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The Role of the 2015 Agreement in Enhancing Adaptation to Climate Change

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FOREWORD

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ABSTRACT

The role of the 2015 agreement in enhancing adaptation to climate change

Adaptation responses are needed to address the existing levels of climate variability and to prepare for future climate impacts. There is wide agreement that adaptation is an important issue and would benefit from being enhanced through more effective action and better planning. The prominence of adaptation in the UNFCCC negotiations has increased, in part as the scientific evidence has become clearer that climate change is occurring and its impacts are projected to grow in future. Efforts to enhance adaptation actions and increase resilience are thus expected to play a key role in the post-2020 climate agreement to be agreed at COP21 in December 2015.

This paper explores how the 2015 agreement can help to foster enhanced policies and co-ordinate planning for greater resilience and adaptation capabilities at the national level. The paper considers the technical advantages and disadvantages of selected adaptation-related concepts that have been put forward in the negotiations. These include proposals for global or national goals; developing or improving adaptation institutions or planning; enhancing information availability; and facilitating or enhancing adaptation finance. Many of these proposals have the potential to improve sub-national, national and international planning about and responses to climate adaptation. However, the actual impact of these proposals is likely to vary significantly depending on how they are implemented on the ground.

JEL Classification: F53, O44, Q54, Q56, Q58

Keywords: adaptation, UNFCCC, climate change, 2015 agreement

RÉSUMÉ

Le rôle de l'accord de 2015 dans l'amélioration de l'adaptation au changement climatique

Des mesures d'adaptation sont nécessaires pour répondre à la variabilité climatique actuelle et se préparer aux conséquences des évolutions à venir. De l'avis général, l'adaptation revêt une grande importance et gagnerait à être intensifiée en améliorant l'efficacité des mesures et la planification. L'adaptation occupe une place plus importante dans les négociations de la CCNUCC, en partie parce que les données scientifiques attestent aujourd'hui plus clairement l'existence du changement climatique et que les projections indiquent que ses impacts iront croissant. Les initiatives visant à intensifier les efforts d'adaptation et renforcer la résilience devraient par conséquent jouer un rôle clé dans l'accord climatique pour l'après-2020 qui sera conclu à la COP21 en décembre 2015.

Ce document montre comment l'accord de 2015 peut contribuer à améliorer les politiques et à coordonner les activités de planification pour renforcer la résilience et les capacités d'adaptation au niveau national. Il passe en revue les avantages et inconvénients techniques de différents concepts proposés durant les

négociations autour de l'adaptation : établissement d'objectifs mondiaux ou nationaux ; développement ou amélioration des institutions ou de la planification de l'adaptation ; meilleure disponibilité de l'information ; et facilitation ou amélioration du financement de l'adaptation. Bon nombre de ces propositions pourraient permettre d'améliorer la planification infranationale, nationale et internationale des réponses en matière d'adaptation climatique. L'impact réel de ces propositions pourrait cependant être très différent selon la façon dont elles seront mises en œuvre sur le terrain.

Classification JEL: F53, O33, Q54, Q56, Q58

Mots clés: adaptation, CCNUCC, changement climatique, accord 2015

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Executive Summary

Adaptation responses are needed to address existing levels of climate variability and change and to prepare for unavoidable climate impacts in the future. There is wide agreement that adaptation is an important issue and would benefit from being enhanced through more effective action and better planning. The prominence of adaptation in the United Nations Framework Convention on Climate Change (UNFCCC) negotiations has increased, in part as the scientific evidence has become clearer that the climate is already changing and its impacts are projected to grow in future. Efforts to enhance adaptation actions and increase resilience are thus expected to play a key role in the post-2020 climate agreement to be established at COP21 in December 2015.

Adaptation is the dynamic process of adjusting to actual or expected effects of climate change. This iterative process comprises several components, including gathering relevant data; assessing resilience, impacts and vulnerability; planning; implementing; monitoring and evaluating results. Adaptation and resilience are linked; adaptation builds social, ecological and economic resilience to the effects of climate change. This paper uses the term resilience¹ to mean the ability of a system to recover from or accommodate the effects of climate change-related events which may manifest through shocks to socio-economic systems.

Parties have made several proposals about how the 2015 agreement could foster increased adaptation². This paper explores the technical pros and cons of the ideas included in selected proposals or options³, focusing on aspects that may help enhance policies and co-ordinated planning for national adaptation. The issues of loss and damage, and of increasing finance available for adaptation, though important, are not covered in this paper.

Some of the proposals made to address adaptation in the 2015 agreement mirror those being developed for mitigation. However, while both mitigation and adaptation are crucial components of a country's response to climate change, there are important differences between them. In particular, the benefits of adaptation actions are predominantly local, whereas the benefits of mitigation actions are global. Activities that foster adaptation and enhanced resilience are often also closely linked to wider development objectives. This makes it difficult, and potentially impossible in some cases, to distinguish a distinct adaptation component of such activities. Adaptation activities are also extremely diverse in their nature and aim, and can be undertaken by public or private actors. Resilience also depends in many cases on the complex interactions between social and ecological systems in a given region or country. Further, the timescale of assessment of the effectiveness of adaptation strategies can vary widely, from the short-term (such as changing agricultural cropping patterns) to the longer-term (e.g. protecting infrastructure from 1 in 100 year flood events). This complexity raises the issue of how prescriptive an international agreement should be in dealing with a mixture of national and sub-national, public and private actions.

¹ There are a number of definitions for the term "resilience" and its relationship to the concept of climate change adaptation. For example, the UNDP and UN/ISDR definitions stress resilience as the capacity of a system to tolerate disturbance without changing to a different state (e.g. infrastructure that withstands climate changes without a change in form and function). Other prominent definitions (e.g. UKCIP) stress resilience as the ability to recover from climate change related effects, expecting that the effects may alter the structure and function of systems to some extent. (Levina and Tirpak, 2006).

² ADP negotiation text, February 2015 <http://unfccc.int/resource/docs/2015/adp2/eng/01.pdf>

³ To avoid repetition, proposals are explored according to theme, to ensure that e.g. institutional issues, planning issues, information issues are only discussed once.

Several adaptation-related or adaptation-focused frameworks, work streams and institutions have already been established under the UNFCCC, often focusing on adaptation in least-developed countries (LDCs) or small island developing states (SIDS). These frameworks, work streams and institutions have had different aims (e.g. identify and finance priority adaptation actions, reduce vulnerability, build capacity, disseminate information), and varying levels of success in meeting them. Key lessons learned include: how institutions' and processes' design and implementation at the national and international level influence the development, prioritisation and implementation of adaptation responses; and the importance of wide stakeholder engagement for adaptation effectiveness. In addition, as effective adaptation strategies are cross-sectoral, multi-dimensional, and can potentially span multiple decades, this has implications for programme design and makes it challenging to monitor their progress and attribute their effects accurately. Thus, there are different views regarding whether and how to operationalise any link between mitigation and adaptation planning and actions within the 2015 agreement.

Proposals made by Parties to include adaptation in the 2015 agreement include: global or national goals; developing or improving adaptation institutions or planning; enhancing information availability; and facilitating or enhancing adaptation finance. Many of these proposals have the potential to improve sub-national, national and international planning about and responses to climate adaptation. For example, establishing a global goal and/or national commitment for adaptation could raise adaptation's profile both domestically and internationally. However, it could be challenging to establish a quantitative adaptation global goal towards which progress can be assessed in an objective and timely manner. Further, establishing legally-binding commitments to a specific adaptation outcome could be challenging as it is difficult to attribute specific outcomes to inputs, and as climate impacts may alter or reverse the expected benefits of adaptation-related inputs.

