guiding principles. These would be of critical importance in strengthening the resilience of communities affected by climate change in areas such as agriculture, forests, water; each with its own challenges and multiplicity of factors. Furthermore, the framework would be capable of dealing with ever-changing circumstances; and can cope with ever changing climate characterized by seasonal, inter-annual and periodic variability, by focusing on robustness and flexibility of solutions.

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