



**USAID**  
FROM THE AMERICAN PEOPLE

# A TAILORED VIEW OF SUCCESSFUL ADAPTATION TO CLIMATE CHANGE

OCTOBER 2014

This report is made possible by the support of the American people through the U.S. Agency for International Development (USAID). The contents are the sole responsibility of Tetra Tech ARD and do not necessarily reflect the views of USAID or the U.S. Government.

**ARCC**



African and Latin American  
Resilience to Climate Change Project

Contributors to this report include Ayesha Dinshaw and Heather McGray of the World Resources Institute through a subcontract to Tetra Tech ARD.

This publication was produced for the United States Agency for International Development by Tetra Tech ARD, through a Task Order under the Prosperity, Livelihoods, and Conserving Ecosystems (PLACE) Indefinite Quantity Contract Core Task Order (USAID Contract No. AID-EPP-I-00-06-00008, Order Number AID-OAA-TO-11-00064).

**Tetra Tech ARD Contacts:**

**Patricia Caffrey**

Chief of Party

African and Latin American Resilience to Climate Change (ARCC)

Burlington, Vermont

Tel.: 802.658.3890

Patricia.Caffrey@tetratech.com

**Anna Farmer**

Project Manager

Burlington, Vermont

Tel.: 802.658.3890

Anna.Farmer@tetratech.com

# A TAILORED VIEW OF SUCCESSFUL ADAPTATION TO CLIMATE CHANGE

AFRICAN AND LATIN AMERICAN RESILIENCE TO CLIMATE CHANGE (ARCC)

OCTOBER 2014

# TABLE OF CONTENTS

<b>ACRONYMS AND ABBREVIATIONS .....</b>	<b>iii</b>
<b>EXECUTIVE SUMMARY.....</b>	<b>iv</b>
<b>1.0 INTRODUCTION.....</b>	<b>1</b>
<b>2.0 THE CHALLENGE OF DEFINING ADAPTATION AND ADAPTATION SUCCESS.....</b>	<b>2</b>
<b>3.0 CHARACTERIZING AN ADAPTATION INTERVENTION .....</b>	<b>4</b>
3.1 THE OBJECTIVE OF THE ADAPTATION INTERVENTION.....	4
3.2 THE RESULT OF THE ADAPTATION INTERVENTION.....	5
<b>4.0 A FRAMEWORK FOR ASSESSING SUCCESSFUL ADAPTATION.....</b>	<b>7</b>
<b>5.0 THE POTENTIAL ROLE OF TRANSFORMATION IN SUCCESSFUL ADAPTATION.....</b>	<b>9</b>
5.1 OVERVIEW OF TRANSFORMATION.....	9
5.2 ROLE OF TRANSFORMATION IN SUCCESSFUL ADAPTATION.....	14
<b>6.0 ENABLING AND ASSESSING SUCCESSFUL ADAPTATION.....</b>	<b>17</b>
<b>7.0 CONCLUSION AND RECOMMENDATIONS.....</b>	<b>19</b>
<b>8.0 REFERENCES.....</b>	<b>21</b>

# ACRONYMS AND ABBREVIATIONS

AR4	Fourth Assessment Report
CIF	Climate Investment Funds
GEF	Global Environment Facility
GCF	Green Climate Fund
IIED	International Institute for Environment and Development
IPCC	Intergovernmental Panel on Climate Change
M&E	Monitoring and evaluation
NAPA	National Adaptation Programmes of Action
PPCR	Pilot Program for Climate Resilience
TAMD	Tracking Adaptation and Measuring Development
UNFCCC	United Nations Framework Convention on Climate Change
USAID	United States Agency for International Development
VA	Vulnerability assessment

# EXECUTIVE SUMMARY

Since adaptation to climate change is highly context-specific, projects and programs intended to help communities adapt to climate change can have a variety of shapes and forms. Although there is no single, narrow definition for adaptation, practitioners and funders need a starting point from which to assess the success of an adaptation intervention. This report provides this point of departure: a matrix to help practitioners and funders characterize their specific adaptation project or program.

Once practitioners and funders have a clear understanding of the characteristics of their adaptation intervention they can consider parameters for judging its success. The authors propose a framework for assessing the success of an adaptation intervention based on its specific characteristics. In this way, this report provides a strategy to create a “tailored” assessment of success of adaptation interventions.

This tailored approach to assessing adaptation success does not enable comparison between different adaptation projects, nor does it allow for practitioners or funders to extrapolate success of one project to their entire portfolio of adaptation work. However, it provides a realistic and practical basis for assessing the success of a given adaptation intervention – a basis grounded in the characteristics of the intervention itself.

The authors also consider the potential role of transformation in successful adaptation. “Transformational adaptation” has become increasingly desirable in the adaptation community of practice, so the authors consider the role of this concept in the process of gauging adaptation success. To ground this research in practical tools, the authors consider their findings in the context of vulnerability assessments and monitoring and evaluation systems.

One conclusion of the report is that transformation should not be considered the ultimate form of adaptation success, and that investments in “transformational adaptation” should be made carefully. Another conclusion is that a focus on monitoring and iterative learning will greatly enhance the likelihood of success in adaptation interventions. A final finding of the report is that adaptation should be linked to development in order to increase its efficacy and likelihood of success.

# 1.0 INTRODUCTION

The effects of climate change vary across the world. The ways in which climate impacts are felt by people differ substantially depending on socio-economic, political, cultural, and environmental factors. These differences in impacts and underlying vulnerabilities necessitate that adaptation initiatives to climate change be context-specific. Moreover, there are different upfront costs of adaptation projects and different timeframes for results. Sometimes adaptation comes in the form of discrete projects, but in other cases it is mainstreamed into broader development initiatives. And sometimes adaptation is autonomous rather than planned.

These and other factors make it challenging to answer the question, “What constitutes successful adaptation?” However, a reasonably clear understanding of adaptation success is needed if we are to make adaptation projects, programs, and policies effective. Without such an understanding, policy makers, funders, and implementers will have little information upon which to base the allocation of resources as well as to design and implement activities. Understanding the components of success is also important for constructing ways of tracking progress toward the ultimate goal of helping vulnerable people successfully adapt to their changing climate.

In Section II, the authors provide a brief overview of definitions for adaptation and adaptation success. Given the wide variety of types of adaptation interventions, it makes sense to use broad and flexible definitions for adaptation and adaptation success. However, to determine the success of a specific adaptation intervention, it is necessary to identify the particulars of that given adaptation intervention. Therefore in Section III, the authors propose two ways to characterize an adaptation intervention: by identifying the objective of the adaptation intervention and its intended result.

In Section IV, the authors use these two characteristics to create a matrix with 16 different definitions of adaptation success. The audience of this paper — funders who are making decisions about adaptation portfolios and adaptation practitioners who are interested in assessing success of their interventions — can use this matrix to locate their intervention. This matrix serves as a starting point for creating more detailed indicators and methods for assessing success.

