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Monitoring and Evaluating Mainstreamed Adaptation to Climate Change

A synthesis study on climate change in development cooperation

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Preface

Climate change is arguably one of the most serious threats to future human development. It is also one of the most difficult problems to tackle, due to its global nature, intergenerational impact and the large uncertainties and risks it entails. Addressing the causes of climate change involves huge and decades-long investments in decoupling economic growth from increasing energy use, and in developing energy-efficient technologies and renewable energy. Such climate mitigation strategies pose an unequal burden on developing countries, where more than ninety per cent of the worlds' new energy demand is expected to come from. Moreover, the effects of climate change itself already unduly affect the poorest people in the least developed countries. For this reason, investing in strategies for adapting to climate change and increasing societal resilience has gained more prominence in recent years.

As a signatory to the 2015 Paris climate agreement, the Netherlands has pledged to assist developing countries in several areas in adapting to climate change. Its current ambition is to increase contributions to international climate financing towards EUR 80 million annually. Half of this amount will be allocated to a new fund for climate and development, with an emphasis on financing climate adaptation. In addition, it wants to promote knowledge of climate adaptation in developing countries through the Global Centre of Excellence on Climate Adaptation.

We need evaluations of climate change policies and interventions to know whether the joint efforts by governments, the private sector and civil society will generate progress in climate mitigation and adaptation. Do they really make a difference across generations and on a global scale? Can they be improved to generate more value added?

Efforts to reduce poverty and improve economic development increasingly take climate risks into account. This so-called 'mainstreaming' of climate adaptation into development interventions can have many benefits. For instance, they can protect investments from having negative climate impacts, thus making a more efficient and effective use of limited resources. At the same time, mainstreaming may also blur the boundaries between regular development activities and climate adaptation interventions, thus posing challenges for monitoring and evaluating their impact and coherence.

We therefore invited Ayesha Dinshaw, associate on climate resilience at the World Resources Institute (WRI), to write this synthesis study on monitoring and evaluating climate adaptation. It explores what climate adaptation interventions that are mainstreamed into development programming may look like, and what challenges these pose for monitoring and evaluating. It also examines which methodological approaches and types of evaluation could meet these challenges.

We would like to thank Mrs. Dinshaw for this study. Christina Chan, Director for the Climate Resilience Practice at the WRI, Martijn Hendriks and Ferko Bodnár, both senior researchers at IOB, provided valuable quality support.

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List of acronyms and abbreviations

ADAPT	Adaptive, Dynamic, Active, Participatory, and Thorough
AMAT	adaptation monitoring and assessment tool
ADB	Asian Development Bank
AF	Adaptation Fund
AMAT	Adaptation Monitoring and Assessment Tool
ASAL	Arid and Semi-Arid Lands
CAFF	Conservation of Arctic Flora and Fauna
CIF	Climate Investment Funds
CMO	Context, Mechanism, and Outcome
DME	Design, Monitoring and Evaluation
FTF	Feed the Future
GEF	Global Environment Facility
GIZ	(German) Gesellschaft für Internationale Zusammenarbeit – German development agency
IDB	Inter-American Development Bank
IDS	Institute of Development Studies
IEG	Independent Evaluation Group
IOB	Policy and Operations Evaluation Department of the Ministry of Foreign Affairs of the Netherlands
IPCC	Intergovernmental Panel on Climate Change
KACCAL	Kenya Adaptation to Climate Change in Arid and Semi-Arid Lands
LiDA	Light Detection and Ranging
M&E	Monitoring and Evaluation
MEL	Monitoring, Evaluation and Learning
MTPTC	Ministry of Public Works, Transport and Telecommunications (Haiti)
OECD	Organisation for Economic Co-operation and Development
PMERL	Participatory Monitoring, Evaluation, Reflection, and Learning
PPCR	Pilot Program for Climate Resilience
PROVIA	Programme of Research on Climate Change Vulnerability, Impacts and Adaptation
SMART	Specific, Measurable, Achievable, Realistic, and Time-bound
TAMD	Tracking Adaptation and Measuring Development
UNDP	United Nations Development Programme
UNFCCC	United Nations Framework Convention on Climate Change
USAID	United States Agency for International Development
WRI	World Resources Institute
3ie	International Initiative for Impact Evaluation

Introduction

This report aims to provide insight into monitoring and evaluation strategies for climate change adaptation in development interventions.

In the race to counter the effects of climate change, mitigation has long been on international policy agendas. However, adaptation has increasingly been recognised as important, and this was solidified at the COP 21 agreement in Paris in 2015. The Paris Agreement stresses that international climate policies should aim at climate change adaptation, and target how people and places can adapt to the effects of a changing climate. The acknowledgement that climate change impacts are being observed and are expected to aggravate, has elevated the role of adaptation in the effort to contend with climate change.

Climate change and development are inextricably linked: the poorest people and least developed regions in the world suffer most from the effects of climate change. Agriculture is often a primary resource for poor individuals' livelihoods, but unpredictable weather changes resulting in impacts such as droughts and heavy unseasonal rainfall invoke serious threats to food security. Moreover, the poor tend to live in areas vulnerable to floods, extreme droughts, or sea level rise. The lack of means to cope with the effects of climate change in developing countries makes adaptation a pressing international development issue. Dealing with the effects of climate change thus necessitates adjustments in various sectors of development, such as agriculture, infrastructure, and water management.

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A recognition of the critical need to adapt has resulted in a growing number of adaptation interventions implemented in recent years. A common characteristic of these responses has been that efforts to reduce poverty and improve economic development increasingly take climate risks into account. This so-called 'mainstreaming' of adaptation into development has many benefits, including increasing the scale of results to contend with the effects of climate change, protecting investments from negative climate impacts, and making more efficient and effective use of limited resources. Despite many benefits of mainstreaming, the blurred distinction between regular development activities and adaptation interventions poses challenges for monitoring and evaluating mainstreamed adaptation.

This report is a synthesis study of monitoring and evaluation of adaptation, with a focus on mainstreamed adaptation whenever possible. The methods and techniques for monitoring and evaluating mainstreamed adaptation are not necessarily different from those used to monitor and evaluate stand-alone adaptation efforts. The main difference lies in considering how to monitor and evaluate adaptation objectives that are nested within development objectives, and therefore account for, and reflect, the overarching development context in the methods, indicators, and parameters chosen to assess progress and success of a given intervention.

Chapter 1 provides an overview of key adaptation terms and concepts, and explores what adaptation interventions that are mainstreamed into development programming could look like. Chapter 2 lays out the challenges that are faced when monitoring and evaluating adaptation interventions, and the methodological approaches available to contend with

these challenges. This chapter also provides a brief overview of some of the methods and techniques being used to monitor and evaluate adaptation, including mainstreamed adaptation.

Chapter 3 offers a deep dive into one key element of monitoring – indicators – and looks at the types of indicators used to measure progress for interventions designed from an adaptation perspective, examples of indicators used for adaptation, and whether and how they differ from those used to monitor and evaluate regular development interventions. Chapter 4 describes various types of evaluations, and explores how three adaptation portfolios contended with the challenges of monitoring and evaluating adaptation. This chapter closes with a brief look at the impacts that can be gauged through evaluations. The report ends with conclusions and broad recommendations for monitoring and evaluation of climate change adaptation in development interventions in chapter 5.

Since adaptation can occur at various scales, this report uses the term ‘intervention’ unless it is specifically referring to an adaptation project, programme, policy, or portfolio. The content and findings of this report are generally applicable to adaptation at any scale, unless otherwise specified.

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Climate change adaptation and development

As discussed in the Introduction, mainstreaming is an important concept in adaptation, and is critical for contending with the scale and magnitude of present-day and future climate impacts. To provide background for the rest of the report, section 1.1 provides definitions and explanations for important adaptation terms and concepts. Section 1.2 then describes two examples of what adaptation can look like when mainstreamed into regular development interventions. These examples are used throughout the rest of the report to highlight important issues related to monitoring and evaluating adaptation, especially mainstreamed adaptation.

1.1 Key adaptation concepts and terms

To set the stage for the rest of the report, this section outlines some concepts that are fundamental to understand when contending with climate change adaptation.

Box 1 Key adaptation concepts and terms

- Climate change
- Hazards
- Impacts
- Climate change impacts
- Risk
- Climate risk management
- Vulnerability
- Adaptive capacity
- Adaptation
- Resilience
- Autonomous adaptation
- Mainstreaming

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The Intergovernmental Panel on Climate Change (IPCC)¹ uses the term **climate change** to mean any change in climate over time that can be identified by shifts in the mean and/or variability of its properties, and that persists for a long period of time (usually decades). The IPCC does not differentiate between climate change that is due to natural variability and that which is the result of human activity. This usage of the term differs from that of the United Nations Framework Convention on Climate Change (UNFCCC), which uses the term to mean specifically those changes in climate that can be attributed to human activity, over and above changes due to natural variability (IPCC 2014).

On the ground, practitioners do not attempt to differentiate between the effects of climate change by source when determining the consequences of climate change on human or natural systems, before choosing and implementing interventions to mitigate these effects. For this reason, this synthesis study uses the IPCC definition of climate change, which does not differentiate between the source of climate change. The IPCC, being the leading international body on climate change science, supplies most of the definitions in this section.

¹ IPCC assessments provide a scientific basis for governments at all levels to develop climate-related policies, and they underlie negotiations at the United Nations Framework Convention on Climate Change (UNFCCC). IPCC assessments are policy-relevant but not policy-prescriptive: they may present projections of future climate change based on different scenarios, highlight the risks that climate change poses, and discuss the implications of response options, but they do not tell policymakers what actions to take (IPCC 2018).

Climate change is experienced through **hazards** and **impacts**. A hazard is a climate-related physical event, such as a hurricane. The impact of the hazard (for example, a hurricane) is the consequence on natural and human systems (in this case damage from flooding caused by the hurricane) (IPCC 2014). **Climate change impacts** can be positive, as in the case of an extended growing season due to longer periods of warm weather in cold climates, but also often negative, as in the case of increased temperatures resulting in drought and yields losses. The potential for negative consequences when something of value is at stake and the outcome is uncertain (recognising there is great diversity when it comes to values) is **risk**. Risk is often represented as the probability of hazards multiplied by the impacts if these hazards were to occur (IPCC 2014).

Decision-making and action that takes into account the risks of climate change can be broadly described by the term **climate risk management**. This can include actions such as reducing the vulnerability of individuals and communities to climate change impacts, improving built infrastructure to withstand climate impacts, and improving the adaptive capacity of individuals to withstand the shocks and stresses of climate change. **Vulnerability** is the propensity or predisposition to be adversely affected, and implies a sensitivity to harm and a lack of ability to cope and adapt (IPCC 2014). **Adaptive capacity**, on the other hand, refers to the ability of individuals, institutions, and systems to adjust and respond to potential damage (IPCC 2014).

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This process of adjusting and responding to actual or expected climate changes and its effects is **adaptation**. While adaptation is an action and process, **resilience** refers to the capacity of a system to cope and adjust to a hazardous event or trend (IPCC 2014). Although the terms adaptation and resilience are often used interchangeably, it is helpful to think of adaptation as a process and resilience as a capacity. Since climate change is an ongoing phenomenon, individuals and resource bases will never be fully adapted, but their resilience can be increased through interventions that take into account the negative impacts of climate change.

Even without climate change, however, many individuals and communities around the world are vulnerable. This vulnerability stems primarily from poverty. The poor are more prone to food insecurity and malnutrition. They lack access to sanitation, clean water, and health care. They often have climate-dependent livelihoods such as farming and livestock management, and do not have savings or access to credit. Therefore, when they are faced with a negative climate change impact, they often do not have the resources to cope or they run the risk of falling even further into poverty if they have to use their meagre resources to **adapt autonomously** – which means they were not consciously planning to adapt to climate change (IPCC 2014).

As climate change has local impacts on people, areas, and specific sectors of development, adaptive measures are needed to make sure that these impacts of the climate change do not undermine development gains. The deficit in development is still quite large across the world, meaning that there are many socio-economically challenged individuals who are at risk of negative consequences of climate change. In this reality, and given that dedicated

finance for adaptation is still limited compared with the estimated need² (WRI 2015), it makes sense to **'mainstream'** climate change adaptation into development. Mainstreaming refers to systematically including climate risks and adaptation planning processes and decision making (including budgeting, implementation and monitoring) (GIZ n.d.).

Mainstreaming accomplishes two related objectives: first, it enables greater adaptation gains. Too often, adaptation interventions are implemented in a siloed manner, interventions are small in scale, and are implemented as one-off projects. Mainstreaming enables adaptation to be included in regular development and planning processes, and change how business-as-usual is done, instead of being added on when additional adaptation funding is available. Second, mainstreaming ensures that development takes future climate change impacts into consideration so that development gains are not undermined by climate change.

As an example of how development and adaptation are linked: sustainable land and water management are necessary to improve and maintain economic development regardless of climate change. Under a regular development scenario without climate change, an example of an intervention in an arid-land development plan might be to increase the number of community-owned wells to improve access to water for livestock. However, if climate scenarios are not considered, it is possible that the wells will be located in areas where there will be a drop in precipitation and thereby groundwater, and the resources spent on the wells will not enable any development gains.

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If the intervention of building community-owned wells to improve access to water during periods of drought was the result of adaptation funding that was programmed by a consultancy that undertook a vulnerability assessment, identified the most at-risk communities, and constructed the wells, it would be a stand-alone, non-mainstreamed adaptation project. However, if the intervention of building such community-owned wells was the result of adaptation funding spent on a programme that enabled local governments to understand the impacts of climate change, identify adaptation interventions that would be most appropriate, and budget and plan for the construction of these interventions – in this case the wells – it would be a mainstreamed adaptation intervention.

Adaptation is a rapidly evolving field, and donors and practitioners are still assessing what works, and why. Since adaptation takes place in many different contexts, and takes many different forms, there is no single suite of adaptation actions that can be implemented uniformly. In order to improve the evidence base of what works, and why, while ensuring that adaptation funding is effectively and efficiently used, monitoring and evaluation of adaptation interventions is critical.

² As scientific research on climate change impacts improves, adaptation finance estimates for the coming decades become higher. A 2014 UNEP report indicated a minimum adaptation finance need for developing countries of approximately USD 140 billion by 2050, and a high end of approximately USD 300 billion by 2050. Taking the commitments for adaptation in 2013 and the lowest estimated needs by 2050, adaptation finance will need to increase by 438 percent by 2050 (WRI 2015).

1.2 Exploring mainstreamed adaptation

This section explores what mainstreamed adaptation may look like. It uses two World Bank adaptation projects (see Annex 1 for more information about them) as its basis, but expands upon these by creating example theories of change to showcase how these adaptation projects fit within a development context. While the objectives, outcomes, and activities of the adaptation projects are those identified in public project documents available on the World Bank website, the development goal, the adaptation goal, and the arrows denoting relationships between the activities and outcomes are the author's interpretation. All the details of the projects have not been used, and these examples are not intended to represent the actual World Bank projects.

