Strengthening Monitoring and Evaluation of Climate Change Adaptation

May 2017

STAP SCIENTIFIC AND TECHNICAL ADVISORY PANEL
An independent group of scientists that advises the Global Environment Facility

gef UN environment

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CITATION

STAP (2017). Strengthening Monitoring and Evaluation of Climate Change Adaptation: A STAP Advisory Document. Global Environment Facility, Washington, D.C.

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ABOUT STAP

The Scientific and Technical Advisory Panel (STAP) comprises seven expert advisors supported by a Secretariat, who are together responsible for connecting the Global Environment Facility to the most up to date, authoritative and globally representative science. http://www.stapgef.org

ABOUT GEF

The Global Environment Facility (GEF) was established on the eve of the 1992 Rio Earth Summit, to help tackle our planet's most pressing environmental problems. Since then, the GEF has provided $14.5 billion in grants and mobilized $75.4 billion in additional financing for almost 4,000 projects. The GEF has become an international partnership of 183 countries, international institutions, civil society organizations, and the private sector to address global environmental issues. http://www.thegef.org

Acknowledgements

This synthesis paper and the work leading up to it was supported by the Scientific and Technical Advisory Panel (STAP) of the Global Environment Facility (GEF) and UNEP/PROVIA. STAP is responsible for providing strategic advice on projects and policies to the GEF. In 2012, the Council approved STAP as its advisory body for the GEF's Least Developed Countries Fund (LDCF) and the Special Climate Change Fund (SCCF). The United Nations Environment Programme (UNEP), through the Global Programme of Research on Climate Change Vulnerability, Impacts and Adaptation (PROVIA), provides a platform for the international scientific community, practitioners, and policy makers to conduct and share policy relevant research and disseminate this knowledge more widely for the benefit of the global community.

This document benefited greatly from the contributions of a number of reviewers and UNEP/PROVIA workshop participants, which STAP wishes to thank: Suruchi Bhadwal, Rosina Bierbaum, Dennis Bours, Paul Desanker, Saliha Dobardzic, Tom Downing, Marcella D'Souza, Meeta Goel, Demetrio Innocenti, Nicolina Lamhauge, Timo Leiter, Veronique Morin, Ian Noble, Archana M Patankar, Sravanthi Rallabandi, Dima Shocair Reda, Christine Roehrer, Shalini Sharma, Upasna Sharma, Mark Tadross, and Anna Viggh.

Executive Summary

Climate change poses an unprecedented threat to the life and livelihoods of billions of people. With US$100 billion per year to be invested worldwide in climate change adaptation and mitigation by 2020 (UNFCCC 2011), it is essential to ensure that the measures taken work – and work well. The GEF has been an "early mover" in supporting climate change adaptation in the developing world – by investing over US$1.3 billion to help communities since 2001, notably through the Least Developed Countries Fund (LDCF) and the Special Climate Change Fund (SCCF). This experience is not only a rich source of insights and learning, it also places the GEF in a unique position to scale-up and mainstream adaptation in the future.

Monitoring and Evaluation (M&E) plays an essential role in understanding where to focus investments, what is working and what is not, why this is the case, and how to learn from experience to know how to maximize impact. M&E can (and should) support strategic and effective investments in climate change adaptation (CCA). While there are now many M&E systems in place for CCA at project, country, and international levels, the field is still relatively young and rapidly evolving. In fact, despite over 15 years of CCA project implementation experience at the GEF and elsewhere, M&E has only in the past few years gained broader attention, focus, and prioritization as a strategic toolset for not only understanding what is and is not working well, but for ongoing learning and improvement to enhance results and impact.

In this context, the GEF STAP and UNEP's Global Programme of Research on Climate Change Vulnerability, Impacts, and Adaptation initiated a process to assess the state of knowledge on CCA M&E. This report reflects the synthesis of efforts over the past two years in that area, and draws from a wide base of knowledge regarding the current state of national and multilateral actions on adaptation, the outcomes of the Paris Agreement, and the needs and priorities of the GEF.

This synthesis report identifies a number of methodological challenges and difficulties for M&E starting with the difficulty of defining "success" in CCA. The long-term nature of climate change makes the success of adaptation efforts only apparent over time and in retrospect, creating difficulties for current and near-term assessments of progress. Further, adaptation interventions occur against the background of evolving climate, environmental and developmental baselines – posing challenges for attribution and evaluation – including the relative lack of counterfactual examples for comparative purposes.

Finally, the report suggests a number of areas that appear promising for strengthening CCA through more effective M&E. This includes:

- orienting M&E and adaptation interventions to support learning;
- adopting indicators that reflect the processes of adaptation at different scales and provide contextual richness, while allowing for some degree of comparability and aggregation;
- progressing from project-based M&E to M&E and learning (MEL) systems that are linked with developmental efforts; and
- creating environments that enable learning and knowledge management.

STAP hopes that this report will provide timely and actionable inputs to the GEF partnership and looks forward to continued engagement with the partnership in the implementation of its recommendations.

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1. Motivation and background

Climate change poses an unprecedented threat to the life and livelihoods of millions of people. The scientific community and many other stakeholders recognize the urgent need to prepare for and adapt to the impacts and long-term consequences of the global climate change. Since 2001, the Global Environment Facility (GEF) has programmed over US$1.3 billion toward climate change resilience, adaptation, and disaster risk reduction. In fact, the GEF's Least Developed Countries Fund (LDCF) and the Special Climate Change Fund (SCCF) together hold the largest and most mature portfolios of adaptation projects in the developing world (GEF 2016b). With the record scale of investments in climate change mitigation and adaptation, as reflected by the commitment of the global community to mobilizing US$100 billion per year by 2020 for climate change adaptation and mitigation (UNFCCC 2011), as well as the scale and urgency of the climate change threat, the stakes are unquestionably high to ensure the success of current and future investments in adaptation.

Monitoring and evaluation (M&E) plays an essential role in understanding where to focus investments, what is working and what and is not (and perhaps more importantly, why this is the case), and how to learn from experience to know how to maximize impact. M&E can (and should) support strategic and effective investments in CCA. However, experience thus far has demonstrated that CCA M&E is particularly challenging—beyond the challenges experienced in most other sectors—given: the inherent complexity of the issue; context-specificity; the combination of natural/climatic, economic, and social variables; the non-linearity of stresses, risks, and change pathways; the lack of predictability; the long-term nature of the problem; and the lack of uniformity around what is required to adapt effectively (Williams 2016; Bours, McGinn, and Pringle 2015; Fisher et al. 2015; Steelman et al. 2015; Naswa et al. 2015). While there are now many CCA M&E systems in place at project, country, and international levels, the field of CCA M&E is still relatively young and rapidly evolving. In fact, despite over 15 years of CCA project implementation experience at the GEF and elsewhere, CCA M&E has only in recent years gained wide attention, focus, and prioritization as a strategic toolset for not only understanding what is and is not working well, but for ongoing learning and improvement to enhance results and impact.

In this context, the GEF STAP and UNEP/PROVIA initiated a process to assess the state of knowledge on CCA M&E and commissioned a set of discussion papers to explore progress in M&E for CCA to spur fresh thinking that can advance the field (UNEP 2013). The discussion papers consider factors such as the intentional shift toward learning as a primary objective for M&E, the multi-sectoral nature of CCA, how to address complexity when designing and implementing M&E, identifying lessons for CCA M&E from M&E approaches in key development sectors including gender mainstreaming, and the challenges of M&E across scales. Drafts of papers exploring these topics were discussed at a technical workshop held in Mumbai in 2015. Based on discussions at the workshop, further discussion within STAP and PROVIA, external review, as well as additional recent research and analysis on CCA M&E, the original papers were consolidated and expanded upon in this report.

This paper is a synthesis for the GEF context of the papers commissioned by STAP and UNEP/PROVIA in 2015. It begins with a brief overview of basic M&E concepts, given that these are not widely

understood and can be confusing. It describes the CCA M&E landscape, citing examples of CCA M&E frameworks and of M&E in practice at different levels (program, national, project). It also summarizes some of the well-known challenges associated with CCA M&E, as these are a foundational point from which to proceed, and cannot be ignored.

Secondly, the paper emphasizes the importance of orienting M&E toward learning, which ultimately requires a paradigm shift from using M&E for accountability to using M&E for learning. Although M&E typically is designed to serve two overarching functions (i.e. accountability and learning), traditional development M&E has emphasized accountability and, to some extent, retrospective learning through ex-post evaluations and other after-the-fact reviews. In dealing with climate change, however, there is a growing emphasis on using M&E for ongoing learning and improvement during the course of an intervention's implementation. The focus on learning takes on added significance in the context of CCA because adaptation is essentially about an uncharted process of change, and effective change requires us to learn to do things differently, or indeed, often to learn to do different things. Learning in fact underpins adaptation; thus, designing for adaptation requires designing for learning. The IPCC has recognized learning as an underpinning to adaptation[1], as have many other entities working on CCA[2]. Yet learning is not embedded into M&E; in fact, learning requires a different approach, set of disciplines, and a culture foreign to many M&E practitioners. Embedded throughout this paper is a call for a fresh approach to M&E, which will over time shift the paradigm from M&E, to *M, E and Learning* (or MEL).

Finally, the paper explains how and why the complexity inherent in CCA and its targeted interventions should inform what M&E (and learning) approaches are needed, lessons from M&E in climate-vulnerable sectors, and insights into mainstreaming gender into CCA M&E (a cross-cutting issue). The paper concludes with a reflection on key recommendations for approaching CCA M&E to effectively serve learning in a manner that will improve results over time.

The main limitation of this study is that the scope of the subject is very broad and deep, whereas the scope of the study itself is limited. Another limitation is the rapid evolution of the CCA M&E field. Even during the course of writing this study, several new CCA M&E initiatives began and useful studies were

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1 The 2012 IPCC report on Managing the Risks of Extreme Events and Disasters to Advance Climate Change Adaptation discusses how the dynamic notion of adaptation calls for learning as an iterative process in order to build resilience and enhance adaptive capacity now, rather than targeting adaptation in the distant future. Action research and learning provide a powerful complement to resilience thinking, as they focus explicitly on iterative or cyclical learning through reflection of successes and failures in experimental action, transfer of knowledge between learning cycles, and the next learning loop that will lead to new types of action (List 2006; Ramos 2006). Critical reflection is paramount to triple-loop learning; it also constitutes the key pillar of double-loop learning, or the questioning of what works and why that is fundamental to shifts in reasoning and behavior (Kolb and Fry 1975; Argyris and Schön 1978; Keen, Brown, and Dyball 2005) Allowing time for reflection in this iterative learning process is important because it provides the necessary space to develop and test theories and strategies under ever-changing conditions. It is through such learning processes that individual and collective empowerment can emerge and potentially be scaled up to trigger transformation (Kesby 2005).

2 For instance, the need to institutionalize and incentivize learning on M&E for adaptation was also highlighted at the Adaptation Committee Workshop on adaptation M&E held in Fiji in September 2013, where it was noted that learning is not just about successes and good practices but also about discovering factors that contribute to failures or to non-delivery (Hammill, Dekens, and Schröder-Breitschuh 2013).

published. Taken together, these limitations point to the reality that more work could – and perhaps should – be done to delve into these timely questions and in so doing advance this burgeoning field, which will help to address critical global issues in a timely fashion.

2. Basic Components of M&E

M&E is used extensively by international and national development agencies and financial institutions to assess the progress and effectiveness of many diverse investment projects and programs. As CCA funding scales up in the near future, it is more critical than ever to ensure the effectiveness, equity and efficiency of CCA interventions (Lamhauge, Lanzi, and Agrawala 2012) and to ensure they are readily adopted. While there are no universally set definitions for M&E terms and concepts, there are four typical M&E components, briefly described here. These components and the concepts behind them are expanded upon in Annex 1.

A **results framework**—often depicted as a theory of change, logic model, or log frame—identifies the intended results an intervention aims to achieve and the logical cause-and-effect relationship between the intervention's inputs, activities, and these results. A Theory of Change (ToC) framework is increasingly favored for CCA M&E initiatives.

Indicators are markers of progress toward the intended results (outlined in the results framework) used to demonstrate the status of an activity, project, or program (see discussion in Annex 1 on indicator baselines and other indicator considerations).

Monitoring generally refers to the systematic and continuous collection of data, quantitative and/or qualitative, about the progress of a project or program over time.

Reporting, alongside monitoring, often at annual (or more/less frequent) intervals, serve to take stock of progress and support routine management and accountability purposes.