Transformational adaptation is becoming an increasingly important issue in adaptation, and there are many questions about whether an adaptation intervention must be transformational to be successful. The emphasis being placed on transformation is evidenced by organizations such as the Green Climate Fund (GCF) and the Intergovernmental Panel on Climate Change (IPCC) that are considering how to fund and implement transformational adaptation. In Section V, the authors review the literature of transformation in adaptation and briefly discuss what the potential role of transformation might be in determining adaptation success.

Finally, to ground this theoretical discussion of adaptation success, in Section VI the authors put their findings in the context of two “tools” of importance for adaptation practice: vulnerability assessments and monitoring and evaluation systems. In Section VII, the paper closes with recommendations for funders and adaptation practitioners who implement adaptation projects, plans, and programs.

## 2.0 THE CHALLENGE OF DEFINING ADAPTATION AND ADAPTATION SUCCESS

Adaptation defies a single, well-bound definition for many reasons. Adaptation is highly contextual due to location-specific climate impacts and various socio-economic, political, cultural, and environmental factors at play within a given community or decision-making process. Adaptation is rarely a one-time event, but instead is a “continuous stream of actions, decisions and attitudes...that reflects existing social norms and processes” (Adger, Arnell, & Tompkins, 2005). Moreover, there are different costs and results timeframes for the diverse forms of adaptation interventions that exist. Adaptation is often conceptualized and funded as a specific set of activities, but in reality it is most often mainstreamed into development or sector-specific projects.

Despite the challenge of defining adaptation, several researchers and organizations have created definitions of adaptation that are useful for guiding resources to address the complex challenges that climate change raises. Doria, Boyd, Tompkins, & Adger (2009) frame adaptation around possible goals, which could include maintaining climate-related risks at present levels, reducing risks from present levels if current risks are deemed to be unacceptable, or minimizing exposure of the most vulnerable populations. Adger et al. (2005) frame adaptation as activities that build the adaptive capacity of individuals and thereby increase their ability to adapt, or activities that implement adaptation decisions (i.e., they transform capacity into action) – or activities that accomplish both. The IPCC (2012) defines adaptation as follows:

“In human systems, the process of adjustment to actual or expected climate and its effects, in order to moderate harm or exploit beneficial opportunities. In natural systems, the process of adjustment to actual climate and its effects; human intervention may facilitate adjustment to expected climate.”

These definitions are fairly general and flexible because adaptation is so context-specific. While a broad and flexible definition of adaptation is necessary, it is nonetheless important to have a definition in order to answer the question, “what constitutes successful adaptation?” Without an understanding of how to answer this question, policy makers, funders, and adaptation practitioners have few guidelines for the most effective allocation of resources and the design and implementation of adaptation activities. Understanding what adaptation success looks like is also important for constructing ways of measuring and tracking progress toward the ultimate goal of helping vulnerable people adapt to a changing climate.

Beyond the lack of a single comprehensive definition of adaptation, other challenges make understanding adaptation success difficult. These challenges include the long-time horizons across which adaptation interventions often must be monitored. They also include uncertainty regarding not only climate impacts but also uncertain changes in economic, social, and other contextual factors (Conrad and Nielsen, n.d.) as well as attribution, since some impacts and adaptation actions can be clearly attributed to climate change while others have a less clear link (Adger et al., 2005).



Several authors have attempted to outline what successful adaptation may look like (see Moser & Maxwell, 2013). For instance, Adger et al. (2005) propose the following definition:

“In the broadest terms, the success of an adaptation strategy or adaptation decision depends on how that action meets the objectives of adaptation, and how it affects the ability of others to meet their adaptation goals. Crucially, an action that is successful for one individual, organisation or level of government may not be classed as successful by another. Success therefore depends on scale of implementation and the criteria used to evaluate it at each scale.”

Adger et al. (2005) also offer the criteria of efficiency, effectiveness, equity, and legitimacy as useful in estimating success in adaptation; however, they note that these criteria are contested, based on competing values, and context-specific. In addition, the relative importance associated with each criterion will differ depending on country, sector, and expectations (Adger et al., 2005).

The Global Environment Facility (GEF) evaluated the adaptation portfolios of the Least Developed Country Fund, the Strategic Priority for Adaptation, and the Special Climate Change Fund to identify potential determinants of adaptation success. The GEF proposes three factors that can be used to estimate success: 1) a project’s ability to minimize uncertainty, achieved by using a spectrum of available sources of data; 2) a project’s ability to alter communities’ long-term perceptions and behavior toward climate change by convincing them of the need to adapt to climate change and giving them the confidence that adaptation activities can succeed; and 3) a project’s ability to address the systemic nature of climate change by mainstreaming it into broader political, legal, and regulatory structures (Conrad and Nielsen, n.d.).

Other researchers have approached defining adaptation success differently. For instance, Doria et al. (2009) used the Delphi approach, which is an expert elicitation tool that engages experts in an iterative process of definition and analysis, to arrive at a collaborative definition of adaptation success. However, the result of this study was that respondents felt that expert elicitation was less useful for assessing subjective concepts, and that success may be better evaluated by those who are adapting or being affected by adaptation measures (Doria et al., 2009). In contrast, Gordon & Dilling (2010) make the case for a definition of adaptation success that can be linked to a set of empirical assessment metrics. Findings from an empirical assessment of adaptation success could then be synthesized through an inductive approach to craft a definition of adaptation success, as opposed to the more common deductive approach that tends to rely on crafting definitions through theoretical discussions.

Although a broad definition of adaptation is necessary when speaking about the large range of adaptation activities that exists, funders and adaptation practitioners ultimately need to define a given adaptation intervention in a narrower way in order to monitor and assess its success. The following section describes a way to create a “tailored” definition of adaptation and a starting point for assessing success.

# 3.0 CHARACTERIZING AN ADAPTATION INTERVENTION

To assess the success of a particular adaptation intervention, the authors propose that adaptation funders and practitioners first characterize their intended intervention. In order to create a “tailored” definition of the adaptation intervention, the authors suggest that funders and practitioners make use of two characteristics: the objective of the intervention, and the expected result of the intervention. An intervention can be a project, program, or portfolio of adaptation actions. The larger and more complex the intervention, the more it may be useful to break it into several parts to analyze how to plan for, measure, and assess success.

For the first dimension, the objective of the intervention, the authors suggest a continuum of adaptation activities along which practitioners or funders can locate their adaptation work. The continuum is intended to help practitioners and funders situate themselves among the wide range of adaptation activities that exist. For the second dimension, the expected results of the intervention, the authors propose a results chain with four categories. Although the results categories exist in a hierarchy in that smaller results lead to larger results, an adaptation intervention can be successful in any of the individual categories. These two characteristics of adaptation interventions are described in further detail below.

