

Measuring Progress on Climate Adaptation

From Concepts to Practical Application

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Background paper prepared for COP23

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List of acronyms

AMAT	Adaptation Monitoring and Assessment Tool
COP	Conference of the Parties
CVCA	Climate Vulnerability Capacity Analysis
GDP	Gross Domestic Product
GEF	Global Environment Facility
GIZ	<i>Gesellschaft für Internationale Zusammenarbeit</i> (German Technical Cooperation)
GNI	Gross National Income
IIED	International Institute for Environment and Development
IPCC	Intergovernmental Panel on Climate Change
LDCF	Least Developed Countries Fund
M&E	Monitoring and Evaluation
MICOA	<i>Ministério para a Coordenação da Acção Ambiental</i> (Ministry for Coordination of Environmental Affairs-Mozambique)
NAP	National Adaptation Plan
NDC	Nationally Determined Contributions
OECD	Organisation for Economic Cooperation and Development
PMERL	Participatory Monitoring, Evaluation, Reflection and Learning
SCCF	Special Climate Change Fund
SDG	Sustainable Development Goal
TAMD	Tracking Adaptation and Monitoring Development
TRAC	Tracking Adaptive Capacity
UN	United Nations
UNEP	United Nations Environment Program
UNFCCC	United Nations Framework Convention on Climate Change

Abstract

Despite the recognition that adaptation is necessary and the political and financial support for it, to date there are no universally accepted metrics to measure it. Measuring the effectiveness of adaptation is subject to two main challenges: knowing what adaptation is to be able to measure it, and determining whether the adaptation actions are effective in reducing vulnerability to climate change. There is also the need to reduce undue burden on countries who also have to report progress against the Sustainable Development Goals and Sendai Framework. Various countries have developed their own monitoring and evaluation systems for charting progress with adaptation. Several methodologies have also been proposed for use at a variety of scales, and here we outline four: Adaptation Tracking Tool, Tracking Adaptation and Monitoring Development; Tracking Adaptive Capacity and Participatory Monitoring, Evaluation, Reflection and Learning.

Motivated by the need to track progress towards countries' commitments in the Paris Agreement, we outline a framework to develop adaptation metrics that are context-specific and measure the effectiveness of adaptation for the global stocktake and national reporting commitments. In particular, our framework reflects our argument that there are 'upstream' questions that need to be addressed prior to developing metrics – namely what adaptation means in different contexts. The framework outlines how to develop adaptation metrics that are context-specific and enable measurement of the effectiveness of adaptation. The framework contains 4 steps. The first is to describe the adaptation context. The second is to define adaptation priorities. Defining adaptation priorities overcomes typical conceptual challenges by being precise in what adaptation looks like in different contexts. Step three is to create an adaptation theory of change for a desirable future state which, again, is a normative judgement. Knowing the desirable future state helps to define indicators to be able to monitor progress towards it. The fourth step entails outlining those specific goals. This framework offers a pragmatic way forward to overcome longstanding conceptual and methodological hurdles that have impeded the measurement of adaptation. It also sidesteps the challenge of comparability by recognising that, rather than universal indicators, the global stocktake can be the sum of individual country efforts.

Key words: adaptation, adaptation metrics, monitoring and evaluation, UNFCCC

1. Introduction

The need for adaptation is now universally accepted in both the science and policy spheres (IPCC, 2014; Lesnikowski et al, 2017). The political imperative of adaptation is recognised within the United Nations Framework Convention on Climate Change (UNFCCC). Calls were made at the Copenhagen Climate Change Conference in 2009 to mobilise adaptation finance of \$100 billion per year by 2020 to fund adaptation, particularly by developing countries. Recent estimates of the adaptation finance gap have suggested that between \$280 and \$500 billion per year by 2050 will be required (UNEP, 2016).

Despite the recognition that adaptation is necessary and the political and financial support for it, to date there are no universally accepted metrics of adaptation. The Preamble to the Paris Agreement states that “adaptation should follow a country-driven, gender-responsive, participatory and fully transparent approach, taking into consideration vulnerable groups, communities and ecosystems, and should be based on and guided by the best available science and, as appropriate, traditional knowledge, knowledge of indigenous peoples and local knowledge systems”.

However, there is very little consensus or guidance on what this means in practice. As a result, it is difficult to determine whether adaptation is taking place (Berrang-Ford et al, 2011). The Paris Agreement commits Parties to outline their commitments to adaptation in the National Adaptation Plans and Nationally Determined Contributions (NDC), and then report against them in the National Communications and, likely, the Adaptation Communications. A global stocktake is due to take place every five years to monitor progress and facilitate the strengthening of commitments to adaptation (and mitigation) in line with the ambition commitment. However, as yet the method through which this should take place is not finalised.

This report aims to address the gap by proposing a framework to measure and evaluate the effectiveness of adaptation and track progress in a way that is consistent with countries’ commitments under the Paris Agreement and the global stocktake. In particular, our framework reflects our argument that there are ‘upstream’ questions that need to be addressed prior to developing metrics – namely what adaptation means in different contexts. The framework outlines how to develop adaptation metrics that are context-specific and enable measurement of the effectiveness of adaptation. In so doing, it enables overcoming longstanding hurdles that have impeded the measurement of adaptation and, as such, provides a pragmatic way forward for the global stocktake of the Paris Agreement, and to enable the ambition commitment.

The report is structured as follows. Section two provides a brief overview of global international agreements relating to adaptation, and their approach to measuring effectiveness. Section three outlines the inherent conceptual, methodological and empirical difficulties in measuring and evaluating adaptation. Section four presents a selection of attempts to monitor and evaluate adaptation at different scales, from global down to local. Section five outlines a framework for measuring adaptation that takes into account effectiveness and adequacy; whilst section six provides a conclusion.

2. Monitoring adaptation within global agreements

2.1 Paris Agreement

The Paris Agreement was adopted in 2015 and entered into force in November 2016 after it was signed by 55 Parties representing 55% of global emissions. It commits countries to limit global average temperature increase to 2°C, with the ambition to limit it to 1.5°C above pre-industrial level. The Paris Agreement provides some guidance for adaptation, without being prescriptive about exactly what form it should take. Article 7.1 of the Agreement states the “global goal on adaptation of enhancing adaptive capacity, strengthening resilience and reducing vulnerability to climate change, with a view to contributing to sustainable development and ensuring adequate adaptation response in the context of the temperature goal referred to in Article 2”.

Monitoring, evaluation and reporting are critical components of the Paris Agreement in tracking progress, but also to refine and strengthen commitments. There are a variety of procedures for this within the transparency framework, which requires countries to clearly outline their actions. Each country published an NDC outlining mitigation commitments. Adaptation needs and commitments can be included in NDCs and National Adaptation Plans (NAPs). To monitor progress and enable the strengthening of the ambition commitment as time goes on, there needs to be a system in place to document progress towards stated goals. This comes in the form of the global stocktake (as outlined in Article 14). Starting in 2023, the global stocktake will subsequently take place every 5 years to monitor progress with NDCs and NAPs and enable the setting of new goals for the following period in order to progress towards the envisaged future (Figure 1).

According to Article 7, paragraph 14, the purpose of the global stocktake for adaptation is to, inter alia:

1. Recognize adaptation efforts of developing country Parties;
2. Enhance the implementation of adaptation action taking into account the adaptation communications;
3. Review the adequacy and effectiveness of adaptation and support provided for adaptation; and
4. Review the overall progress made in achieving the global goal on adaptation.

Figure 1: Purpose of the global stocktake under the Paris Agreement

The operationalization of the global stocktake of the Paris Agreement is still under discussion and is due to be finalized before the 24th Conference of the Parties in December 2018. In the meantime, the Ad Hoc Working Group on the Paris Agreement, with the support of the subsidiary bodies, is considering the modalities and sources of information for the adaptation reporting. The Adaptation Committee and Least Developed Countries Expert Group are considering modalities for recognizing adaptation efforts of developing country parties, as well as the adequacy and effectiveness of adaptation actions.