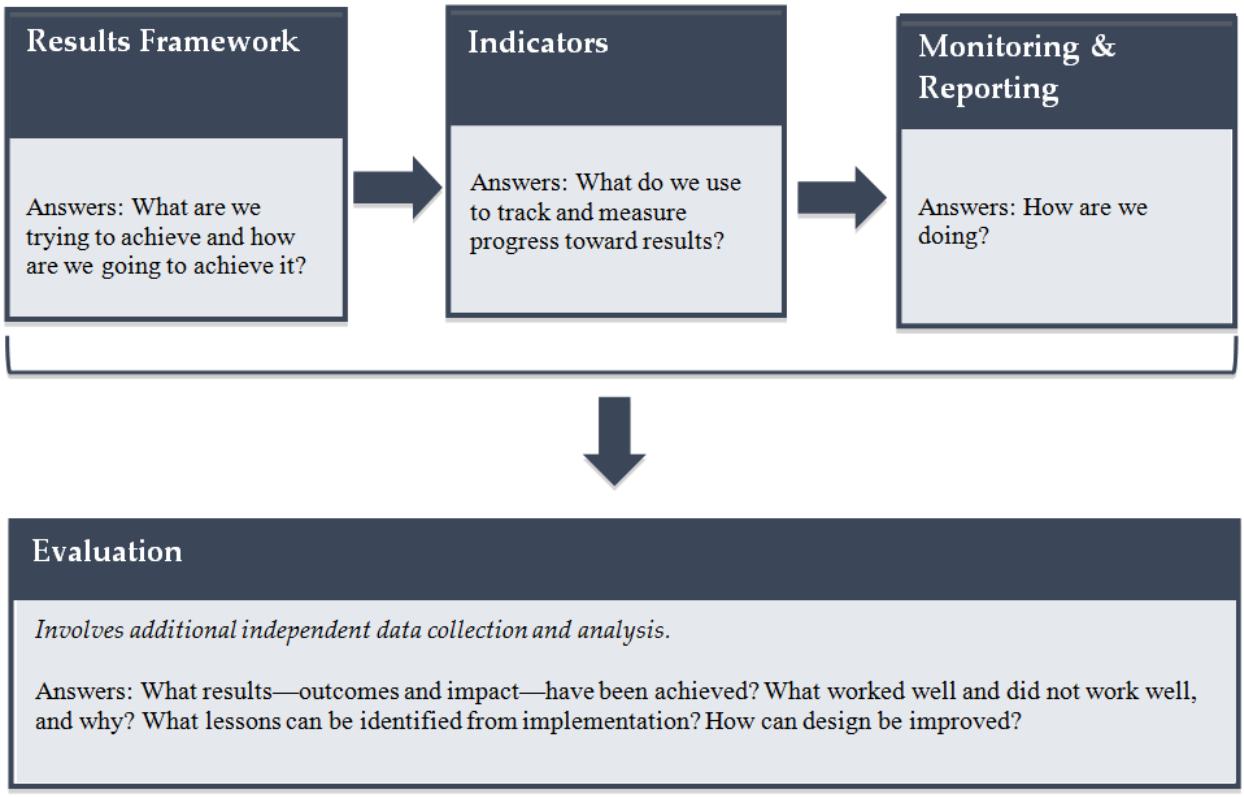
Evaluation is a separate analysis that draws upon all these components, but also involves additional independent data collection and analysis. It is in essence concerned with valuing. The OECD defines evaluation as "The systematic and objective assessment of an ongoing or completed project, program, or policy, its design, implementation and results. The aim is to determine the relevance and fulfillment of objectives, development efficiency, effectiveness, impact and sustainability". (OECD 2002)

Exhibit 1 is a simplified diagram of the relationships between these terms and their meaning. Please note that there is variation in how these terms are defined and used in practice.[3,4]

3 A lack of standard nomenclature does not disrupt progress on M&E system design or delivery, even though refinements and standardized usage would benefit the field in the long run.

4 Some institutions depict these frameworks vertically with impact at the top, others depict these vertically with activities or inputs at the top (and impact at the bottom), and others choose horizontal frameworks with activities/inputs on the left and impact on the right.

Exhibit 1. Basic Components of an M&E System



Source: Williams (2016)

3. Conceptual, Methodological and Practical Challenges in CCA M&E

The challenges facing CCA M&E are widely recognized by M&E practitioners and are briefly described here. Ideas for addressing these challenges are discussed in subsequent sections of the paper.

Challenge 1: Evolving knowledge on key concepts and constructs

A particular challenge for M&E in the context of climate change adaptation lies with the definitions and conceptualizations of much of the core terminology itself. For example, the starting point of M&E is the results framework – which specifies expected results and the objectives to be achieved. In CCA, questions about what adaptation is or what constitutes "successful" adaptation are still widely debated – and this poses an obvious challenge for M&E efforts. Similarly, many related terms such as 'vulnerability', 'adaptive capacity' and 'resilience' are commonly used, where there are still definitional and conceptual debates.

Challenge 2: Lack of suitability of many traditional M&E approaches for CCA

Most traditional M&E approaches assume that the interventions they focus upon are relatively simple, with a linear cause-and-effect relationship where a known type of intervention will result in a known outcome, and this pattern can be repeated over and over. CCA is typically a much more complex, long-term, uncertain and unpredictable undertaking. This requires alternative and often more creative M&E. Mixed methods, systems approaches, innovation, and learning approaches are favored over single-method M&E designs (Fisher et al. 2015; Bours, McGinn, and Pringle 2015; Williams 2016).

Challenge 3: Identifying meaningful indicators and establishing baselines and targets

For context specificity, difficulty in identifying meaningful impact indicators, and challenges with aggregation, there is a lack of widely agreed indicators to determine the effectiveness of CCA interventions. Whether agreed-upon or standardized indicators are even feasible or desirable is the subject of healthy debate among practitioners. Setting baselines and targets is also often complicated for reasons explained above, the rapidly changing nature of climate vulnerability, risks and impacts, and our inability to predict how CCA will materialize in the future (Dinshaw et al. 2014).

Carefully selecting suitable indicators (rather than, for example, simply applying a set in use by others), moderating expectations for what indicators can reveal in terms of longer-term outcomes and impact, and supplementing quantitative (and summarized) indicator data with thoughtful qualitative narratives are some ways to address the challenges associated with indicators. So too is focusing more on a process of learning-focused evaluation as a separate exercise that can draw from, but go beyond, the use of indicators themselves. Efforts to improve the quality and utility of CCA indicators and their relevance (and scalability) may also bear fruit in the next few years.

Challenge 4: Assessing attribution

Due to the many natural, social, and economic influencing factors affecting CCA, the reality that many donors or other contributors are supporting the same resilience intervention, and methodological

challenges surrounding attribution in complex systems change scenarios, it is often hard or impossible for evaluations to directly attribute results to a particular intervention. For this reason, establishing contribution to a particular change or result, not attribution solely to one intervention, is typically more realistic (Williams 2016; Fisher et al. 2015; Bours, McGinn, and Pringle 2014b).

Challenge 5: Connecting M&E across scales

CCA at one scale—such as the local level—may not equate to adaptation at a regional or national scale. The same is true for points in time and sectors: Simply because a CCA intervention worked well once does not guarantee that it will work well again, even in the same circumstances, simply because the complex adaptive systems within which CCA is taking place are constantly shifting. The lack of predictable comparability, replicability, and scalability of CCA create practical methodological challenges for M&E—pointing to creative and mixed-method approaches—as well as calling into question the external validity of evaluation findings (Krause, Schwab, and Birkmann 2015).

Still, there are some practical options for connecting information across scales to improve the evidence base for adaptation planning and decision-making. For example, Leiter (2015) describes two options beyond aggregating standardized metrics across scales. The first involves linking information based on level-specific metrics, with a flexible set of standardized indicators that can be selected according to their applicability to the respective context. The second involves informally linking and synthesizing information across scales, from a variety of information sources (e.g. evaluations, project reports, informal dialogues), including qualitative information, to supplement standardized national level reporting. Addressing the challenges (and opportunities) posed by scale is a priority, and it is likely that current research and experimentation in this area will yield further options and solutions.

Challenge 6: Lack of M&E expertise and capacity

Countries and other entities implementing CCA measures often do not have institutional structures, technical capacity or the resources to carry out M&E activities. M&E is a resource-intensive activity which requires sound technical, financial and trained human resources. From a developing country perspective, putting together these resources may be a challenge. Moreover, CCA M&E is itself particularly challenging, requiring specialized training in cross-disciplinary expertise. The resources and capacities needed to undertake this successfully are not often present. Starting with simple and modest M&E, investing in building M&E capacity, and expecting M&E to evolve and improve over time are ways to manage this challenge, which cannot be entirely avoided.

Challenge 7: The risk of maladaptation

An issue that has gained some attention—but not yet enough—is climate change maladaptation. There is no standard definition of this term. The IPCC defines maladaptation as *actions that may lead to increased risk of adverse climate-related outcomes, increased vulnerability to climate change, or diminished welfare, now or in the future* (IPCC 2013). Although this issue of unintended risks or consequences has been recognized for some time, it is only now beginning to gain the attention it deserves. For instance, a recent paper entitled *Addressing the risk of maladaptation to climate change*, reviews the current theoretical scholarship on maladaptation and provides some specific case studies—in

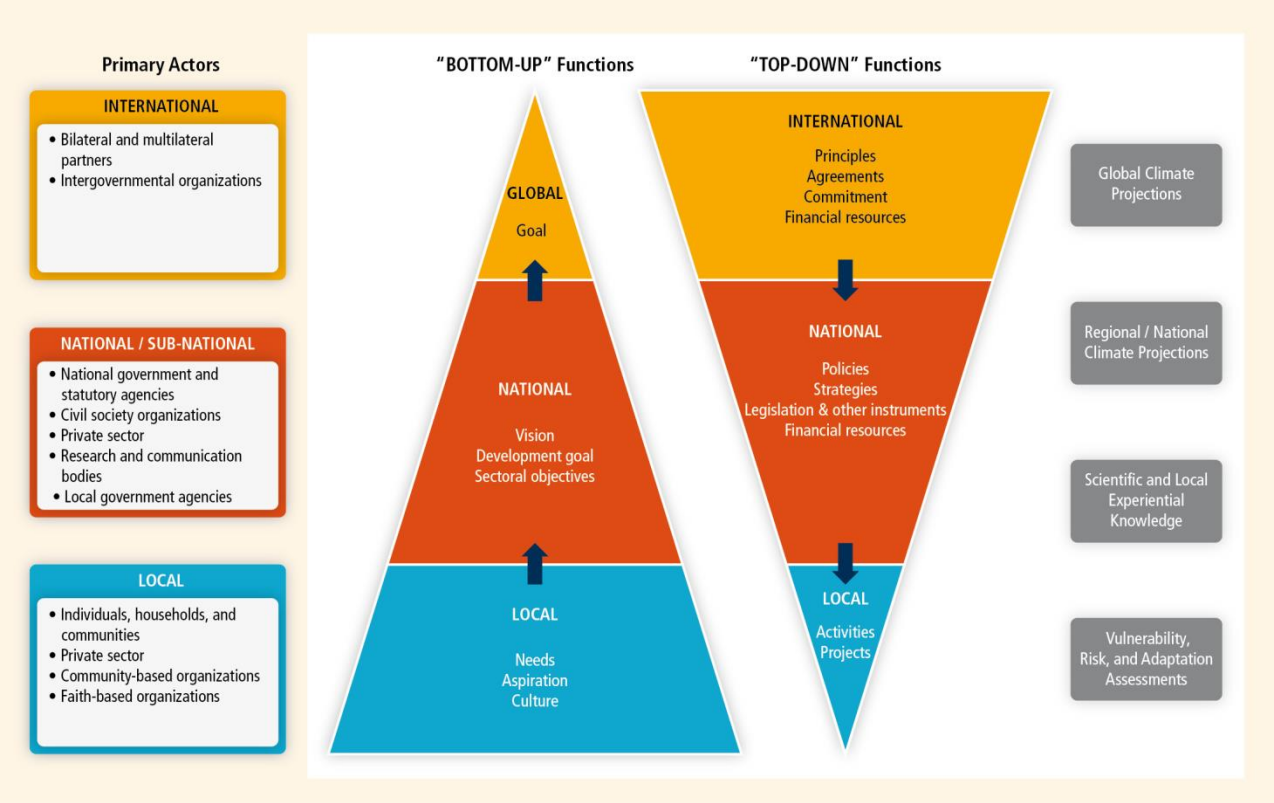
the Maldives, Ethiopia, South Africa, and Bangladesh (Magnan et al. 2016). This paper argues that maladaptation should be at the top of the planning agenda, and there is no reason why it should not also be on the top of the M&E agenda, which so far – with only a few exceptions – has not focused on this critical issue.

4. Addressing CCA M&E Challenges Across Scales

The field of CCA M&E is expanding rapidly, with many new M&E systems being designed and implemented around the world, and examples available for others to learn from global to local levels. While most climate change impacts are experienced locally (e.g. floods, reductions in crop yields, or spread of diseases) these localized impacts can have national and international ramifications that require action beyond the local level. To be effective, CCA interventions—and therefore CCA M&E—must address issues across scales. Effective and efficient adaptation policies and programs often require coordination and collaboration across local to national (and sometimes international) organizations and institutions. A striking example is the heat waves and fires in and around Moscow in 2010, which affected wheat exports and had global consequences (Shaposhnikov et al. 2014). The importance of designing CCA M&E at different scales is widely recognized, as is the challenge of doing so. Exhibit 2 shows a simplified set of actors needed for both 'top down' and 'bottom up' management of climate change adaptation and disaster risk. In practice, adaptation projects and interventions are at multiple scales – from community-based adaptation to national adaptation planning. Consequently, CCA M&E needs to be able to capture and reflect these cross-scale linkages.

In the following section is a brief overview of overarching frameworks used at higher levels (e.g. program, institution) as well as examples of project-level M&E that illustrate current M&E practice. It also briefly describes related communities of practice and other capacity-building efforts related to CCA M&E. In this regard, it is worth pointing out that while most project-level M&E systems (such as results-based management and logical framework approaches) tend to focus naturally on specific outputs and associated outcomes (Lamhauge, Lanzi, and Agrawala 2012), there is now recognition that given the long lead-times for assessing the performance of interventions and the associated difficulties with attribution, it may also be important to evaluate adaptation processes (Preston, Yuen, and Westaway 2011).

Exhibit 2. System of actors and functions for managing disaster risk and adapting to climate change (Lal et al. 2012)



4.1. Illustrative CCA M&E frameworks

A variety of CCA M&E frameworks are publicly available for use by stakeholders. Many have been developed by multilateral and bilateral funding agencies such as the GEF, Adaptation Fund, USAID (USA) or DFID (UK) to ensure effective and efficient utilization of resources. Others have been developed to support national and sub-national planning and implementation. Most start with some kind of results framework, then identify indicators (or a process for identifying indicators in specific applications). Those that have been used in practice are often employed by recipients of funding from an agency that requires the use of a framework, monitor and report on the indicators. Evaluation, although usually at least identified or mentioned, is less commonly at the center of these frameworks, and in many cases is more of a separate-but-related undertaking that goes beyond the frameworks themselves. Overall, CCA M&E frameworks and their application are evolving quickly.

The examples of M&E systems presented in Exhibit 3 and further below illustrate prominent frameworks, applied at a range of scales, including project, national, and global levels. Some are flexible and can be applied across scales, though doing so is typically challenging, as discussed below. Indeed, flexibility and the ability to both view and analyze systems across scales are fundamentally important to CCA and

CCA M&E. As noted by O'Connell et al. (2015), all systems function at multiple scales, and interactions across scales affect each other. Furthermore, what works well at one scale may have the opposite effect at another (see also discussion of maladaptation above).

Thankfully, the rapid increase in both attention to climate change and funding for CCA—as well as integration of CCA into development agendas—is pushing the application of scaling in all directions, down from the international to national and local levels, and up from the local to national levels, across sectors and countries. Although the challenges associated with scaling of CCA M&E (and CCA in general) are quite real and realistically unavoidable, it is likely that valuable lessons from experience will lead to further innovations beyond those already mentioned herein.

