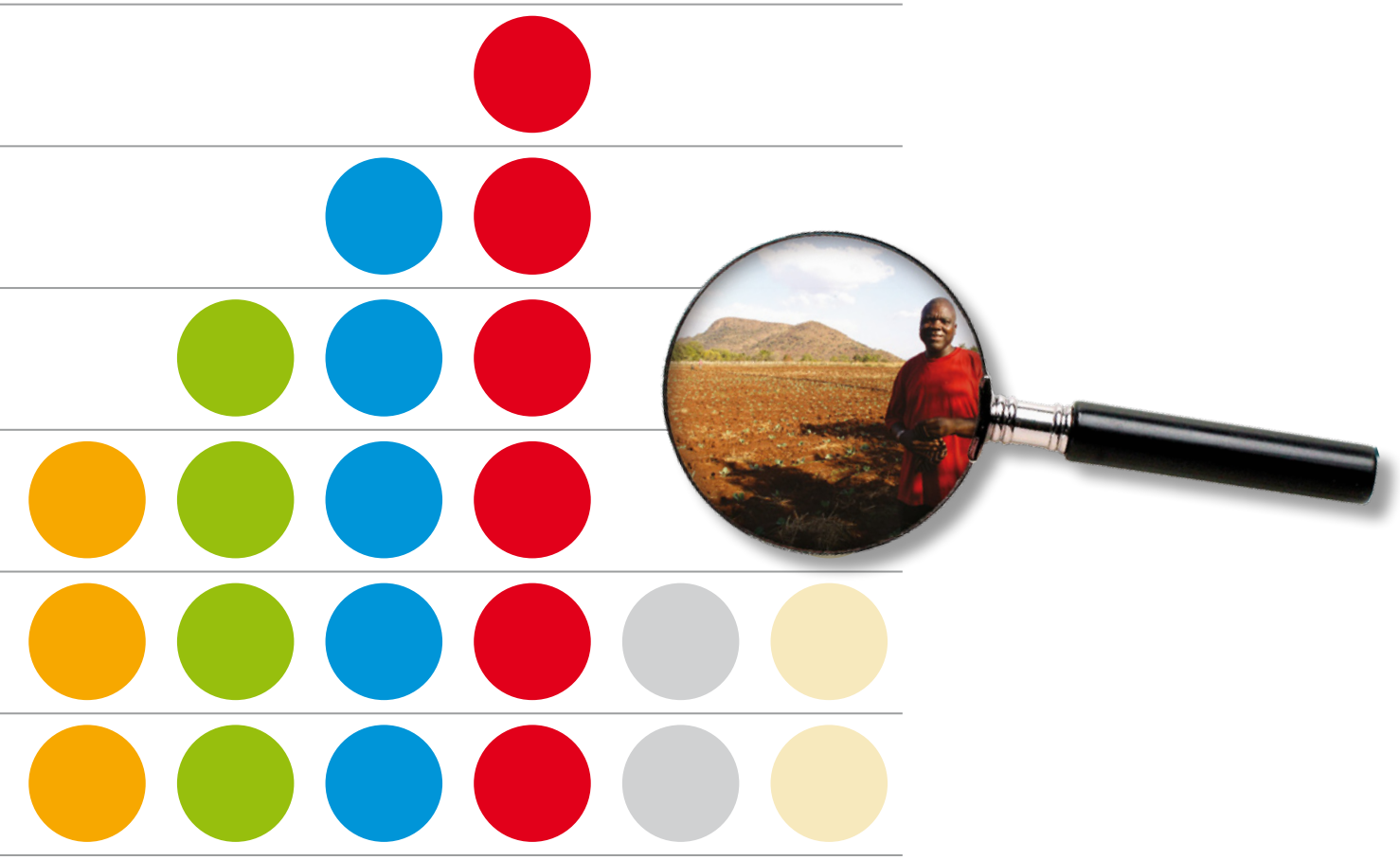

Making Adaptation Count

Concepts and Options for Monitoring and Evaluation of Climate Change Adaptation

giz

On behalf of BMZ Federal Ministry for Economic Cooperation and Development

WORLD RESOURCES INSTITUTE

Imprint

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Foreword

Adapting to climate change is no longer an option. It is a necessity. Examples can be found around the globe.

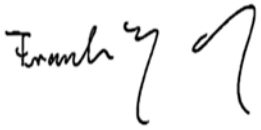
In recent years, erratic rainfall patterns in Sub-Saharan Africa have contributed to massive food shortages of key grains, such as maize and rice. Mongolia has faced steadily rising average temperatures for 50 years, which has contributed to warming permafrost and melting glaciers. Water tables have shifted as a result, threatening the pastoral livestock sector upon which half of Mongolia's population depends. In the Caribbean Sea, rising sea levels, combined with ongoing environmental pressures, are projected to accelerate erosion and coastal flooding in small-island and low-lying states. Developing country governments and those communities most vulnerable to the effects of climate change and variability will require considerable financial and technical support to achieve development goals under such circumstances.

Fortunately, adaptation efforts have evolved significantly in recent years. Alongside growing political recognition, a wealth of new experience in implementation has been gained. While much remains to be learned in terms of what constitutes successful adaptation, the time has come to consider seriously how to most effectively use available funding.

Monitoring and evaluation (M&E) systems have a critical role to play as stakeholders seek to ensure that their investments are effective in building climate resilience. How do we account for success and learn from failures as we confront the complexities and uncertainties of climate change adaptation? How do we know when we are reducing climate risks? To what extent are we succeeding, and who is benefitting?

Aimed at development practitioners and decision makers, this publication offers a roadmap for designing M&E systems for climate change adaptation that help fulfill core principles of aid effectiveness. It brings together the latest thinking on adaptation and practical experiences from development cooperation, building on the work of the World Resources Institute (WRI), as well as the Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH on behalf of the German Federal Ministry for Economic Cooperation and Development (BMZ). It argues that M&E systems need to enable results-based management, promote flexibility, and support iterative learning as the world grapples with the uncertainties of climate change impacts. Achieving these goals requires development practitioners to carefully articulate their adaptation objectives, clarify the basis for their project design, and make transparent their assumptions regarding, for example, climatic, social and economic factors that may influence the project's ability to help vulnerable people thrive in a changing climate. With this foundation, project managers can then select indicators and build information systems that are able to track adaptation success. This publication outlines a six-step sequence to support this process.

We hope this publication will foster dialogue and be a useful contribution toward answering the urgent challenge of making global adaptation efforts as effective as possible.



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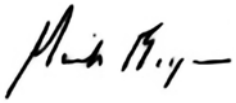


Manish Bapna
Acting President, World Resources Institute (WRI)

Executive Summary

Adaptation, Development, and Monitoring and Evaluation

The impacts of climate change increasingly threaten the achievement of poverty reduction and other development objectives, including the 2015 Millennium Development Goals (MDG). Research suggests that impacts over the course of the 21st century, if unaddressed, could cause a 5–10 percent loss in global gross domestic product (GDP), with poor countries' wealth declining in excess of 10 percent.[1] Even more significant are the potential threats to human security – reduced agricultural production, heightened water scarcity, exposure to droughts, floods, storms, and diseases.[2]

As developing country governments and their international partners grow increasingly aware of these threats, they are turning to options for adapting to climate change in the development context. However, the national, sectoral, and project-based adaptation plans and policies now emerging are largely in their infancy and relatively untested. Monitoring and evaluation (M&E) of such initiatives, as they are implemented across the developing world, will be critically important for judging their effectiveness and making decisions on which efforts to scale up as climate impacts intensify. Industrialized countries and donor agencies channeling billions of dollars into adaptation finance, including under the auspices of the United Nations Framework Convention on Climate Change (UNFCCC), will require such systems as an important dimension to the adaptation initiatives they support.

About This Publication

This paper aims to provide adaptation and development practitioners with a practical framework for developing M&E systems that can track the success and failure of adaptation initiatives in the development context. It is based upon a series of convenings, case studies, and interviews conducted by the World Resources Institute (WRI) in collaboration with the Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH, with financial support from the German Federal Ministry for Economic Cooperation and Development (BMZ). In particular, the authors reviewed M&E systems in the planning and implementation stages for several relevant GIZ and Kreditanstalt für Wiederaufbau Bankengruppe (KfW or German Development Bank) natural resource management and adaptation projects in India.

We expect adaptation M&E practice will evolve substantially in the years ahead. We offer this guidance in the hope that capturing early lessons in adaptation can propel future successful efforts. This paper addresses the planning, design, and early implementation stages of adaptation interventions. The key framework can also serve as a basis for funders and their partners to develop or analyse programmatic agendas, formulate evaluation questions, or supplement guidance on M&E in a specific sector or thematic area.

The core principles presented in this report center around the importance of M&E as a tool to shape successful adaptation efforts. We also recognize, however, that M&E can serve other useful purposes. For example, it can help identify positive synergies between efforts towards adaptation and other objectives, such as economic growth or climate change mitigation.

The guidance presented here is limited to the scope of our research and consultations and has not yet been substantially tested in the field. Practitioners will undoubtedly need to adjust their use of this paper to the unique needs of specific interventions, and to existing M&E systems and management standards. Furthermore, analysis of adaptation strategies and efforts beyond the intervention level are largely beyond the scope of this paper. Very different methodologies may be needed to assess, for example, large-scale, countrywide adaptation strategies, or sector-wide adaptation efforts. Finally, as practitioners, governments, and other development cooperation partners progress in this emerging field, much remains to be tested and learned about "what works" in adaptation and how to measure it.

Summary of Key Findings

This report consists of four chapters designed to provide a roadmap for adaptation and development practitioners on how to design and implement project-level monitoring and evaluation systems. The key content of each chapter is summarized below.

1 Stern 2006.
2 UNDP 2008a.

Chapter 1: The Role of M&E in Adaptation

The report first highlights the importance of M&E for improving adaptation in a developing country context and identifies several core concepts that characterize how M&E for adaptation differs from M&E for other aims:

- No one set of adaptation indicators or single type of M&E system will work for all adaptation interventions. Indicators must be chosen based on the relationship between planned adaptation activities and the socio-economic, environmental and climatic context in which they will be implemented.
- M&E systems play two critical roles in ensuring effective adaptation: they support the long-term process of learning "what works" in adaptation and they provide a tool for practitioners to manage their work in the context of the uncertainty surrounding climate change impacts.
- Practitioners encounter many challenges in designing and using M&E systems for adaptation, including achieving results in both long and short timeframes, and dealing with the cross-sectoral nature of adaptation interventions.
- Competing priorities for how to use M&E can create tensions that practitioners must face in order to design effective M&E systems for adaptation. These include whether M&E supports bottom-up or top-down decision-making, and whether M&E as a tool for learning can be reconciled with its role in supporting accountability.

Chapter 2: Lessons from Early Adaptation Efforts

Chapter 2 explores lessons learned for M&E from early adaptation efforts in the developing world, and identifies an emerging set of principles for adaptation M&E. These provide the foundation for the step-by-step approach we then propose in Chapter 3 for establishing an M&E system.

- Adaptation in the development context can be broadly categorized by three types of efforts – community-based adaptation, program and project-based adaptation, and national policy initiatives. These areas have evolved separately to meet specific needs, and each requires M&E systems tailored to meet those needs.
- Broad early lessons on the use of M&E for adaptation can be seen across the types of adaptation efforts noted above. First, defining adaptation success requires consideration of the context in which adaptation activities occur. Second, a diversity of inputs – including information and participants – contributes to successful adaptation M&E systems. Third, tracking assumptions is an important component of M&E systems for adaptation, in order to contend with the uncertainties associated with climate change.
- Three principles underpin effective M&E systems for adaptation interventions: design for learning; manage for results; and maintain flexibility in the face of uncertainty.

Figure ES1. Building on Early Lessons in Adaptation M&E

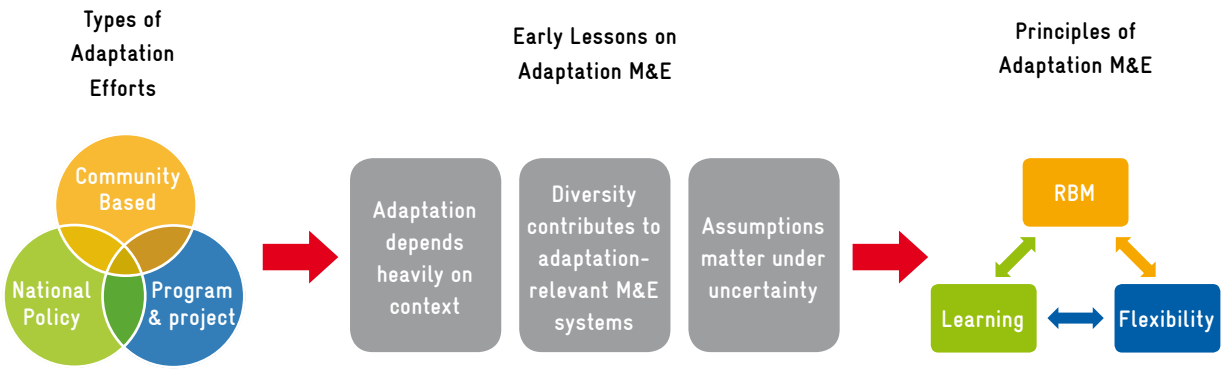
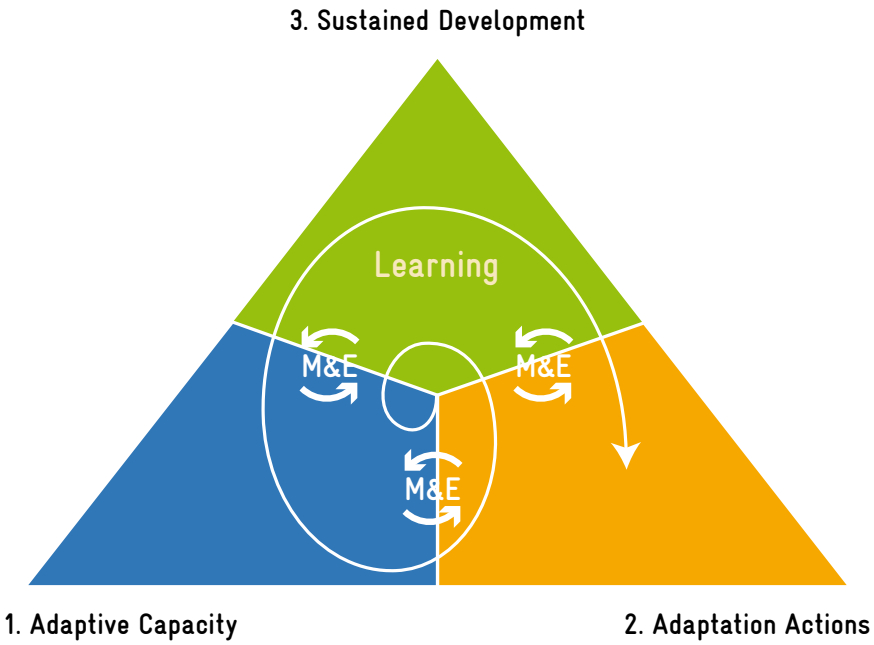


Figure ES2. Three Dimensions of Adaptation



Chapter 3: Steps and Options: Developing M&E Systems

The bulk of the report presents a comprehensive six-step process to develop adaptation-relevant M&E systems for use in developing countries. Development practitioners can apply these steps either to develop an M&E system for an adaptation project or program, or to identify ways to monitor and evaluate the adaptation components of a development intervention. The steps can also help funders and practitioners to gauge the utility of existing M&E systems for adaptation initiatives.

Each step raises key design and implementation questions for practitioners to address. The steps are organized around three key dimensions of adaptation (see Figure ES2), and example indicators for each dimension help practitioners identify criteria for defining a given project's contribution to adaptation.

- **Step 1 Describe the Adaptation Context** – Since the nature and quality of adaptation depends heavily on context, it is essential for practitioners to understand the climate and non-climate factors and populations that will affect and be affected by the interventions they plan. Conducting a climate vulnerability and/or climate risk assessment early in the intervention design process helps practitioners and their partners, for example, to identify and reflect stakeholder-driven priorities.
- **Step 2 Identify the Contribution to Adaptation** – Adaptation is many things to many actors and stakeholders, and attribution of any given set of activities to a known outcome is impossible. Instead, this paper proposes a three-part framework constructed around possible contributions to the adaptation process: adaptive capacity, adaptation actions, and sustained development in a changing climate. Funders and their partners can use this framework to, among other things, define high-level goals or outcomes. Practitioners can use it to characterize types of lessons learned from the M&E systems of various adaptation interventions.
- **Step 3 Form an Adaptation Hypothesis** – To test the validity of a location-specific approach to adaptation, practitioners can formulate an adaptation hypothesis for each major expected outcome. For example, crop diversification might be a strategy for a farming village to manage increasing climate variability. The hypothesis might be that the use of a particular seed blend will reduce crop sensitivity to extreme temperatures and drought, thereby improving average yield and overall average food security. The intervention results would show whether the tested approach yielded the quality or degree of intended behavioral or environmental changes.

- **Step 4 Create an Adaptation Theory of Change** – In light of the many uncertainties surrounding adaptation interventions, a theory of change is a helpful tool for practitioners to illustrate the relationship between an intervention's components, expected results, and assumptions about factors that can enable or inhibit the likelihood of achieving success. Practitioners can use a theory of change to identify and correct false assumptions, integrate new information into a strategy, or pinpoint the reasons for achievements or failures.
- **Step 5 Choose Indicators and Set a Baseline** – Choosing appropriate indicators for adaptation requires rooting an intervention's goals within its specific climate change and development context. Practitioners can use the three adaptation dimensions shown in Figure ES2 to characterize indicators by type of outcome, and devise a baseline to measure progress within each. This step illustrates two sets of example indicators within each adaptation dimension. In this chapter we describe 'assets' and 'institutional functions' as two types of indicators that are particularly useful in describing **adaptive capacity**. Under **adaptation actions** we highlight activities and decisions that address particular 'climate hazards,' or work to reduce 'vulnerability drivers.' And we propose 'ecosystem services' and 'livelihoods' as two useful types of indicators for demonstrating the long-term and systematic needs of **sustaining development** in a changing climate.
- **Step 6 Use the Adaptation M&E System** – This step guides practitioners through how to implement the M&E system developed through the previous five steps. Adaptation-relevant M&E systems can be used by practitioners to demonstrate the relative contribution of interventions to the adaptation process and answer evaluation questions related to, for example, performance, efficiency and effectiveness. We highlight the differences between activity and outcome monitoring, and discuss the importance of results-based management, flexibility, and learning, including through regular feedback loops and engagement with partners.

Chapter 4: Conclusions

The report concludes by highlighting ways to "learn by doing" in the development of M&E practice for adaptation. It proposes several important areas for further development and research.

- **Think outside the project box**: The challenges of M&E for adaptation are largely shaped by factors outside the individual project cycle. Therefore, developers of M&E systems need to move toward measuring changes in broader systems.
- **Explore options for overcoming barriers to participation**: Further work is needed to understand how technology, capacity building, and wise use of financial resources can reduce the costs associated with stakeholder participation in M&E, improve inclusion processes, and scale up use of participatory approaches.
- **Link existing M&E systems**: Stronger connections between bottom-up and top-down information and decision making could help focus scarce resources by eliminating duplicate reporting structures, sharing common relevant information, and potentially improving accessibility and transparency. Integrated adaptation M&E systems could also be used to link disparate sectoral or thematic activities.
- **Promote experimentation**: Useful experimental approaches for adaptation from the developed world are beginning to gain traction in the development sphere. M&E will play an important role in helping to learn when such approaches have value and how they can be adjusted to specific locations.
- **Face tensions and trade-offs openly**: M&E of adaptation presents challenges in a world of limited resources, where it is rarely possible to manage multiple processes for a given place, issue, or activity. Open discussion of tensions and trade-offs can ensure that a given system is used appropriately, and that its results are not misunderstood, misinterpreted, or used for cross-purposes.

1. Concepts: Introduction to Adaptation M&E for Development Practitioners

As developing country governments and their international partners grow more aware of the threat climate change poses to development goals, particularly in the poorest countries, they increasingly face the question of how to best invest funding to support adaptation to climate change. M&E will play an important role in ensuring that adaptation funding is used as effectively as possible, and that lessons from early investments inform the continual improvement of adaptation interventions.

This paper aims to help development practitioners navigate the many options at their disposal for crafting practical M&E systems for their adaptation work. While M&E for adaptation draws substantially on methods, frameworks, and indicators frequently used in other development spheres, practitioners will also need to address several ideas, issues, and challenges of particular importance to climate change adaptation.

Among the peculiarities of M&E for adaptation is the broad diversity of activities and outcomes that may be monitored or evaluated. Adaptation activities take place across the full spectrum of "sectors" within development – from health, to infrastructure, to gender, to youth initiatives, and more. Thus, any approach to M&E for adaptation must strike a balance between structure and flexibility. On the one hand, it must provide sufficient structure to assist in tracking whether and how an initiative is adaptive; on the other hand, it must provide sufficient flexibility to be useful across the full range of adaptation activities and contexts. This guidance attempts to strike such a balance.

M&E for adaptation also faces a diversity of development practitioners who may engage in the M&E process. Practitioners bring a wide variety of experience and expertise to the process of developing and using an adaptation M&E system, which necessitates a second balancing act in this paper. While we have attempted throughout to focus on ***M&E for adaptation*** as a whole, readers with expertise in adaptation will most likely appreciate different parts of this paper than those steeped in M&E. Likewise, readers with a strategic or policy interest in M&E for adaptation will likely most appreciate Chapters 1, 2, and 4, while those responsible for designing an M&E system for a specific intervention will spend more time with the many details in Chapter 3 and the annexes. In all cases, readers should view this guidance as a complement to their existing expertise in particular sectors, development issues, frameworks, and evaluation methods – not as a stand-alone solution to their M&E needs.

We begin by framing key concepts in M&E for adaptation, including the relationship of adaptation to development in general, the importance of M&E for adaptation, and several challenges and tensions at play in the design of M&E systems for adaptation.

1.1 Climate Change Adaptation in the Development Context

Adaptation to climate change refers to a process of adjusting to actual and expected climatic changes, or to the effects of climate change on social and ecological systems. Adaptation aims to moderate harm to human well-being associated with those changes, and to exploit potentially beneficial opportunities.[3]

To understand adaptation in the development context, practitioners must also take vulnerability into account. Vulnerability refers to the degree to which populations face harm from climatic changes. Many factors contribute to climate vulnerability, including environmental, socioeconomic, and institutional factors – not just the climate. For example, some people may be more vulnerable because, as farmers or fishers, their livelihoods make them especially sensitive to changing storm and rainfall patterns. Likewise, some people may have greater vulnerability because they lack the resources they need to protect themselves from harm, such as a sturdy roof in a storm, a boat during a flood, or a road for accessing markets when drought makes local food sources unreliable. [3]

Given the many different drivers of vulnerability and the diversity of possible climatic changes, adaptation may entail any number of different activities. For example, a farming community may plant new crops that have a higher heat tolerance or resistance to drought. Tour operators dependent upon reefs threatened by warming sea waters may learn new trades to diversify their livelihood. A coastal community may restore mangroves to protect against more frequent storm surges, or move away from the coast altogether if highly threatened. A government may protect citizens by investing in drought early-warning systems, and may build its environmental observation systems in order to monitor how climate change affects important national resources. In each case, what constitutes adaptation depends upon the specific local context.

The above examples highlight how climate change is entwined with a wide range of activities critical for

3 The issue of vulnerability has a rich academic literature. For additional discussion and a compilation of definitions of vulnerability, see http://www.vulnerabilitynet.org/definitions.shtml

development. Accordingly, governments and funders increasingly view adaptation efforts as part of the development process. However, many development activities – such as building a road or improving slum housing – may reduce climate vulnerability as a "co-benefit" to other objectives. In other words, adaptation underpins success in development as the climate changes, but development success can also facilitate adaptation.

There are important inter-relations between adaptation to climate change and development activities (see also Michaelowa and Koehler 2011). The question of additionality is not only an issue within international climate finance. There are also some very practical questions regarding project planning "What is an adaptation project and what is not?", "What is new or different about adaptation projects?" and "What are the impacts on the formulation of objectives and indicators as well as on monitoring of projects' impacts?" How, then, are development practitioners to know what really constitutes or distinguishes adaptation?

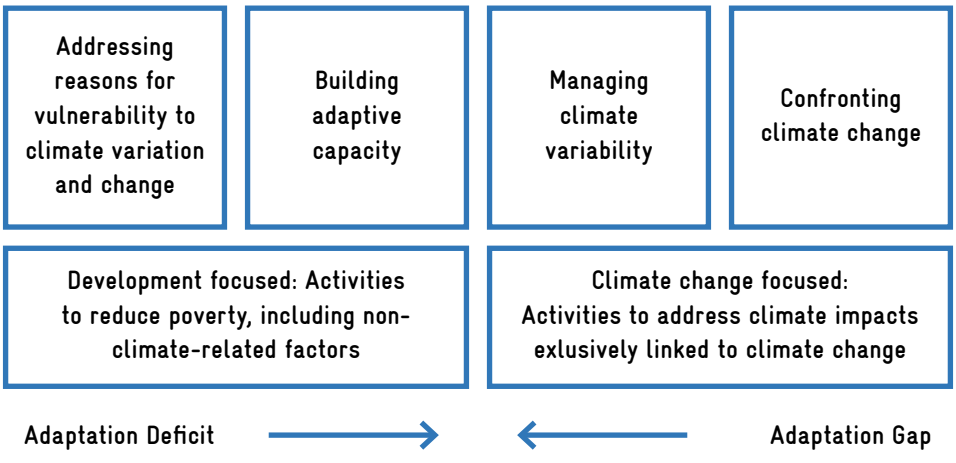
This paper argues that what constitutes adaptation depends heavily upon the specific context in which activities take place. Ultimately, one cannot distinguish between "adaptation activities" and "development activities" per se; the adaptiveness of an intervention depends not upon the activities undertaken, but rather, upon the relationship between the activities, the climate change context, and the vulnerability of the stakeholders targeted by the intervention. M&E for adaptation, therefore, hinges upon a process of understanding key aspects of the context, identifying changes needed to reduce vulnerability in that context, and measuring progress toward realizing those changes. Chapter 3 of this paper proposes such a process.

Understanding the context in which an adaptation intervention takes place requires practitioners to explore the specific relationship between the development status of the intervention's beneficiaries and their vulnerability to climate change. To assist in this, WRI and its partners in 2007 proposed a continuum for understanding the relationship between adaptation and development (Figure 1). The continuum recognizes that only a few activities – the "climate change-focused" ones on the right-hand side of the continuum – have a purely adaptation benefit. Such activities are often referred to as filling an "adaptation gap,"[4] in which the difference between the beneficiaries' status and the status appropriate to a changing climate is due solely to a failure to specifically address the effects of climate change.

In contrast, many activities – on the left-hand side of the continuum in Figure 3 – contribute to adaptation by addressing more general development needs, such as health, education, livelihoods, or governance. Such measures often serve as prerequisites for building the resources and capabilities that enable people to anticipate future needs, respond with agility to surprises, and recover quickly from shocks (i.e. "adaptive capacity"). These prerequisite activities are sometimes referred to as addressing an "adaptation deficit," in which the difference between the

4 Annex I, Box 1 provides a comprehensive table defining "adaptation gap," "adaptation deficit," "adaptive capacity," and other terms frequently used to describe adaptation in the development context.

Figure 1. Adaptation Continuum



Source: modified from McGray et al. 2007 and World Bank 2011

beneficiaries' status and the status appropriate to a changing climate is due to broader unmet development needs, and not only to a failure to address climate change.

Most initiatives will face situations that fall somewhere in the middle of the continuum, and include elements of both an adaptation deficit and an adaptation gap. In other words, climate vulnerability derives from both development needs *and* the need to explicitly address climate change. In designing adaptation initiatives and their M&E systems, the challenge for development practitioners is to identify the most relevant mix of activities and indicators to address their specific mix of adaptation challenges.

1.2 The Importance of M&E for Adaptation

Monitoring refers to an ongoing process of tracking and reviewing activities, their results, and the surrounding context. The aim is usually to make immediate adjustments to activities if deviations from objectives, targets, or standards are detected. However, monitoring also generates information that can be used for in-depth evaluations of projects or programs. Because monitoring and evaluation are often considered a single "M&E system," this paper treats them as such. Box 1 examines the key dimensions of an M&E system established for the Climate Change Adaptation in Africa Program. (See Annex 1, Box 2 for detailed definitions of key terms practitioners commonly use to describe M&E.)

M&E can play an important role in any instance where practitioners seek to document results and improve performance. However, given the uncertainty and dynamism associated with climate change, M&E is especially important for adaptation. Specifically, M&E systems play two critical roles in promoting successful adaptation:

They provide critical support to the long-term process of learning "what works" in adaptation. M&E can broaden understanding of adaptation options to improve definitions of adaptation effectiveness, and over time, to ensure that adaptation efforts deliver their intended results. In this way, M&E plays an investigative or documentary role in adaptation. For example, it may help practitioners understand:

- how an adaptation intervention influences and is influenced by policies, institutions, economic shifts, and other factors;
- what factors contribute to unplanned or "autonomous" adaptation;
- historical coping mechanisms and evidence of resilience to previous climate-related events;
- socially or economically acceptable levels of risk in decision making; and
- how to develop new adaptation strategies for addressing the effects of climate change.

They provide a powerful tool to help practitioners manage their work. For example, over the near term, practitioners may use M&E to:

- adjust adaptation activities based on how successful they are in achieving intended adaptation objectives;
- adjust adaptation activities to address unexpected challenges, unintended consequences, or other surprises;
- compare institutional structures, processes, and results across various interventions in different locations; and
- prompt discussion and shared learning among participants and stakeholders in a particular adaptation initiative.

Box 1. Climate Change Adaptation in Africa: A Snapshot of M&E in Practice

Objectives

Climate Change Adaptation in Africa (CCAA) is a 5-year program jointly supported by the International Development Research Centre (IDRC) and the United Kingdom's Department for International Development (DFID) to address an acute lack of capacity to deal with unavoidable climate change in Africa. Through the execution of 46 projects in 33 countries, the program aims are to:

* strengthen the capacity of African scientists, organisations, decision makers, and others to contribute to adaptation to climate change;
* support adaptation by rural and urban people, particularly the most vulnerable, through action research;
* generate a better shared understanding of the findings of scientists and research institutes on climate variability and change; and
* inform policy processes with high-quality, science-based knowledge.[5]

5 CCAA 2011.

Monitoring

The CCAA program puts a strong emphasis on M&E not only for accountability purposes, but also because it promotes learning that is critical to the success of adaptation. The program therefore seeks to instill an evaluative culture among researchers.[6] M&E is carried out in three tiers: at the program level, at the project level, and at the level of the participatory action research groups with which projects work. The program trained project teams in outcome mapping (OM), an approach developed by IDRC that helps project managers to document specific behavioral changes, practices, and relationships among key partners with whom the program interacts. OM also encourages reflection on completed activities, so that ongoing strategies can be adjusted to achieve project objectives. CCAA used the OM approach together with results-based management (RBM) tools (a logical framework) as core methods of its M&E system.

CCAA encouraged its project teams to be creative in combining OM with other tools, in order to integrate M&E with planning and decision making, rather than treating it as a parallel bureaucratic activity. Some project teams deemphasized the role of OM, and instead used e.g. tools better able to define and monitor biophysical or socioeconomic indicators.[7] They were encouraged to develop their indicators relative to their own objectives, and managers expressed progress in their interim and final technical reports. Based on the latter, as well as on visits and regular communication, program officers then tracked the progress of each project team for the outcomes defined in the program's logical framework (logframe). These include, among others, how the project teams: assessed vulnerabilities; developed options for enhancing adaptive capacity; facilitated knowledge sharing amongst different groups of stakeholders; as well as whether they published and disseminated project results. They also included how stakeholders participated in adaptation research and how research findings contributed to the development of adaptation policies and plans.

Since the program revolves around active understanding and use of scientific research to improve the adaptation process, tracking and assessment of knowledge sharing play a central role in its success. Therefore, CCAA established a knowledge-sharing framework to facilitate learning among program partners and others actively working on climate change adaptation in the region. Four user groups were targeted: policymakers, researchers, at-risk groups, and capacity developers (e.g. extension services, community facilitators). As part of this framework, the program supported the development of the Africa Adapt platform which is now widely used for knowledge exchange even outside of CCAA.

Evaluation

In 2008, the program commissioned a mid-term review of the CCAA program. Four scientists were involved in this formative evaluation, and they used the information generated from M&E system documentation, along with field visits, surveys, and interviews to conduct their assessment. This evaluation included a "project level" review of activities and progress, and a "strategic level" assessment of objectives, approaches, outputs, and overall progress.

The review concluded that the program is relevant and significant to Africa's current needs, and that the strategic objectives remain relevant to the longer-term challenges of adaptation and capacity building in the region. However, since capacity is a longer-term goal, additional work remains in fleshing out specific deliverables at the project level in the 5-year time frame. The evaluators also concluded that the program needs to place more emphasis on future climate change, as opposed to current variability. They also highlighted an absence of networking between CCAA projects, as well as between CCAA projects and other regional climate change adaptation projects.[8] This review was used to make improvements to the program's strategy as well as to guide the design of initiatives aimed at transferring ownership of some activities, including the African Climate Change Fellowship Program and the Africa Adapt platform, to African institutions by program closing.

Although ultimate impacts are yet uncertain, there is early evidence of CCAA positively affecting policymaking in relation to coastal flooding in Morocco and crop insurance in Ethiopia.[9] Based on ongoing evidence collected through the M&E system, using OM and RBM will improve the ability of the program coordinators to focus their efforts throughout the remaining implementation period, both to ensure successful results and to address problematic areas.

6 Denton 2009.
7 Beaulieu 2010.
8 CCAA 2008.
9 For more information, see R4D 2011.

1.3 Results-Based Management and the Aid Effectiveness Agenda

In the last several decades, a growing body of analysis and advocacy has emerged to critique the efficacy of development assistance.

In 2005, the international community responded to the growing critique with The Paris Declaration on Aid Effectiveness, which enshrines five principles, summarized here by the Organisation for Economic Co-operation and Development (OECD):[10]

- **Ownership** – Developing countries set their own strategies for poverty reduction, improve their institutions, and tackle corruption.
- **Alignment** – Donor countries align behind these objectives and use local systems.
- **Harmonization** – Donor countries coordinate, simplify procedures, and share information to avoid duplication.
- **Results** – Developing countries and donors shift focus to development results, and results get measured.
- **Mutual Accountability** – Donors and partners are accountable for development results.