Considering the adequacy and effectiveness of adaptation actions is unique to the global stocktake, and is not currently considered in other reporting requirements under the UNFCCC, such as the National Communications. At their twelfth meeting, in Bonn in September 2017, the Adaptation Committee and Least Developed Countries Expert Group highlighted that reviews of the adequacy and effectiveness of adaptation could consider the degree to which:

- a) The ability and capacity to adapt to the adverse impacts of climate change has been increased;
 - b) Climate resilience has been fostered/strengthened and vulnerability to climate change has been reduced;
 - c) Contributions to sustainable development were made;
 - d) Adaptation actions are adequate in the context of the temperature goal referred to in Article 2 (Adaptation Committee/Least Developed Countries Expert Group, 2017).
- However, despite outlining what this can contain, so far there has been little progress on how to do this.

2.2 Sustainable Development Goals

The Sustainable Development Goals (SDGs) comprise 17 global goals intended to transform the world by 2030. They were adopted in 2015 and succeed and expand upon the Millennium Development Goals, which were eight goals intended to improve the life of the world's poorest people. Sustainable Development Goal 13 is on climate action (Figure 2). This explicitly endorses the approaches taken under the UNFCCC.

Targets under SDG 13 – Climate Action

- Strengthen resilience and adaptive capacity to climate-related hazards and natural disasters in all countries
- Integrate climate change measures into national policies, strategies and planning
- Improve education, awareness-raising and human and institutional capacity on climate change mitigation, adaptation, impact reduction and early warning
- Implement the commitment undertaken by developed-country parties to the United Nations Framework Convention on Climate Change to a goal of mobilizing jointly \$100 billion annually by 2020 from all sources to address the needs of developing countries in the context of meaningful mitigation actions and transparency on implementation and fully operationalize the Green Climate Fund through its capitalization as soon as possible
- Promote mechanisms for raising capacity for effective climate change-related planning and management in least developed countries and small island developing States, including focusing on women, youth and local and marginalized communities

* Acknowledging that the United Nations Framework Convention on Climate Change is the primary international, intergovernmental forum for negotiating the global response to climate change.

Figure 2: Targets under SDG 13-Climate Action

A key operational difference between the Paris Agreement and the SDGs is that the latter contain explicit targets under the goals (as did the Millennium Development Goals). Across all 17 goals there are 169 targets, of which four sit under SDG 13 on climate action (Figure 2). Indicators for the SDGs are divided into three tiers reflecting their level of methodological development and availability of global data for comparison. Tier 1 indicators are conceptually clear with established methodologies and readily-available data; tier 2 indicators are conceptually clear and established methodologies but without data regularly produced by countries; and tier 3 indicators are yet to have established methodologies or standards (although they are to be developed).

To date there are two tier 2 indicators under SDG 13 (UN, 2017). These are:

(a) Number of deaths, missing persons and directly affected persons attributed to disasters per 100,000 population

(b) Number of countries that adopt and implement national disaster risk strategies in line with the Sendai Framework for Disaster Risk Reduction 2015-30.

The tier 3 indicators currently under development are process-based and linked to the amount of finance mobilized and the number of countries integrating climate change into curricula, receiving climate support and communicating strengthening of capacity building to address climate change.

2.3 Sendai Framework

The Sendai Framework for Disaster Risk Reduction 2015-2030 is a voluntary commitment to prevent new and reduce existing disaster risks (UN, 2015). It outlines four priorities; namely:

(i) Understanding disaster risk,

(ii) Strengthening disaster risk governance to manage disaster risk,

(iii) Investing in disaster reduction for resilience,

(iv) Enhancing disaster preparedness for effective response, and to "Build Back Better" in recovery, rehabilitation and reconstruction.

As with the SDGs, the Sendai Framework outlines clear targets to achieve the four priorities. These are:

(a) Substantially reduce global disaster mortality by 2030, aiming to lower the average per 100,000 global mortality rate in the decade 2020–2030 compared to the period 2005– 2015;

(b) Substantially reduce the number of affected people globally by 2030, aiming to lower the average global figure per 100,000 in the decade 2020–2030 compared to the period 2005–2015;

(c) Reduce direct disaster economic loss in relation to global gross domestic product (GDP) by 2030;

(d) Substantially reduce disaster damage to critical infrastructure and disruption of basic services, among them health and educational facilities, including through developing their resilience by 2030;

(e) Substantially increase the number of countries with national and local disaster risk reduction strategies by 2020;

(f) Substantially enhance international cooperation to developing countries through adequate and sustainable support to complement their national actions for implementation of the present Framework by 2030;

(g) Substantially increase the availability of and access to multi-hazard early warning systems and disaster risk information and assessments to people by 2030

Targets (a) and (b) are very clearly linked with the current indicator (a) of the SDGs, ensuring complementarity and easing the reporting burden on countries.

3. Challenges in measuring and evaluating the effectiveness of adaptation

Ford et al (2015) distinguish conceptual, methodological and empirical challenges to measuring and evaluating the effectiveness of adaptation (which are further elaborated in UNEP, 2017). The conceptual, methodological and empirical challenges are closely

intertwined. Although there is widespread consensus about the need for adaptation, how it is defined in practice can vary widely. The difficulties of defining adaptation means that it is difficult to develop metrics, or systems of measurement, because knowing what to measure is contingent on a definition. The absence of metrics (which partly stems from the lack of universal definition), means that there are no standardly-collected datasets that can be used to measure adequacy and effectiveness (Christiansen et al, 2018)(Table 1).

Table 1: Summary of conceptual, methodological and empirical challenges of measuring adaptation

Conceptual	Methodological	Empirical
Adaptation is a process rather than an end point	Moving baselines	Availability of data
Long timescales/future state so adaptation is often avoided losses	"Avoided loss" difficult to measure	Comparability of data
Difficulties in distinguishing adaptation and development		Opportunities to aggregate data
Defining adaptation is normative		

3.1 Conceptual challenges-what does adaptation look like?

3.1.1 Adaptation as a process and not an end point

Despite universal acceptance of the need for it, and financial commitments to enable it, there is no one accepted definition of adaptation. The role of some strategies, such as diversification, which have traditionally been considered to be adaptation, is now being questioned (Simonet and Jobbins, 2015). The IPCC defines adaptation as "...the process of adjustment to actual or expected climate and its effects, which seeks to moderate harm or exploit beneficial opportunities" (Agard et al, 2014). This marks a change in how adaptation is seen from a tangible end-point to recognition that it will rather require pathways (Fazey et al, 2015; Agrawal and Lemos, 2015; Wise et al, 2014). Characterising it as a process as opposed to an end point also immediately creates challenges for identifying adaptation and, as a consequence, measuring its effectiveness as it is a moving target.

3.1.1.1 Defining the boundaries of the adaptation space

Identifying adaptation as a process means that there are no clear boundaries as to what it is, and what it is not. Is installing irrigation an adaptation, for example, or is it only an adaptation if the security of future water availability in a changing climate has been secured? Are cash transfers to vulnerable groups an adaptation to climate change, or is that an example of development as usual? Since there are no universal definitions of adaptation, focus tends to be on defining the barriers and limits to the process taking place. In that way rather than defining what adaptation is, we rather define what it is not. The IPCC Fourth Assessment Report included reference to constraints within the title of its adaptation chapter (Assessment of adaptation practices, options, constraints and capacity) and the Fifth Assessment Report dedicated one of four adaptation chapters explicitly to constraints and limits (Adaptation Opportunities, Constraints and Limits)(Adger et al, 2007; Klein et al, 2014). These reports assess

the significant literature on potential constraints, limits and barriers to adaptation (e.g. Adger et al, 2009; Moser and Ekstrom, 2010). Limits to adaptation are relevant to discussions on effectiveness and adequacy. Adaptation must take place within the hard limits (beyond which it is not possible), but the adequacy is somewhat normative, related to the nature of socially-acceptable risk, as outlined in 3.1.1.2.