The content of some adaptation-related proposals for the 2015 agreement, or how they would be operationalised, is not yet clear. Parties' proposals differ as to whether adaptation efforts under the 2015 agreement will be geared towards *guiding* Parties' planning and implementation of adaptation efforts or towards *providing information* that Parties can use in their implementation of adaptation. This means that it is not straightforward to determine the specific effects of individual text proposals or options. For example, it would be difficult for the international community to prescribe what should be included in any adaptation component of an (intended) nationally determined contributions ((I)NDCs). Such a contribution could include a wide variety of components, including those related to improving adaptation-related institutions, co-ordination, planning, stakeholder engagement or specific adaptation actions or goals. Thus, different types of any adaptation-related components of (I)NDCs are likely to have different effects, depending on what they include. While the general direction of climate impacts for a region may be known, there is more uncertainty at national and sub-national levels, particularly for rainfall and other features depending on the complex dynamics of the climate system where we do not even have a probabilistic understanding of the projected changes. It will therefore be difficult to credibly tie projected global climate impacts and expected national adaptation needs and costs. This is because adaptation needs and costs are affected not only by the extent of climate change, but also by a given country's regulatory environment and socio-economic context and trends.

Some proposals for how to include adaptation in the 2015 agreement overlap considerably with each other. This illustrates that there may be several different paths to achieving a common objective. For example, proposals to improve a country's adaptation planning are included in Party submissions focused on enhancing the National Adaptation Plan (NAP) process, and could also be part of a planning-focused (I)NDC or a planning-focused national adaptation commitment/contribution/ action.

There is also some overlap between proposals for new adaptation institutions and arrangements, and the mandate for existing ones. For example, as many of the current UNFCCC arrangements for adaptation are focused on LDCs and SIDS, expanding coverage for supporting and encouraging adaptation efforts across

a wider spectrum of Parties could help to broaden the countries in which these efforts are applied. If the 2015 agreement could enhance knowledge and knowledge transfer about vulnerabilities, as well as best practices and lessons learned for adaptation, this would help to ensure that adaptation actions implemented are based on the best available knowledge. As several information or learning-exchange mechanisms have already been established in the UNFCCC context and elsewhere, the potential benefits of additional centralised information depositories, such as a knowledge platform, are unclear without further clarifications as to the role of such a platform.

Table 1 (below) outlines summary characteristics of selected proposals for adaptation in the 2015 agreement. This highlights that many proposals have the potential to enhance adaptation responses, resilience, planning, institutions, co-ordination, as well as information availability and exchange. However, whether such improvements will happen in practice depends on the details of what is included in such proposals, how the proposals are interpreted and implemented, as well as the interactions and linkages between them.

Table 1. Summary Characteristics of selected proposed options to include adaptation in the 2015 agreement

Table Key: ✗(no); ✓ / ✗ (proposal potentially meets criterion if specific elements are in place); ✓ (yes)

	Increased signal on importance of adaptation?	Directly enhances resilience?	Directly enhances adaptation action?	Directly recognises national efforts?	Directly encourages improved planning?	Develops improved international institutions?	Encourages improved national or sub-national institutions?	Encourages stakeholder involvement?	Improves information availability?	Fulfils a new function?	Can be tracked / monitored	Targets specific regions, groups or sectors?
Global adaptation goal												
Quantitative global goal	✓	✗	✗	✗	✗	✓ / ✗	✗	✗	✗	✓	✓ / ✗	✓ / ✗
Qualitative global goal	✓	✗	✗	✗	✗	✓ / ✗	✗	✗	✗	✓	✓ / ✗	✓ / ✗
Universal Individual commitments, contributions or actions	✓	✗	✓	✓	✗	✓ / ✗	✓ / ✗	✓ / ✗	✓ / ✗	✗	✓ / ✗	✓
Adaptation component of (I)NDCs												
Institutional-focused adaptation (I)NDCs	✓ / ✗	✗	✗	✓	✗	✗	✓	✓ / ✗	✓ / ✗	✓ / ✗	✓ / ✗	✓
Planning-focused adaptation (I)NDCs	✓ / ✗	✗	✗	✓	✓	✓ / ✗	✓ / ✗	✓ / ✗	✓ / ✗	✓ / ✗	✓ / ✗	✓
International-level institutions for governing adaptation												
Continuing with existing institutions	✗	✗	✗	✗	✗	✗	✓ / ✗	✓ / ✗	✓ / ✗	✗	✓ / ✗	✓
New international adaptation institutions												
Subsidiary body for adaptation	✓ / ✗	✗	✗	✗	✓ / ✗	✓ / ✗	✓ / ✗	✓ / ✗	✓ / ✗	✓ / ✗	✓	✓ / ✗
Adaptation registry	✓ / ✗	✗	✗	✗	✓ / ✗	✗	✓ / ✗	✗	✓ / ✗	✓ / ✗	✓	✓ / ✗
Adaptation clearing-house and registry	✓ / ✗	✗	✗	✗	✓ / ✗	✗	✓ / ✗	✗	✓ / ✗	✓ / ✗	✓	✓ / ✗
Global knowledge platform	✓ / ✗	✗	✗	✗	✓ / ✗	✗	✗	✗	✓ / ✗	✓ / ✗	✓	✓ / ✗
Evolution of the NAP process	✓	✗	✗	✓	✓	✗	✓ / ✗	✓ / ✗	✓ / ✗	✗	✓ / ✗	✓
Relating adaptation needs to mitigation and finance levels	✓	✗	✗	✗	✗	✗	✗	✗	✗	✓ / ✗	✗	✗

1. Introduction

The Intergovernmental Panel on Climate Change (IPCC) indicates that “the effects of climate change are already occurring on all continents and across the ocean” (IPCC, 2014a). This means that climate change adaptation actions and strategies are increasingly needed. As such, the profile of adaptation in the United Nations Framework Convention on Climate Change (UNFCCC) context has increased in recent years, and is widely expected to be an important pillar of the 2015 agreement.

Several proposals for inclusion of adaptation in the 2015 agreement are denoted in the “Lima call for climate action” (UNFCCC, 2014), which was updated in the Geneva negotiating text produced in the Geneva session of the Ad-Hoc Working Group on the Durban Platform (ADP) (UNFCCC, 2015a). This paper explores technical pros and cons of the ideas included in selected proposals or options⁴ of the “negating text”, focusing on aspects that may help foster enhanced policies and co-ordinated planning for greater resilience⁵ and adaptation capabilities on the national level. A functionally-tailored response to increased adaptation may provide the enhanced capacity for adaptation on the national level across Parties. Many of the proposals focused on adaptation are related to potential increases in or management of adaptation finance. While adaptation finance and loss and damage are both important issues, they are beyond the scope of this paper. Loss and damage refers to negative effects of climate variability and climate change with which systems have not been able to cope despite mitigation and adaptation efforts (UNFCCC, 2013d).

Since the Bali Action Plan, adaptation has been one of the pillars of the UNFCCC regime on climate change.⁶ Given the possible far-ranging adverse impacts of climate change, adaptation is increasingly an integral component of countries’ strategies to address climate change, along with mitigation. Benefits of adaptation measures differ significantly from those related to mitigation, since they are largely reflected locally⁷. For developing country Parties, particularly Least Developed Countries (LDCs) and Small Island Developing States (SIDS), a majority of the population’s livelihoods are directly dependent upon sectors that are highly vulnerable to climate change impacts, such as agriculture and forestry (OECD, 2009; FAO, 2011; Adger et al., 2013).

Adaptation efforts are therefore needed both in the short- and long-term. Several institutions and processes focusing on adaptation (including on how to plan, prioritise, fund and implement adaptation) have been initiated in the UNFCCC context. For example, UNFCCC guidance has provided a framework for Parties, especially LDCs to consider adaptation strategies (e.g. the national adaptation plan or NAP process). In many cases LDCs and developing country Parties have started the process of national adaptation planning ahead of other Parties and have experience in this process. Further, many Annex I countries have developed national adaptation strategies independent of the UNFCCC process. This paper explores how a 2015 agreement could address adaptation, in order to enhance its implementation.

Sections 2.1 and 2.2 of this paper provide background, context and a brief overview of adaptation under the UNFCCC regime to date. The progress of and lessons learned from adaptation measures initiated under the UNFCCC regime, particularly the national adaptation programmes of action (NAPAs) and the NAP

⁴ To avoid repetition, proposals are explored according to theme, to ensure that e.g. institutional issues, planning issues, information issues are only discussed once.