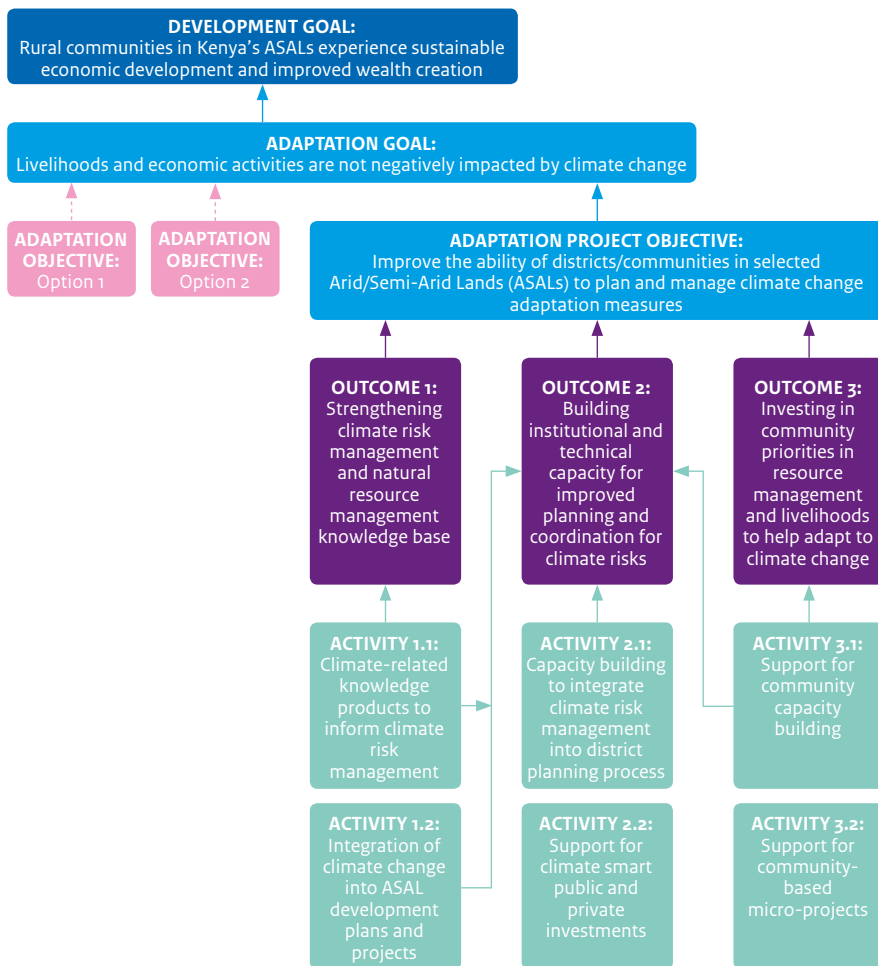
These examples are structured as follows: a description of the development context to explain why development is needed, followed by a description of the **overarching development goal** highlighting what a regular development intervention might aspire to in this development context. This is followed by a description of the climate change impacts that will likely undermine progress towards the development goal, and the **adaptation goal** necessary to contend with the impacts of climate change. The adaptation goal is the larger aim of any number of specific adaptation interventions. A description of the **adaptation objective** of one specific adaptation intervention is provided here, followed by the adaptation **outcomes** and **activities** specific to this adaptation intervention. These goals and objectives have been created by the author to show how adaptation can be 'nested' within larger development needs, as a helpful way of elucidating mainstreaming.

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Kenya adaptation to climate change in arid and semi-arid lands (KACCAL) project

Figure 1 is an example theory of change for a specific World Bank project. It shows how adaptation can be embedded within the larger development context. Such mainstreaming of adaptation into development programming ensures that development efforts succeed despite the impacts of climate change.

Figure 1 Example theory of change for World Bank KACCAL project



Kenia’s arid and semi-arid lands (ASALs) require special attention for development. They cover more than 80 percent of the country’s land mass and account for approximately 30 percent of the country’s population. ASALs are also home to about 70 percent of the country’s livestock population. The predominant livelihoods in these areas are marginal dryland agriculture, pastoralism and agro-pastoralism, which are associated with relative poverty and insecurity. Therefore, the **overarching development goal** in ASALs is to alleviate poverty and reduce livelihood vulnerability (World Bank 2007). This regular development goal is the context within which climate change and adaptation occur.

This development goal seems appropriate, because the Government of Kenya has acknowledged the special attention to poverty reduction required in the ASALs, especially as it relates to livelihood insecurity. For instance, the national Economic Recovery Plan states

that to achieve poverty reduction in the smallholder livestock sector, it needs to address issues such as degradation of lands and poor access to water. Efforts to achieve the development goal and enable secure, profitable livelihoods in ASALs can include interventions such as improved natural resource management, improved land use management, effective service delivery, and the creation of conflict management systems (World Bank 2007).

Climate change will exacerbate existing vulnerabilities and threatens to undermine economic growth and poverty reduction gains that have been made in ASALs over the previous decades. Therefore, the **adaptation goal** within this development context is to ensure that already-vulnerable livelihoods and economic activities are not further negatively impacted by climate change, and that adaptation interventions protect the improvements that have already been made to these livelihoods and communities' well-being. In this way, mainstreamed adaptation can help protect economic growth and enable it to stay at the same level as before climate change impacts occurred.

There are many options for how the adaptation goal can be reached. Examples include programmes to build awareness of climate change, and programmes to increase the capacity of community members to access climate information services. In this example we use the World Bank's Kenya Adaptation to Climate Change in Arid and Semi-Arid Lands (KACCAL) project, for which the main **adaptation project objective** is to improve the ability of participating counties and communities in arid and semi-arid lands to plan and implement climate change adaptation measures. Often, a lack of understanding of climate impacts, adaptation options, or how to actually implement adaptation options can limit the ability of decision-makers to contend with climate change. Improving the knowledge base and institutional and technical capacity of decision-makers at the local level will enable them to prepare for climate change.

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To achieve the adaptation project objective, the KACCAL project has three **outcomes**: to strengthen climate risk management and the natural resource base related knowledge; to build institutional and technical capacity for improved planning and coordination to manage current and future climate risks at the county and national levels; and to invest in communities' priorities in sustainable land and water management and in alternative livelihoods that help them adapt to climate risk. Achieving these outcomes not only makes it possible to achieve the adaptation goal, but also supports the broader development objective by helping ensure that the development goal of poverty alleviation and sustainable economic development is not jeopardised by the negative impacts of climate change.

Looking more closely at what is needed to achieve the adaptation objective: outcome 1 focuses on improving the knowledge base for climate risk management and natural resource management. The activities necessary to reach this outcome include developing relevant knowledge products – such as enhanced vulnerability assessments and downscaled climate scenarios. For instance, this outcome will inform the implementation of the Climate Change Strategy spearheaded by the Kenyan Ministry of Environment and Natural Resources, and support the ongoing institutional efforts to strengthen a national Sustainable Land and Natural Resources Management Platform (World Bank 2009). Activity 1.2 focuses on bringing this improved knowledge to the district level, and empowering

district officials integrate climate change into ASAL development plans. To enable this, national stakeholders will be trained on how to best disseminate the knowledge products to district officials in a user-friendly format.

The knowledge products developed under the first outcome will also enable the activities in outcome 2 to be completed. Outcome 2 focuses on building institutional and technical capacity for better planning and coordination for climate risks. These capacity building efforts will focus on the district level, and include entities such as the District Coordination Unit and the District Steering Group, which will utilise the knowledge products to better assess climate risks, improve early warning systems, and integrate climate resilience thinking into policies and plans (World Bank 2009). This activity will also improve the capacity of the Mobile Extension Teams which provide technical and advisory support to district officials and community members, to access, utilise, and share climate-related information (World Bank 2009).

Outcomes 1 and 2, and the activities within these outcomes, are the ones most specifically oriented to climate change in that they identify climate-specific information that is required. Worded as they are, these activities would not be included in a project that was not concerned with climate risks. On the other hand, while outcome 3 is also oriented towards adaptation ('investing in community priorities in resource management and livelihoods to help adapt to climate change'), the activities under outcome 3 focus on building capacity and investing in community priorities to help individuals and communities adapt to climate change. These activities could also be found in a non-climate-specific development project. It is the link between these activities and the outcome that makes them relevant to this adaptation project.

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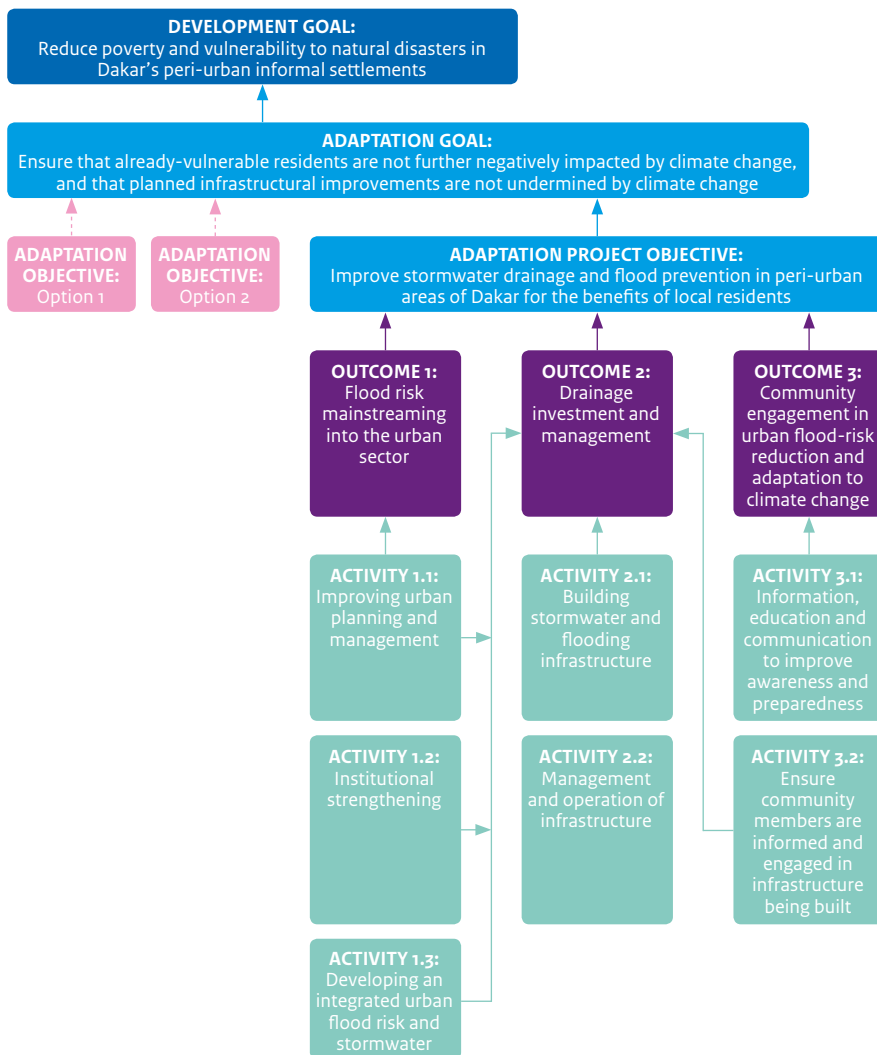
For instance, activity 3.2 is 'support for community micro-projects'. In a non-adaptation intervention, these micro projects would focus on development needs, such as health care or school facilities, but in an adaptation intervention, the micro-projects would have to be specific to adaptation. An example of an adaptation-specific micro-project could be: establishing a community communication plan for sharing the weather advisory information that only a few people who are wealthy enough to own cell phones get via text messages sent by the national meteorological department. In the context of this project, therefore, for a successful outcome 3 it would be imperative for the capacity and support identified in these activities to be specific to enabling the communities to adapt.

In imagining this theory of change it seems that the crux of the project's success lies in outcome 2: building institutional and technical capacity for improved planning and coordination to deal with climate risks. In this project, capacity was built at both the national and district levels, with national-level stakeholders being trained to appropriately disseminate knowledge and build capacity at the district level. Five of the six activities seem to contribute to the outcome, and the logic seems to make sense: despite having the strengthened climate risk management knowledge base identified in outcome 1, as well as community-level capacity and support identified in outcome 3, a lack of institutional and technical capacity to plan and coordinate for climate risks over the long term will be unlikely to yield strong action on adaptation.

Senegal stormwater management and climate change adaptation project

Figure 2 is another example theory of change for a specific World Bank project to show how adaptation can be embedded within the larger development context.

Figure 2 Example theory of change for World Bank Senegal Stormwater Management and Climate Change Adaptation Project



Senegal is rapidly urbanising, with more than 42 per cent of the country's population living in urban areas (World Bank 2012). Of this urban population, 24 per cent (2.7 million people) of these people live in the Dakar Metropolitan Area, which covers only 0.3 per cent of the country's land mass (World Bank 2012). Over 90 per cent of the urban population of the peri-urban region of Dakar lives in areas classified as slums or spontaneous settlements (World Bank 2012). Coastal flooding is a chronic problem in Senegal. The Government of Senegal has identified disaster and prevention and management to be a priority pillar in its Poverty Reduction Strategic Paper for 2006-2010 and its Economic and Social Policy document for 2011-2015. These show that disaster prevention is a development priority in national policy. However, urban planning and stormwater management in the peri-urban areas of Dakar is poor and the flooding continues to worsen (World Bank 2012).

For the purpose of developing this example theory of change, the **overarching development goal** in the Dakar peri-urban area is to reduce poverty and vulnerability to natural disasters. Efforts to achieve the development goal could include improving infrastructure such as drainage, improving pumping operations to remove large quantities of flood water that cannot be drained, and improving access of residents to health care centers during the rainy season.

| 19 | Climate change will exacerbate the flooding currently faced by the residents of peri-urban Dakar, as the extreme weather events will likely be more frequent, and more severe. In this example theory of change, the **adaptation goal** would be to prevent the already-vulnerable residents of the informal settlements, which are prone to flooding in peri-urban Dakar, from being further negatively impacted by climate change, and to ensure that planned infrastructural improvements are not undermined by climate change.

There are many options for achieving this adaptation goal. Examples include improved housing for informal settlement of inhabitants, and improved early warning systems. This example is of the World Bank Senegal stormwater management and climate change adaptation project. The **adaptation project objective** is to improve stormwater drainage and flood prevention in peri-urban areas of Dakar for the benefits of local residents. The drainage plans created under this project take into account the projected sea level rise resulting from climate change. However, because even the improved drainage plans will not be able to protect beneficiaries from all future climate-related flooding, the project has a community engagement component to inform residents of the residual risks and adaptation measures that may be needed in case of extreme events (World Bank 2012).

The adaptation project has three **outcomes**: mainstreaming flood risk into urban planning and management; drainage investment and maintenance; and community engagement on urban flood-risk reduction and adaptation to climate change.

Outcome 1 focuses on improving flood risk integration into urban planning and management and planning tools, strengthening relevant institutions and departments such as the National Committee for Flood Protection which is responsible for guiding and coordinating flood related activities, and developing an integrated urban flood risk and

stormwater management programme for the peri-urban areas of Dakar. If these activities were done without considering future climate change impacts, they could lock in infrastructure decisions that did not adequately contend with future flooding.

Mainstreaming climate change information into urban management ensures that the plans and the people responsible for implementing them are appropriately taking into account the increased likelihood and severity of future flood events.

Outcome 2 focuses on the drainage infrastructure to be built, and the management and operation of this infrastructure. In addition to building the physical infrastructure, this outcome will be achieved through an activity focused on rapid institutional response to ensure effective drainage and stormwater management in the event of an extreme flood. Taken out of the context of an adaptation project, the activities in this outcome would likely be very similar to activities in a regular infrastructure project. Here, the link with outcome 1 and especially outcome 3 moves it from a regular infrastructure project to one that accounts for future climate impacts, such as estimated sea level rise, and focuses on preparedness of the most vulnerable individuals and communities.

Outcome 3 focuses on building flood awareness and capacity to prepare and adapt to extreme flooding. It aims to do this through an information, education and communication strategy supported by media tools that aim to enable awareness and behaviour change. Implementation of this strategy will be done by 'social facilitators' which are non-governmental consulting firms. Their role is to ensure that community members are informed about, and engaged in, all the activities undertaken under outcome 2. Doing this ensures that the infrastructure efforts are consultative and incorporate community participation.