The fourth principle – measurement of results – has led many donors to re-orient their organisations toward ensuring that their work goes beyond outputs to achieve meaningful outcomes and lasting impact. Typically, M&E plays a central role in results-based management (RBM), supporting frequent assessment of progress, reporting on performance, and improvement of strategies. In the RBM context, M&E often emphasizes quantitative indicators, such as the number of people inoculated against a disease, or tons of greenhouse gas emissions reduced. However, the emphasis on measurability is more challenging for development objectives that are more qualitative in nature, such as women's empowerment or development of institutional capacity.[11]

As development practitioners turn their attention to adaptation, they are bringing their results orientation with them and look for ways to measure results in the adaptation sphere. The bulk of this paper explores options that may support the application of RBM to adaptation through M&E. The following section explores the specific challenges practitioners will face as they seek to deploy M&E in the service of effective climate adaptation in developing countries.

10 OECD 2005.

11 For an example methodology for measuring development results stemming from capacity development, see GIZ 2008.

1.4 Challenges to M&E for Adaptation

Adaptation poses M&E hurdles that have long troubled practitioners in the development field more broadly. M&E can be costly, especially if done well. It is frequently not prioritized, since in many cases initiatives face insufficient resources just for implementation. Even when well resourced, data limitations may reduce the scope or effectiveness of M&E. Project developers may also face challenges in engaging the right stakeholders to ensure M&E efforts succeed. In spite of the many benefits M&E can bring, the overall picture is often one of limited capacity and incentive for investing in M&E to improve performance.

The nature of adaptation also presents several technical challenges to the application of existing practices in M&E. While not unique to adaptation, these challenges are pervasive and prominent in efforts to develop M&E practices for adaptation. They include:

- **Long and short time frames**: M&E systems will need to track success in the short- (<5 years), medium- (5–20 years) and long-term (20+ years) time horizons. Many development initiatives must consider these time horizons, but they are of particular importance to adaptation, given that the results of many adaptation actions taken now will only become clear over decades of climatic change. This may lead to trade-offs between near- and long-term adaptation success. For example, irrigation activities that may improve near-term resilience to variable rainfall may also accustom farmers to a level of water use that is unsustainable in the long run if a drier climate reduces groundwater recharge. A GIZ study realized by Perspectives presents an interesting approach how to measure comparable long term impacts with a set of standardised sustainability indicators (see chapter 3.5.3).
- **High degree of uncertainty**: Though the science of climate change has improved greatly, much remains uncertain about how and when the climate will change, how human and natural systems will shift in response, and what factors will most influence vulnerability over time. For M&E practices, this uncertainty makes for a "moving target"; it will not be possible to simply measure adaptation progress toward a known future climatic state.
- **Diverse definitions of "adaptation effectiveness"**: The relative newness of adaptation and the broad variety of interventions that may constitute adaptation together lead to a wide range of approaches and indicators for

defining "success." Whereas the health, education, and other established sectors have, over time, achieved some consensus on important indicators or targets, adaptation has as yet reached no such agreement. This complicates decisions on what M&E tools and processes to use in order to assess "effectiveness" with adequate scope and complexity.

- **Frequent need for "counterfactuals"**: In many instances, adaptation success may ultimately be determined by the absence of a negative event, requiring M&E to deal with measurement against a counterfactual scenario. For example, success may consist of readiness for a Category 5 storm that has not yet happened. If or when the storm occurs, the "success" may consist of fewer deaths or damages compared to "what might have happened" in the absence of adaptation measures, such as establishing a national emergency response system.
- **Cross-sectoral nature**: Adaptation encompasses a wide variety of actors at different levels – from local to national jurisdictions, across ministries, and between public, private, and informal sectors. Learning how to coordinate and incorporate climate risk and vulnerability into existing plans and operations is part of the solution. M&E, therefore, needs to consider the entire system, examining the linkages between various institutional arrangements.

Given the above challenges, related social and political factors, and the diversity of players involved, adaptation places many demands upon M&E efforts. To complicate matters further, M&E is sometimes conflated with "MRV" (measurement, reporting, and verification), a term that arose from the 2007 Bali Action Plan signed by parties to the UNFCCC. The relevant provision of the Plan requires that three things be "measurable, reportable, and verifiable":

- industrialized countries' greenhouse gas mitigation actions,
- developing countries' greenhouse gas mitigation actions, and
- the support industrialized countries provide to developing countries to take climate actions.

The global community is now engaged in negotiating a system through which MRV will occur under the UNFCCC. M&E and MRV systems are related in that both can play a role in tracking climate finance, although for different purposes. This paper does not address MRV in detail, but does provide an overview of the overlap and differences between the two concepts in Annex I, Box 3.

In all practicality, a given M&E system will rarely succeed in being all things to all people, and will not likely rise to all adaptation challenges successfully. Adaptation practitioners, therefore, need to make difficult choices in designing their M&E systems and must accept tradeoffs in what their M&E systems can achieve. Priorities informing the design and implementation of M&E for adaptation depend heavily on a practitioner's point of reference, and often reflect tensions produced by the issues described above. Table 1 highlights tensions in several areas of focus where practitioners often must balance competing needs and uses of M&E. Their choices and the priorities that inform them will be reflected in the kind of information generated by the M&E system, as well as the types of reporting, learning, and management that the information can support.

Table 1. Tensions Shaping M&E Systems for Adaptation

The Purpose of M&E: Learning vs. Accountability
M&E can be used primarily to ensure either an improved understanding of factors that affect the impacts of an intervention or that project or program commitments, expectations, and standards are met. Learning can conflict with accountability when meeting particular standards or protocols for M&E is not conducive to a learning environment or does not allow for mistakes to inform the learning process.
Definition of Effective Adaptation: Process vs. Outcome
M&E systems take different approaches in defining the successful progress of an adaptation activity. Success can be measured by the quality and function of adaptation processes, or by the quality of the results of processes. Many systems attempt to address both process and outcome, but limited resources will typically mean incomplete coverage of one or both. This is discussed further in Chapter 3.
Basis for M&E System Design: Practical vs. Conceptual
M&E approaches can be borrowed from tried and tested interventions in natural resources management, sustainable agriculture, or other development spheres. Alternatively, practitioners can use adaptation itself as the basis for M&E, although this may mean using untested theoretical frameworks.
Ownership of M&E: Bottom-Up vs. Top-Down
An M&E system with a bottom-up emphasis reflects the priorities of local communities, civil society organizations, and local governments. M&E with a top-down emphasis is designed to meet the needs of large-scale institutions, national governments, or international stakeholders. Top-down and bottom-up interests rarely intersect, often leading one set of stakeholders to have greater "ownership" of M&E than others.

2. Early Efforts in Adaptation M&E: Lessons and Principles

This chapter highlights the different types of early adaptation efforts in a developing context, draws broad lessons from them, and then establishes three principles for adaptation M&E, based on this review of current practice.

Over the past two decades, adaptation was hotly debated in the global United Nations (UN)-led climate negotiations, and in academic journals, but this discourse resulted in limited action. In the early 2000s, nongovernmental organisations (NGOs) began piloting small adaptation projects at the community level, several bilateral programs and multilateral initiatives were launched, and proactive governments began slowly incorporating adaptation into their domestic development policies and international assistance programs. In 2007, the situation shifted dramatically due to a confluence of circumstances. The completion of the Intergovernmental Panel on Climate Change (IPCC) *Fourth Assessment Report*[12], United Nations Development Program's (UNDP's) climate-focused *Human Development Report*[13], and international agreement on the Bali Action Plan vaulted adaptation into the spotlight as an important development issue. Today governments and funders have a modest body of global experience from which to begin drawing some lessons for M&E.[14]

2.1 Types of Adaptation M&E Efforts

A review of M&E-relevant activity on adaptation, many of which are described in the tables of Annex II, reveals three broad categories of efforts:[15]

- **Community-based initiatives**, largely informed by anthropological studies on livelihoods and dominated by NGO-driven activities with a bottom-up, participatory ethic.
- **Program- and project-based efforts**, driven largely by the global development community, and drawing heavily on rural development approaches and professional project management.
- **National policy initiatives**, which began with the UNFCCC National Adaptation Programmes of Action (NAPAs) and disaster risk reduction initiatives, but are increasingly comprehensive and strategic.

Community-Based Efforts

Community-based adaptation (CBA) efforts typically promote M&E systems that can function and self-perpetuate at the community level in order to succeed in the long term and be of direct practical relevance in the short term. With this aim in mind, programs often focus on identifying socially and economically acceptable levels of risk, building trust and awareness of climate change as an influence on livelihoods and local socioeconomic conditions, as well as possible future expectations. An important aim is to undertake activities that treat the abstract, long-term idea of "climate change" in the context of communities' near-term daily priorities. Although many of the activities and processes of an adaptation intervention may not differ from other projects for improving natural resource or water management, disaster risk reduction, or agriculture, part of the challenge to M&E is working with a different set of inputs and expectations.[16] Inputs may need to include highly localized analysis of the drivers of vulnerability, for example, and intervention expectations will need to align with the immediate development needs of these communities.

Reflecting the values of a community-based approach to development, including the principle of local "ownership" of objectives and activities, early experiences in M&E have been designed around a participatory approach to evaluation. Several NGOs have developed portfolios of CBA initiatives that include frameworks for participatory M&E. (See Annex II, Table 2c.) In addition, a number of community-based initiatives have led to the development of tools that help to integrate climate risks and vulnerability into the regular project cycle of community-based development efforts. While most of these provide little guidance specific to M&E, they may assist in identifying indicators and developing baselines. (See Annex II, Table 2b.)

For example, CARE's Climate Vulnerability and Capacity Analysis is another planning tool that helps field staff to understand the socioeconomic dimensions of vulnerability by integrating relevant science and local knowledge into adaptation strategies and pursuing dialogue within communities and between local governments and civil society organisations (CSOs). Also, the Community-based Risk Screening Tool – Adaptation & Livelihoods (CRiSTAL), IISD, is a flexible decision-support tool that allows project planners to factor in the role that ecosystem management and sustainable livelihoods can play in successful

12 IPCC 2007.
13 UNDP 2007c.
14 Annex II summarizes key implications for M&E from a variety of adaptation intervention resources reviewed for this paper.
15 UNDP undated-a.
16 For more information on CBA, see Christian Aid 2009, CARE 2010, Huq and Reid 2007, Pettengell 2010, wikiAdapt 2008, and other relevant organisations (Practical Action, Overseas Development Institute (ODI), Red Cross Red Crescent (RCRC), World Wildlife Fund (WWF)).

adaptation. It also helps practitioners identify indicators that stem from a systematic understanding of the links between local livelihoods and climate. Though few are specific to M&E or provide guidance beyond intervention design and planning stages, each of these tools helps to integrate climate risks and vulnerability into the regular project cycle of community-based efforts.

Project and Program-Based Efforts

Although development assistance can support adaptation, and vice versa, the dynamics of climate change politics have placed emphasis on demonstrating that adaptation funding is "new and additional" to development investments that would have been made even if the global climate was not changing. This has led in practice to a highly project-based mode of implementing adaptation, since dedicated finances can be easily measured and distinguished from other funding streams. In this context, M&E has been able to draw on a large body of methods and experience applicable to project cycles. M&E resources are currently being expanded and refined, with a growing number of results frameworks designed to specifically focus on adaptation. For example, early adaptation projects conducted through the finance mechanisms of the UNFCCC, namely the Global Environment Facility (GEF) Special Climate Change Fund (SCCF) and Least Developed Countries Fund (LDCF), have developed numerous studies and results frameworks for adaptation. GEF's Adaptation Monitoring and Assessment Tool, the World Bank Pilot Project in Climate Resilience results framework, and the Adaptation Fund Board (AFB) results framework are also very recent efforts to guide practitioners in developing adaptation-relevant M&E systems.[17] European and UN funding agencies also regularly revisit and evaluate existing performance criteria, and develop project- and program-level methodologies and tools for practitioners in implementing and executing agencies.[18]

Many agencies that fund and implement development projects increasingly recognize that adaptation cannot continue to be exclusively conducted through a set of discrete "adaptation projects." These agencies also need to "climate-proof" projects, programs, and policies where the intervention objective is not adaptation per se, by making adjustments in order to achieve poverty reduction, economic growth, health, education, or other development objectives in a changing climate. Various risk-screening tools and mainstreaming guidelines are under development by multilateral and bilateral organisations to support this process. These include efforts by the OECD-Development Assistance Committee (DAC), the Asian Development Bank, the Inter-American Development Bank, the World Bank, UNDP, DIFD, U.S. Agency for International Development, the Danish International Development Agency and GIZ, to name a few. (See Annex II, Tables 2a and 2b.) However, with few exceptions, these tools are rarely designed to address M&E for adaptation specifically, let alone provide guidance on developing M&E systems appropriate to adaptation interventions.

An early guide to address adaptation in the development arena is UNDP's Adaptation Policy Framework, which outlines options for mainstreaming adaptation into policymaking. It is designed to aid national policymakers and planners, as well as project and program coordinators, in clarifying their priorities for formulating and implementing adaptation strategies, policies, and other measures at multiple levels of society. Like CRiSTAL, it views adaptation to short-term climate variability as a basis for reducing vulnerability in the long term. Though not focused on M&E for adaptation, it offers some methodological advice on developing relevant indicators. A more recent guide from the European Commission focuses specifically on adaptation as a factor in sustainability, and seeks to integrate environment and climate change into development. It suggests ways to introduce adaptation into climate-sensitive sectors through budget planning and other standard national decision processes.

National Policy Initiatives

Adaptation M&E in the context of national policy can be complex, and is not well developed to date. Given competing priorities and a lack of awareness or understanding of climate science and climate change, resources are infrequently devoted to producing quality M&E and effective knowledge management tools. The first formal national plans on adaptation in developing countries, for example, were the NAPAs, funded through the support of the GEF's LDCF. Early NAPAs were criticized for what they initially lacked: funding to immediately implement identified projects; a longer-term, more strategic approach; incentives to develop M&E systems that could foster adaptive management and learning; and mechanisms for expanding from discrete projects into broader, more systemic national adaptation efforts.[19]

17 GEF 2011, GEF 2008b, World Bank 2010c, AFB 2010c, AFB 2009.
18 See GEF Evaluation Office 2008; UNDP Undated e.
19 DANIDA 2009.

More recent NAPAs, however, as well as national adaptation policies and programs developed independently from the UNFCCC system, are learning how to better address vulnerability and adaptive capacity. In the case of NAPAs, improvements include newly devoted resources for implementation; a new framework for tracking LDCF results; and improved means for comparability, learning, and reflection. Taken together, these reforms are expected to move efforts beyond the early "projectisized" approach towards cross-cutting issues and country-driven priorities.[20] A few developing countries have also formed national climate change policies and coinciding results frameworks that provide a platform for economic growth, environmental management, and poverty reduction in the context of a changing climate. Notable among these are the independent efforts of governments and research partners in Bangladesh, Bolivia, Ghana, Guatemala, India, and Uganda.[21]

In addition, OECD has developed a mainstreaming guide to assist governments and international funders to integrate adaptation into core development activities, and incrementally into their M&E, with a focus on geographic zones, communities, and sectors most vulnerable to climate change. It addresses four levels of government decision-making processes systems as entry points – national, sector, project, and local – and encourages moving the coordination of adaptation activities into powerful central bodies. The guide promotes harmonization with existing plans and strategies for adaptation, such as relevant existing sector-level results frameworks. It also promotes engaging a wide variety of stakeholders to identify adaptation options and define indicators of progress. Another flexible tool is WRI's National Adaptive Capacity (NAC) framework, which examines what a national government is capable of doing in order to adapt. Participation and transparency are built into each step of the tool, which seeks to draw on a variety of experiences and inputs to establish national adaptive capacity. Government officials can use the resulting assessment as a baseline assessment[22] for future adaptation planning.

20 DANIDA 2010.

21 Government of Bangladesh 2006, Government of India 2008, Government of Uganda 2007. See also NCAP 2005. For information regarding Bangladesh, Boliva, Ghana, and Guatemala: http://www.nlcap.net/home/.

22 An intervention baseline is the starting scenario or point from which results are measured and tracked during implementation, or a reference scenario can also be a projected picture of the future without adaptation, to which intervention results can be compared (UNDP 2010a). A further discussion on baselines follows Step 4 on indicators.

2.2 Lessons from Early Efforts

Several shared themes emerge from the categories of adaptation efforts above, pointing to three broadly applicable lessons for M&E:

Adaptation depends heavily on context. Climate change risks link with other challenges facing communities and cannot be addressed in isolation. Such challenges can include socioeconomic, policy-related, technological, environmental, or financial factors that may influence vulnerability or create barriers to adaptation. This text refers to these and related factors as the "adaptation context." Step 1 of Chapter 3 guides readers in making decisions about indicators and methods for measuring adaptation success in light of this context.

Defining adaptation in context means that no single set of adaptation strategies or "adaptation indicators" will work in all circumstances. For example, activities that build ecological resilience in one place may have very different consequences in a different ecosystem. Initiatives to decrease socioeconomic vulnerability in one community may prove irrelevant to the livelihoods, priorities and social issues in a neighbouring community. Another example relates to climate risks that manifest as near-term needs associated with low levels of development (i.e. the "adaptation deficit"). M&E that assesses progress at addressing an adaptation deficit may look quite distinct from M&E that targets adaptation to clear impacts of climate change.

The need for defining adaptation in context is one reason adaptation initiatives frequently emphasize participatory approaches, especially CBA initiatives.[23] In the context of the uncertainty associated with climate change, stakeholders can play a critical role in identifying vulnerability drivers and setting priorities for action.[24] Engaging stakeholders in M&E helps to capture the most relevant understanding of risks and the effect of adaptation interventions, by drawing from the collective input of the people most affected.

Diversity contributes to adaptation-relevant M&E systems. Systems that employ M&E for adaptation frequently use multiple methods and integrate a wide variety of data from different sources. For example, many adaptation M&E systems combine qualitative and quantitative

23 Annex II highlights many tools for developing these participatory approaches to M&E.

24 Dessai and Van der Sluijs 2007 found stakeholder involvement to be key to 5 of 11 frameworks they reviewed for decision making under uncertainty, and it was complementary to the remaining 6.

information, and others complement scientific information with local or traditional knowledge in crafting results narratives. Annexes II also highlight tools and frameworks in use for adaptation M&E, several of which apply mixed methodologies and a variety of data sources.

Perhaps the most important area of diversity in M&E for adaptation relates to how practitioners define effectiveness for adaptation initiatives. A wide variety of possible indicators may assist in "measuring" interventions, each of which may reveal a different dimension of successful adaption. Typically outcome indicators, for example, focus on the function of M&E for supporting accountability processes, especially the accountability of adaptation project proponents to their funders, and of development agencies to their political constituents. However, the utility of many outcome indicators is undermined by the long time horizons across which adaptation outcomes must be assessed if M&E is truly to capture whether interventions succeed in addressing specific impacts of climate change. On the other hand, process indicators can be easily applied over short time scales, and provide a good fit with the role of M&E in supporting ongoing learning and capacity development. However, they may disappoint those who seek quantitative evidence of lives saved, damages averted, or related development impacts.[25]

Assumptions matter under uncertainty. The design of every adaptation intervention will hinge upon assumptions about how several factors (e.g. climatic, economic, and policy factors) may affect the outcomes of the intervention. Making assumptions explicit and tracking how they change throughout implementation allow a more comprehensive picture of what has worked toward or against reaching desired results. Assumptions also reflect values and underscore why particular actions are chosen over others.

Tracking assumptions before and during implementation provides intervention managers with the basis for determining whether the original strategy behind an intervention continues to apply over time. Noting critical assumptions about factors that affect results helps them manage the many uncertainties associated with climate change and the diversity of factors that affect the vulnerability of target populations. Identifying and tracking assumptions can also be a powerful method for practitioners to avoid risks or capitalize on opportunities in order to increase the likelihood of achieving results. Many development agencies make it standard practice to report on assumptions; these practices can provide valuable insights into the "how" and "why" of adaptation success, and can promote creativity and innovation. By making assumptions explicit at the beginning of an intervention, and by tracking their validity over time, practitioners create a process for adaptive management during the course of implementation.[26]

2.3 Principles for Adaptation M&E

Based upon the review of M&E for adaptation described above, this paper proposes three linked principles as a basis for developing adaptation M&E systems. These principles form the foundation for the design options for practitioners laid out in the next chapter. Figure 2 illustrates the progression from early adaptation efforts, through early lessons for adaptation M&E, leading to the three principles of adaptation M&E as described in this section.

Design for Learning

Since many uncertainties surround how climate change will unfold and what will constitute successful adaptation, the learning function of M&E will provide critical benefits to society. Without attention to learning as the core function of M&E, we are unlikely to capture successful efforts at autonomous adaptation, avoid maladaptation, or amass lessons about what works. Perhaps even more important, M&E that supports learning can help explain why and how adaptive activities and capacities work.

Solutions for complex challenges often emerge from trial and error. The strong demand for learning products in the context of adaptation is evident in a growing number of 'communities of practice' and initiatives to exchange information and knowledge around adaptation.[27] M&E systems must meet this demand if adaptation is to succeed in the long run. Effective learning in the complex context of adaptation will continue to require engaging a range of stakeholders and partners in reflection, documentation, and communication about their experiences, both good

25 Step 4 in Chapter 3 assists readers in considering key issues in choosing indicators for adaptation interventions. Box 5 further discusses the application of outcome and process indicators.

26 Step 3 in Chapter 3 emphasizes the identification and tracking of assumptions as a critical dimension of a good M&E system for adaptation.

27 See, for example, UNDP's Adaptation Learning Mechanism, the multi-partner AfricaAdapt Knowledge Sharing network, DFID's Climate and Development Knowledge Network, and the GEF Evaluation Office's Climate-Eval Web site. Annex II table 2d provides additional information.

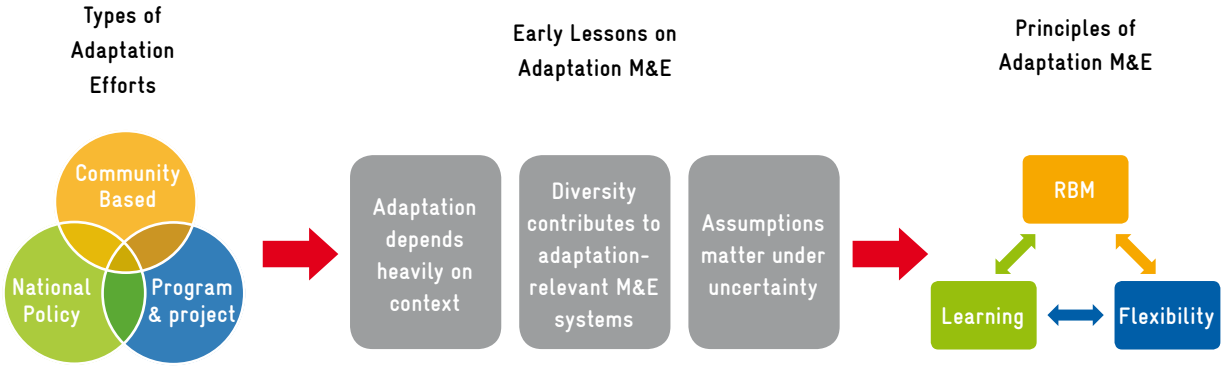


Figure 2. Building on Early Lessons in Adaptation M&E

and bad. This process of sharing information and experience among a broad set of players is central to learning, and will speed the improvement of adaptation initiatives.

Manage for Results

M&E systems used to assess the quality of adaptation must account for factors that affect long-term changes, even if they cannot be definitively measured in a given implementation period. RBM captures the quality of implementation efforts and the results of those efforts. RBM supports efforts to meet periodic targets and captures evidence for reflecting on what leads to intended and unintended changes.

In the shorter-term context of a particular adaptation intervention, a growing number of adaptation frameworks and guidelines are designed to help enable RBM of interventions.[28] These tools are still evolving and are growing more pragmatic and implementation-oriented. Over time, they should increasingly assist practitioners in adjusting intervention strategies and assumptions during implementation, in order to ensure that objectives are achieved and results delivered.

Maintain Flexibility

The M&E systems developed to track progress for adaptation must support flexible approaches conducive to learning and RBM. For example, more and more adaptation initiatives are devising strategies designed to yield results acceptable under a range of possible future scenarios. Principles of adaptive co-management – a blend of adaptive management and collaborative management that has been applied to environmental resources – may also be helpful in building flexibility into the M&E system.[29]

Adaptation approaches can be tailored to changing circumstances through a management system that allows for a diversity of answers to a single question, redundancy in adaptation options (several different parallel efforts toward a similar goal), and a willingness to change focus or pathways mid-stream. Therefore, monitoring and reporting structures must be designed to accommodate this multiplicity of pathways to success. Several development implementing agencies, NGOs, CSOs and other actors have recognized this need for strategic and managerial flexibility, and have developed, or are developing, tools and methodologies to improve the quality and expectations of flexibility.[30] Box 2 describes the flexible model employed by the Watershed Organisation Trust in India for watershed management, which now incorporates climate change adaptation.

28 See Annex II, Tables 2a, 2b, and 2c for examples from UNDP, the World Bank, the GEF, and the AFB, as well as those devised by various actors for project- and program-level initiatives. Some regional adaptation framework examples are the Asian Cities Climate Change Resilience Network (ACCCRN), the Africa Climate Change Resilience Alliance (ACCRA), and the International Center for Integrated Mountain Development (ICIMOD).

29 See Chapter 4 and Annex II for further explanation and examples.

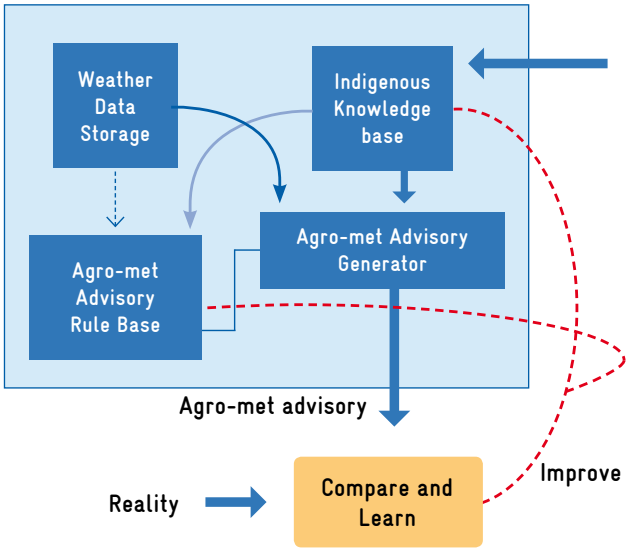
30 See, for example, the United Kingdom Climate Impacts Program's Adaptation Wizard tool ((UKCIP 2009, the International Institute for Environment and Development's "Participatory Learning and Action" knowledge-sharing platform (IIED 2005), the AFB's emerging governance and financing structure (AFB Undated and AFB 2010b), and UNEP's "CC DARE: Climate Change Adaptation and Development Initiative" (UNEP 2009).

Box 2. Watershed Organisation Trust: Using M&E to Stay Flexible

Since 1993, the Watershed Organisation Trust (WOTR) has worked to help rural Indian communities improve their access to and the quality of their water resources. WOTR takes an innovative approach to watershed development that has enabled it to scale up and expand throughout India over the past few years. Its model for watershed management is shaped by broad public participation, emphasis on local knowledge, and consistent use of monitoring to enable flexibility at multiple levels.

WOTR has developed an integrated project model for watershed restoration that can be implemented in each village according to its specific geographic, environmental, and socioeconomic context. Participation provides the key to this flexibility. Each project employs an approach called Participatory Net Planning, which emphasizes application of local knowledge throughout planning, implementation, monitoring, and learning. WOTR also employs training and capacity-building programs, and has found that these activities help sustain an intervention that the local populations have constructed themselves, with the capacity for future modification of the model based on emerging needs or climatic variations.

While WOTR's work began as a novel approach to development, it now has begun to leverage its flexible model for adaptation to climate change. WOTR's monitoring has found that while the overall quantity of rainfall in many regions has already begun to decrease, its watershed restoration efforts have collectively enabled an increase over the same period of time in the amount of water captured through the watershed. WOTR has also launched several integrated climate adaptation pilots that include agrometrology, crop planning and management, water budgeting, water distribution, biodiversity initiatives, and market linkages. Lessons from monitoring these initiatives will be used to tailor the WOTR model to better support development under a changing climate.



3. Steps and Options: Developing M&E Systems for Adaptation Interventions

Introduction to Steps for Developing an M&E System

This chapter proposes a step-wise decision-making process for developing an M&E system for an adaptation intervention or for a development intervention that addresses adaptation ("adaptation intervention"). The resulting M&E system will be designed with the key framing principles of this paper: a focus on learning; results-based management; and the understanding that adaptation is a long-term process that requires flexibility.

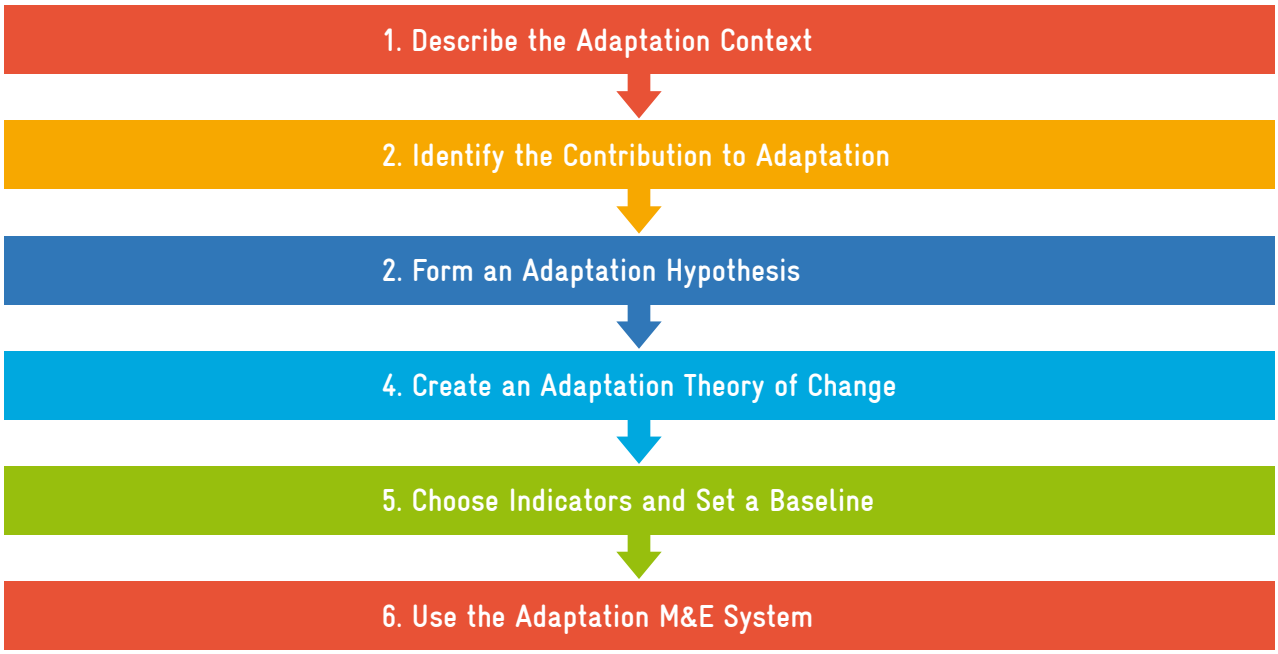
To develop an M&E system, practitioners need to first identify the key factors associated with the planned program, policy, or project that could trigger desired changes and positive impacts.[31] While each adaptation intervention will be at a different stage of planning when creating an M&E system to track results, and may have a different focus on expected results, a well-designed M&E system forms the basis for asking the "right" questions at the "right" time.

Taking each of these points into account, this chapter describes a six-step process for developing an M&E system for an adaptation intervention (Figure 3). For each step, the chapter provides a variety of examples readers may choose to follow, or from which they may borrow ideas relevant to their initiatives. Together with the resources reviewed in Annex II and further examples provided in Annexes III and IV, these materials give readers a range of options for tailoring their M&E system to the particular needs and context of a given intervention. The options detailed in this text are not comprehensive, but provide a menu of several practical and relevant methodologies and tools.

Step 1 gives sample options for describing the climate adaptation context for the intervention, enabling an understanding of needs and priorities for action. Step 2 characterizes the intervention objectives according to the key proposed framing for identifying its contribution to the adaptation process. Step 3 illustrates the use of an adaptation hypothesis to test whether the M&E system links back to the risks and vulnerabilities the intervention intended to address. Step 4 creates a "theory of change" to aid in tracking results and monitoring relevant direct and indirect factors affecting those results. The theory of change also spells out key assumptions about how and why the intervention functions. Step 5 provides a range of sample options for choosing appropriate indicators to capture the relative adaptation contribution. Finally, Step 6 discusses the process of setting up and using the M&E system in line with the key framing principles of this paper.

31 For two recent handbooks on (development) impact evaluation, see Gertler, Pual J. et al. 2011 and Khandker, Shahidur R., Gayatri B. Koolwal and Hussain A. Samad 2009.

Figure 3. Steps for Developing an M&E System for an Adaptation Intervention



These steps can be used for various ends. Development practitioners can deploy them to develop an M&E system for an adaptation intervention or to identify ways to monitor and evaluate adaptation-related dimensions of a broader development intervention. They can also provide a platform for reflecting on the usefulness of existing M&E systems for a particular adaptation program or strategy. The steps are generally ordered sequentially, but depending on the stage of planning for a particular intervention, it may be useful to skip a step, focus on a single step, or move through them out of order.

3.1 Step 1 – Describe the Adaptation Context

In designing an adaptation program or project and its M&E system, practitioners must explore current understanding of the climate and non-climate factors likely to aid or inhibit the measures taken. Such information enables project managers to set a baseline against which results are accounted for during and after implementation.[32] It can also greatly strengthen objectives and strategy. Often, climate risk or vulnerability assessments may already have been completed prior to the design and approval of an intervention. In other cases, new studies, surveys, or research may be a critical first step. Climate change risk and vulnerability assessments help implementers and project partners:

- Become aware of and better understand climate (and non-climate) factors that an adaptation intervention both is influenced by and aims to influence, whether directly or indirectly (such as clarifying who or what is exposed to what risks, what non-climate factors are driving vulnerability, and what are socially acceptable levels of risk).
- Describe needs and priorities of stakeholders (such as livelihoods and public health).[33]
- Identify otherwise unforeseen opportunities (such as ways of spreading risk, or overlaps with related development efforts).
- Maintain flexibility in working toward a goal by trying out different options when an initial strategy fails.

There are a wide variety of options for assessing the climate context of an adaptation intervention. Extensive studies may analyse multiple layers of climate, environmental and socio-economic data to form composite maps of vulnerability. Box 3, for example, illustrates a KfW Entwicklungsbank (development bank) program in India in which a district-level vulnerability assessment provided the basis for prioritizing adaptation actions for climate vulnerability reduction at a regional level. A process of "participatory micro-planning" accounts for village-level capacity and development priorities, and the entire program's M&E system links this bottom-up assessment with performance evaluation at the district, state, and regional levels. At the other extreme, rapid appraisals based on a review of existing data or documentation (such as a NAPA or a sectoral climate impact study) or stakeholder surveys can help gauge relationships between people and current climate stresses. Table 2, for example, shows a qualitative risk assessment for water sector planning.