⁵ The term resilience in this paper indicates the ability of a system to recover from or accommodate the effects of climate change-related events which may manifest through shocks to socio-economic systems.

⁶ Note that the UNFCCC and the Kyoto Protocol, especially through the Clean Development Mechanism (CDM) had some provisions related to adaptation before the Bali Plan.

⁷ There are some trans-boundary benefits from adaptation measures, such as in water basins.

process, that are applicable to LDCs and SIDS for the most part are assessed in Section 2.3. Many adaptation activities have associated regional, national and local aspects; given the focus of this paper, projects and programmes are reviewed with regards to UNFCCC-level processes. Section 2.3 also includes discussion of national policies on adaptation that lie outside of the NAPAs and NAP process and a summary of the challenges in monitoring and evaluating climate change adaptation generally. Section 3 lays out technical advantages and disadvantages of key issues and options for adaptation efforts, as noted as noted in the official negotiating text produced during the Geneva session of the ADP in February 2015 (UNFCCC, 2015a). Conclusions are provided in Section 4.

2. Background and context

2.1 Overview of Adaptation

Adaptation to climate change is not a stand-alone activity, but is inherently interlinked with ecological, social and economic systems. The IPCC notes that adaptation is “the process of adjustment to actual or expected climate and its effects (IPCC, 2012). In human systems, adaptation seeks to moderate or avoid harm or exploit beneficial opportunities. In some natural systems, human intervention may facilitate adjustment to expected climate and its effects” (IPCC, 2013). In this paper, enhancing adaptive capacity is assumed to improve the resilience of a system (e.g. community, region) in terms of the “capacity of social, economic and environmental systems to cope” (IPCC, 2014a).

Adaptation thus contains process elements, as well as specific adaptation measures. Within the UNFCCC process, adaptation spans five components, namely: 1. observation of climatic and non-climatic variables; 2. assessment of climate impacts and vulnerability; 3. planning; 4. implementation; and 5. monitoring and evaluation of adaptation actions (UNFCCC, 2015b)⁸. Adaptation measures vary greatly along the dimensions of timing, approach and scale. Adaptation can be viewed either as reactive (occurring after the initial impacts of climate change are evident) or anticipatory. Furthermore, adaptive measures can be planned or autonomous in nature (Smit and Pilifosova, 2001).

Planned adaptation tends to result from policy designs (e.g. regulations, standards and investment plans) that strive to maintain a certain objective. Autonomous adaptation classifies actions taken by individual institutions, enterprises or communities (Adger, 2010) “in response to experienced climate and its effects, without planning explicitly or consciously focused on addressing climate change” (IPCC, 2014a). Adaptation measures can also be stand-alone or integrated (i.e. mainstreamed) within existing policies, programmes and operations. Mainstreaming adaptation within sectoral planning and governance structures allows barriers, such as policy incoherence, to be avoided (OECD, 2009). In addition, adaptation measures can include technological, informational, regulatory, financial, behavioural or planning aspects (Table 2).

⁸ <http://unfccc.int/adaptation/items/7006.php#Observation>

Table 2. Selected Adaptation Measures -- Types

	Anticipatory	Reactive
Private	<ul style="list-style-type: none"> • Purchase of insurance • Construction of buildings on stilts • Redesign of oil-rigs 	<ul style="list-style-type: none"> • Changes in farming practices • Changes in insurance premiums • Purchase of or increased use of air-conditioning
Public	<ul style="list-style-type: none"> • Early-warning systems • Improved building codes and design standards • Incentives for relocation 	<ul style="list-style-type: none"> • Compensatory payments / subsidies • Enforcement of building codes

Source: IPCC, 2001.

Climate risks can be dealt with through adaptation, mitigation or acceptance of residual impacts that cannot be addressed by either adaptation or mitigation measures (e.g. due to financial or other constraints) (Klein et al., 2007). Goklany (2005) highlights that mitigation can reduce the aggregate global adaptation challenge. Adaptation efforts tend to be much more localised spatially compared to mitigation efforts (Klein et al., 2007). Economic incentives differ for adaptation actions compared to mitigation significantly – “the extent to which society can rely on autonomous adaptation to reduce the [total] costs of climate change essentially defines the need for further policy” (Stern, 2007) aimed at adaptation. Hallegatte (2009) argues for considering adaptation and mitigation jointly, given their interactions. Adaptation and mitigation are related in a number of ways at different decision-making levels. At the highest level of aggregation, adaptation and mitigation can theoretically act as either policy substitutes (Warren et al., 2012) or policy complements (Bosello et al., 2011). Moser (2012) provides a detailed analysis of the difficulty of closely linking adaptation and mitigation measures, especially at the global level.

Table 3. Summary of adaptation approaches and examples

Adaptation Approaches	Examples
Technological approach	Drought-resistant crop varieties
Informational approach	Early-warning systems; sea-level rise management
Regulatory approach	Building codes; Design standards
Market or financial mechanism	Payments for ecosystem services ; subsidies; insurance
Behavioural intervention	Agricultural extension services; training programmes
Land-use planning	Zoning; watershed and land-use management
Ecosystem-based approach	Wetland restoration

Source: Li et al. (2015)

Climate vulnerability is often used as an integrative measure of the threats to a system and it can act as a proxy for monitoring aspects of adaptation (IPCC, 2001; Kelly and Adger, 2000). The IPCC (2014a) defines vulnerability as the “The propensity or predisposition to be adversely affected, sensitivity or susceptibility to harm and lack of capacity to cope and adapt” to climate stress; it may be represented as either long-term changes in climate conditions, or by changes in climate variability, including the magnitude and frequency of extreme events.” There are broadly two interpretations of vulnerability – as an end point or as a starting point (O’Brien et al., 2010). Vulnerability assessments are sometimes used as

indicative tools for monitoring and evaluation of adaptation processes; this topic is discussed further in Section 2.3.4 of this paper.

2.2 Adaptation in the UNFCCC Process to date

The significance of adaptation within the UNFCCC climate regime has increased over the last decade (Okereke et al., 2014) and will be an important part of the negotiations at COP 21 in Paris. There have been a number of key steps taken in the development of an adaptation regime under the UNFCCC process (Adaptation Committee, 2013; Briner et al., 2014 – outlined further in Annex 1 of this paper).

The Marrakech Accords, agreed at COP7 (2001) served as a landmark for adaptation within the UNFCCC. Until COP7, adaptation was only addressed by one COP decision (Decision 11/CP.1) to “describe expected progress in cooperation to prepare for adaptation” under the tasks of the review of first communications from Annex I Parties. For the first time, COP7 decisions recognised the intrinsic link between climate and development issues (Dessai and Schipper, 2003). For example, under Decision 5/CP.7, Parties established the LDC Work Programme in order to develop national climate change mechanisms and to increase adaptive capacity. The Accords made a range of decisions on adaptation under the UNFCCC regime, including the formulation of the National Adaptation Programme of Action (NAPA).

The Buenos Aires Programme of Work on Adaptation and Response Measures, agreed at COP10 (2004) led to the COP11 (2005) agreement on the Nairobi Work Programme (NWP) on impacts, vulnerability and adaptation to climate change (Decision2/CP11).

The Bali Action Plan was adopted at COP13 (2007) and established adaptation as one of four pillars of the UNFCCC.⁹ The approach to processes applied during implementation of the Bali Road Map offers some lessons learned for future implementation under the UNFCCC. Several structures and operational mechanisms were agreed in the Bali Road Map negotiations that can fit into the agreement to be negotiated at COP21 with regards to adaption, including transparency, technology transfer and response measures (Ngwadla et al., n.d.).

In parallel to the actions of the NWP under the SBSTA, the Cancun Adaptation Framework (CAF) agreed at COP 16 (Decision 1/CP.16) focuses on implementation, support and stakeholder engagement in adaptation measures and established the Adaptation Committee (AC) to promote implementation of enhanced action on adaptation (UNFCCC, 2010). The National Adaptation Plans (NAPs) process for developing countries to address medium- and long-term adaptation needs was launched under the CAF.