Exhibit 3. Illustrative Examples of CCA M&E Frameworks

Action	Agency	Focus
M&E framework for projects/ programs	UNDP Adaptation Policy Framework (Lim and Spanger-Siegfried 2004)	Guidance on designing and implementing projects to reduce negative impacts and enhance beneficial consequences of climate change
	GEF Adaptation Monitoring and Assessment Tool (AMAT)	Tracking tool for adaptation progress used under the LDCF/SCCF results framework
	Results Based Management (RBM) and Logical Framework reviewed by OECD	Framework used by agencies such as CIDA, DFID, DGIS, JICA, SDC, and SIDA for adaptation related projects in Asia, South East Asia, Pacific Islands, etc. Five categories of adaptation activities assessed using RBM and Logical framework
	Pilot Program for Climate Resilience (PPCR), Climate Information Fund (CIF)	Guidance and reporting tools for five core indicators at national and project level
Framework linking adaptation with development objectives	WRI six-step framework on behalf of GIZ (Spearman and McGray 2011)	Six step framework as a practical tool for tracking success and failure of adaptation interventions in the context of development agenda
	Tracking Adaptation and Measuring Development (TAMD) by IIED (Brooks et al. 2013)	Two track approach for evaluating adaptation progress at the macro level to inform high-level decision-making
	UKCIP AdaptME toolkit (Pringle 2011)	Applied at different levels and sectors for evaluating adaptation progress and performance
National level audits and reviews	International Organisation of Supreme Audit Institutions (INTOSAI WGEA 2010)	Guidance on auditing the government response to climate change including adaptation interventions
	International Initiative for Impact Evaluation (3iE) (Prowse and Snilstveit 2010)	Impact evaluation methodology to be utilized in assessing the impacts of adaptation interventions
	OECD review of national M&E systems (OECD 2015)	Review of national M&E systems to identify lessons learned and inform future development of adaptation policies and programmes
	Progress, Effectiveness and Gain M&E tool by LDC Expert Group	This process focused monitoring tool uses the 10 essential functions of the NAP process as its foundation, and establishes expected outcomes and metrics that can be used to measure progress in each of the functions.

4.1.1. GEF RBM Action Plan and LDCF/SCCF RBM Framework

The GEF's Results-Based Management (RBM) Action Plan aims to refine its focal area results frameworks, strengthen corporate-level results reporting, and improve the ability to make key management decisions based on the best available information on results (GEF 2016a). In May 2014, the LDCF/SCCF Council adopted a revised RBM Framework for the Least Developed Countries Fund and the Special Climate Change Fund (LDCF/SCCF) (GEF 2014b). The revised Framework and indicators form the basis for portfolio-level monitoring and reporting of the expected and actual results of LDCF/SCCF-financed climate change adaptation projects. The LDCF/SCCF uses the Adaptation Monitoring and Assessment Tool (AMAT) as a tracking tool for adaptation progress under the LDCF/SCCF Results Framework (GEF 2014a).

4.1.2. PPCR Monitoring and Reporting Toolkit

The PPCR Monitoring and Reporting Toolkit of the Climate Investment Funds is another results measurement system example. PPCR has five core (required) indicators[5]; of these, two are monitored at the national (pilot country) level, and the remainder are based on information gathered from PPCR projects, aggregated and monitored at the program level for each PPCR pilot country.

4.1.3. TAMD

The Tracking Adaptation and Measuring Development (TAMD) is a framework for evaluating adaptation and adaptation-relevant development initiatives across scales (Brooks et al. 2013). TAMD is a 'twin track' framework that evaluates adaptation success as a combination of how widely and how well countries or institutions manage climate risks (Track 1 for climate risk management) and how successful adaptation interventions are in reducing climate vulnerability and in keeping development on course (Track 2 for development performance).

TAMD seeks to assess the adaptation process at scales from global to local by evaluating the outputs, outcomes, and impacts of adaptation and adaptation-relevant development interventions within and across the two tracks, and by considering how outputs are linked to outcomes and impacts.[6]

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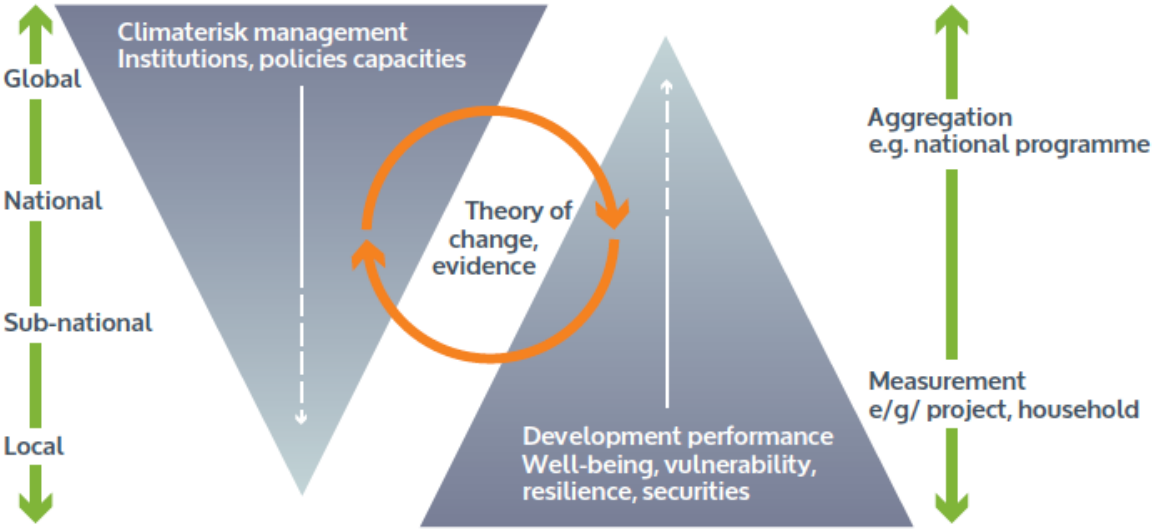
5 The five core indicators are: (1) Degree of integration of climate change into national including sector planning; (2) Evidence of strengthened government capacity and coordination mechanism to mainstream climate resilience; (3) Quality and extent to which climate responsive instruments/investment models are developed and tested; (4) Extent to which vulnerable households, communities, businesses and public sector services use improved PPCR supported tools, instruments, strategies, activities to respond to Climate Variability and Climate Change; and (5) Number of people supported by the PPCR to cope with the effects of climate change.

6 To address the challenge of attributing adaptation outcomes and impacts to specific interventions, TAMD proposes a quasi-experimental approach that estimates indicators for vulnerability and capacity to adapt to particular climate risks, and more usual development indicators for populations before, during, and after interventions.

Exhibit 4. The Tracking Adaptation and Measuring Development framework, illustrating the climate risk management and development performance tracks (Bours, McGinn, and Pringle 2014a; Brooks et al. 2013)



4.1.4. PEG tool

The Progress, Effectiveness and Gains Monitoring and Evaluation (PEG M&E) tool was developed by the Least Developed Countries (LDC) expert group as a tool to support LDCs by defining a set of metrics to monitor and assess the National Adaptation Plan (NAP) process. It is a response to the guidelines for the NAP process, which require reporting on Progress, Effectiveness and Gaps within the process. Hence, it is designed to be a process rather than outcome focused monitoring tool. The PEG tool uses the ten essential functions of the NAP process (UNFCCC 2013) as its foundation, and establishes expected outcomes and metrics that can be used to measure progress in each of the functions. It is focused on the NAP process at the national level, and aims to operate synergistically with both detailed project/program M&E, as well as more general adaptation work (Maletjane 2015).

4.1.5. UKCIP AdaptME

The UKCIP[7] AdaptME Toolkit provides conceptual and practical support in evaluating adaptation progress and performance across different levels and sectors (Pringle 2011). The Toolkit provides support for clarifying concepts, including defining the purpose of evaluation and aids in prioritizing evaluation activities. Its primary focus is the process of evaluation, but it can also be useful in the development of monitoring frameworks. Additional discussion of different CCA M&E frameworks and approaches can be found in Bours, McGinn, and Pringle (2014c).

7 Formerly known as the UK Climate Impacts Programme.

4.1.6. WRI/GIZ Six-Step Process

The World Resources Institute (WRI), on behalf of the German international development agency Gesellschaft für Internationale Zusammenarbeit (GIZ), has developed a six-step process to develop CCA-relevant M&E systems to be used in the developing countries. These are: describing the adaptation context; identifying the stakeholders; defining the adaptation hypothesis; choosing indicators; and applying the M&E system. The steps are organized around three dimensions of adaptation – adaptive capacity; adaptation actions; and sustained development, with a focus on 'learning by doing'. Overall, this process is described as having a focus on learning, results-based management and the understanding that adaptation is a long-term process requiring flexibility (Spearman and McGray 2011).

4.2. Insights from project and program evaluation

Given the limited track record of adaptation funding there is little by way of true impact evaluation that could provide insights for designing and using M&E. There are, however, some initial experiences with formal and informal evaluation that hold useful insights for strengthening M&E.

4.2.1. Lessons from the experience of the LDCF

The Least Developed Countries Fund (LDCF) was created to support the preparation and implementation of the National Adaptation Programmes of Action (NAPAs), which were meant to address the urgent and immediate adaptation needs in least developed countries. Initiated in 2001, the LDCF has been one of the principal means for supporting adaptation activities in the developing world, and NAPAs have driven much of the national level action on adaptation in LDCs for over a decade. NAPAs provide a process for LDCs to identify priority activities that respond to their urgent and immediate needs to adapt to climate change. Each NAPA has requirements for M&E.

A recent GEF publication documents some of the insights from adaptation projects supported by the GEF, through the LDCF, and even earlier, through the Strategic Pilot on Adaptation (GEF 2016b). The conclusions from the case studies of adaptation projects covered in the book highlight the importance of learning from adaptation experiences. As the book notes, "While knowledge is being generated, it is not always clear how systematic this effort is, where this knowledge can be found, and how it can be readily accessed". Clearly, M&E will have an important role to play in addressing these knowledge gaps.

Another publication released in May 2016 by the Independent Evaluation Office of the GEF (GEF IEO) presents a program evaluation of the LDCF[8] (GEF IEO 2016). While not focused specifically on M&E, the evaluation outlined a number of findings in relation to M&E, considering the 217 NAPA projects

8 The LDCF is mandated by parties to the UNFCCC to, among other responsibilities, provide support to LDCs' climate adaptation efforts including the preparation of NAPAs and the implementation of NAPA priority projects. As of September 2015, 50 LDCs had completed their NAPAs, accessing a total of over $900 million in total donor financing, including $12.20 million from the LDCF in support of the preparation of their NAPA (GEF IEO 2016).

under implementation[9]. The vast majority of projects clearly described their intended adaptation benefits taking into consideration both context and potential risks[10]—and over 85 percent of projects explained their benefits in measurable terms.[11,12] Nearly all NAPA projects (i.e. 98.3%) had a high to very high probability of delivering tangible adaptation benefits, and for over half (i.e. 52.6%) of these projects, the adaptation benefits are both realistic and measurable. Other projects could improve the measurability of their benefits and their M&E frameworks[13] and improve project baselines as well as risks appreciation and mitigation measures.

While clarity of intended benefits and measurability of those benefits are generally positive signals from an M&E perspective, it is also the case that measurability alone does not automatically equate to substantive or meaningful benefits. For instance, a commonly measured benefit (indicator, in many cases) is the number of beneficiaries; however, how this benefit/indicator is measured and whether it is a truly meaningful indicator of progress and results is debatable. This is an issue field-wide, not unique to LDCs or NAPAs. Further, in the context of CCA, there is an increasing focus on qualitative indicators that can capture more context and complexity, rather than employing simple statistics which do not tell the full story. Therefore, 'measurable' is still generally good, but it may not truly indicate that the M&E system is substantively meaningful or based on a sound results framework designed to deliver the intended results.

A related general observation noted by the GEF IEO evaluation team was that capacity for M&E among the LDCs with NAPA projects is often low, as the case field is wide. This observation also applies beyond LDCs and NAPA projects. An example of M&E from the Sudan NAPA adaptation project completed in 2015 is described in Exhibit 5. This example illustrates a common phenomenon—that, despite conducting the routine/required M&E (including identifying a results framework in the form of a log frame and monitoring and reporting based on indicators), the M&E fell short of its potential as a management and learning tool. Ideally, capacity for M&E would grow over time, and newer projects would benefit from the experience of early implementers, such as the Sudan example presented below.[14]

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9 As of the October 31, 2015 cutoff date for the GEF IEO's LDCF evaluation.

10 Nearly all projects (96.6 percent) clearly describe the intended adaptation benefits and convey the country's adaptation aspirations; a very high percentage (92.2 percent) realistically take into consideration the country's context when describing the intended adaptation benefits; and a very high percentage (90.4 percent) takes into account potential major risks and includes sufficient risk mitigation measures (GEF IEO 2016).

11 These projects scored in the "large to extremely large extent" range in terms of explaining the adaptation benefits in measurable terms.

12 The remaining 14.7 percent of NAPA implementation projects could improve their linkages with the 'adaptation monitoring and assessment tool' (AMAT) and their M&E frameworks.

13 Including linkages to the Adaptation Monitoring and Assessment Tool (AMAT).

14 Without further analysis beyond the scope of the evaluation, it is not clear whether more recently initiated projects are either starting off with stronger M&E systems or are benefitting from the experience of the early implementers from a design and implementation perspective. It is likely there is still room for improvement in terms of building stronger M&E over time, and using M&E to capitalize on evidence and lessons learned in a manner which will improve the design, implementation, and results. A focused analysis of NAPA project M&E improvements, and of the lessons drawn (and applied) from M&E findings over time, could yield important insights in this regard.

4.2.2. Assessing national-level M&E systems

The growing risks from climate variability and change, coupled with increasing donor interest, mean that many local actors are implementing adaptation options designed by and for local human and natural systems, such as mangrove restoration to reduce vulnerability to storm surges. Ideally, these should be embedded within national adaptation and development plans, to ensure that adaptation options implemented directly or indirectly promote national development objectives.

At the same time, national policies and institutions can affect the magnitude and pattern of impacts by affecting local vulnerability and the capacity to respond. National priorities, limited national human and financial resources, and other factors influence the extent to which a nation focuses on addressing poor and underserved regions most likely to be affected by climate variability and change. Choices made about the location of critical infrastructure, for example, have historically been made without considering the potential consequences of increases in the intensity of extreme climatic events.