Box 3. KfW: Using a Vulnerability Assessment to Prioritize Action at the Regional Level

Authors: Marcus Stewen, Nand Kishor Agrawal and Daniel Happ.

Introduction

India's northern region is expected to suffer severely from climate change. Anticipated impacts include melting of glaciers, increased floods, and extended droughts. Additionally, the region's natural resource base is under enormous pressure as a result of high population growth rates and increasing livelihood demands.

Therefore, one of the first global investment programs in climate change adaptation financed by the German Government through KfW Entwicklungsbank will focus on Northeast India. The Indo-German North East Climate Change Adaptation Program (NECCAP), currently in the final stages of planning, will finance measures to improve the adaptive capacity of vulnerable rural people and increase the resilience of land-use practices and ecosystems.

Three main outputs are envisaged:

(1) development and implementation of an effective selection and planning process for adequate adaptation measures,

(2) implementation of individual "adaptation actions" (i.e. direct-risk reduction and vulnerability reduction), and

(3) policy mainstreaming of successful models.

32 For a resource on understanding and using climate change information, see Kropp and Scholze. 2009.

33 For an example approach to defining priorities, see Hahn and Fröde 2010.

The program's inclusive approach involves embedding adaptation measures into a system for integrated and participatory village-based land-use and development planning. The adaptation measures are adjusted to local needs and are either based on a participatory village planning level designed as part of the larger program system, or designed as stand-alone activities. The former, known as participatory micro-planning, is a major pillar of the program's implementation concept, dictated by the following principles:

* The village micro-plan identifies all development activities, including measures for climate proofing, and access to suitable funding, including government schemes, NECCAP, and other sources.
* Plans integrate all stakeholders and clearly allocate sources of funds to each intervention.

In preparation for this initiative, the existing climate data of Northeast India were aggregated and climate change projections were developed. Analysis of historical climate data revealed considerable changes in the climate of Northeast India in recent decades, including significant increases in minimum and maximum temperatures and more erratic rainfall patterns, as well as an increase of drought and flood incidents. Projections of regional climate change, developed for program planning, indicate a clear continuation of these trends for 2021–2050 (see Figure 4).

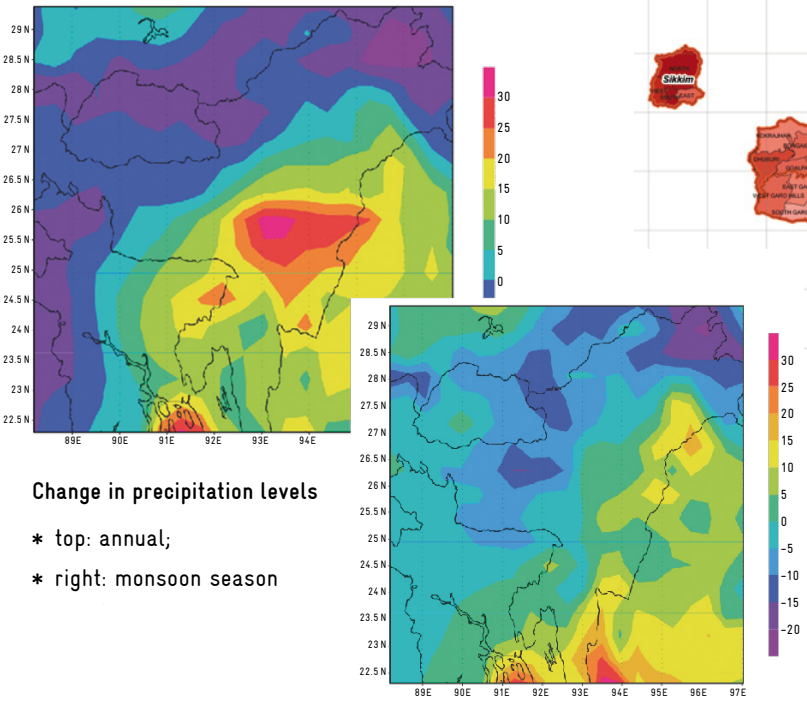
Vulnerability Assessment

These climate analyses and projections were used to determine the relative vulnerability of individual districts and sectors to the expected impacts of climate change. The resulting vulnerability profiles provided the basis for the innovative aspects of the program:

* the selection and prioritization of districts for program implementation according to their vulnerability to impacts of climate change, and
* the selection and prioritization of program activities regarding their potential to increase adaptive capacities.

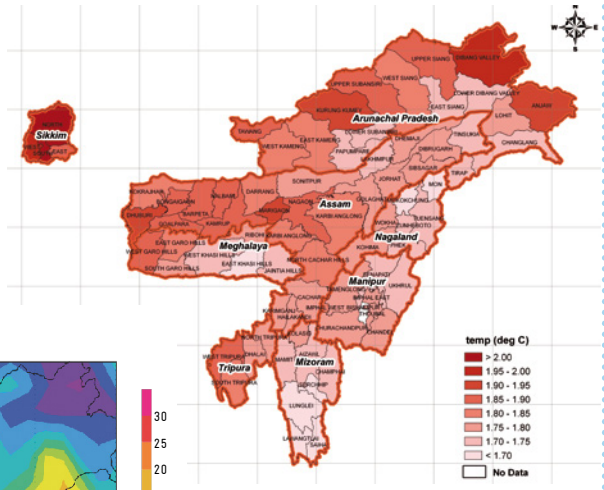
At this stage, 15 districts (out of 57 in the five participating states) have been identified for program implementation, based upon vulnerability ranking and low adaptive capacity.

Figure 4: Climate Change in Northeast India



Change in precipitation levels

* top: annual;
* right: monsoon season



Increase in temperature

2021-2050,
Baseline: 1975;
HadCM3 (RCM), A1B

Source: Ravindranath et al. 2010

Within the selected districts, concrete program activities will be chosen according to several technical selection criteria, including their relative potential to contribute to increased adaptive capacity of the rural poor. Activity selection will also align with the State Action Plans on Climate Change, which are currently under preparation in most of the north-eastern states.

Development of the M&E System

The NECCAP is designed as an open, demand-driven approach to adaptation. The respective state governments bear the main responsibility for implementation and compete with each other for program financing. Therefore, the actual budget allocation depends on the success and efficient implementation of the individual state projects. In other words, funding is performance-based.

Since there is no standardized procedure for impact monitoring of adaptation, NECCAP is one of the first programs of its kind to design a concrete M&E system with the support of the Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH and other leading institutions active in climate change adaptation. Independent monitoring missions will evaluate the implementation quality of each sub-project.

The program monitoring system will be integrated into the Indian governmental system. As the executing agency, the Ministry of Development of North East Region (DoNER), will set up an independent Regional Society for Climate Change Adaptation for the North East. State governments will set up project management units to coordinate and implement activities across affected line departments. The Regional Society will be responsible for technical steering and for screening and allocating funding for state proposals. It will also assemble data for financial and physical monitoring and for implementing impact monitoring. In addition, it will deploy screening criteria and guidelines for the design or redesign of proposals for projects and sub-projects from states and, where required, will assist states in redesigning projects and sub-projects.

Finally, indicators to measure impacts toward the program's goal will include:

* aggregated indicators for the adaptive capacity of target groups (such as increase and diversification of income, reduction of share of population below poverty line in spite of climate change);
* sectoral indicators (e.g. increased agricultural productivity and water availability, improved natural resource base, reduced damage due to floods (damage costs, reduced flooded agricultural area));
* indicators to measure the NECCAP contribution to the objectives of State-Level Action Plans on Climate Change (proportion of achievements realized through NECCAP); and
* indicators measuring the structural impact of the program, such as the number of centrally sponsored and state-sponsored schemes revised with a view to climate change adaptation-proofed design.

Table 2. Qualitative Risk Assessment for Water Sector Planning

Planning Area	Current and Expected Stresses to Systems in this Planning Area	Projected Climate Change impacts to Systems in this Planning Area	RISK ANALYSIS		
			Consequences of Impact (high, medium, low)	Probability of Impact (high, medium, low, unknown)	Estimated Risk to Systems in this Planning Area (high, medium, low)
Water Supply	More summer drought	More drought, summer water stress likely due to lower winter snowpack and warmer, drier summers. Population growth will compound problem.	High – threat to public safety, loss in consumer confidence, lost revenue. Affects entire customer base.	High – already a concern and warmer, drier conditions expected.	High
Storm water Management	Combined sewer overflows (CSOs)	More localized flooding, water quality problems possible if precipitation becomes more intense, frequent.	Medium – contributes to water quality degradation, potential health and ecosystems impacts. Affects combined sanitary/storm sewer piping in about 30% of the city.	Unknown at the regional level, but issue is already a major management concern and more intense precipitation observed since 1973.	Medium
Road operations and maintenance	Pavement buckling on asphalt roads in extreme heat events	More required asphalt maintenance likely.	Medium – potential implications for public safety, higher road maintenance costs, travel restrictions for heavy loads. Affects 55% of the city's medium and high volume roadways.	High – warmer summer temperatures expected.	Medium-High

Source: Snover, A.K., et al. 2007

Development practitioners and funders can also deploy established tools and approaches to assess the vulnerability of a local population targeted for an adaptation initiative. The UNFCCC Nairobi work program, for example, formed a Compendium on Tools and Methods for adaptation that provides resources for vulnerability mapping, socioeconomic scenarios, and sector climate impact assessments.[34] A recent report consolidating this work[35] concluded that methods and tools for understanding climate change impacts, vulnerabilities, and risks and for assessing climate change adaption options, including risk reduction, are most useful when they:

- can be used to address adaptation at different temporal and spatial scales;
- are developed and applied in a transparent, flexible, and participatory manner, taking into account multiple perspectives and interests, in particular those of end users;
- can be applied in a number of research contexts, or modified to accommodate multiple applications;
- are simple, requiring little input data or specialist knowledge;
- adopt a holistic approach to hazards, for example by translating disaster risk management plans and materials into local languages; and
- test scenarios appropriately.

Key questions for practitioners to consider in using vulnerability and risk assessments for M&E of adaptation interventions include:

- Is the information on risks and vulnerabilities adequate for establishing a baseline (or is additional assessment needed)?
- Does the assessment identify key enabling factors and key barriers to reaching the intervention's objectives?
- How will the M&E system treat uncertainty and gaps in the climate risk and vulnerability information?

3.2 Step 2 – Identify the Contribution to Adaptation

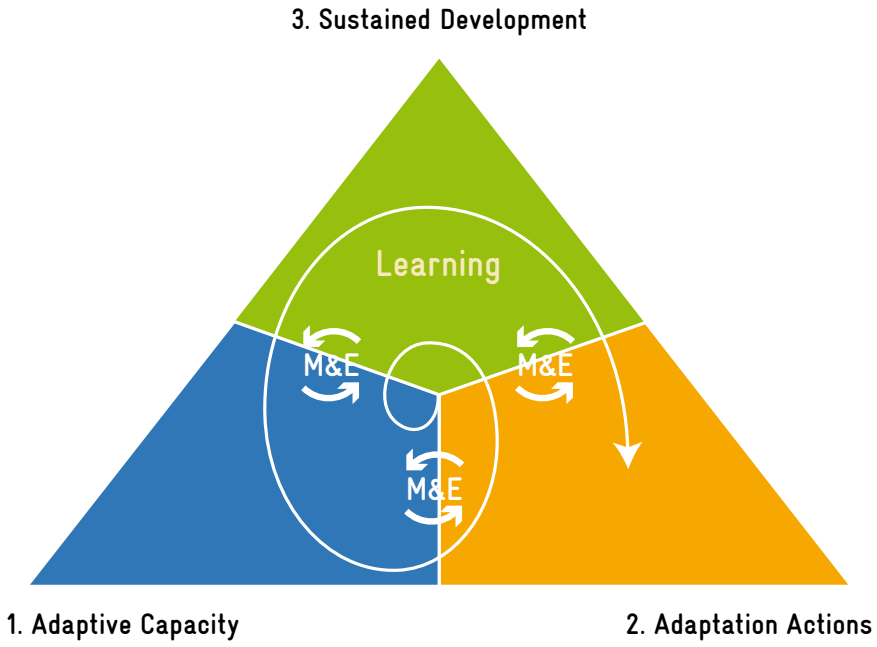
Given the diversity of possible objectives and activities with relevance to the process of adaptation, no one size fits all for M&E systems of adaptation interventions. Each intervention is tailored to a specific context and addresses factors important to that context. In light of the dynamic systems that affect intervention results, attributing desirable changes to a single intervention may be impossible. This paper proposes, rather, that each intervention makes a contribution to adaptation that can be described based on the nature of its achieved objectives.

To help practitioners identify an intervention's contribution to adaptation, this paper uses a three-part conceptual framework to categorize adaptation objectives (Figure 5). This framework illustrates what is being monitored and evaluated in any given program or project, and helps match appropriate indicators with the activities, outputs, outcomes, and objectives of the intervention (Step 5). Each addresses a unique dimension of adaptation. The three dimensions together provide practitioners with a framework for defining successful adaptation across a range of contexts:

- **Adaptive Capacity**: Building the capacity for a population to adapt provides a foundation for anticipating and adjusting to climatic conditions that will continue to change over a long period of time. Measures taken might include creating a new coordinating body across climate-relevant government ministries or improving the availability of good climate data and the ability to interpret the data.[36]
- **Adaptation Action**: To address specific climate change risks, adaptive capacity must be applied to specific decisions and actions. These actions may directly reduce or manage the biophysical impacts of climate change, or they may address non-climatic factors contributing to vulnerability. Some examples include planting drought-resistant crops in an area of reduced rainfall, and building a levee around a port that faces increased incidence of tidal surges.
- **Sustained Development in a Changing Climate**: The endpoint of adaptation is successful development – for example, human well-being and economic welfare improve in spite of continuing challenges posed by climate change. Development in a changing climate embraces a wide variety of objectives, such as a decrease in victims of climate-related diseases or an increase in income whose source is not threatened by climatic changes, such as reduced rainfall.

34 See UNFCCC undated-a.
35 UNFCCC 2010.
36 The uncertainties associated with climate change make the capacity to adapt often more important than any particular effort to adapt. For further discussion, see Yohe and Tol 2001 and Baas and Ramasamy 2008.

Figure 5. Three Dimensions of Adaptation



Funders and their partners can use the adaptation dimensions framework to:

- describe outcome- or program-level objectives, strategic objectives, or higher-level aggregation of results;
- assess the relative weight and importance of each dimension toward the adaptation process in a given intervention or context; and
- examine the relative strengths and weaknesses or success factors of the individual dimensions or the relationship between them in a given intervention or context.

Project managers can use the dimensions framework to:

- reduce the likelihood of neglecting important areas of analysis of adaptive success,
- characterize the types of lessons learned and best practices generated through the M&E system, and
- avoid double-counting of dimensions to be assessed in an M&E system.

Over the long term, results in all three dimensions are needed for successful adaptation. While any one intervention may not address all three, each intervention ultimately supports a learning process through which results from adaptive capacity interventions (1) support the implementation of adaptation actions (2), while lessons from adaptation actions feed back into the capacity development process. Both are needed if development is to succeed in a changing climate (3). This iterative learning process is represented in Figure 5 by a spiral arrow moving sequentially outward through each of the three dimensions of adaptation.

The following section further discusses each dimension and gives examples of objectives practitioners might set within each dimension.

Building Adaptive Capacity. Adaptive capacity means having the skills, resources, and flexibility to adjust a course of action and prevail in light of changing conditions. In the context of climate change, adaptive capacity objectives seek to improve the quality of readiness for dealing with both known and uncertain effects of climate variability and climate change. Adaptive capacity fosters forward thinking, planning, and laying the groundwork to avoid harm and capitalize on opportunity. An intervention's aim falls within this adaptation dimension if it seeks to improve the quality and availability of resources needed to adapt, or if it addresses the capability to use those resources effectively.[37]

37 UNDP 2010a.

To fulfill such objectives, practitioners might seek to bolster technical, financial, environmental, legal, or other forms of institutional, organisational, or individual capacity. Systems that exhibit adaptive capacity are poised to manage a number of different possible future climate scenarios. If successful, such an approach generates more targeted and effective adaptation actions and reduces the additional burden of climate impacts on development.

Examples of objectives that practitioners might set for building adaptive capacity include:

- support the creation of legislation that mandates adaptation planning in key sectors,
- improve the uptake of information on climate risks by a particular audience, and
- remove barriers to the use of specific adaptation technologies.

Implementing Adaptation Actions. Adaptation actions concretely address identified climate risks by directly reducing or managing these risks to a vulnerable population. A project manager's objectives are the desired results of activities that address known effects of climate variability (such as altered monsoon intensity or coverage) or specific projected climate change impacts (such as sea level rise) on a sector, community, or ecosystem. While building adaptive capacity addresses a state of being for humans and institutions, adaptation actions have concrete socioeconomic and biophysical results. Some level of adaptive capacity must precede adaptation actions, as the capacity provides the skills, knowledge, and resources needed to take action. Typically, information on predicted climate variability and change and on the vulnerabilities of the target group or system together provides enough information to identify and select appropriate adaptation actions.

Examples of objectives that practitioners might set for adaptation actions include:

- rehabilitate an ecosystem, such as a mangrove, that provides protection against climate risks,
- improve agricultural productivity using new farming techniques, and
- reduce the severity of damage to transportation infrastructure from extreme weather.

Sustaining Development in a Changing Climate. Sustained development means both reaching development agenda targets and maintaining a desirable level of development in the face of climate change. As described in Chapter 1, adaptation is becoming an increasingly important ingredient in successful development. Without adaptation to climate risks, the chances of achieving development goals diminish. Therefore, the objectives of sustained development in a changing climate embody those of development-relevant agendas championed by governments and funders, such as economic growth, poverty reduction, public health, good governance, gender equality, ecosystem services, and public services. Such objectives might also promote increased attention to the effects of climate risks, as well as synergies between climate and non-climate risks that can feed into building adaptive capacity.

However, practitioners planning interventions should recognize that not all development is adaptation and not all adaptation leads to development. For example, in a growing economy that does not account for climate risks, increasing GDP could also increase vulnerability if economic growth overexploits climate-sensitive resources. Likewise, near-term economic growth may set a community upon a development path that accumulates climate risk over time, as when growing reliance upon irrigation becomes unsustainable as the climate dries and groundwater recharge slows.

In short, governments (and funders) face trade-offs, including the possibility that development activities may inadvertently exacerbate the effects of climate change more than taking no action. This paper suggests that in using adaptive capacity to inform adaptation actions, lessons learned and knowledge captured through the M&E system can lead to more focused and feasible approaches to development under future climate conditions. The continual success of adaptation is to inform and enable development, despite the effects of climate change. Still, knowing how that development was achieved is equally important to sustaining it in a changing climate, and M&E plays a central role.

Examples of objectives that practitioners might set for sustained development include:

- improve the health of a population in a malaria-endemic region;
- reduce property loss for small island state coastal communities; and
- achieve identified national targets within a globally recognized development index (e.g. the Human Development Index, MDG Progress Index).

Key questions for practitioners to identify an intervention's contribution to adaptation include:

- Which dimension(s) of adaptation do the intervention's main objectives address?
- How does the M&E system reflect the relationship between the adaptation dimensions?

3.3 Step 3 – Form an Adaptation Hypothesis

Once it is clear how the intervention's key objectives contribute to one or more of the adaptation dimensions, it is important for practitioners to link the outcomes of those main objectives back to the relevant risks and vulnerabilities the intervention intends to address. An adaptation hypothesis is a testable statement that describes how each outcome addresses risks or vulnerabilities prioritized in Step 1.

For each major outcome sought for an intervention, practitioners should produce a hypothesis that outlines how and why the outcome is expected to contribute to adaptation. This brief statement should summarize the rationale for the outcome, typically by linking the outcome through key dimensions of the intervention strategy to the findings of the initial vulnerability or risk assessment. This should help practitioners ensure that the design of the M&E system addresses the specific climate context, and therefore focuses M&E on the factors most likely to measure adaptation benefits. For example, a community-based adaptation project of the M.S. Swaminathan Research Foundation, included an objective to "enhance the adaptive capacity of the local communities," which encompassed activities and outcomes in four capacity categories.[38] The respective hypotheses were as follows:

Livestock: Livestock rearing is an important coping strategy in the face of increased climate variability. Buffer stocks of fodder (including tree fodder) and good breeds of livestock can be important risk-reduction strategies and can enhance adaptive capacities.

Energy: Biomass-based energy production offers an alternative coping strategy for households vulnerable to climate change impacts in semi-arid areas.

Water: Community access to weather monitoring and prediction data, combined with community-managed water resource systems, can lead to greater water use efficiencies and improved adaptive capacities.

Land Use: Village-level land-use maps can provide a range of options for different rainfall scenarios. They can lead to stabilization of yields from rain-fed farming, and greater food and economic security.

We use the term "hypothesis" to acknowledge the uncertainties associated with both the impacts of climate change and the adaptation contribution of particular activities. Even if the intervention succeeds in achieving its intended outcomes, those outcomes may not contribute to adaptation as expected, either because the impacts of climate change are not as anticipated, or because the adaptive nature of the results is less than expected. The term "hypothesis" recognizes that the results, whether positive or negative, can contribute to a learning process to better inform effective adaptation.

Questions for practitioners to consider in forming an adaptation hypothesis for an intervention include:

- Does the adaptation hypothesis make clear how the intervention addresses climate adaptation needs identified in the vulnerability and risk assessment (Step 1)?
- Does each major intervention outcome have an adaptation hypothesis?

3.4 Step 4 – Create an Adaptation Theory of Change

Once a clear hypothesis is drafted for each intervention outcome, the next step is to draft a consistent theory of change (ToC) (Step 4) that links core activities to adaptation outcomes. A ToC traces the conditions needed to reach objectives by breaking them down into achievable steps. This typically means mapping out the primary activities, outputs, and outcome(s) associated with a given objective. The sequential narrative of a ToC (also described as a "results chain" or an "impacts chain") is helpful for understanding how and why an intervention functions. It acts as a point of reference for checking progress while monitoring, and can be used to evaluate completed projects and inform future project design.[39] This paper treats an intervention's ToC as the "backbone" of the intervention's M&E system.

Typically, a ToC is illustrated with a table or visual of expected inputs, outputs, outcomes, and impacts for the intervention (see Figure 6). The "theory" is how the program or project is expected to progress from inputs to impacts. Mapping out the relationships between these steps

38 Appadurai, Arivudai Nambi. 2011.

39 For example of guides on developing a theory of change, see Kellogg Foundation undated; see also Organisational Research Services 2004.

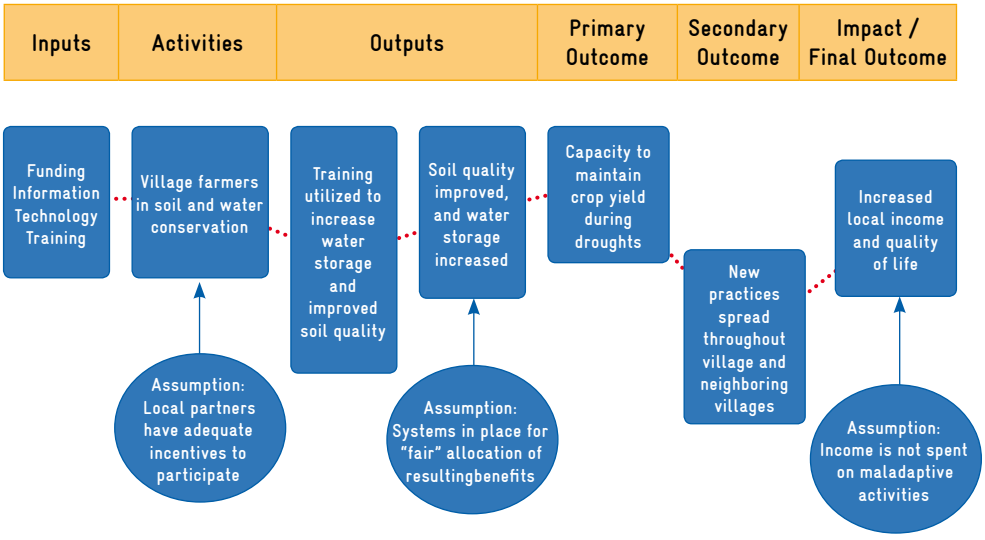
enables practitioners to visualize the strategy or rationale behind intervention objectives. In the case of adaptation, it shows how the intervention helps build adaptive capacity, facilitates adaptation actions, and supports development in light of climate change. As development cooperation portfolios increasingly undergo climate risk screening and climate proofing, ToCs can be used to integrate current and future climate risks into interventions' objectives, strategies, and assumptions. Over time, poor execution or wasted resources also become more readily apparent as weak points within and between the various stages of the ToC.

Furthermore, ToCs can be used to highlight key "assumptions" behind the intervention strategy or design. In order for M&E to support appropriate adjustment of an intervention over time, it is important to make explicit any assumptions about key factors that may help or hinder the achievement of intended results. Assumptions may be related to the design and execution of the intervention (and are, therefore, controllable), or may be related to conditions and events outside the intervention. For example, intervention managers may make assumptions at the design stage about a particular policy or environmental condition that is expected to influence intervention results many years later. Likewise, stakeholders and intervention partners may have assumptions about factors that affect the achievement of results. Noting the key assumptions in the ToC can help clarify the basis of decision making and can help to form evaluation questions for assessing closed interventions. Assumptions also provide a good indication of the values that underpin the intervention.

Figure 6 illustrates key assumptions at relevant stages of a ToC for a hypothetical rural village facing increased incidence of drought and soil degradation. This example is written from the perspective of the intervention managers. Their noted assumptions are based on an understanding of key factors that either positively or negatively affect the achievement of intervention objectives, and points to where that assumption is relevant in the ToC. The basis of determining which assumptions are important comes from an understanding of the context of the intervention. For example, practitioners may want to note assumptions about risks to achieving objectives, which they may discover through examination of past efforts in a similar context, or during Step 1. Likewise, they may wish to note assumptions about an opportunity to magnify positive results (e.g. a forthcoming policy change, actions that resulted in autonomous adaptation). Annex III provides complete ToC from four adaptation-relevant programs,[40] from which practitioners can identify approaches and options most relevant to the intervention(s) they plan.

40 Asian Cities Climate Change Resilience Network, TerrAfrica land degradation, GIZ Rural Adaptation in India, World Bank Climate Investment Funds Pilot Program on Climate Resilience.

Figure 6. Example Theory of Change with Assumptions[41]



41 This depiction is highly oversimplified for illustrative purposes. For example, not all key assumptions are included, several outputs typically lead to one outcome, and several outcomes must be met in order to attain "impact."

ToCs related to preparedness for events or circumstances that may occur unpredictably, or not at all (such as those for disaster risk reduction), are often the most conceptually difficult to construct. Likewise, adaptation interventions that face multiple possible future scenarios may require detailed thought and consultation. However, a ToC may be especially useful for managing a multi-scenario intervention, since practitioners will especially need to:

- identify and correct false assumptions,
- integrate new information into the strategy over time, and
- learn from reflection on iterative results in order to reach objectives.

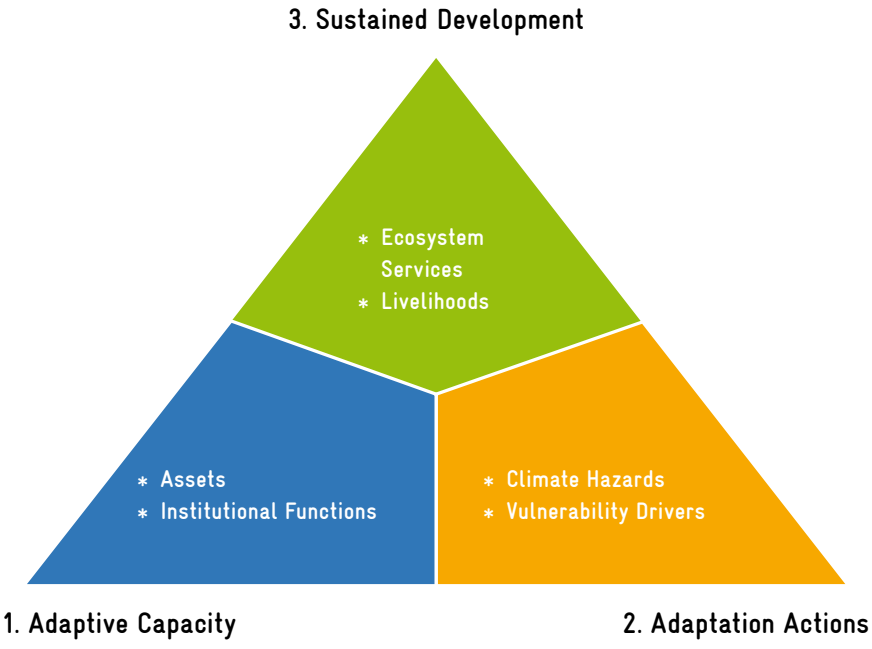
Many types of ToCs are relevant to climate change adaptation. Examples include those formulated for sustainable land management, watershed management, sustainable forestry, sustainable agriculture, and information sharing and technical capacity building in NRM or climate change.[42] Practitioners have also begun to develop and test participatory planning methodologies that are complementary to RBM and ToCs, but also help address the complexities of M&E for adaptation and NRM. Some of these options include outcome mapping (first introduced in Box 1), impact and response matrixes, and conceptual models, which are tools particularly suited for helping to capture local factors that shape the relationship between local climate and non-climate stresses and the options to address them. Annex V provides visual depictions of these three methodologies.

Key questions for practitioners to consider when creating a ToC for an adaptation intervention include:

- Does the ToC link the intervention objectives with the outcome-level adaptation hypotheses (Step 3)?
- Does the intervention ToC support or inform a programmatic or higher-level ToC (such as at the relevant sector or policy levels)?
- What surrounding key factors or conditions could advance or undermine the success of the intervention? Does the M&E system make assumptions about these factors or conditions in the relevant stage of the ToC?

42 For further examples of ToCs and results frameworks relevant to adaptation and sustainable land management, see Annexes III and IV.

Figure 7. Example Indicator Sets for Each Adaptation Dimension



3.5 Step 5 – Choose Indicators and Set a Baseline

Choosing indicators to support M&E for adaptation presents challenges because many different options exist. Adaptation cannot be measured by a single, universal indicator as mitigation of climate change can. Potentially, practitioners could select from among any number of development, natural resource management, disaster risk management, and other indicators appropriate for assessing adaptation in a particular climate context. But the particular challenge is to define the concrete adaptation impact which should also be reflected by the choice of the indicators. Steps 1–4 focused on the question of how an intervention relates to a particular climate context, so that in Step 5 practitioners can choose indicators that:

- are informed by the vulnerability and risk assessment (Step 1);
- target the intervention's adaptation objectives (Step 2);
- link back to the adaptation hypothesis (Step 3); and
- are informed by the ToC (Step 4).

The Adaptation Dimensions Framework can assist in focusing the indicator selection process. For each dimension, this paper highlights two possible sets of useful indicators for describing adaptation intervention objectives, each of which presents a distinct way of defining success. These by no means cover the full range of potential indicator options, and are not intended to exclude others. Moreover, interventions with multiple objectives may benefit from using indicators from several sets, as well as applying a mixed methodology of outcome and process indicators (Box 4). Figure 7 lists the example indicator sets within their respective dimensions of adaptation. They are described in detail in sections 3.5.1 (Adaptive Capacity), 3.5.2 (Adaptation Actions), and 3.5.3 (Sustained Development), followed by section 3.5.4, a discussion on setting baselines for the adaptation dimensions.

Box 4. Defining Adaptation Effectiveness: Process and Outcome Indicators

Practitioners often struggle to find the appropriate balance of process and outcome indicators in M&E systems for adaptation, reflecting several of the key tensions highlighted above in Table 1. Typically, outcome indicators are associated with emphasis on the function of M&E for supporting accountability processes, especially of adaptation project proponents to their funders, and of development agencies to their political constituents. However, the utility of many outcome indicators is limited by the long time horizons across which M&E must measure adaptation outcomes if it is truly to capture whether interventions succeed in addressing specific climate change risks. Conversely, process indicators can often apply well at short time scales, and provide a good fit with the role of M&E in supporting ongoing learning and capacity development. However, they may disappoint those who seek evidence of lives saved, damages averted, or related impacts.

The European Topic Centre on Air and Climate Change[43] sums up the advantages and disadvantages of using process and outcome indicators for adaptation.

Table 3: Advantages and Disadvantages of Using Process and Outcome Indicators for Adaptation

Process-based indicators	Outcome-based indicators
Advantages	
* Allow stakeholders/sectoral experts to choose the most appropriate adaptation action to meet an outcome. * Flexible approach – can adjust to new information as it becomes available.	* Most government policy objectives/targets are outcome-based. * May be possible to link adaptation objectives with objectives in other policy areas. * Likely to be sector-specific.
Disadvantages	
* Defining a process does not guarantee successful adaptation. * A different approach from most other government targets, so often unfamiliar to practitioners. * May make it difficult to integrate adaptation objectives with objectives in other policy areas. * Not necessarily sector-specific.	* Defining an outcome does not guarantee successful adaptation. * Risk of being overly prescriptive of adaptation options (specifying suboptimal options). * May be inflexible and make it difficult to introduce new information (though great scope for flexibility in implementing specific actions to achieve outcome).

43 ETC/ACC 2009.

The balance between process and outcome indicators in a given M&E system will reflect distinct priorities and expectations for adaptation as follows:

Process. Many adaptation initiatives focus on the establishment of an adaptive process as their objective. Typically, in these initiatives, adaptation effectiveness means setting in motion an ongoing process of understanding and addressing risks and vulnerabilities, which fosters learning and improvement. This perspective aligns well with the uncertainties associated with climate change and recognizes that an adaptation endpoint often cannot be determined at the outset. Success consists of establishing a process that enables decision makers to match their actions to the needs created by climatic circumstances, vulnerability drivers, and stakeholders' priorities and risk tolerances. M&E in this context considers elements of procedure, including, for example:

* Degree and quality of participant involvement in adaptation decisions,
* Relevance and quality of informational inputs to adaptation decisions,
* Thoroughness of accounting for climate risks and vulnerability in decision making,
* Number and quality of laws or policies addressing climate change, and
* Whether and how the adaptation process is sustained.

Outcome. Several adaptation initiatives focus more on identifying the substantive outcomes than identifying the procedural outcomes. For these, adaptation success typically means building specific capacities, reducing a particular vulnerability, or managing specific risks. Outcomes may connect to procedural effectiveness, but the emphasis is on evidence of change, rather than on the processes through which change occurs. Examples include:

* Change in degree of exposure to climate risks and threats;
* Evidence of changed quality of climate-sensitive natural resource base;
* Utility and quality of early warning systems;
* Change in stakeholder response to climate risk, or utilization of adaptation options; and
* Evidence of community, sectoral, or institutional understanding and capability to deal with or avoid climate-induced losses.