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This chapter elucidates the benefits of embedding adaptation within a broader development goal: adaptation goals are more systemically and sustainably woven into plans and processes rather than being one-off, stand-alone and potentially small-scale efforts. At the same time, development goals take into account the negative impacts of climate change so as not to be undermined by them. The discussion of the Dakar peri-urban flood infrastructure adaptation project shows that not all activities in adaptation projects are different from those that are required under regular development programming. However, inclusion of some climate and adaptation-specific information and interventions is necessary.

2

Methods to monitor and evaluate adaptation

Monitoring and evaluation are two distinct but interlinked activities. Monitoring is the ongoing collection, management and analysis of data to ensure that a project or programme is on track to meet its adaptation aims. Monitoring typically involves several steps: identifying adaptation outcomes that are to be achieved, as well as related outputs, activities and inputs; choosing indicators to assess progress; and managing and analysing data collected. Evaluation is periodic assessments at key points during an intervention and/or after the project or programme is completed, to see whether the intended results have been achieved. What is monitored feeds into what is evaluated, so they are often grouped as M&E.

This chapter begins with an overview of some of the main challenges of monitoring and evaluating climate change adaptation interventions along with methods to contend with these challenges (section 2.1). It then provides a snapshot of some of the tools and frameworks available to conduct M&E for adaptation (section 2.2). These two sections set the scene for chapter 3, which focuses on indicators (a key element of monitoring), and chapter 4, which focuses on evaluations.

2.1 Managing the challenges of adaptation M&E

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Monitoring and evaluating climate change adaptation present a ‘thorny’ set of challenges (Bours et al. 2014a). There are several things that make M&E for adaptation challenging – some of which have to do with the nature of climate change, some with the nature of adaptation interventions, and others with the specifics of adaptation M&E. There are methodological approaches that can mitigate most of these challenges to some degree.

Box 2 Key challenges for adaptation M&E

- uncertainty of future climate change
- development and non-climate stressors
- inequity of adaptation
- long time horizons
- shifting baselines
- lack of counterfactual
- attribution and contribution
- ensuring learning
- indicator selection

Uncertainty of future climate change: Uncertainty is inherent in future climate change as well as in how society will respond to these future changes. Assumptions can be made in order to make decisions with limited information under uncertainty, but these assumptions should be made explicit in project documentation and M&E systems created to assess progress and success (GIZ 2011). Examples of assumptions are that the information collected during monitoring will remain valid over the course of the intervention, that there is sufficient incentive for key stakeholders to engage with the process, and that stakeholders are able to influence the desired outcome (Pringle 2011). An evaluation should carefully track and examine such assumptions to ensure that the intervention is doing the right thing, in addition to whether it is doing things right.

When evaluating adaptation interventions that have been implemented under uncertainty, it is also helpful to be cognisant of not only climatic conditions, but also of political and socio-economic conditions under which decisions were made, and whether these have changed over the course of the intervention. For instance, in the Senegal example from section 1.2, a government scheme to re-house or upgrade informal settlement dwellers would change the number and exposure of individuals vulnerable to flooding, and accounting for such a change in the context in which the project is operating will be critical during an evaluation. To track such changes in context, it can be useful to establish baselines. Baselines can be established for climate data (for instance, number of rainy days per year) but also for public perceptions or economic conditions (for instance, the cost of a particular technology) (Pringle 2011).

Development and non-climate stressors: Although climate change can seriously undermine development, it is important not to attribute all vulnerability to climate change. For instance, in the Senegal example we see that major drivers of vulnerability are informal housing and poor drainage infrastructure. GIZ provides another example: the increased risk of bushfires in Mozambique is the result not only of greater aridity, which can be linked to climate change, but also of the spread of slash-and-burn clearing in response to population growth and the decline in traditional governance of natural resources (GIZ 2013).

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Additionally, in some cases, adaptation may not enhance development, especially given the unpredictability of climate change, and this needs to be kept in mind when assessing mainstreamed adaptation interventions. For instance, drought-resistant crops may be hardier when rainfall is limited but will decrease average yields if there is plenty of rainfall. Acknowledging the important non-climate stressors and drivers of vulnerability in the intervention design and M&E system will enable a fuller picture of adaptation progress.

Inequity of adaptation: Adaptation is not inherently equitable. An action which aids adaptation in one location or community may increase vulnerability elsewhere, and this is critical to assess when defining success of the intervention. A strong degree of participation can reduce the potential inequality of adaptation interventions, or unintended consequences. For instance, in the Senegal example in section 1.2, the activities in outcome 3 include community consultations and participation, which in turn is reflected by the intermediate results indicators 'People reached by information, education and communication strategy at local and national level' and 'Local flood management committees in Pikine and Guediawaye are engaged in stormwater management activities'. It may also be useful to use a theory of change and logic model to test what trade-offs or losses have been assumed (Pringle 2011).

Long time horizons: There are two facets of dealing with long time horizons in adaptation: one is that some interventions take a long time to be implemented (for instance, an ecosystem-based adaptation intervention in which trees take a long time to grow) and the other is that adaptation results can only be judged as climate impacts become clearer over time (for instance, farmers with access to drought-resistant seeds sustain yields despite

increasing incidents of drought, where the drought may not occur immediately after the seed-distribution intervention) (Dinshaw et al. 2014).

In addition, adaptation is an ongoing process; it does not have an end point. If successful, adaptation enables development to thrive despite the negative impacts of climate change, but many (especially mainstreamed) adaptation intervention outcomes may not be fully achieved within a project or programme cycle. For instance, the Kenya example in section 1.2 focuses on building knowledge products and capacity, and the outcomes of those activities may not be seen during the World Bank project's five year period. Since most project and even programme cycles are fairly short, there can be significant time lags between the end of an intervention and when impacts can be measured.

Using a theory of change can be useful for projects and evaluations that are contending with long time frames, as it allows for changes in assumptions and planning in an evolving context (Bours et al. 2014c). Using process indicators enable implementers to know if they are moving along the right track even though the impacts of the intervention cannot yet be determined (Bours et al. 2014c; Pringle 2011). Formative evaluations, which take place during the course of the intervention and emphasise learning, are especially helpful for appropriately treating adaptation as a process (Pringle 2011).

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Shifting baselines: A result of implementing adaptation interventions over long time horizons is the shifting baseline. When the natural or socio-economic context in which an adaptation intervention is being implemented is in flux, the use of a fixed baseline loses its validity. In these cases the intervention itself, not just the indicators used to measure its progress, may need to shift to accommodate a changing context. Simply comparing 'before' and 'after' will be insufficient to evaluate impact (Bours et al. 2014b). The changing context may require revising the baseline to provide a more accurate comparison between what would have happened without the intervention and what actually happened (i.e. the counterfactual) (Dinshaw et al. 2014).

Lack of counterfactual: With adaptation, much of what is necessary to measure is avoided loss, which is difficult without a counterfactual. The time horizon issue is also linked with counterfactuals – for instance, if an intervention is implemented to improve a local government's disaster management capacity, but there is no disaster during the timeframe of the intervention, it is challenging to know what would have happened in the absence of the intervention (Bours et al. 2014b). There is a good body of literature on measuring and evaluating avoided hazards in the disaster risk reduction field (Bours et al. 2014b) as well as methodologies from development that can be helpful in creating counterfactuals (Dinshaw et al. 2014).

However, establishing a counterfactual is challenging, in large part due to the uncertainty of the future climate and all the possible ways in which society could respond (Pringle 2011). Had there been no intervention, there is not one single possible outcome that could have happened. Given this, establishing a counterfactual may not always be the most useful way of measuring progress (Pringle 2011). Instead, it may be more effective to consider the

intervention as one of a number of ‘adaptation pathways’, and the evaluator can assess the effectiveness of the pathway chosen for the intervention (as defined in the intervention’s theory of change or logic model) in the context of certain social, economic and environmental variables (Pringle 2011, p. 20). As described in the paragraph below, another alternative to establishing a counterfactual, which is often done to assess attribution, is to aim to establish the contribution of the intervention instead.

Attribution and contribution: One of the reasons for establishing a counterfactual and measuring progress against it is to gauge attribution – i.e. how much of the progress or success of adaptation was due to the intervention itself? Especially with mainstreamed adaptation interventions, when adaptation has been integrated into a larger development initiative, it is often more useful to consider the contribution of an intervention to observed adaptation outcomes rather than trying to elicit attribution. A contribution perspective also takes the broader situation into consideration, focusing less on the intervention as the single cause and more on how the intervention interacts with other factors (Dinshaw et al. 2014). A contribution approach entails using an evaluation framework which highlights the contributing factors and the relationships between them, and facilitates evaluations that document lessons learned.

| 25 | **Ensuring learning:** Although understanding the results of adaptation interventions that are funded is important, adaptation M&E needs to be undertaken with the spirit of continual improvement and learning as well (Pringle 2011). Several online platforms for sharing lessons learned about adaptation exist (for example, [weADAPT](#) and the [Adaptation Learning Mechanism](#)) but there is still more to be done to ensure that learning informs future decision-making. Evaluations are a key mechanism for learning, and learning should be the primary evaluation objective. Ideally, both formative and summative evaluations would inform decision-making (see chapter 4), and critically, the timing of the evaluations should serve the timing of future key decisions. For example, an evaluation of a flood defence scheme should inform flood management budgets before they are decided (Pringle 2011).

Indicator selection: There is no standard approach to adaptation or M&E for adaptation, and no universal metric or indicator for adaptation M&E. As described in the guidance on choosing indicators for adaptation projects in section 3.1, the most appropriate way to manage this is carefully choosing a suite of indicators that works best for the intervention at hand. In some cases, lack of data availability constrains the choice of indicators. If the data is not available in the appropriate format, or at the right scale, or over an adequate time period, data collection is required but this can be costly and time consuming. When possible, relying on existing datasets is helpful, but ideally not at the cost of an appropriate choice of indicators (Mathew et al. 2016).

2.2 Monitoring and evaluation resources

Adaptation M&E is done for different reasons, and the purpose can guide the choice of M&E methods or approaches. For instance, the purpose may be to monitor whether an adaptation project is progressing as planned, and achieving its intended results. For this purpose, monitoring using a theory of change is usually most appropriate. To monitor whether a sub-national plan or strategy is being implemented well, and is achieving its intended results, it is useful to develop a sub-national M&E system or integrate adaptation into sectoral M&E systems (GIZ 2013).

Recently, there has been a proliferation in tools, methodologies and frameworks for monitoring and evaluating adaptation. Bours et al. developed a comprehensive overview of existing adaptation monitoring and evaluation resources, which is the source of the information presented in this section (Bours et al. 2014b). Table 1 highlights the well-known resources available, and notes whether the resource includes step-by-step guidance, a detailed framework, indicators and guidance on developing indicators, or an example logframe. The table also notes whether the resource is intended for use at the national or sub-national / community scale.

| 26 | **Table 1** *Partial reproduction of Table of Key Features / Characteristics of Reviewed Documents*

	Name of M&E resource	Type of resource	Step-by-step guide	Detailed framework	List of indicators	Indicator development	Example logframe	Scale (N, S)*
1	Making adaptation count	Toolkit	X	X	X	X		N
2	Tracking progress for effective action	Agency guidance (GEF)		X	X	X		N
3	AdaptME toolkit	Toolkit	X		X		X	N, S
4	Climate change adaptation monitoring and assessment tool (AMAT)	Agency guidance (GEF)	X		X	X	X	N
5	Participatory monitoring, evaluation, reflection and learning (PMERL)	Toolkit	X	X	X	X	X	S
6	Adaptation made to measure	Toolkit	X		X	X		N
7	Results framework and baseline guidance	Agency guidance (AF)	X		X	X	X	N, S
8	Tracking adaptation and measuring development (TAMD)	Toolkit	X	X	X	X		N, S
9	Climate resilience and food security: a framework for planning and monitoring	Analytic framework	X	X				N, S
10	Programme of research on vulnerability, impacts and adaptation (PROVIA)	Toolkit	X	X				N, S

	Name of M&E resource	Type of resource	Step-by-step guide	Detailed framework	List of indicators	Indicator development	Example logframe	Scale (N, S)*
11	PPCR monitoring and reporting toolkit	Agency guidance (CIF)	X		X	X	X	N
12	Monitoring and evaluation framework for adaptation to climate change (<i>draft</i>)	Agency guidance (UNDP)			X	X	X	N

*N: National, S: Sub-national / community.

Source: Bours et al. 2014b.

The following bullets provide an overview of each of the M&E resources in Table 1. Further information and the links to the resources themselves are accessible in *Monitoring & evaluation for climate change adaptation and resilience: A synthesis of tools, frameworks and approaches* (Bours et al. 2014b).

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- 1) Making adaptation count: This manual provides guidance that encompasses both conceptual and practical matters, and places a strong emphasis on matching an intended programme to environmental, institutional, and other key contexts. The manual is designed to be flexible, and it makes a point of addressing dilemmas and challenges in a way that encourages one to make sound decisions about them. It lays the groundwork for the later GIZ document *Adaptation Made to Measure* (Bours et al. 2014b).
- 2) Tracking progress for effective action: This paper provides guidance to national-level practitioners by providing a theoretical and conceptual overview of adaptation, reviews of key M&E approaches for adaptation, and practical recommendations for choosing appropriate M&E strategies. It also has a focus on disaster risk reduction and its overlap with adaptation. Helpfully, this paper provides an in-depth look at indicators with examples and has a broad coverage of the key terms, issues, and gaps in adaptation M&E. However, this means it provides more of a conceptual overview than a hands-on guide (Bours et al. 2014b).
- 3) AdaptME toolkit: This equips practitioners with critical information and guidance with which to devise an adaptation M&E framework that fits their programme, context, and purposes. It is not a directive or comprehensive set of instructions; indeed, the author emphasises that there is no one-size-fits-all approach. AdaptME takes an 'ask the right questions' approach, which enables users to more selectively apply key concepts to their own priorities. It is designed to be flexible; it can be used as the basis for a new M&E system or it can be applied to an existing system or framework to enhance the degree to which it accounts for climate adaptation considerations (Bours et al. 2014b).

- 4) Climate change adaptation monitoring and assessment tool (AMAT): This is a tracking tool to document progress of the entire Global Environment Facility (GEF) Developed Countries Fund / Special Climate Change Fund portfolios and aggregate them in order to report progress at an international level. Each funded project is required to report against at least one specified objective, outcome, and output indicator defined in its menu of options at project approval, mid-term, and at project completion. Since this toolkit is tailored to the GEF, its application in other contexts may be limited, but it provides a good example of how an agency has enabled reporting and aggregation of findings. This approach does, however, skew towards tracking progress against specific indicators rather than a nuanced exploration of what did, or didn't work, and why.
- 5) Participatory monitoring, evaluation, reflection and learning (PMERL): These CARE manuals offer a clear step-by-step guide together with tools, recommendations, checklists, and references for community-based approaches to adaptation programme design, monitoring, and evaluation. Designed to be used by field-level project teams, the materials are useful, practical, and easily understood and applied at the local level. The step-by-step guides are well-written and easy to follow, and while ideally one would build from the previous activity, they can also be used flexibly and selectively. These manuals also highlight the importance of gender mainstreaming within climate change adaptation (Bours et al. 2014b).
- 6) Adaptation made to measure: This toolkit is intended to inform the design and monitoring of climate change adaptation projects, and particularly seeks to equip the reader to take a systematic approach towards developing adaptation projects and results-based systems to monitor them. There is a step-by-step guide, with each stage of analysis illustrated by concrete examples. Each section of the workbook builds upon previous ones, so one must methodically complete each section before being able to continue to the next one. The reader must thus be prepared to invest time and effort into building a detailed framework (Bours et al. 2014b).
- 7) Results framework and baseline guidance: This manual was created to help Adaptation Fund partners design M&E frameworks that are in alignment with AF requirements. However, it may also be useful to other entities because it is a good introduction to the basic components of results-based management frameworks. Those who are interested in approaches to align and aggregate disparate projects and programmes into an overall portfolio would also find this of interest. The main drawback is that it is very difficult to navigate; the manual is well over 100 pages (including annexes) and there is no Table of Contents (Bours et al. 2014b).
- 8) Tracking adaptation and measuring development (TAMD): TAMD offers a 'twin track' framework and toolkit, with track 1 enabling information on how well countries manage climate risk and track 2 assessing how successful adaptation interventions are in reducing vulnerability and keeping development on course. The framework is intended for use across sectors and levels of programming, and demonstrate how the two tracks have an influence on each other in a feedback loop. This framework and toolkit are supported by a follow up paper which delves into indicator selection and use, as well as pilots in five countries with preliminary findings (Bours et al. 2014b).