Institutional arrangements for adaptation have expanded over time and various adaptation-related frameworks, work streams and institutions have been established under the UNFCCC. A discussion of adaptation financing under UNFCCC funds and related institutions is available in Kato et al. (2014) and Ellis et al. (2015). There are also a number of UN agencies (e.g. UNDP, UNEP, UNISDR, FAO and WHO) and multilateral conventions (e.g. Convention on Biological Diversity (CBD) and the Convention to Combat Desertification (CCD)) with some focus on helping LDC Parties address vulnerabilities through undertaking adaptation activities and enhancing resilience. Other examples of processes that address adaptation-related issues include the post-2015 process on the Sustainable Development Goals (SDGs), the Hyogo Framework for Action 2005-2015 and the Sendai Framework for Disaster Risk Reduction 2015-2030 (see Box 1). A further review of these types of activities and potential inter-linkages amongst one another and with the constituent elements of the UNFCCC would be beneficial in future planning in order to showcase synergies between existing structures and to avoid unnecessary duplication.

⁹ The other three pillars of the UNFCCC are: mitigation, finance and technology transfer.

The international-level institutional set-up for adaptation is already complex, in terms of the number of institutions as well as the type of flows (e.g. information and finance) between them (AC, 2013; Briner et al., 2014). Furthermore, many institutions and arrangements concerning adaptation under the UNFCCC regime were established recently. This includes the Adaptation Committee (AC) and the technical guidelines for the NAP process, both agreed in 2010. Thus, full assessment of the arrangements is premature, though preliminary assessments may suggest that the post-2020 UNFCCC regime to use existing institutions and arrangement with increased effectiveness opposed to creating new and additional mechanisms and institutions (Briner et al., 2014).

Box 1. Processes outside the UNFCCC that address adaptation-related issues

There are climate change adaptation activities in place within international processes outside of the UNFCCC regime that may have particular relevance to future UNFCCC adaptation planning. One such example is the recently-adopted Sendai Framework for Disaster Risk Reduction 2015-2030 (WCDRR 2015). Within this agreement, clear references are made to climate change which underline the mandate of the UNFCCC to negotiate the climate adaptation elements relevant to the disaster risk resilience (DRR) context. The document calls for “increased, timely, stable and predictable contributions” to the United Nations Trust Fund for Disaster Reduction (§48g), but does not explicitly define the mechanism. Furthermore, the document calls for incorporation of DRR measures “into multilateral and bilateral development assistance programmes within and across all sectors, as appropriate, related to...sustainable development...and adaptation to climate change (§47d). Elements of the agreement in Sendai may send increased signalling as to the importance of adaptation measures on the international level in order to facilitate local-level actions.

2.3 Review and lessons learned

Assessing the performance of institutions and mechanisms set-up under the UNFCCC regime can yield lessons for assessing the technical feasibility of adaptation-related proposals in the 2015 Agreement. Many Parties are in the process of integrating adaptation into their national policies and development plans (e.g. food security and poverty reduction). Experience with adaptation is growing, both through mechanisms directed by the UNFCCC regime and those outside of it. This section reviews the NAPAs and NAP process under the UNFCCC, as well as National Adaptation Strategies outside the UNFCCC. Whereas it is expected that developing countries will be most affected by climate change (e.g. IPCC, 2014c), adaptation to climate change is an important issue for planning processes in all countries. Up to now, there has been greater emphasis in the UNFCCC context on guidance and support for adaptation planning in developing country and LDC Parties. Thus, the majority of the review and lessons learned under UNFCCC-guided adaptation relate to planning and actions taken by these Parties.

2.3.1 National Adaptation Programmes of Action (NAPAs) - Review

NAPAs were conceived to “identify urgent and immediate needs through an action-oriented and country-driven process that culminates in prioritisation of actions on adaptation through select projects” (LEG, 2002) and are applicable to LDC Parties only. The NAPAs are guided by an eight-step process that results in a list of discrete projects for a country, rather than a holistic adaptation plan¹⁰. The rationale behind this

¹⁰ The process includes: synthesis of available information; assessment of national vulnerability to current climate variability and extreme hazard events, the risk of which may increase due to climate change; identification of key adaptation measures; identification of criteria for prioritisation of adaptation activities and a selection of key short-term activities.

localised approach is that climate change impacts are primarily localised, so adaptation programmes tend to have the most impact and greatest efficiency when formulated and implemented locally (Brooks et al., 2011). All LDCs have submitted NAPAs and some have translated to implemented projects (SBI, 2014). NAPAs received by the UNFCCC Secretariat have been tracked and published¹¹.

The NAPA guidelines highlight the importance of projects that target adaptation for groups that are most vulnerable within countries from the socioeconomic and climatic perspectives. The need for projects to be additional to existing adaptation projects and to be mainstreamed to the extent possible (e.g. within development projects) is a key consideration under the NAPA guidance (LEG, 2002). Given the long timeframes and uncertainties associated with adaptation it is difficult to determine the extent to which this has been the case for NAPA projects, which have been implemented relatively recently.

There is some disagreement as to the relative success of the NAPAs, especially regarding whether technical guidance aspirations were achieved and the effectiveness of implementation. Focus on urgent and immediate needs has made NAPAs largely dependent on consultant-driven reviews from existing information in the analysis of sectoral vulnerability, rather than encouraging new research efforts¹² (Talafré et al., 2008). One strength of the NAPAs is that emphasis is placed on participatory processes involving vulnerable groups in different sectors and regions; a grassroots approach was employed in the development of many project plans (Osman-Elasha and Downing, 2007; Talafré et al., 2008).

Parties engaged with NAPAs and the UNFCCC are aware of constraints on technical capacities within the NAPA development that have limited effectiveness, especially in the assessment stage (SBTA, 2013; TEC, 2014). Many countries have used the NAPA process to guide national adaptation planning, including projects which include implementation of technologies for adaptation (Adaptation Committee, 2013). Some of the challenges of technology use and transfer may be countered by provisions in the new Technology Mechanism (Decision 1/CP.16) established by Parties at the Cancun Agreements in December 2010. The Technology Mechanism comprises the Technology Executive Committee (TEC) and the Climate Technology Centre and Network (CTCN). Efforts have been made to link Technology Needs Assessments (TNAs) with NAPAs and NAs (TEC, 2013). Some TNAs have drawn on completed NAPAs and 25 % of Parties identified outputs of TNAs that could fit into their national communications or NAs (TEC, 2014).

Institutional barriers have been highlighted as a main obstacle in the NAPA process, primarily due to partner organisations' bureaucratic structures causing delays in provision of data or funding for scoping research (IIED, 2008). In addition, there are various barriers to implementation of projects, including predictability of financial resources (GEF, 2009; ECBI 2010). There are some concerns that insufficient funding has been readily available for projects identified under NAPAs, especially for larger LDCs, e.g. Sudan and Ethiopia (Kissinger and Namgyel, 2014). For example, Osman-Elasha and Downing (2007) describe available funding opportunities as "either insufficient or difficult to access due to procedural constraints and complicated criteria set by the funding agencies". Furthermore, once funding has been secured, many countries feel that they have little authority over how it is spent (Blythe, 2012). The LDCF has been specifically geared towards provision of adaptation finance to LDC Parties, especially in order to support NAPA preparation activities, but the choice of which projects are selected for implementation and funding remains unclear (Huq, 2011; Kissinger and Namgyel, 2014). For example, only one project from Mozambique has been approved for funding, leaving three of the four identified national adaptation priorities unaddressed (Blythe, 2012). Ghisu and Ancharaz (2013) suggest that about three-fourths of total

¹¹ The list of NAPAs received by the UNFCCC Secretariat and the related NAPA pdf are available at: http://unfccc.int/adaptation/workstreams/national_adaptation_programmes_of_action/items/4585.php

¹² This claim does not include the consultation process.

money spent on implementation of NAPA projects thus far have been funded from sources outside the LDCF. As of 15 September 2014, a total of 158 NAPA projects had been approved by the GEF Council, with LDCF grants amounting to USD 882.7 million since 2007 (SBI, 2014b).