3.1.1.2 A risk management approach to adaptation

Identifying constraints, limits and barriers defines a space in which adaptation can take place. Barriers may be finite, and can relate to physical factors, for example the limits in which species can survive; but constraints and limits may be more variable over time, and can potentially be overcome, for example through technology or institutional change. Having softer constraints and limits opens up normative questions as to the politically and socially acceptable tolerance of risk which, in turn, defines where adaptation must occur. Figure 3 shows how tolerable risks exist in the space between adaptation limits and acceptable risks (Dow et al, 2013). Expanding the adaptation limits will lead to a greater range of tolerable risks and, ultimately lowered risks of adverse impacts of climate change. The acceptable risk is often poorly defined, and we tend to have heuristics that are implicitly directing policy and practice (Preston et al, 2015). This is often reflected in the UNFCCC discussions, where the need for adaptation is accepted, but what it looks like is poorly defined.

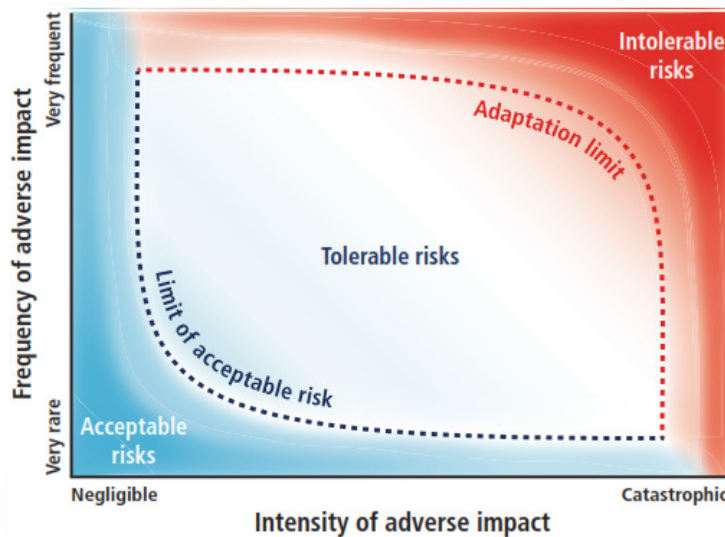


Figure 3: Conceptual model of the determinants of acceptable, tolerable, and intolerable risks and their implications for limits to adaptation (Dow et al, 2013).

3.1.2 Timescales and the fact that successful adaptations are often avoided losses

Definitions of adaptation are complicated by its relative invisibility. If an adaptation is put in place now, its success can only really be judged in the future, looking back and assessing whether incremental change in climate, or extreme events, did or did not have negative effects. However, avoidance of, or reduction in harm is much more difficult to determine as there is no control against which to compare what would have happened had the adaptations not been put in place. Because of this challenge of seeing “adaptation”, some parties advocate the need to rather consider adaptive capacity.

3.1.2.1 Considering adaptive capacity

Adaptive capacity is “the ability of systems, institutions, and individuals to adjust to potential damage, to take advantage of opportunities, or to respond to consequences” (Agard et al, 2014). Adaptive capacity can be built at the current time and, in the future case of exposure to climate hazards, can be enabled in order to bring about adaptation. Adaptive capacity is thus a latent state, whilst adaptation can be seen as a tangible output. Since it can be developed at the present time, focusing on adaptive capacity can reduce the risk of maladaptation, which arises from the implementation of adaptation options that increase the vulnerability of individuals, institutions, sectors or regions (Barnett and O’Neill, 2010). Monitoring adaptive capacity is one way to overcome a current challenge faced by governments, which is that if the benefits of adaptation may only become evident in the future, it is difficult to justify prioritizing them relative to more pressing and immediate development needs (Jones et al, 2015).

3.1.3 The relationship between adaptation and development

Differing opinions also exist on the relationship between adaptation and development. The two concepts are clearly related, as both have an implicit goal to improve wellbeing (Schipper, 2007). However all adaptation should also be development (particularly in an African context, where immediate development improvements are so pressing) – but not all development is adaptation. In essence, development becomes adaptation when it has no or low regrets – i.e. its sustainability and robustness under a range of potential feasible climate futures has been taken into account. Conceptually it can be viewed as spanning a continuum from “regular” development activities that also reduce vulnerability to a range of climate hazards and risks, to highly targeted adaptation measures designed to address specific, identifiable and quantifiable climate risks (McGray et al, 2007, Figure 4).

3.1.3.1 Vulnerability reduction

At one end of the development-adaptation continuum are common development measures and actions that increase resilience and reduce vulnerability by anticipating and spreading risk in the context of current and emerging patterns of climate variability and extremes, and which promote environmentally sustainable development. These measures will help to address the existing adaptation deficit and are likely to help populations and institutions cope better with climate change, particularly where it involves the incremental intensification of currently familiar climate hazards. Such measures will deliver development benefits and increase resilience to existing hazards, and thus can be deemed to create adaptive capacity. Such solutions create net development benefits under current circumstances as well as being robust under future climates, and are thus sometimes called “win-win” or “no regrets” (Hallegatte, 2009).

Actions to build adaptive capacity and reduce the current adaptation deficit can be both “hard” and “soft” and institutional. The majority of bilateral and multilateral donors have incorporated climate screening into their development cooperation to ensure that it does enable adaptation and not inadvertently promote maladaptation (Tanner et al, 2007; OECD, 2006; Ministry of Foreign Affairs of Denmark, 2005; Klein, 2001).

3.1.3.2 Adaptation measures targeting explicit climate risk

At the other end of the continuum are unambiguous adaptation measures designed to address specific aspects of climate change, and which may involve anticipating and planning for particular climate change impacts. These actions are typically “hard” and often involve climate proofing of existing or new planned infrastructure at a variety of scales. Examples might include dams, spillways, drainage systems, reservoirs or desalination plants.

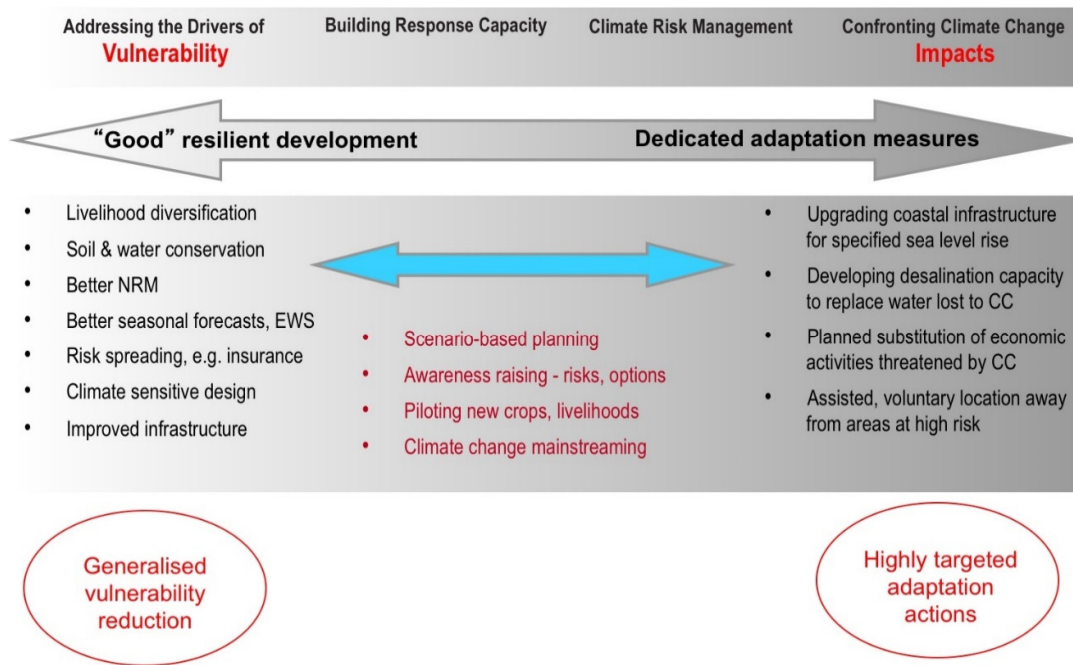


Figure 4: The development-adaptation continuum (McGray et al, 2007)

Between the two ends of the continuum are actions and processes that do not necessarily address specific identifiable impacts, but which go beyond generalised vulnerability reduction. These actions and processes are heavily focused on the development of adaptive capacity, the implementation of mechanisms to facilitate climate change mainstreaming, and activities such as scenario planning and the improvement and dissemination of climate information to provide a foundation on which adaptation and climate resilience can be built.