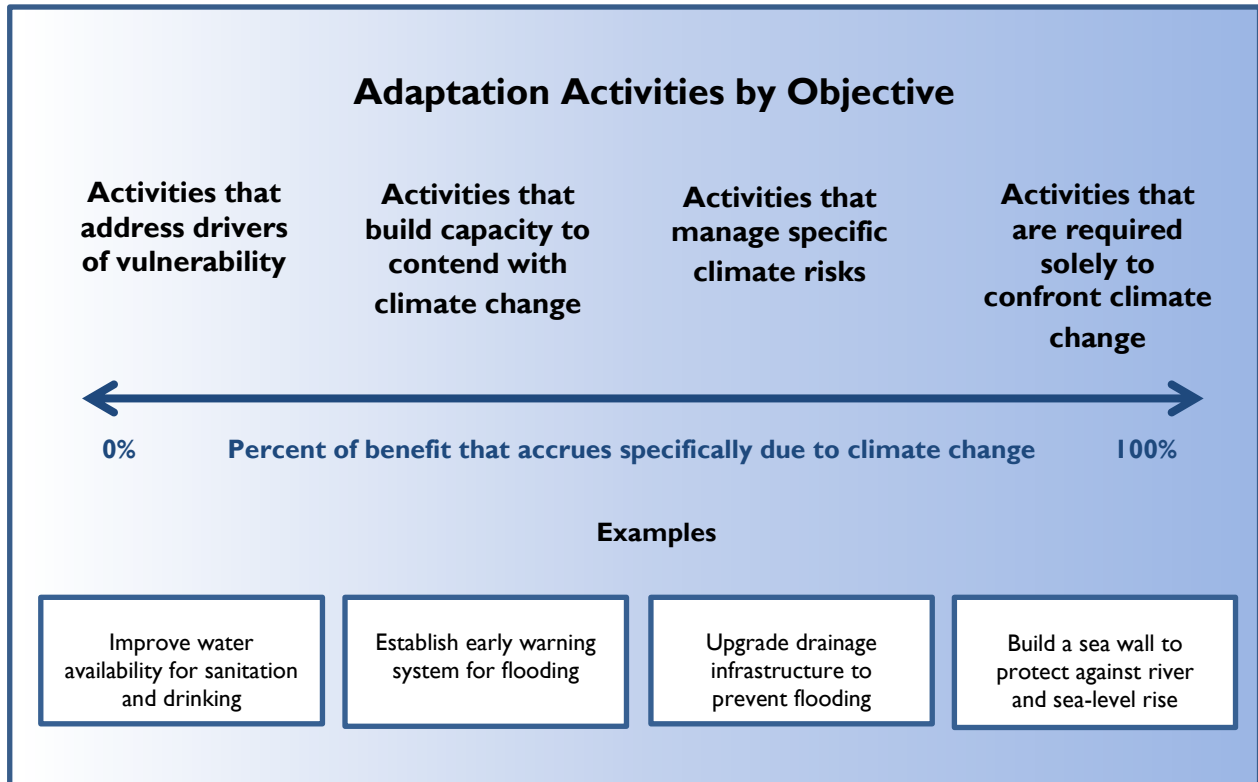
## 3.1 THE OBJECTIVE OF THE ADAPTATION INTERVENTION

As described in Section II, adaptation activities are extremely diverse in nature. Adaptation to climate change is also inherently connected with development (McGray, Hamill, & Bradley, 2007). By adapting the “continuum” approach from McGray et al. (2007), the authors characterize the objective of an adaptation intervention in terms of how closely linked the intervention is with development versus how closely it contends with a specific climate change impact (Figure 1, following page). There is a spectrum of what adaptation can look like between these two points, and different adaptation interventions will fall along various points of this spectrum.

Figure 1 shows four categories that may be useful to group the broad array of types of adaptation interventions. The first category includes activities that have the objective to address the drivers of vulnerability and are most closely linked with socioeconomic development. Activities in this category are 100 percent beneficial regardless of climate change impacts. The second category includes activities that have the objective to build capacity to contend with climate change by addressing underlying issues in a more systemic way. These activities include improving leadership, learning capacity, fair governance, and increasing resources. Activities in this category increase well-being regardless of climate change, but also help contend with climate change. The third category includes activities with the objective of managing specific climate risks. Activities in this category are most often process-oriented and focus on a system or part of a system. The authors use the term “risk management system” broadly, for example, to include natural systems such as green infrastructure. Activities in this category consider specific climate change impacts, and a greater percent of benefits accrue if those specific impacts occur. The objective of

the fourth category of activities addresses the unprecedented impacts that are unique to climate change, such as sea-level rise and glacial lake outburst floods. This group of activities begins to move into the realm of “loss and damage” in that they address climate change effects with high impact and irreversibility, where 100 percent of the benefit of the intervention accrues due to the materialization of climate change hazards.

**FIGURE I: A CONTINUUM OF ADAPTATION ACTIVITIES BY OBJECTIVE**



Source: Adapted from McGray, Hammill, & Bradley, 2007

The continuum enables adaptation practitioners and funders to use the objective of the adaptation intervention to determine where on the continuum their particular adaptation project or intervention lies. By placing it in one or more of the categories of the continuum, they can more easily determine the specific factors and indicators that are necessary to consider in tracking and assessing the success of an intervention.

However, not all interventions will fall neatly into one category. Some interventions may be on a boundary between two categories, while others may span two or more categories. It is important to note that this continuum is not a step-wise approach to addressing climate change impacts, whereby one begins at the left and moves towards the right. Instead, it simply attempts to group the range of adaptation activities that exist while recognizing that no grouping of adaptation activities will be perfect.

### **3.2 THE RESULT OF THE ADAPTATION INTERVENTION**

The chain of results used in this paper is: outputs, outcomes, and impacts (as defined by the United Nations Framework Convention on Climate Change [UNFCCC], 2010). The authors propose an additional type of result — “tested impact” — given that long time horizons are a vitally important (yet often rarely funded) parameter for defining adaptation success. The word “tested” is not used here to

denote that the impact of an intervention has been tested in the present for effectiveness in the future. Instead, it is used to signify that interventions implemented in the present will be “tested” by climate impacts time and again – and if they remain successful over a series of climate shocks and impacts, they will have been tested for success by time. This type of result also accounts for the high uncertainty inherent in climate change and contextual factors that we cannot predict.

- **Outputs:** measurable products and services that result from an adaptation project, policy, or program
- **Outcomes:** the short- and medium-term effects of an adaptation intervention’s outputs
- **Impacts:** the positive and negative long-term effects of an adaptation intervention on identifiable groups and systems
- **Tested impact:** the positive and negative effects of an adaptation intervention far into the future, over the course of a series of climate change hazards

Success of a specific intervention may occur in one or several of these results categories, as shown in the example of installing an early warning system in Table I below.

**TABLE I: EXAMPLES OF THE RESULTS HIERARCHY FOR AN ADAPTATION INTERVENTION**

<b>Output</b>	The establishment of an early warning system.
<b>Outcome</b>	Use of the early warning system for an approaching hurricane.
<b>Impact</b>	More than 100 lives were saved due to use of the early warning system. (However, if the early warning system was used and the hurricane lessened in intensity and did not make land-fall, it would have been used without impact).
<b>Tested Impact</b>	The tested impact would be positive if it was used for several hurricanes and saved many people over time. However, if it was used for several hurricanes that did not prove to be dangerous, then the efficacy of the early warning system may be compromised as people begin to ignore evacuation warnings associated with it.