National level CCA M&E systems have also gained momentum, as documented in recent reports by GEF, GIZ, and OECD. In 2013 GIZ published *Monitoring and Evaluating Adaptation at Aggregated Levels: A Comparative Analysis of Ten Systems* (Hammill, Dekens, and Schröder-Breitschuh 2013). This report is helpful for understanding the similarities and differences between a set of CCA M&E systems at the program, national, and global fund levels (France, Germany, Kenya, Mekong River Commission of Cambodia, Morocco, Nepal, Norway, Philippines, the CIF's PPCR, and the UK).

The GIZ report also identified the overarching lessons learned about key challenges regarding adaptation M&E systems and enabling factors. Lessons on key challenges included: conceptual ambiguity about what constitutes successful adaptation; challenges surrounding coordination and harmonization across sectors, scales, and partners; resource and capacity constraints; and data and information challenges. Lessons on M&E enabling factors included the need for political will and leadership; the importance of multi-stakeholder participation; and that aligning and/or integrating evolving CCA system with/into existing M&E structures can save resources in the long run.

4.2.3. Project-level CCA M&E

Project-level M&E is standard for most internationally funded CCA projects. Minimal M&E requirements often involve (i) developing a results framework (ToC, logic model, log frame, or equivalent), (ii) identifying indicators to match the results framework, and (iii) monitoring and reporting on the indicators on a routine—often annual—basis. Mid-term evaluations and terminal (final or ex-post) evaluations are also common, though many CCA projects are still in the early stages of implementation and as such have not undergone these evaluations. Other projects, including ones developed locally or funded through other means, such as philanthropy, may or may not have the same kinds of M&E practices.

While a fair amount of project-level M&E work is underway, it has mostly been treated as a 'check-the-box' administrative requirement, rather than as a valuable tool for improving design or results, or for sharing lessons learned so that others can benefit from experience. It is for this reason that there is increasing focus on improving M&E in creative ways that are suitable for CCA and that clearly enable key stakeholders to attain their goals. Below are two different examples of project-level M&E, one that

remained largely an administrative requirement (i.e. M&E undertaken for a completed NAPA project in Sudan funded by the GEF LDCF/SCCF) and one where there was an attempt to make M&E serve as input to a learning-based iterative adaptive management process (i.e. a bottom up M&E-turned-learning initiative at the Watershed Organisation Trust in India).

Sudan NAPA project

This CCA project in Sudan aimed to build resilience in the agricultural and water sectors. This project was nation-wide, applying at both project and national scales. It is one of 11 completed NAPA projects, as of June 2016. The project, with a budget of approximately US$6.3 million[15], began in 2009 and ended in 2015, when a terminal evaluation was conducted. The M&E approach (see Exhibit 5) was typical for NAPA and other development projects, consisting of monitoring, reporting, and evaluation plans from the outset and a terminal evaluation completed at the end of the project. Although a log frame was developed and indicators identified and reported on, the evaluation found that weaknesses in these tools meant that they could not be used as to improve management or to assess progress. This is not an uncommon situation, particularly for efforts that approach M&E as 'check the box' exercises to meet basic requirements.

[15] The project was financed by the GEF LDCF (US$3,300,000), UNDP (US$500,000). Committed co-financing from the government of Sudan totaled US$3,000,000. The Project was implemented by the Sudan Higher Council for Environment and Natural Resources.

Exhibit 5. M&E of NAPA Priority Interventions to Build Resilience in the Agriculture and Water Sectors to the Adverse Impacts of Climate Change in Sudan (Fenton and Osman 2015)

The objective of the NAPA project in Sudan was "to implement an urgent set of adaptation-focused measures [to] minimize and reverse the food insecurity of small-scale farmers and pastoralists, thereby reducing the vulnerability of rural communities to climate change, including variability" (Fenton and Osman 2015).

Monitoring and Reporting

The project's Results and Resources Framework included performance and impact indicators. Annual monitoring occurred through a Tripartite Review (TPR), a high policy-level meeting of the parties directly involved in the implementation of a project. An Annual Project Report (APR) was submitted to UNDP prior to the TPR for review and comments.

Terminal Evaluation

In 2015 an independent Terminal Evaluation of the project was conducted to determine whether the project has achieved its intended outcomes. The evaluation focused on the effectiveness, efficiency and timeliness of project implementation, and it highlighted issues and lessons relevant to similar programs.

The evaluation found that the project's implementation approach was highly successful overall. The project successfully reached and helped a large number of beneficiaries in poor and vulnerable communities. It generated a strong engagement and interest amongst the community members and strong support from the State-level participants. It also led to strong coordination at the state level and good partnerships with necessary stakeholders.

The evaluation also identified weaknesses in implementation, including (i) the log frame was used mostly as a reporting tool and not as a management tool; (ii) the project ran almost 18 months over schedule; and (iii) there was low involvement of key decision-makers in the State Governments. Further, while the project documents clearly set out the management arrangements, a clear foundation for results-based and adaptive management, and an approach to monitoring, the absence of suitable indicators was a major weakness in the project monitoring framework.

Indicators, baseline values, and target values for the project objective and the outcomes were identified in the project planning document. However, the evaluation found that almost all of these indicators seemed poorly selected, several of the indicators bore little relation to the result they were supposed to indicate, and there was confusion across the indicators, baseline values, and targets in many cases. The indicators thus could not be used to assess progress, nor as an input to aid project management and decision-making.

Watershed Organisation Trust

A very different example is from the Watershed Organisation Trust, where what began as a traditional log frame approach evolved into a bottom-up learning effort across scales. Founded in 1993, the Watershed Organisation Trust (WOTR) is an NGO operating in seven Indian states[16] focusing on participatory Watershed Development, Natural Resources Management and Climate Change Adaptation. In 2009, WOTR—with support from the Swiss Agency for Cooperation and Development (SDC) and India's National Bank for Agriculture and Rural Development (NABARD)—agreed to an innovative 5-year CCA program for piloting integrated, community-based adaptation[17] at a local level and exploring ways of scaling up the emerging findings into state and national policies.

This second main focus of the project, scaling up, is of particular interest here. The project's unique approach to multi-level system innovation and systemic 'intermediation' for climate resilient development, drawing on action learning and action research approaches, built a set of strategic partnerships at state and national levels. Some of these enabled the development and application of crop and block-specific agro-met based advisories, which required a multi-scale approach. Other partnerships created a significant demand at the state level in Andhra Pradesh and Maharashtra for the upscaling of adaptive actions (Colvin, Chaturvedi, and Skeie 2014).

Beyond the lessons learned about scalability through stakeholder engagement and social learning was WOTR's experience with its results framework. Over the course of the project, WOTR sought to shift from an initial linear log frame, which did not support the more sophisticated adaptive developmental framework underpinning its implicit theory of change, to a scalable M&E system that supported change management, learning, and flexibility.

Despite good intentions and recognition of some of the tools that might be needed, WOTR was unable to bring the two approaches together. Thus the linear log frame continued to act as the main point of reference for M&E between WOTR, SDC and NABARD, while tools for adaptive management and action learning were used and recognized primarily by WOTR alone (Colvin, Chaturvedi, and Skeie 2014).

This case highlights ways in which learning can thread through a scaling-up project to achieve progressive impact, as well as ways in which linear log frame systems can undermine, ignore or even actively suppress learning among a wider set of partners.

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[16] Andhra Pradesh, Jharkhand, Madhya Pradesh Maharashtra, Odisha, Rajasthan, and Telangana.

[17] The project worked in seven Clusters comprising 53 villages across four states (Andhra Pradesh Madhya Pradesh, Maharashtra and Telengana), having a total population of approximately 53,652 persons (10,024 Households) spread across a geographical area of around 38,006 ha (380.06 sq.kms). These were chosen as, together, they were seen as representative of the bulk of vulnerable, backward and poor communities in rainfed agrarian India, involving different agro-ecological and climatic zones; culturally and ethnically different communities; and different levels of backwardness and integration with the wider economy. WOTR had previously worked in 25 of these villages over a period of several years. Through these previous watershed projects various soil and water conservation structures had already been developed for these villages.

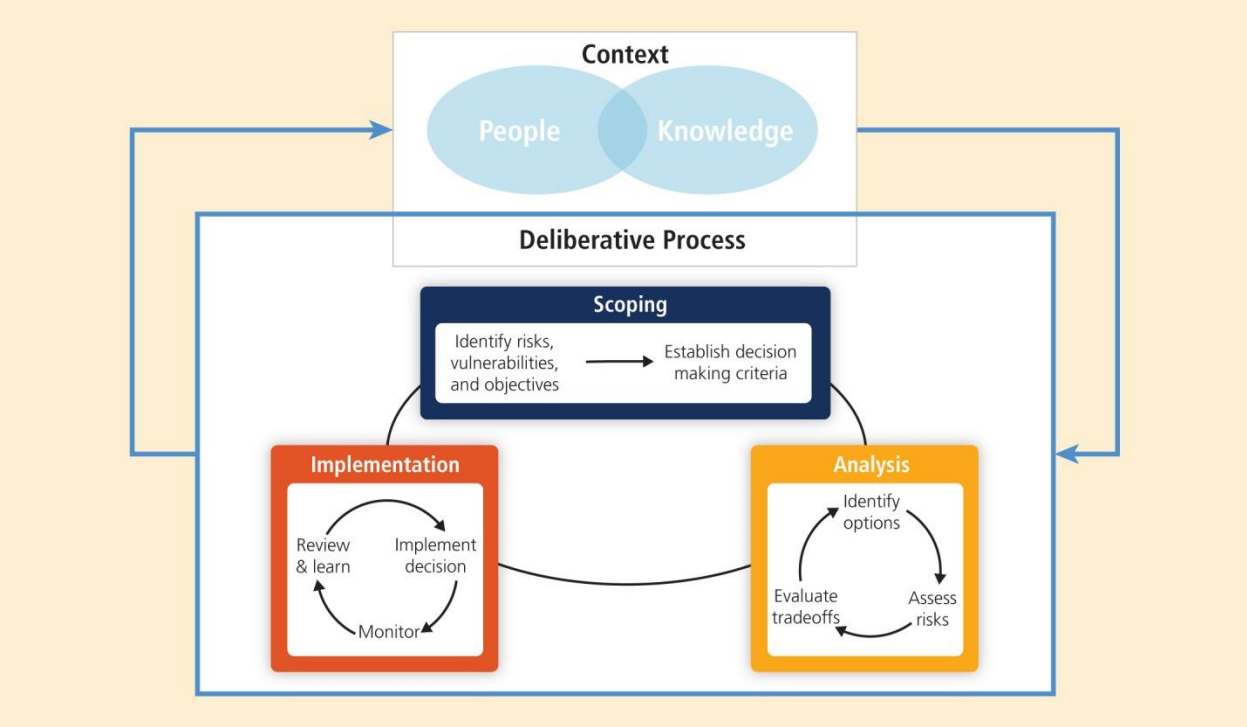
5. Strengthening CCA M&E

Climate change adaptation decisions and actions are affected by uncertainties and focus on valued objectives, and are thus regarded properly as decisions involving risk. Starting with the Fourth Assessment Report, the IPCC has endorsed iterative risk management as a suitable decision-support framework for CCA, as it offers formalized methods for addressing uncertainty, involving stakeholder participation, identifying potential policy responses, and evaluation of those responses (IPCC 2007).

Given that iterative risk management is an ongoing process of assessment, action, reassessment, and response (IRGC 2010) that spans – in the case of many climate-related decisions – decades if not longer, M&E forms an essential element of CCA decision-making (see Exhibit 6). Monitoring, evaluation and learning is also one of the key principles of effective decision support, where learning and review become important to track decision progress. This can be achieved by developing an ongoing monitoring and review process during the scoping stage of a project or program. If circumstances change so much that desired outcomes may not be achieved, then reframing of the decision criteria, process and goals may be required. This is the central idea underlying adaptive management.

Given the importance of monitoring, evaluation and learning in climate change adaptation, this section outlines some ideas and directions for strengthening M&E practice.

Exhibit 6. The climate change adaptation decision-making process (Jones et al. 2014)



5.1. Supporting learning

Despite the recognition that learning underpins adaptation (Lal et al. 2012), most traditional M&E frameworks do not have learning mechanisms in place. Even if they did, successful learning requires more than simply having a plan. It also requires the cultural safety to experiment, take risks, fail (and learn from failure), and an understanding of these things by donors and/or governments. It ultimately requires an attitude of accountability to learning and improvement, rather than accountability solely to sticking to the original plan or a particular 'return on investment'.

Just as M&E has multiple traditions and 'schools' of practice, so too does learning. One popular learning framing is between single-, double-, and triple-loop learning (see Exhibit 7). To support strategic learning at the systems levels required for CCA, double- and triple-loop practices are seen as particularly important (Tschakert and Dietrich 2010; Colvin, Scharfetter, and Vogel 2014), even though single-loop learning has to date been the predominant focus of M&E.