3.1.3.3 Adaptation pathways and adaptive development

Bringing together elements of development and adaptation, recognizing that adaptation is a process and can be achieved through different adaptation pathways, the concept of adaptive development is also gaining traction. Adaptive development is development that takes into account climate risks, and thus will be resilient in the face of climate change (Agrawal and Lemos, 2015). Adaptive development is enabled by adaptive institutions and information-based policy intervention. Explicit consideration of how to encourage sustainable development (and generic adaptive capacity) as well as specific adaptive capacity is thus required (Eakin et al, 2014).

3.1.4 Defining adaptation is normative

Various theories and concepts thus posit that adaptation is a process. It takes place within an adaptation space defined by hard limits and soft constraints, and which change over time. Various adaptation pathways can be followed within the process, reflecting decisions on risk management. These adaptation pathways lead to adaptive capacity, from which adaptation can be enabled in the case of future exposure to climate hazards. An encompassing term for this process is adaptive development (i.e. development that is resilient in the face of a changing climate). There can be many normative elements within this, for example in terms of what counts as a tolerable risk, and what constitutes politically- and socially-acceptable adaptation pathways. As an illustrative example, Figure 5 outlines what CARE International deems to be components of adaptation (CARE, 2016).

	Title	Good Practice
1.	Risk, vulnerability and capacity	Analyse climate risks, differential vulnerability and capacity of people, ecosystems and institutions.
2.	Participation, inclusion and gender equality	Ensure participation, agency, transparency and inclusion of all groups
3.	Climate information and uncertainty	Incorporate management of uncertainty and use of climate information
4.	Planning and decision making processes	Promote anticipatory, flexible and forward looking adaptation planning and decision making processes
5.	Innovation, local and indigenous knowledge and technology	Promote innovation, local (including traditional and indigenous) knowledge and technology
6.	Adaptive management	Ensure an integrated and holistic response with adaptive management of climate related risks and impacts over time
7.	Institutional linkages	Establish institutional arrangements and linkages which facilitate multi-stakeholder engagement
8.	Learning, capacity building and knowledge management	Integrate learning, capacity building, monitoring and knowledge management processes
9.	Scaling up and sustainability	Support ongoing and sustainable adaptation at scale

Figure 5: CARE International’s adaptation good practice checklist (CARE, 2016)

3.2 Methodological-how to measure adaptation?

The conceptual variability around adaptation translates into methodological challenges about how to measure and evaluate it (Hedger et al, 2008). Adaptation encompasses an enormous range of measures and actions, the nature of which will vary according to geographic location, the climate hazards faced, local and national development and sectoral contexts, the nature of available information about climate hazards and associated risks, and the timescale with which development practitioners are concerned (Brooks et al, 2011a). Despite the large number of projects claiming to enable adaptation, there is a noticeable absence of evidence on how adaptation is occurring, particularly in the developing world (Berrang-Ford et al, 2011). Assessing whether or not adaptation is taking place is contingent upon the conceptual understanding and definition that is being taken. Similarly, since adaptation is seen as a process, this does not fit well with project-based M&E systems that are contingent on predefined end goals. Since there is rarely agreement, it is difficult to compare and contrast the effectiveness of different projects at scale.

Unlike for development, no universal metrics for adaptation exist, which makes it difficult to define adequacy and effectiveness. Although they are sometimes criticized, for development interventions there now exists a widely-utilised set of indicators that can be used to track progress. Global acceptance of these is reflected in the role of the UN Human Development Report. This annual report contains a number of indicators accepted to represent the state of development in a country, including life expectancy at birth, expected years of schooling, mean years of schooling, and Gross National Income (GNI) per capita. Aims of development and what development looks like are much less contested than for adaptation. Recognising the policy imperative of having them, indicators of adaptation, or adaptive capacity, have been variously attempted. In summarizing the challenges, Yohe and Tol (2002) state that “many of the variables cannot be quantified, and many of the component functions can only be qualitatively described” (Yohe and Tol, 2002: 27). This is exacerbated by the fact that, since adaptation is a process, it is essentially a moving target.

Not all responses are adaptation, and the lack of conceptual clarity translates into methodological challenges in monitoring adaptation (Eriksen and Brown, 2011; Eriksen et al, 2011). A recent review of 92 adaptation projects managed by the Global Environment Facility (under the Least Developed Countries Fund [LDCF], Special Climate Change Fund [SCCF] and Strategic Priority for Adaptation) found a number of common activities relating to information and communications technology, to early warning systems, to new or improved infrastructure, in funded adaptation projects (Biagini et al, 2014). However, commonality of activities does not necessarily make them adaptations (i.e. they may be inadequate, in the language of the Paris Agreement).

Within the UNFCCC framework, adaptations are thought to be interventions that reduce vulnerability. An analysis of approved proposals submitted to the Adaptation Fund found huge variability in evidence for how the planned activities would reduce vulnerability, in what way, and for whom (Remling and Persson, 2014). Many of the examples cited as adaptation are, in fact, reporting on vulnerability assessments and natural systems (or intentions to act), as opposed to adaptation actions (Berrang-Ford et al, 2011). This means that they highlight the need to act, or the implications of changing climate variables on various ecosystems/elements of ecosystems (e.g. coasts, water resources, forests and their associated fauna) – but do not explicitly address if and how adaptation is occurring in light of the identified risks.

The challenges of being able to define adaptation means that many M&E systems tend to prioritise process (in terms of activities that are being undertaken) rather than outcomes and impacts (UNEP, 2017). This reflects the fact that reporting on what you are doing is methodologically less problematic than reporting on outputs and outcomes. This compromises adequacy and effectiveness – because it is possible to follow a process well, without that process necessary bringing about adaptation. There is a lot of emphasis on sound principles for the supply of adaptation (e.g. through finance), on institutional safeguards, and on fiduciary requirements. There is even focus on whether resources are effectively being used for their intended purpose (IIED, 2010; Figure 6). However, there is less emphasis on what this purpose should be, and its adequacy and effectiveness downstream. Outcomes and impacts are even more challenging since, with the conceptual challenges with adaptation, it is often difficult to define what they should look like. Whilst desired adaptation outcomes might

include things such as “reduced vulnerability to climate change” or “improved resilience”, defining what this looks like in practice is a challenge. This means that many adaptation M&E systems are forced to focus on indicators such as “adaptation projects taking place” – without any critical analysis of whether or not those projects are actually leading to adaptation.