Practitioners may use several criteria for choosing appropriate indicators for their M&E systems. The following general checklist for development indicator selection is modified from the Canadian International Development Agency:[44]

1. **Validity**: Does the indicator measure a change in climate risk or vulnerability?
2. **Precise Meaning**: Do stakeholders agree on exactly what the indicator measures in this context?
3. **Practical, Affordable, and Simple**: Are climate- and adaptation-relevant data actually available at reasonable cost and effort? Will it be easy to collect and analyse information?
4. **Reliability**: Can the indicator be consistently measured against the adaptation baseline over the short, medium and long term?
5. **Sensitivity**: When the respective climatic effects or adaptive behaviors change, is the indicator susceptible to those changes?
6. **Clear Direction**: Are we sure whether an increase in value is good or bad and for which adaptation dimensions?
7. **Utility**: Will the information collected be useful for adaptive management, results accountability, and learning?
8. **Owned**: Do stakeholders agree that this indicator makes sense for testing the adaptation hypothesis?

When applied in a generic sense, these criteria are appropriate guidance for all development indicators. However, one of the challenges of M&E for adaptation is choosing indicators that address the nature, breadth, and degree of changes in response to climate change over long periods of time. Such aspects may or may not be reflected in indicators selected according to the above criteria.

44 CIDA 2004. Reprinted in AFB 2010.

Especially in the early stages of M&E for adaptation, learning how and to what degree any given intervention addresses any one or all three of the adaptation dimensions means choosing indicators that measure these long-term changes. Therefore, to capture this process, UNDP suggests the following parameters for defining indicators of success for adaptation interventions at the project and portfolio levels:

1. Coverage: The extent to which projects reach vulnerable stakeholders (individuals, households, businesses, government agencies, policymakers, etc.).
2. Impact: The extent to which projects reduce vulnerability and/or enhance adaptive capacity.
3. Sustainability: The ability of stakeholders to continue the adaptation process beyond project lifetimes,[45] thereby sustaining development benefits.
4. Replicability: The extent to which projects generate and disseminate results and lessons of value in other contexts.[46]

Key questions for practitioners to consider in developing indicators for adaptation include:

- Do these indicators address climate risk or vulnerability at the most appropriate scale? (Step 1)
- Can the indicators help account for maladaptation and autonomous adaptation according to the risk and/or vulnerability assessment (Step 1)?[47]
- Do the indicators adequately address short-term (<5 years), medium-term (5–20years), and long-term (20+ years) time frames for climate variability and climate change?
- To which adaptation dimensions (Step 2) will results measured with these indicators contribute?
- Are the indicators relevant to "test" the relevant adaptation hypotheses (Step 3)?
- Do the indicators reflect evidence of progress within or between stages of the ToC (Step 4)?
- Based on the adaptation objectives, is there an appropriate balance between process and outcome indicators (Box 5)? Between qualitative and quantitative indicators?
- Is there a manageable number of indicators, given expected time frames for reporting and resources available for monitoring?[48]
- Are there indicators to measure the quality of design and implementation, and indicators that measure impact?

In conjunction with the development of indicators for an M&E system, practitioners typically identify the baseline values for each indicator. The setting of baselines relies heavily upon understanding the climate change context at the time the intervention begins (Step 1). Section 3.6.4 provides additional advice on baselines and targets, with examples.

3.5.1 Indicators for Building Adaptive Capacity

In identifying useful indicators for measuring adaptive capacity, practitioners should consider, among other things:

- the foundations of effective organisational structures around adaptation-related issues,
- the resources and capabilities within institutions working on adaptation-related issues,
- the relevant experiences and skill sets of target groups and individuals,
- the sources of quality information on the effects of climate change, and
- other resources or conditions that may support actions that may lead to improved adaptation.

Key questions for practitioners to consider in developing adaptive capacity indicators include:

- Do these indicators describe the resources or capabilities needed to act on the particular climate risks, hazards, or drivers of vulnerability that the intervention addresses?
- Do results reported from these indicators inform or improve identification of options for adaptation actions and/or sustained development in the context of climate change?

45 Sustainability assessment can also be facilitated by the development of evaluation mechanisms to assess the "legacy" of projects after they have ended. These mechanisms could consist of simple evaluations based on questionnaire surveys managed by country and regional offices.

46 UNDP 2008b.

47 For example, examine the "early" versus "late adaptors" to an identified risk, and which approaches yielded which results.

48 For example, a rule of thumb might be no more than eight indicators per intervention, and there should be two or more outputs used to assess each outcome.

- Can the results reported from these indicators be used to help stakeholders, such as policymakers or communities, make decisions about development in the context of climate change?

Following are two example indicator sets for adaptive capacity: institutional functions and assets.

1. Institutional Functions. An institutional function can be defined as an activity to which an institution is particularly well suited or as a duty assigned by law or by custom. Several "adaptation functions" are emerging as critical for success, and the development of institutional capacity to perform these functions is one possible type of indicator through which to frame adaptive capacity. A "functions approach" to adaptive capacity asks, "What are people able to do that can help them adapt?" For example, irrespective of the specific climate risks or vulnerability drivers at play in a particular place, the capacity to assess risk and vulnerability will be critically important as adaptation efforts progress. Likewise, the capacity to manage climate-related information will be vital to the success of almost all ongoing adaptation initiatives. The government of Bangladesh, for example, identified six "pillars" as national priorities in its 2008 national climate change strategy, which builds the foundation for targeted adaptation actions and capacity building. Using largely qualitative and process-oriented indicators, this approach can identify opportunities and priorities for building adaptive capacity.[49]

WRI's National Adaptive Capacity Framework (NAC)[50] provides a typology of such adaptation-specific functions at the national level, which may be helpful in developing indicators or a ToC that uses institutional functions indicators. Developers of M&E systems may also consider the integration of adaptation into "non-adaptation-specific" institutional functions, such as national budgeting, legislative oversight, district planning, or the provision of key public services (education, health care, social safety nets, transportation infrastructure, etc.). Critical functions are likely to vary, depending on the geographic scale of an adaptive capacity intervention. There is a growing interest among development cooperation funders and their partners in discussions of the potential role of decentralization and local-level institutions in adaptation.[51] In Bolivia, for example, initial efforts to adapt to climate change were isolated and dispersed. The NAC assessment helped identify opportunities for coordination between these disparate efforts. Table 4 shows example indicators for institutional functions drawn from the NAC pilot of Bolivia.

49 Government of Bangladesh 2009.
50 WRI 2009.
51 Agrawal 2008.

Table 4. Bolivia: Piloting the National Adaptive Capacity Framework

Function	Indicators	Policy Provisions and Criteria	Indicators
Process indicators			
EVALUATION	There is a clear mandate to include climate risk considerations within local development plans and other planning instruments.	Local development plans.	Availability of methodologies, guidelines to assist local planners.
COORDINATION	An institution has been tasked to follow up adaptation efforts in the country.	Mechanismo National de Adaptación al Cambio Climático (MNACC) (National Mechanism for Adaptation to Climate Change) Enforcement by the Law of the Republic	Mandated institution has a set of indicators and indicators by which to coordinate other players.
RISK REDUCTION	In 5 years, a set of economic incentives for risk reduction has been tested and applied by local, regional, and national investments.	Local funding provisions.	Percentage of "risk mitigation" funds provided by the central government to local, regional, and national investment projects.

Source: Iwanciw, Javier Gonzalez, and Heidi Zalles. 2010

2. Assets. Resources that provide a foundation for taking adaptation actions – whether social, cultural, economic, environmental, or technological – can be thought of as assets for adaptation. Assessing adaptive capacity through asset indicators means focusing on resources available for such use. Trees could be considered an adaptation asset in particular contexts, for example, because growing them can affect the micro-climate by reducing ground temperature and increasing rainfall. Planting and tending drought-resistant trees with edible fruits can also enhance food security and nutrition, and provide an additional source of fuel wood.[52] Asset-based indicators, therefore, reflect the "stock" of available adaptation resources and are commonly depicted by outcome indicators (as opposed to process indicators). Entry points for an asset approach are highly dependent on the context of the intervention and could range from the localized assets (such as livestock or grain stores) to global leveraging of resources (such as international financial mechanisms or adaptation-relevant technologies).

52 See similar projects in Zimbabwe (Agobia 1999) and Botswana (UNESCO 1999).

An asset approach can be particularly important for the poorest and most vulnerable members of a population, as their adaptation options are often determined by asset constraints.[53] Table 5 defines and illustrates example indicators for assets potentially important to adaptation at the individual, household and community levels.

53 Prowse and Scott 2008.

Table 5. Definitions and Example Indicators for Capital Assets

Asset	Definition	Example Indicators
Physical	The stock of plant, equipment, infrastructure, and other productive resources owned by individuals, the business sector, or the country itself.	* Area of productive rangeland
Financial	The financial resources available to people (savings, supplies of credit).	* Number of people with access to credit
Human	Investments in the education, health, and nutrition of individuals. Labor is linked to investments in human capital, health status influences people's capacity to work, and skill and education determine the returns from their labor.	* Percentage of school-aged children in school
Social	An intangible asset, defined as the rules, norms, obligations, reciprocity, and trust embedded in social relations, social structures, and societies' institutional arrangements. It is embedded at the micro-institutional level (communities and households), as well as in the rules and regulations governing formalized institutions in the marketplace, political system, and civil society.	* Legitimacy of natural resource management committees
Natural	The stock of environmentally provided assets, such as soil, atmosphere, forests, minerals, water, and wetlands. In rural communities, land is a critical productive asset for the poor; in urban areas, land for shelter is also a critical productive asset.	* Quality of housing structure

Source: adapted from Moser 2007

3.5.2 Indicators for Implementing Adaptation Actions

As discussed earlier, the adaptation actions dimension of a given program or project focuses on the implementation of discrete activities that address particular climate risks and vulnerabilities. Many of these interventions rely on adaptive capacity in order to succeed. At the same time, the implementation of adaptation actions sometimes helps to build capacity, so practitioners may discover a dynamic "learning by doing" relationship between adaptation actions and adaptive capacity dimensions.

Adaptation actions can be approached through two complementary types of indicators: climate hazards and vulnerability drivers. These two approaches focus on distinct categories of factors that contribute to climate risk. However, in most cases adaptation action interventions, or portions of such interventions, will use both perspectives in prioritizing activities and selecting indicators. The balance of hazard and vulnerability emphasis should reflect the relative contribution of various factors identified in vulnerability and impacts assessments, which should also have informed the ToC.

Key questions to consider in the selection of adaptation action indicators include:

- Do results reported on these indicators show changes in the biophysical aspects of vulnerability to climate risks or hazards, based on the risk/vulnerability assessment (Step 1)?
- Will the value of the indicator change over time relative to short- (<5 years), medium- (5–20 years)- or long-term (20+ years) climate scenarios (Step 1)?
- Do results reported on these indicators reveal adaptive capacity needs or help identify options for sustained development in a changing climate (Step 2)?
- Can results reported on these indicators help to identify options for adjusting the adaptation hypothesis, ToC, and associated activities should the action prove ineffectual or maladaptive?
- Do the indicators reflect the prioritization of risk factors identified by the intervention's target group?[54]

Following are two example indicator sets for adaptation actions: climate hazards and vulnerability drivers.

54 Bear in mind that risk tolerances are highly subjective and may often be more relevant for successful adaptation than quantification of risk. This is especially true in the many cases where quantification of the relative contribution of risk factors is highly uncertain, or where quantified evidence is lacking entirely.

1. Climate Hazards. Climate hazards indicators focus on a physical manifestation of climate change or a hazard that may put people or ecosystems at risk. This approach focuses on the severity and frequency of biophysical phenomena, such as storm surges, salinization of water, drying of habitat, disease vector movement, or changing intensity of precipitation. Adaptation actions derived from a climate hazard perspective would range from physical protection measures, such as moving vulnerable people out of harm's way, to increasing storage capacities (of food and water) or introducing risk transfer mechanisms, such as insurance. Associated indicators often will be general indicators that describe the exposure of the target population to a specific hazard, even though groups and individuals within that population may have differential exposure or different types or levels of risk to which the exposure might lead. The assumptions, baseline, and ToC should address these critical pieces of context. These indicators should be designed to capture shifting hazard profiles, which are a hallmark of the changing climate.

In an effort to address seasonal population growth and projected shortages of water supply in South Africa, for example, a municipality has adopted a comprehensive water resource management and development program over the course of the past decade, addressing water demand management and finding additional, sustainable sources of water.[55] In another example, the Asian Development Bank (ADB) supported a project to implement structural and nonstructural protective measures to reduce the impacts of floods in China's Hunan River basin. Table 6 lists performance targets and indicators developed for the M&E of this project. The aim was to eventually increase commercial and industrial investment and employment, while reducing government expenditures on flood repairs, compensation, and private property losses. The project assumes that the population in flood-protected areas recognizes flood risks beyond design standards, despite possible in-migration, and that floods will not exceed infrastructure design standards.

2. Vulnerability Drivers. As discussed in Chapter 1, many climate and non-climate factors may contribute to vulnerability. Effective adaptation actions, therefore, depend on the social, economic, environmental, or political factors that make some people, communities, or ecosystems more vulnerable to a particular climate hazard than others. Adaptation actions frequently address these factors, rather than addressing exposure to a hazard.

55 UNISDR 2010.

Table 6. China: Hunan Flood Management Sector Project Performance Targets and Indicators

Design Summary	Performance Targets/Indicators
Impact: Sustainable and inclusive socioeconomic growth in flood-prone areas of Hunan Province.	* Number of newly established industrial and commercial enterprises in the project areas increases compared with base year 2006. * Land values for commercial and industrial purposes in project areas increases by at least 20% over 2005 levels by 2012. * Urban poverty incidence in the project areas is reduced compared with 2003 incidence of 6.7%.
Outcome: Flood protection for strategic and priority flood-prone areas in the upper reaches of the four main river basins in Hunan Province is improved.	* Annualized flood damage and disaster relief costs are reduced in participating cities as a result of increased standards for flood protection works and improved flood emergency preparedness. * Direct economic losses from floods and waterlogging are reduced compared with current average losses.
Outputs 1. Nonstructural flood management systems: operational flood warning and management systems for up to 35 municipalities and counties linked to the provincial flood-warning and -management system.	* Warning time against potential floods in the project area is increased (current warning time is a few hours to one day). * Forecasting and warning data are more frequently accurate.
Outputs 2. Structural flood protection, resettlement, and environment management: flood protection works are completed in priority locations as part of Hunan's River Basin Flood Control Plan and the 11th Hunan Provincial Five-Year Plan and in compliance with People's Republic of China regulations and ADB safeguard policies.	* Flood-control level of county-level cities is improved to 1 in 20-year-return flood from below 1 in 5-year-return flood recurrence by the end of project. * Flood-control level of municipal cities is improved to 1 in 50 or 100-year-return flood by the end of the project. * Satisfaction level of the 20,133 relocated persons is restored to pre-resettlement levels in terms of income and livelihood. * Percentage of environment management plan monitoring targets is achieved.
Output 3. Project management and capacity building: operational and strengthened project management and monitoring systems.	* Timely and informative reporting of local project management offices reflects accurate and on-time project implementation in line with agreed assurances. * Domestic systems-based project management and monitoring system, including Project Performance Management System, is operationalized.
Output 4. Flood management sector planning: selected sector assessments and planning to support development of integrated flood management plans (grant financed through the advisory technical assistance).	* Basin-wide flood-warning system development needs are assessed; flood insurance is appraised with support from advisory technical assistance; next actions for inclusion in a future flood management plan are agreed upon by key provincial authorities by 2008.

Source: ABD 2006

This approach to indicators frequently addresses factors that overlap significantly with those for poverty reduction and other "non-climate" goals. Practitioners should carefully justify the selection of vulnerability driver indicators with a ToC that derives from, if possible, a robust vulnerability assessment. This is important because outside observers may interpret many of these indicators as "business-as-usual" development indicators if there is not a logical link to a specific climate risk or set of climate stressors.

For example, CARE's Community Land Use Responses to Climate Change Project worked with local communities to integrate adaptation issues into the Medium-Term Plans (2010–2015) for two districts in Ghana. Floods, droughts, and erratic rainfall were identified as key issues exacerbating the vulnerability of the local population, and the project strengthened communities' capacity to communicate their needs and identified priority actions to reduce vulnerability to climate change.[56] Another example is given in Table 7, which describes the performance indicators for a GEF project intended to address the vulnerability of pastoral farmers in Namibia.

56 CARE 2009b.

Table 7. Namibia: Adapting to Climate Change through the Improvement of Traditional Crops and Livestock Farming (Climate Change Adaptation)

Project Objective, Outcomes & Outputs	Key Performance Indicators
Objective: To develop and pilot a range of coping mechanisms for reducing the vulnerability of farmers and pastoralists to climate change, including variability.	* At least five distinct coping mechanisms for climate change and variability adopted by small-scale farmers. Livestock and crop yield losses reduced by at least 25% among small-scale farmers in the project site.
Outcome 1: Climate change adaptation measures of rural communities in agricultural production are piloted and tested.	* Adoption of improved crop varieties and livestock breeds in the project site increased by at least 25%.
Output 1.1: Risk reduction strategies in pilot area contribute to improved adaptive capacity and resilience to drought.	* Number of households in the project site planting improved crop varieties increased by at least 25%. * Number of households in the project site having traditional Sanga breeds increased by at least 25%. * At least two improved crop varieties and livestock breeds introduced in the project site. * Number of households in the project site with improved farm outputs increased by at least 25%. * Farm output in yields per/hectare increase by at least 25%. * Number of households in the project site using improved technologies, such as rainwater harvesting, increased by at least 25%. * Soil erosion rates in the project site reduced by at least 10%.
Output 1.2: Markets developed for diversified products from community agricultural production and support mechanisms for tapping those in the pilot area.	* Livelihood strategies at household level in the project site increased to more than two. * Income generated from farm product sales (in the project site) increased by at least 10%.
Output 1.3: Capacities of service organizations in pilot regions strengthened to address climate change adaptation and drought.	* At least four service organizations in pilot regions capacitated to adapt to climate and prepare for drought periods.
Output 1.4: Livestock rearing improved through the introduction of various adaptation measures aimed at improving integrated pasture management and strengthening animal biocapacity.	* At least two adaptation measures identified and tested.

Source: GEF 2008

3.5.3 Indicators for Sustained Development in a Changing Climate

A successful adaptation process enables the achievement of development goals in spite of the challenges associated with a changing climate. The monitoring and reporting of indicators of sustained development are the third point of verification in the "adaptation dimensions" framing. If development indicators show positive results in contexts at high levels of climatic risk and/or vulnerability, it is likely that adaptive capacity and adaptation actions have helped diminish the negative effects of climate change on the development agenda.

However, the eventual impacts of climate-proofing development activities and the efforts of adaptation interventions can only become apparent in the long run, based on the quality of results and the nature of the risks to sustaining those results. Furthermore, adaptive capacity and adaptation activities are likely to be "necessary but not sufficient" to address development goals. There may be countless unintentional, fortuitous, or unforeseen factors that shape the speed, direction, and character of development in a given context. In short, there is no way of knowing which short-term efforts lead to which long-term impacts. In light of this "attribution gap," the indicators under this third adaptation dimension cannot completely illustrate the effectiveness of the adaptive capacity and adaptation activities in contributing to sustained development.

Key questions for practitioners to consider in generating sustained development indicators include:

- How might sector planners, policymakers or other development decision makers use the results of these indicators to improve the treatment of climate change in their spheres of influence?
- Do the indicators capture the "added value" of adaptation toward reaching stakeholders' development goals?
- Over what time frame should the M&E system gather data in order to use these indicators to test the relevant adaptation hypothesis?

Many different indicators may prove useful for tracking sustained development as an adaptation objective, depending upon the sector in which the intervention takes place. Following are two example indicator sets that are frequently used in adaptation-relevant initiatives: ecosystem services and livelihoods.

1. Ecosystem Services. Ecosystem services are centered on the benefits that people derive from nature. Some benefits, such as crops, fish, and fresh water (provisioning services), are tangible. Others, such as pollination, erosion regulation, climate regulation (regulating services), and aesthetic and spiritual fulfillment (cultural services), are less so. All, however, directly or indirectly underpin economies and livelihoods.

Early efforts to apply ecosystem service concepts and information have strengthened both public- and private-sector development strategies and have improved environmental outcomes. But approaches to analyse information about ecosystem services and apply it to climate change are relatively new and still evolving. Until now, most indicators used for ecosystem services have been adopted from narrower environmental fields, such as biodiversity, ecology, and climatology, and from economic sectors, such as agriculture, forestry, and fisheries.[57] Entry points for ecosystem services might include standards for environmental impact assessments or strategic environmental assessments, review periods for environmental law, assessments of shifting dependence on ecosystem services, and/or any processes for the valuation of natural resources.

According to its NAPA, Samoa is predisposed to drought, high frequency of heavy rain that results in floods, hot or high ambient temperatures, high frequency of storms, and sea level rise. In particular, coastal erosion and ecosystem degradation pose serious risks to biodiversity and livelihoods dependent on the reef fish breeding grounds of the mangroves. Table 8 describes the two key ecosystem-related outcomes and corresponding outputs of a UNDP/GEF multi-partner intervention that seeks to protect coastal ecosystems against climate stresses in the Samoan villages of Fasitootai and Vailuutai.

2. Livelihoods. Since the poorest and most vulnerable populations often depend greatly on land and other natural resources to support their livelihoods, many development organisations have devised a sustainable livelihoods approach (SLA) to help strengthen and sustain people's well-being.[58] Indicators for an SLA or a household livelihood security approach might measure whether basic needs are being met or are accessible, despite external shocks and stressors. This is closely related to the asset approach in that a combination of assets is required to maintain the livelihood of a given community or

57 Layke 2009.
58 See, for example, IFAD undated and ICIMOD 2008.

Table 8. Samoa: Reduce Impacts of Climate Change-Driven Erosion through Protection and Conservation of Mangroves, Ecosystems, and Coral Reefs

Outcome 4: Protection of ecosystems that buffer the community from climate change risks made more economically sustainable.	
Output	**Criteria**
Output 4.1	Development of an Eco-Tourism Plan aimed at generating economic incentives for protection of ecosystems that buffer the community from climate change impacts.
Output 4.2	Development of a seawater fish farm, not only for economic incentive, but for awareness and education of community and children from kindergarten and primary school for sustainability.
Output 4.3	Identify record, protect, and restore historical sites (not related to climate change, but included for completeness of vision)
Output 4.4	Clean up swamp and wetland for future development of a freshwater fish farm (tilapia) for economic return.

Source: UNDP/GEF 2009

household. Secure livelihoods depend on a wide range of factors, such as income level, income-generating activities, property and storage, migration patterns, and often outside assistance in the form of loans or other borrowing. Entry points for livelihoods might include household surveys on food security, nutrition, education, or other key aspects of healthy local economies and human well-being.

The GEF's Assessments of Impacts and Adaptations to Climate Change[59] project supported developing country scientists and experts to conduct 24 regional climate change assessments across Africa, Asia, Latin America, and the Caribbean, and the Indian and Pacific Oceans. This global initiative followed a sustainable livelihood model loosely based on a DFID-derived methodology of the "five capitals" – natural, physical, human, social, and financial. Project case studies from Sudan sought to evaluate the performance of sustainable livelihood and environmental management measures for building resilience to today's climate-related shocks, and assess their potential for reducing community vulnerability to future climate change. The studies focused on adaptive strategies, or long-term behavioral patterns. Table 9 highlights a sample of the indicators used.

The GIZ/Perspectives[60] study "Monitoring the adaptive effect of GIZ's natural resource management and adaptation projects" (2011) recommends utilizing sustainability indicators beyond the attribution gap which is particularly relevant within the sustained development dimension of adaptation. The authors suggest a set of three sustained development indicators: saved wealth (measured by a mixed index of absolute and relative wealth savings achieved by an adaptation project, in order to both cover economic value and vulnerability), saved health (reduction of climate change impacts on human health) and environmental benefits (measures environmental benefits and services that are not economically quantified in the sustained wealth indicator). Such standardized indicators could supplement vulnerability indicators and they would have the benefit to allow more comparability of adaptive impacts.

59 AIACC Undated.

60 Michaelowa and Koehler 2011.

Table 9. Sudan: Sustainable Livelihood Approach (SLA) Indicators for Community Resilience

Sudan	Generic Indicators for SLA (to be tailored to local levels)
SLA for assessing community resilience to climate change: case studies from Sudan	Land degradation (slowed or reversed)
	Condition of the vegetation cover (stabilized or improved)
	Soil and/or crop productivity (stabilized or increased)
	Water supply (stabilized or increased)
	Average income levels (stabilized or increased)
	Food stores (stabilized or increased)
	Migration (slowed, stabilized, or reversed)

Excerpt of Criteria and Indicators for Social Capital

Capital Asset	Dimension	Criteria	Indicators
Social Capital	Productivity	* Areas of women's gardens. * Contribution of women's gardens in satisfying community needs for vegetables, fruits and other agricultural crops. * Role of local committees in the organization and promotion of community works.	* % of expansion or decrease in areas of women's gardens. * Garden products as % of total village supply of fruits and vegetables. * % of people who participate in community development.
	Equity	* Participation in the decision-making process, and access of marginal groups to same.	* Representation by each group in the decision-making process.
	Sustainability	* Expansion in the use of mud to public buildings. * Expansion in the use of improved charcoal stoves. * Government provision of institutional support to local community institutions.	* % of public buildings with mud walls (mosques, schools, and restaurants) * Dissemination rate of improved charcoal stoves. * Number of coordinated activities between government and local committees.
	Risks/Assumptions	* Capability of committees to continue performing their tasks.	

Source: Elasha, Balgis-Osman, et al. 2005

3.5.4 Setting a Baseline

Once a set of appropriate indicators has been identified, practitioners can record baseline values for comparing conditions before, during, and after the implementation of the intervention. They also should consider the baseline observations when determining appropriate targets for the intervention.

Understanding the baseline enables practitioners to form realistic and timely targets for adaptation interventions. A target is a value for an indicator that serves as a goal for the intervention. Evidence gathered through vulnerability and/or risk assessments can also aid practitioners in choosing appropriate targets. Furthermore, intervention managers and their partners should deliberate over which targets and how many targets can be met, given the prevailing assumptions about risks to achieving them and resources devoted to each. Key questions presented in this section help guide practitioners in developing an adaptation baseline and considering baselines for each adaptation dimension. Annex IV provides examples of monitoring matrices with baseline values and targets.

Ideally, a mid-term or final evaluation can make a straightforward "before-and-after" comparison of observed, recorded, and verified results toward targets. Alternatively, an evaluation could compare intervention results to a projected future scenario in which the intervention never took place. Such "counterfactuals" are sometimes used to deal with a moving or dynamic baseline or in cases where the original baseline observation is no longer relevant at the time of assessing the intervention's accomplishments. Practitioners are unlikely to face a moving baseline during a short implementation period (<5 years, for example), but may face a moving baseline for longer-term projects and programs. Some researchers are beginning to explore options for dealing with a moving baseline in the context of adaptation, but most implementing organisations do not provide extensive guidance or methodologies to do so, because it is infrequently a concern during relatively short implementation periods.[61] Funders of adaptation interventions, however, will undoubtedly have to contend with moving baselines to assess the impacts of several related interventions over the long term.

Another way to track longer-term change in a baseline value, which might otherwise be hard to quantify or to address because of changing conditions, is to identify a range of possible outcomes with ratings (an index) that can then be used to monitor progress. The GEF Adaptation Monitoring and Assessment Tool (Table 10), for example, uses score ranges for indicators that are otherwise difficult to describe and synthesize (are difficult indicators to add together, for example), such as "strengthened adaptive capacity" and "diversified and strengthened livelihoods." Another example is the Netherlands Climate Assistance Program policy action matrix (Table 11), where the full range of development stages is numbered 1 through 4 across relevant categories for achievement. Such descriptive indexes can rate the direction or quality of progress of indicators toward targets during the course of an intervention or across many interventions.

61 See, for example, UNDP 2008b and AFB 2010c.

Table 10. GEF Adaptation Monitoring and Assessment Tool: Example Index for an Outcome Indicator

Outcome	Indicator	Baseline Value	Final Score
Diversified and strengthened livelihoods and sources of income for vulnerable people in targeted areas	Households and communities have more secure access to livelihood assets (Score) – Disaggregated by gender		
	The score for this indicator will have to be assigned based on the results of a conducted survey. The score ranges from 1 to 5. Following are the explanations of rankings. 1) No access to livelihood assets. 2) Poor access to livelihood assets. 3) Moderated access to livelihood assets. 4) Secure access to livelihood assets. 5) Very secure access to livelihood assets.	2	3

Source: adapted from GEF 2011

Table 11. Netherlands Climate Assistance Program: Policy Action Matrix

Policy - Action Matrix ○ Current situation ○ Changes needed to reach target

Criteria	Development Stage			
	1	2	3	4
Political		Some awareness of CC		Full political support for CCA policies
Policy	Does not exist		Legislation approved and financed	
Institutional		Framework on paper only	Roles and responsibilities understood and practiced	
Disaster preparedness	Draft document in discussion			Contingency planning in place at all levels
Recovery and reconstruction		Recovery plan outdated	Comprehensive plan in place	

Source: NCAP 2005

The AFB suggests the following guidance for forming adaptation baselines[62] and targets:

1. Review and synthesize existing information on current vulnerability, climate risk, and current adaptation measures based on previous studies, expert opinion, and policy context.
2. Describe adaptation policies and measures in place that influence the ability to successfully cope with climate variability.
3. Develop baseline indicators of vulnerability and adaptive capacity that take into account the underlying historical trend in the indicator value over time. Note whether there is a trend upward or downward over the last 5 or 10 years that can be drawn from existing records or statistics.

62 AFB 2010c.

Data sources

- Baselines may be established using existing secondary data sources or may require a primary data collection effort.
- One source is the baseline data currently available on the IPCC's Data Distribution Center Web site.
- Historical/baseline data: current vulnerabilities (trend analysis, vulnerability mapping) and current adaptation measures (consultations, field interviews, literature review).
- Scenarios: future impacts and vulnerabilities (methods employed could include impact assessment and vulnerability mapping); adaptation to future impacts (using such approaches as multi-criteria analysis, cost–benefit analysis, and consultations).

Data collection methods

- Trend analysis, vulnerability mapping (food insecurity, poverty mapping, natural disaster losses), multi-criteria analysis.
- Cost–benefit analysis, vulnerability reduction assessment (UNDP).[63]

In addition, setting targets is important because they:

- help bring the objectives of a project into focus,
- help validate a project by describing in concrete terms what the intervention will produce,
- orient project managers and staff to the tasks to be achieved, and
- can act as the foundation for clarifying results for which managers will be held responsible.

In the course of identifying baseline values, there may be some indicators for which no baseline data can be found or for which the data are incomplete or possibly inaccurate. In such instances, a proxy or surrogate baseline can be formed (one that is close but not ideal), or the relevant indicator(s) could be dropped. For example, it might not be clear to what degree particular climate change policies are currently being implemented and/or relevant laws enforced. A small sample of sectors known to be particularly sensitive to current climate variability may provide enough information to formulate critical baseline information on the intervention target areas. However, if this is not possible, climate-proofing investments and/or information on climate risk insurance schemes could be another means to develop a proxy baseline. Since specific adaptation programs and projects can also provide a learning process to inform a national adaptation strategy or larger research agenda, it may be useful for project leaders to seek partnerships with other organisations with mutual interests in collecting relevant data.

Key questions for practitioners to consider in forming and using an adaptation baseline include: [64]

- Does the baseline provide a clear picture of the risks and/or vulnerabilities that the intervention intends to address?
- Does the baseline enable differentiation of monitoring for possible changes due to climate change, changes caused by non-climate dynamics, and changes induced by the intervention (Step 6)?
- Are priorities for action made more apparent with information gathered to form the baseline?
- Is it clear which baseline values relate to which adaptation dimensions and how (Step 2)?
- Are the targets proposed realistic based on baseline data and based on available monitoring resources?
- Should the baseline move over time? If yes, how often should the baseline be reassessed to account for progress toward targets?

Key questions for practitioners to consider in developing a baseline for adaptive capacity include:

- Does the baseline build on existing planning and reporting formats with information on development, poverty, and/or capacity?[65]
- Has the baseline analysis missed important sources of existing adaptive capacity, such as the role of women or the cultural relationship of communities with the land?

Key questions to consider in developing a baseline for adaptation actions include:

- Does the baseline account for known maladaptive and autonomous activities related to the adaptation actions proposed, as described by a risk or vulnerability assessment (Step 1)?
- Does the baseline consider the interactions between several adaptation actions in a single intervention?
- Does the baseline consider the specific adaptive capacity needed to perform specific adaptation actions in the intervention?

Key questions for practitioners to consider in developing a baseline for sustained development include:

- Is this baseline derived from existing plans and reports on key development priorities that are affected by climate change? [66]

63 UNDP 2008a.

64 See also Annex II for further resources helpful for establishing adaptation baselines.

65 These may include, for example, national development plans, sectoral risk studies, NAPAs, National Communications (NCs), National Capacity Self-Assessments (NCSA), previous evaluations from relevant government or development performance frameworks, and pre-existing vulnerability or risk assessments.

66 For example, specific MDGs, aspects of national development strategies, and/or sectoral investment priorities.

- What are the gaps (including levels of uncertainty) in baseline information on projected climate change impacts on development goals, and how will they be treated in the course of tracking implementation results?
- Does the baseline acknowledge parallel efforts by other partners in similar or overlapping areas of relevance to the adaptation intervention?
- Does the baseline account for local surveys and other sources of bottom-up climate and non-climate vulnerability studies?

3.6 Step 6 – Use the Adaptation M&E System

Once the intervention planners have designed an intervention, their activities shift to implementation, and monitoring commences. To get the M&E system up and running, it is important to clarify:

- what is being monitored during the implementation (indicators and/or the factors that affect them – see Step 5),
- how often it is monitored (and verified and reported),
- the sources of where relevant information can be found, and
- who is responsible for collecting this information.

Table 12 illustrates a monitoring matrix template that summarizes monitoring methods, timing, data sources, and responsibilities of respective participants. Sometimes monitoring of activities (i.e. whether and how activities produce intended outputs) will be conducted separately from monitoring of outcomes (i.e. whether and how outputs are used and lead to change). For a monitoring matrix that uses the framework presented in this paper, see the draft matrix from GIZ reproduced in Annex IV, Table 3.

Good management of the monitoring system creates a narrative to provide context and reasoning behind the results reported through the M&E system. The products of intervention monitoring can also be used to establish lessons learned across adaptation interventions of the same program or sector, to identify successes in particular sector adaptation strategies, or to inform national policies in light of climate change and adaptation efforts.