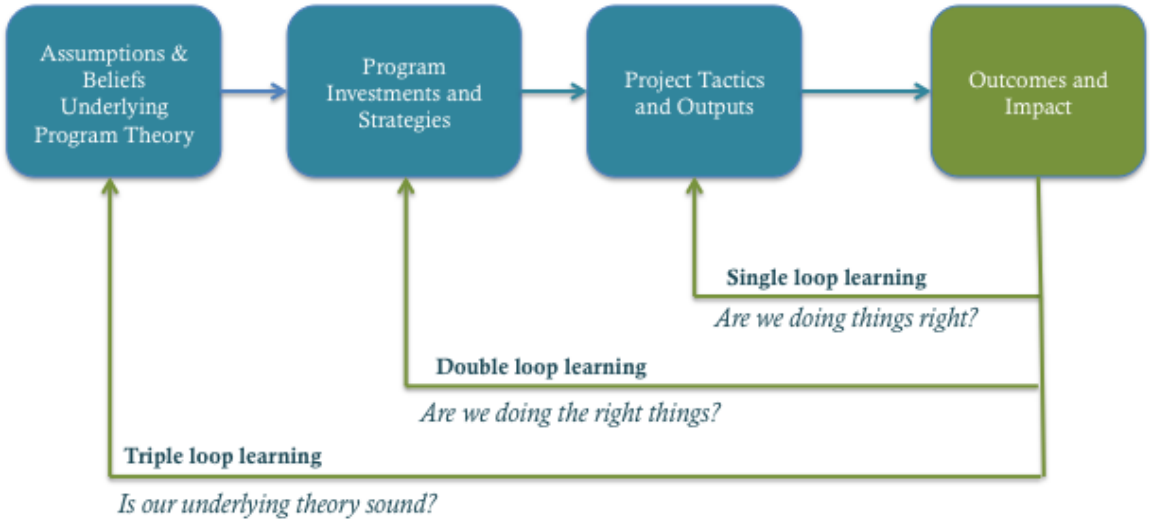
Learning-focused approaches are also foreign to many M&E practitioners – most of whom are focused in the realm of data analysis – and integrating learning (which is also about data analysis, but more than that) and evaluation is surprisingly difficult. The difference can go beyond speaking two languages to different professional philosophies, cultures, and norms, despite having similar ultimate intentions around improving results. However, for CCA, these disconnects are slowly changing as learning is increasingly understood to be the linchpin to effective adaptation, which is itself fundamentally a learning process.[18]

5.1.1. The role of risk taking and experimentation

A learning orientation inherently involves experiencing and sense making, the process of making sense of or giving meaning to information or experience. It involves learning-by-doing, trial-and-error approaches that at times involve taking risks with no guarantees of particular results or returns on investment, even though these can and should be enhanced by learning. Embracing learning requires support for flexibility around things that are often expected to be static, including investment decisions, strategies and program/project designs, and tactics. It can require adjusting implementation approaches mid-course, testing promising innovations which may have a high chance of failing, and experimenting with high-risk, high-return investments. Among other things, a learning approach thus involves permission to fail—or planning for 'intelligent failures' (Edmondson 2012; Williams 2016).

18 GEF, the Climate Investment Funds (CIF), Watershed Organization Trust (WOTR), U.S. Agency for International Development (USAID), and the UK's International Climate Fund, among others, provide good examples of different kinds of organizations that are pioneering innovative M&E in a manner which will help to inform CCA M&E more broadly. Examples from these institutions are provided throughout this paper.

Exhibit 7. Triple-loop learning



5.1.2. One approach to support learning

Villanueva's 2010 *Learning to ADAPT: Monitoring and Evaluation Approaches in Climate Change Adaptation and Disaster Risk Reduction–Challenges, Gaps and Ways Forward* describes how the unique nature of CCA calls for experience-based learning M&E processes in order to discover insights into adaptive capacity and its links to adaptation processes, risk, and vulnerability reduction at large. She explains the need to challenge existing M&E practice that focuses on measuring results and efficiency towards new M&E that enables flexibility, accounts for uncertainty and complexity and encourages an understanding of the linkages between capacity, action, and the driving forces of individuals and communities towards change (Villanueva 2010).

Villanueva offers a framework to promote learning through a set of ADAPT principles:

- Adaptive learning: this emphasizes the need for methodological flexibility and triangulation and adapting the M&E framework to dynamic and heterogeneous local conditions.
- Dynamic monitoring: establishes dynamic baselines, which provides real time feedback to inform practice.
- Active: in understanding the social, cultural, and personal issues such as values, confidence, motivation, risks, and perception.
- Participatory: approaches in the monitoring and evaluation process of those with a stake in the program.
- Thorough: captures the wider operational environment, accounts for underlying causes of vulnerability, and checks and rectifies possible maladaptation.

The ADAPT principles are consistent with findings and recommendations identified in several other studies, and they offer a conceptual starting point for CCA M&E that bodes well for learning. The other recommendations included in this paper, such as 'start with modest expectations', 'flexible approach', and 'iterate planning and implementation routinely based on experience', will support learning. This applies both to the CCA interventions and to associated M&E.

5.2. Addressing uncertainty and complexity

Climate change poses a challenge for M&E due to the long time scales involved, the pervasive impacts and resulting risks and the 'deep' uncertainties attached to many of those risks (Ogden and Innes 2009; Lempert and McKay 2011). These uncertainties include not only future climate but also socio-economic changes and potential changes in norms and values within and across generations.

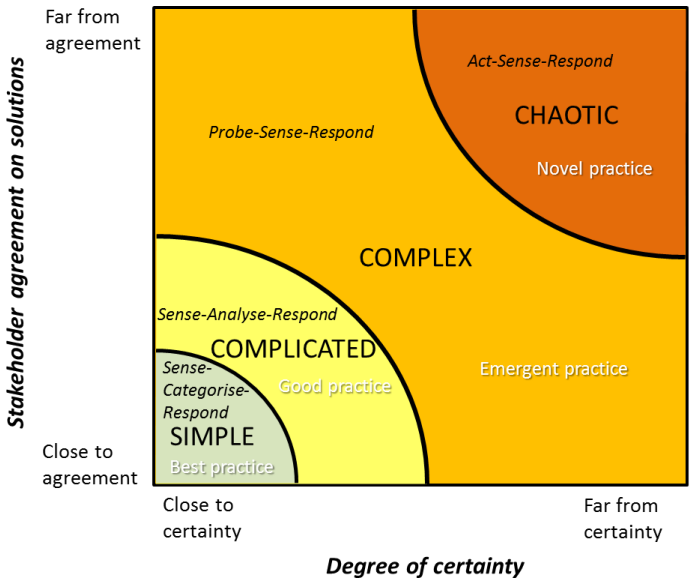
Therefore, when considering M&E approaches in CCA, it is appropriate to examine whether the situation at hand is simple, complicated, complex, or chaotic. This framing builds on David Snowden's 'Cynefin' framework.[19] It makes the case that each situation requires different modes of M&E practice, including a learning orientation that can be accurately characterized as M, E, and Learning (or MEL).

In the Cynefin framework (see Exhibit 8) the degree of complexity is shaped by two primary factors. On the x-axis is the degree of certainty in defining the problem and potential solutions. To some extent there is a correspondence between this axis and time frames, with greater uncertainty pertaining to events further in the future, although even some relatively short-term situations (including weather and the probability of extreme events) can be highly dynamic.

On the y-axis is the degree of agreement between stakeholders on how problems and potential solutions should be framed. This depends on the nature of each situation and on the breadth and diversity of stakeholders involved. While there is no strict correspondence between this axis and spatial frames, it is to be expected that as geography and levels of governance increase, there is greater likelihood of disagreement. At the same time, some local situations can be highly contested and therefore potentially complex.

19 Cynefin is a Welsh word which can be translated to 'habitat' or 'place', although this fails to convey its full meaning. The term was chosen by the Welsh scholar Dave Snowden to describe a perspective on the evolutionary nature of complex systems, including their inherent uncertainty. The name serves as a reminder that all human interactions are strongly influenced and determined by our experiences, both personal and collective, such as stories or music.

Exhibit 8. The Cynefin framework, introducing simple, complicated, complex, and chaotic situations (Snowden and Boone 2007)



Based on the relationship between the x and y axes, the situation can be simple, complicated, complex or chaotic, which has the following implications for cause-and-effect of actions or interventions and their relationship to particular outcomes:

Simple: Cause and effect relations are repeatable and predictable; consequences are easily known.

Complicated: Cause and effect are separated over time and space but can be analyzed with standard impact tools.

Complex: Cause and effect are coherent in retrospect, but are unpredictable due to non-linear feedbacks.

Chaotic: No cause and effect relationships generally perceivable.

Exhibit 9. Characteristics and Approaches for Simple, Complicated, Complex, and Chaotic Situations
(Snowden and Boone 2007)

Framing	Characteristics of the situation	Design and leadership approaches
Simple	Repeating patterns and consistent events Clear cause-and-effect relationships evident to everyone: right answer exists Known knowns Fact-based management	Sense, categorise, respond Ensure that proper processes are in place Delegate Use best practices Understand that extensive interactive communication may not be necessary
Complicated	Expert diagnosis required Case-and-effect relationships discoverable but not immediately apparent; more than one right answer possible Known unknowns Fact-based management	Sense, analyse, respond Create panels of experts Listen to conflicting advice Create good practice
Complex	Flux and unpredictability No right answers: emergent instructive patterns Many competing stakes and ideas A need for creative and innovative approaches Pattern-based leadership	Probe, sense, respond Create environments and experiments that allow patterns to emerge Increase levels of interaction and communication Use methods that can help generate ideas and innovative practices: Open up discussions (as through large group methods) Stimulate attractors Encourage dissent and diversity Manage start conditions Monitor for emergence
Chaotic	High turbulence No clear cause-and-effect relation-ships, so no point in looking for right answers Unknowables Many decisions to make and no time to think High tension Pattern-based leadership	Act, sense, respond Look for what works instead of seeking right answers Take immediate action to re-establish order (command and control) Provide clear, direct communication

5.3. Design considerations based on degree of complexity

Exhibit 9 explains this framing in more detail, along with how each degree of complexity bears on the suitability of intervention design and leadership. Simple situations, where use of "best practices" is appropriate, require us to sense, *categorize*, and then respond with the best practice solution that fits that categorization. For complicated situations, where cause-and-effect relationships are discoverable, there is a strong emphasis on analysis (sense—*analyze*—respond) in order to determine and then implement good practice. By contrast, complex situations require less (and more rapid) analysis and more *experimentation* based on iterative cycles of probing—*sensing*—responding—and learning, leading to emergent solutions. Finally, chaotic situations require us to take immediate action to re-establish order (*act*—sense—respond). Chaotic situations call for rapid decisive leadership based on expert judgment. Practically speaking, there is no time for M&E in chaotic situations. The degree of complexity has direct implications on MEL as well (see Exhibit 10).

5.3.1. MEL in simple situations

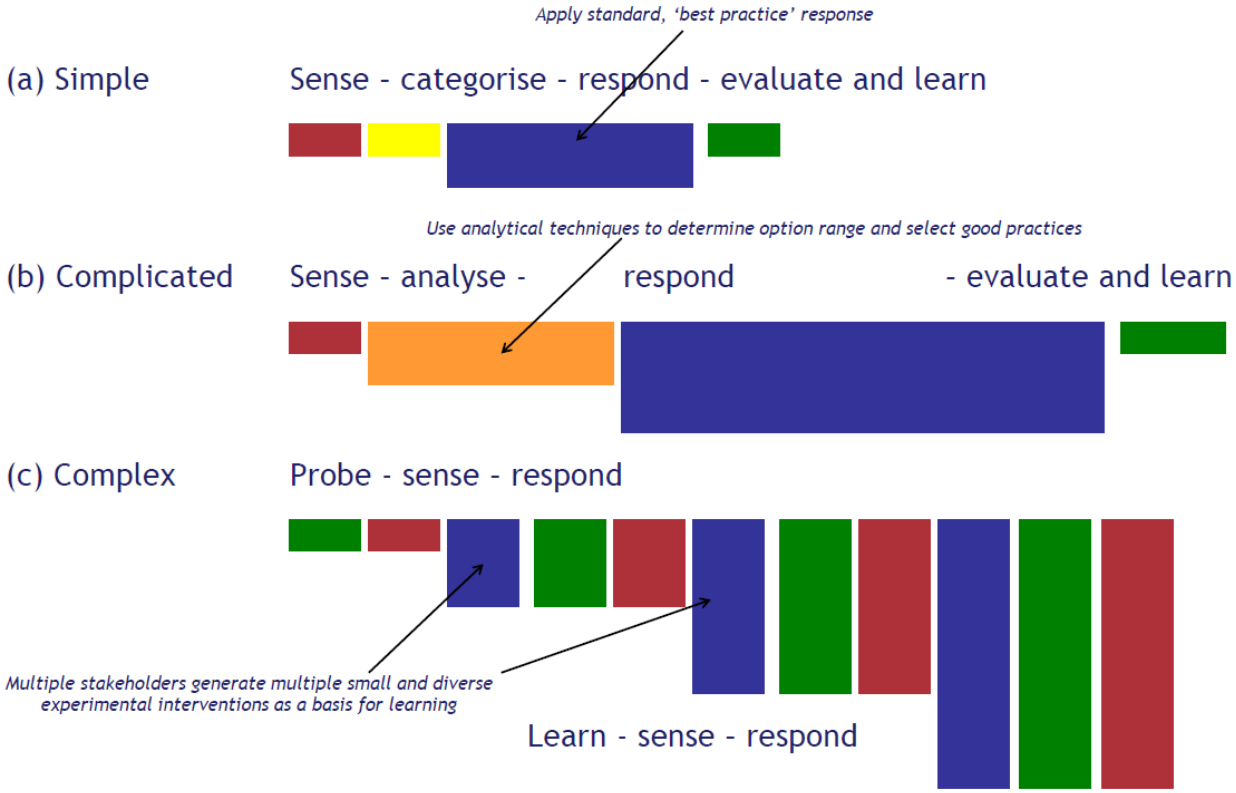
In simple situations, the MEL system typically involves a comparative outcome assessment using pre- and post-project indicators or equivalent data based on a classic linear log frame (or logic model-type) approach. Evaluation and learning within a simple pathway usually takes place at the end of the project or, if interim M&E takes place, somewhere mid-course, when the focus is on doing current activities better; i.e. on improving current best practices. Notably, this is the standard approach to M&E for many initiatives, even if the situation within which the initiative is operating is complicated, complex, or even chaotic. In other words, there is often a mismatch between the situation and M&E approach taken.

5.3.2. MEL in complicated situations

Similar to simple situations, in complicated situations, evaluation and learning often take place at the end of response cycles. While some programs delay evaluation to mid or end-of-program reviews of output, outcome, and impact measures, many also use annual reviews to provide opportunities for more regular course correction, which allows for improvement (single-loop learning) but equally for reframing (double-loop learning). Enabling course corrections requires well-designed processes of adaptive management to be embedded within organizations and programs; the risk otherwise is that adaptive management is only afforded 'lip service' (Allan and Stankey 2009) and learning is not translated into the next cycle of action ('respond' in the terminology of Exhibit 10).

Exhibit 10. Different design pathways involve different MEL designs.

Key: Red bars indicate phases of sensing; yellow bars phases of categorization; blue bars phases of response; orange bars phases of analysis; and green bars phases of evaluation and learning. In (c) 'probing' is also shown in green as it is essentially a questioning activity (what is going on here?) that leads to early sensing. The depth of the bars indicates the number of stakeholders likely to be involved within each phase.