- 9) **Climate resilience and food security: a framework for planning and monitoring:** This working paper explores monitoring food system resilience to climate change and provides a conceptual framework for strengthening the food security of vulnerable populations at different scales. The framework consists of two 'pinwheels' – one which focuses on context and key factors, and the second on assessing resilience. While very well thought through and flexible, this tool is useful for assessing resilience; it does not offer guidance on developing a full M&E framework that can be used to assess progress of adaptation interventions funded by an agency over time (Bours et al. 2014b).
- 10) **Programme of research on vulnerability, impacts and adaptation (PROVIA):** The PROVIA manual and supporting documents provide perhaps the most comprehensive guidance that has been published to date on assessing climate change vulnerability, impacts, and adaptation. The authors review various M&E approaches, and especially emphasise those M&E tools that focus on learning and reflection. They also provide a decision tree to help users decide on an M&E process and walk the reader through a selection of adaptation M&E tools that they recommend. While the authors are to be commended for managing a large body of material very thoroughly and effectively, this may also be a disadvantage for some audiences as the manual is very long (Bours et al. 2014b).
- 11) **PPCR monitoring and reporting toolkit:** This introduces a standardised logic model and instructions (including scorecards and tables) on how to complete the monitoring process in line with the PPCR requirements. As with other agency-specific reporting directions, these materials from CIF are targeted at a narrow audience of implementing partners. However, it would also be of interest to those seeking an example of a practical overarching results framework at the portfolio level, together with standardised indicators. Because the materials are intended to be used even by implementers who lack monitoring capacity, the directions are extremely clear and include guidance on how to actually collect the required information. However, as the core indicators are pre-defined, there is little or no information on the process of indicator development (Bours et al. 2014b).
- 12) **Monitoring and evaluation frameworks for adaptation to climate change:** This report is a valuable starting point for adaptation M&E because it provides useful insight into some of the most fundamental issues which need to be tackled in establishing an M&E framework for climate change adaptation interventions. While very specific to UNDP, it provides good background on linking portfolio-level goals and objectives to project level goals, objectives, outcomes and outputs (i.e. a traditional logframe) in the context of climate adaption (Bours et al. 2014b).

2.3 Good practice in adaptation M&E method selection and implementation

Since there is no one-size-fits-all approach for designing adaptation interventions, adaptation M&E requires tailored methodologies. In order to select the most appropriate ones, it is important to have clarity about both the purpose of the intervention (the adaptation goal and objective, as outlined in section 1.2) and the purpose of the evaluation (see chapter 4). Ideally, M&E should be considered during the ideation and design phases of the project, not at the end, so that the design of the project and the M&E system are appropriate and complement one another. At the outset, the learning objectives, mechanisms to incorporate the lessons learned into the ongoing project intervention, and means of communicating the lessons learned externally to build the evidence base should be made clear.

It is also important to consider the context in which the intervention is being implemented, as well as the potential challenges that the M&E system may face (see section 2.1), and to choose a methodology that is appropriate to the context and can contend with these challenges. One of the most difficult challenges is that of implementing projects over fairly short time horizons, but wanting to monitor outcomes and impacts that will only manifest over long time horizons. In these situations, being realistic about what data can be collected and what can be said about attribution is important, and making use of Theories of Change, process indicators and process evaluations is helpful.

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As noted in the introduction to this chapter, indicators are a key element of an M&E system. Indicators enable monitoring and tracking of progress, and ultimately the findings in evaluations. Therefore, they need to be chosen carefully, to ensure that they answer the questions about progress and impact, and that the data required is available at the right scale. If used appropriately, indicators can greatly increase understanding of progress and success of a complex adaptation intervention, but measuring progress on indicators alone is not a short cut to a deep understanding of adaptation (Bours et al. 2014c). Despite having a key role in M&E, indicators alone cannot result in good M&E – the project design, methods chosen, and capacity for learning from findings are equally important. Indicators are a means to an end (albeit important), not in an end in themselves.

The next chapter provides information on the types of indicators used in adaptation M&E, guidance on choosing indicators, and examples of adaptation indicators.

3

Indicators to measure adaptation progress

This chapter provides guidance on choosing appropriate indicators for adaptation M&E. It also provides two sets of examples. The first set is of indicators used in adaptation interventions. These are from a repository of adaptation indicators published by GIZ and from the USAID Feed the Future programme, which has resilience mainstreamed into it. This set of examples is intended to give a sense of the kinds of indicators used for adaptation in the agriculture and water sectors, and to show how indicators measuring progress on adaptation are often a mix of ‘adaptation-specific indicators’ and ‘regular development indicators’. The second set of examples consists of five pairs of adaptation and non-adaptation World Bank projects. This set is intended to delve deeper into how projects use a mix of adaptation-specific indicators and regular development indicators to measure progress in adaptation projects.

As described in previous chapters, adaptation is effective when it is mainstreamed into development processes. Indicators play an important role in ensuring that adaptation is, in fact, occurring in mainstreamed interventions, and the interventions are not simply ‘window dressed’ as adaptation projects. To ensure effective adaptation mainstreaming, a combination of adaptation-specific indicators and regular development indicators is important. Regular development indicators include the number of beneficiaries and of women beneficiaries, hectares of land (for an agricultural intervention), kilometres of drainage (for a flooding intervention), and so forth. Adaptation indicators are discussed below.

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Indicators can be disaggregated in a few different ways. These include:

- What the indicator measures (e.g. climate change indicators, which measure changes in climate over time for key trends such as temperature and precipitation; climate impact indicators, which measure the impacts of climate change on biophysical systems and human systems; vulnerability indicators, which measure the degree to which the biophysical or human system is susceptible to the adverse impacts of climate change; climate adaptation indicators, which measure the response to climate impacts through implementation of adaptation actions; and resilience indicators, which measure the ability of a system to absorb disturbances while retaining its same basic structure and ways of functioning) (Ellis 2014). This categorisation is not standard – for instance, see the GIZ categorisation in section 3.2.
- The type of indicator (i.e. outcome indicators, which demonstrate that a particular objective has been met; process indicators, which capture contributions to a long term goal, and measure progression towards an outcome; and output indicators, which are quantifiable measures of what has been achieved). Sometimes the difference between outcome and process indicators depends on the programme objective: for instance, ‘number of people trained’ could be an outcome indicator if the goal of the programme is to train people, but a process indicator if the goal of the programme is wider, and focuses on capacity building (Bours et al. 2014c). Table 1 on page 6 of Bours et al. (2014c) showcases the advantages and disadvantages of process and outcome indicators, and provides examples of each.

- The form of data they utilise (i.e. quantitative indicators, which provide numerical data; qualitative indicators, which provide narrative information; and binary indicators, which have a yes/no answer). Some indicators are more appropriate for some content than others – for instance, adaptation indicators often relate to processes, so they are more likely to be qualitative than climate change indicators or climate impact indicators, which tend to be qualitative (Ellis 2014).

Process indicators are often used to measure adaptation progress because most projects have not reached the point where the outcome of an intervention can be evaluated. Using process indicators provides a sense of whether the ‘direction of travel’ is correct, given the information available at a specific point in time (Pringle 2011). For instance, in the Senegal example in section 1.2, community engagement to ensure equitable and sustainable flood prevention measures could be monitored using the indicator ‘Local flood management committees in Pikine and Guediawaye are engaged in stormwater management activities’.

3.1 Guidance on choosing indicators

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The key to good indicator selection for adaptation is the suite of indicators chosen. It is often most appropriate to use a broad range of different types of indicators for adaptation M&E because of the inherent complexity and uncertainty that underlies many adaptation interventions (Bours et al. 2014c). Especially if adaptation is mainstreamed into development, indicators relevant to the development process or plan will need to be included. Although several indicators are likely to be required to effectively undertake adaptation M&E, they should be carefully selected to match the project design and theory of change and/or logic model.

While there is no standard set of indicators for measuring adaptation progress, there are principles and standards that may be helpful when choosing indicators. For instance, Villanueva (2011) suggests using the ADAPT principles: the indicators should enable Adaptive learning and Dynamic monitoring, and be Active, Participatory, and Thorough. Adaptive indicators reflect the possibility of changing conditions. Dynamic indicators capture the way processes are changing, while active indicators capture actions as opposed to states of being. Participatory indicators are developed by and with the individuals affected by the intervention, and thorough indicators include indicators that capture the possibility of maladaptation and whether and how the intervention is addressing underlying causes of vulnerability (Villanueva 2011).

Another technique to select the most appropriate indicators is by using the SMART test: are the indicators chosen Specific, Measurable, Achievable, Realistic, and Time-bound? (Bours et al. 2014c). The Inter-American Development Bank (IDB) study on indicators to assess the effectiveness of climate change projects shows how they use the SMART framework to arrive at a set of indicators for different types of adaptation projects – direct projects which specifically address climate concerns, additional projects which have a broader development agenda but a clear climate component, and serendipitous projects which have incidental climate benefits without any change in project design, implementation or evaluation (IDB 2012).

Another useful way of testing the utility of indicators is by using standards, such as those developed by the United Nations Programme on HIV/AIDS in Box 3. These standards are a series of questions intended to ensure that indicators are appropriate, can be measured, and ensure that the entire indicator set works well together. It is unlikely that there will be many indicators that will pass every question, but these questions will also highlight the limitations of each indicator, which is helpful to know at the outset.

Box 3 *Standards for Indicators Developed by the United Nations Programme on HIV/AIDS*

- Standard 1: The indicator is needed and useful
 - Q1: Is there evidence that this indicator is needed at the appropriate level?
 - Q2: Which stakeholders need and would use the information collected by this indicator?
 - Q3: How would information from this indicator be used?
 - Q4: What effect would this information have on planning and decision-making?
 - Q5: Is this information available from other indicators and/or other sources?
 - Q6: Is this indicator harmonised with other indicators?
- Standard 2: The indicator has technical merit
 - Q1: Does the indicator have substantive merit?
 - Q2: Is the indicator reliable and valid?
 - Q3: Has the indicator been peer reviewed?
- Standard 3: The indicator is fully defined. Required information includes:
 - Title and definition
 - Purpose and rationale
 - Method of measurement
 - Data collection methodology
 - Data collection frequency
 - Data disaggregation
 - Guidelines to interpret and use data
 - Strengths and weaknesses
 - Challenges
 - Relevant sources of additional information
- Standard 4: It is feasible to measure the indicator
 - Q1: How well are the systems, tools and mechanisms that are required to collect, interpret and use data for this indicator functioning?
 - Q2: How would this indicator be integrated into a national monitoring and evaluation framework and system?
 - Q3: To what extent are the financial and human resources needed to measure this indicator available?
 - Q4: What evidence exists that measuring this indicator is worth the cost?

- Standard 5: The indicator has been field-tested or used operationally
 - Q1: To what extent has the indicator been field-tested or used operationally?
 - Q2: Is this indicator part of a system to review its performance in ongoing use?

- Standard 6: The indicator set is coherent and well-balanced
 - Q1: Does the indicator set give an overall picture of the adequacy or otherwise of the response being measured?
 - Q2: Does the indicator set have an appropriate balance of indicators across the elements of the response?
 - Q3: Does the indicator set cover different monitoring and evaluation levels appropriately?
 - Q4: Does the set contain an appropriate number of indicators?

Source: UNAIDS 2010.

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Bours et al. (2014c) point out that not everything that is useful can be counted. Although quantitative indicators are very useful, so are qualitative ones, especially for complex socio-economic dynamics that underlie vulnerability to climate change and successful adaptation. Qualitative indicators are also critical for telling the whole story and avoiding over-simplification. Pringle (2011) notes that it 'is essential that we monitor what is important in improving our understanding, not only what is measurable', giving the following example: a reduction in insurance claims in a flood prone region may reflect that insurance companies are refusing to insure properties, rather than that properties are better protected as a result of an adaptation intervention under evaluation (Pringle 2011, p. 31).

Although using a few simple indicators is attractively straightforward (such as number of beneficiaries reached), and distilling findings into one or a few catchy numbers is useful to share with policy makers, it is important that indicators reflect the full context and do not result in misleading conclusions (Pringle 2011, Bours et al. 2014c). In order to tell the whole story, Pringle (2011) notes that sometimes it is necessary for the team to consider whether the indicators chosen reflect a particular framing or perception of success, and whether this needs to be altered. For instance, do the perceptions of success of community members need to be better integrated into project design and indicator selection?

Another critical element in indicator selection is data availability. Often, data for the indicators chosen is not available, not available at a given scale, or not available across a specific scale. For instance, in the Kenya example in section 1.2, the project was implemented across several districts. It is possible that the data for the indicator 'public and private advisory agents trained in community climate risk management' would not be evenly and readily available across all districts, especially because it is unlikely that such information is already being collected by a pre-existing M&E system for regular development efforts. Data availability for an indicator may also change over the course of the study period, and this will affect what can be measured and when (Pringle 2011).

The ability to collect data depends heavily on human resources, and technical as well as financial capacity to develop and apply the indicators. Indicators with relative ease of measurability, easy data collection opportunities, and low acquisition costs are much more likely to be easily applied (GIZ 2014). If there is an existing M&E system in place it can also help to align with this, to utilise data that is already being gathered (GIZ 2014).

3.2 Examples of indicators used for adaptation in 2 sectors: agriculture and water

This section provides examples of indicators used to measure adaptation. The first set is drawn from GIZ's '**Repository of Adaptation Indicators**' (GIZ 2014). The indicators presented in this repository are based on regional, national and sub-national M&E systems currently piloted or implemented, which have been reviewed in the GIZ study 'Monitoring and Evaluating Adaptation at Aggregated Levels: A Comparative Analysis of Ten Systems'. These indicators are intended to be representative, not exhaustive, and are a helpful starting point for showcasing the kinds of indicators currently being used in the adaptation space.

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GIZ uses four categories to differentiate the focus of the indicator: climate parameters, climate impacts, adaptation actions, and adaptation results. The first two types of indicators are often used in vulnerability assessments and guide the choice of adaptation intervention:

- Climate parameter indicators: Information about observed climatic conditions that helps track the climatic context within which adaptation strategies are implemented. The indicators are very similar for both agriculture and water resources sectors, such as: change in annual precipitation, or number of hot days.
- Climate impact indicators: Information about the observed impacts of climate variability and change on socioecological systems to help track the climate context within which adaptation strategies are being implemented. Examples from the agricultural sector include: number of hectares of productive land lost to soil erosion, shift of agrophenological phases of cultivated plants, and losses of GDP in percentage per year due to extreme rainfall. Indicators specific to water include: number of households affected by drought, number of people permanently displaced from homes as a result of flood, drought, or sea-level rise, and total length of sewerage and drainage network at risk from climate hazards.