<p>Principles to assess effectiveness of adaptation finance</p> <p>Equity Funding should target the most vulnerable geographical areas and groups.</p> <p>Urgency Disbursement should meet urgent needs.</p> <p>Efficiency Adaptation finance should be spent on local people.</p> <p>Effectiveness Interventions should reduce and not increase vulnerability.</p> <p>Transparency Stakeholders must have information on what funding is available, how it is deployed, and how it is used.</p> <p>Accountability Actions, measures and processes are dispersed to as local a level as is practical, and are channelled through a country’s own institutions and systems.</p> <p>Sustainability Actions must be environmentally, socially and economically sustainable, with longer-term and scaling-up implications considered.</p> <p>Flexibility Results should be robust under a range of climate scenarios.</p> <p>Human rights Programmes should further the principles in the Universal Declaration of Human Rights.</p> <p>Participation Planning should involve stakeholders across appropriate levels of governance and across civil society.</p>
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Figure 6: 10 principles to assess effectiveness of adaptation finance (IIED, 2010)

3.3 Empirical-do appropriate datasets exist?

Empirical challenges in measuring and evaluating the effectiveness of adaptation follow from the conceptual and methodological challenges. This includes the context-specificity and the fact that adaptation looks different in different places. Empirical challenges are also very pertinent to the Paris Agreement, since it highlights that, with the transparency framework, reporting obligations should not place undue burden on Parties (Article 13, paragraph 3). The absence of standard methodologies, combined with the conceptual ambiguities around adaptation, means that where monitoring and evaluation (M&E) systems have been set up, they are typically project-based. As a result, comparison over time and from place to place is difficult.

One of the reasons that project-based indicators cannot be compared is due to the scale-specificity of adaptation. Whilst the drivers of adaptive capacity are similar regardless of scale, the indicators themselves typically need to be scale-specific in order to capture the intended change (Adger et al, 2004). If the desired change is improvement in economic status, a possible national-level indicator might be poverty level, which is a readily available source of data. However, the same source of data would not capture sub-national variation. At local level, an indicator of the same dimension in a rural agrarian setting might be something like value of livestock assets, which could be compiled based on locally-available information (Vincent, 2007). An aggregate of the latter, even if data were available and could be combined, would unlikely be the most appropriate mechanism to capture national-level economic well-being, since it is unlikely that the entire country would comprise rural agrarian settings. The

difficulties of aggregation across scales makes it complicated to monitor collective progress towards the global goal on adaptation (Leiter, 2015; Christiansen et al, 2018).

4. Attempts to monitor and evaluate adaptation

The lack of indicators is posing a challenge for the various parties that are now keen to develop indicators and M&E frameworks for their adaptation programmes and projects. Various countries have done this, for example South Africa and Kenya (Department of Environmental Affairs 2017, Republic of Kenya, 2013). Donor organisations are also beginning to develop frameworks for use in projects they fund (Leiter, 2018; Dinshaw et al, 2014; Brooks et al, 2014; Lamhauge et al, 2014; Bours et al, 2013; GIZ, 2012). This section reviews different selection of non-country and non-donor-specific approaches targeted at different levels of analysis, with different frameworks for measuring adaptation (Table 2).

<i>Example</i>	<i>Scale</i>	<i>Concept</i>	<i>Method</i>	<i>Data</i>
Adaptation Monitoring and Assessment Tool (AMAT)	Global	Vulnerability reduction and capacity development	Quantitative indicators	Project-collected
Tracking Adaptation and Monitoring Development (TAMD)	National	Top down climate risk management and bottom up development of adaptive capacity	Scorecards	Primary qualitative and quantitative
Tracking Adaptive Capacity (TRAC)	Local	Vulnerability as a function of exposure, sensitivity and adaptive capacity	Composite index	Primary quantitative
Participatory Monitoring, Evaluation, Reflection and Learning for Adaptation (PMERL)	Local	Indicators of adaptive capacity (individual and institutional)	Composite index	Primary qualitative and quantitative

Table 2: Examples of the conceptual, methodological and empirical approaches employed by a selection of attempts to measure adaptation at different scales

4.1 Global - Adaptation Monitoring and Assessment Tool (AMAT)-Global Environment Facility

With large amount of money allocated to adaptation finance, there is an immediate imperative to measure the effectiveness of such funds. The LDCF was expressly established as a mechanism to support the financial transfer for adaptation from Annex One (developed country) to non-Annex one (developing) countries. It is managed by the Global Environment Facility who, in their 2014-18 Programming Strategy on Adaptation, outline three objectives with associated incomes and indicators (GEF, 2014a, b). All LDCF and SCCF projects are thus obliged to use the Adaptation Monitoring and Assessment Tool (AMAT). The aim of the tool

is to enable more comprehensive monitoring and reporting on progress and outcomes, based on consistent definitions (which thus enables cross-country comparison).

The three objectives encompassed within the AMAT are as follows:

(i) reduce the vulnerability of people, livelihoods, physical assets, and natural environments to the adverse effects of climate change,

(ii) Strengthen institutional and technical capacities for climate change,

(iii) Integrate climate change adaptation into relevant policies, plans and associated processes.

Each objective has three related outcomes, and then indicators relating to each outcome. Equity, including gender, is an important thread running through the framework. The indicators are largely numerical, e.g. number of people benefiting from diversified, climate-resilient livelihoods; or the number of plans and processes developed to identify, prioritise and integrate adaptation strategies and measures.

This macro-scale approach needs to be applicable to a variety of contexts, and is designed to synthesise results of a number of projects funded under the Least Developed Countries Fund and Special Climate Change Fund. Indicators are deliberately kept very generic to make them applicable to a broad range of very different projects. AMAT acts as a supplement to more specific and comprehensive evaluation frameworks designed for each project.

4.2 National - Tracking Adaptation and Monitoring Development

The Tracking Adaptation and Monitoring Development (TAMD) takes a twin track approach to tracking adaptation and monitoring development (Brooks et al, 2011b). This “twin track” approach attempts to address some of the recognised conceptual, methodological and empirical challenges of measuring and evaluating adaptation. Conceptually the twin track approach allows a top down assessment of climate risk management approaches (track one), linked with a bottom up assessment of the success of adaptation interventions in leading to effective development, and how development interventions can boost communities’ capacity to adapt to climate change (track two)(Figure 7). In this respect, it addresses several elements of the development-adaptation continuum proposed by McGray et al (2007; Figure 4). Methodologically it is based on four guiding principles: sustainability, replicability, stakeholder acceptance, and cost-effectiveness. To address empirical challenges, a key criterion for short-listing indicators is measurability and ease of data access, as well as ensuring a linkage with national development indicators.

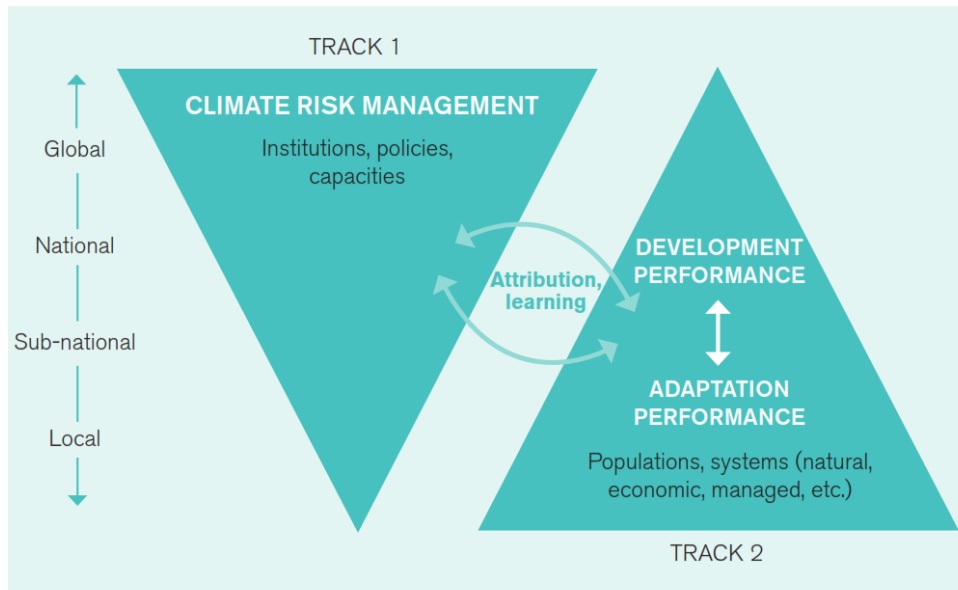


Figure 7: “Twin track” framework for tracking adaptation and monitoring development (Brooks et al, 2011b)