These categories of results are a hierarchy, in that the higher levels of results cannot be achieved without the lower levels being achieved. For instance, an outcome cannot be achieved without specific outputs having been achieved; however, not every adaptation intervention aims to achieve a tested impact. For this reason, the intervention can be a success even if it yields only outputs, outcomes, or impacts. For example, if the intention of an intervention is to achieve the output of building an early warning system and it achieves this output, then the intervention itself can be labeled a success. However, the intervention cannot be labeled “successful adaptation” writ large, because simply having the early warning system does not ensure that vulnerable populations are not negatively affected by the hurricane.

# 4.0 A FRAMEWORK FOR ASSESSING SUCCESSFUL ADAPTATION

The authors propose a framework for determining adaptation success that uses the two parameters discussed above: 1) the objective of the adaptation vis-à-vis climate and development, and 2) the four results chain steps. Table 2 uses this framing to create a 4x4 matrix of 16 definitions of adaptation success. This table enables a practitioner to begin to assess the success of an adaptation intervention. By locating their intervention within the matrix, practitioners have a starting point for identifying intervention-specific success factors, options, and indicators for measuring progress.

**TABLE 2: FRAMEWORK OF DEFINITIONS OF ADAPTATION SUCCESS**

Intervention Objectives	Results Chain Steps			
	Output	Outcome	Impact	Tested Impact
<b>Addressing drivers of vulnerability</b>	Activities undertaken to address climatic and/or non-climatic vulnerability factors	Activities lead to measurable reduction in identified vulnerability factors	Reduction in identified vulnerability factors leads to improvement in well-being	Reduction in vulnerability and increase in well-being are sustained over time – through climate shocks and slow changes in climate trends
<b>Building capacity to contend with climate change</b>	Establishment of new assets or systems intended to build adaptive capacity	New assets or systems function as intended in the near term	Functioning assets or systems make a measurable difference in lives, livelihoods, assets, or other measurable indicators of climate resilience	Climate resilience derived from established assets or systems is sustained over time – through climate shocks and slow changes in climate trends

<b>Managing specific climate risks</b>	Implementation of climate risk management systems	New risk management systems perform as intended in the near term	Risk management systems measurably decrease losses due to climate change	There is ongoing improvement of risk management systems over time, and risk reduction is sustained over time – through shocks and slow changes in climate trends
<b>Confronting climate change impacts</b>	Implementation of interventions that reduce harm due to a climate change-specific hazard	Interventions to diminish harm perform well in the near term	Protection of lives, livelihoods, ecosystems, assets, or other measurable indicators from a climate change-specific hazard	Key assets are protected over time – through shocks and slow changes in climate trends, and risk of system failure is reduced

Although these definitions are helpful for thinking through adaptation and how to assess the success of specific adaptation interventions, it is important to remember that the definitions are broad, the lines between them are fuzzy, and often an intervention will not fit neatly within one definition. In addition, interventions may occur specifically at the boundary of two definitions or move from one category of definition to another over time. This matrix cannot incorporate such dynamism, but funders and practitioners should incorporate this fluidity when using the matrix as a starting point for thinking about success of an adaptation intervention, ideally at the beginning of planning for the intervention.

# 5.0 THE POTENTIAL ROLE OF TRANSFORMATION IN SUCCESSFUL ADAPTATION

“Transformative adaptation” is becoming an increasingly desirable concept in the adaptation sphere, especially in adaptation funding and policy arenas. For instance, transformation was considered in the design of the Green Climate Fund and was a strong theme in the IPCC AR4 Working Group II report (2014). Despite the growing interest in, and demand for, transformative adaptation, there is little clarity and consensus on what transformation is, what criteria should be used to identify it, how to measure it, and how to operationalize it. It is also unclear what the role of transformation is (or should be) in successful adaptation. There is a growing literature on transformation in adaptation, and the section below provides a brief overview of the main ideas in this literature.

## 5.1 OVERVIEW OF TRANSFORMATION

There is broad agreement among authors that transformational change should be considered in the context of incremental change, and that the main difference between incremental and transformational change lies in the extent of change. If incremental change implies transition from one stage to the next, transformation implies fundamental and radical shifts. These shifts may be in over-arching political-economy regimes and associated discourses on development, as espoused by Pelling (2010), or in production processes and consumption patterns to enable climate-resilient pathways, as proposed by the Green Climate Fund (GCF, 2011).

Incremental change occurs within the same system, whereas transformational change leads to the creation of a new system. Nelson, Adger, & Brown (2007) posit that transformation occurs when the nature of a system, such as social or economic conditions, becomes untenable or undesirable. However, Pelling (2010) notes that in many developing countries that are negatively affected by climate change impacts, social and economic conditions for large portions of the population are already undesirable and untenable, yet no transformation has occurred.

Pelling proposes that transformational change may arise out of incremental transitions through a “pathway to transformation” (2010), and Nelson et al. (2007) agree that there is no clear breaking point between when incremental transition stops and transformational transition begins. Kates, William, & Wilbanks (2012) suggest that some types of adaptations may constitute an “intermediate class” if they are transformational at some scales but not at others if incremental adaptations occur over long enough time scales that their cumulative effect is transformational, or if institutional changes in thinking and capacity improve the likelihood of future transformational change. These authors also highlight that it is possible to realize retrospectively that cumulative incremental change may coalesce into transformational adaptation (Kates William, & Wilbanks, 2012). Box 1 on the following page provides some examples of this “intermediate class” of changes.

## BOX 1: EXAMPLES OF “INTERMEDIATE CHANGES” THAT ARE NEITHER CLEARLY INCREMENTAL NOR TRANSFORMATIVE

**Good governance advocacy:** In many parts of the world, grass-roots efforts to fight corruption and improve governance struggle to make even incremental changes, sometimes appearing nearly futile over the short term. However, incremental changes made can be documented, and in some cases (in Indonesia and many Latin American countries, for instance) eventually have contributed to substantially overhauled government systems.

**Decentralization:** An example of institutional changes in thinking and capacity that improve the likelihood of future transformational change could be the effective dissemination of power and financial resources to the local levels of government to enable effective adaptation.

**Seawalls:** In some cases, the same intervention may be transformational or not, depending on the specifics of the situation. Kates, William, & Wilbanks (2012) posit that if a sea wall is built that is similar to others in the area and simply protects existing land use, it is not transformational. However, if the sea wall being built is much larger than those built in the area and it fundamentally alters coastal land use, then it could be considered transformational.