To gauge the effectiveness of adaptation interventions, the following two sets of indicators are used:

- Adaptation action (implementation) indicators: Information to help track the implementation of adaptation strategies. Examples from the agriculture sector include: uptake of soil conservation measures, cultivation of varieties of grapes which like warmth, and percentage of farmers and fisherfolk with access to financial services. Examples from the water resources sector include: number of public awareness campaigns on water efficiency, percentage of population living in flood and/or drought-prone areas with access to rainfall forecasts, and percentage of new hydroelectric projects that consider future climate risks.

- Adaptation results (outcome) indicators: Information to help monitor and evaluate the outcomes of adaptation strategies where outcomes are broadly understood in terms of increased adaptive capacity (often framed as development outcomes), decreased sensitivity to climate stress, or some combination thereof. Examples from the agriculture sector include: percentage of farmland covered by crop insurance, increase in percentage of climate resilient crops used, and percentage of livestock insured against death due to extreme and slow-onset weather events. Examples from the water resources sector include: percentage of poor people in drought-prone areas with access to safe and reliable water, percentage of urban households with access to piped water, and percentage of surface cultivated with drought resistant varieties.

The GIZ repository of indicators also includes a category for capacity building and mainstreaming indicators, which are applicable across interventions focused on a given sector. Unlike the sectoral indicators, almost all of the indicators in this category are definitively about climate or adaptation, and the indicators in this category mostly focus on adaptation action. Examples of indicators in this category include: number of existing meteorological stations per territorial unit in the country, degree of integration of climate change in national and sectoral planning, and number of vulnerable stakeholders using climate responsive tools to respond to climate variability or climate change.

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The repository shows that the indicators used to measure adaptation progress in the agriculture and water sectors are a mix of those that would be used in regular development interventions (for instance, percentage of urban households with piped water could be an indicator used in a sanitation intervention) and those that are adaptation-specific (for instance, percentage of surface cultivated with drought resistant varieties). However, the capacity building and mainstreaming indicators are almost always adaptation-specific, since the capacity being built is specific to enable stakeholders to contend with climate change impacts.

The second set of example indicators is drawn from **USAID's Feed the Future (FTF) programme**. FTF is the U.S. Government's global hunger and food security programme, and its two main objectives are to foster inclusive agricultural sector growth, and improve the nutritional status of women and children. The programme's logic model in Figure 3 shows how increased resilience is a pillar that supports both objectives, and that climate resilience is mainstreamed into this broader development programme. Resilience is one of the programme's six focus areas, and the programme sees resilience as the key to breaking the cycle of poverty that is exacerbated by shocks and stresses that threaten food security, nutrition and well-being.

Figure 3 USAID’s Feed the Future Logic Model



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The FTF programme has a robust M&E system in place, which USAID has used to determine the following measures of success in the 12 target countries: 9 million more people are living above the poverty line, 1.7 million additional households are not suffering from hunger, 1.8 million more children are living free from the devastating effects of stunting (26% reduction), and higher yields – FTF farmers have achieved, on average, maize yields that are 23% higher than the national average and groundnut yields that are 64% higher than the national average (Feed the Future 2017).

The indicators chosen for the intermediate outcome pillars of the logic model are a good example of how adaptation-specific and regular development indicators can be used to effectively measure mainstreamed climate change adaptation. The intermediate result of ‘increased resilience of vulnerable communities and households’ has the following three indicators: (1) depth of poverty, which is the mean percent shortfall relative to the USD 1.25 poverty line; (2) prevalence of households with moderate or severe hunger; and (3) number of US Government social assistance beneficiaries participating in productive safety nets (Feed the Future 2016). These are not adaptation-specific indicators, but as part of the full suite of indicators, they can help represent a picture of decreased vulnerability and increased resilience, especially born out of increased food security.

The full list of indicators covers a wide range of issues, including: women’s dietary diversity, prevalence of exclusive breastfeeding for children under the age of 6 months, number of individuals receiving nutrition-related professional training through US Government supported programmes, the value of new private sector capital investment in the agriculture sector or food chain leveraged by FTF implementation, number of households with formalised land with US Government assistance, number of farmers who have applied improved

technologies or management practices with US Government assistance, and number of people using climate information or implementing risk-reducing actions to improve resilience to climate change as supported by US Government assistance (Feed the Future 2016).

This shows how, for mainstreamed adaptation interventions, the range of indicators is very broad and inclusive. Interestingly, the adaptation-specific indicators are not housed under the intermediate result that focuses on resilience; instead, the climate and resilience indicators noted in the paragraph above, as well as others, are housed in the intermediate result category called 'enhanced human and institutional capacity development for increased sustainable agriculture sector productivity' (Feed the Future 2016). Similar to the GIZ repository, the adaptation-specific indicators are linked to capacity building. This suggests that successful adaptation depends greatly on the capacity of key stakeholders to understand adaptation needs and be able to make decisions differently than if they were regular development decisions.

3.3 Comparison of indicators used in adaptation and non-adaptation projects

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The examples above highlight what adaptation indicators look like when adaptation is mainstreamed into projects and programmes. To further explore what indicators in adaptation projects look like, this section compares five pairs of adaptation and non-adaptation World Bank projects. Annex 1 includes a brief description of each project and a side-by-side comparison of the indicators of the adaptation and non-adaptation projects.

The project pairs were chosen according to the following methodology:

- Project descriptions and indicators were easily accessible on the World Bank website;
- Projects selected as adaptation projects had titles that clearly indicated they focused on addressing climate impacts (they included words such as adaptation, resilience, or vulnerability reduction in the title);
- Projects selected as non-adaptation projects were similar enough to adaptation projects to enable comparison of indicators;
- The full set of projects was geographically diverse;
- The projects were relevant to the sectors of interest (agriculture, water, and disaster preparedness).

The project pairs cover arid land management (two projects in Kenya), watershed management (projects in Pakistan and Bolivia), agriculture and natural resource management (two projects in Yemen), flood management (projects in Argentina and Senegal) and disaster risk reduction (projects in Haiti and Saint Lucia).

Looking across all five pairs of adaptation and non-adaptation projects, there were many regular development indicators that could have been equally usable by both the adaptation and non-adaptation projects. For instance, kilometres of primary drainage system put in

place, number of government ministries connected to a spatial data sharing platform, and bridges rehabilitated or reconstructed under the project are all indicators from the adaptation project set, but could have easily been found in the non-adaptation specific set of projects if they were not combined with indicators that accounted for climate change.

Four out of the five adaptation projects had far fewer than half of the indicators specific to adaptation, with more than half being regular development indicators. The research supports the finding that indicators commonly used to measure development are useful to measure changes in climate-related events, and can be used to assess impact on adaptive capacity (3ie 2010).

The key difference between the adaptation and non-adaptation project indicators is that the adaptation projects included adaptation-specific indicators in addition to the regular development indicators. Examples of adaptation-specific indicators from the projects are: key stakeholders trained in flood risk management, urban climate change resilience, and territorial planning; improved local data sets and capacity to predict regional climate change; and methodology and tool for screening agricultural investment programmes for climate risks. Of all the adaptation-specific indicators, almost all were adaptation action indicators that focus on implementation (see section 3.2). These indicators included both a focus on physical infrastructure and assets, and capacity and awareness building.

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In the example of the stormwater management project in Senegal (see section 1.2), the intermediary results indicators include regular development indicators, such as: primary drainage system is put in place, and a functional operations and maintenance drainage management system. Indicators such as these alone would not help the beneficiaries adapt to worse flooding due to climate change. However, adaptation-specific indicators were also included, such as: key stakeholders are trained in flood risk management, urban climate change resilience, and territorial planning. Presuming that the urban planners responsible for developing the drainage system are one such 'key player', the drainage system will be designed in such a way that it will withstand flooding that is worsened by climate change. Another adaptation-specific indicator in this project is: people reached by an information, education, and communication strategy at both the local and national levels. This kind of adaptation-specific indicator can measure non-infrastructure preparedness aspects of the project.

The fact that the adaptation projects had so many regular development indicators shows that a broad selection of relevant indicators is more important than any specific climate indicator. This is important, because there is an often misguided emphasis placed on indicator selection within the M&E process. Indicators are not the 'silver bullet' to ensuring that interventions are effective. While they play an important function in M&E, they cannot substitute other elements of good M&E, such as thoughtful and context-appropriate intervention design, strong stakeholder buy-in, and feedback mechanisms to ensure lessons learned are incorporated throughout the process.

4

Evaluations to assess adaptation success

The information that has been monitored through the duration of an intervention can be used to evaluate its outputs, outcomes, and impacts. Before beginning an evaluation, it is helpful to clearly articulate the purpose or reasons for undertaking the evaluation, reflect on what is being evaluated and against what, and decide when to do the evaluation for maximum impact. It is also critical to assess assumptions underlying the intervention. It can be very helpful to refer back to the assumptions that underlie the intervention's logic model or theory of change and see whether they are still valid, as well as how they can be tested.

There is often more than one reason for undertaking an evaluation and sometimes these reasons may be conflicting. For instance, although it is generally agreed that learning is critical for improved adaptation efforts, the reality is that investment in learning varies considerably between evaluations. There may be a tension between learning ('what happened and why?') and accountability ('have we done what we said we would?') (Pringle 2011). Being aware of these tensions ahead of time will enable a balanced evaluation approach. Determining the purpose of the evaluation and the unit of comparison can help create a good set of evaluation criteria, i.e. indicators (Pringle 2011).

Pringle (2011) lists the potential reasons for undertaking an evaluation. These include:

- To evaluate effectiveness: To do this, it is essential that the objectives (outputs and outcomes) are clearly specified at the start.
- To assess efficiency: Evaluators may want to determine the efficiency of the intervention including assessing the costs, benefits and risks involved and the timeliness of actions.
- To understand equity: The impacts of climate change will be experienced unevenly, both spatially and temporally, which is an important factor to consider when evaluating the appropriateness and effectiveness of adaptation interventions.
- To provide accountability: There may be a contractual or procedural requirement to undertake an evaluation to ensure that commitments, expectations, and standards are met. Accountability may overlap with efficacy and efficiency considerations.
- To assess outcomes: An evaluation may seek to provide an understanding of the outcomes of an intervention and its impacts. This can be challenging, see sections 2.1 and 4.3 for details.
- To improve learning: Learning should permeate all reasons for undertaking an evaluation: what works and why? However, this objective can sometimes be at odds with other objectives, and is challenging to achieve.
- To improve future interventions: The purpose of an evaluation may be to strengthen future activities and interventions either at the end of a project (to inform future projects) or mid-way through an on-going project.

After clarifying why an evaluation is needed, it is helpful to clearly define what is going to be evaluated. Some interventions focus on building adaptive capacity, and others on adaptation. In reality, most adaptation interventions involve activities relating to both adaptive capacity and adaptation actions, but this distinction may provide a practical way of thinking about what is being evaluated and how to evaluate it. It also helps to clarify whether the evaluation focuses on a specific sector or discipline, and if so, whether data sources or standards that might be applicable to the evaluation already exist (Pringle 2011).

While doing this, it is also helpful to identify what the results will be measured against. The comparison of findings can be against the objectives of the intervention, against an emerging understanding of good adaptation, or against a baseline.

Evaluations can be done at different times during and/or after the course of an intervention. A formative evaluation is done while the intervention is still underway, and the findings focus on improving the interventions. Formative evaluations are often associated with ex-ante and mid-term evaluations. In contrast, a summative evaluation seeks to judge the overall effectiveness of an intervention, usually after a project or programme has been completed (ex-post) (Pringle 2011).

Clear communication during and after an evaluation is critical for ensuring learning. Communication can be achieved in many different ways, including written reports and public events. Deciding on a purpose for communicating and identifying the audience is the first step, followed by understanding the audience's preferred way of receiving and utilising information. However, communication is not only about sharing findings from the evaluation and should go both ways: mechanisms for gathering feedback are also important, especially during formative evaluations (Pringle 2011).

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This chapter first describes common types of evaluations used in the adaptation field (section 4.1). Section 4.2 then examines three portfolio evaluations, from the World Bank, USAID's Feed the Future programme, and UNDP's climate adaptation programme, to see how they dealt with the M&E challenges described in section 2.1. It ends with section 4.3, which includes brief examples of the kinds of results found in adaptation impact evaluations. These examples show how challenging it is to make quantifiable statements of impact for adaptation interventions.

4.1 Types of evaluations

This section provides an overview of the types of evaluations that can be undertaken during and/or after an intervention has been implemented.

Process evaluations are used to document how the implementation of an intervention is progressing. Overarching questions for a process evaluation include 'How well has the program been established?', 'How is the program implemented?' and 'Is the program implemented well?' (Turner et al. 2014, p. 15) to ensure that the programme operation is adhering to the programme design. A process approach implies continuous monitoring and adjusting, as required, throughout the course of the intervention.

Within adaptation, a process-based evaluation methodology seeks to define the stages in a process that will lead to the best end point without specifying what that point is at the outset. Within each stage, indicators for adaptive capacity are developed. It is, therefore, an upstream approach which builds the capacity to manage a variety of outcomes but does not define what specific outcomes will emerge – and therefore process evaluations do not

identify outcome indicators (Villanueva 2011). Process evaluations enable project managers to identify and implement the most appropriate adaptation options in a dynamic way, using the continuous feedback and correction cycles that this approach entails (World Bank n.d.).

DEFRA, the UK Department for Environment, Food and Rural Affairs, used a process evaluation framework to assess progress of local level authorities on adaptation. The framework measures adaptation progress over five levels, each with criteria and evidence required to meet the criteria. For example, one criterion (i.e. indicator) is 'Undertaken local risk-based assessment of significant vulnerabilities and opportunities to weather climate, both now and in the future', with the evidence being that local risk assessments are undertaken, significant vulnerabilities and opportunities are identified, or senior management are aware of the findings of the risk assessment so that they can take action (Villanueva 2011, p. 27). This shows how, in a process evaluation, progress is measured against benchmarks as opposed to outcomes. However, a limitation of process evaluations is that the outcomes of the processes are not captured. To measure long-term impacts, outcome indicators will be required (Villanueva 2011).

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Impact evaluations make it possible to clearly attribute changes to an intervention, or at least quantify the contribution an intervention has made to these changes. Impact evaluations account for all changes: expected and unexpected, positive and negative. In addition to providing information on the changes, impact evaluations link these changes to their causes. This establishment of causality is an important element of these evaluations, and critical to answering the basic question that underpins impact evaluations: 'what would have happened in the absence of the intervention?' To answer this question, a counterfactual assessment is required (GIZ 2015).

Impact evaluations have sophisticated designs and involve collecting a considerable amount of empirical data. They are useful when trying to ascertain whether a new or innovative approach is working, or whether there is adequate evidence that a specific intervention is working well in a number of different contexts so that scaling up is appropriate (World Bank n.d.). They can also improve the evidence base to guide policy makers. Better information about what works and what doesn't will support the effective allocation of adaptation funds (3ie 2010, GIZ 2015).

For instance, using the Kenya example from section 1.2, an impact evaluation could shed light on whether the ASAL development plans and projects that incorporated climate change increased the resilience of communities in the districts where the project was implemented (accounting for their diverse contexts), in comparison to communities in districts where the project was not implemented. If the evaluation showed good impact, the project could be scaled to additional ASAL districts in Kenya.