M&E practices for adaptation have most commonly aligned with those used for environmental and natural resource management and for economic and social development and capacity building, but may also resemble other areas relevant to adaptation. Annex IV shows examples of a monitoring table for flood protection in the Hunan River basin, a diagram of process monitoring for the Sujala watershed project in India, a diagram of outcome and activity monitoring from Intercooperation, and an excerpt from the program monitoring logframe for the Africa Climate Change Resilience Alliance. Essential to the various models for adaptation monitoring are:

- regular feedback loops for communication, coordination, and learning;
- a clear sense of what is being monitored in terms of activities undertaken to produce outputs, factors

Table 12. Planning Matrix for Monitoring

Targets (Outcomes and Outputs)	* Derived from theory of change and relate to the adaptation hypothesis * Address at least one of the adaptation dimensions
Indicators	* Should account for key indicators within the relevant adaptation dimension * Should also account for key areas to monitor (e.g., related to context, assumptions)
Baseline Value	* Derived vulnerability/risk assessment * May need to be re-examined periodically
Date and Current Value	* What is the M&E event? * Date noted at the time of reporting (monitoring, mid-term, final assessment)
Data Collection Method	* Survey? Meeting? Workshop? * Should be a systematic and consistent source
Responsibilities	* Who is responsible for organizing the data collection and verifying data quality and sources?
Resources	* Estimate of resources required and committed for carrying out planning and monitoring activities.
Risks	* What are the risks and assumptions for carrying out the planned monitoring activities? * How may these affect the planned monitoring events and quality of data?

Source: Adapted from UNDP 2009

influencing results (which could be based on the nature of the climate risks or vulnerability, or based on assumptions and risks), and indicators for outcomes;

- the capacity to narrow down or revise types and number of indicators, as needed, once implementation has begun;
- monitoring processes and results, which serve a purpose beyond assessment of the intervention, through, for example, results reported to policy processes, and by identifying ways to keep options open for future adaptation strategies and decision making.[67]

The previous five steps and various options to consider in developing a suitable monitoring framework can help clarify what scope of information and context may be essential to monitor. For some aspects of monitoring – especially as attention turns from activities and outputs to outcomes and the achievement of objectives – factors that affect levels of climate risk and/or vulnerability can only be understood once implementation has begun (or ended). The following advice is from the Corporate Development Unit of GIZ and lists the tasks of results-based monitoring as:

1. **Monitoring activities and outputs:**
   - Monitoring the results produced by the activities and outputs of the development measure, particularly the use of outputs, should address:
     - ✓ comparison with the anticipated and planned results (milestones),
     - ✓ examination of the possibility of achieving objectives, and
     - ✓ communication and discussion of findings.
   - The following points should be observed:
     - ✓ results of major activities,
     - ✓ outputs for third parties,
     - ✓ use of outputs, and
     - ✓ factors beyond the intervention that promote or hinder the use of outputs.
2. **Monitoring outcomes and the achievement of objectives:**
   - Observing changes in the wider setting of the development measure that can be plausibly linked with the achievement of objectives.
   - For these tasks, the technical cooperation measure employs existing, reliable secondary data, supports partner organisations in setting up corresponding monitoring and data collection systems, or collects relevant data separately or with other actors in the same sector.[68]

While the ToC acts as a foundation for the strategies and assumptions behind intervention activities, monitoring requires using the principles of M&E for adaptation in practice. A final consideration is whether the intervention's monitoring system will help answer evaluation questions. For example, the following set of questions is modified from the OECD-DAC standards for evaluating development assistance. Along with cross-cutting issues like gender and environmental impact, evaluations of adaptation interventions might seek to answer questions related to the following:[69]

- **Relevance**: To what extent were the adaptation intervention activities consistent with the priorities of the stakeholders, and with the relevant policies of the funder?
- **Effectiveness**: To what extent did the intervention reach its adaptation targets?
- **Efficiency**: Was there sufficient value to the qualitative and quantitative outputs for the amount and quality of inputs?
- **Impact**: What were the positive and negative changes produced by the adaptation intervention toward adaptive capacity, adaptation actions, and/or sustaining development, directly or indirectly, intended or unintended?
- **Sustainability**: What is the likelihood that intervention outputs and activities are likely to remain or continue after donor funding has been withdrawn?[70]

67 One of the tenets of adaptive management is to avoid decisions that limit the range or quality of future decision-making options. For further tools and information on this in the context of adaptation, see, for example, UKCIP and Learning for Sustainability.

68 GIZ 2008.

69 OECD undated.

70 OECD-DAC sustainability refers to environmental and financial sustainability, but social sustainability may also be addressed in development projects.

Key questions to consider in setting up and using an adaptation M&E system include:

- Does the M&E system incorporate all the major dimensions of the project and clearly outline timing and responsibilities for specific people to monitor specific indicators, factors affecting results, and other relevant dynamics?
- Does the monitoring system include appropriate windows for reporting on specific RBM criteria, such as funding, as well as on iterative results and learning to improve the adaptation process?
- How are the intervention partners involved in the monitoring and verification of results?
- Given early evidence of results, how will the stakeholders and implementers revisit the adaptation hypothesis and ToC periodically to check whether the intervention approach remains valid to the adaptation objectives?
- Does the M&E system generate information in a way that can be fed into a policy process or used by other partners or interventions to improve their efforts?
- Does the M&E system generate information in a way that can answer evaluation questions relevant to the relevance, effectiveness, efficiency, impact, and sustainability of the intervention?

4. Conclusion: Priorities for "Learning by Doing" for Adaptation M&E

In the spirit of "learning by doing," we offer in this concluding chapter several themes for further exploration as adaptation portfolios expand their knowledge base, technical capacity, and financial resources. Many frameworks proposed for planning and assessing adaptation are in the early days of implementation. This is an opportune moment for many actors in the adaptation and development arenas to test these approaches and methodologies, before emerging adaptation M&E systems are formalized and/or fully operational. For example, WRI and GIZ will test the framing proposed in this paper with adaptation interventions in the development context. These thoughts on the way forward are intended to provoke further discussion, identify fruitful areas for research, and recommend several concrete steps to further the development of M&E practices for adaptation.

Think Outside the "Project Box"

The challenges of M&E for adaptation are largely shaped by factors outside the project cycle.[71] Therefore, developers of approaches to M&E for adaptation need to look beyond the duration of individual projects, and move toward measuring changes in broader systems. Although current adaptation efforts are often defined by the project cycle, work on M&E should also address the demands of policymakers and their need to track outcomes after project closing. A broader perspective is also needed to fully address the important idea of adaptive capacity. Lessons learned in aid effectiveness and long-term development efforts deserve exploration as a source of options for M&E. The M&E systems used by countries to measure progress on their MDGs, for example, may provide useful ideas on monitoring a long-term, complex, and globally significant set of metrics.

Explore Options for Overcoming Barriers to Participation

This paper has emphasized important links from participation and local ownership of M&E to learning and successful adaptation processes. However, we recognize that participatory approaches face many barriers to successful, widespread implementation. Further work is needed to understand how technology, capacity building, and wise use of financial resources can reduce the costs associated with stakeholder participation in M&E, improve the quality of inclusion processes, and create incentives to scale up use of participatory approaches. Research and practical application should also explore the application of various options for participation, to better understand what form and extent of participation are most appropriate for different M&E contexts.

Link Existing M&E Systems

Most practitioners recognize that increased harmonization with country partners' priorities and policies, along with coordination among actors involved in similar activities, will improve the quality of development and adaptation interventions. However, there are few tools and little guidance on how to use M&E to promote these linkages. Stronger connections between bottom-up information and decision making and top-down information and decision making could help focus scarce resources by eliminating duplicate reporting structures, sharing common relevant information, and potentially improving accessibility and transparency. Furthermore, more integrated adaptation M&E systems could assist in linking disparate sectoral or thematic activities in powerful ways. For example, what are the implications of priorities laid out in NAPAs for those in national poverty reduction strategies? What population trends does the urban planning department or agency track or expect under future climate scenarios? As adaptation efforts intensify across the developing world, we will need M&E tools that are able to adopt a systems perspective and assess adaptation in a more integrated and holistic manner.

Promote Experimentation

Following existing protocol does not often result in innovation. Rather, innovation emerges in an environment that values experimentation and a mixed-methodologies approach to the design of adaptation interventions. Supporting innovation requires appropriate M&E methods that acknowledge experimentation and trial and error may be at odds with current expectations for results delivery. However, many innovative approaches to planning and project design can support stakeholder-driven research agendas, help develop locally appropriate definitions of adaptation success, reduce the costs of monitoring for outcomes, and help streamline different project operations. Several interesting experimental approaches for adaptation emerged first in the developed world and are beginning to gain traction in the development sphere. M&E will play an important role in helping to learn when such approaches have value and how they can be adjusted. Emerging areas of experimentation where M&E could provide support include:

71 A typical project cycle for the World Bank, for example, consists of identification, preparation, appraisal, approval, implementation, completion, and evaluation.

- *Scenario-neutral planning*: A methodology of addressing long-term risks in light of short-term priorities and scarce resources. The idea is to take incremental actions that do not diminish the opportunities to take more aggressive actions later. An example is the Thames 2100 project.[72]
- *Conceptual models*: Conservation practitioners have begun to use conceptual models to map and assess the intricate interactions between the social, economic, cultural, and environmental factors enabling or hindering conservation efforts. A conceptual model begins by delineating the primary factors influencing a given set of intervention activities, and how these map to the particular threats to achieving high-level objectives. The model can then be translated into a theory of change for purposes of RBM.[73]
- *Adaptive management*: Focused on the resilience of ecosystems, this is a strategy of iterative feedback and learning in order to deal with risk and uncertainty. The main emphasis is on continuous learning from trial and error, and it is especially useful for small-scale systems. An example is the restoration of the Upper Mississippi and Missouri River systems.[74]
- *Robust decision making (RDM)*: Managing climate risks often means seeking to predict the future and make decisions based on the likely outcome according to that prediction. RBM reframes this by asking "How can we choose actions today that will be consistent with our long-term interests?" This approach attempts to avoid some of the organisational rigidity and difficulty in bringing about consensus common to traditional analytical methods under uncertainties. Although it may not always produce the optimal decision, RDM is flexible in that it performs well compared to alternatives over a wide range of possible futures. RDM is used by many natural U.S. resource agencies. "Info-Gap" and "robust control" theories are other examples of new, related analytic methods.[75]
- *Developmental evaluation*: This contingency-based approach to evaluation centers on the value of the dynamics of interactions and decision-making processes, rather than top-down models and bottom-up principles of management. It acknowledges the complexity of organisational change, with regular feedback cycles and learning, in order to support innovation and adaptation.[76] An example of use is the ACCCRN program, as illustrated in Annex III, Figure 1.

72 Case study can be found at UK Met Office 2008.
73 Margolis et al. 2008.
74 Dessai and van de Sluijs 2007.
75 Lempert and Kalra 2011.

Face Tensions and Trade-offs Openly

As noted throughout this paper, one size does not fit all when it comes to M&E for adaptation – no one system will work for all purposes or all players. Funders, field practitioners, local communities, and other practitioners typically have distinct M&E needs and interests, and will prioritize different M&E system features. This presents challenges in a world of limited resources, where it rarely is possible to manage multiple M&E processes for a given place, issue, or activity. However, by being open about tensions and trade-offs, we can ensure that a given system is used for the purposes for which it was designed, and that its results are not misunderstood or misinterpreted. We can also aim to create M&E tools that complement each other, and avoid working at cross-purposes. For example, efforts should be made to prevent funders' interest in using M&E to report their results from undermining or eclipsing communities' interest in using M&E to learn how to better adapt. Several frameworks currently under development[77] have the potential to fulfill the many important roles of M&E in the context of adaptation. Creating a living body of knowledge and good practices in this emerging field will inevitably mean fostering flexible and inclusive learning environments in which the tensions and trade-offs of M&E for adaptation are treated not as obstacles but as parameters for guiding how and why adaptation is measured.

76 Quinn Patton 2009.
77 At the time this paper was written, The RCRC Climate Center, International Institute for Environment and Development, UK DFID, CARE, and OECD all had promising work in process.

Acronyms

3ie	International Initiative for Impact Evaluations
AA	Adaptation action
AC	Adaptive capacity
ACCCRN	Asian Cities Climate Change Resilience Network
ACCRA	Africa Climate Change Resilience Alliance
ADB	Asian Development Bank
AF	Adaptation Fund
AFB	Adaptation Fund Board
AfDB	African Development Bank
AG	Area group
AIACC	Assessment of Impacts of and Adaptations to Climate Change
ALM	Adaptation Learning Mechanism
AMAT	Adaptation Monitoring and Assessment Tool
APF	Adaptation Policy Framework
BMZ	German Federal Ministry for Economic Cooperation and Development
CBA	Community-based adaptation
CBO	Community-based organisations
CC DARE	Climate Change and Development – Adapting by Reducing Vulnerability (UNDP/UNEP)
CCA	Climate change adaptation
CCAA	Climate Change Adaptation in Africa
CDKN	Climate and Development Knowledge Network
CEDRA	Climate Change and Environmental Degradation Risk and Adaptation assessment
CEP	Country Environmental Profile
CGIAR	Consultative Group on International Agricultural Research
CIDA	Canadian International Development Agency
CIF	Climate Investment Fund
CIG	Common interest group
COP16	16th edition of Conference of the Parties of the United Nations Framework Convention on Climate Change
CRiSTAL	Community-based Risk Screening Tool – Adaptation and Livelihoods
CSDRM	Climate smart disaster risk management
CSO	Civil society organisation
CVCA	Climate Vulnerability and Capacity Analysis
DAC	Development Assistance Committee (OECD)

DANIDA	Danish International Development Agency
DEFRA	Department for Environment, Food and Rural Affairs (United Kingdom)
DFID	Department for International Development (United Kingdom)
DRM	Disaster risk management
DRR	Disaster risk reduction
EC	European Commission
ECB	European Central Bank
EM&R	Ecosystem management and restoration
ETC/ACC	European Topic Centre on Air Pollution and Climate Change Mitigation
FAO	Food and Agriculture Organization (United Nations)
GDP	Gross domestic product
GEF	Global Environment Facility
GIZ	Deutsche Gesellschaft für Internationale Zusammenarbeit
GTZ	Deutsche Gesellschaft für Technische Zusammenarbeit
GNDR	Global Network for Disaster Risk Reduction
IADB	Inter-American Development Bank
ICIMOD	International Centre for Integrated Mountain Development
ICT	Information and communication technology
IDRC	International Development Research Centre
IDS	Institute for Development Studies
IFAD	International Fund for Agricultural Development
IIED	International Institute for Environment and Development
IISD	International Institute for Sustainable Development
IKM	Information & knowledge management
IPCC	Intergovernmental Panel on Climate Change
ISET	Institute for Social and Environmental Transition
IUCN	International Union for Conservation of Nature
KfW	KfW Entwicklungsbank (development bank), part of the KfW Bankengruppe
LDCF	Least Developed Country Fund (GEF)
LPMO	Local project management office
M&E	Monitoring and evaluation
MDG	2015 Millennium Development Goals
MLO	Multilateral organisations

MNACC	Mechanismo National de Adaptación al Cambio Climático (National Mechanism for Adaptation to Climate Change)
MoEF (India)	Ministry of Environment & Forests, Government of India
MRV	Measurement, reporting, and verification
N/A	Not applicable
NAC	National Adaptive Capacity Framework
NAPA	National Adaptation Program of Action
NC	National Communications
NCAP	Netherlands Climate Assistance Program
NCSA	National-Capacity Self Assessment
NECCAP	Indo-German North East Climate Change Adaptation Program
NGO	Nongovernmental organisation
NICCD	Notes on ICTs, Climate Change and Development
NRM	Natural resource management
ODI	Overseas Development Institute
OECD	Organisation for Economic Co-operation and Development
OECD-DAC	Organisation for Economic Co-operation and Development, Development Assistance Committee
OM	Outcome mapping
PAF	Performance assessment framework
PDS	Public distribution system
PIK	Potsdam Institute for Climate Impact Research
PLA	Participatory learning and action
PPCR	Pilot Program for Climate Resilience (World Bank)
PPMO	Provincial Project Management Office
PREVAL	Regional Platform for Evaluation Capacity Building in Latin America and the Caribbean
RBM	Results-based management
RCRC	Red Cross Red Crescent
RDM	Robust decision making
RF	Rockefeller Foundation
RP	Resettlement Plan
SAPCC	State Action Plan on Climate Change
SCCF	Special Climate Change Fund (GEF)
SCR	Strengthening Climate Resilience
SD	Sustained development

SHG	Self-help group
SL	Sustainable livelihoods
SLA	Sustainable livelihoods approach
SPA	Strategic Pilot in Adaptation
SRI	System of rice intensification
SWS-EC	Sujala Watershed Executive Committee
TA	Technical assistance
TERI	The Energy and Resources Institute
ToC	Theory of change
UCCR	University Consortium for Climate Research
UKCIP	United Kingdom Climate Impacts Program
UN	United Nations
UN OIOS MECD	United Nations Office of Internal Oversight Services, Monitoring, Evaluation and Consulting Division
UNDESA	United Nations Department of Economic and Social Affairs
UNDP	United Nations Development Program
UNEP	United Nations Environment Program
UNESCO	United Nations Educational, Scientific and Cultural Organization
UNFCCC	United Nations Framework Convention on Climate Change
UNISDR	United Nations International Strategy for Disaster Reduction
USAID	United States Agency for International Development
WOTR	Watershed Organisation Trust
WRI	World Resources Institute
WWF	World Wildlife Fund

References

3ie. 2011. International Initiative for Impact Evaluation. Web site. Available at: http://www.3ieimpact.org/.

ACCRA. 2010a. ACCRA's Local Adaptive Capacity Framework (LACF). Africa Climate Change Resilience Alliance. Available at: http://community.eldis.org/.59d669a7/LACFconsult.pdf.

ACCRA. 2010b. Africa Climate Change Resilience Alliance. Logframe. Available at: http://community.eldis.org/txFileDownload/f.59d669a7/n.Annex%20C%202%20ACCRA%20Logframe_amended%2026%20May%202010.xls.

ACCCRN. 2010. Asia Cities Climate Change Resilience Network (ACCCRN) Monitoring Indicators Paper. October 18. Further information available at: http://www.rockefellerfoundation.org/what-we-do/current-work/developing-climate-change-resilience/asian-cities-climate-change-resilience/.

ActKnowledge. Undated. Theory of Change Community. Available at: http://www.theoryofchange.org/background/basics.html.

ADB. 2008. Project Risk Screening Tool. Asian Development Bank. Available at: http://unfccc.int/adaptation/nairobi_work_programme/knowledge_resources_and_publications/items/5465.php.

ADB. 2006. Proposed Loan and Technical Assistance Grant: People's Republic of China: Hunan Flood Management Sector Project – Report and Recommendation of the President to the Board of Directors. Project No. 37641. Asian Development Bank, Manila.

AFB. 2010a. An Approach to Implementing Results Based Management – RBM. Available at: http://www.adaptation-fund.org/system/files/AFB.EFC_.1.3.An%20Approach%20to%20Implementing%20RBM.pdf.

AFB. 2010b. Financial Status of the Adaptation Fund Trust Fund. Prepared by the World Bank as Trustee for the Adaptation Fund. Available at: http://www.adaptation-fund.org/system/files/AFB.EFC_.3.8.pdf.

AFB. 2010c. Project Level Result Frameworks and Baseline Guidance Document. Adaptation Fund Board, Ethics and Finance Committee. Available at: http://www.adaptation-fund.org/system/files/AFB.EFC_.2.3%20Project%20level%20results%20framework%20and%20baseline%20guidance%20document.pdf.

AFB. 2009. Results Based Management Framework. Adaptation Fund Board. Available at: http://www.adaptation-fund.org/system/files/AFB.B.8.8_RBM.pdf.

AFB. Undated a. Rules of procedure of the Adaptation Fund Board. Available at: http://www.adaptation-fund.org/system/files/Rules%20of%20procedure%20of%20the%20Adaptation%20Fund%20Board.pdf.

AfricaAdapt. 2009. ENDA and Partners, with Funding by IDRC and DFID. Online forum. Available at: http://africa-adapt.net/AA/Default.aspx.

Agobia, C. 1999. Enhancing Sustainable Livelihoods in Drought Prone Areas of Mudzi (Makaha Ward) and Gwanda (Gwanda Ward 19) Building on Adaptive Strategies. IISD Community Drought Mitigation Project Final Report Project No. 050/19284. Available at: http://www.iisd.org/publications/pub.aspx?id=425.

Agrawal, Arun. 2008. The Role of Local Institutions in Adaptation to Climate Change. Paper prepared for the Social Dimensions of Climate Change, Social Development Department, The World Bank, Washington, DC, March 5–6, 2008. Available at: http://siteresources.worldbank.org/EXTSOCIALDEVELOPMENT/Resources/updated_SDCCWorkingPaper_LocalInstitutions.pdf.

AIACC. Undated. Assessments of Impacts and Adaptations to Climate Change in Multiple Regions and Sectors. Available at: http://www.aiaccproject.org/aiacc.html.

Appadurai, Arivudai Nambi. 2011. Responding to Climate Change: Adopting a Landscape Level Perspective. M.S. Swaminathan Research Foundation, Chennai India. Presented February 2, 2011, DSDS 201 – Special Event, IUCN-TERI.

Baas, Stephan, and Selvaraju Ramasamy. 2008. Food and Agriculture Organization. Improved Adaptive Capacity to Climate Change for Sustainable Livelihoods in the Agriculture Sector. Summary Report, Project Phase 1. Community Based Adaptation in Action. Available at: http://www.fao.org/nr/clim/abst/clim_080303_en.htm.

Barnett, Jon, and Saffron O'Neill. 2010. "Maladaptation." Global Environmental Change 20:211-13. Available at: http://unimelb.academia.edu/SaffronOneill/Papers/343053/Maladaptation.

Barrett, Christopher B., et al. 2007. Poverty Traps and Climate Risk: Limitations and Opportunities of Index-Based Risk Financing. Working paper. The International Research Institute for Climate and Society. September. Available at: http://portal.iri.columbia.edu/portal/server.pt/gateway/PTARGS_0_2_2045_0_0_18/Poverty_Word-Fmt%20c6%20Dec%202007%20CBB%20Revision-1.pdf.

Beaulieu, Natalie, et al. 2010. Evaluation as an Integral Part of Climate Change Adaptation in Africa. Secrétariat international francophone pour l'évaluation environnementale (SIFEE). Available at: http://www.idrc.ca/uploads/user-S/12883774401Beaulieu_evaluation_as_integral.pdf.

Brooks, Nick. 2003. Vulnerability, Risk and Adaptation: A Conceptual Framework. Tyndall Center for Climate Change Research. Working Paper 38. Available at: http://www.eird.org/cd/on-better-terms/docs/Brooks-N-Vulnerability-risk-and-adaptation-a-conceptual-framework.pdf.

Burton, Ian, Elizabeth Malone, and Saleemul Huq. 2004. Adaptation Policy Frameworks for Climate Change: Developing Strategies, Policies, and Measures. Cambridge University Press: Cambridge, UK. Available at: http://www.undp.org/climatechange/adapt/apf.html.

Busby, Joshua W., et al. 2010. Locating Climate Insecurity: Where Are the Most Vulnerable Places in Africa? The Robert S. Strauss Center for International Security and Law. Available at: http://ccaps.strausscenter.org/system/research_items/pdfs/19/original.pdf?1286296660.

CARE. 2010. Climate Change Adaptation Tools for Action. Available at: http://www.care.org/getinvolved/advocacy/climatechange/ourwork_adaptation_tools.asp.

CARE. 2009a. Climate Vulnerability and Capacity Analysis (CVCA): Handbook. Available at: http://www.careclimatechange.org/index.php?option=com_content&view=article&id=25&Itemid=30.

CARE. 2009b. Participatory and Inclusive Planning for Adaptation to Climate Change in Northern Ghana. Community Land Use Responses to Climate Change Project. Available at: http://www.careclimatechange.org/files/adaptation/Ghana_09.pdf.

CARE International. Undated. "Participatory M&E." Available at: http://www.careclimatechange.org/mae.

CCAA. 2011. Climate Change Adaptation in Africa. DFID/IDRC. Available at: www.idrc.ca\ccaa.

CCAA. 2008. Mid-Term Review of the DFID/IDRC Climate Change Adaptation in Africa (CCAA) Research and Capacity Development Programme. Executive Summary available at: http://www.idrc.ca/uploads/user-S/12300450841Mid-Term_Review_of_CCAA_programme_Executive_Summary.doc.

CDKN. 2010. Climate and Development Knowledge Network. Available at: http://www.cdkn.org.

Christian Aid. 2009. Community Answers to Climate Chaos: Getting Climate Justice from the UNFCCC. Available at: http://www.christianaid.org.uk/images/community-answers-to-climate-chaos.pdf.

Christian Aid, Plan, CCDC, and IDS. 2010. Strengthening Climate Resilience (SCR). Consortium. Available at: http://community.eldis.org/scr/.

CIDA. 2004. CIDA Evaluation Guide. Available at: http://www.acdi-cida.gc.ca/inet/images.nsf/vLUImages/Performancereview5/$file/English_E_guide.pdf.

ci:grasp. 2011. Climate Impacts: Global and Regional Adaptation Support Platform. GIZ and Potsdam Institute for Climate Impact Research (PIK). Available at: http://cigrasp.pik-potsdam.de/.

Climate Funds Update. 2011. "Areas of Focus." Available at: http://www.climatefundsupdate.org/graphs-statistics/areas-of-focus.

Critchley, W. 1991. Looking after Our Land: Soil and Water Conservation in Dryland Africa. Oxfam. Available at: http://www.fao.org/docrep/X5301E/X5301E00.htm.

DANIDA. 2010. Follow up to the LDCF Evaluation. GEF. Available at: http://www.thegef.org/gef/sites/thegef.org/files/documents/Follow-up%20to%20LDCF%20Evaluation%20DANIDA%20mem%20b%20.pdf.

DANIDA. 2009. Evaluation of the Operation of the Least Developed Countries Fund for Adaptation to Climate Change. Evaluation Department, Ministry of Foreign Affairs of Denmark. Available at: http://www.oecd.org/dataoecd/44/24/43989776.pdf.

DANIDA. 2005. Climate Change Screening Note. Available at: http://www.danidadevforum.um.dk/en/menu/Topics/ClimateChange/ClimateAndDevelopment/ToolsAndReferences/ClimateChangeScreeningNote/.

DEFRA. 2010. Measuring Adaptation to Climate Change – A Proposed Approach. Available at: http://archive.defra.gov.uk/environment/climate/documents/100219-measuring-adapt.pdf.

Denton, Fatima. 2009. Challenges for Evaluating Climate Change in the Context of Africa. In Evaluating Climate Change and Development, Van den Berg, R., and Feldstein, O., editors. World Bank Series on Development Volume 8. Transaction publishers, pp.115-130.

Dessai, Suraje, and Jeroen van der Sluijs. 2007. Uncertainty and Climate Change Adaptation: A Scoping Study. Copernicus Institute for Sustainable Development and Innovation. Utrecht, The Netherlands. Available at: http://nws.chem.uu.nl/publica/Publicaties2007/NWS-E-2007-198.pdf.

DFID. 2010a. DFID Research 2009–2010: Providing Research Evidence That Enables Poverty Reduction. Available at: http://www.ukcds.org.uk/_assets/file/publications/DFID-research-report-09-10.pdf.

DFID. 2010b. Monitoring and Evaluation of CSDRM (Climate Smart Disaster Risk Management). Available at: http://community.eldis.org/.59d5ba58/monitoring.html.

DFID. 2009. Growth & Employment States. Available at: http://webarchive.nationalarchives.gov.uk/+/http://www.dfid.gov.uk/Documents/procurement/log-frame-gems-may-2009.pdf.

EC. 2009. Guidelines on the Integration of Environment and Climate Change in Development Cooperation. Available at: http://ec.europa.eu/europeaid/infopoint/publications/europeaid/documents/172a_en.pdf.

Elasha, Balgis-Osman, et al. 2005. Sustainable Livelihood Approach for Assessing Community Resilience to Climate Change: Case Studies from Sudan. AIACC Working Paper No.17. August 2005. Available at: http://www.aiaccproject.org/working_papers/Working%20Papers/AIACC_WP_No017.pdf.

Few, Roger, et al. 2006. Linking Climate Change Adaptation and Disaster Risk Management for Sustainable Poverty Reduction: Synthesis Report. European Commission. Available at: http://www.preventionweb.net/files/570_10367.pdf.

Ford, James D., et al. 2010. "Case Study and Analogue Methodologies in Climate Change Vulnerability Research." Climate Change. May–June. Available at: http://wires.wiley.com/WileyCDA/WiresArticle/wisId-WCC48.html.

Frankel-Reed, Jennifer and Nick Brooks. 2008. Proposed Framework for Monitoring Adaptation to Climate Change. UNDP. Available at: www.undp.org/climatechange/adapt/downloads/Adaptation_ME_DRAFT_Feb12.doc.

Fransen, Taryn, Hilary McMahon and Smita Nakhooda. 2008. Measuring the Way to a New Global Climate Agreement. WRI Working Paper. Available at: http://pdf.wri.org/working_papers/measuring_the_way_to_a_new_global_climate_agreement.pdf.

GEF. 2011. LDCF/SCCF Adaptation Monitoring and Assessment Tool (AMAT). Available at: http://www.thegef.org/gef/tracking_tool_LDCF_SCCF.

GEF. 2009. Implementing NAPA Priority Interventions to Build Resilience and Adaptive Capacity of the Agriculture Sector to Climate Change in Niger. Request for CEO Endorsement/ Approval. Available at: http://207.190.239.148/uploadedfiles/Niger_07-09-07_Implementing_NAPA_Priority_Interventions_of_Agricultural_Sector_Climate_Change.pdf.

GEF. 2008a. CPP Namibia: Adapting to Climate Change through the Improvement of Traditional Crops and Livestock Farming (CCA) Project Document. Available at: http://www.gefonline.org/projectDetailsSQL.cfm?projID=2915.

GEF. 2008b. Results Based Management Framework for LDCF and SCCF. Presented at LDCF/SCCF Council Meeting, November 13, 2008. GEF/LDCF.SCCF.5/3. Available at: http://www.thegef.org/gef/sites/thegef.org/files/documents/LDCF.SCCF_.5.3%20%20Resource-Based%20Management%20Framework.pdf.

GEF Evaluation Office. 2009a. Climate-Eval. Available at: http://climate.esdevaluation.org/gefeo/home.

GEF Evaluation Office. 2009b.Towards Enhancing the Impacts of Environmental Projects: The ROtI Handbook. Available at: http://www.thegef.org/gef/sites/thegef.org/files/documents/M2_ROtI%20Handbook.pdf.

GEF Evaluation Office. 2008. Background and Elements for a GEF Monitoring and Evaluation Framework on Adaptation. Available at: http://www.thegef.org/gef/node/344.

Gender CC. 2010. GenderCC – Women for Climate Justice. Available at: http://www.gendercc.net/about-gendercc.html.

Gertler, Pual J. et al. 2011. Impact Evaluation in Practice. Washington DC: World Bank. Available at: http://siteresources.worldbank.org/EXTHDOFFICE/Resources/5485726-1295455628620/Impact_Evaluation_in_Practice.pdf.

GIZ. 2011. Integrating Climate Change Adaptation into Development Co-operation. A Practice-Oriented Training Based on the OECD Policy Guidance. Handouts. Available at: http://www.oecd.org/dataoecd/8/4/46905379.pdf.

GIZ. 2008. Results-based Monitoring: Guidelines for Technical Cooperation. http://www.csr-weltweit.de/uploads/tx_jpdownloads/wirkungsorientiertes-monitoring-leitfaden-en_01.pdf.

GNDR. 2011. Views From the Frontline (VFL). Available at: http://www.globalnetwork-dr.org/voices-from-the-frontline-2011.html.

GNDR. 2009. Views From the Frontline (VFL). Available at: http://www.globalnetwork-dr.org/vfl-2009.html.

Government of Bangladesh. 2006. National Adaptation Programme of Action (NAPA), Ministry of Environment and Forest. Available at: unfccc.int/resource/docs/napa/ban01.pdf.

Government of India. 2008. National Action Plan on Climate Change. Available at: http://pmindia.nic.in/Pg01-52.pdf.

Government of Uganda. 2007. Uganda National Adaptation Programmes of Action. Available at: http://www.preventionweb.net/files/8578_uga01.pdf.

Hahn, Marlene and Alexander Fröde. 2010. Climate Proofed: Climate Proofing for Development. Adapting to Climate Change, Reducing Risk. Deutsche Gesellschaft für Technische Zusammenarbeit (GIZ). November 2010. Available at http://www2.gtz.de/dokumente/bib-2010/gtz2010-0714en-climate-proofing.pdf.

Harley, Mike, et al. 2008. Climate Change Vulnerability and Adaptation Indicators. ETC/ACC. ETCACC Technical Paper 2008/9. Available at: http://acm.eionet.europa.eu/reports/ETCACC_TP_2008_9_CCvuln_adapt_indicators.

Harley, Mike and Jelle van Minnen. 2009. Development of Adaptation Indicators. ETC/ACC. Available at: http://eea.eionet.europa.eu/Public/irc/eionet-circle/airclimate/library?l=/public/workshops/indicators_biodiversity/background_documents/etcacc_indicatorspdf/_EN_1.0_&a=d.

Huq, Saleemul, and Hannah Reid. 2007. A Vital Approach to the Threat Climate Change Poses to the Poor. IIED. Available at: http://www.iied.org/pubs/pdfs/17005IIED.pdf.

ICIMOD. 2008. Strategic Framework. Available at: http://www.icimod.org/?page=117.

IDRC. 2010. Climate Change Adaptation in Africa. Available at: http://publicwebsite.idrc.ca/EN/Programs/Agriculture_and_the_Environment/Climate_Change_and_Adaptation_in_Africa/Pages/default.aspx.

IDRC. Undated. "Climate Change Adaptation in Africa: CCAA Knowledge Sharing Framework." Available at: http://www.idrc.ca/ccaa/ev-120882-201-1-DO_TOPIC.html.

IFAD. 2010. Climate Change Strategy. Available at: http://www.ifad.org/climate/strategy/e.pdf.

IFAD. Undated. "The Sustainable Livelihoods Approach." Available at: http://www.ifad.org/sla/index.htm.

IIED. 2005. "Participatory Learning and Action." Available at: http://www.planotes.org/about.html#b.

IISD. 2010. Community-based Risk Screening Tool – Adaptation and Livelihoods (CRiSTAL). Available at: http://www.cristaltool.org/.

IISD, TERI, and IDRC. 2006. Designing Policies in a World of Uncertainty, Change and Surprise: Adaptive Policy-Making for Agriculture and Water Resources in the Face of Climate Change. Available at: http://www.iisd.org/pdf/2006/climate_designing_policies.pdf.

IPCC. 2007. Fourth Assessment Report. Glossary of Synthesis Report. Available at: http://www.ipcc.ch/pdf/assessment-report/ar4/syr/ar4_syr_appendix.pdf.

IUCN. 2009. Ecosystem-based Adaptation (EbA): Position Paper. Available at: http://cmsdata.iucn.org/downloads/iucn_position_paper_eba_september_09.pdf.

Iwanciw, Javier Gonzalez, and Heidi Zalles. 2010. "Bolivia Adapting to Climate Change: Piloting the National Adaptive Capacity Framework (NAC)." La Paz: Universidad Nur, July 15.