Pelling (2010) also proposes that most efforts on adaptation focus on the proximate causes, while transformation is concerned with the wider, less visible root causes of vulnerability, which exist in the social, cultural, economic, and political spheres. He notes that these systems are so “omnipresent” and assumed to be part of the world as we know it that they are not often addressed as systematically as they need to be. For real transformation, there must be deep, permanent shifts in value systems, organizational structures, and perceptions of the world and people’s place in it. Pelling (2010) makes the case that these shifts need to occur across societies, not within sectors.

In the reviewed literature, there seems to be agreement that transformational change can be either intentional or unintentional. However, Nelson et al. (2007) note that if it is unintentional — a result of an uncontrolled process — the change stems from insufficient system resilience<sup>1</sup> and is more likely to lead to undesirable states of low productivity and well-being. The GCF highlights political will and leadership as critical to overcoming barriers and catalyzing efforts to make changes beyond existing patterns but asks the question, “How can such actions be universal, accelerated, sustainable, and at the scale necessary to achieve global transformation?” (GCF, 2011).

Kate, William, & Wilbanks (2012) note that the main barriers to anticipatory transformative change are uncertainties about climate change, the potential benefits of intentional transformation, and the perceived high costs of transformational actions. To contend with these uncertainties and high costs, it is important that transformational adaptations be both flexible and robust to a wide array of potential climate futures. Other barriers include long-standing policies such as resource allocations that are no longer reasonable within a changing climate, ingrained behaviors and patterns such as concepts of self-identity and sense of place, preferences for stability over disruption, and ease of returning back to familiar thought and behavior patterns (Kates, William, & Wilbanks, 2012).

---

<sup>1</sup> The authors note that the resilience discourse in the development community was extremely dynamic at the time of writing. A full review of that discourse and its treatment of transformation falls beyond the scope of this paper.



Park et al. (2012) approach transformation from the resilience literature, in which transition is the term used to describe the shifting from one phase of the adaptive cycle to the next. Transitioning through an adaptive cycle may result in a complete transformation and the creation of a fundamentally new system. Park et al. (2012) also hypothesize that once a transformation has been successful and system functioning has been re-established (albeit in a different form), decision making returns to the realm of the incremental adaptation cycle until conditions sufficiently change to warrant another transformational change. In contrast, Nelson et al. (2007) propose “adaptedness” as an outcome to which resilience, incremental adjustments, and transformative change all contribute.

Pelling (2010) notes that apparent success at one level of adaptation may hide problems at other levels. His definition of resilience focuses on maintaining the status quo and ensuring a return to the same state of well-being after a crisis, so he posits that a focus on resilience could have the negative effect of suppressing deeper changes in values and institutions that are needed for transformational change. He goes further, proposing that the notion of resilience is attractive to donors and governments precisely because it does not challenge the status quo, and innovations that resilience requires are often less politically challenging, more visible, and quicker to implement than those that transformational change requires.

Thresholds or tipping points represent boundaries that, when crossed, cause a disturbance and a transition to another state. Since the systems in which adaptation takes place are often complex, it is very challenging to define thresholds beforehand; a threshold may only become apparent after a transition to another state has occurred (Nelson et al., 2007). Nelson posits that transformational change results from crossing ecological or social thresholds. However, Pelling (2010) notes that cultural values can play an equally large role in pushing a system past a tipping point toward transformation. The destruction that a natural disaster causes may also act as a tipping point and create a window, even if temporary, for novel and nontraditional action at the local, national, or international levels (Pelling, 2010; Kates, William, & Wilbanks, 2012).

The issue of transformation is by no means unique to the field of adaptation. Additionally, since it often calls for a systemic overhaul or mindset change, it cannot be confined to adaptation practice. Out of necessity, transformational adaptation is tied to changes in the development context, countries’ laws and norms, and international politics. As an example of a way in which transformational change is approached outside of the adaptation field, Box 2 on the following page considers the role of transformation within the context of gender.

## BOX 2: TRANSFORMATIONAL CHANGE IN THE FIELD OF GENDER

Akin to the adaptation continuum described in Section III, a continuum is often used in the field of gender to explain the different types of strategies for integrating gender considerations into programs. Unlike the adaptation continuum that McGray et al. (2007) propose, which is not a step-wise continuum, gender continua do include a progression from more harmful to more beneficial ways of incorporating gender considerations into programs. The continuum that USAID (2006) proposes begins with gender blind, which means that no analysis of gender has been done prior to implementing the program. It then moves onto gender exploitative, which is when approaches take advantage of rigid gender norms to achieve program objectives; followed by gender accommodating, in which interventions acknowledge the inequities of gender norms and strive to limit harmful impact on gender relations. It finally moves onto gender transformative, which includes approaches that actively strive to examine and change unequal gender norms. A similar, alternative gender continuum by Gupta (2000) proposes five categories across the continuum instead of four: stereotyping/harmful, gender neutral, gender sensitive, transformative, and empowering. This difference is interesting, because often transformation is seen as the ultimate, or most positive, stage of change, when in fact it is important to remember that transformation can be negative or quite difficult for those undergoing the transformation. And as the Gupta continuum proposes, there may be scope for further positive change post-transformation.

The main findings on transformation from the literature follow:

- There is no single definition of what constitutes transformative change.
- Transformation may occur through a “pathway to transformation,” in which the division between incremental and transformational change is unclear.
- There may be an “intermediate class” of changes, which includes changes that may be transformational at some scales but not others, or their cumulative impact might be transformational while their individual impact is not, or they could improve the likelihood of future transformational change.
- Transformation is linked to resilience, but different authors view this relationship quite differently.
- Transformation is not unique to the field of adaptation; since it often calls for a systemic overhaul or mindset change, it cannot be confined to adaptation practice.
- Transformation can be negative, and there may be scope for positive change post-transformation.

### BOX 3: CHARACTERISTICS OF TRANSFORMATION FROM THE LITERATURE

- **Intentionality:** Authors tend to agree that transformation can be either intentional or unintentional. However, some note that when transformation is unintentional, it is often a result of insufficient system resilience and is therefore undesirable.
- **Scale:** Some authors note that transformation can occur at any scale, while others say change needs to occur at a large scale to be transformative.
- **Location:** Implementing an existing intervention in a new location can be transformative, or relocation of a system or community to a new location may be transformative.
- **Link to incremental change:** All authors discuss transformative change in the context of incremental change. All also note that although they are distinct, they are linked, the line between them is unclear, and transformation may often result from incremental change.
- **Link to resilience:** Some authors see resilience and transformation as two different adaptation pathways and note that resilience may suppress deeper transformative change. Others note that resilience is based on systems thinking, which is beneficial for considering transformation.
- **Link to vulnerability:** Authors note that large vulnerability requires transformational adaptation. Authors also note that transformation is concerned with wider, less visible root causes of vulnerability.