The TAMD approach has been trialled in a number of countries. In Mozambique it has been used to address the need for a national adaptation M&E system, which is currently undergoing consultation as mandated by the National Strategy for Mitigation and Adaptation of Climate Change 2015-25 (MICOA, 2015). For track 1 of TAMD, seven impact indicators and 42 outcome indicators have been developed, which are closely aligned to the government impact and outcome indicators initially proposed and under consultation to inform the M&E framework. At local level, TAMD has been used to develop Local Adaptation Plans that are informed by participatory climate vulnerability and capacity assessment (CVCA), theories of change, and institutional scorecards. The CVCA creates a baseline against which to track progress, whilst the theory of change ensures that outcome indicators are rooted in local priorities for adaptation and desired future circumstances. Different scale-appropriate scorecards are used at national and district level and they assess criteria including integration of climate change in national planning; coordination mechanisms for climate change interventions; integration of climate information and planning under uncertainty, as well as awareness and coordination (Artur et al, 2014).

4.3 Local - Tracking Adaptive Capacity (TRAC) and Participatory Monitoring, Evaluation, Reflection and Learning for Adaptation (PMERL)

At local level there is typically more scope to take into account the local context and local aspirations in terms of future. If it is only necessary to measure effectiveness and change over time, and not from place to place, such localised methods can be effective. Such local level approaches typically require primary data collection, which can make them more time-intensive.

Tracking Adaptive Capacity is an example of a community-based participatory methodology to assess and monitor adaptive capacity (Okumu et al, 2013). The focus is tracking changes in levels of resilience over time. The authors state three underlying principles: efficiency,

scalability and quality of results. The key measurement is vulnerability, which reflects a combination of exposure, sensitivity, and adaptive capacity, as recognised by the IPCC (Agard et al, 2014; Figure 8). Thus the implicit assumption is that adaptation results from a reduction in vulnerability. As with other attempts to determine vulnerability, multiple indicators are used (Vincent, 2004). Questions relating to resource endowment, access to services, farm management and food security are used to inform indicators that are physical, economic, and social/human, with the main focus being the relationship between climate risks and harvest. TRAC has been used in Homa Bay and Busia counties in Kenya.

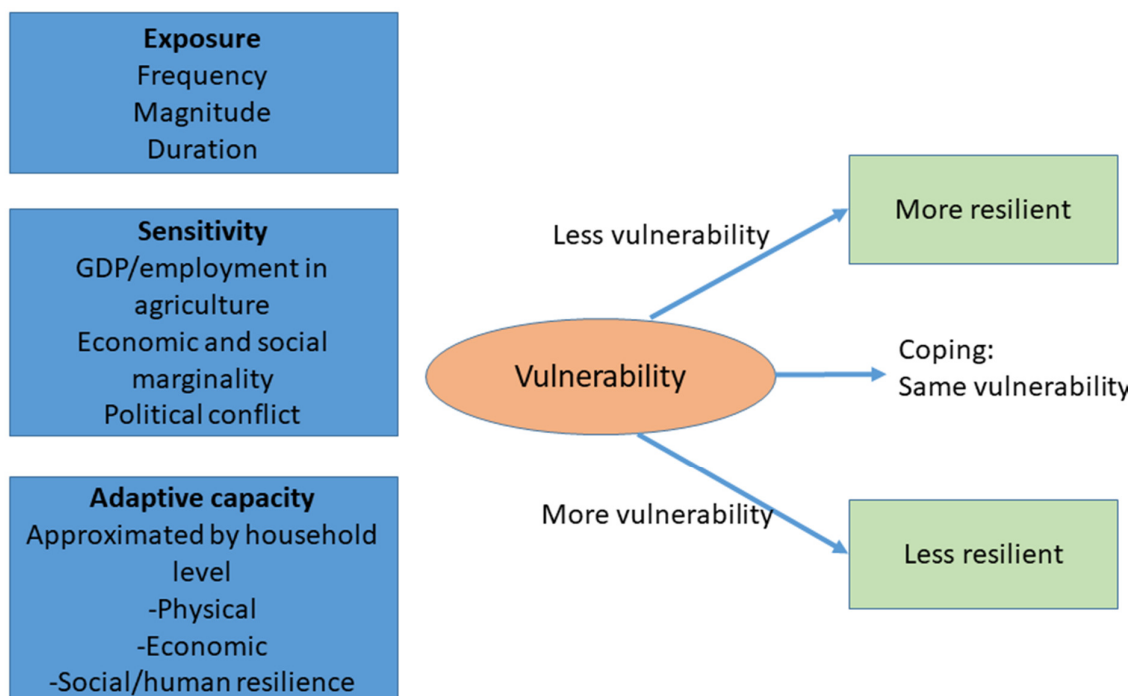


Figure 8: TRAC approach to monitoring adaptation (Okuru et al, 2013)

CARE’s Participatory Monitoring, Evaluation, Reflection and Learning for Community-based Adaptation follows a similar model of primary data collection. The aim is to assess change through processes that involve many people or groups, each of which is affecting, or is affected by, the changes being assessed. To monitor adaptation, their Local Adaptive Capacity framework represents the asset base, institutions and entitlements, knowledge and information, innovation, and flexible forward-looking decision-making and governance (CARE, 2014)(Figure 9). The process involves mapping key stakeholders and their interests and deciding what to monitor. This allows scale-specificity and a reflection of the aims and priorities of the people being monitoring – similar to track 2 of the TAMD framework. Reflecting and learning is also a key part of the process.

Characteristic	Feature that reflects a high adaptive capacity
Asset base	Availability of key assets that allow the system to respond to evolving circumstances
Institutions and entitlements	Existence of an appropriate and evolving institutional environment that allows fair access and entitlement to key assets and capitals
Knowledge and information	The system has the ability to collect, analyse and disseminate knowledge and information in support of adaptation activities
Innovation	The system creates an enabling environment to foster innovation, experimentation and the ability to explore niche solutions in order to take advantage to of new opportunities
Flexible forward-looking decision-making and governance	The system is able to anticipate, incorporate and respond to changes with regard to its governance structures and future planning

Figure 9: Adaptive Capacity Framework used in PMERL (CARE, 2014)

5. Overcoming the challenges

Conceptual, methodological and empirical challenges have impeded the measurement of adaptation to date. Various frameworks exist for monitoring and evaluating adaptation at different scales and, various principles have been proposed to inform the global stocktake (e.g. UNEP Adaptation Gap Report, 2017; Tompkins et al, 2018; Craft and Fisher, 2018). There is no universal metric, nor readily available existing data. This situation presents a challenge for the Paris Agreement, and its commitment to (i) recognise adaptation efforts of developing country parties, (ii) enhance the implementation of adaptation action taking into account adaptation communications, (iii) review the adequacy and effectiveness of adaptation, and (iv) review the overall progress made in achieving the global goal on adaptation.