5.3.3. MEL in complex situations

The design approach for complex situations is significantly different to that used in complicated or simple situations. Because complex situations contain 'unknown unknowns'—such as when and how climate stressors will affect communities and sectors such as agriculture—and their patterning can only be understood in retrospect, design in such situations is an emergent process, involving iterative cycles of 'probe–sense–respond–reflect/learn' (Exhibit 10-c). 'Probing' is a process of engaging actively with the situation by asking good questions and leads quite rapidly to sense-making, as initial patterns emerge.

A major difference in the design approach for complex situations lies in the significant part played by emergence in project and program design (Ison et al. 2007). Complex interventions present the greatest challenge for MEL, because the path to success is so variable and cannot be articulated in advance (Rogers 2008). To work effectively with emergence requires a design approach shaped primarily by experimentation and learning, based on much more rapid plan-act-reflect (or more accurately, probe-sense-respond) cycles, leading to an ongoing, iterative design process (Abbasi 2014).

A further differentiating feature lies in the extent, diversity, and complexity of the stakeholder landscape contributing to this ongoing design process. Rather than being driven primarily by expert knowledge and analysis, as in complicated situations, complex designs rely on processes of collaborative—or at least networked—knowledge production (i.e. co-production, or 'social learning') (Ison, Blackmore, and Iaquinto 2013), which may operate across communities of stakeholders of a significant size, as well as across several scales of governance. Active engagement involves stakeholders in sense-making from early in the process, and the sense-making that stakeholders bring to the situation is as important as the leadership brought to the design of responses. Moreover, multiple responses may be designed, each involving different clusters of stakeholders. These responses may be treated more as experiments guided by 'learning questions' than as definitive options, the idea being to build on what works and for multiple stakeholders to learn from parallel experiments, requiring a 'safe fail' rather than 'fail safe' environment, in which failures are seen as successes so long as learning is derived from them.

All of this fundamentally reshapes MEL in complex situations. There are several aspects to this: MEL no longer takes place principally at the end of a program, or on an annual or mid-term basis. Instead, MEL—or now, more accurately, MLE—is a continuous process, based on more rapid learning cycles (e.g. semi-annually, quarterly or monthly). This creates new challenges in terms of shaping a mid or end-of-term (summative) program evaluation. For example, while it might be possible, in principle, to produce a summative evaluation of an initiative (undertaken in a complex situation) that satisfies the Development Assistance Committee (DAC) criteria (i.e. efficiency, effectiveness, relevance, impact and sustainability), the methodologies for undertaking such an evaluation are likely to be significantly different to those used in evaluating a complicated or simple program.

A wide range of tools and approaches have been developed over the past decade that can be applied to MEL for climate change adaptation in complex situations. Recent reviews include Susannah Fisher and colleagues "Evaluating Climate Change Adaptation: Learning From Methods in International Development" (Fisher et al. 2015) Another review conducted for the OECD (Dinshaw et al. 2014) summarizes a number of methods suitable for complex situations, including participatory M&E, most significant change, outcome mapping (Smutylo 2005), beneficiary monitoring and participation, and

developmental evaluation (Patton 2011). Likewise, there are many developments in evaluation practice that are suited for complex situations – besides developmental evaluation these include realist evaluation (Marchal, Van Belle, and Westhorp 2016) and participatory systemic inquiry (Burns 2014).

Systems thinking and systems practices are also increasingly being adopted as approaches for effective design, implementation and learning in complex situations, including in the context of CCA. Work by Wiek and colleagues (2011) highlights systemic thinking as one of five key competencies for sustainable development practice. Heather Britt draws on systems concepts to guide 'complexity-aware monitoring', including the application of most significant change and outcome harvesting techniques (Britt and Patsalides 2013). Several other sources are also available to inform systems approaches to evaluation and learning.[20]

5.4. From project-based M&E to M&E systems integrated with development

Across a range of development sectors, there is active movement toward developing M&E systems that incorporate CCA. Integration of CCA M&E into M&E of other social and development sectors is occurring both as a result of internal (e.g. within a development or funding organization, country, ministry) priority setting and as a result of international climate change finance which generally requires M&E and provides frameworks for undertaking M&E.

The NAPAs, discussed earlier in this paper, provide one mechanism for countries to plan for and implement M&E. Other donor-driven M&E requirements, including ones that involve cross-sectoral M&E, have also been previously mentioned. For example, each CIF PPCR pilot country develops a Strategic Programs for Climate Resilience document which cuts across climate-vulnerable sectors. Pilot countries then report annually on a set of country-wide, cross-sectoral indicators as part of the PPCR performance monitoring and reporting process. The required PPCR indicator reporting includes measures of integration of CCA planning across climate-vulnerable sectors and the level of CCA coordination at the national level.[21]

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20 Ray Ison and colleagues (Wei et al. 2012; Ison et al. 2011) draw on soft systems thinking in the design of social learning practices and pathways for use by practitioners with an interest in transforming wicked situations, illustrating their praxis through extensive work in the field of integrated water resources management, including on adaptive and integrated water resources management in the context of CCA. Danny Burns is another practitioner-scholar who has written extensively about his own lineage of systemic practice—and which combines systemic action research and participatory systemic inquiry—including implications for MEL within this tradition (Burns 2014; Burns 2012).

21 For instance, as of mid-2014, most PPCR pilot countries reported a general increase in CCA planning integration across sectors. For example, in Tajikistan, since 2010, climate resilience measures have been integrated into Tajikistan's Agriculture Sector Reform Program for 2012-2020. Saint Vincent and the Grenadines has incorporated climate and disaster risk management into the National Economic and Social Development Plan. In Niger, the Community Action Project for Climate Resilience involves mainstreaming climate resilience into development strategies at national and local level,

As CCA becomes a higher priority on sector-specific and national agendas, it is likely that CCA M&E will be more proactively integrated into M&E from other sectoral perspectives. According to a 2015 OECD report on emerging practices in M&E in national CCA, domestic circumstances tend to determine the design of countries' M&E frameworks and their implementation. Furthermore, the frameworks build to varying extents on M&E systems already in place, rather than starting an entirely new M&E system from the theoretical lens of CCA (OECD 2015).

This finding is also supported by other research, revealing not only that domestic circumstances and programs are driving the development of M&E systems, but also that M&E occurring in climate-vulnerable sectors does not always directly address climate change. For instance, Bours et al. (2014a) examined four published agriculture and food security (AFS) program evaluations from Bangladesh, Cambodia, Timor Leste, and Vietnam. Three of the four evaluations did not specifically address climate change though the substance of the programs and evaluation findings related to climate change. Looking across the four evaluations, the authors concluded that:

> *Climate change adaptation should be better integrated into design, monitoring, and evaluation frameworks rather than simply referenced as 'context' which limits the ability to derive conclusions about climate change adaptation. The agriculture and food security program M&E frameworks and evaluation ToRs examined did not always specify climate change adaptation, resulting in scattered findings strategies that were not fully assessed*.

The authors noted that other CCA experts have come to similar conclusions, citing Sterrett's 2011 *Review of Climate Change Adaptation Practices in South Asia* conducted for Oxfam (Sterrett 2011), which noted the challenge of drawing conclusions from disparate programmes, and Webb and Dazé's 2011 evaluation of CCA-relevant programmes in Timor Leste, which found that "activities could have achieved a stronger impact if they had more specifically designed responses in relation to relevant [climate change] hazards" (Webb, J. and Dazé 2011).

One of the four evaluations reviewed by Bours et al. (2014a) was the Cambodia Joint Climate Change Initiative (JCCI), which links the work of international and Cambodian NGOs to CCA with a human rights-based approach to development and with livelihood improvements for farmers and fishers. The 2013 evaluation of JCCI (Dahlgren, Christoplos, and Phanith 2013) concluded that:

> *Combining climate change and human rights created a synergy that has been beneficial for results; in fact, the results are more or less defined as the effects of applying a rights-based perspective to mitigating and adapting to the impact of climate change.*

The JCCI evaluation also found that the cross-sectoral design and implementation of JCCI strongly contributed to increasing the partners' knowledge and interest in pursuing CCA measures, and that JCCI

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involving collaboration with the Ministry of Health and revision of over 30 local development plans to integrate climate change (Climate Intestment Funds 2014).

has been relevant and useful for implementing the Swedish strategy for development cooperation with Cambodia (Dahlgren, Christoplos, and Phanith 2013).

5.4.1. M&E integration across sectors: Progress made and further work ahead

The following examples in other countries further illustrate the developmental state of M&E integration across sectors, as well as the challenges of implementing such integration, particularly in lower-capacity countries.

Bangladesh has been working for several years to integrate M&E across sectors and explicitly integrate CCA in doing so. The country is engaging in an ambitious Poverty, Environment, Climate Mainstreaming (PeCM) project being implemented by the General Economics Division of the Planning Commission, Ministry of Planning, Bangladesh, with support from UNDP and UNEP's Poverty and Environment Initiative. PeCM aims to mainstream poverty, environment and climate change issues into national level planning and budgeting processes using an 'upscaling' model in which lessons learned from local change processes are used to inform decision making at higher administrative levels. In early 2014, PeCM released an Indicator Framework for Inclusive and Resilient Development providing "guidance for the development and assessment of proposals that address adversity due to the onslaught of climate change on economic development by using the tools of compliance and safeguard indicators encompassing the poverty environment climate and disaster nexus" (Government of the People's Republic of Bangladesh 2014).

South Africa is also developing a Climate Change Response M&E framework. The country's National Development Plan sets out a vision of South Africa's transition to a low-carbon, resilient economy and just society that is well underway by 2030. The Plan lays out the intention to build an evidence base to inform planning, prioritize data-collection mechanisms, including setting up mandatory monitoring, evaluation and reporting processes for all relevant stakeholders. For CCA and impact, the plan is to establish a system for gathering information and reporting progress on the implementation of adaptation actions and to measure climate variables at scales appropriate to the institutions that must implement responses. Challenges acknowledged in implementing the framework include data gaps, an absence of climate legislation, long and complicated causal chains, dynamic baselines, ensuring system credibility, overlapping and duplicative data sources, and data collection capacity constraints (Letete 2014).

OECD (2015) reports that, in **Ghana**, the government assessed in 2012 the capacity of nine ministries, departments, and agencies with the objective of identifying the strengths and weaknesses of the government's approach to Manage for Development Results. As described by OECD, there was a significant lack of capacity to monitor and evaluate public policies in all sectors. Further, the majority of sectors lacked the capacity to analyze statistical data and to use M&E findings to inform decision-making processes. To ensure evidence-based decision-making processes, the assessment concluded that relevant government ministries, departments and agencies would have to enhance their capacity (OECD 2015).

Additional insights on M&E based on research from four sectors—agriculture and food security, health, disaster risk reduction/disaster risk management and natural resource management—are thematically consistent with those identified thus far.

Although the research and examples cited illustrate a nascent trend toward integration of M&E from other sectors into CCA M&E—typically as part of a government-wide M&E process—it is clear that several

challenges remain, including defining the boundaries of what constitutes CCA, building capacity for M&E (particularly in LDCs), selecting appropriate methods and ultimately, implementing M&E systems in a manner that strengthens learning, accountability and results.

5.4.2. Methodological implications

The M&E systems from other climate-vulnerable sectors reviewed for this study, coupled with the findings on the necessity to design CCA M&E for learning, the relevance of the degree of complexity for CCA M&E, and issues of scalability, all point to the use of innovative and mixed methods approaches to M&E. This finding is consistent with reviews conducted by others, including Evaluating Climate Change Adaptation: Learning From Methods in International Development (Fisher et al. 2015) which, as already noted, provides a useful reference on methods suitable for difficult situations based on M&E research from a variety of sectors.

5.5. Mainstreaming gender into CCA M&E

Gender is a cross-cutting issue for both prevention of and adaptation to climate change. Mainstreaming gender both into the design and implementation of climate change interventions is critical to their ultimate success; the same holds true for climate change M&E.

The World Health Organization (WHO) describes how climate-related impacts on health excessively affect women, influencing and exacerbating existing social determinants of health such as poverty and illiteracy (Haddad and Villalobos Prats 2012). Furthermore, natural disasters continue to kill more women than men, and kill women at a younger age. These gender differences appear to be more pronounced in severe disasters, and places where women have relatively lower socioeconomic status than men (Nelson 2011; WHO 2014).

The UNFCCC also describes how the impacts of climate change—such as drought, floods, extreme weather events, and reduced food and water security—affect women and men differently, with the poorest being the most vulnerable. Women represent 70 percent of the world's poor and are disproportionately affected by climate change. At the same time, women play a crucial role in CCA and mitigation. The UNFCCC has therefore committed to involving women and men in all decision-making processes on climate action as a significant factor in meeting the long-term objectives of the UNFCCC (2014).

Beyond involving women and men in decision making, the concept of mainstreaming gender into M&E of CCA—as well as M&E of other development sectors—is a priority within the international development community including climate change finance institutions.

The United Nations Evaluation Group (UNEG) defines gender mainstreaming as *the process of assessing the implications for women and men of any planned action, including legislation, policies or programmes, in any area and at all levels*. It is a strategy for making women's as well as men's concerns and experiences an integral dimension in the design, implementation, monitoring and evaluation of policies and programmes in all political, economic and social spheres, so that inequality between men and women is not perpetuated (UNEG 2014).

Consistent with the concept of gender mainstreaming, the CIF (Kuriakose 2014), the GEF,[22] and the GCF (2015) have all adopted gender policies and/or action plans, and these and other funds are also incorporating gender into their performance measurement frameworks. Gender mainstreaming is a priority for other climate-change related development sectors as well.

A series of guidance documents, papers, and toolkits have been developed to support gender mainstreaming in M&E and more broadly in the design and implementation of CCA and other development programs. UNEG issued guidance—*Integrating Human Rights and Gender Equality in Evaluations*—in 2014 (UNEG 2014), supplementing a related handbook it issued in 2011 (UNEG 2011). The 2014 UNEG guidance highlights the importance of inclusion and participation of women and men marginalized and/or discriminated against in the evaluation process, paying attention to which groups benefit and which groups contribute to the intervention under review, and ensuring respect for cultural sensitivities.[23] The guidance also provides several other recommendations and tips.[24]

Experts who participated in a 2013 meeting sponsored by UN Women on Gender Mainstreaming Approaches in Development Programming: Being Strategic and Achieving Results in an Evolving Development Context noted that, while SMART (Specific, Measurable, Achievable, Relevant and Time-bound) indicators are typically recommended, they cannot always measure complex social changes. An alternative offered by one expert was gender indicators that are 'SPICED': Subjective, Participatory, Interpreted and Communicable, Cross-checked and compared, Empowering, and Diverse and disaggregated (Espinosa 2013).