However, there are usually limited situations in which impact evaluations are the best course of action. They require specialised expertise, are expensive, and take years to implement (CIF 2014a). The long time horizon of potential climate change impacts and the relatively short time frames for most adaptation projects make impact evaluations challenging

(GIZ 2015). Moreover, many climate policies are at a relatively early stage of implementation, which makes assessing impact challenging (3ie 2010). Many adaptation initiatives have so far focussed on governance and institutional processes, which are not suitable for impact evaluation (such as capacity building exercises, needs assessments and policy development) (3ie 2010).

The key difference between process and impact evaluations is that process evaluations do not pre-determine the types of outcomes that the intervention will produce, and therefore do not make use of outcome indicators. Process evaluations focus more on 'how well an intervention is functioning' while impact evaluations focus more on the 'what has been achieved as a result of the intervention'. In order to address questions around 'why an intervention worked, or did not', theory-based evaluations can be helpful.

Theory-based evaluations involve using an explicit theory of change to examine all the assumptions that underlie the causal results chain of an intervention, from inputs to outcomes to impact. They are especially useful for adaptation because they enable evaluators to embrace its inherent complexity. More than most other evaluation approaches, they pay explicit attention to the context of the intervention, acknowledging how contextual factors can help or hinder success. The theory of change can be used to test all the assumptions in the causal chain of results against what is observed to have happened, and delve deeper into the factors that contributed to the success or failure of each particular causal link in the theory of change.

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Realistic evaluations are a type of theory-based evaluations. They focus on the underlying mechanism within a specific context, where mechanisms are the element of the intervention that triggers that change to occur (Centre of Excellence for Evaluation at the Treasury Board of Canada Secretariat n.d.). In this way, realist evaluations, and theory-based evaluations more generally, focus on the 'way in which' certain interventions are expected to yield specific outcomes. This differs from the 'how' that is the focus of process evaluations because it focuses on how the intervention will achieve the outcome, not on how well the intervention is being implemented.

Real time evaluations are not based on a specific methodology like the types of evaluations described above. They are notable for when they are undertaken. Their premise is that information about what is working, how, and why, is most useful during the course of the intervention. Real time evaluations do not mean that the information is available immediately, but rather that the findings can be timed to coincide with key intervention milestones or decision points, with the end goal that the intervention will be more successful. By their nature, real time evaluations have a strong learning orientation. They therefore have clear potential to add value to adaptation initiatives, the majority of which are still in the process of determining how best to fund and implement successful adaptation at scale.

Real time evaluation focuses not only on gaining knowledge but on applying findings from the evaluation, and there is no standard way of applying the lessons learned – it depends on the organisation's ability to utilise the findings and itself adapt. They are sometimes also known as or associated with formative, participatory, and developmental evaluations, all of which typically integrate the fundamental concepts behind real time evaluation (CIF 2014b).

The most suitable circumstances for undertaking a real time evaluation are: when a clear learning opportunity exists (a reason to learn, an incentive, and when there is a learning culture) and when there are realistic expectations about improvement, since there are no guarantees of improvement, and when it does occur it tends to take time. A limitation is that the analysis may not be as rigorous as that in a summative evaluation and it is often difficult to generate evidence that will predictably lead to demonstrable results (CIF 2014b).

The Asian Development Bank (ADB) conducted a real time evaluation of its initiatives to support access to climate finance in 2014. The evaluation notes that “Rather than wait several years to evaluate the initial programme of transformative climate change interventions, ADB decided it would be prudent to obtain evaluative feedback at this early stage of providing ongoing support. The evaluation is designed to contribute to the identification of options for improving ADB’s approach to mainstreaming support for climate change, and to the design of future programmes and interventions” (ADB 2014, p. 2). A formative, learning-oriented real time evaluation is a good fit for this evaluation purpose.

Evaluations can take place at different levels: at the project, programme, sector, portfolio, national and international level (see the pyramid of adaptation evaluation in ‘Desk Review: Evaluation of Adaptation to Climate Change from a Development Perspective’) (IDS 2008). The following section highlights a selection of portfolio evaluations that have been done using different evaluation methodologies.

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4.2 Examples of how evaluations contend with the challenges of adaptation M&E

This section provides insight from three portfolio evaluations into the question: how have these evaluations contended with the challenges of undertaking monitoring and evaluation of climate change adaptation interventions? These challenges are outlined in section 2.1. This section does not focus on the findings of the evaluations – whether or not the interventions did achieve their adaptation aims – but instead on how the evaluation was organised, how adaptation success was framed, the methods that were used, and the kinds of recommendations provided.

The three evaluations considered below are an assessment of the World Bank’s experience on climate change adaptation, USAID’s Feed the Future programme, and a realist meta-analysis of evaluations of nine UNDP climate change adaptation programmes. These reports were chosen because they represent different degrees to which adaptation has been mainstreamed. The World Bank portfolio is very diverse and even includes projects not labelled as adaptation but deemed by the evaluators to have adaptation relevance. The Feed the Future programme has resilience mainstreamed into its theory of change, but the evaluation had a challenging time identifying and evaluating adaptation-specific components. The UNDP review focused on adaptation but included nine different programmes in nine different countries, and these were some of the first evaluations of adaptation programmes done by UNDP, so the extent and treatment of adaptation was not even.

Adapting to Climate Change: Assessing the World Bank Experience: The World Bank's Independent Evaluation Group (IEG) produced an assessment of the World Bank's experience with climate change adaptation (IEG n.d.). This notes at the outset that adaptation is a very broad agenda and that IEG had difficulty defining the scope of the evaluation. Ultimately, it was structured around two key priorities found in adaptation literature and practice: win-win adaptation strategies that contend with vulnerability to current climate variability as well as future climate change (because these are critically linked with development efforts), and strategic decisions that need to consider climate change at the risk of locking in vulnerability over the long term.

The evaluation poses three main learning questions:

- Dealing with climate variability: What can be learned from past and ongoing efforts to deal with adverse climate, climate variability, and climate extremes? The inquiry centers on disaster risk management and agriculture, two fundamentally climate-driven sectors.
- Factoring climate change risks into investment projects: Under what circumstances is it most important to incorporate climate change risks into the design and appraisal of long-lived investment projects? To what extent, and how, is this done?
- Anticipating climate change: What are the lessons from efforts explicitly aimed at adaptation to climate change at the national and regional level? How should development practice change, now that the need for adaptation is better understood?

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The evaluation also posed an accountability question: How has the Bank Group performed against climate adaptation goals incorporated in the 'Strategic Framework for Development and Climate Change'?

The evaluators included all World Bank projects and programmes that touched upon climate variability, even if these were not labelled as adaptation. It focused on two climate-relevant sectors: agriculture and disaster risk management, with water being a cross-cutting theme across both. The evaluation distinguished four types of adaptation efforts and these had different evaluation methodologies that were most appropriate. Table 2 is a partial replication from a table in the evaluation that outlines the types of adaptation efforts and most appropriate corresponding evaluation methods.

Table 2 *Partial reproduction of Typology of Evaluation Approaches to Adaptation Activities*

Type of Activity	Scope of Assessment	Type of Assessment
Adaptation to chronic climate variability: water stress, flooding, and drought that occur every few years or more often.	Outcome and impacts of completed or long-running activities: adaptation 'analogs'.	Impact assessment and sustainability (longevity); objective oriented assessment of relevance, efficacy, and efficiency; assessment of robustness of design to climate change.
Adaptation to extreme events: infrequent but severe droughts, floods, heat waves, and storms, that occur every few decades or less often.	Project and programme design.	Quality of climate vulnerability analysis; design relevance and logical framework; appropriateness of use of climate projections; achievement and cost-effectiveness of outputs and intermediate outcomes.
Adaptation to long-term, transformational change: such as ecosystem loss, changes in agroclimatic regime, and flooding of islands and coasts.		
Capacity building for adaptive institutions.	Outputs and intermediate outcomes.	For example: has capacity been built and used; is information reliable and is it being appropriately applied; are plans being implemented?

Source: IEG n.d.

As the table shows, evaluation of the shorter-term and more concrete activities that contend with chronic variability focused on outcomes and impacts, and the research methods were oriented towards relevance, efficacy and efficiency. The evaluations of the longer-term, more complex activities that contend with extreme events, transformational change, and capacity building focused on programme design, outputs and intermediate outcomes, and included more qualitative research methods.

Another key input to effective long-term monitoring and evaluation is the World Bank's results framework for climate change. The evaluation lists recommendations for improving the results framework from an adaptation perspective, namely by including indicators that are more directly focused on vulnerability, resilience, and capacity building. The suggestions cover issues such as: measures of household vulnerability and resilience which can be implemented using surveys by phone and computer-assisted interviewing techniques, and measures of water use and depletion which can be monitored using remote sensing paired with ground measurements (IEG n.d.).

In addition to improving the results framework for monitoring, the evaluation findings include a list of issues the World Bank needs to monitor better in order to promote more effective and equitable adaptation. For instance, as households diversify their livelihoods and sources of income, to what extent do they become more climate resilient? How much

does index-based agricultural insurance improve household consumption and resilience? Are ecosystem-based adaptation interventions sustained over time, and if so, do they achieve their adaptation goals? (IEG n.d.). These kind of questions show that, although the World Bank has a strong development and increasingly mainstreamed adaptation portfolio, many questions about outcomes and impacts remain.

Feed the Future Global Performance Evaluation Report: USAID's Feed the Future (FTF) programme is a whole of government initiative that includes 11 US government departments and agencies to reduce the prevalence of hunger and poverty in 19 focus countries. The programme's two main objectives are inclusive agriculture sector growth, and improved nutrition for women and children. Resilience to climate change impacts is mainstreamed into FTF – it is one of the programme's six focus areas, and the programme sees resilience as the key to breaking the cycle of poverty. See section 3.2 for more details on FTF programming and the indicators used to monitor resilience in the programme.

The purpose of the global performance evaluation was to provide both a formative and summative assessment of the FTF's programme's progress and achievements thus far, for both accountability and learning. It took a mixed-method approach, using both quantitative and qualitative methods and data that were triangulated to ensure validity; these included surveys, interviews and feedback from the FTF Monitoring System. While not focusing on impact, it did examine the extent to which the programme has reached its goal of reducing the prevalence of poverty and undernutrition by an average of 20% in the areas where it was implemented (USAID 2016a).

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The evaluation used 12 questions to guide the research, falling into four broad categories: questions about how an intervention had been performed (e.g. 'How have value chain approaches been applied and what have been the successes and challenges of focusing resources on strategic and limited value chains?'), how and to what extent an intervention had been implemented (e.g. 'How and to what extent have Feed the Future interventions, both Mission- and centrally-managed, helped build human and institutional capacities for the agricultural and nutrition/health sectors?'), how well an intervention had performed (e.g. 'How well has the initiative leveraged private sector participation to support agriculture and nutritional outcomes?'), and what FTF's contribution to a larger outcome was (e.g. 'How well is Feed the Future promoting policy reform at the national and regional level, including implementation of policy reform?') (USAID 2016a, pp. 2-3).

A limitation acknowledged in the evaluation is the time lag between the design of activities and their implementation, and between implementation and receiving results. The evaluators estimate this second lag to be about five years – and they caution that the evidence that underpins the evaluation findings are not only partial, but also likely out of date (USAID 2016a). Another limitation of the evaluation was a lack of sufficient data points in the FTF Monitoring System specifically, and a lack of data broadly. To gather additional data to fill the gaps, the evaluators administered surveys. When data were too biased, these were used for triangulation purposes only (USAID 2016b).

Since adaptation and resilience are integrated into FTF and not treated as a standalone issue at all, the evaluators did not mention how they addressed resilience. However, while their overall findings were promising, in that FTF had made significant contributions towards improved agricultural productivity and engagement with various actors, they noted that the programme needs to re-assess how to best address resilience and the needs of the poorest and most vulnerable people (USAID 2016a). This indicates that measuring success specifically on the resilience components of FTF has been challenging and, thus far, not done to a point that enables resilience-specific findings.

A Realist Review of Climate Change Adaptation Programme Evaluations – Methodological Implications and Programmatic Findings: The Independent Evaluation Office of UNDP undertook a realist review of nine UNDP climate change adaptation project or programme evaluations from nine different countries. Therefore, this is not a traditional portfolio evaluation, but a meta-analysis of the programmes' evaluation reports. This review was chosen to be included in this paper for two reasons: first, realist evaluation is interesting for adaptation because it considers the mechanisms explaining why interventions do or do not work (see section 4.1 for more information on realist evaluations), and second, the nine country programmes provide a wide range of handling adaptation.

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One way in which this review contends with the challenges of adaptation M&E is in the choice of methodology itself. A realist approach was chosen because it is suited to evaluating complex programmes with different causal mechanisms operating in various contexts, and when there is high causal uncertainty (UNDP 2015). To identify whether outcomes (O) were achieved, a realist evaluator examines the underlying context (C) and mechanisms (M), which are the ways in which interventions create change. A realist approach is 'all about hypothesising and testing CMO configurations' (UNDP 2015, p. 4). A realist approach does not result in a static diagnosis of whether or not a programme is working, but rather provides a means to determine how and under what conditions a programme would work (UNDP 2015).

The analysis used four evaluation criteria – relevance, effectiveness, efficiency, and sustainability – to answer the following key questions:

- What are the important 'regularities' (outcomes) recognised by the evaluators of the adaptation programmes for each evaluation criterion?
- What are the underlying mechanisms that increase or decrease those regularities?
- What are the contextual conditions that necessarily enable or foster the mechanisms to generate desired outcomes?

Using these criteria and key questions the evaluators constructed CMO configurations for the four criteria. One of their limitations was that they could only create CMO configurations within each of the four criteria, not for each of the interventions in each of the programmes. Therefore, the term outcome as used here does not translate into the outcomes expected from achieving adaptation programme goals. Rather, outcome is used to represent the key components required for achieving a high or low level in the evaluation criteria. For example, for the efficiency criterion, the evaluators tried to identify the outcomes (key components) that may enhance the level of efficiency, under what

circumstances, and using what underlying mechanism (UNDP 2015). Their key components of each criterion are listed in Table 3.

Table 3 Key components for evaluation criterion of UNDP Realist Evaluation

Criteria	Key components
Relevance	Community/district, government, donor/global level alignment and relevance.
Efficiency	Financial execution, programme management, staff hiring and retention, stakeholder involvement.
Effectiveness	Adaptive capacity, adaptive measures, mainstreaming, awareness raising.
Sustainability	Long term adaptive capacity, adaptive measures, initiatives and replications, long-term stakeholder engagement, mainstreaming.

Source: UDP 2015.

Two examples of the CMO configurations are presented below – the first for the effectiveness criterion, and the second for the efficiency criterion.

Figure 4 Reproduction of CMO Configuration for Effectiveness Criterion

CONTEXT	MECHANISM	OUTCOME
Specifically identified types of participants are well aware of the climate risks + Specific types of skills that they need to acquire are clear to them	Training and transfer of needed techniques and practices for the relevant people facilitate these skills, techniques and knowledge to be applied and used	+ High level of adaptive capacity + High level of utilisation of adaptive measures

Source: UNDP 2015.

Figure 5 Reproduction of CMO Configuration for Efficiency Criterion

CONTEXT	MECHANISM	OUTCOME
A high level of demand on jobs in international development and the domestic market +	Delayed recruitment process and relatively short programme duration make hired staff lose their work and career motivation	= High staff turnover rates

Source: UNDP 2015.

When considered together, these nine CMO configurations provide a sense of the contextual conditions that foster successful adaptation, key programme theories and the mechanisms that cut across programme activities, and both positive and negative patterns to learn about not only what was working but also what facilitated learning from failures (UNDP 2015). To ensure actual use of the evaluation findings, the evaluators created summary tables listing the contextual conditions required for different mechanisms. These can help implementers understand what works, how it works, and under what conditions (UNDP 2015).