Examples of potential transformation found in the literature include the following:

- In 2008, the African Agriculture Technology Foundation created a public/private partnership to create higher-yielding drought-tolerant maize varieties and to distribute the seeds to farmers in five African countries for 25 years without royalties, along with best agronomic practices. Efforts to breed drought-resistant maize plants in East Africa are not new; the potential for transformation in this case lies in the mix of institutional and technological actions, the combination of partners (local, national, global), the new breeding techniques, the inclusion of other best agronomic practices, the cost-free distribution to farmers, and the extended time horizon (Kates, William, & Wilbanks, 2012).
- The act of transferring existing adaptations to new locations can be transformative. For example, crop insurance against weather loss has long been available in developed countries but not in developing countries. Pilot studies of African weather-indexed crop insurance, which could have a transformative impact in a new place, have been conducted or are under way in a number of countries including Kenya, Malawi, and Ethiopia. Another example is water resources. In California, there has been a water system based on surface runoff for more than a century, but water providers are now turning to ocean water and identifying sites for future desalinization plants (Kates, William, & Wilbanks, 2012).
- Because of climate change impacts on vineyards, a number of boutique winery owners are choosing either to undertake wholesale *in situ* land use change (i.e., substituting grape production with alternative activities such as tourism or the growth of other crop species); to diversify into additional on- and off-farm income-generating activities; to relocate their wine production enterprises to more agro-climatically suitable regions; or alternatively to 'mothball' their assets temporarily from grape and wine production. The intention of the latter strategy is to either resume grape and wine production or to sell the enterprise at a later date when social, economic, or climatic conditions are perceived to be more favorable (Park et al., 2012).

## 5.2 ROLE OF TRANSFORMATION IN SUCCESSFUL ADAPTATION

In adaptation projects, programs, and plans where it makes sense to try to fund, operationalize, or measure transformation, it is useful to consider whether transformation is to be seen as the result of the intervention, or whether the process of undertaking the intervention itself is intended to be transformative. Take the example of helping farmers adapt to higher temperatures and higher likelihood of drought – if the result is intended to be transformative, a series of adaptation activities may be undertaken to ensure that everyone has access to drought-resistant seeds. If the process is intended to be transformative, the focus might be to implement a series of adaptation activities that influence national plans or policies so that they are robust, inclusive, and flexible. When such transformational plans or policies are implemented, they result in an increase in farmers’ resilience to drought in a way that is sustainable over time.

Not all adaptation interventions need to include transformation in order to be effective or successful. For instance, success will need to be viewed and assessed differently between the following two interventions. The first is an intervention that intends to identify the drivers of vulnerability in a given community and produce a report with guidance for the state government on how to address these drivers of vulnerability. This intervention thereby

- falls into the “addressing drivers of vulnerability” category of the continuum;
- intends to achieve the “output”; and
- has no explicit intention to be transformative.

The second intervention intends to minimize the loss faced by vulnerable populations who lived along a sea coast but must permanently relocate inland due to sea-level rise. This intervention thereby

- falls into the “confronting climate change” category of the continuum;
- intends to achieve a “tested impact;” and
- has the intention to be transformative.

Table 3 on the following page uses the matrix introduced in Section IV. In Table 3, the authors propose that a focus on transformation is more likely to be relevant and necessary in a sub-set of adaptation intervention contexts. These include contexts in which the objective of the intervention is to take an explicitly systems-oriented perspective, because altering a system causes a fundamental and transformative shift in system functioning. These adaptation intervention contexts are marked with the red boxes in the matrix below.

The authors also propose that interventions with the objective of confronting a specific climate change hazard, such as sea-level rise and glacial lake outburst floods, will also be transformational because they are likely to require large-scale, infrastructural changes that will persist for a long time. These adaptation intervention contexts have been marked with green boxes in the matrix.

However, the authors make note of the strong link between incremental and transformative adaptation<sup>1</sup> to posit that transformation has the potential to exist within each of the cells of the matrix, albeit to

---

<sup>1</sup> Kates, William, & Wilbanks (2012) suggest that some types of adaptations may constitute an “intermediate class” if they are transformational at some scales but not at others, or if incremental adaptations occur over long-enough time scales

varying degrees. A different way of framing this idea is that there is another continuum at work in adaptation – the continuum between incremental and transformative adaptation (Hammill, 2014, personal communication).

**TABLE 3: TRANSFORMATION WITHIN THE DIVERSITY OF DEFINITIONS OF ADAPTATION SUCCESS**

Result of intervention	Category of Adaptation Intervention			
	Activities that address drivers of vulnerability	Activities that build capacity to contend with climate change	Activities that manage specific climate risks	Activities required solely to confront climate change
Output				
Outcome				
Impact				
Tested impact				

As part of the discussion of the role of transformation in successful adaptation, it is vitally important to remember that all new and potentially transformational changes may not be positive. For instance, if communities in low-lying island states need to be relocated because of sea-level rise and they experience loss of their homeland, this change is transformative in a disruptive and negative way. Similarly, migration is an adaptation action that is likely to have potentially highly transformative and some negative consequences for family and social structures. Preventing or diminishing the negative impacts of transformation, especially unintended transformation that results from low system resilience, may be as important to consider as integrating transformation into new adaptation projects and plans.

Although there are still many questions about the role of transformation in successful adaptation, some efforts are already underway to build transformation into assessing adaptation success. Box 4 on the following page highlights two such initiatives – the Tracking Adaptation and Measuring Development (TAMD) approach to evaluating adaptation success, and the Pilot Program for Climate Resilience (PPCR) results framework.

---

that their cumulative effect is transformational, or if institutional changes in thinking and capacity improve the likelihood of future transformational change.

#### **BOX 4: TRANSFORMATION IN THE TRACKING AND MEASURING DEVELOPMENT (TAMD) AND PILOT PROGRAM FOR CLIMATE RESILIENCE (PPCR) FRAMEWORKS**

Tracking Adaptation and Measuring Development (TAMD) (Anderson, 2012) is an approach to evaluating adaptation success, created by the International Institute for Environment and Development (IIED). TAMD uses a tripartite framework of adaptation interventions: those that address the existing adaptation deficit; those that manage incremental changes in climate-related risks; and those that proactively address the profound, long-term impacts of climate change by transforming systems. Transformational adaptation is explicit in the TAMD framework, and IIED justifies this fact by noting that climate change response evaluation frameworks assume that adaptation will “neutralize” the impacts of climate change on development interventions, which were created without consideration of climate change. However, this justification is insufficient, and such frameworks underestimate the need for transformation (Brooks, Anderson, Ayers, Burton, & Tellam, 2011). The TAMD framework offers indicators for assessing how well institutions manage climate risks to development (“upstream” indicators) and indicators for how successful adaptation interventions are reducing vulnerability and keeping development on track in the face of changing climate risks (“downstream” indicators). However, there is no specific indicator to assess transformation.