Kellogg Foundation. Undated. Logic Model Development Guide. Available at http://www.wkkf.org/knowledge-center/resources/2010/Logic-Model-Development-Guide.aspx.

Khandker, Shahidur R., Gayatri B. Koolwal and Hussain A. Samad. 2009. Handbook on Impact Evaluation: Quantitative Methods and Practices. Washington DC: World Bank. Available at: http://www-wds.worldbank.org/external/default/WDSContentServer/WDSP/IB/2009/12/10/000333037_20091210014322/Rendered/PDF/520990PUB0EPI1101Official0Use0Only1.pdf.

Kreft, Sönke, et al. 2010. The Millennium Development Goals and Climate Change: Taking Stock and Looking Ahead. Germanwatch. Available at: http://www.germanwatch.org/klima/klimdg10e.pdf.

Kropp, Juergen, and Michael Scholze. 2009. Climate Change Information for Effective Adaptation. A Practitioner's Manual. GIZ and PIK. Available at: http://ccsl.iccip.net/gtz2009-0175en-climate-change-information.pdf.

Layke, Christian. 2009. Measuring Nature's Benefits: A Preliminary Roadmap for Improving Ecosystem Service Indicators. WRI. Working Paper. Available at: http://www.wri.org/publication/measuring-natures-benefits.

Learning for Sustainability. 2011. "Theory of Change and Logic Models." Available at: http://learningforsustainability.net/evaluation/theoryofchange.php.

Leary, Neil and Jyoti Kulkarni. 2007. Climate Change Vulnerability and Adaptation in Developing Country Regions: Draft Final Report of the AIACC Project. AIACC Executing Agencies: The International START Secretariat, Washington, USA and The Academy of Sciences for the Developing World, Trieste, Italy. Implementing Agency: UNDP. Available at: http://www.aiaccproject.org/Final%20Reports/Final%20Reports/Draft%20Final%20Report_AIACC_April%2007.pdf.

Lempert, Robert, and Nidhi Kalra. 2011. Managing Climate Risks in Developing Countries with Robust Decision Making. World Resources Report, Washington. DC. Available at: http://www.worldresourcesreport.org.

Margolis, Richard, et al. 2008. "Using Conceptual Models as a Planning and Evaluation Tool in Conservation," Evaluation and Program Planning Journal 32(2009):138-47. Foundations of Success. Journal homepage available at journal homepage: www.elsevier.com/locate/evalprogplan.

McGray, Heather, et al. 2007. Weathering the Storm: Options for Framing Adaptation and Development. WRI. Available at: http://www.wri.org/publication/weathering-the-storm.

Michaelowa, Axel, and Michel Koehler. 2011. "Monitoring the adaptive effect of GIZ' natural resource management and adaptation projects." Perspectives Climate Change.

Minto, Barbara. 1996. The Minto Pyramid Principle: Logic in Writing, Thinking, & Problem Solving. Minto International. Available at: http://www.barbaraminto.com/.

Mitchell, Tom, Maarten van Aalst, and Paula Silva Villanueva. 2010. Assessing Progress on Integrating Disaster Risk Reduction and Climate Change Adaptation in Development Processes. Institute of Development Studies. Available at: http://community.eldis.org/.59e0d267/Convergence.pdf.

Morra Imas, Linda G., and Ray C. Rist. 2009. The Road to Results: Designing and Conducting Effective Development Evaluations. Washington, DC: World Bank.

Moser, Caroline. 2007. Reproduced in Moser, Caroline. Undated. A Conceptual and Operational Framework for Pro-Poor Asset Adaptation to Urban Climate Change. Available at: http://siteresources.worldbank.org/INTURBANDEVELOPMENT/Resources/336387-1256566800920/6505269-1268260567624/Moser.pdf

Mustafa, Daanish, Sara Ahmed, Eva Saroch, and The Risk to Resilience Study Team. 2009. From Risk to Resilience – Pinning Down Vulnerability: From Narratives to Numbers. Working Paper 2. Ed. M. Moench, E. Caspari, and A. Pokhrel. Kathmandu, Nepal: ISET-Nepal and ProVention. Available at: http://www.proventionconsortium.org/themes/default/pdfs/CBA/ISET_wp02_resilience.pdf.

NCAP. 2005. Netherlands Climate Action Program (NCAP). Available at : http://www.nlcap.net/.

Nkem, Johnson, et al. 2007. Methodological Framework for Vulnerability Assessment of Climate Change Impacts on Forest-Based Development Sectors. Second Year Annual Report. CIFOR. Available at: http://www.cifor.cgiar.org/trofcca/attachment/03%20TroFCCA%20Annual%20Report%20-%20%20Year%202%20-%20web.pdf.

NICCD 2011. Notes on ICTs, Climate Change and Development. Available at: http://niccd.wordpress.com/.

ODI. 2011. Economic Growth. Overseas Development Institute. Available at: http://www.odi.org.uk/work/themes/details.asp?id=5&title=economic-growth.

OECD. 2010. "Glossary of Key Terms in Evaluation and Results Based Management." Available at: http://www.oecd.org/dataoecd/29/21/2754804.pdf.

OECD. 2009a. The Economics of Climate Change Mitigation: Policies and Options for Global Action Beyond 2012. Available at: http://www.oecd.org/document/56/0,3746,en_2649_34361_43705336_1_1_1_1,00.html.

OECD. 2009b. Integrating Climate Change Adaptation into Development Co-operation. Available at: http://www.oecd.org/dataoecd/0/9/43652123.pdf.

OECD. 2008. Accra Agenda for Action. Available at: www.oecd.org/dataoecd/11/41/34428351.pdf.

OECD. 2005. The Paris Declaration on Aid Effectiveness. Full text available at: http://www.oecd.org/document/19/0,3746,en_2649_3236398_43554003_1_1_1_1,00.html. Summary of five core principles available at: http://www.oecd.org/document/18/0,3746,en_2649_3236398_35401554_1_1_1_1,00.html.

OECD. 2000. Results Based Management in the Development Co-Operation Agencies: A Review of Experience. Background Report. DAC Working Party on Aid Evaluation. Available at: http://www.oecd.org/secure/pdfDocument/0,2834,en_21571361_34047972_31950853_1_1_1_1,00.pdf.

OECD. Undated. "DAC Criteria for Evaluating Development Assistance." Available at: http://www.oecd.org/document/22/0,2340,en_2649_34435_2086550_1_1_1_1,00.html.

Olhoff, Anne, and Caroline Schaer. 2010. Stocktaking of Tools and Guidance to Mainstream Adaptation. UNDP. Available at: http://content.undp.org/go/cms-service/download/publication/?version=live&id=2386693.

Organizational Research Services. 2004. Theory of Change: A Practical Tool for Action, Results and Learning. Prepared for Annie E. Casey Foundation. Available at: http://www.aecf.org/upload/publicationfiles/cc2977k440.pdf.

O'Sullivan, Robert, et al. 2011. Creation and Evolution of Adaptation Funds. WWF. Available at: http://www.climatefocus.com/documents/creation_and_evolution_of_adaptation_funds.

Perez, Rosa, and Gary Yohe. 2004. "Technical Paper 9: Continuing the Adaptation Process." In Adaptation Policy Frameworks for Climate Change: Developing Strategies, Policies and Measures. Ed. Bo Lim and Erika Spanger-Siegfried. Available at: http://content.undp.org/go/cms-service/stream/asset/?asset_id=2200843.

Persson, Åsa, et al. 2009. Adaptation Finance under a Copenhagen Agreed Outcome. Stockholm Environment Institute. Available at: http://sei-international.org/mediamanager/documents/Publications/Climate-mitigation-adaptation/Equitable_approaches_to_mitigation_and_adaptation/adaptation-finance-copenhagen.pdf.

Pettengell, Catherine. 2010. Climate Change Adaptation: Enabling People Living in Poverty to Adapt. Oxfam. Available at: http://www.oxfam.org/en/policy/climate-change-adaptation.

Porsché, Ilona. Undated. "Climate Change Adaptation in Rural Areas of India – CCA RAI." Internal documentation provided by GTZ India.

PREVAL. Undated. "Overview of a Logframe Template and Content Output." Available at: http://preval.org/en/content/overview-logframe-template-and-content-output.

ProVention Consortium. 2000. Hosted by International Federation of Red Cross and Red Crescent Societies (IFRC) since 2003. Available at: http://www.proventionconsortium.org/.

Prowse, Martin and Birte Snilsveit. 2010. Impact Evaluation and Interventions to Address Climate Change: A Scoping Study. International Initiative for Impact Evaluation (3ie). Working paper No. 7. March 2010. Available at: http://www.preventionweb.net/files/15135_ImpactEvaluationandInterventionstoA.pdf.

Prowse, Martin, and Lucy Scott. 2008. Assets and Adaptation: An Emerging Debate. Institute for Development Studies. IDS Bulletin 39(4). Available at: http://www.odi.org.uk/resources/download/2564.pdf.

Quinn Patton, Michael. 2010. Developmental Evaluation: Applying Complexity Concepts to Enhance Innovation and Use. New York, NY: Guilford Press.

Quinn Patton, Michael. 2009. "Developmental Evaluation". Presentation to the Canadian Evaluation Society (CES). Available at: http://evaluationcanada.ca/distribution/20090601_quinn_patton_michael_a.pdf.

R4D. 2011. Search Research Database Project Record: Climate Change Adaptation in Africa. Available at: http://www.dfid.gov.uk/r4d/SearchResearchDatabase.asp?ProjectID=60055.

Rockefeller Foundation. Undated. Climate Change Resilience Initiative. Available at: http://www.rockefellerfoundation.org/uploads/files/c2c7bee1-0127-4c60-91aa-893f038b240a-developing.pdf.

Roduner, Daniel, Walter Schlappi (AGRIDEA), and Walter Egli (NADEL). 2008. "Logical Framework Approach and Outcome Mapping," Rural Development News 2008(2). Available at: http://www.agridea-international.ch/fileadmin/10_International/PDF/RDN/RDN_2008/2_Logical_Framework_Approach_and_Outcome_Mapping.pdf.

Rodriguez L. Jose et al. 2009. Annual Disaster Statistical Review: Numbers and Trends 2008. EM-DAT. Brussels: CRED. Available at: http://www.emdat.be/publication/annual-disaster-statistical-review-numbers-and-trends-2008.

Snover, A.K., et al. 2007. Preparing for Climate Change: A Guidebook for Local, Regional, and State Governments. Chapter 9. Oakland, CA: ICLEI – Local Governments for Sustainability. Available at: http://cses.washington.edu/db/pdf/snoveretalgb574ch9.pdf.

Stern, Nicholas. 2006. Stern Review on the Economics of Climate Change. Prepared for the Prime Minister and the Chancellor of the Exchequer on the Economics of Climate Change. Cambridge, UK: Cambridge University Press. Available at: http://webarchive.nationalarchives.gov.uk/+/http://www.hm-treasury.gov.uk/independent_reviews/stern_review_economics_climate_change/stern_review_report.cfm.

Tearfund. 2009. Climate Change and Environmental Degradation Risk and Adaptation assessment (CEDRA). Available at: http://tilz.tearfund.org/webdocs/Tilz/Topics/Environmental%20Sustainability/CEDRA%20D5.pdf.

UK Met Office. 2008. Thames Estuary 2100 Project. Available at: http://www.metoffice.gov.uk/services/climate-services/case-studies/barrier.

UKCIP. 2009. Adaptation Wizard. Available at: http://www.ukcip.org.uk/wizard/.

UNDESA. 2009. Climate Change and Sustainable Development. Available at: http://www.un.org/esa/dsd/dsd_aofw_cc/cc_index.shtml.

UNDP. 2011. Disaster Risk Reduction: Maldives. Available at: http://www.mv.undp.org/v2/index.php?lid=83.

UNDP. 2010a. Adaptation Policy Frameworks for Climate Change: Developing Strategies, Policies and Measures: Annexes. Available at: http://www.undp.org/gef/documents/publications/apf-annexes-a-b.pdf.

UNDP. 2010b. Designing Climate Change Adaptation Initiatives: A UNDP Toolkit for Practitioners. Available at: http://www.adaptationlearning.net/sites/default/files/Toolkit_for_Designing_Climate_Change_Adaptation_Initiatives___November_2010.pdf.

UNDP. 2009. Handbook on Planning, Monitoring and Evaluating for Development Results. Available at: http://www.undp.org/evaluation/handbook.

UNDP. 2008a. A Guide to the Vulnerability Reduction Assessment. Available at: http://www.undp-adaptation.org/projects/websites/docs/CBA_VRA_Guide_Dec_08.pdf.

UNDP. 2008b. Community-based Adaptation (CBA) Country Programme Strategy (CPS) – Namibia. Available at: http://www.undp-adaptation.org/projects/websites/docs/Namibia_-_CBA_CPS_-_FINAL.doc.

UNDP. 2007a. Adaptation Learning Mechanism (ALM). Available at: http://www.adaptationlearning.net/.

UNDP. 2007b. Draft – Monitoring and Evaluation Framework for Adaptation to Climate Change. Available at: www.undp.org/climatechange/adapt/downloads/Adaptation_ME_DRAFT_July.pdf.

UNDP 2007c. Human Development Report (HDR) 2007/2008. Fighting Climate Change: Human solidarity in a divided world. Available at: http://hdr.undp.org/en/media/HDR_20072008_EN_Complete.pdf.

UNDP. Undated-a. Community-Base Adaptation: Monitoring and Evaluation. New York, NY: UNDP. Available at http://www.undp-adaptation.org/projects/websites/index.php?option=com_content&task=view&id=344.

UNDP. Undated-b. Programming Climate Change Adaptation Projects. Available at: http://www.undp.org/climatechange/adapt/program.html.

UNDP. Undated-c. The NCSA Around the World. Available at: http://ncsa.undp.org.

UNDP. Undated-d. "Adaptation to Climate Change." Available at: http://www.undp.org/climatechange/adapt/definitions.html.

UNDP. Undated-e. Adaptation Policy Frameworks for Climate Change: Developing Strategies, Policies and Measures: Annexes. Available at: http://www.undp.org/gef/documents/publications/apf-annexes-a-b.pdf.

UNDP/GEF. 2009. Project Proposal: Reduce Impacts of Climate Change Driven Erosion through Protection and Conservation of Mangroves, Eco-systems, and Coral Reefs (in Samoa). Community-based Adaptation. UNDP Small Grants Program. Available at: http://www.undp-adaptation.org/projects/websites/docs/Prodocs/FASITOOTAI_CBA_FULL_PROPOSAL_FINAL.pdf.

UNDP/GEF. 2004. Developing Socio-economic Scenarios for Use in Vulnerability and Adaptation Assessments. In National Communications Support Unit Handbook. Available at: http://www.adaptation-learning.net/sites/default/files/sec.pdf.

UNEP. 2009. CC DARE: Climate Change Adaptation and Development Initiative. Available at: http://www.ccdare.org/Home/tabid/6655/Default.aspx.

UNESCO. 1999. Sustainable Domestication of Indigenous Fruit Trees: The Interaction Between Soil and Biotic Resources in Some Drylands of Southern Africa. In UNESCO Best Practices on Indigenous Knowledge. Available at: http://www.unesco.org/most/bpik2.htm.

UNFCCC. 2010. Adaptation Assessment, Planning and Practice: An Overview from the Nairobi Work Programme on Impacts, Vulnerability and Adaptation to Climate Change. Available at: http://unfccc.int/resource/docs/publications/10_nwp_adap_assess_en.pdf.

UNFCCC. Undated-a. Compendium on Methods and Tools to Evaluate Impacts of, and Vulnerability and Adaptation to, Climate Change. Available at: http://unfccc.int/adaptation/nairobi_workprogramme/knowledge_resources_and_publications/items/5457.php.

UNFCCC. Undated-b. "NAPAs Received by the Secretariat." Available at: http://unfccc.int/cooperation_support/least_developed_countries_portal/submitted_napas/items/4585.php.

UNFCCC. Undated-c. "National Reports." Available at: http://unfccc.int/national_reports/items/1408.php.

UNISDR. 2010. Local Governments and Disaster Risk Reduction: Good Practices and Lessons Learned. Available at: http://www.unisdr.org/africa/publications/v.php?id=13627.

UNISDR. 2008. Linking Disaster Risk Reduction and Poverty Reduction. Available at: http://www.unisdr.org/eng/about_isdr/isdr-publications/14_Linking_Disaster_Risk_Reduction_Poverty_Reduction/Linking_Disaster_Risk_Reduction_Poverty_Reduction.pdf.

UNISDR. Undated-a. Global Network of Civil Society Organisations for Disaster Reduction. Available at: http://www.unisdr.org/eng/partner-netw/ngos/rd-ngo-eng.htm.

UNISDR. Undated-b. "Terminology." Available at: http://www.unisdr.org/eng/library/lib-terminology-eng.htm.

University of California. Undated. Sustainable Agriculture Research & Education Program. Available at: http://www.sarep.ucdavis.edu.

UN OIOS MECD. 2010. Glossary of monitoring and evaluation terms. Available at: http://www.un.org/Depts/oios/mecd/mecd_glossary/index.htm.

USAID. 2007. Adapting to Climate Variability and Change: A Guidance Manual for Development Planning. Available at: http://pdf.usaid.gov/pdf_docs/PNADJ990.pdf.

Van Aalst, Maaren, Danielle Hirsch, and Ian Tellam. 2007. Poverty Reduction at Risk: Managing the Impacts of Climate Change on Poverty Alleviation Activities. NCAP. Available at: http://www.nlcap.net/uploads/media/Poverty_Reduction_at_Risk_Synthesis_Report.v1.pdf.

WeADAPT. 2007. Available at: http://www.weadapt.org/.

wikiAdapt. 2008. "Community-Based Adaptation (CBA) Projects." Available at: http://wikiadapt.org/index.php?title=Community-Based_Adaptation_%28CBA%29_projects.

World Bank. 2011. India: Andhra Pradesh Drought Adaptation Initiative. Lessons from Community Based Adaptation Approaches to Strengthen Climate Resilience. Final Report. South Asia Region, India Country Management Unit, Sustainable Development Department, Environment, Water Resources and Climate Change Unit. April 2011.

World Bank. 2010a. Climate Change – Note 8: Selection of Specific M&E Indicators for Adaptation. Available at: http://www.careclimatechange.org/index.php?option=com_content&view=article&id=25&Itemid=30.

World Bank. 2010b. Mainstreaming Adaptation to Climate Change in Agriculture and Natural Resources Management Projects. Available at: http://climatechange.worldbank.org/climatechange/content/mainstreaming-adaptation-climate-change-agriculture-and-natural-resources-management-project.

World Bank. 2010c. Pilot Program for Climate Resilience (PPCR). Climate Investment Funds (CIF). Available at: http://www.climateinvestmentfunds.org/cif/ppcr.

World Bank. 2010d. Pilot Program for Climate Resilience Results Framework. Climate Investment Funds. Available at: http://www.climateinvestmentfunds.org/cif/sites/climateinvestmentfunds.org/files/CIF_Results_Frameworks-CTF-SCF-TFCMarch2010.pdf.

World Bank/GEF. 2010. Country Support Tool. Available at: http://knowledgebase.terrafrica.org/ter-documents/ter-view-doc/0/?uid=44755.

World Bank. 2009. Guidance Note 8: Selection of Specific M&E Indicators for Adaptation. Available at: http://climatechange.worldbank.org/climatechange/content/note-8-selection-specific-me-indicators-adaptation.

World Bank. Undated-a. "Participatory Monitoring and Evaluation." Available at: http://web.worldbank.org/WBSITE/EXTERNAL/TOPICS/EXTSOCIALDEVELOPMENT/EXTPCENG/0,,contentMDK:20509352~menuPK:1278203~pagePK:148956~piPK:216618~theSitePK:410306,00.html.

World Bank. Undated-b. Climate Change: Adaptation Guidance Notes – Key Words and Definitions. Available at: http://climatechange.worldbank.org/climatechange/content/adaptation-guidance-notes-key-words-and-definitions.

WOTR 2010. Watershed Organisation Trust. India. Available at: http://www.wotr.org/.

WRI. 2009. The National Adaptive Capacity Framework: Key Institutional Functions for a Changing Climate. Available at: http://pdf.wri.org/working_papers/NAC_framework_2009-12.pdf.

Yohe, G., and Richard S.J. Tol. 2001. Indicators for Social and Economic Coping Capacity–Moving Toward a Working Definition of Adaptive Capacity. Available at: http://www.aiaccproject.org/resources/ele_lib_docs/gyoheindicators.doc.pdf.

Annex I. Terminology

Box 1. Adaptation in the Development Context

Adaptation to climate change is often characterized by the following terms:

Climate Adaptation: Adjustment of natural or human systems in response to actual or expected climatic stimuli or their effects, which moderates harm or exploits beneficial opportunities. Adaptation is a process and not an outcome.[78]

Climate Hazard: The physical manifestation of climate change/variability (e.g. change in precipitation, temperature, sea level). The outcome of hazards can be worsened by non-climate factors (e.g. a storm surge leads to significant flooding due to poor forest management).[79]

Exposure: The extent to which people, property, or systems are in a hazard zone and subject to harm or loss.[80]

Sensitivity: The extent to which a system is affected – positively or negatively – by climate variability and climate change.[81]

Adaptive Capacity: The ability to avoid harm from climate change or variability, and/or take advantage of opportunity. For the purposes of this paper, "resilience" (ability to absorb or "bounce back" to your original state) and "coping" (ability to manage risks or stresses but not necessarily bounce back) are considered elements of adaptive capacity.[82]

Vulnerability: The degree to which a system is susceptible to, and unable to cope with, the adverse effects of climate change, including climate variability and extremes. A function of the exposure, magnitude, and rate of climate change and variation to which a system is exposed, as well as its sensitivity and adaptive capacity.[83]

Autonomous Adaptation: Adaptation that does not constitute a conscious response (such as a policy or intervention) to climatic stimuli but is triggered by ecological changes in natural systems and by market or welfare changes in human systems. Also referred to as spontaneous adaptation.[84]

Maladaptation: An action or process that inadvertently increases current or future climatic effects or vulnerability by creating conditions that ultimately increase climate change emissions, negatively affect sensitivity or exposure, or reinforce or strengthen socioeconomic drivers of vulnerability.[85]

78 Adapted from IPCC 2007 and WRI 2008.
79 Adapted from Brooks 2003.
80 Adapted from UNISDR undated-b.
81 IPCC 2007.
82 Adapted from IPCC 2007.
83 IPCC 2007.
84 IPCC 2007.
85 Adapted from Barnett and O'Neill 2010 and WRI 2008.

Early efforts in adaptation often take one or several of the following forms:[86]

Adaptation Mainstreaming: A process of integrating climate change adaptation into the policies and practices of an institution (e.g. government ministry, multilateral agency, nongovernmental organisation (NGO)). Mainstreaming of cross-cutting issues, such as climate change, gender inequality, and environmental degradation, typically treats the issue as an element of more established activities or sectors (e.g. health, agriculture, industry) instead of as a separate initiative (e.g. mainstreaming climate change into development).

Climate (risk) Screening: The process of understanding and integrating climate change factors into development intervention design and planning.

Climate-Proofing: Identifying risks to development interventions, or any natural or human asset, as a result of climate change and climate variability, and ensuring that those risks are reduced to acceptable levels. Climate proofing is meant to improve the likelihood of sustaining intervention results and helps improve adaptation strategies that can better inform adjustments to interventions.

Adaptation Programs: A set of adaptation interventions designed around a common adaptation policy or strategy, budget, and time frame.

Discrete Adaptation: Also known as "stand-alone," these efforts are not tied to any specific programmatic strategy, but rather address a specific climate risk in a particular context and time.

Two terms used to differentiate adaptation needs in the development context include:[87]

Adaptation Deficit: A failure to adapt to current climatic conditions because of a low level of development (for example, inadequate housing structures to deal with extreme weather, a lack of access to credit for investing in new crop varieties, or limited technical expertise to manage a natural buffer to the effects of sea level rise).

Adaptation Gap: A failure to take special interventions required to address issues that arise as a consequence of climate variability and change (for example, being better equipped to deal with extreme weather events, having buffers against droughts, and dealing with changes in cropping patterns resulting from temperature rise).

86 Definitions adapted from various sources, including UNDP undated-d, UNDP undated-e, and World Bank undated-b.
87 Modified from World Bank 2011.

Box 2. Monitoring and Evaluation

What does an M&E system do?[88]

Monitoring	Evaluation
Distinguishing Characteristics	
* Ongoing, continuous * Internal activity * Responsibility of management * Continuous feedback to improve intervention performance	* Period and time bound * Internal, external, or participatory * Responsibility of evaluator together with staff and management * Periodic feedback
Complementary Roles	
* Clarifies program objectives * Links activities and their resources to objectives * Translates objectives into performance indicators and sets targets * Routinely collects data on those indicators, compares actual results with targets * Reports progress to managers and alerts them to problems	* Analyses why intended results were or were not achieved * Assesses specific causal contributions of activities to results * Examines implementation process * Explores unintended results * Provides lessons, highlights significant accomplishments or program potential, and offers recommendations for improvement

What can an M&E system examine?[89]

Typically an M&E system examines the elements of the intervention's theory of change (ToC), which is a depiction of the intervention plan or strategy that shows the relationships between the key activities and products needed to achieve desired outcomes and impacts. Elements of a ToC include:

* **Input**: The financial, technical, and human resources invested by funders and partners to address specific goals through an intervention.
* **Activities**: Actions undertaken by funders and their partners in order to deliver outputs and contribute toward outcomes.
* **Indicator**: A consistent qualitative or quantitative measurement of an aspect of the intervention that can be monitored to track processes or outcomes.
* **Baseline**: Any datum against which change is measured through monitoring of indicators and/or the factors affecting them.
* **Target**: A qualitative or quantitative value of an indicator that is set as a goal over and above the baseline value for the intervention implementation period.
* **Output**: Concrete, tangible products or services resulting from the use of inputs toward a particular (set of) objective(s).
* **Outcome**: Changes in behavior and/or environment – at individual, community, and/or institutional levels – made possible in part by outputs achieved, but largely beyond the control of the intervention.
* **Impact**: Systematic and lasting changes in behavior and/or the environment, toward which an intervention can contribute but is beyond its control and time scale.
* **Assumptions**: Underlying circumstances or factors – either under control or beyond the control of the intervention – that are believed to affect the validity or quality of intervention results.

88 Modified from Morra Imas and Rist 2009, World Bank 2004.
89 Definitions adapted from various sources, including OECD 2010, UN OIOS MECD 2010, ActKnowledge 2011, Learning for Sustainability 2011, Organizational Research Services 2004.

Box 2. Monitoring and Evaluation (continued)

What does the M&E system look like over time?[90]

Element Examined	Inputs	Activities	Outputs	Outcomes	Impact
Timing	During Intervention			After Intervention	
Indicators	Planning	Implementation – e.g. process & outcome, qualitative & quantitative		Performance, Sustainability, Impact	
M&E System	M&E Planning (ex-ante, baseline value)	Monitoring & Internal Evaluation (procedural, formative)		External Evaluation (ex-post, summative)	
Underlying Assumptions	e.g. assumptions about diverse factors that may affect the outcome of an intervention, such as quality of inputs, the ability to perform adaptive management, the effect of market dynamics (growth, demand, prices), the status or enforcement of relevant laws or policies, influence of relevant subsidies, cultural/social norms				

What are some kinds of evaluations at different points in time? [91]

* **Ex-ante**: An internal or external "prospective" evaluation or appraisal that is used to assess options, or sharpen scope or priorities before further action is taken (for example, a vulnerability assessment or a budget appraisal).
* **Formative**: An internal or external "process" evaluation conducted during implementation to examine progress and inform better management or course-correction (for example, a mid-term review, or a progress report).
* **Ex-post**: A "summative" evaluation that takes place after an intervention is completed (for example, a final performance evaluation or an impact evaluation).

What are some qualities that evaluation questions assess?[92]

* **Efficiency**: Did this intervention achieve the most it could for the resources (time, expertise, money, etc.) it used?
* **Effectiveness**: To what extent did the intervention attain its objectives and expected accomplishments, and deliver planned outputs?
* **Relevance**: Was the intervention pertinent or significant to stakeholder requirements, country needs, global priorities, and partners' and funders' policies?

90 This diagram does not show the "attribution gap," which is the space between outputs and outcomes. This gap represents the idea that no intervention can claim full responsibility for outcomes because of the countless other factors that influence them.
91 Adapted from Morra Imas and Rist 2009.
92 Adapted from OECD 2010 and UN OIOS MECD 2010.

Box 3. M&E and MRV: Overlapping Functions, Different Politics

Negotiations under the United Nations Framework Convention on Climate Change (UNFCCC) frequently generate highly technical and specific vocabulary and abbreviations. These terms may confuse the uninitiated, but they can play important roles in international law, and often help the international community move toward agreement on a challenging point of negotiation. "Measurement, reporting, and verification"—or "MRV"—is one such term.

The 2007 Bali Action Plan made two sets of activities "measurable, reportable, and verifiable":[93] (1) all countries' mitigation actions, and (2) developed countries' provision of support to developing countries (in the form of technology, finance, and capacity building). The concept of "MRV" provides a basis for mutual accountability between developed and developing country parties, to ensure that both sides take appropriate mitigation actions and commitments, and that the developed world provides support for the actions of developing countries.

This type of accountability was new for the UNFCCC – developed countries had previously had fairly clear and specific greenhouse gas reporting guidelines, but their provision of finance was not formally scrutinized, and emission reporting guidelines for developing countries had been quite loose. In the 2010 Cancún Agreements, UNFCCC parties took important steps toward an operational system for MRV by agreeing to establish (1) an international registry for financial and technical support, and (2) regular reporting and review processes for mitigation actions.

The term "monitoring and evaluation" (M&E), on the other hand, has been used for a much longer time, in a range of contexts, and does not carry political weight or legal meaning peculiar to the UNFCCC. Although development specialists and professional evaluators often take the lead in designing and implementing M&E activities, a range of different players may undertake M&E, and they may use it for a variety of purposes. For example, M&E may serve as a basis for reporting to a funder, legislative body, or other authority on the results of an initiative that received support from the authority. Alternatively, an M&E system may be developed and used by a government or a community solely for its own planning and self-improvement.

In many cases, M&E has an accountability function, as does MRV in the UNFCCC. However, in the development context, the accountability supported by M&E is typically oriented toward assessing the effectiveness of activities, so as to make sure funding is wisely spent. This form of accountability typically is subject to domestic stakeholder expectations and political demands, such as when a legislature approves a budget.

Under the Bali Action Plan, MRV does not apply to the effectiveness of adaptation activities. Rather, it is the provision of finance that is an obligation subject to the accountability of MRV, not the wise use of finance for adaptation. Moreover, domestic constituencies are a secondary audience for MRV, which is intended to enable accountability of governments to each other on the international stage. Thus, while MRV and M&E both can play a role in tracking finance, they likely will do so to different purposes and in different contexts, and will respond to different constituencies.

With careful design, M&E systems for adaptation and MRV systems for finance could be made complementary to each other, and could promote efficiency by drawing upon the same data resources. However, it is not clear that they will do so, or that their respective purposes would necessarily be well served by doing so. Ultimately, tracking financial flows is largely distinct from tracking what works for adapting to climate change.

93 Fransen, McMahon and Nakhooda 2008.

Annex II. Review of Adaptation & Development M&E Resources

This paper is based on the following activities:

1. A desk review of current tools and approaches to M&E of adaptation (Annex II, Tables 1 and 2);
2. Extensive interviews with development and adaptation practitioners from NGOs, multilateral and bilateral organizations, and government staff active in adaptation and M&E;
3. A series of convenings with active practitioners (including a World Resources Institute (WRI) event at the 16th edition of Conference of the Parties of the UNFCCC in Cancún, and a session at the Adaptation Mainstreaming workshop in Delhi, November 2010);
4. A field visit to India to observe adaptation-relevant work and M&E systems in the Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH portfolio.

Annex II summarizes key characteristics of the programs, tools, and approaches reviewed in activities 1 and 2 above. For additional background on activities undertaken in the development of this paper, please see the project page of WRI's Web site at: http://www.wri.org/project/vulnerability-and-adaptation.

Table 1. Examples of Adaptation M&E Approaches at the Community, Project/Program, and National Levels

Level	Tool or Guidance	Description	Implications for M&E	Definitions of Adaptation Effectiveness	Adaptation Indicators Guidance
Community	**CARE: Climate Vulnerability and Capacity Analysis (CVCA[94]), 2009**	**Community-level** tool for vulnerability and capacity assessment. Designed to help CARE field staff and partners design and implement adaptation projects. Results in an understanding of the socioeconomic dimensions of vulnerability.	Participatory approach to the creation of a baseline that combines science and local knowledge. Builds understanding of climate risks and adaptation strategies that can be used to inform an M&E system.	**Outcome**: Increases in adaptive capacity over time, especially that of the most vulnerable populations within communities and households. **Process**: Dialogue within communities and among stakeholders, such as local government and civil society.	Qualitative information from the CVCA can be used to design quantitative surveys and/or CVCA could be integrated into M&E systems by using initial analysis as a baseline.[95]
Community	**IISD: Community-based Risk Screening Tool – Adaptation and Livelihoods (CRiSTAL[96]), 2010 (updated)**	**Community-level** decision-support tool to promote the integration of risk reduction and climate change adaptation into community-level projects. Originally designed to help project planners to recognize the contribution of ecosystem management and restoration (EM&R) and sustainable livelihoods (SL)[97] toward adaptation. Enables users to assess a project's impact on community-level adaptive capacity.	Assists users in making adjustments in approach or design in order to improve a project's impact on adaptive capacity. Identifies useful indicators and metrics by aiding users to systematically understand the links between local livelihoods and climate. Flexible tool for multiple applications.	**Outcome**: Strengthening of coping and resilience to current risks and stresses as a basis for adapting to longer-term climate change. **Process**: Stakeholder consultations using participatory methods to elicit information on local livelihoods and climate contexts.	Qualitative metrics suggested as defined by 4 parameters under 2 modules and 3 scales: * Synthesizing Info on Climate and Livelihoods (a. What is the climate context? b. What is the livelihood context?) * Planning and Managing Projects for Adaptation (a. What are the impacts of project activities on livelihood resources? b. How can project activities be adjusted to reduce vulnerability and enhance adaptive capacity?) * Scales: National, local government/community, household/individual.

94 CARE 2009a.
95 CVCA is not designed to quantify vulnerability or provide results that can be generalized to regional or national levels.
96 IISD 2010.
97 Ecosystem management and restoration (EM&R), sustainable livelihoods (SL).