Broadening out from the review of the three portfolio evaluations described above, in a review of international and donor agency portfolio evaluations, Bours et al. note that there seems to have been an evolution in adaptation portfolio evaluations. Earlier (2009-2012) evaluations were often unable to contain robust conclusions because data were scattered or incoherent and 'there were very few such strong and to-the-point indicators. Moreover, none of these indicators related to each other across projects, making it nearly impossible to aggregate data at the fund level' (Bours et al. 2014a, p. 6). Bours et al. note that as the field of adaptation has progressed, interventions are better designed and monitored, which in turn enables more recent evaluations to make more specific and targeted recommendations about the interventions evaluated (Bours et al. 2014a).

Despite advances in adaptation M&E, it is still very challenging to be precise about the impacts of adaptation interventions. This is due, in large part, to the many challenges remaining (see section 2.1). Section 4.3 provides a brief overview of the kinds of information available about adaptation impacts in two sectors, and the factors that limit what can be said about these impacts.

4.3 Insight into adaptation impacts

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The available literature suggests that it is challenging to know whether and how much the needle is moving on adaptation progress. This has mainly to do with the vast array of interventions: adaptation efforts take place at various scales – including project, programme, and country – on a diverse range of topics – such as agriculture, water, and land use – and in a diverse set of ways – such as capacity building, technological changes, and shifts in livelihoods. Besides this variation among adaptation interventions, there is no standard definition of adaptation success, no standard method or set of indicators to evaluate this, and data collection is fragmented.

While we cannot describe the exact impact of adaptation, several proxies exist to understand progress made, for instance the amount of funding dedicated to climate change adaptation, or the degree to which adaptation is mainstreamed into development planning and implementation. Another source of information of impacts are evaluations, and this section showcases examples of the kinds of information available from different types of evaluations. The examples below offer a brief look at how findings on adaptation impacts from portfolio evaluations, impact evaluations, and country evaluations are presented. They focus on two sectors: water and agriculture.

Example of adaptation impact information from portfolio evaluations: Assessing the World Bank's experience with adaptation, the Independent Evaluation Group (IEG) is able to make only generalised statements. For instance, on the topic of rainfed agriculture, it writes, 'Some evidence suggests that sustainable land and watershed management projects have boosted incomes in such areas. Resilience benefits are *presumed*, but must be verified ... There has been *some* success with drought mitigation and relief projects, but weather index insurance for households has not yet fulfilled hopes that it could be a major risk

management tool. In irrigated areas, new techniques for monitoring actual water consumption *may provide a tool for institutions to manage water ...*' (IEG n.d., p. xix) (italics by author for emphasis). In part, this is because at the time of this evaluation the World Bank lacked a comprehensive, outcome-oriented results framework for adaptation (IEG n.d.) but also because identifying adaptation impacts is inherently challenging (see section 2.1).

Example of adaptation impact information from impact evaluations: Oxfam implemented an adaptation project intended to improve the ability of small-scale producers in north-western Nicaragua to adapt to climate change. Project activities included training on improved techniques for crop production, information on selection and storage of seeds, and livestock management. It undertook an impact evaluation to assess the project's impact on direct beneficiaries, as well as indirect beneficiaries from the same local cooperatives.

The evaluators used a quasi-experimental design and found that both direct and indirect beneficiaries successfully improved agricultural practices and diversified the crops they grew, increased tree planting, and increased their involvement in risk management and emergency preparedness committees. Only the direct project beneficiaries had improved understanding of climate change, and neither group showed any evidence of changing saving patterns, accessing remittances or state support, or storing grain differently.

| 53 | The review revealed the need to improve strategies to achieve indirect outcomes, and the need to link women's empowerment with resilience-building efforts (Oxfam 2015). Again, the findings are shared in fairly generalisable terms, such as 'improved' and 'increased'.

Example of adaptation impact information from country evaluations: The World Bank provides funding and technical assistance to countries to increase their ability to adapt. The assessment of its experience with adaptation shows that ongoing drought-management efforts in countries such as Kenya and Ethiopia have created strong institutions for drought mitigation and relief. For instance, in Ethiopia, the Productive Safety Net Project has reduced the period of food insecurity by 0.9 months for households affected by drought (IEG n.d.).

Only in a few instances can the actual impact of an intervention be measured with such precision. Most evaluations can clearly outline why a choice of an intervention was made, and what the hypothesis for success is – for example, improved agricultural practices will result in higher yields and that will increase the income and well-being of a given family, which will increase their ability to withstand shocks and stresses due to climate change. But only in a few instances is the actual degree of increased adaptive capacity measured.

Impacts are especially difficult to quantify or describe well in mainstreamed adaptation interventions. For example, the evaluators of the Sida decentralised evaluation on resilience, risk and vulnerability write: "This review cannot draw verifiable conclusions about the quality or even the quantity of mainstreaming of risk, resilience and vulnerability concerns in Sida's overall development portfolio. There are, however, indications that mainstreaming has been very uneven" (Sida 2012, p. 17).

In some cases, assessing the degree to which adaptation has been mainstreamed is difficult because adaptation has been only superficially added into development programming. The authors of a Sida portfolio evaluation observed that although adaptation concepts had been included in Sida's programming, and the right words were used, 'in many cases these components have not been accompanied by a fundamental rethinking of strategy and practice' (Bours et al. 2014a, p. 9). Consequently, the results framework lacks clarity on how to unpack these adaptation aims and how to hold development actors accountable for their success (Bours et al. 2014a).

This 'fundamental rethinking' seems critical for effective mainstreaming of adaptation into development and for evaluating the impact of such integrated efforts. As noted throughout this report, adaptation often entails activities that are already undertaken as part of development efforts, such as raising awareness and community participation. The difference therefore lies in how problems are defined, what strategies are selected, and how priorities are set – not in implementing solutions (McGray et al. 2007).

5

Conclusions and recommendations

This report provides an overview of the key concepts in adaptation, and describes what mainstreamed adaptation can look like (chapter 1). It lays out the challenges of the M&E of adaptation, and some of the methods and techniques available (chapter 2). It offers a view into the types of indicators used to measure progress for adaptation interventions (chapter 3), and into the types of evaluations available for assessing adaptation impact (chapter 4). This chapter highlights some of the key findings from the report by providing recommendations for monitoring and evaluation of climate change adaptation in development interventions.

Mainstreaming adaptation enables systemic and dynamic climate resilient development:

It is critical to ensure that adaptation is not a collection of one-off, stand-alone and potentially small-scale efforts. Embedding and sustaining adaptation within a broader development goal and integrating it into development plans and processes, changes the way development is done. At the same time, mainstreamed adaptation protects development goals from the negative impacts of climate change. Seeing development, and the effort of mainstreaming adaptation, as an ongoing and dynamic process as opposed to a single, static outcome, will enable the appropriate choice of M&E methodologies.

M&E can help ensure good adaptation mainstreaming: Mainstreaming adaptation into development is needed to ensure that climate change does not undermine development progress, and to ensure that the scale of adaptation matches future climate change impacts. If they are not well thought-through, mainstreamed adaptation projects risk being standard development projects with some adaptation elements as ‘window dressing’. Therefore, when developing or funding mainstreamed interventions it is critical to use a theory of change that makes the underlying assumptions explicit. Being clear about how the adaptation goals and choosing the right suite of indicators to ensure that progress on the adaptation-specific elements of the project can be monitored.

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Adaptation-specific indicators in mainstreamed adaptation focus on climate and capacity:

The indicators that diverge most in adaptation mainstreamed and non-mainstreamed development projects are those focusing on climate impacts and on capacity building. While the interventions themselves may not be very different (for example, building drainage infrastructure in the Senegal example from section 1.2) mainstreamed adaptation projects incorporate climate projections (in the Senegal example to ensure that the drainage can withstand increased sea level rise and flooding) and build the capacity of key stakeholders to plan for and manage climate impacts on urban infrastructure.

Indicators alone cannot provide insight into adaptation success: There is a tendency to focus on indicators and treat them as ‘silver bullets’ for knowing whether an adaptation intervention is successful. While indicators play an important role in M&E, the most appropriate suite of indicators cannot be developed without a strong and thoughtful intervention design. Evaluations yield much stronger findings if the indicators are well chosen, and the appropriate data have been gathered. Ultimately, if the M&E system does not result in learning, it has lost a critical opportunity to move the needle on adaptation. Learning during the intervention is important for improvement during implementation. To this end, formative and real time evaluations can be very useful. Learning after the

intervention, by sharing afterwards what worked, how, and why, is important for improving the evidence base for adaptation.

M&E needs to be fit-for-purpose: As this report shows, there are many appropriate methodologies, indicators, and types of evaluations to address the challenges of adaptation M&E. This diversity makes it possible to fit the M&E system to the specifics and the context of the adaptation intervention. For example, there is no single indicator that should be used across all adaptation projects, and not all adaptation interventions are appropriate for an impact evaluation. While fit-for-purpose M&E will enable the best findings and opportunities for learning, it is challenging because it requires a fair amount of effort to create the M&E system for each project, programme or portfolio. In addition, it begs the question of how to aggregate findings of adaptation progress across a portfolio or policy.

Understanding why interventions work is as important as understanding what works: Given the challenges of adaptation M&E, including uncertainty of climate impacts, long time horizons, and attribution, it is difficult to estimate (especially in quantifiable terms) the impact of a given adaptation intervention or group of interventions. Therefore, while there are often guidelines on good adaptation practice, international experiences with adaptation to date provide little detail on how adaptation worked in practice over the long term, and which mechanisms attributed to results. Impact evaluations are a useful albeit challenging tool, from which the adaptation field should not shy away. However, the situations in which an impact evaluation is appropriate and possible are limited. While impact evaluations provide a strong case for whether and how adaptation interventions are working, it is equally important for evaluations to explain why an intervention works. To this end, other methods, such as Realist Evaluations, may help build the evidence base for adaptation.

Annexes

Annex I Indicators used in adaptation and non-adaptation projects

This annex offers a comparison between five pairs of similar adaptation and non-adaptation World Bank projects. It provides insight into the kinds of indicators used to measure progress on adaptation interventions, and how these differs from indicators measuring standard development projects. The methodology for choosing these projects, as well as findings from the comparison, are outlined section 3.3. The names of each project include hyperlinks to the relevant project page on the World Bank website for further information.

Two types of indicators are included for each project: Project Development Objective indicators, and intermediate-level results indicators. The World Bank’s Results Framework and M&E Guidance Note (2013) notes that: PDO level result indicators (outcome indicators) are intended to measure the uptake, adoption, and use of outputs by the target group within the project period, and intermediate results or outcome indicators serve to track progress toward achieving the development objectives until the final project outcomes are attained (these may also measure progress in project outputs).

The five project pairs are as follows:

Non-Adaptation Project	Adaptation Project
Arid Lands Resource Management Project Phase Two	Kenya: Adaptation to Climate Change in Arid and Semi-Arid Lands (KACCAL)
PK Balochistan Small Scale Irrigation Project	Bolivia Climate Resilience – Integrated Basin Management
Rainfed Agriculture and Livestock Project	Agro-biodiversity and Adaptation
AR APL1 Urban Flood Prevention and Drainage	Stormwater Management and Climate Change Adaptation Project
Haiti Emergency Bridge Reconstruction & Vulnerability Reduction Project	Saint Lucia Disaster Vulnerability Reduction Project

Basic information	Non-adaptation project	Adaptation project
<p>Country: Kenya.</p> <p>Climate concern: drought.</p> <p>Sector: natural resource management.</p>	<p>Arid Lands Resource Management Project Phase Two</p> <p>Brief description of the projects</p> <p>The project aims to build the capacity of communities in the Arid Districts of Kenya to better cope with drought. The project has three components: (1) the Natural Resources and Drought Management Component aims to mitigate the risk posed by drought and other factors by strengthening and institutionalising natural resources and drought management systems; (2) the Community-Driven Development component will foster development capacity at the community level and below to empower communities to take greater charge of their own development agenda and take responsibility for the development choices made; and (3) the Support to Local Development Component aims to foster a conducive enabling environment in the arid lands to allow the population to break out of the prevalent survival-relief continuum into a positive development agenda leading to economic growth and reduced dependence on outside intervention.</p>	<p>Kenya: Adaptation to Climate Change in Arid and Semi-Arid Lands (KACCAL)</p> <p>The Project Global Environmental Objective (GEO) is to improve the ability of participating counties and communities in the arid and semi-arid lands to plan and implement climate change adaptation measures. This would be achieved through support to: (1) strengthen climate risk management and the natural resource base related knowledge; (2) build institutional and technical capacity for improved planning and coordination to manage current and future climate risks at the county and national levels; and (3) invest in communities' priorities in sustainable land and water management and in alternative livelihoods that help them adapt to climate risk.</p>
	<p>Project development objective indicators/</p> <p>Decreasing proportion of people in each ASAL district assessed as needing free food aid, normalised by severity of drought.</p> <p>Reduced time lapse between reported stress and response, including recovery time.</p> <p>Improved child nutritional status over time, normalised by severity of drought.</p> <p>Increased number of people with access to social services.</p> <p>Strengthened voice of people from project districts in local and national development, as shown through reflection of arid lands concerns in the IP-ERS and other national level policies.</p>	<p>Number of District management plans with concrete climate risk management activities reflected in the budget.</p> <p>Percentage of Community adaptation projects rated satisfactory or better by participating communities.</p>

Basic information	Non-adaptation project	Adaptation project
	<p>Arid Lands Resource Management Project Phase Two</p>	<p>Kenya: Adaptation to Climate Change in Arid and Semi-Arid Lands (KACCAL)</p>
	<p>Intermediate results indicator/s</p>	
	<p>Drought Management System in place and functioning at district and national level.</p>	<p>Climate risk profiles developed and used for district management plans.</p>
		<p>Methodology and tool for screening agricultural investment programmes for climate risk developed.</p>
		<p>Public and private advisory agents trained in community climate risk management.</p>
		<p>Percentage of Kenya Agriculture and Agribusiness Project, sub-projects in the Participating Districts screened for improving response to climate risk.</p>
		<p>Public and private sector investments rated satisfactory or better by beneficiaries.</p>
		<p>Community Action Plans with concrete climate risk management activities reflected in the budget.</p>
		<p>Community adaptation micro-projects developed and implemented.</p>
		<p>Direct project beneficiaries.</p>
		<p>Female beneficiaries.</p>

Basic information	Non-adaptation project	Adaptation project
<p>Countries: Pakistan and Bolivia.</p> <p>Climate concern: strengthening capacity for adaptation, improving information systems.</p> <p>Sector: water resource management.</p>	<p>PK Balochistan Small Scale Irrigation Project</p> <p>Brief description of the projects</p> <p>The objectives of the Balochistan Small Scale Irrigation Project for Pakistan are: (1) to restore and increase water storage in the Band Khushdill Khan (BKK); (2) to increase water productivity through a combination of engineering, management and agricultural measures in the Pishin Lora Basin (PLB); and (3) to build the local capacity in implementing such schemes and in formulating a plan for sustainable water resources development and watershed management.</p> <p>Project development objective indicator/s</p> <p>Increased surface water availability and approach restoration of hydrological balance in PLB by reducing groundwater depletion.</p> <p>Improve productivity of irrigated agriculture.</p> <p>Improved institutional local government capacity and farmers organisations to implement similar schemes for sustainable water resources and watershed management.</p>	<p>Bolivia Climate Resilience – Integrated Basin Management</p> <p>The objective of the Climate Resilience – Integrated Basin Management Project for Bolivia is to support the implementation of Borrower’s strategic programme for climate resilience by strengthening the Borrower’s institutional capacity to define the new integrated river basin management approach to climate change adaptation and supporting its implementation in three pilot sub-basins in the Rio Grande basin. The project comprises of three components. The first component is strengthening national capacity for climate change adaptation, the second component is strengthening capacity for adaptation to climate change in the Rio Grande river basin, and the third component is design and implementation of subprojects that improve climate resilience in the Rio Grande river basin.</p> <p>Adoption by the Government of an Integrated River Basin Planning Methodology that considers CC scenarios.</p> <p>Number of government institutions using the tools developed and knowledge created by the PPCR for CC adaptation.</p> <p>Availability and adequacy of timely and reliable hydro-meteorological data, forecasts and climate change related studies measured through the increase in target users satisfaction.</p> <p>Number of pilot sub-basins where an Integrated River basin management system focused on improving climate resilience is operational.</p> <p>Direct project beneficiaries.</p> <p>Female beneficiaries.</p>