2.3.2 National Adaptation Plan (NAP) Process - Review

The NAP process is designed as an iterative approach, in recognition that medium- and long-term adaptation planning and action is an on-going process (LEG, 2012a). The NAP process is meant to be used by developing countries primarily to advance from NAPA experiences and arrangements into comprehensive, longer-term planning for adaptation (GCCA, 2013).

The agreed objectives of the NAP process are two-fold (Decision 5/CP.17): 1. “to reduce vulnerability to the impacts of climate change, by building adaptive capacity and resilience” and 2. “to facilitate the integration of climate change adaptation, in a coherent manner, into relevant new and existing policies, programmes and activities, in particular development planning processes and strategies, within all relevant sectors and at different levels, as appropriate.” These guidelines encourage Parties to build on existent work and to strengthen the environment to enable sustainable adaptation planning and mainstreaming (LDC, 2012).

Table 4 provides a comparison between NAPAs and the NAP process. The NAP process is still relatively new compared to the well-established NAPAs for LDCs, as discussed in the previous section. The technical guidelines of the NAP process build on the NAPA processes in several ways (Decision 5/CP.17, paragraph 2).

Table 4. Comparison of NAPAs and the NAP Process

	NAPA	NAP Process
Objective	Immediate and urgent adaptation needs; identify priority projects.	Mid-/long-term adaptation needs + iterative planning responses + implementation of NAPs
Target	LDCs	All developing country Parties with initial focus on LDCs
End product	NAPA document; implementation of some projects related to urgent/immediate needs	Enabling environment and sustainable mechanisms for advancing climate-resilient development
(National-level) Institutional Lead	Primarily Environment Ministry	Inter-ministerial co-ordination, e.g. Ministries of Planning, Finance and Environment (in a prominent role)
Financial Support	Full cost financing from LDCF for enabling activities for NAPA preparation. LDCF/bilateral funding for full cost of adaptation for select follow-up projects	Full cost financing from LDCF for preparation of the NAP process. The Least Developed Countries Expert Group (LEG) is mandated by the COP to provide technical guidance and support for the NAP process for LDCs. ¹³

The NAP technical guidelines (LEG, 2012a) suggest that NAPs will vary from country to country given needs at any given time, which is consistent with the definition of adaptation. The NAP process consists of four main steps, each of which consists of four or five broad suggested elements (Decision 5/CP.17). The four main steps are: 1) lay the groundwork and address gaps; 2) preparatory elements (e.g. analytic activities undertaken to support information gaps identified in the first step); 3) implementation strategies,

¹³ The Adaptation Committee plays an analogous role for the Parties that are not LDCs. This excludes full cost funding for preparation of the NAP Process.

and; 4) reporting, monitoring and review. The NAP provides a framework for adaptation planning, as opposed to being an end in itself (Bours et al., 2013). In this manner the NAPs may help shift thinking towards anticipatory adaptation and processes to proactive, well-structure projects, as reactive measures could become increasingly ineffective in the future (Fankhauser et al., 2013).

As of 19 November 2014, 46 developing country Parties, the majority of which are LDCs, provided information to the UNFCCC on the measures they have taken under the NAP process (UNFCCC, 2014d).¹⁴ The measures vary between countries, though the majority fall under element 1 of the NAP process constituent elements to “lay the groundwork and address gaps.” The measures taken under each element build upon one another. Table 5 provides a summary of measures taken by developing country Parties in the NAP process by element to date. Due to the short timeframe over which the NAP process has been in force, few countries have reached steps 3 (implementation strategies) and 4 (reporting, monitoring and review) (SBI, 2014a).

Table 5. Summary of measures taken by developing country Parties in the NAP process by element

NAP Element	Measures taken	Number of developing country Parties (of which LDCs)
1. Laying the groundwork and addressing gaps	Stakeholder consultations	5 (3)
	Stocktaking of available information on climate change impacts, vulnerability and adaptation	4 (4)
	Assessing gaps and needs in relation to the enabling environment for the NAP process	10 (10)
	Development of road maps and strategies for the NAP process	9 (8)
2. Preparatory elements	Comprehensive risk and vulnerability assessments	2 (1)
	Compilation of drafts NAPs	3 (3)
	Integration of adaptation into national and subnational planning	11 (4)
3. Implementation strategies	Development of implementation strategy for medium- and long-term adaptation	1
4. Reporting, monitoring, and review	Preparation of Monitoring indicators	1

Source: SBI, 2014b.

The outputs of the NAP process to date vary between countries and are largely dependent on the priorities of individual Parties (see Table 6). Some outputs are similar to Parties’ NAPAs in terms of urgent and short-term actions, while others focus on longer-term sub-regional or local plans that fit within sectoral or development planning (Kissinger and Namgyel, 2014). A review of adaptation planning for LDCs highlights that many Parties use probability/likelihood assessments to guide development of low cost and “no regret” adaptation strategies (Vermeulen et al., 2012) that are then planned to feed into NAPs.

¹⁴ http://unfccc.int/documentation/documents/advanced_search/items/6911.php?preref=600008253

However, as outlined by Hijioka et al. (2014) projections on a local basis can be highly uncertain. This may mean that other estimation approaches, such as scenario-based evaluations, could also be useful.

In planning NAPs, some countries frame climate change adaptation goals within development plans from the outset (GEF, 2014). The NAP process appears to help encourage mainstreaming climate change adaptation into sectoral planning (USAID, 2013). For some LDCs, it seems that the NAP process can provide an important platform to create and maintain necessary linkages between current and future legislation. For example, the Solomon Islands' National Development Strategy (NDS) makes responding to climate change one of eight key policy objectives (MECDM, 2012).

Parties' current adaptation efforts generally build on past and ongoing adaptation initiatives, clearly demonstrating that adaptation is a continuation of efforts based on ongoing learning. Many Parties see climate change adaptation as part of their sustainable development efforts and are increasingly mainstreaming their adaptation efforts (SBI, 2014a).

Table 6. Summary of measures taken by selected LDC and other developing country Parties in the NAP Process

Adaptation strategy	Country	Example adaptation activities
<p>No- and low- regrets options</p> <p>Prioritisation of response measures that enable conditions and institutions to support climate adaptation and economic development in tandem.</p> <p>Prioritisation of response measures based on the most vulnerable populations and regions.</p>	Bangladesh	“Climate proofing” investments have resulted in economic growth and poverty reduction.
	Nepal	Supporting local-level adaptation programmes in communities most vulnerable to climate change in the mid- and far-western regions. Building on Nepal’s 2004 Initial National Communication to the UNFCCC and the <i>National Capacity Self-Assessment</i> (2008).
	Rwanda	Irrigation infrastructure within the Integrated Water Resource Management in areas of highest vulnerability to rural livelihoods (e.g. tea and coffee export revenue areas). Development of agroforestry. Overall structure of adaptation is focused on “quick wins,” which enable key pillars, such as institutional frameworks, capacity building and knowledge transfer in the medium- and long-term.
	Solomon Islands	National Climate Change Policy (2012-2017) prioritises enabling conditions and institutional structures to respond to climate change-related risks and vulnerabilities (MECDM, 2012).
	Malawi	Developing a National Climate Change Investment Plan to help mobilise and implement climate change activities.
<p>Integrating NAPs into national development plans and priorities and cross-sector adaptation planning (mainstreaming)</p>	Bangladesh	Expert committee has suggested a four-tier monitoring mechanism to integrate adaptation into sectoral activities. The Climate Change Strategy and Action Plan (Government of Bangladesh, 2009) and the Sixth Five Year Plan (Government of Bangladesh, 2011) encourage research on climate change adaptation.
	Bhutan	11 th five-year plan (2013-2018) has a goal of climate resilience at the national and sectoral levels (Government of Bhutan, 2011).
	Cambodia	Mainstream climate change into the National Strategic Development Plan for 2014-2018. (Royal Government of Cambodia 2013).
	Ghana	Creation of the “Akropong Approach ¹⁵ ” (Kemp-Benedict and Agyemang-Bonsu, 2008) for analysis of potential cross-sectoral project plans. Uses logical framework analysis and multi-criteria analysis to identify and match problems and cross-cutting policy solutions (Kissinger et al., 2013).
	Nepal	Climate Investment Funds’ Pilot Programme on Climate Resilience to help build national capacity and institutions for climate change adaptation (ADB 2011).
	Tanzania	NAP process planned to review national and local strategies and programmes and integrate NAP priorities into the next Five year plan (United Republic of Tanzania 2013).
	Tuvalu	The National Strategic Action Plan for Climate Change and Disaster Risk Management (NSAP) was approved in 2011 and lays the institutional groundwork for mainstreaming. The need for the NSAP was identified in Tuvalu’s NAPA and feeds directly into the planned NAP process.