Level	Tool or Guidance	Description	Implications for M&E	Definitions of Adaptation Effectiveness	Adaptation Indicators Guidance
Project/Program	**UNDP (GEF): Adaptation Policy Frameworks for Climate Change (APF[98]), 2010 (updated)**	**Project- and program-level** mainstreaming guide that seeks to address the lack of a clear roadmap for adaptation policymaking. Designed for national policymakers, planners, project/program designers, and coordinators. Offers a flexible and structured 5-stage approach with guiding technical papers for each stage. Results in users clarifying their own priority issues and improved ability to implement responsive adaptation strategies, policies, and measures.	Can be used for scoping, planning, designing, and implementing activities in a developing context. Distinguishes between assessment of current climate risks, future climate risks, and vulnerability, each of which can provide different input into a baseline. Offers suggestions for qualitative and quantitative analysis for measures of effectiveness. Flexible tool that can be used for formulating and implementing adaptation strategies, policies, and measures at multiple scales.	**Outcome**: Adaptation to short-term climate variability and extreme events serves as a starting point for reducing vulnerability to longer-term climate change. Addressing the multiple levels in society at which adaptation occurs, including the local level. Adaptation policies and measures assessed in a development context. **Process**: Maintain equal importance between the adaptation strategy and the process by which it is implemented. Emphasize stakeholder participation in defining socioeconomic conditions and prospects and their relationship to climate risks and vulnerability.	Qualitative and quantitative performance indicators, the use of the Pressure-State-Response (PSR[99]) framework [not described herein], and four other dimensions for indicators of: * Implementation of the adaptation strategies in the various focal areas can enumerate the delivery of technical services, operating funds, and capital inputs with related disbursements and the resulting outputs generated (e.g. facilities created, activities and participatory processes organized). * Institutional change can demonstrate capacity development, attitudinal and awareness shifts, and policy reorientations. * Impact in global and local terms can reveal the environmental accomplishments of the adaptation strategies (e.g. disaster damages trend). * Socioeconomic conditions can be inter-related with the environmental results and impacts, including measures of the consequences of adaptation strategies interventions.

98 UNDP undated-d and Perez and Yohe 2004.

99 PSR: 1. Indicators can describe pressures on the climate caused by human activities (e.g. greenhouse gas emissions). 2. Indicators can describe the state of the environment in terms of environmental quality and aspects of quantity and/or the quality of natural resources. 3. Response indicators can, in the context of the PSR framework, refer only to societal (not ecosystem) responses.

Level	Tool or Guidance	Description	Implications for M&E	Definitions of Adaptation Effectiveness	Adaptation Indicators Guidance
Project/Program	**EC/EuropeAid: Tools and Methods Series Guidelines No. 4 – Guidelines on the Integration of Environment and Climate Change in Development Cooperation,**[100] **2009**	**Project- and program-level** guidance on mainstreaming environment and climate change into European development cooperation. Intended for staff and partners as a comprehensive reference to integrating environment and climate change into the different operational cycles of the EC. These guidelines replace the **Environmental Integration Handbook for EC Development Cooperation** (2007 edition).	Suggests assessing exposure and sensitivity of projects and programs, as well as response capacity to deal with existing and anticipated climate variability and climate change. Addresses entry points for environment and climate change in programming, sector policy support programs, general budget support, and projects.	**Outcome**: Improved likelihood of sustainability by identifying and avoiding direct and indirect environmental impacts of projects and programs in various relevant sectors, and capturing opportunities to improve environmental conditions. **Process**: Improved dialogue with partner countries on a more environmental approach to policies and programs.	Indicators should reflect the main environmental and sustainability concerns influenced by the EC, especially within the relevant focal areas/sectors.[101] Appropriate indicators may be derived from Millennium Development Goals (MDGs) and those identified by the CEP (Country Environmental Profile). Blend environmental indicators with those that capture the risks of encouraging environmentally damaging trends. Limit the number of new indicators monitored by using mixed indicators (e.g. energy efficiency, transport).
National	**OECD: Integrating Climate Change Adaptation into Development Cooperation, Policy Guidance,**[102] **2009**	**Multi-level country-based** guidance outlining priority areas for governments and international donors. Reflects the state of the art for policymakers and decision makers in confronting the challenges of integrating adaptation within core development activities. Promotes an improved understanding of climate change and its impacts, helps identify appropriate entry points, and aids efforts toward reducing vulnerability to climate variability and climate change.	Recommends moving the coordination of adaptation activities into powerful central bodies. Enables consideration of how to integrate long-term climate risks into national planning processes and budgets. Seeks to harmonize with existing systems (e.g. plans and strategies for adaptation).[103]	**Outcome**: Integration of adaptation into core development activities, with a focus on those communities, sectors, and geographical zones most vulnerable to climate change. **Process**: Decision-making processes incorporate adaptation in the "whole of government," or, the four levels of national ministries, sectoral ministries, project level, and local level.	Develop metrics and indicators to assess the effectiveness of efforts to integrate climate risks and adaptation considerations. Engage a wide variety of stakeholders to identify adaptation options and indicators of progress and success. As new areas of policy are developed for adaptation, early indicators may be more focused on input and process, and over time, become more outcome-oriented. If governments have already committed to addressing adaptation, specific goals and indicators for adaptation and disaster risk reduction (DRR) could be integrated into performance assessment frameworks.[104]

100 EC 2009.
101 Annex 10 is devoted to developing indicators.
102 OECD 2009b.
103 In line with the Paris Declaration on Aid Effectiveness, 2005.
104 Performance Assessment Frameworks (PAFs): government systems set up to monitor and review budget support programs, often thematic or sectoral. WRI 2011.

Level	Tool or Guidance	Description	Implications for M&E	Definitions of Adaptation Effectiveness	Adaptation Indicators Guidance
National	**WRI: National Adaptive Capacity Framework (NAC[105]), 2009**	**National-level** tool to identify strengths and gaps in a country's adaptation system in order to understand where improvement may be needed or where strengths may enable rapid adaptation progress. Designed for national government decision makers, civil society, and researchers. Results in an assessment of institutional strengths and weaknesses.	Initial functions assessment can be used as a baseline reference toward future adaptation planning. Participation and transparency incorporated into each functions question. Flexible tool applicable to multiple national governments.	**Outcome:** Utilize existing systems, processes, and roles within a national government to capitalize on opportunities for building adaptive capacity. **Process**: Involving key officials and decision makers to raise awareness of existing strengths and gaps in adaptive capacity. Draw on a variety of experiences.	Action or process indicators to be centered on the question "What am I able to **do** that can help me adapt?" and tailored to the individual functions. Step 1 is a context worksheet comprised of questions to capture key background documents and preliminarily identify actors to be involved.

105 WRI 2009.

Table 2. Information Resources for Adaptation M&E

This table lists a variety of practical resources that may be helpful to practitioners working on M&E for adaptation initiatives. While few available resources are yet designed solely to address M&E for adaptation, many adaptation tools and programs include recommendations on M&E, or provide frameworks, guidance, or examples of relevance to M&E.

This table is divided into four parts: (1) M&E Guidance for Adaptation, (2) Adaptation Planning Tools (3) Adaptation Programs, and (4) Other Resources. Each resource listed provides information relevant to an aspect of the guidance presented in this paper. The majority of resources provide some treatment of indicators.

Table 2a. M&E Guidance Resources for Adaptation

Resource	Focus of Resource	Resource Provides Guidance On:						Adaptation Elements Addressed*	Indicator Types Addressed	M&E Stage(s) Addressed
		Learning	RBM	Flexibility	Indicators	TOC	Other			
AFB: Results-Based Management Framework,[106] 2009	Overview of results-based management (RBM) and major components.	X	X		X		Describes goals, expected impacts, outcome, and outputs, as well as indicators and targets. Promotes **measuring improved management, measuring performance**, and learning. Provides guidance on output and outcome indicators and on the establishment of baselines.	AC, AA	Institutional functions, vulnerability drivers.	Planning, implementation, ex-post
DEFRA: Measuring Adaptation to Climate Change - A Proposed Approach,[106] 2010	Framework for developing indicators to monitor the United Kingdom's "adaptation status."			X	X		Describes means to explore, prioritize, and select initial sets of indicators to monitor progress and assess effectiveness. Explains both **process measures and outcome measures**. Outlines principles of good adaptation.	AC, AA	Assets, institutional functions	Implementation
ETC/ACC: Climate Change Vulnerability and Adaptation Indicators,[106] 2008	Technical paper on developing adaptation indicators.				X		Defines indicators needed to **monitor the progress in implementing adaptation measures** and indicators needed to **measure the effectiveness of adaptation policies**. Builds framework for indicator development that develops **links across sectors and at all levels**.	AC, AA	Assets, institutional functions, vulnerability drivers, climate hazards	Ex-ante, planning, implementation, ex-post
International Initiative for Impact Evaluation (3ie): Impact Evaluation and Interventions to Address Climate Change - A Scoping Study,[109] 2010	Technical paper on adaptation and mitigation impact evaluation					X	Describes impact evaluation in the context of adaptation. Identifies **major challenges** to conducting impact evaluations and **how they can be approached**. Includes examples in agriculture, water resource management, and social protection, as well as **mainstreaming adaptation** and **disaster risk reduction**.	AC, AA, SD	Assets, institutional functions, vulnerability drivers, climate hazards, livelihoods, ecosystem services	Ex-post
LDCF/SCCF: Adaptation Monitoring and Assessment Tool (AMAT)[110], 2011	Guidance to meet GEF-5 criteria for Special Climate Change Fund (SCCF) and Least Developed Country Fund (LDCF) indicators.				X		Introduces a **tracking tool** to measure progress toward achieving the outputs and outcomes established at the portfolio level. Provides **generic indicators for adaptation projects** with a focus on reducing vulnerability, increasing adaptive capacity, and promoting adoption of adaptation technology.	AC, AA, SD	Assets, Institutional functions, vulnerability drivers, climate hazards, livelihoods, ecosystems	Planning
UNDP: A Proposed Framework for Monitoring Adaptation to Climate Change,[111] 2008	Guidance on developing climate change adaptation projects and programs and monitoring adaptation progress.	X	X		X		Provides six evidence-based **thematic areas to monitor**. Suggests four criteria for adaptation indicators. Covers the program and project level. Disseminates lessons learned through the Adaptation Learning Mechanism (ALM) project.	AC, AA, SD	Institutional functions, vulnerability drivers, livelihoods	Implementation
World Bank: Guidance Note 8: Selection of Specific M&E Indicators for Adaptation,[112] 2009	Portion of larger guidance on mainstreaming adaptation into agriculture and natural resource management sectors.				X	X	Aids in identifying development objectives and project goals. Suggests selection of specific M&E indicators relevant to adaptation projects (**distinguishing performance and impact**). Outlines best practices for collecting baseline data, establishing M&E systems, and collecting data.	AC, SD	Institutional functions, livelihoods	Ex-ante, panning, implementation, ex-post

106 AFB 2009.

107 DEFRA 2010.

108 Harley, Mike, et al. 2008. This guidance is intended for an EU context.

109 Prowse and Snilsveit 2010.

110 GEF 2011.

111 Frankel-Reed and Brooks 2008.

112 World Bank 2010a.

* AC: adaptive capacity; AA: adaptation action; SD: sustained development in a changing climate

Table 2b. Adaptation Planning Tools That Address M&E

Resource	Focus of Resource	Resource Provides Guidance On:						Adaptation Elements Addressed*	Indicator Types Addressed	M&E Stage(s) Addressed
		Learning	RBM	Flexibility	Indicators	TOC	Other			
CARE: Climate Vulnerability and Capacity Analysis (CVCA),[113] 2009	Handbook for community-based adaptation.	X		X			Aids in conducting a **vulnerability assessment at community level** and **applying this information** to the design, implementation, monitoring, and evaluation of activities at multiple scales. **Combines community knowledge with scientific data** for greater understanding. Promotes **collaborative learning** and multi-stakeholder analysis.	AC, SD	Assets, livelihoods	Ex-ante, planning
DFID & Partners: Climate Smart Disaster Risk Management (CSDRM),[114] 2010	Management framework for mainstreaming adaptation into disaster risk mananagement (DRM)	X			X		Supports DRM polices and practice to integrate (1) **changing disaster risk and uncertainties**, (2) **enhance adaptive capacity**, and (3) **address the structural causes of poverty and vulnerability**. Outlines indicators connecting these three areas and **applicable across levels and scales**. Supports learning about the integration process and generates evidence-based CSDRM interventions.	AC, AA, SD	Assets, vulnerability drivers, livelihoods, ecosystem services	Ex-ante, planning, implementation
IISD & Partners: Community-based Risk Screening Tool - Adaptation & Livelihoods (CRiSTAL),[115] 2007	Tool for EM&R and SL at the community level.			X			Aids in systematically **understanding links between local livelihoods and climate**. Enables users to assess a project's impact on **community-level adaptive capacity** and to **make project adjustments** to improve the impact.	AC, AA, SD	Vulnerability drivers, climate hazards, livelihoods, ecosystem services	Ex-ante, planning, implementation
ISET & Partners: From Risk to Resilience - Pinning down Vulnerability: From Narratives to Numbers,[116] 2009	Tool for development practitioners and policymakers to assess vulnerability in disaster and extreme climate risk regions.				X		Presents a **vulnerability and capacities index** for measuring differential vulnerability at the **household and community levels in rural and urban areas**. Provides criteria on three key dimensions of vulnerability – material (income, education), institutional (infrastructure, social capital), and attitudinal (sense of empowerment).	AC, AA, SD	Assets, vulnerability drivers, specific climate hazards, livelihoods	Ex-ante
OECD: Integrating Climate Change Adaptation into Development Co-operation,[117] 2009	Guidance on mainstreaming climate adaptation at national, sectoral, and project levels, in both urban and rural contexts.		X	X			Encourages **country ownership** by identifying ways for funders to support developing countries in reducing their vulnerability to climate variability and change. Suggests assessing **sector-specific climate impacts and vulnerability**, with a **focus on process indicators** for now and outcome-related indicators to come later. Advises to engage a **wide variety of stakeholders** to identify adaptation options and indicators.	AC, SD	Assets, Livelihoods	Planning
Tearfund: Climate Change and Environmental Degradation Risk and Adaptation assessment (CEDRA),[118] 2009	Field tool to help agencies prioritize environmental hazards and adapt their project portfolio accordingly.	X		X			Provides step-by-step risk assessment. Encourages **participatory decision making, collaboration, and knowledge sharing** to determine local, district, and national impacts and adaptation strategies. Emphasizes **integrated learning and flexibility** in the project cycle.	AA, AC, SD	Institutional functions, vulnerability, climate hazards, livelihoods, ecosystems	Ex-ante, implementation

113 CARE 2009a.
114 DfID 2010a.
115 IISD 2010.
116 Mustafa et al. 2008.
117 OECD 2009b.
118 Tearfund 2009.

* AC: adaptive capacity; AA: adaptation action; SD: sustained development in a changing climate

Table 2b. Adaptation Planning Tools That Address M&E (continued)

Resource	Focus of Resource	Resource Provides Guidance On:						Adaptation Elements Addressed*	Indicator Types Addressed	M&E Stage(s) Addressed
		Learning	RBM	Flexibility	Indicators	TOC	Other			
UKCIP: Adaptation Wizard,[119] 2009	Five-step process to help organizations assess and respond to their vulnerability to climate change.			X			Helps identify valuable opportunities or important climate risks within an organization, and helps outline an adaptation strategy. Poses **critical questions about the effectiveness of adaptation measures**, and encourages ongoing monitoring.	AC, AA	Assets, vulnerability drivers	Implementation
UNDP: A Toolkit for Designing Climate Change Adaptation Initiatives,[120] 2010	Step-by-step guide on how to develop adaptation initiatives.	X			X		Outlines key elements to consider when developing an adaptation initiative at national, subnational, and community levels. Examines linkages between development and adaptation. Guides the process of **designing indicators and formulating the key results**. Outlines critical elements for M&E.	AC, AA	Assets, institutional functions, vulnerability drivers, specific climate hazards	Planning
USAID: Adapting to Climate Variability and Change: A Guidance Manual for Development Planning,[121] 2007	Approach to mainstream climate change into project planning.		X				Provides a six-step approach for assessing vulnerability and identifying and implementing climate change adaptations by paralleling the project cycle. Provides guidance on **designing baselines** and **approaches to evaluating adaptation interventions**.	AC, AA	Institutional functions, assets, vulnerability drivers	Implementation

119 UKCIP 2009.

120 UNDP 2010b.

121 USAID 2007.

* AC: adaptive capacity; AA: adaptation action; SD: sustained development in a changing climate

Table 2c. Adaptation Programs with M&E Frameworks

Resource	Focus of Resource	Approach to M&E	Adaptation Elements Addressed*	Indicator Types Addressed	M&E Stage(s) Addressed
DFID & Partners: Strengthening Climate Resilience (SCR), [122] **2010**	Program to help governments and civil society organizations add a climate change lens on traditional DRM	Ensures a **flexible approach** and **dissemination** of SRC evidence-base; Explains a CSDRM approach. Identifies integration of DRM, climate adaption, and development.	AC, AD, SD	Assets, vulnerability drivers, ecosystem, livelihoods	implementation
IDRC/DFID: Climate Change Adaptation in Africa (CCAA),[123] **2006**	**Research and capacity development program** to improve the capacity of African communities and governments to adapt to climate change.	Carries out M&E at the **levels of program, project, and participatory action research groups**. Uses outcome mapping (OM) to examine changes affected by the program. Combines **OM with RBM tools**. Uses a **knowledge-sharing framework** for the region (**see also Box 1** in the main text for an overview).	AC	Assets, institutional functions	Implementation, ex-post
Netherlands Climate Assistance Programme (NCAP),[124] **2005**	Assists developing countries to become independent in formulating climate policy.	Links local-scale strategies with national scale-policies. Promotes exchange of experiences between developing countries on climate issues. Establishes **linkages from vulnerability and adaptation to climate change to national poverty reduction objectives** and integrates adaptation to climate change into sustainable development plans. Outlines detailed indicators.	AC, AA	Assets, institutional functions, vulnerability drivers, specific climate hazards	Implementation
Oxfam, ODI, CARE, & Partners: Africa Climate Change Resilience Alliance (ACCRA),[125] **2010**	Consortium of programs to increase governments' and development actors' use of evidence in designing and implementing humanitarian and development interventions in Africa.	Combines good practices from a **variety of relevant disciplines** (DRR, sustainable livelihoods approach, social protection). Promotes an **enabling environment for innovation** through research, testing, and experimentation. Provides guiding questions on establishing an **adaptation baseline** under five characteristics of adaptive capacity. Discusses key **barriers and opportunities**.	AC	Assets, institutional functions	Planning, implementation
Rockefeller & Partners: Asian Cities Climate Change Resilience Network (ACCCRN),[126] **2008**	Network of cities that are working to develop robust plans to address the consequences of climate change.	Includes **theory of change with assumptions**. Provides key indicators at impact, outcome, and output levels, together with process indicators. Incorporates a diversity of approaches. Establishes a **network for learning and engagement**. Encourages flexibility.	AC, SD	Assets, institutional functions, livelihoods	Implementation
UNDP: Community-Based Adaptation (CBA),[127] **2008**	Portfolio of community-driven climate change risk management projects.	Utilizes the **Vulnerability Reduction Assessment** as an innovative M&E system. Ensures that **project monitoring is done by communities** and ground in local context. Focuses on **country driven needs**. Incorporates quantitative and qualitative indicators.	AC, AA, SD	Assets, institutional functions, vulnerability drivers, specific climate hazards, ecosystem, livelihoods	Implementation
World Bank: Pilot Program for Climate Resilience (PPCR),[128] **2010**	Scoping program for the Climate Investment Fund to pilot and demonstrate ways to integrate climate risk and resilience into core development planning.	Utilizes a **results framework that includes logic models and performance measurement frameworks**. Enables "learning by doing" and sharing of lessons at the country, regional, and global levels.	AC, AA, SD	Institutional functions, vulnerability drivers, livelihoods	Implementation

122 Christian Aid, Plan, CCDC, and IDS 2010.
123 IDRC 2011.
124 NCAP 2005.
125 ACCRA 2010a.
126 ACCCRN 2010.
127 UNDP undated-a.
128 World Bank 2010c.

* AC: adaptive capacity; AA: adaptation action; SD: sustained development in a changing climate.

Table 2d. Other Relevant Adaptation Resources

Resource	Focus of Resource	Relevance to M&E
GEF: Climate-Eval,1 2010	Online forum to foster information sharing among climate evaluators.	Learning, sharing lessons learned, and best practices. Forthcoming meta-studies on mitigation and adaptation evaluation.
GNDR: Views from the Frontline (VFL),2 2011	Network of civil society organizations committed to working together to improve DRR policy and practice.	Innovative local-level monitoring system, focusing on vulnerable people influencing policy.
ProVention Consortium,3 2000	Forum to share knowledge and to connect and leverage resources for DRR.	Functions to share knowledge, and to connect and leverage resources to reduce disaster risk. Extensive resources available.
UNDP: Adaptation Learning Mechanism (ALM),4 2007	Online forum to share adaptation practices; integrate climate change risks and adaptation into development policy, planning, and operations; and build capacity.	Provides space for learning, sharing lessons learned, and best practices.
UNFCCC Adaptation Evaluation5	Database created as part of the Nairobi Work Program.	Compendium on methods and tools to evaluate the impacts of, and vulnerability and adaptation to, climate change.
WeADAPT,6 2007	Online forum on climate adaptation issues that allows practitioners, researchers, and policymakers to access information and to share experiences and lessons learned.	Contains themes on Framing Adaptation, Risk Monitoring, Decision Screening, and Communication, as well as different tools and methods, examples, and useful external links.

129 GEF Evaluation Office 2009a.

130 GNDR 2009.

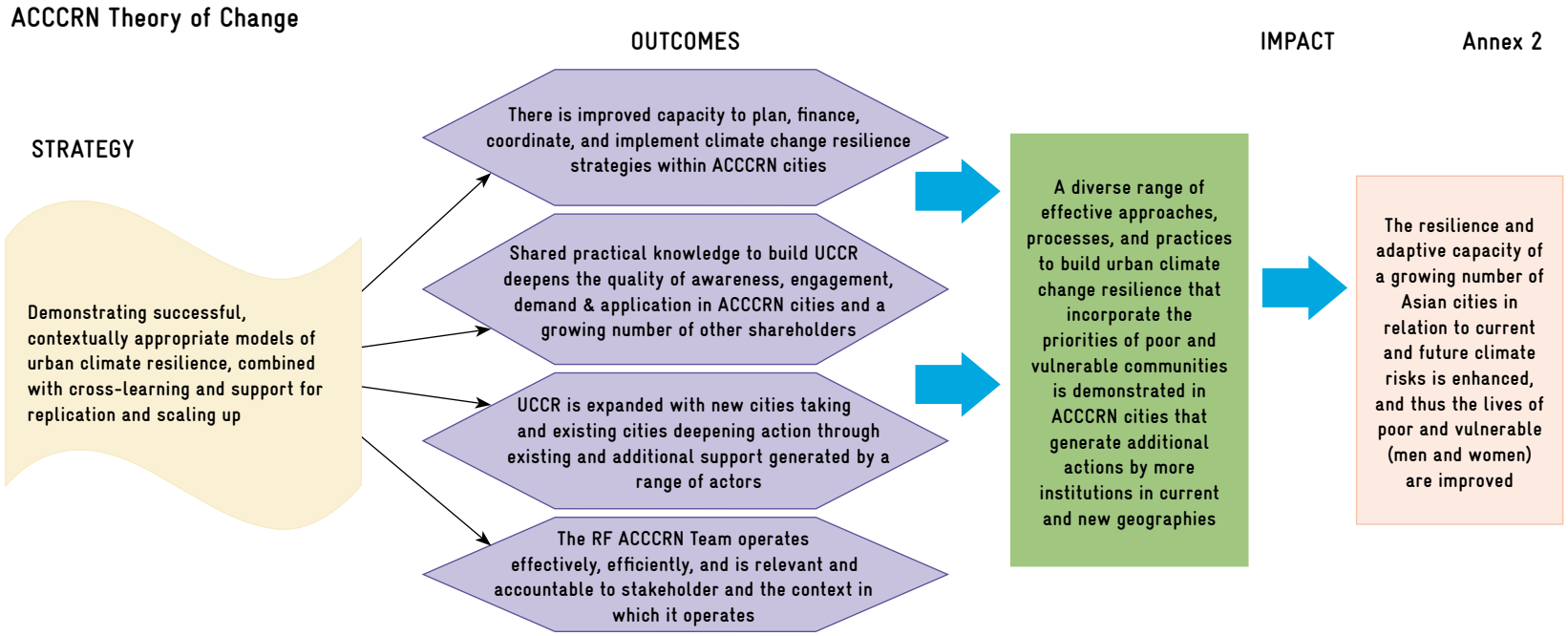
131 ProVention Consortium 2000.

132 UNDP 2007a.

133 UNFCCC 2010.

134 WeADAPT 2007.

Figure 1. Asian Cities Climate Change Resilience Network (ACCCRN) – Theory of Change



Underlying assumptions

Choices of strategy and approaches	Achievement of Outcomes	Achievement of Impact
* Working with city governments is a necessary but not sufficient condition to address UCCR needs and is necessary to ensure long-term financial and institutional action to build UCCR. * Examples and knowledge of what cities are doing are sufficient to increase the prioritization of UCCR issues within their planning/budget frameworks. * An iterative learning process improves the set of interventions to build resilience and achieve local ownership. * A multi-stakeholder process leads to cogeneration of local knowledge. * Need to work in a multiplicity of environments to generate models and learning.	* Lessons learned are transferable across cities. * Pools of money to support replication from donor agencies will be available within the next 1-2 years, and we will be able to tap into this. * Resilience improvements are measurable and credible to other city governments and subject matter experts. * City governments will continue to push this agenda after direct RF support is withdrawn. * Those networking functions that prove of value will be financially supported beyond the current three year funding window, either from RF, governments, or donors. * RF has adequate staff numbers to take on what may be an increasing workload in the coming 2-3 years.	* Supporting development of practical models will do more to enhance resilience than allocating a similar sum of funds for research and analysis. * This is a young field, and the most effective strategy to achieve impact is through direct experimentation in resilience building. * Multi-stakeholder processes to develop local resilience plans and interventions will lead to greater local ownership, and thus more successful and sustainable resilience interventions. * By working at the city level you can have more impact on the poor and vulnerable communities than by working exclusively with poor and vulnerable. * Models of UCCR can be created, implemented and documented within the program's time frame and with the budget.

Figure 2. GEF/World Bank: TerrAfrica - Country Support Tool Results Chain (not an adaptation project)

Figure 3. GIZ: Rural Adaptation in India, Support for State Action Plans on Climate Change (SAPCCs) – Impacts Chain

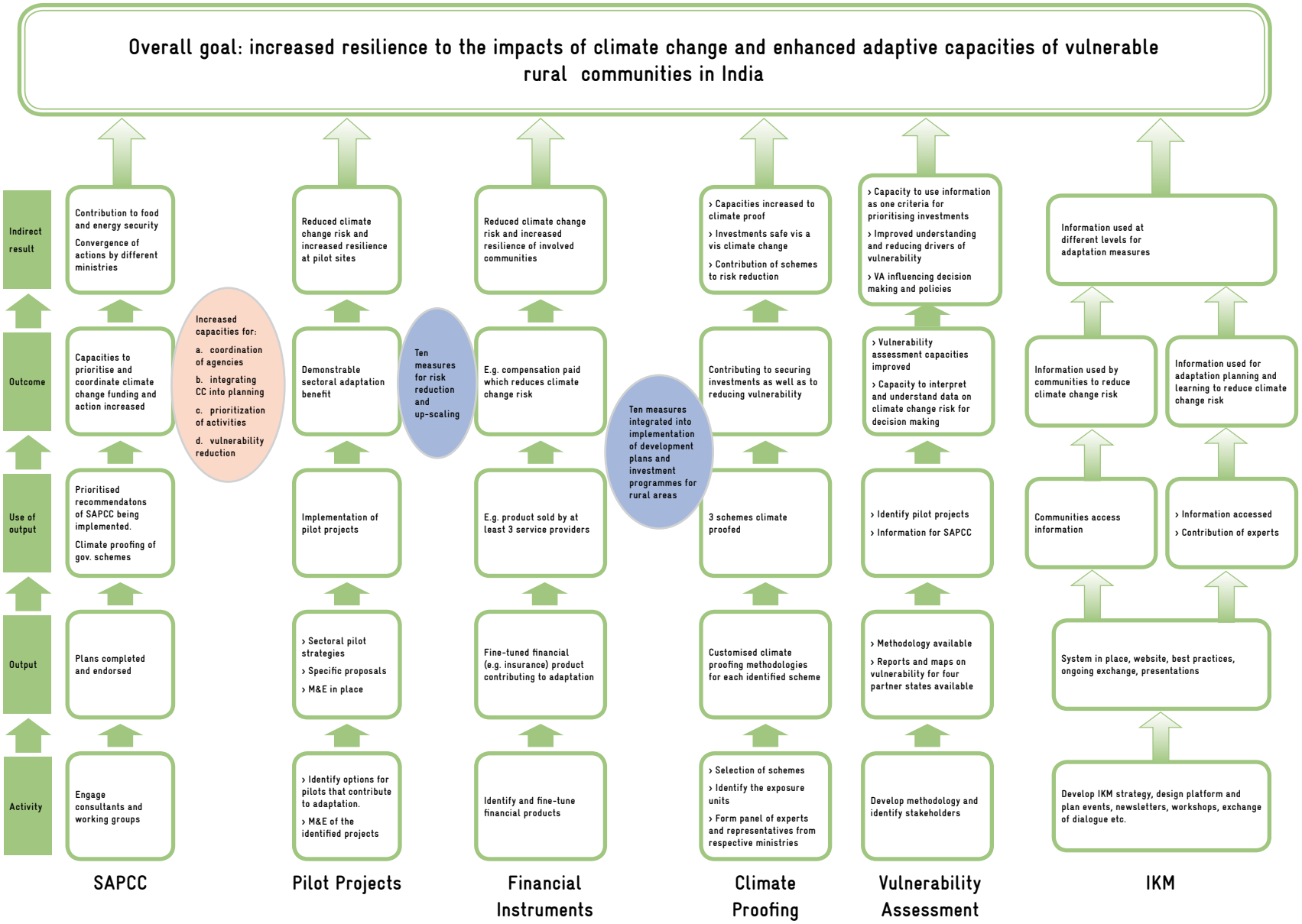
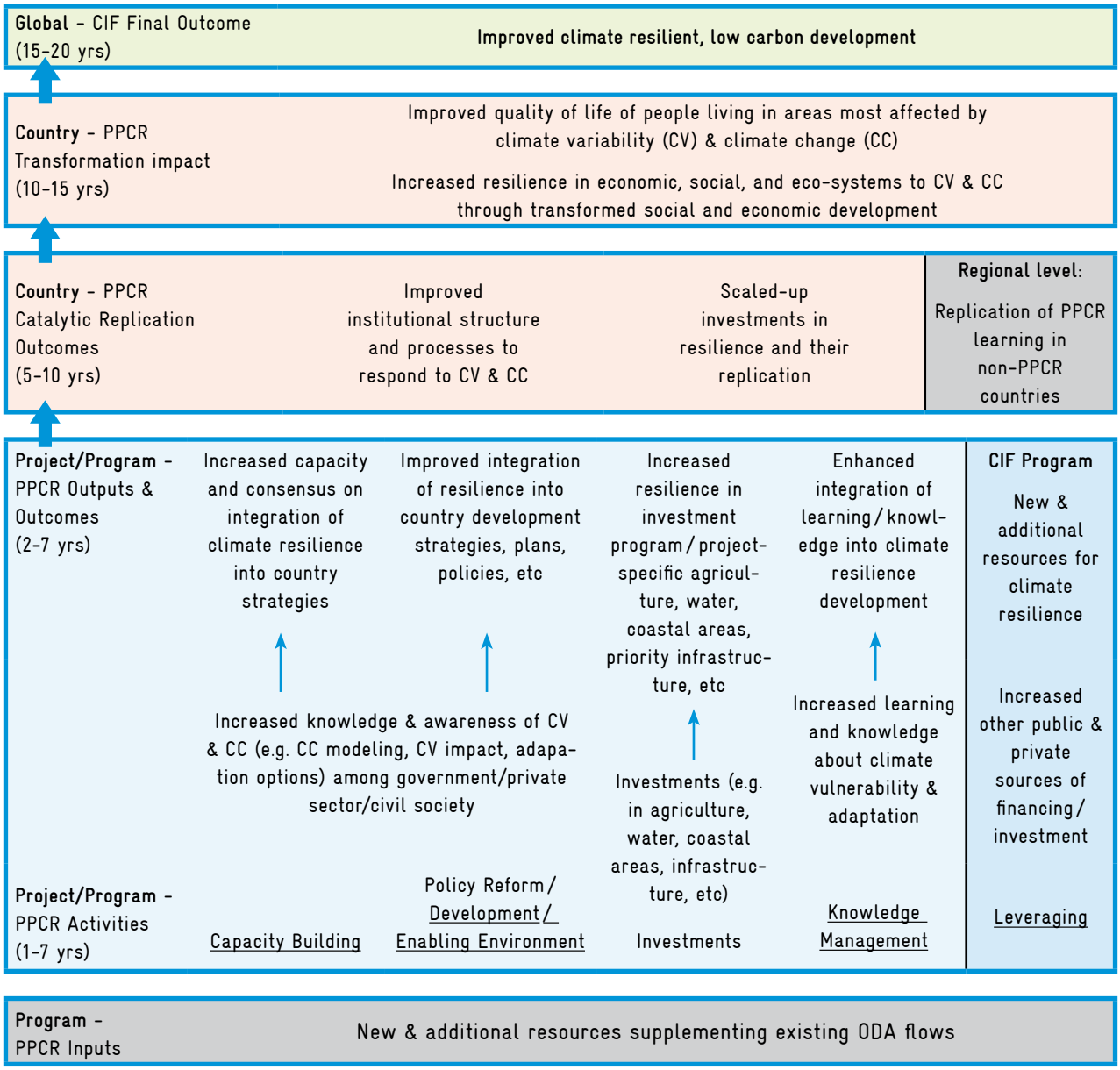


Figure 4. World Bank: Climate Investment Funds (CIF) Pilot Program for Climate Resilience (PPCR) – Logic Model



Annex IV. Example Adaptation Monitoring Plans

Table 1. Asian Development Bank: Hunan River Basin Flood Control, China

Source: ADB 2006.