Here we propose that there are two major barriers to overcome the stalemate. The first is failure to contextualize what adaptation is, so that each country is defining its adaptation goals. This context-specificity is recognized in the Preamble to the Paris Agreement, which states that “adaptation should follow a country-driven, gender-responsive, participatory and fully transparent approach, taking into consideration vulnerable groups, communities and ecosystems, and should be based on and guided by the best available science and, as appropriate, traditional knowledge, knowledge of indigenous peoples and local knowledge systems”. The NDCs under the UNFCCC show that there is also recognition in the international arena that countries should set their own adaptation goals (Lesnikowski et al, 2017). When each country defines what adaptation is, they are able to take into account their specific risk context and also their normative goals for adaptation. This addresses challenges outlined above because outcomes and objectives can become context-specific, making it easier to define indicators which accurately monitor progress as well as the adequacy of adaptation actions.

The second barrier is preoccupation with comparability of adaptation from country to country, and the implicit assumption that universal metrics are required. There are different ways of aggregating indicators for adaptation, other than standardised metrics. In focusing on monitoring adaptation across scales, Leiter (2015) highlights the potential for linking based on level-specific metrics, or informal links and synthesis across scales, both of which are already

being used by various countries in their internal adaptation M&E systems. To this cross-level, we add the opportunity to have country-specific metrics.

The global stocktake intends to assess the state of adaptation globally, in order to monitor progress and enable the ambition mechanism. However, whilst all countries aspire to achieving adaptation, if we accept the context specificity, then what that looks like varies from place to place. The measurement of progress and the need to reassess commitments also takes place at national level so, whilst this should be global in the sense that all country Parties do it, there is no real need to have a universal metric to attempt to compare one country with another. The global stocktake can still comprise country-specific baselines and progress, and does not need to be a composite (where the component parts are not evident). The progress in one country over time is more important than the comparison between countries. This, in turn, allows prioritisation of climate finance, for example, to distinguish between countries making slow progress and those making rapid progress. Accepting that the global stocktake does not require aggregation through comparable indicators allows each country to develop metrics that will effectively monitor its progress towards adaptation, as well as its adequacy given their context.

5.1 A framework for measuring the effectiveness of adaptation

This section outlines a framework for measuring the effectiveness of adaptation, including adequacy. What is innovative in this framework is recognition of the normative nature of what counts as effectiveness in adaptation, i.e. what are the priorities within the broad adaptation goals? To date the preoccupation with the stocktake has been on finding common indicators that allow comparability from country to country (UNEP, 2017). Given the context-specificity of both adaptation needs and (normative) adaptation priorities finding a mechanism to compare one place with another has been challenging, as metrics that allow cross-country comparison are typically too coarse to pick up on these differences. A framework that recognises the context-specificity of adaptation has two important implications. It means that each country (or unit of analysis) can set its own adaptation priorities and criteria for effectiveness, overcoming many of the conceptual challenges with adaptation.

When the adaptation priorities are clear and context-appropriate, it is much easier to identify a methodology to ensure that what is tracked is meaningful adaptation, and thus to enable definition of indicators and monitoring of progress. Therefore this framework is also consistent with, and complements, principles developed elsewhere, for example in UNEP's Adaptation Gap Report (UNEP, 2017). Ensuring that individual countries are progressing towards adaptation, whatever it may mean for them, is more important than being able to compare place to place. We already have ample vulnerability assessments that are used to justify the immediacy in some locations relative to others. These vulnerability assessments outline adaptation needs and are already conducted as part of the National Communications to the UNFCCC, so can be used to ensure adequacy of adaptation priorities. In this case, the "global" nature of the stocktake comprises the compilation of national level circumstances.

Should one place need to be compared with another, this would also be possible. An ordinal ranking of progress in one country's priorities can be compared with a similar ranking relative to the other's priorities. If one country's goal is to reduce the number of people requiring food aid, it would be possible to develop numerical targets relative to the baseline setting. The

objective improvement could be fitted to a scale from 1-10, for example, in terms of showing progress. Another country's priority may be to improve the number of women receiving and acting upon climate information for farming. Similarly there would be country-specific numerical targets in place but, in order to show relative progress to the first country, these could also be fitted to a ranking scale. If the first country scores 7, and the second country scores 5, even though the baseline and the ideal effective and adequate adaptation points are different, it is easy to see which country is progressing most rapidly towards effective and adequate adaptation. In this case, the first country has made greater progress (by scoring 7) than the second country (which scores 5).

This framework can be applied through several steps, each of which are consistent with the Paris Agreement requirement to not place undue burden on developing countries to meet the commitments of the global stocktake (**Error! Reference source not found.**). Since this approach is innovative and not currently practiced by any countries, box 1 provides an illustration of what it may look like.

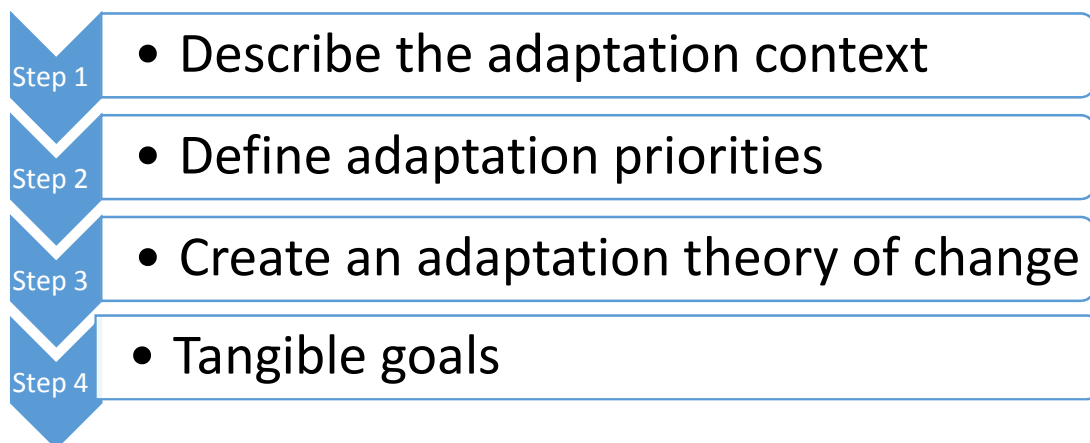


Figure 10: Steps for establishing measuring climate change adaptation (modified from GIZ, 2011)

5.1.2 Step One-Decide the adaptation context

The first step, to decide the adaptation context, involves discussing the need for adaptation, i.e. the nature of vulnerability. This step is already undertaken in National Communications to the UNFCCC, and typically marks the opening paragraphs of any application for adaptation finance. The adaptation context and current adaptation needs are thus already reported at a country level and can be used to highlight adaptation needs and create a baseline.

5.1.3 Step Two-Define adaptation priorities

Step two is typically overlooked or not made explicit, and thus an innovation – to outline adaptation priorities. This requires going beyond “enhancing adaptive capacity, strengthening resilience and reducing vulnerability” and highlighting the normative priorities within these broad categories, recognising that there are likely to be trade-offs.

Adaptation priorities often embody normative aims, in which the socio-political aspirations of government (or private sector parties) are reflected. Some parties may consider equity to be important – for example making sure that certain groups of the population are preferentially targeted. Gender is often one cause for considering equity. Within patriarchal societies women have often been disadvantaged relative to men, and so equitable attempts at adaptation may have prioritise them relative to men – or the adaptation interventions themselves may be different. If gender equity is a key element of effectiveness, “enhanced capacity” might mean that women farmers have access to, and understand the information coming from, early warning systems for floods. Countries may have a pro-poor agenda, meaning that adaptation is successful when resilience to climate change is achieved amongst the poorest groups of the population. In locations exposed to extreme events, a decision might be to prioritise adaptation to the most extreme of extreme events. In the case of floods, for example, a country might install early warning systems and preparedness for a 1 in 100 year flood, but pay less attention to the more regular floods (the *minimax* principle – whereby the emphasis is on minimizing the risk of maximal events). Or conversely they may prefer to shoulder the risk of the most extreme of extreme events, and rather focus on reducing risk from the smaller magnitude more frequent occurrences (the *maximin* principle – whereby the emphasis is on maximizing the risk of minimal losses). In the case of floods if this is the priority, embankments may be installed that protect settlements from 1 in 5 year floods, but are not sufficiently high to protect against a 1 in 100 year flood (*maximin*). If the adaptation priority follows the *maximin* principle, “reduced vulnerability” could be defined as ensuring that infrastructure (e.g. roads, and water and sanitation piping) are of sufficient construction to withstand a category 5 tropical cyclone.