Source: Synthesis of information found in Kissinger and Namgyel (2014)

¹⁵ See Kemp-Benedict and Agyemang-Bonsu (2008) <http://www.sciencedirect.com/science/article/pii/S0016328708001225>

Given that the NAP process began in 2010, monitoring and evaluation of NAPs and the implementation thereof may be premature, as they are a relatively new mechanism (Briner et al., 2014). The LEG technical guidelines extend and specify how Parties may include monitoring and evaluation in NAP processes (LEG 2012), but as noted in Table 5, reporting, monitoring, and review of NAPs are not yet under consideration for most Parties. These guidelines encourage LDC Parties to define a framework and strategy for monitoring and evaluation of NAPs. Yet, it is a challenge to set-up such a framework in a manner that is consistent and efficient across contexts, as elaborated in Section 2.3.5.

2.3.4 National Adaptation Strategies

All developing country Parties to the UNFCCC are invited to undertake NAPs. Concurrently, many developed countries have created national adaptation strategies (NASs) through their own defined national-level processes. By March 2015, 24 OECD countries have published NASs, with an additional six OECD countries currently developing their adaptation plans (OECD 2015, forthcoming). Countries undertaking NASs may benefit from the extensive planning knowledge and review gained by others via NAPA development and the NAP process. Such reciprocal knowledge transfer for adaptation planning could potentially be further facilitated in future via proposals such as a Global Knowledge Platform.

A review of approaches to NAS development across countries indicates the importance of accommodating the pre-existing governance structures, especially the relationship between national and local adaptation planning. One such example is U.S. Executive Order 13653 (2013)¹⁶ which directed Federal agencies to take steps to facilitate resilience and adaptation actions at the community level. The Task Force members who undertook this work spanned state, local, private-sector players and tribal leaders to advise the Federal Administration on how it can better respond to community needs for climate change adaptation.

In many countries, an NAS provides a strategy framework that is rather generalised, while the effective planning and execution of adaptation activities is done on more localised levels. This is a point that may be salient in further development of UNFCCC-level adaptation guidance to country Parties. It has been found that adaptive capacity at a local scale is sometimes constrained by larger scale processes (Wyborn, 2015).

The European Environment Agency (EEA) (2014) conducted a survey and analysis of national adaptation policy processes in 30 European countries (see Box 2). The most frequently reported policy instruments were provision of information and mainstreaming in sectors. The greatest barriers to adaptation across this sample of countries was identified as lack of (financial and human) resources, which is similar to responses made by developing and LDC Parties. Overall, countries were found to have taken similar paths in planning for climate change adaptation. An area for greater emphasis was identified as improved understanding of governance approaches for adaptation at various levels (e.g. national, regional and local).

¹⁶ Amended by Executive Order 13683 of December 11, 2014. <http://www.gpo.gov/fdsys/pkg/FR-2014-12-16/pdf/2014-29625.pdf>

Box 2. Lessons learned from National Adaptation Strategies

The lessons identified from a review of national adaptation strategies across the EU Parties may provide some insights into aspects of the NAP process (SBSTA, 2014)¹⁷. The degree to which these strategies will successfully deliver results remains to be seen, since many are still in the initial phases of implementation.

1. **Mainstreaming:** Integrating adaptation with existing national programmes and policies is central to all adaptation strategies.
2. **Sectoral focus:** All adaptation strategies, or their related action plan, have combined the need for cross government working groups to drive implementation with strong linkages into key sectors.
3. **Stakeholder involvement:** Varying approaches have been taken on stakeholder involvement in the development process of existing adaptation strategies, from centralised to relatively decentralised. Centralised approaches have involved a small core group of administrations only, while decentralised approaches have engaged a wide range of state and non-state stakeholders.
4. **Communication and awareness-raising:** All EU Member States acknowledge that without effective communication, capacity building and awareness-raising, implementation of the adaptation strategy and associated actions will be very challenging.
5. **An evolving process:** All adaptation strategies appear to be intended as evolving documents which will be reviewed. Revision of adaptation strategies should be aligned with advancing climate change science, research and technology and enhanced capacity.

Source: SBSTA, 2014.

2.3.5 Monitoring and Evaluation for Adaptation

Monitoring and evaluation of climate change impacts under adaptation projects is not covered by internationally-agreed processes at present. However, UNFCCC guidance has encouraged risk and vulnerability assessments in the assessment stage of NAPAs, NAPs and national communications (CGE, 2012). These assessments could be useful for monitoring and evaluation of adaptation efforts underway and completed in the future. The uncertainties surrounding climate change adaptation, especially attribution of impacts, makes monitoring and evaluation particularly challenging (GEF, 2012; Lamhauge, 2015). This section reviews lessons learned and suggestions for best practices from monitoring and evaluation of climate change adaptation efforts.

¹⁷ <http://unfccc.int/resource/docs/2014/sbsta/eng/misc08.pdf>

Given the generally long timescales associated with climate change adaptation and its iterative nature, monitoring and evaluation can review either processes or outcomes, and differ according to the goal of the review. Adaptation initiatives may be placed into three broad categories (Brooks et al., 2011):

1. Addressing the existing adaptation gap¹⁸,
2. Managing incremental changes in climate-related risks, or
3. Anticipatory actions to that transform or replace existing systems and practices.

Ford et al. (2013) identify a typology of approaches that strive to monitor and evaluate adaptation: 1. outcome-based evaluations that look at reduction in climate change impacts and 2. systemic measures that monitor the status of adaptation interventions. These two types of evaluation can be linked. Process measures can inform planning by estimating best possible outcomes by seeking “to define and measure progress against the key stages...that would lead to the best choice of end point, without specifying that point at the outset (Defra, 2010). Outcome measures by default are dependent on weather events and the trajectory of climate change, as well as social uncertainties (e.g. migration patterns).

Given these delineations for monitoring and evaluation, outcome-based approaches may be best suited to assessment of individual projects, taking into account the relevant institutional and policy contexts. While national adaptation strategies and plans may be best served by process-based approaches, effective adaptation would benefit from a review of both process and outcomes (ODI, 2013)¹⁹. OECD (2015a) notes that project and programme evaluations can help identify what approaches to adaptation are most effective, while national audits and climate expenditure reviews help ensure resources allocated for adaptation efforts are targeted effectively and are cost-effective.

National monitoring and evaluation should reflect the design of a country’s frameworks for adaptation implementation and account for domestic circumstances and potential path-dependency (e.g. local or national guidance) (Lamhauge, 2015). For example, though India’s National Action Plan on Climate Change targets the mainstreaming of adaptation measures, the details of these adaptation activities are prepared and executed at the State-level via State Action Plans on Climate Change (Government of India, 2014). International guidance on monitoring and evaluation of adaptation on the national-level would need to take into account the fact that some nations (e.g. India and Canada) work on adaptation primarily at the state-level. Guidance at the international level is therefore appropriate when there is flexibility for national governments to tailor assessments to country-specific adaptation needs, with consideration for regional and local levels. Specifically, when establishing national monitoring and evaluation processes for adaptation: 1. data availability, 2. Monitoring and evaluation capacity and 3. Co-ordination between providers and users of climate data should be considered (OECD 2015a).

Different tools and indicators can be combined to provide an overview of the larger resilience picture surrounding climate change adaptation efforts OECD (2015a). Four approaches that have been identified by OECD (2015a) as creating effective monitoring and evaluation tools when combined in ways appropriate to the sectoral and governance-level being addressed:

¹⁸ The adaptation gap may be considered as the difference between the current state of a system and a state that would minimise adverse impacts of existing climate conditions and variabilities. There are recognised global adaptation gaps in technology, knowledge (capacity) and finance (e.g. UNEP, 2014).