The Pilot Program for Climate Resilience (PPCR) is a program of the Climate Investment Funds (CIF), which funds countries’ efforts to integrate climate risk and resilience into development planning and implementation. PPCR programs are country-led and build on countries’ National Adaptation Programmes of Action (NAPAs). The revised PPCR results framework (CIF, 2012) groups results into three categories: transformational impacts; PPCR program outcomes; and PPCR project/program outputs and outcomes. The results framework notes that “transformational impact cannot be achieved only by PPCR interventions. It requires a truly national effort to move into a climate resilient development pathway by increasing resilience of households, communities, businesses, sectors and society and improved climate responsive development planning.” The core indicators for transformational impacts in the revised results frameworks are: 1) numbers of people the PPCR supports in coping with effects of climate change, and 2) the degree of integration of climate change in national, including sector, planning.

# 6.0 ENABLING AND ASSESSING SUCCESSFUL ADAPTATION

To ground the discussion of adaptation success in this paper, this section addresses the question, how can tools like vulnerability assessments (VAs) and monitoring and evaluation (M&E) systems best enable the creation and assessment of successful adaptation interventions? These two tools are commonly used in adaptation work.

VAs help guide adaptation interventions. They are often undertaken in order to identify and understand the key elements of the context in which adaptation is needed. They help identify which people, places, sectors, or ecosystems are vulnerable. Depending on the design of the assessment, they may also identify specific factors that contribute to vulnerability. VAs provide the input necessary for all four categories of the results chain: outputs, outcomes, impacts, and tested impacts. In this way, they enable good adaptation.

M&E systems are needed to understand whether a given intervention is achieving its goals and intended results. M&E indicators and systems help track and assess the effectiveness of adaptation interventions ideally over long periods of time, since climate change is uncertain and has long-term impacts. Unfortunately, however, long-term monitoring is rarely funded.

These two tools may also be integrated, as VAs done prior to implementation of an intervention can help establish a baseline and selection of indicators to be monitored.

The three issues discussed above in the context of adaptation success — the objective of the adaptation intervention, the intended result of the adaptation intervention, and the potential role of transformation in an adaptation intervention — are considered in regard to VAs and M&E in Table 4 below.

**TABLE 4: THE ROLE OF VULNERABILITY ASSESSMENTS AND MONITORING AND EVALUATION IN ENABLING AND MEASURING ADAPTATION SUCCESS**

	<b>Vulnerability Assessments</b>	<b>Monitoring and Evaluation</b>
<b>The objective of a successful adaptation intervention</b>	<ul style="list-style-type: none"> <li>Depending on the purpose and design of a VA, its recommendations may skew toward interventions needed in one or more of the continuum categories</li> </ul>	<ul style="list-style-type: none"> <li>Critical to the success of M&amp;E is the selection of indicators. Categorizing an adaptation activity using the continuum can help with indicator selection</li> </ul>
<b>The result of a successful adaptation intervention</b>	<ul style="list-style-type: none"> <li>VAs may be helpful in guiding the category of success — output, outcome, impact, and tested impact — for which an intervention should aim</li> <li>VAs may be useful in helping decision makers and practitioners understand how tested impact over time can really look</li> </ul>	<ul style="list-style-type: none"> <li>The results chain is useful to ground an intervention in what it aims to achieve. The steps of outputs, outcomes, and impacts are standard M&amp;E results categories, but striving for having impact over time may be increasingly important for enabling and measuring successful adaptation</li> </ul>

	Vulnerability Assessments	Monitoring and Evaluation
<b>The role of transformation in successful adaptation</b>	<ul style="list-style-type: none"> <li>• If the potential for creating and implementing a transformative adaptation intervention is kept in mind at the beginning of conducting a VA, the VA methodologies can focus on a careful causal analysis that can identify the root causes of vulnerability</li> </ul>	<ul style="list-style-type: none"> <li>• Monitoring external factors such as leadership changes and policy windows can help identify appropriate avenues for transformative adaptation</li> <li>• Once an intentionally transformative intervention has been implemented, monitoring and incorporating lessons learned along the way can help ensure sustainability over time</li> </ul>

With regard to the role of VAs in determining the objective of a successful adaptation intervention, a VA that is quite broad in scope will focus on a range of underlying factors (both climate and non-climate) that contribute to sensitivity, exposure, and adaptive capacity. This focus makes solutions toward the left side of the continuum — addressing drivers of vulnerability and building response capacity — more likely to be relevant. Meanwhile, a VA whose purpose or scope is contained to specific processes, decisions, or climate impacts may lead to deeper treatment of a smaller number of factors, likely including specific climate hazards and risks. Such an assessment would more likely lead to interventions toward the right side of the continuum – managing climate risk and confronting climate change.

With regard to M&E, the results categories can be useful in ensuring an intervention works toward and achieves its intended goals. For instance, if the intention of an adaptation intervention is to install weather stations, and it achieves this goal, then this output constitutes success. However, if the intention of the intervention is to have farmers utilize information from newly-installed weather stations to better manage their planting, but all that is achieved is setting up the weather stations and no further action is taken, then this output cannot be considered a success. Having appropriate M&E indicators and systems in place can help implementers keep their projects on a successful track.

If transformation can be planned for, once an intentionally transformative intervention has been implemented, monitoring and incorporating lessons learned is important. For instance, if an ecosystem goes through a transformation, the ways in which the transformation affects all sections of society, especially the most vulnerable, should be monitored, and good practices for negating negative impacts of the transformation should be replicated. It is vital to keep in mind the potential negative consequences of transformation and to plan for them.



# 7.0 CONCLUSION AND RECOMMENDATIONS

The complexity of vulnerability, the uncertainty associated with future climate change, the diversity of potential adaptation activities, and the long-term time horizon across which adaptation plays out all conspire to make the task of understanding success in adaptation a challenge. At the same time, without some understanding of success, adaptation progress cannot be practically measured or evaluated, and adaptation practice will improve slowly.

This paper presents a broad and flexible depiction of adaptation and adaptation success. It argues that multiple types of adaptation success are inevitable given the broad range of adaptation interventions seen to date and the variety of contexts in which adaptation needs to occur. There is strength in the diversity of adaptation interventions and in the different manifestations of adaptation success, because this diversity indicates that adaptation is relevant to the context and is not a cookie-cutter or inappropriate intervention implemented regardless of the needs and vulnerabilities at hand.

One key take-away is that there is limited utility in separating good development and adaptation when considering what successful adaptation looks like, and in fact attempting to do so poses a risk of undermining adaptation effectiveness. Enabling development to succeed in the face of climate change is one of the overarching goals of adaptation, and for this goal, it must be integrated into development practice in ways that make tracking it as a distinct endeavor extremely challenging and largely unnecessary. Another important message is that although monitoring adaptation requires projects to have long time horizons and sustained funding over time, such monitoring allows for important lesson-learning. Last, while transformation is emerging as an important concept in adaptation, a fine and often blurry line remains between change and transformational change. This fine line makes it challenging to find examples of changes that can definitively be labeled as transformative.

Below are guidelines that reflect each of these key findings for funders, policymakers, and implementers involved in adaptation projects, plans, and programs.