5.1.4 Step Three-Create an adaptation theory of change

Clarity over the intended end point helps to articulate a sound theory of change (step three). Theories of change are commonly used by M&E practitioners, including in adaptation (Bours et al, 2014). As Stein and Valters (2012) note, “In its early conceptualisation in 1995, Weiss described a [Theory of Change] as ‘a theory of how and why an initiative works.’ More fully articulated, this can be understood as a way to describe the set of assumptions that explain both the mini-steps that lead to a long term goal and the connections between these activities and the outcomes of an intervention or programme” (p5). Theories of change shed light on the most appropriate indicators that should be monitored and can, in turn, be further elaborated in a logframe. This increases the likelihood that monitoring is not just highlighting successful implementation of a project, but also that the project is achieving the adaptation impact that it sets out to achieve (i.e. that it is measuring the “right” thing). The theory of change approach is particularly useful for adaptation because it allows accounting for its complexity, long-timeframe, and process-based nature. Thus throughout an initiative monitoring and formative evaluations can create evidence that can enable revisiting of the theory of change and course correction if required.

5.1.5 Step Four-Tangible goals

The result of the aforementioned three steps will be the knowledge to define adaptation outputs and outcomes. Without interrogation of what adaptation means in a particular context, and priorities to be realised, it is very difficult to judge whether adaptation is effective

(and often even if it is occurring). From this point, an M&E system can be developed as in other projects – with outputs and interim indicators of progress. It is likely that indicators within the M&E system will include “negative” indicators which record avoided losses, as these are critical to ensure effectiveness of adaptations. For example if climate risk assessment highlights that heat stress is a major risk, then an indicator which tracks occurrences of hospitalisation for heat stress might be included, with the intention that a decrease shows that adaptation has been effective. Adequacy will be addressed through the baseline and the adaptation priorities and theory of change – and will provide an opportunity to increase interventions to increase the rate of avoided losses. In subsequent years of the stocktake, the process can be revisited. This also allows for recognition of the fact that adaptation is a process and that the adaptation space is defined by both physical limits and social constraints and barriers; and also that normative criteria of effectiveness in adaptation may also change over time.

5.2 How this framework addresses existing challenges of measuring adaptation

Taking this approach addresses some of the challenges of measuring adaptation outlined in section two. Being explicit about the particular adaptation priorities, which are normative, addresses many of the conceptual challenges of adaptation. It allows countries (or sub-national units) to define how adaptation is best for them, and thus enables context-specificity and shifting priorities over time. This means that countries (or sub-national units) can monitor progress against their own goals of adaptation, and be recognised for that progress, even though others may choose different adaptation priorities. South Africa, for example, has ten “desired adaptation outcomes” in its M&E framework. Some of these are structural (e.g. “robust policies to address climate change” and “appropriate processes and mechanisms for coordinating adaptation”). One of the outcomes is “secure food, water and energy supplies for all”. Of course this is an important goal, but deciding on the explicit priorities embodied in achieving this allows better measuring of progress towards it.

Being explicit about the goals of adaptation means that many of the methodological challenges can also be addressed. Often these stem from only having implicit adaptation goals, for example “reduction of vulnerability” – which are too multi-faceted to create indicators to measure change. When the explicit priorities within the goals are determined, it becomes much easier to identify how you can track change. There is already significant guidance on how to create meaningful and measurable indicators (e.g. Clim-Eval Community of Practice, 2015; BASE, 2015; GIZ, 2012). However, in terms of addressing the empirical challenges, the data needs will be context-specific, reflecting the adaptation priorities and selected indicators, but it is possible that the types of development-related data and indicators that are already routinely collected could be used in combination and as proxies.

Step 1-Adaptation context:

Country x already struggles to achieve food security for its growing population, and is experiencing more frequent humanitarian crises as a result of increasing frequency of drought. Women and children are particularly negatively affected.

Step 2-Adaptation priorities:

Ensuring that agricultural systems are able to maintain production, even in the face of drought occurrence.

Step 3-Adaptation theory of change:

Adaptation policies and plans that promote gender-responsive, climate-appropriate agricultural production will reduce vulnerability to drought exposure.

Step 4-Tangible goals:

Reduction in numbers of women and children requiring food aid each year (using sex-disaggregated data).

Based on the tangible goals, indicators can be determined, reflecting good practice in adaptation indicators as outlined by other parties (e.g. UNEP, 2017). Monitoring progress over time will highlight the extent (or otherwise) of progress towards adaptation, defined in this dimension as a reduction in the numbers of women and children requiring food aid each year. In this case, aiming for zero reliance would be considered fully adequate. For other indicators, it may be that the threshold for adequacy would differ.

Box 1: An illustration of the framework

6. Conclusion

The Paris Agreement has catalysed discussions on how to measure adaptation, given the global stocktake and the ambition commitment. Measuring adaptation has typically been beset by conceptual, methodological and empirical problems. To date, various countries and donors have proposed frameworks for monitoring and evaluating adaptation, but none have been universally applied. One of the major challenges behind measuring adaptation is the lack of explicit definition of adaptation priorities which impedes documentation and the evaluation of the effectiveness of interventions – i.e. the ability to measure. In this report we have proposed a pragmatic way forward that enables us to take stock of adaptation, and also evaluate its effectiveness.

Adaptation tends to be accepted as an “intuitive goal” and generic – for example Article 7, paragraph 1 of the Paris Agreement cites the goal of adaptation as “enhancing adaptive capacity, strengthening resilience and reducing vulnerability to climate change”. Since adaptation means different things in different places, and there are different pathways to achieve it, what it means in one place needs to be defined. When time is spent considering what the normative goal of adaptation is – what pathways might be followed – that if each country sets its goals and is explicit about adaptation means to them (which is currently a missed step) – then it is possible to come up with indicators to measure progress and these can be aggregated for the global stocktake.

Addressing the context-specificity of adaptation addresses another challenge around the global stocktake, which is the assumption of the need for universal indicators for comparability. Comparable indicators can be a problem because of the context-specificity of adaptation, and different normative goals. What is particularly innovative is how this framework addresses the challenge of comparability. Countries (or other units of analysis) use nationally determined adaptation priorities (as opposed to a universal definition). The global stocktake can thus be an aggregate of national based assessments that does not require direct spatial comparability.

Having country-specific adaptation goals outlined means that indicators can be set and that progress towards them can be monitored over time.

Interrogating what adaptation means in a specific context and defining adaptation priorities addresses conceptual challenges and makes it easier to determine the adequacy (relative to adaptation context) and effectiveness (whether adaptation is occurring). The precise nature of indicators and metrics will depend on the priorities but reflect a theory of change that creates a future of effective adaptation and enables regular reassessment on the adequacy, reflecting that adaptation is a process. Countries can develop their adaptation goals based on risk assessments reflecting future conditions, combined with normative judgements based on policy priorities that determine what counts as “effective”. Elements of effectiveness relate to equity and elements of game theory, such as *maximin* and *minimax*, which outline the boundaries of acceptability of risk. Being explicit about such adaptation priorities addresses one of the major conceptual challenges in allowing definitions of adaptation to be self-determined and context-appropriate. Data collection and analysis for the global stocktake under the Paris Agreement could also inform the climate action goal under the Sustainable Development Goals, thus contributing more widely.

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