¹⁹ As a caveat, outcome-based approaches may be well-suited to some national level adaptation approaches, especially those that impact the vulnerability of a given project to a specific weather event. Examples include coastal economic development and destruction of mangroves.

1. Climate change risk and vulnerability assessments
2. Indicators to monitor progress on adaptation priorities
3. Project and programme evaluations to identify effective adaptation approaches
4. National audits and climate expenditure reviews

As noted in Section 2.1, vulnerability and vulnerability indicators are often used as proxies for measuring adaptation, since a main goal of adaptation is to reduce vulnerability to climate change-related hazards and to build adaptive capacity. Within a system or population, vulnerability will vary as a result of differentiated physical exposure and other social, economic, political and cultural factors (Cardona et al., 2012). Vulnerability metrics and indicators will need to be selected to take these dimensions into account as well as being flexible enough to deal with varying contexts and data availability (GIZ, 2013). Vulnerability indicators often include development indicators (e.g. related to poverty), as well as additional indicators specific to particular climate risk contexts (Brooks et al., 2011).

There are three major methodological challenges affecting monitoring and evaluation of adaptation (Lamhauge, 2015; Dinshaw et al., 2014):

1. Measuring the attribution of adaptation interventions,
2. Establishing baselines and setting targets and
3. Assessing long-term climate change adaptation.

Assessing attribution for adaptation involves “identifying whether the objectives have been achieved and whether this can be attributed to the measures taken” (UNFCCC, 2010b). Specifically, mainstreaming adaptation in policies that apply across sectors may complicate the measurement process, as larger adaptation programmes (i.e. with many objectives and subcomponents) are often more difficult to understand, to monitor and evaluate effectively (SIDA, 2013).

As with many types of development interventions, linking an output criterion as resulting from a given outcome or impact is difficult (OKAPI, 2012), given the need to estimate a counterfactual against which to compare results OECD (forthcoming). Thus, result chains have been increasingly replaced with tracking of impacts and outcomes on short- or medium-terms when possible (Lamhauge et al., 2011). As adaptation becomes more mainstreamed across sectors attribution becomes more complicated to measure.

Adaptation baselines are difficult to establish, since adaptation measures foregone losses in most cases and measurable targets are not defined, especially on the national level. Thus, the use of vulnerability indices as a broader objective that indicates success of adaptation efforts may help establish comparable baselines over longer timeframes (Casado-Asensio and Steurer, 2013; OECD, 2015a). In addition, determining indicators that accurately and effectively assess adaptation projects and are in fact measureable is not straightforward (SIDA, 2013).

Indicators may be most effective when they build a framework for assessing the likelihood of success for a given adaptation intervention which is reviewed periodically and accompanied by periodic risk and vulnerability assessments. For example, the GEF Independent Evaluation Office (2013) lists three potential determinants for successful adaptation, which provide a loose framework for assessing the likelihood of success, but are not easily translated into measureable monitoring and evaluation indicators: 1. project’s ability to minimise uncertainty, 2. project’s ability to alter affected communities’ long-term perception and

behaviour concerning climate change adaptation activities and 3. project's ability to contribute to the mainstreaming of adaptation considerations into broader political, legal and regulative structures.

Box 3. Pilot Programme for Climate Resilience (PPCR) system for monitoring and evaluation

The PPCR is a targeted programme of the Strategic Climate Fund (SCF), which is one of two funds within the Climate Investment Funds framework. It is active in nine pilot countries and has two regional programmes, which includes nine AOSIS states): Bangladesh, Cambodia, Dominica, Haiti, Jamaica, Mozambique, Nepal, Niger, Papua New Guinea, Saint Lucia, Saint Vincent and the Grenadines, Samoa, Tajikistan, Tonga, Yemen and Zambia. The system is operational at the country, regional and PPCR programme levels (CIF, 2013).

The aim of the PPCR is “to pilot and demonstrate ways in which climate risk and resilience may be integrated into core development planning and implementation by providing incentives for scaled-up action and initiating transformational change” (CIF, 2009).

The monitoring and reporting process started for the PPCR in 2013. Most of the PPCR pilot countries have a draft or final plan for monitoring and reporting and have reported baselines (GIZ, 2014). The PPCR pilot countries are required to make annual reports to the CIF on five core indicators, as designed by the CIF:

1. Degree of Integration of climate change in national, including sector, planning
2. Evidence of strengthened government capacity and co-ordination mechanism to mainstream climate resilience
3. Quality and extent to which climate responsive instruments/ investment models are developed and tested
4. Extent to which vulnerable households, communities, businesses and public sector services use improved PPCR-supported tools, instruments, strategies and activities to respond to climate variability or climate change
5. Number of people supported by the PPCR to cope with the effects of climate change.

The PPCR Toolkit uses digital scorecards to help calculate the core indicators and is meant to facilitate a flexible and streamlined approach to tracking progress (CIF, 2013). Guidance on the system notes an emphasis on the learning process (i.e. agreeing on the scores through participatory processes) as a key by product of the monitoring and review process (GIZ, 2014).

Given the short period of time that the PPCR monitoring and review mechanisms have been in place, it is early to assess its effectiveness. Yet, a review of the PPCR noted that recipient countries expressed concerns about the costs of additional monitoring and review measures, especially since the PPCR is not a grant-based programme (ODI, 2014).

3. Options for including adaptation issues in the 2015 agreement

Adaptation as a process faces challenges. In particular, limited capacity and resources (e.g. financial and human) are barriers to enhanced adaptation. The on-going climate negotiations include several proposed options to enhance action on adaptation (UNFCCC, 2014a; UNFCCC, 2015a). These include the long-term and global aspects of adaptation; adaptation commitments/contributions/actions; monitoring and evaluation

(M&E); sharing information; and institutional arrangements. This section will explore what some of the options currently put forward would entail, and highlight from a technical perspective their potential to enhance adaptation actions and co-ordinated planning for greater resilience. For each proposal examined, the following criteria are outlined: the effect of the proposal as a signal of increased importance of adaptation; whether it directly enhances adaptation efforts undertaken, resilience, adaptation, improved planning, improved institutions, stakeholder involvement, information availability; whether it fulfils a new function; whether it can be used to target specific regions, groups or sectors; and whether it can be tracked or monitored.

3.1 Global adaptation goal

Early discussions under the UNFCCC framework placed more emphasis on mitigation than adaptation: both in terms of national and international goals, as well as on reporting and review. However, it has become increasingly clear that climate change is already occurring, as well as existing climate variability, and that the effects of climate change will increase in the coming decades (IPCC, 2014a). One way that the 2015 agreement could increase emphasis on adaptation could be to establish similar provisions for both mitigation and adaptation. However, the characteristics of mitigation and adaptation are different, which may limit the viability of “parallelism” between the two issues in the 2015 agreement; a comprehensive agreement will take both into account, but in different manners (Ngwadla and Karlsen, 2015). Text agreed at COP16 in Cancun for mitigation recognised “that deep cuts in global greenhouse gas emissions are required according to science ... so as to hold the increase in global average temperature below 2°C above pre-industrial levels, and that Parties should take urgent action to meet this long-term goal” (UNFCCC, 2010).

The Geneva negotiating text (UNFCCC, 2015a) includes an option to establish a global goal for adaptation, which could be seen as a way to mirror this mitigation-related text. Conceptually, a global goal on adaptation provides a goalpost for Parties to collectively aspire to reach and as such can raise the political profile of the issue. Yet, the structure of such a global goal is not made explicit in the Geneva negotiating text and the effectiveness and viability of such a goal will be affected by the structure that the agreement takes. There are various options for how a goal could be structured. A global adaptation goal could be presented in qualitative or quantitative terms. It could include components focusing on inputs (e.g. support), processes (e.g. planning and institutional interactions) and/or on outcomes (e.g. increasing resilience to the effects of climate change).