A workshop held in April 2015 focused on gender-responsive climate change indicators to inform climate-relevant funding contexts, including the GCF as it develops its performance measurement framework. The Heinrich Böll Stiftung North America Office and the International Union for Conservation of Nature (IUCN) hosted the workshop with 30 gender experts and representatives from climate change finance institutions. Gender and M&E specialists from three climate finance institutions—the CIF, the GEF and the Adaptation Fund—shared reflections on their gender-responsive/sensitive M&E work. High-level reflections from participants at this workshop include the following (Heinrich Böll Stiftung North America and International Union for Conservation of Nature IUCN 2015):

> Go beyond gender-disaggregated indicators to address the underlying issues of existing power-relationships between men and women, such as access to resources and wealth. Of equal importance, therefore, is what is measured, not just how many men or women are affected by or benefit from

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22 GEF has had a gender policy in place since 2011 and recently in fall 2014 agreed on a Gender Equality Action Plan.

23 The guidance cites the following practices from the American Evaluation Association Statement on Cultural Competence In Evaluation (www.eval.org/p/cm/ld/ fid=92): Acknowledging the complexity of cultural identities; Recognizing the dynamics of power; Recognizing and eliminating bias in language; and Employing culturally appropriate methods.

24 These tips include good practices around gender analysis; tips for formulating human rights and gender equality indicators, such as not treating stakeholders as a uniform group and using a mix of qualitative and quantitative indicators; and types of evaluation approaches to foster participation in evaluation, such as utilization-focused evaluation, Appreciative Inquiry, feminist evaluation, empowerment evaluation, and the most significant change approach (UNEG 2014).

specific activities.

Build M&E requirements from a gender-rights perspective. Results management can use a human rights framework as a starting point, focusing on men and women as rights-holders and drawing upon existing UN sectoral requirements stemming from such an approach (e.g. right to water and food).

Consider the gendered dimensions of the care and informal economy. Aggregate indicators could look at, for example, a change in the burden of care and the redistribution of care (e.g. via time-use surveys/data, UN Women has done work with UN Statistics); this is particularly relevant for a number of adaptation sector performance measurements, including for agriculture/food security, water, and health.

Reflect longer-term time horizons. Indicators need to reflect a longer-term horizon to be indicative of the societal changes necessary to have lasting impacts and contribute to a paradigm shift in development approaches.

Notably, these experts expressed concern about some of the current trends in gender-relevant M&E, including disaggregating by gender and aiming for indicators that are measurable. (This comment is related to a previous one made about SPICED versus SMART indicators.) At the same time, it is unclear whether these concepts have been field-tested and whether they are practical. On the whole (again, as with other issues covered in this paper), the field is in the early stages. Good practices will likely emerge through the 'learning by doing' experience over the next several years.

Finally, other recent work on gender in related sectors can further inform CCA M&E. For example, in 2014 the CGIAR Research Program on Climate Change, Agriculture and Food Security, CARE International, and the World Agroforestry Centre published a Gender and Inclusion Toolbox: Participatory Research in Climate Change and Agriculture (Jost, Ferdous, and Spicer 2014).[25]

[25] Although this toolbox is not specifically designed for M&E purposes , the toolbox's research modules include tools—such as wealth and vulnerability ranking, village resource and use map, perception of women's empowerment, and seasonal calendars (gender roles) —that could be built into M&E systems (Jost, Ferdous, and Spicer 2014).

6. Recommendations for CCA M&E

This study points to a number of recommendations that are corroborated by experience and expert judgment across the CCA M&E field. The question therefore becomes not "what **is** the current direction of CCA M&E?" is – as its direction will undoubtedly continue to evolve – rather it is "What does this all mean?" and "How can we implement and advance CCA M&E given where we are now?"

Below are ten key recommendations, reflecting on the messages articulated throughout this study, including the importance of designing M&E for learning, how experience with CCA M&E is maturing and novel methodological approaches holds promise, the importance of mainstreaming M&E, and the importance of integrating M&E into broader knowledge management strategies.

6.1. Orienting M&E and project design to support learning

The scientific and practitioner literature emphasizes adaptation as a process of iterative risk management – with a central role for learning, given the deep uncertainties with climate change, contested values and objectives and unclear cause-effect relationships. M&E systems and associated indicators historically have leaned toward accountability—to identify whether programs and projects have met their targets and achieved their results, whether GEF investment has been efficient, and whether there were any unintended consequences (positive or negative). While these are indeed important aspects, learning often requires different approaches that emphasize emergent, rather than pre-specified outcomes; extensive stakeholder engagement from concept through design, implementation and evaluation; as well as risk-taking and experimentation. Moving beyond a narrow accountability-based focus to a learning orientation will require significant rethinking and commitment from donors, recipients and implementers.

Recommendation 1: Start as simply as possible, learn by doing, and plan for change.

CCA M&E is likely to be most effective if it is designed and implemented iteratively, starting with modest ambition and testing, and then developing over time based on experience and iteration. Such an approach resonates with Theory of Change and systems-level design approaches. Recognizing the urgency and inherent complexity of CCA, and also that the scale of investment in CCA is increasing rapidly, this may translate into making plans for a modest number of initial indicators and early learning or formative evaluation activities. These starting points can be reviewed and updated on a regular basis, and scaled up or built upon if when they are demonstrated to be useful for understanding what is working (or not working) and making improvements. Note, however, that this recommendation to 'start as simply as possible' should not be confused with rhetoric to 'keep things simple', which is often used as a basis for avoiding complexity.

Recommendation 2: Encourage projects that support experimentation and are designed in a way that supports MEL

CCA M&E will require learning by doing. Even when considering the best-in-class lessons from experience to date and CCA M&E innovations with strong potential, there are no 'silver bullets' which will continue to be a 'learning-by-doing' field, just like CCA itself. Expectations for CCA M&E should be realistically modest. For instance, it is simply not the case that applying existing M&E frameworks (or any particular set of existing indicators) will work brilliantly and immediately. Instead, each effort can seek to understand what is already available, and with some thoughtful and context-specific consideration, can pick and choose what may work, start modestly, then test and iterate over time

Recommendation 3: Allocate sufficient resources for M&E

M&E is often seen as an activity that while necessary, detracts from the main objectives of an intervention – and consequently there is reluctance to invest in M&E. A general 'rule of thumb' for budgeting for M&E is to plan for between 1 to 10 percent of a project budget, with one percent being minimal for basic requirements, and ten percent reflecting more ambitious stakeholder engagement and robust evidence-based learning on a routine basis. In the case of CCA, given the importance of learning, it would be advisable for M&E support at the upper end of the range.

6.2 New developments in indicators and methodological approaches hold promise for strengthening MEL and CCA programming

Adaptation is increasingly seen as a process of mainstreaming, requiring long-term systemic and institutional changes. The portfolio of adaptation projects being supported by the GEF and other agencies increasingly consists of 'upstream' interventions that seek to create or strengthen institutional capacity, enabling environments, or readiness. For example, countries are coming forward with projects to support their national adaptation plan (NAP) processes. Consequently, measuring and tracking progress requires GEF to monitor and track process and capability outcomes. Given the local and heterogeneous nature of adaptation interventions and outcomes, indicator selection needs to strike an appropriate balance between the need for comparability and aggregation, and the need to preserve contextual richness and detail.

Recommendation 4: Be flexible with indicator selection, including qualitative and quantitative indicators and process and outcome indicators

The challenge is to find indicators that are measurable but also can be aggregated to provide meaningful results at higher levels. This could mean that simple indicators, popular for development work, may not work as well in M&E frameworks for CCA. Uncertainty about future climate creates challenges in both adaptation planning and evaluation. As such, defining and determining success in adaptation can be difficult. With adaptation, conventional development projects must take into account the potential future impacts of climate change. These impacts are often uncertain or unknown at the relevant geographic and temporal scales. This dimension of uncertainty compounds other risks, uncertainties, and information gaps that projects would normally face. All of these challenges are manifested in the difficult task of tracking and measuring success in adaptation. It is important in CCA M&E to adopt a set of indicators that provide contextual richness and detail, and meet the need for comparability and aggregation.

Recommendation 5: Be prepared to constructively address tensions and trade-offs.

Tensions and trade-offs within the M&E process for CCA are to be expected. As already discussed, one tension frequently experienced is between accountability to delivery (i.e., sticking to a plan or achieving pre-identified results) and accountability to learning. However, other tensions are also to be expected, particularly around suitable methods and the values they represent, including what constitutes credible evidence and their relevance, appropriateness, robustness, and validity. Experts are unlikely to agree on what is best, but that does not mean that there are not sound viable choices; it is more a matter of doing enough research to be aware of the tensions (or consulting with trusted advisors who can do this research on behalf of an effort), being comfortable with the trade-offs that committing to particular strategies and methods entail, and being able to explain these to others as needed.

Recommendation 6: Consider mixed method approaches.

Mixed method M&E approaches are typically recommended. This applies broadly to selection of results frameworks (and perhaps trying a few approaches to these), indicator selection (e.g. testing both quantitative and qualitative indicators), and selecting suitable evaluation and learning approaches and methods. Traditional evaluation methods that assume linear cause-and-effect relationships suitable for simple situations are often unsuitable due to the complex, context-specific, dynamic, and long-term nature of CCA and the unique nature of the required solutions. (They can be suitable for a certain subset of interventions that are simple and short term, and/or for analyses that are aiming to understand one controllable variable at a point in time, such as behavior or attitudes of a community based on a specific activity.)

6.3 Move from project-based M&E to systems integrated with development

Countries are investing in measuring and tracking progress in a wide variety of development sectors that are also targets for interventions for climate change adaptation; including agriculture, food security, public health and water resources. Indeed, a primary goal of mainstreaming is to ensure consideration of current and future climate risks in climate sensitive sectors. Adaptation metrics and M&E will need to connect with, and leverage, national and sectoral monitoring and measuring systems to ensure that data and indicators relevant for adaptation are reflected in these systems. In addition, adaptation and resilience considerations are mainstreamed into national development assessment activities – including tracking progress on the SDGs. The relationship between CCA and mainstream development matters, with priority considerations including how CCA may disrupt development, support and enhance development, or even redefine development. This is a question of context, with different national governments (and sectors and local communities) seeing this relationship in different ways. Therefore, considerations of effective CCA must be considered in light of context-specific development needs and objectives, and so too must M&E of CCA.

Recommendation 7: Explore and exploit complementarities and synergies between CCA M&E and development M&E

Countries are investing in measuring and tracking progress in a variety of development sectors that are also targets for interventions for climate change adaptation; including agriculture, food security, public health and water resources. CCA M&E will need to connect with, and leverage national and sectoral monitoring and measuring systems to ensure that data and indicators relevant for CCA are reflected in these systems – and that adaptation and resilience considerations are mainstreamed into national development assessment activities – including tracking progress on the Sustainable Development Goals.

Recommendation 8: Design M&E for and with stakeholders

Although there is widespread agreement that M&E in general should be designed with, and for, stakeholders. This is particularly true for CCA M&E given that adaptation is particularly stakeholder based, stakeholder experienced, and unique to each set of stakeholders. In practice this means engagement with stakeholders from climate-sensitive development sectors – where the actual needs for climate resilience lie. Further, CCA is characterized by high data needs and whether it is local climate information or socio-economic characteristics that determine vulnerability and adaptive capacity. Learning and complexity orientations further necessitate stakeholder engagement (from all relevant sectors) early on and often. This starts with development of a results framework and throughout the stages of M&E including evaluation and learning cycles.

6.4 Create environments that enable learning and knowledge management

Learning occurs in many ways. An important requirement for learning is the ability to document practices, extract lessons and share and exchange knowledge. The conversion of tacit to explicit knowledge and vice-versa is integral to learning and often requires engagement between different communities – including the practitioner and academic communities. There is now a growing formal knowledge base of resources about CCA M&E, including frameworks, case studies, guidance notes, as well as the peer-reviewed literature. However, it is necessary to further strengthen this knowledge base – which may be possible through partnerships with knowledge institutions. Such partnerships are also important for the explicit to tacit conversion, where the uptake of formal knowledge may occur most effectively through exchange (discussion / dialogue) and in-person interactions.

Recommendation 9: Create and support communities of practice and learning environments

CCA M&E—as well as M&E of other complexity-rich issues across a variety of sectors—will benefit from formal and informal communities of practice, updates of studies like these, and individual peer-to-peer exchanges. The GEF has supported and used communities of practice. A good example is iW:Learn in the international waters focal area. In CCA, there are now a variety of regional and thematic communities of practice including the Asia-Pacific Adaptation Network (APAN), and NAPCentral, and in the M&E area, the GEF IEO's climate-eval, as well as SEA change. The GEF could engage with and strengthen these initiatives. Further, the GEF could engage more deeply with the academic community to mine and analyze the GEF experiences with CCA, not only to support M&E, but also to derive lessons and insights that may be valuable not only for the GEF, but for the wider community.

Recommendation 10: Invest in capacity-building for M&E, especially in local institutions

Given current states of development in many countries of both CCA understanding and of M&E systems, it is important to invest in capacity building around what constitutes CCA in each context, what sectors should be engaged, and what M&E means (and entails) in each fit-for-purpose situation. Further capacity building (e.g. through stakeholder engagement and technical training and continued mentoring), resource investments (e.g. for data collection), and training for M&E practitioners (who often are not versed in a wide range of methods or learning approaches) are also likely to be needed, particularly in those cases where donors are requiring M&E in order to provide funding.

The STAP hopes that these ten recommendations will provide timely and actionable inputs to the GEF partnership and looks forward to continued engagement with the partnership in their implementation.