Output 2: Flood protection works are completed in priority locations as part of Hunan's River Basin Flood Control Plan and 11th Five Year Plan and in compliance with the People's Republic of China regulations and Asian Development Bank (ADB) safeguard policies: Resettlement subcomponent

Performance Targets	Information Needs	Baseline Information Requirements and Status	Data Gathering Methods and Responsibilities	Planning, Training, Data Management, Expertise, Resources, Responsibilities	Analysis, Reporting, Feedback, and Change Processes and Responsibilities
1. Land acquisition and resettlement minimized. 2. Adequate funding available for land acquisition and resettlement. 3. Domestic approval achieved before land acquisition and resettlement implementation. 4. Affected people and work units compensated for lost assets in line with Resettlement Plans (RP). 5. Rehabilitation implemented according to RP. 6. Affected facilities and temporary land areas restored to original condition. 7. Income and living conditions restored to previous levels.	Efforts in comparing alternatives to minimize resettlement impacts. Allocated resettlement funds to Local project management offices (LPMOs). Adopted compensation rates. Disclosure of RPs and compensation rates in project areas. Implementation status for economic rehabilitation in affected villages. Status of housing site selection, reconstruction, and relocation. Income levels and sources of incomes among sample households for both before and after resettlement.	Resettlement Plans (RPs) for all subprojects. Published resettlement compensation rates in the project areas or compensation contract or agreements with affected people. Resettlement information booklet. Resettlement minimization efforts summarized in the RPs. Consultation process, identification of new housing sites, and proposed village economic rehabilitation plans included in the subproject RPs. Socioeconomic survey and income levels of sample households were included in the subproject RPs.	Local project management offices (LPMOs) and land resource bureaus' internal resettlement monitoring and site supervision, including status of compensation delivery, information disclosure, compensation rates, disbursement of resettlement funds, and implementation of rehabilitation measures. Regular supervision by Provincial Project Management Office (PPMO) staff and twice-yearly ADB review missions. Resettlement implementation and institutions will be monitored by a third party, external agency. Internal meetings will be held among resettlement officials, affected villages and work units, and interviews with sample households will be conducted. Post-construction review will be undertaken.	Detailed internal reporting format has been developed and introduced for the Provincial Project Management Office (PPMO) and LPMOs. Consulting services will be provided through advisory technical assistance to assist the PPMO and LPMOs to prepare the first internal resettlement monitoring report for submission to ADB. PPMO will provide on-the-job training to staff of LPMOs during project implementation on: construction activities, required mitigations, sensitive areas requiring special protection, compliance monitoring, enforcement procedures, and reporting requirements. A resettlement unit will be set up for each LPMO and staffed with qualified personnel.	LPMOs submit to PPMO quarterly and semiannual subproject resettlement internal monitoring reports. PPMO submits quarterly/annual monitoring report to ADB. Key resettlement progress reporting tables for each subproject will be included in the overall internal resettlement monitoring report. External monitoring reports will be sent to the PPMO and LPMOs to be reviewed and acted on. Based on issues identified, the PPMO will follow up with individual LPMOs; resolutions will be reported in the next internal monitoring report. Annual workshops with key stakeholders (including representatives from the PPMO and LPMOs) could be organized to review overall resettlement implementation, exchange experiences, and explore ways to resolve remaining issues and problems.

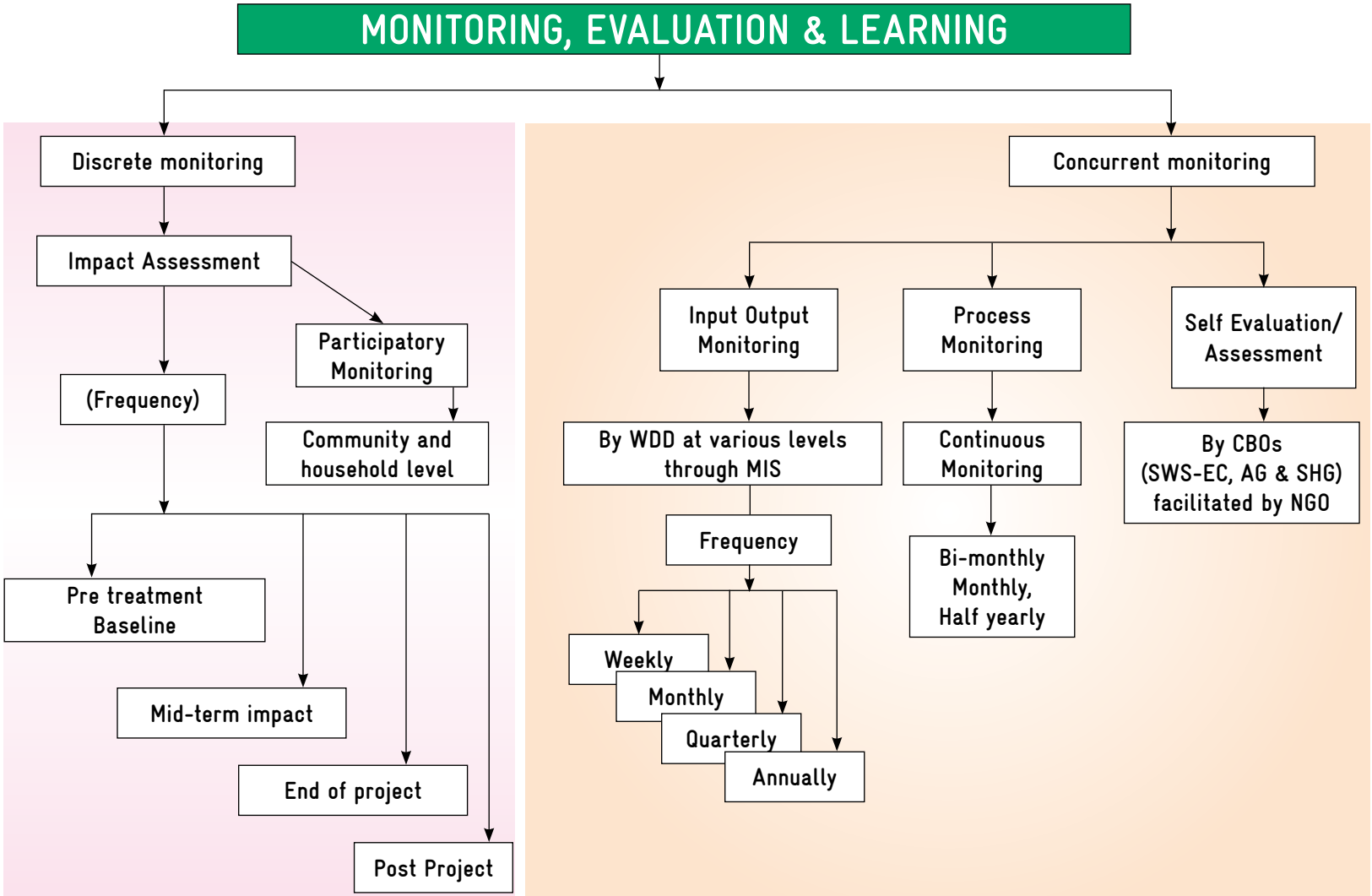
Table 2. Adaptation to Climate Change in Rural Africa Program: Example Portion of Monitoring Logframe

Source: ACCRA2010b.

GOAL	Indicator 1.1	Baseline (2009)	Milestone 1 (date)	Milestone 2 (date)	Target (2011)	Note: This program contributes toward goal level change. However, it is understood that achieving this goal is not within this program's direct control. Many other actors and initiatives will contribute toward achieving this goal.
Vulnerable people are more resilient to climate change.	Rating of overall progress against Hyogo Framework for Action.	2.38 (On a 5-point scale, 2009)	Not applicable (N/A) – report is biennial	N/A – report is biennial	3	
		Source				
		Views from the Frontline (GNDR 2009)			Views from the Frontline (GNDR 2011)	
	Indicator 1.2	Baseline (2008)	Milestone 1 (2011)		Target (2014)	
	Number of deaths from climatological, hydrological, and meteorological disasters in Africa.	16.2 million	15 million		12 million	
		Source				
		Annual Disaster Statistical Review (EM-DAT 2009)			Annual Disaster Statistical Review (EM-DAT 2008)	
	Indicator 1.3	Baseline (2008)	Milestone 1 (2011)	Milestone 2 (2013)	Target (2015)	
	Proportion of undernourished population in Sub-Saharan Africa	29%			15%	
		Source				
		MDG Report			MDG	

PURPOSE	Indicator 2.1	Baseline (2009)	Milestone 1 (Aug 2010)	Milestone 2 (date)	Target (2011)	Assumptions
To increase the use of evidence in decision making by governments (specifically in Ethiopia, Uganda, and Mozambique) and other development and humanitarian actors (specifically consortium agencies and their networks, including ECB) in decision making around the development and the implementation policies and interventions that improve poor people's resilience to climate-related hazards.	Level of understanding of consortium agency and government staff involved in the program around the value of linking CCA, social protection, DRR, and livelihoods interventions and ability to cite examples of where this has had a positive impact on resilience to climate change.	2	3	We will only collect data on this annually.	4	We are consciously focusing more of our efforts on influencing change at the level of the countries and agencies involved in this program, which is why they are mentioned explicitly in our purpose statement. However, we are also committed to disseminating the information more widely through links with regional and global networks and by sharing our research findings with the IPCC working group and others. We are conscious, however, that the impact of research on policy and investment takes time to be reflected in concrete plans. Therefore, we feel that our targets are reasonable for a 2-year time frame. As per output 3 of the program, we will be making every effort to put in place plans to lay the foundations for a wider impact in the future. Key assumptions are: * Major incidents of political instability or violence do not deteriorate. * Predicted heavy flooding in Uganda and Ethiopia does not disrupt program activities. * Consortium agencies retain close relationships and capacity to influence governments in the three countries. * Governments have adequate funding to include recommended interventions. * Levels of international aid funding do not significantly decrease, and new streams of adaptation funding become available. * Secure funding for consortium agencies' operational programming is maintained. * Consortium agencies secure funding beyond the 2-year period in order to further develop our advocacy activities.
		Source				
		National-level capacity gap analysis. Agency self-assessment, to be conducted in 2009	Light review of monitoring data by Program Manager		Program evaluation	
	Indicator 2.2	Baseline (2009)	Milestone 1 (Aug 2010)	Milestone 2 (date)	Target (2011)	
	Extent to which consortium members use evidence generated by this program to influence their own agencies and networks to adopt and invest in successful approaches to improving resilience in new and existing programs.	1	2	We will only collect data on this annually.	4	
		Source				
		Agency self-assessment, to be conducted in 2009	Light review of monitoring data by Program Manager		Program evaluation	
	Indicator 2.3	Baseline (2009)	Milestone 1 (Aug 2010)	Milestone 2 (date)	Target (2011)	
	Extent to which government plans and budgets have been modified through use of generated evidence (e.g. closer working between institutions responsible for DRR, social protection, and climate change; additional resources to participatory risk analysis).	1	2	We anticipate that progress will be made in the 2nd year of this contract. We will not expend resources in collecting data against this indicator before the dissemination activities are complete, so will do so in the evaluation at the end of Year 2.	3	
		Source				
		Policy analysis, by November 2009.	Light review of monitoring data by Program Manager		Program evaluation	
	Indicator 2.4	Baseline (April 2010)	Milestone 1(date)	Milestone 2(date)	Target (October 2011)	
	Number of administrative areas where ACCRA capacity building results in more effective use of existing budgets for activities that reduce disaster risk and enhance adaptive capacity.	0	We anticipate that progress will be made in the 2nd year of this contract. We will not expend resources in collecting data against this indicator before the dissemination activities are complete, so will do so in the evaluation at the end of Year 2.		Ethiopia: 1 district / 1 region Uganda: 3 districts / 3 regions Mozambique: 1 district /1 region	
		Source				
					Program evaluation	

Figure 1. World Bank: Sujala Watershed Project, India – Monitoring, Evaluation, and Learning [not an adaptation project]



Schematic representation of M&E in Sujala Project

Figure 2. Intercooperation: Monitoring for Activities and Outcomes

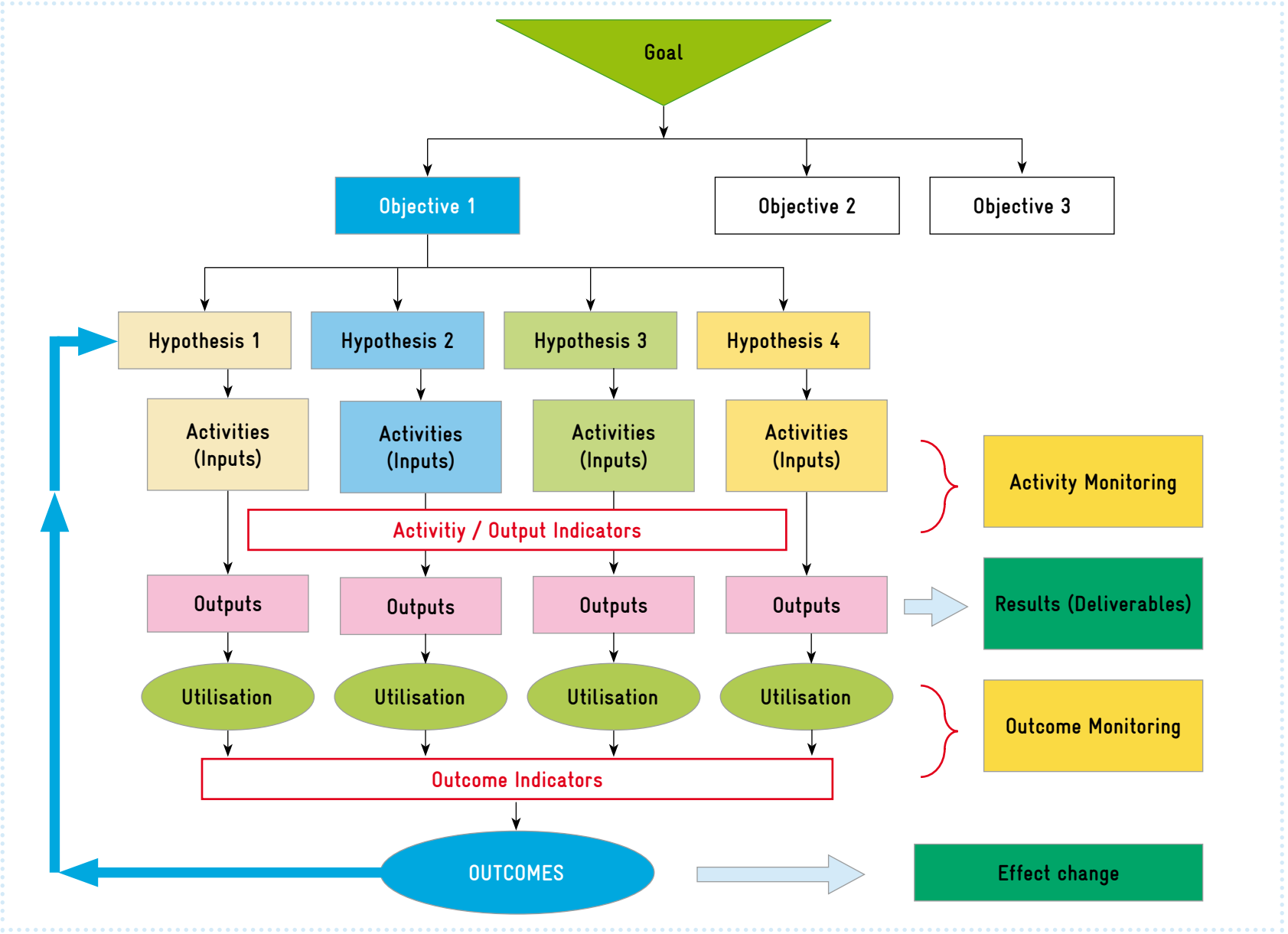


Table 3. GIZ: Possible Structure of an Adaptation Monitoring Matrix

Results chain / Indicators	Area of adaptation contributions/results	Enhancing Adaptive Capacity	Adaptation Activities	Safeguarding Achievement of Overarching Development Objectives		
				Economic	Social	Ecological
		Monitoring the development of problem-solving capacity needed to prepare for climate change (e.g. early warning capacity)	Monitoring the reduction of or preparation for key climate change risks (e.g. expansion of water storage capacity)	Monitoring changes at the level of overarching development objectives that are put at risk by climage change (e.g. income, health, ecosystem conservation etc.)		
	Adaptation hypothesis					
	Overarching objective of intervention					
	Direct result					
	Use of output					
	Output					

Annex V. Example Methodologies Complementary to Theories of Change

Table 1. World Bank: Andhra Pradesh Drought Adaptation Initiative, India – Impact and Response Matrix

Source: World Bank 2011.

Table 2.5: Impact and response matrix		
Expected Impact – Negative and Positive	Response	Pilots
Reduced or erratic rainfall will increase rain-fed production risks, while heavy unseasonal rainfall can increase the potential for top soil erosion. Also, increased temperature, reduced soil moisture or shorter growing periods could affect crop yields.	Better management of soil moisture through increase in, and conservation of organic matter. Timely suply of agricultural imputs to take advantage of available moisture and rainfall.	Development of diversified farming system
		Instroduction of plough bullocks in support of small farmers
		Establishment of village level seed banks
		Establishment of tree nurseries
Increased quantities of groundwater withdrawal as reduced rainfall will reduce the availability of surface water and groundwater.	More efficient use of groundwater by using it for critical irrigation and ensuring access to all by treating it as a common property.	Development of system for groundwater management
		Introduction of system of rice intensification (SRI)
		Introduction of millet into the Government Public Distribution system (PDS) as incentive to encourage its production
Erratic rainfall pattern could disturb employment opportunities for those dependent on seasonal agricultural labor for their livelihood, triggering out-migration.	Enhanced livelihood opportunities for marginal groups through goat and sheep rearing, backyard poultry and fish farming in tanks.	Development of backyard poultry
		Establishment of chick rearing centers
		Development of inland fisheries cooperatives
		Establishment of common interest groups (CIG) for goat rearers
		Establishment of goat crèche (goat kids rearing center)
		Farming on leased land
		Common property resource development
Reduced fodder production due to crop failure in rainfed agriculture will have negative impact on the productivity of dairy cattle. Also, unseasonal rainfall might result in outbreaks of siseases normally linked to the rainy season.	Integration of crops and livestock in a mixed farming system for fodder production combined with better animal health service delivery.	Development of diversified farming system
		Introduction of village-level fodder banks
		Development of community-managed livestock vaccination service
		Development of livestock insurance system
		Establishment of tree nurseries
Erratic or unseasonal rainfall could have a positive impact on sheep and goat rearing as grazing becomes possible during seasons that normally would not off this possibility. But disease outbreaks due to unseasonal rainfall could be a negative impact.	Common land restoration for grazing and for rainwater infiltration, combined with better animal health service delivery.	Development of system for common property resource management
		Establishment of common interest groups (CIG) for goat herders
		Establishment of goat crèche (goat kids rearing center)
		Development of community-managed livestock vaccination service

Table 2. Outcome Mapping (IDRC) and Logical Framework Approach

Source: Rodunter et al. 2008.

The **vision** reflects the broad human, social & environmental betterment in which the program is engaged and to which it is contributing.	
The **mission statement** describes in a broad way the contribution of the donor program to the vision. It describes how the program intends to operationalise its role in support of the vision and how to support the achievement of outcomes by its partners, and how it will remain effective, efficient, relevant and sustainable.	
Outcome Challenge: Boundary Partner A The outcome challenges describe the changed behaviours (relationships, activities, and/ or actions) of a partner; and how they would be behaving if they were contributing ideally to the vision. Set of progress markers: Progress Markers are a gradual set of statements (milestones) describing a progression of changed behaviour in a partner. They describe changes in actions, activities & relationships leading up to the ideal outcome challenge statement.	**Outcome Challenge** Boundary Partner B Set of progress markers
Support strategies from the program / project: The strategies outline the approaches of the project team in working with the partners. They indicate the relative influence the program is likely to have on a project partner. An overview of the strategies helps to pinpoint strategic gaps in the approach or determine whether the program is overextended; it also suggests the type of evaluation method appropriate to track and assess the performance of the project.	**Support strategies** for Partner B
Organisational practices describe the efforts of the project team in order to remain innovative, efficient and relevant for the program purpose.	

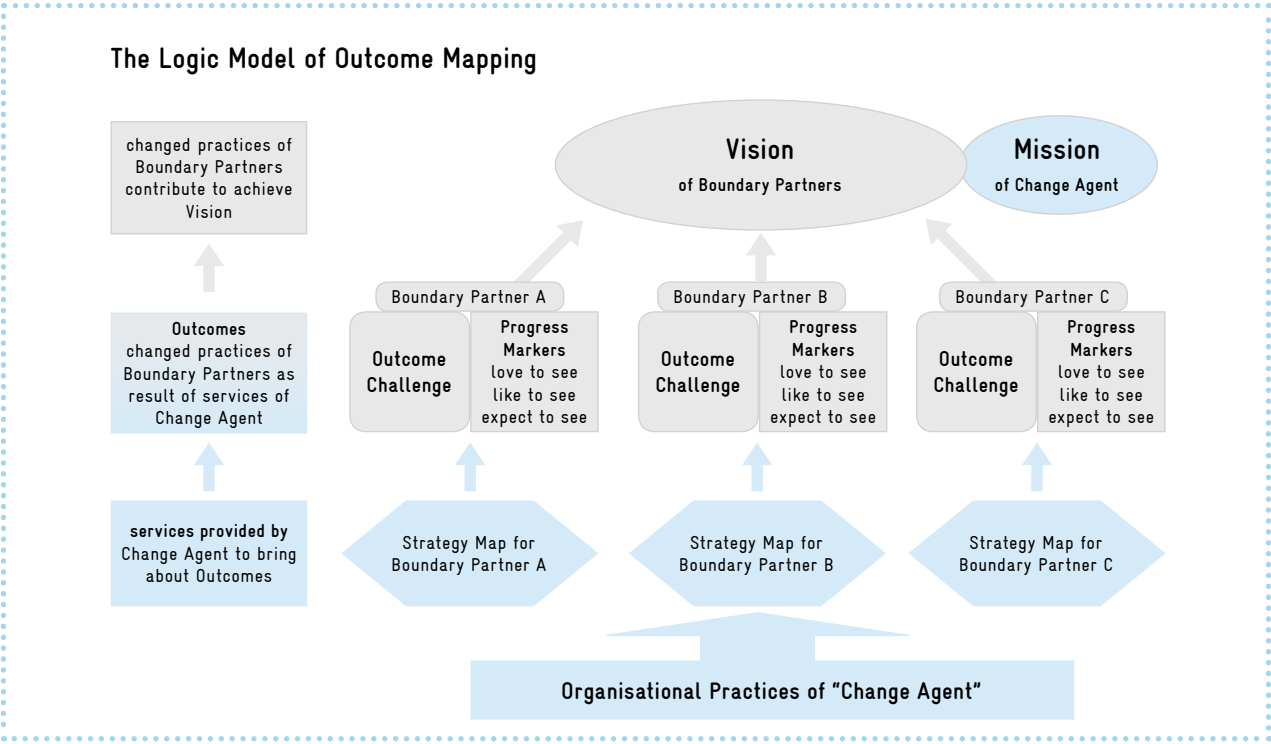


Figure 1. Conceptual Model Components and Example for a Terrestrial Site
Source: Margolis et al. 2008.

The main components of a conceptual model include the following:

Scope: Definition of the broad parameters or rough boundaries (geographic or thematic) for where or on what a project will focus (e.g. La Amistad International Park and its buffer zone).

Conservation Target: An element of biodiversity at a project site, which can be a species, habitat/ecological system, or ecologcal process on which a project has chosen to focus (e.g. river turtles, high value wetlands, water purification processes).

Direct Threat: A human action that immediately degrades one or more biodiversity targets. For example, logging or fishing.

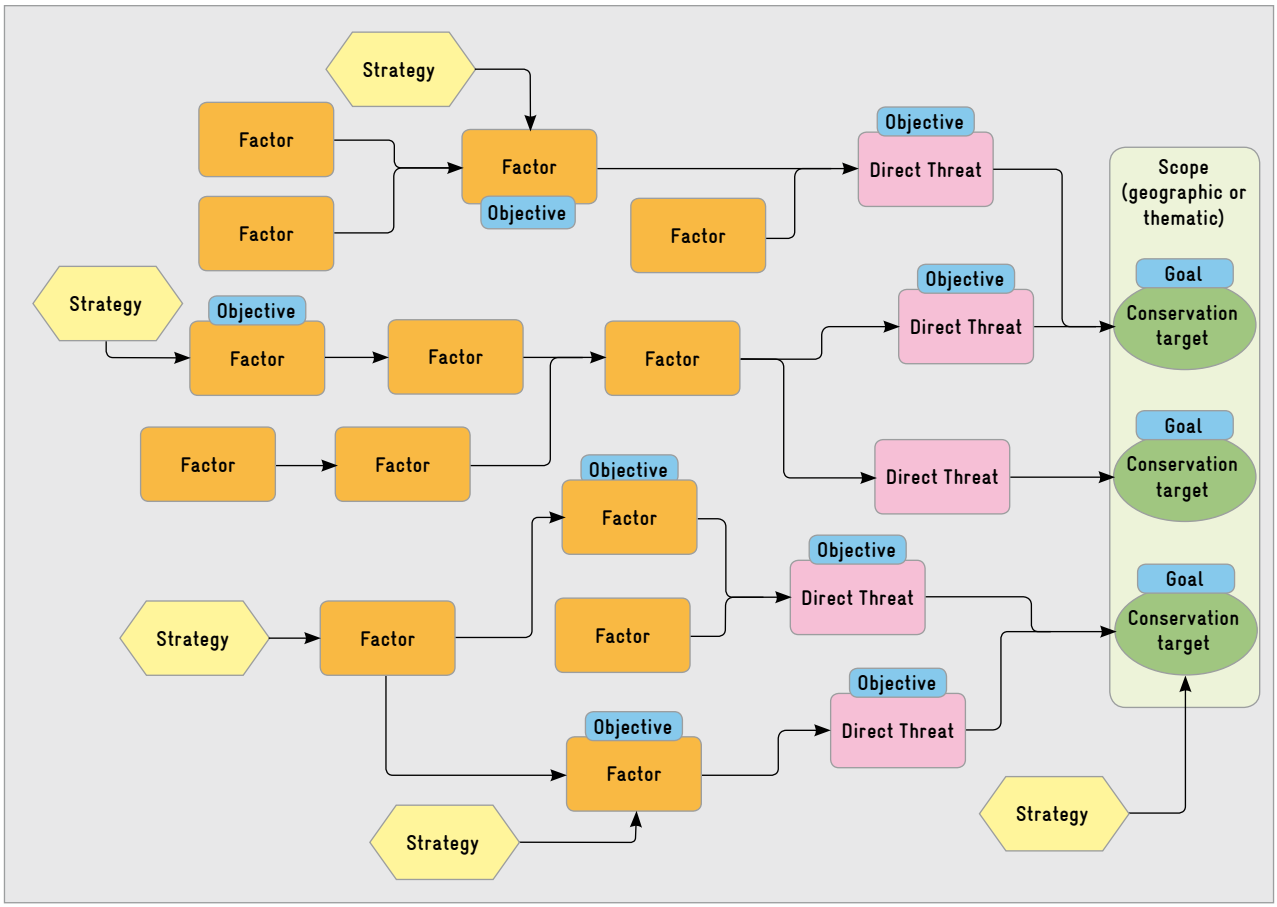
Contributing Factor: The indirect threats, opportunities, and other important variables that influence direct threats. These include, for example, perverse economic incentives, favorable attitudes about conservation, and stakeholder education levels.

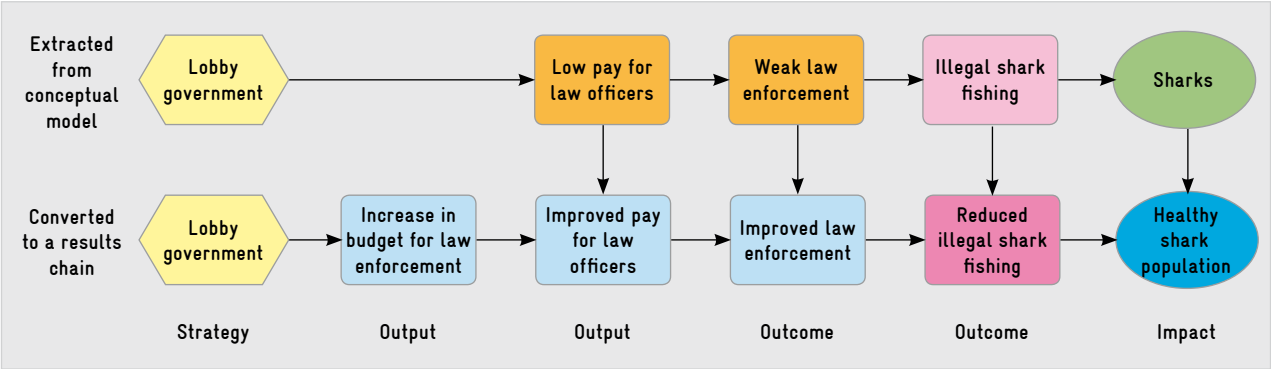
Strategy: A group of actions with a common focus that work together to influence one or more contributing factors, unltimately reducing threats or restoring natural systems.

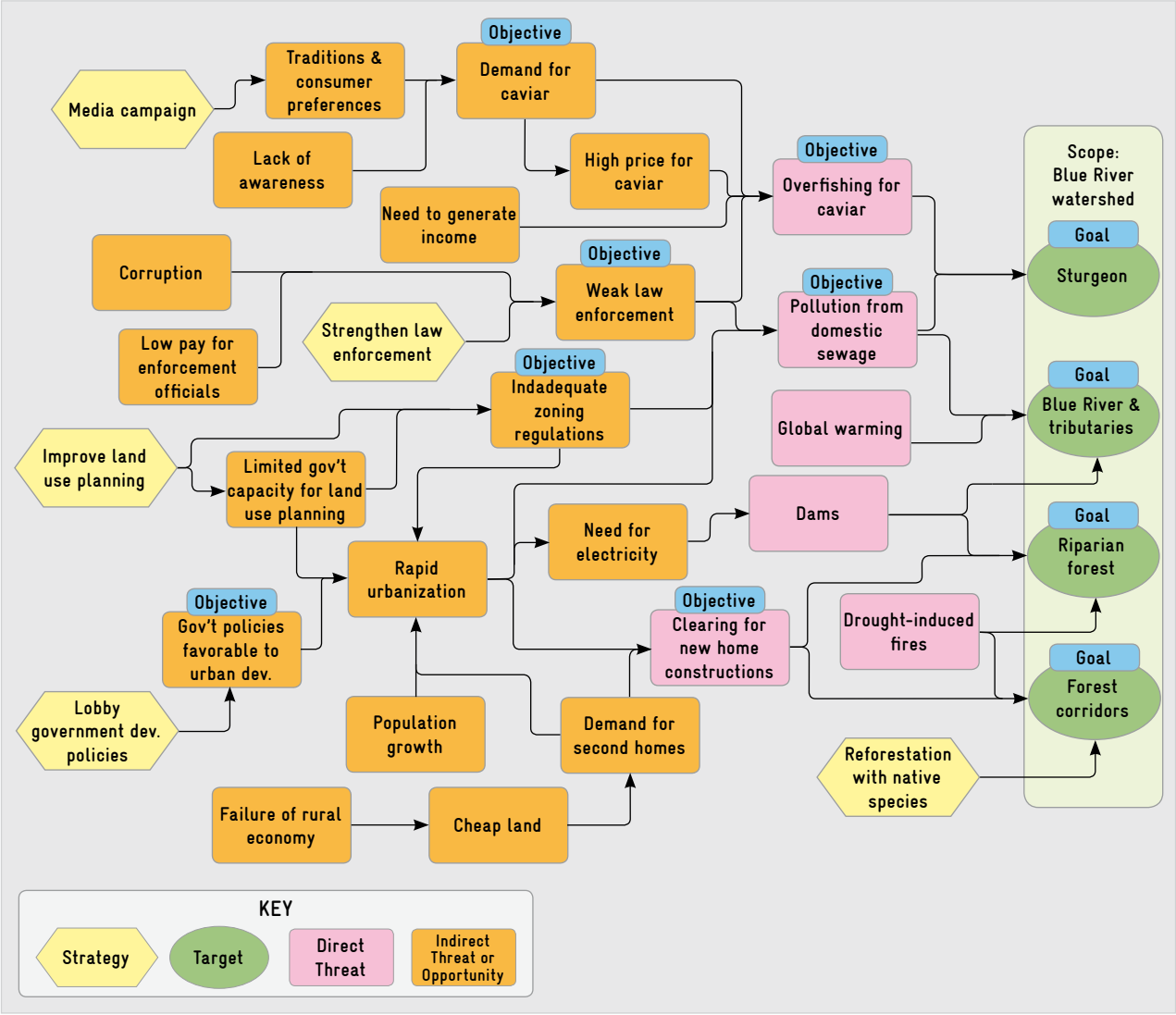
Goal: A general summary of the desired future state of, or impact on, a conservation target.

Objective: A specific statement detailing the desired accomplishements or outcomes of a project, such as reducing a critical threat.

The following generic conceptual model illustrates the relationship of these terms:



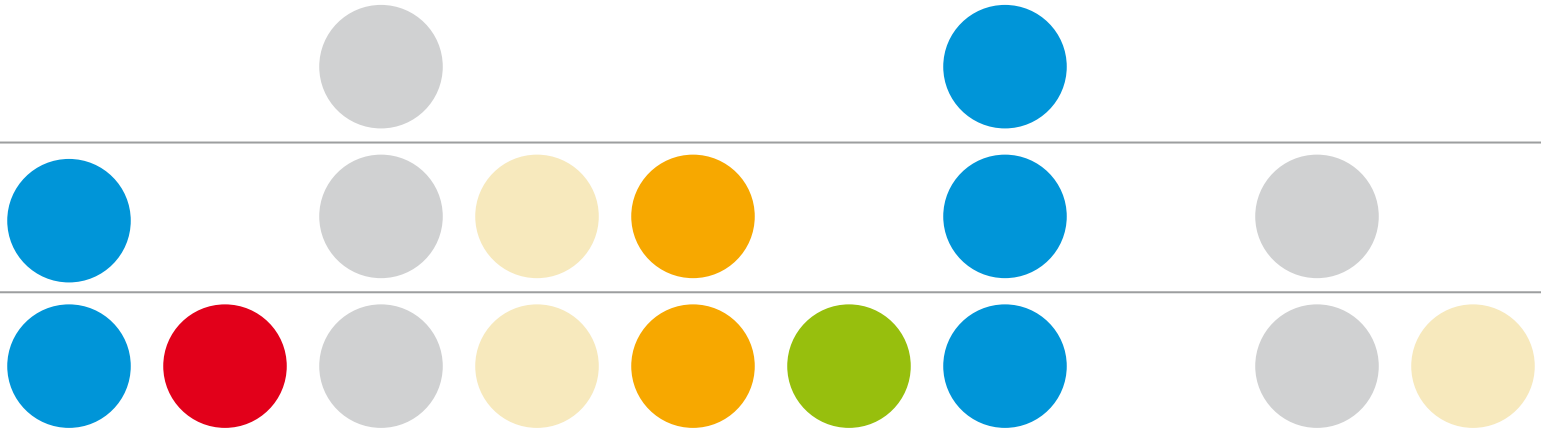




Example Goal (Forest corridors):
By 2025, the forest corridor linking the Blue River watershed to Los Grillos is unfragmented and at least 5 km wide.

Example Objective (Government policies favorable to urban development):
By the end of 2008, conservation friendly zoning regulations have been developed and approved by the city council.

Example Objective (Clearing for new home construction):
By 2015, there is no new home construction being carried out, permitted, or planned in fragile areas.



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