Basic information	Non-adaptation project	Adaptation project
	<p>PK Balochistan Small Scale Irrigation Project</p>	<p>Bolivia Climate Resilience – Integrated Basin Management</p>
	<p>Intermediate results indicator/s</p>	
	<p>Increase in surface water and reduction in dependency on groundwater sources.</p>	<p>MPD, MMYa, SEARPI and SDC demonstrate a better capacity to understand and take into account climate change impacts, through a capacity assessment.</p>
	<p>Increase in productivity of water for irrigated areas in the vicinity of the BKK.</p>	<p>Installed capacities for the operation of the National Climate Change and Water Information System.</p>
	<p>Percent increase in productivity of delivered water to irrigated areas in the subproject areas and vicinity of the SSIS.</p>	<p>Number of protocols that establish and define the coordination and continuous interchange of hydro-meteorological information between the identified relevant institutions.</p>
	<p>Percent increase in irrigated cropping intensity and crop yields.</p>	<p>Website for dissemination of centralised hydro-meteorological data is operational.</p>
	<p># of FOs/COs aware of groundwater overuse and trained in agriculture practices such as high efficiency irrigation and integrated pest management.</p>	<p>Number of IRBM participation mechanisms established.</p>
		<p>Number of new or rehabilitated hydro-meteorological monitoring stations.</p>
		<p>Number of hydro-meteorological stations installed.</p>
		<p>Number of hydro-meteorological stations rehabilitated.</p>
		<p>Number of operating drought and flood early warning systems.</p>
		<p>Number of integrated river basin management plans elaborated with the Integrated River Basin Planning methodology of MMAYA adopted.</p>
		<p>Area provided with irrigation and drainage services (ha).</p>
		<p>Area provided with irrigation and drainage services – new (ha).</p>
		<p>Area provided with irrigation and drainage services – improved (ha).</p>
		<p>Additional area protected from erosion (Ha).</p>
		<p>Length of waterways equipped with new or rehabilitated defensive flood protection infrastructure or natural bank stabilisation.</p>
		<p>Number of water basin management sub-projects within the pilot river basins financed by PPCR.</p>

Basic information	Non-adaptation project	Adaptation project
<p>Countries: Yemen.</p> <p>Climate concern: lack of water.</p> <p>Sector: agriculture.</p>	<p>Rainfed Agriculture and Livestock Project</p> <p>Brief description of the projects</p> <p>The Yemen Rainfed Agriculture and Livestock Project contributes to the higher development objectives of reducing poverty in rural areas and improving natural resources management. The project would enable poor rural producers in rainfed areas to: improve their production, processing and marketing systems; protect their assets: soil, water, rangeland, seeds and animals; and get organised for the first two purposes noted above.</p>	<p>Agro-biodiversity and Adaptation</p> <p>The objectives of the Agro-biodiversity and Climate Adaptation Project for Yemen are: to enhance capacity and awareness at key national agencies and at local levels; to respond to climate variability and change; and to better equip local communities to cope with climate change through the conservation and use of agro-biodiversity. There are four components to the project, the first component being agro-biodiversity and local knowledge utilisation and assessment. The second component is the climate change modeling and capacity building. The third component is the integrating climate change into rain-fed agriculture. Finally, the fourth component is the project management, coordination, and monitoring and evaluation.</p>
	<p>Project development objective indicator/s</p> <p>Number of kg of improved seeds produced and bought each year in the five governorates.</p> <p>One seed grower association per governorate.</p> <p>The number of visit per para veterinary has increase in the 5 Governorates.</p> <p>The number and diversity of test practiced in the labs have increased.</p> <p>One quarantine station is functioning.</p> <p>Number of cases of diseases threatening to livestock productivity have decrease.</p> <p>Number of functioning rural producer groups, association or networks.</p> <p>Beneficiaries activities output.</p> <p>Areas (ha) covered with improved soil conservation and water harvesting.</p>	<p>Lessons from community pilots are documented and scaled up.</p> <p>Strategy for climate resilient agriculture for rainfed highlands adopted and applied by key national agencies.</p> <p>Direct project beneficiaries.</p> <p>Female beneficiaries.</p> <p>Client days of training provided.</p> <p>Client days of training provided – female.</p> <p>Pilot communities have developed plans for natural resource management focusing on conservation and adaptation planning based on agro-biodiversity resources.</p> <p>Beneficiaries, especially female, have been trained on water conservation, nutrition, natural resource conservation, etc., beyond the 10-12 pilot villages.</p> <p>Number of community pilots using local knowledge & agro-biodiversity resources designed and developed.</p>

Basic information	Non-adaptation project	Adaptation project
	Rainfed Agriculture and Livestock Project	Agro-biodiversity and Adaptation
	Intermediate results indicator/s	
	Number of landraces characterised and conserved.	By YR2 inventory of agro-biodiversity resources completed and documented.
	Number of tons of improved seeds produced each year.	By YR2 climate resilience profiles of at least 5 landraces developed, and these landraces piloted.
	Number of seed grower groups formed and trained.	By YR1 existing MOU on sharing and harmonisation of climate data strengthened and institutionalised in relevant climate-related agencies.
	Number of para veterinary trained, equipped and operating in the five governorates.	By YR4, number of trained technical specialists in climate-related agencies to undertake climate modeling.
	3 laboratories and 1 quarantine station rehabilitated, equipped with trained personnel and operating cost.	Improved local data sets developed and local capacity to predict regional climate change based on global circulation model output enhanced on a pilot base.
	Number of village rural producer committees created and functioning.	By end of YR2 number of community coping strategies developed.
	Number of sub projects reviewed and selected by Village Committee.	By end of YR3 at least 20 coping strategies are tested and piloted in local landscape units.
	Amount of funding disbursed for all the sub-projects.	By end of Year 3, draft Strategy for Climate Resilient Agriculture for Rainfed High Highlands endorsed by MAI.
	Number of rural producers involved.	By end of YR1, monitoring and evaluation system in place.
	Kms. of terraces rehabilitated, Kms. of wadi banks protected, No. of water harvesting structures, and No. of ha of upper catchment revegetated.	MTR findings and lessons learned are being incorporated into PIM.
		Community agro-biodiversity plans developed in villages.
		Criteria for selection of projects finalised.
		By YR3 at least 20 small income generation projects are up and running.
		Conservation methods documented (community local knowledge).
		At least 10 small-scale upgrading projects approved and implemented by communities.
		Committee has been set up to oversee process.
		Awareness raising and dissemination programmes designed.
		First phase of community awareness programme launched.

Basic information	Non-adaptation project	Adaptation project
<p>Countries: Argentina and Senegal.</p> <p>Climate concern: flooding.</p> <p>Sector: water.</p>	<p>AR APL1 Urban Flood Prevention and Drainage</p> <p>Brief description of the projects</p> <p>The project objective is to increase The City of Buenos Aires' resilience to flooding through protection of its critical infrastructure and the introduction of a risk management approach to the government investment programme. The project focuses on the issue of risk identification and reduction through prevention, mitigation, education and training. To achieve this, the project would increase the city resilience to flooding through: (a) land use planning, building codes, construction practices, urban environment management, increasing information through hazard maps, contingency plans and vulnerability analysis; and (b) the improvement of the city's flood defenses through water drainage.</p> <p>Project development objective indicator/s</p> <p>Population awareness, preparedness and consciousness.</p> <p>Increase of real estate market values reflecting incremental improvements in flood protection levels.</p> <p>Reduction of population in the basin under risk of flooding in the 10 year recurrence.</p> <p>Reduction in damage to properties by storms up to 10 years of recurrence.</p>	<p>Stormwater Management and Climate Change Adaptation Project</p> <p>The objective of the Stormwater Management and Climate Change Adaptation Project for Senegal To reduce flood risks in peri-urban areas of Dakar and improve capacity to plan and implement sustainable city management practices, including climate resilience, in selected urban areas. There are four components to the project, the first component being flood risk mainstreaming in the urban sector; the second component is the drainage investment and management, the third component is the community engagement in urban flood-risk reduction and adaptation to climate change and finally, the fourth component is the project coordination, management, monitoring and evaluation.</p>
	<p>Population awareness, preparedness and consciousness.</p> <p>Increase of real estate market values reflecting incremental improvements in flood protection levels.</p> <p>Reduction of population in the basin under risk of flooding in the 10 year recurrence.</p> <p>Reduction in damage to properties by storms up to 10 years of recurrence.</p>	<p>Direct project beneficiaries.</p> <p>Female beneficiaries.</p> <p>Area in peri-urban Dakar protected against recurrent flooding through drainage works (hectare).</p> <p>Tools related to urban resilience including climate change, adopted.</p>

Basic information	Non-adaptation project	Adaptation project
	<p>AR APL1 Urban Flood Prevention and Drainage</p> <p>Intermediate results indicator/s</p>	<p>Stormwater Management and Climate Change Adaptation Project</p>
	<p>Length of drainage tunnel completed.</p>	<p>Key stakeholders (persons) trained in flood risk management, urban climate change resilience and territorial planning.</p>
		<p>Experience in 'inter-municipal sustainable city' practices, through concerted territorial development.</p>
		<p>Primary drainage system in Pikine and Guediawaye put in place (Meters).</p>
		<p>An O&M stormwater drainage management system in Pikine and Guediawaye is functional.</p>
		<p>Drainage channels cleaned at least once per year before rainy season in project area.</p>
		<p>People reached by IEC strategy at local and national level.</p>
		<p>Local flood management committees in Pikine and Guediawaye are engaged in stormwater management activities.</p>
		<p>Eligible flood risk reduction community investments completed.</p>

Basic information	Non-adaptation project	Adaptation project
<p>Countries: Haiti and Saint Lucia.</p> <p>Climate concern: increased frequency and severity of natural disasters.</p> <p>Sectors: infrastructure and emergency response.</p>	<p>Haiti Emergency Bridge Reconstruction & Vulnerability Reduction Project</p> <p>Brief description of the projects</p> <p>The Emergency Bridge Reconstruction and Vulnerability Reduction Project for Haiti aims to partially finance the costs associated with the reconstruction and emergency maintenance of selected key infrastructure destroyed or damaged by the series of hurricanes and tropical storms that struck Haiti in September 2008. The project is also expected to improve the resilience of Haitian bridges and roads to future natural disasters. Finally, the project will finance selected institutional building and technical assistance activities to help improve infrastructure asset management practices within the Ministry of Public Works, Transport and Communications (MTPC) and to support vulnerability reduction activities by providing technical assistance to the NDRMS for, inter alia, the preparation, planning and monitoring of the national recovery, and reconstruction plan.</p> <p>Project development objective indicator/s</p> <p>Disaster Risk Management Units within key ministries are operational and sustainable, with adequate instruments/tools and staffing before the end of the project.</p> <p>MTPC bridge management unit is operational and sustainable, with adequate resources and staffing.</p> <p>MPCE vulnerability reduction unit is operational and sustainable.</p> <p>National Disaster Risk Management System (NDRMS) Policy and framework assessed and strengthened before the end of 2013.</p> <p>Roads rehabilitated (km), non-rural roads.</p>	<p>Saint Lucia Disaster Vulnerability Reduction Project</p> <p>The Disaster Vulnerability Reduction Project for Saint Lucia aims to reduce urgent disaster vulnerability and increase long-term climate resilience in Saint Lucia by addressing the multi-faceted risks associated with hydro-meteorological events. The project consists of five components, the first one being the risk reduction and adaption measures. The second is technical assistance for improved assessment and application of disaster and climate risk information in decision-making. The third component is the climate adaption financing facility which is designed to establish a pilot financing mechanism meant to promote increased climate resilience under a climate adaption financing facility. The fourth is an emergency response component, and the fifth is strengthening institutional capacity for project management and implementation activities.</p> <p>Direct project beneficiaries.</p> <p>Female beneficiaries.</p> <p>Number of days of interrupted traffic due to landslips, flooding and other climate-related events in project areas.</p> <p>Number of school facilities, health centers and emergency shelters with reduced vulnerability to landslips, flooding and other climate-related events as a result of project interventions.</p> <p>Climate risk analysis reflected in transport and drainage infrastructure design.</p>

Basic information	Non-adaptation project	Adaptation project
	Haiti Emergency Bridge Reconstruction & Vulnerability Reduction Project	Saint Lucia Disaster Vulnerability Reduction Project
	Intermediate results indicator/s	
	Number of emergency fords and overpasses built in the two months following the emergency.	Percentage of project activities that have incorporated a beneficiary feedback system.
	Number of bridges rebuilt with satisfactory technical standards.	Roads rehabilitated, Non-rural (kilometers).
	10 emergency bridges purchased.	Storm drains constructed under the project (meters).
	Number of bridges and road sections that have been repaired or consolidated with satisfactory technical standards.	Bridges rehabilitated/reconstructed under the Project (number).
	Number of community-based initiatives performing routine maintenance with satisfactory technical standards.	Number of Government ministries/agencies connected to a spatial data sharing platform.
	Bridge inventory completed and up to date.	Number of Government officials trained in spatial data management and data analysis under the Project.
	Constitution of an effective crisis management and vulnerability reduction unit in MPTC.	Meteorological, hydrological, and sea level rise monitoring networks installed and active.
	Constitution of a bridge management unit in MPTC.	LIDAR mapping of the entire country completed.
	Vulnerability Reduction Unit established within MPCE and a National Framework for Vulnerability Reduction created, in place before the end of 2012 and integrated into sectoral policies and programmes before the end of 2013.	CAFF funds are fully disbursed in the form of climate adaptation loans.
	Timely presentation of Disaster Recovery and Reconstruction Program(s) are submitted and coordinated every semester and yearly by all stakeholders from second semester of 2011.	Total number of approved Sub-loan Borrowers (CAFF Project beneficiaries).
	A Multi-sectoral Vulnerability Reduction Unit (EM-VRU) created and operational within CIAT before the end of the project.	Share of female Sub-loan Borrowers.
	Transversal development strategies developed by CIAT (i.e.: watershed management, urban planning, territorial development and land tenure, Risk Prevention Plans) established and in place before end of project.	Share of business loans.
	Disaster risk management principles integrated and assessed into these transversal strategies.	Percentage of outstanding loans in good standing.
		Operations Manual for this component prepared to facilitate disbursement in the event of an emergency.
		Time taken to disburse funds in the event of an eligible emergency.

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Photo cover: December 2015, drought in Ethiopia, different areas have been hit by drought. An Afar woman is walking on the main road in Afar, Teru woreda. In Afar, many livestock and other animals have died. Livestock is the main source of income for the Afar people. Hollandse Hoogte / Petterik Wiggers.

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