- **Link adaptation to development.**

The continuum of adaptation interventions (Figure 1) shows that adaptation may be more or less directly linked to development objectives, but that all efforts need to be considered within the overarching development context. Even responses to specific climate risks or impacts cannot occur outside of the field of development. For instance, if a project aims to help farmers incorporate climate data into planting decisions due to projected droughts (activities that manage specific climate risks – in this case, drought), then the project will be more effective if it considers the broader development policy context such as water policies, safety net schemes, and local institutional capacity. Disengaging adaptation from development (even if to ensure accountability to funders) would only diminish the efficacy of the project.

- **Focus on monitoring and learning.**

Monitoring progress over time and learning from experience allows for adaptive management of an adaptation intervention. Gauging success is important to show efficient and effective use of funds

and to showcase best practices, but given that adaptation efforts have begun implementation relatively recently, making causal connections between actions and outputs and outcomes requires ongoing or at least periodic tracking of key indicators over time (Moser et al., 2013). Additionally, if an adaptation intervention is no longer as effective as it could be, it does not necessarily qualify as a “failure” – for instance, beach nourishment may be desirable and cost-effective for some time but ineffective over a longer time horizon (Moser and Maxwell, 2013). In this instance, monitoring thresholds could highlight the need for an alternative course of action. Gathering experience in such adaptive management of adaptation interventions over time will contribute to learning, which in turn can guide future adaptation efforts.

- **Invest in transformative adaptation efforts carefully.**

Transformation should not be seen as the ultimate form of adaptation success. For one, the adaptation community is still not sure what really constitutes transformation, what criteria can be used to define it, and what best practices foster it. Also, transformation may be negative – or negative for particular segments of the affected population, and it is also likely to be extremely costly and difficult to implement given its systemic nature. Moreover, most definitions of transformation appear to be at odds with the largely incremental process of mainstreaming, which has proven central to many areas of adaptation practice. It seems likely that both transformative and incremental adaptation outcomes are relevant and necessary and will vary in their impact based upon the specific adaptation context.

Funders, practitioners, and researchers must collaborate to determine what constitutes transformational adaptation, how to use this concept to increase the success of adaptation, and how to plan for the potential negative impacts of unintentional transformation that can increase the vulnerability of already at-risk populations. We need to better understand transformation before trying to fund, operationalize, or measure it, and we should be especially careful about conflating it with success.

## 8.0 REFERENCES

- Adger, N., Arnell, N., and Tompkins, E. (2005). "Successful Adaptation to Climate Change Across Scales." *Global Environmental Change* 15(2), 77–86.
- Anderson, S. (2012). "TAMD: A framework for assessing climate adaptation and development effects." Briefing note. London: International Institute of Environment and Development (IIED).
- Brooks, N., Anderson, S., Ayers, J., Burton, I., and Tellam, I. (2011). "Tracking Adaptation and Measuring Development." Climate Change Working Paper No. 1. London: IIED.
- CIF (Climate Investment Funds). (2012). "Revised PPCR Results Framework."
- Conrad, B., and Nielsen, S. (n.d.) "Evaluating Adaptation to Climate Change — The Challenge of Defining Success." Retrieved from <http://www.thegef.org/gef/node/5404>. Last accessed: 5 December 2013.
- Doria, M., Boyd, E., Tompkins, E., and Adger, N. (2009). "Using Expert Elicitation to Define Successful Adaptation to Climate Change." *Environmental Science & Policy* 12(7), 810–819.
- GCF (Green Climate Fund). (2011). "Workshop on the role of the Green Climate Fund in fostering transformational change, engaging civil society and leveraging the private sector." Geneva, Switzerland, 11 September, 2011. Transitional Committee, Second Workshop.
- Gupta, R. (2000). "Gender, Sexuality, and HIV/AIDS: The What, the Why, and the How." Plenary Address at the XIII International AIDS Conference in Durban, South Africa on 12 July, 2000.
- Gordon, E., and Dilling, L. (2010). "An Empirical Approach to Defining Success in Climate Adaptation."
- Hammill, A. (2014). Personal communication.
- IPCC (Intergovernmental Panel on Climate Change). (2014). "Climate Change 2014: Impacts, Adaptation, and Vulnerability. Part A: Global and Sectoral Aspects. Contribution of Working Group II to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change." Field, C.B., Barros, V.R., Dokken, D.J., Mach, K.J., Mastrandrea, M.D., Bilir, T.E., Chatterjee, M., Ebi, K.L., Estrada, Y.O., Genova, R.C., Girma, B., Kissel, E.S., Levy, A.N., MacCracken, S., Mastrandrea, P.R., and White, L.L. (eds.) Cambridge and New York: Cambridge University Press.
- IPCC (Intergovernmental Panel on Climate Change). (2012). "Managing the Risks of Extreme Events and Disasters to Advance Climate Change Adaptation. A Special Report of Working Groups I and II of the Intergovernmental Panel on Climate Change." Field, C.B., Barros, V., Stocker, T.F., Qin, D., Dokken, D.J., Ebi, K.L., Mastrandrea, M.D., Mach, K.J., Plattner, G.-K., Allen, S.K., Tignor, M., and Midgley, P.M. (eds.) Cambridge and New York: Cambridge University Press.
- Kates, R., William, T., and Wilbanks, T. (2012). "Transformational Adaptation when Incremental Adaptations to Climate Change are Insufficient." Proceedings of the National Academy of Sciences of the United States of America (PNAS) April 16, 2012.

- McGray, H., Hamill, A., and Bradley, R. (2007). "Weathering the Storm: Options for Framing Adaptation and Development." Washington, D.C.: World Resources Institute.
- Moser, S., and Maxwell, T. (eds.) (2013). *Successful Adaptation to Climate Change: Linking Science and Policy in a Rapidly Changing World*.
- Nelson, D., Adger, N., and Brown, K. (2007). "Adaptation to Environmental Change: Contributions of a Resilience Framework." *Annual Review of Environment and Resources* Vol. 32, 395–419.
- Park, S., Mashall, N., Jakku, E., Dowd, A., Howden, S., Mendham, E., and Fleming, A. (2012). "Informing adaptation responses to climate change through theories of transformation." *Global Environmental Change* 22(1), 115–126.
- Pelling, M. (2010). *Adapting to Climate Change: From Resilience to Transformation*. London and New York: Routledge.
- UNFCCC (United Nations Framework Convention on Climate Change). (2010). "Synthesis report on efforts undertaken to monitor and evaluate the implementation of adaptation projects, policies and programmes and the costs and effectiveness of completed projects, policies and programmes, and views on lessons learned, good practices, gaps and needs." Item 3 of the provisional agenda Nairobi work programme on impacts, vulnerability and adaptation to climate change.
- USAID (United States Agency for International Development). (2006). Gender Mainstreaming Workshop Document: USAID Armenia and Project Nova. 11-13 July, 2006.

**U.S. Agency for International Development**

1300 Pennsylvania Avenue, NW

Washington, DC 20523

Tel: (202) 712-0000

Fax: (202) 216-3524

[www.usaid.gov](http://www.usaid.gov)