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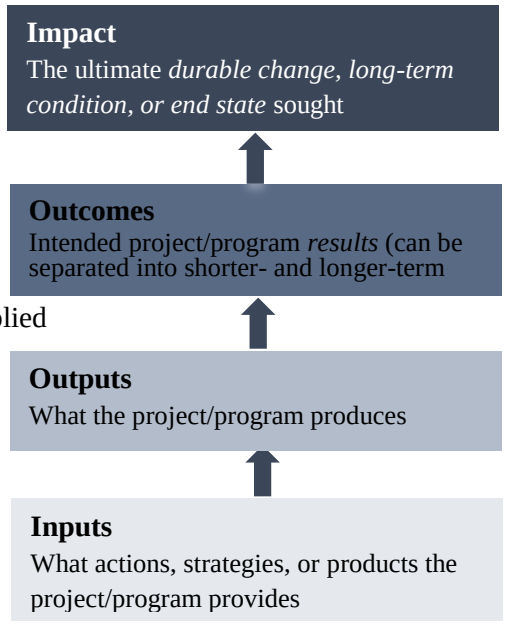
Annex 1. Detailed Overview of M&E Components[26]

A1. Results Frameworks

A **results framework**—often depicted as a theory of change, logic model, or log frame—identifies the intended results an intervention aims to achieve and the logical cause-and-effect relationship between the intervention's inputs and activities and these results. (See simplified example in Exhibit A1.)

Exhibit A1. Simplified typical levels of a results framework



Results frameworks are overarching conceptual guideposts that serve as the basis for M&E. Most results frameworks are based on visual tools such as theories of change, log frames, logic models, or similar tools[27] which visualize the pathway connecting inputs and activities to anticipated outcomes through a set of causal mechanisms. The tools can be applied at different levels, including project, program, portfolio, and institutional.

There is no "right" tool to use; however, the most common among international climate finance institutions are linear, typically hierarchical theories of change, logic models, or log frames. These tools define a combination of the targeted inputs, activities, outputs, outcomes, and impacts (short, medium, and/or long-term impacts) that the intervention aims to achieve.

A Theory of Change (ToC) framework is increasingly favored for CCA M&E initiatives. If developed according to the principles that set ToCs apart from other tools, ToC embrace more of a systems view that is particularly well suited to the complexity, non-linearity, and unpredictability of climate change and its necessary adaptations. While there is no single definition of what a ToC is and no set methodology, there is an emerging consensus that context[28], assumptions[29], qualitative information[30] (supplementing quantitative data), and more nuanced visuals and /or narratives (Gosling and Edwards 2003) on shifts toward systems-level change are integrated into many ToCs. ToCs are also flexible, providing an option for depicting change in a non-linear manner as a pathway, process, or sequence of change from current

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26 Information in this Annex is based on Williams (2016), with updates.

27 These include results chains, results hierarchies, impact chains, outcome maps, and other tools.

28 Context for the initiative, including social, political and environmental conditions, the current state of the problem the project is seeking to influence and other actors able to influence change.

29 Assumptions about how these changes might happen, as a check on whether the activities and outputs are appropriate for influencing change in the desired direction in this context.

30 Discussing issues that are inherently qualitative and/or cannot be readily quantified without causing problematic reductionism.

context to desired impacts.

Recent publications have highlighted the use of ToCs for CCA (as well as resilience more broadly - e.g. O'Connell et al. 2015) and some have focused on building field capacity for using ToCs for CCA M&E (e.g. Tolmie 2014).

A2. Indicators

Indicators are markers of progress toward the intended results outlined in the results framework. Indicators are used to demonstrate the status of an activity, project, or program. Over time, reporting on indicators provides information on whether a certain condition exists or certain results have been achieved. Indicators are defined by the physical, social, financial or other measured dimension, such as– for example–the percentage of households served by early warning systems. Indicators are the basis for most monitoring and reporting as part of a broader M&E system.

While there are no defined methodologies or guiding principles for selecting indicators for M&E, choosing indicators constitutes a critical step in the M&E process. Several studies focusing on CCA M&E discuss indicators in use in the field (Williams 2016; Hammill, Dekens, and Schröder-Breitschuh 2013; GIZ and IISD 2015; Olivier, Leiter, and Linke 2013) and some also provide useful guidance for indicator selection (e.g. Climate Eval Community of Practice 2015; Naswa et al. 2015; Bours, McGinn, and Pringle 2014c).

Baselines

Indicators are typically first measured against a baseline—the status or condition before the intervention is implemented. Targets for each indicator are typically set to measure change relative to the baseline. For example, a target could be a 50 percent increase in households served by early warning systems as compared to a baseline of 10 percent. At the same time, establishing baselines can be difficult for CCA initiatives because the drivers of change (climatic, economic, social, etc.) can change, and because baselines are not often precisely defined or established at the beginning of an intervention, making it difficult or impossible to accurately estimate in retrospect. Depending on the indicator and nature of the intervention, baselines are not simple 'states' that can be clearly measured at a point in time to begin with. For example, it can require a shock, such as a natural disaster, or other measurable shift to understand baseline status before an intervention and yet another shocks to test the relative change after the intervention. Such shocks can be unpredictable and may not occur for years, if not longer.

Intentionally considering and, where possible, establishing baselines prior to starting interventions is the first step in addressing these challenges. It can also be helpful to set modest expectations for quantifying change, emphasize a combination of qualitative and quantitative indicators to assess shifts over time, and focus on interim indicators of progress which can be more feasible to measure against baselines.

Indicators for each level of a results framework

Indicators are typically identified for each level of a results framework (ToC or other), from inputs to impact (noting that sometimes the levels are titled or categorized in different ways). Indicators are also

often identified for each primary (overarching) result identified (e.g. GEF 2014b).

For CCA, the most common indicators that have been reported on to date have been at the input and output levels. Inputs are sometimes divided into more specific components, such as resources (including funding and number of staff hired/deployed) and activities (e.g. developing technical guidance or designing plans for resilient infrastructure). Outputs include things such as the number of trainings held or number of households provided with educational materials. The reason these indicators have been the most common is twofold: first, most CCA work is in the early stages of implementation, and, second, because inputs and outputs are typically much simpler to monitor and report on.

Interim outcome indicators

Measuring the long-term impact of adaptation interventions (e.g. from a 5 to 30-year time horizon) is not straightforward. Long-term impact indicators are difficult to measure, because (i) impact will only materialize in the future (years if not decades away), (ii) impact is often unpredictable and a function of many variables (rarely just one influence or intervention that can be controlled for measurement purposes), (iii) the measures of impact are analytically complex (related to ii), (iv) it can require deep technical expertise and resources to measure; and (v) there is little CCA-specific field experience with impact measurement to draw from to date.

For these reasons, interim outcomes (e.g. identifiable in 2-5 years), the early indications of results that may lead to impact later, are often the most robust signals of results that can be measured in a reasonable time frame. Such indicators are also not simple themselves, but they are increasingly recognized as important signs of influence and success. They may include, for instance, policies adopted and implemented, households living in structures that are built to be more resilient to shocks, the number of sector-development plans that effectively incorporate climate resilience, or the percent of population covered by emergency warning systems, are both measurable and can serve as valuable proxies for longer-term outcomes and impacts when those are not easy to measure.

Indicators across context and scale

Given the local nature of adaptation (as with disaster risk management and other particularly local issues), indicators for CCA can be difficult to apply, aggregate, or compare across contexts or scales. What may indicate improved adaptive capacity or reduced vulnerability in one location (or sector) may not in another, posing a number of challenges for looking at systems-level changes and knowing whether there are broader trends or applicable lessons from place to place or at higher levels (e.g. national, international, program). For this reason, common CCA indicators such as the number of beneficiaries are often both generic and basic—and may or may not substantively indicate whether the interventions are going to make a long-term difference. A number of ideas and approaches for addressing this challenge, including supplementing quantitative metrics with qualitative analysis, are offered in this paper.

A3. Monitoring and Reporting

Monitoring generally refers to the systematic and continuous collection of data, quantitative and/or qualitative, about the progress of a project or program over time. It is most often focused on collection of data corresponding with a set of indicators; however, it can also cover other kinds of qualitative or quantitative data collection used to track the status and progress of an effort over time. If monitoring information is of suitable quality for doing so, it is also used to identify project/program strengths and weaknesses in order to improve quality (Gosling and Edwards 2003) and/or to keep the project/program 'on track' in relation to stated objectives. Monitoring and corresponding reporting, often at annual (or more/less frequent) intervals, serve to take stock of progress and support routine management and accountability purposes. Monitoring and reporting are thus accountability and management instruments that provide regular feedback on performance (GEF 2010). Note that there are also a variety of additional nuanced interpretations of what constitutes monitoring, and how monitoring relates to evaluation[31].

A4. Evaluation

Evaluation is a separate analysis that draws upon all the aforementioned components, but also involves additional independent data collection and analysis. It is in essence concerned with valuing.

The OECD defines evaluation as "The systematic and objective assessment of an ongoing or completed project, program, or policy, its design, implementation and results. The aim is to determine the relevance and fulfillment of objectives, development efficiency, effectiveness, impact and sustainability" (OECD 2002). In the international development tradition, evaluation thus generally refers to studies that seek to understand changes in a situation as a result of a development intervention and thus to assess the effort's overall merit (for a certain time period, often a funding period). Depending on when they take place in the funding cycle, evaluations can lead to improvements (e.g. mid-term evaluations) and/or generate new knowledge (e.g. terminal or summative evaluations).

It is essential that evaluation is also about learning – practical learning for improving, theoretical learning to add to knowledge and knowing, and accountability learning in order to prove merit and value for investment. However, while many organizations espouse continuous learning and adaptation as part of their culture and practice, actual efforts to use evaluation in this way often fall flat (Williams 2014). Moreover, how evaluation relates to learning varies depending on the methodological tradition[32].

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31 There is considerable variation in the literature as to what constitutes monitoring. A critical point of debate is the extent to which analysis, or the process of sense-making, is considered part of monitoring. Some refer to this or imply that monitoring inherently includes this, while others equate analysis with 'evaluation'. Further debate, as highlighted by Kolkma, has focused on whether monitoring is only concerned with the present, as opposed to evaluation which typically deals with the past. Some consider that monitoring is geared more for day-to-day management in relation to targets, time-frames and budgets, whereas evaluation is geared more for learning or policy development. Similarly, some conceptualize monitoring as covering inputs, outputs and activities, whereas evaluation focuses more on outcomes and impacts.

32 In a well-known debate between figureheads of two evaluation traditions, represented by Michael Scriven and Michael Quinn Patton, Scriven advocates a hands-off role for evaluators who should undertake goal-free evaluation and present an analysis of effects. This analysis can then be transformed into something useful by the client itself. By contrast, Patton urges

Learning and evaluation have also been linked via the notion of organizational learning (Torres and Preskill 2001), in terms of self-evaluation (UPWARD 1996) and through lessons learned (Patton 2001).

Evaluation typically examines why and how results have been achieved, what has worked well and not worked well, and what kind of changes to design and implementation could improve results. Although evaluation often takes place either mid-course during an intervention or after an intervention is completed, different evaluation types are planned and implemented at any stage.

Unfortunately, there is no standard evaluation typology or even standard set of definitions for specific evaluation types. However, most evaluations—regardless of label or type—are based on similar core concepts:

- Overarching objectives of accountability and learning;
- Ensuring that evaluations are based on independent and impartial assessments;
- Understanding whether interventions are designed well and working as intended; and
- Identifying learning and lessons, and possible recommendations to improve results and impact.

Evaluations of CCA interventions vary substantially. To date, CCA evaluations have often been project-based and focused more on accountability than continuous learning during implementation. However, this is shifting, with an increasingly popular interest in departing from traditional international development evaluation approaches to more learning-focused and systems-thinking evaluation approaches.

Other components of M&E systems

On occasion, M&E systems include other components, such as knowledge management systems. These may or may not be considered part of M&E, and are therefore considered supplementary unless otherwise noted on an ad-hoc basis.

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evaluators to engage with the client and focus evaluations around what clients want to learn and what use it will have for them.

Annex 2. CCA M&E Communities of Practice and Related Capacity-Building Efforts[33]

GEF—Climate-Eval Community of Practice

The GEF IEO hosts the Climate-Eval CoP, an online community of practice and global network of M&E practitioners to establish standards and norms, support capacity development, and share good practices of climate change and natural resource management evaluations. In addition to hosting the online CoP, support from multiple donors has sponsored field-building studies and two global conferences, the latest of which was the International Conference on Evaluating Climate Change and Development held in November 2014 in Washington, DC (Climate-Eval 2014). A recent report published by GEF on behalf of the Climate-Eval CoP is a *Good Practice Study on Indicator Development, Selection and Use Principles for Climate Change Adaptation M&E* (Climate-Eval Community of Practice, June 2015).

AdaptationCommunity.net

AdaptationCommunity.net is an on-line community of practice sponsored by the German international development agency (GIZ) to support adaptation to climate change. Since March 2013, AdapationCommunity.net has been providing knowledge through an inventory of methods for adaptation to climate change with examples of practical application in the form of Method Briefs and webinars. The Community also provides a platform for exchange among practitioners through webinars and an area for exchanging ideas. AdaptationCommunity.net has a section devoted to M&E, which includes national and project-level adaptation M&E, examples from application, M&E Training, and additional resources.

OECD Studies on Climate Change Adaptation M&E

OECD has published several useful climate change adaptation studies, including *National Climate Change Adaptation: Emerging Practices in Monitoring and Evaluation* (OECD 2015), and *Monitoring and Evaluation of Climate Change Adaptation: Methodological Approaches* (OECD 2014b), published in cooperation with the World Resources Institute and the International Institute for Sustainable Development.

CoP for Resilience Measurement-Monitoring, Evaluation and Learning

In early 2016, the Rockefeller Foundation launched a CoP for Resilience Measurement-Monitoring, Evaluation and Learning (MEL). The CoP aspires to collaboratively recognize leading approaches and tools for measuring resilience in different contexts, to identify commonalities across approaches, and to build the knowledge, capacity, and skills to generate, share, and learn from the evidence base for resilience investments. This CoP goes beyond climate change resilience into other sectors, but is also directly related to climate change adaptation (and resilience) M&E.

[33] Information in this Annex is based on Williams 2016, with updates.

SEA Change CoP

From 2010-2014, the SEA Change CoP (www.seachangecop.org) served as an on-line CoP focused on the monitoring and evaluation of climate change interventions in Asia and beyond, with funding from the Rockefeller Foundation, and technical and logistical support from Pact (www.pactworld.org). Funding for the site has been discontinued, but many useful resources remain available.