Establishing a quantitative goal for a global adaptation response would be challenging for several reasons. These include that adaptation actions are highly site-specific, involve multiple sectors and can frequently be cross-cutting in nature. This means that there is no single environment-related unit in which adaptation actions or progress towards climate resilience can be meaningfully presented and aggregated (Adaptation Committee, 2014). Without a single unit in which progress towards climate resilience can be identified and monitored/tracked, it would be challenging to establish a single quantitative global goal. In addition, it is more straightforward to quantify the inputs or immediate outputs of adaptation actions – whereas it is the (often longer-term) outcomes or impacts of these actions that affect resilience.²⁰ However, using outcome indicators can be challenging, as appropriate datasets may not exist at the level of disaggregation needed (e.g. watershed, city, sub-national region, ASC 2014). Moreover, there can be a significant time lag between implementing an action and identifying its effectiveness (Ellis et al., 2013; OECD, forthcoming). This also impedes accurate and timely identification of progress towards a goal. In addition, discussions have highlighted that it is “neither necessarily possible nor desirable” to aggregate indicators from a local to a national level (Adaptation Committee, 2014a). While countries may share an overarching goal of

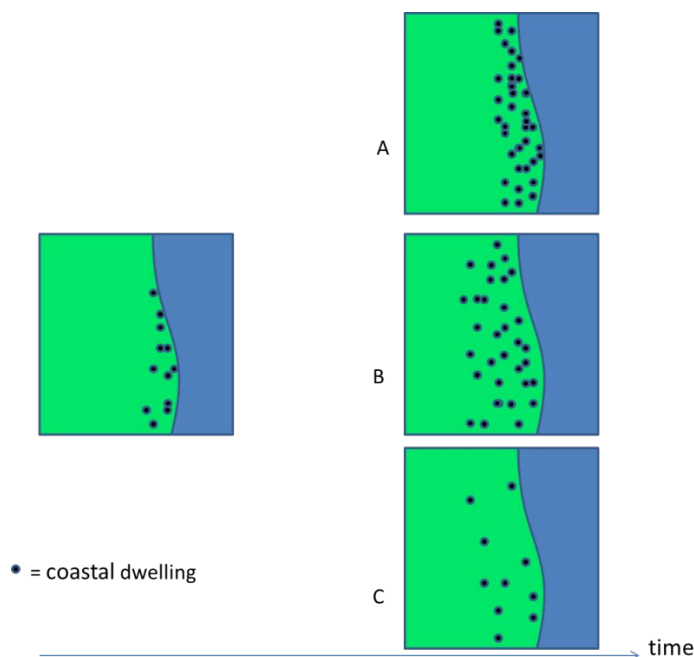
²⁰ For example, the training of farmers (output = number of farmers trained), outcome = changing cropping habits, impact = improved food security.

increasing their resilience, the path to achieving increased resilience is likely to be different for e.g. low-lying coastal countries and land-locked mountainous countries, and so is also likely to be assessed in a different manner.

As outlined by the UNISDR (2013), “it is the combination of public and private investment and how this investment is managed and regulated that determines the degree of hazard, exposure and vulnerability that a country faces”. Thus, both the extent of climate change and domestic policy and socio-economic changes will influence the number of people affected by a given climate event (and the cost of adapting to such an event). This is illustrated in Figure 1, which presents three possible development pathways over time for a given coastal area. Pathway A leads to a densely populated coast, pathway B is less-densely populated, and pathway C leads to a sparsely-populated coast. For a given sea-level rise, the number of people or households at risk, as well as the cost of adaptation measures will vary between the different development pathways.

Some potential structures of a global goal could conflate national and international issues. This could occur for goals expressed, e.g. in terms of numbers/percentages of people or value of infrastructure affected by climate impact X. Disentangling these sub-national, national and international effects would be challenging, rendering progress towards a quantitative global adaptation goal difficult to attribute to adaptation actions (versus socio-economic, regulatory or other changes). For this reason, a review of the Hyogo Framework for Action (UNISDR, 2013) suggests that three sets of indicators would be needed to assess reduced vulnerability: 1. indicators focusing on underlying drivers, 2. on disaster risk and 3. on resilience.

Figure 1. Influence of socio-economic developments on resilience



An alternative would be to establish a qualitative global adaptation goal, e.g. to enhance adaptive capacity and improve the resilience of populations to climate change, to improve integration of climate concerns into national planning, and to collect relevant data. These are all issues that are important in enhancing adaptation, but that may be difficult to quantify in an objective manner. This has led some adaptation

practitioners to suggest using “qualitative targets” for climate adaptation (e.g. Adaptation Committee, 2014a; PPCR, 2009). The international community has experience with establishing qualitative goals for climate adaptation in various international fora. For example, the proposed SDG on climate change (OWG, 2014) includes qualitative sub-goals relating to adaptation, including to strengthen adaptive capacity and to integrate adaptation into national strategies and plans. The Hyogo Framework for Action (HFA) includes five strategic priorities in the area of disaster risk reduction (Prevention Web, 2015). These five priorities are also qualitative, e.g. “Making disaster risk reduction a policy priority”, as are the underlying core indicators. Qualitative monitoring reports (by country, as it is difficult to aggregate qualitative reports) highlight that progress has been made in several countries, although this varies between “minor” and “substantial” (HFA 2011). The Convention on Combating Desertification also includes four “strategic objectives” in its 10-year strategic plan to enhance the implementation of the Convention (UNFCCC, 2003). These objectives are all qualitative. One of the long-term impacts of the 1st strategic objective is adaptation-related, i.e. that affected populations’ socio-economic and environmental vulnerability to climate change, climate variability and drought is reduced (UNCCD, 1994).

There could be significant challenges in implementing a global adaptation goal, even if it is qualitative. These relate to the legal nature of a goal as well as to assessing progress towards a goal. Assessing progress towards a qualitative goal is possible but challenging. For example, qualitative goals are used in the World Bank-run Pilot Program for Climate Resilience (PPCR) for specific activities (see Box 2). However, assessing progress to a qualitative goal (e.g. integrating climate risks into development strategies) can also be challenging due to the subjective aspects of such an assessment. Some countries may be uncomfortable in agreeing to a legally-binding commitment which cannot be determined objectively.

The effectiveness of a global adaptation goal for enhancing specific adaptation actions would depend on how such a goal is phrased. An advantage of establishing an adaptation goal (that is functionally tailored) would be to send an international signal of the importance of developing and implementing integrated adaptation strategies. This could in turn raise the political profile of adaptation at a national level, and thus facilitate enhanced national-level co-ordination, institutions, planning and/or actions. Table 7 summarises the characteristics of both a global qualitative and quantitative goal.

Table 7. Global adaptation goal – summary characteristics

	Qualitative global goal	Quantitative global goal
Sends increased international political signal on importance of adaptation	Yes	Yes: would be challenging to identify appropriate indicator(s).
Directly enhances resilience	No: could potentially do so indirectly depending on how goal is phrased and if/how progress is assessed.	No: could potentially do so depending on how goal is phrased and if/how progress is assessed.
Directly enhances adaptation action	No: could potentially depending on how goal is phrased, implementation is supported and if/how progress is assessed.	No: could potentially do so depending on how goal is phrased, implementation is supported and if/how progress is assessed.
Directly recognises national adaptation efforts	No: unlikely to be this detailed.	No: unlikely to be this detailed.
Directly encourages improved planning	No: could potentially do so depending on how goal is phrased, though unlikely to be specific to national- and regional-level planning.	No: could potentially do so depending on how goal is phrased, though unlikely to be specific to national- and regional-level planning.
Develops improved international institutions	Potentially: depending on how goal is phrased and the supporting implementation measures within the UNFCCC.	Potentially: depending on how goal is phrased and the supporting implementation measures within the UNFCCC.
Encourages improved national or sub-national institutions	No: unlikely to be this detailed.	No: unlikely to be this detailed.
Encourages increased stakeholder involvement	No: unlikely to be this detailed.	No: unlikely to be this detailed.
Improves information availability	No: proposed structure does not include provision(s) related to this characteristic.	No: proposed structure does not include provision(s) related to this characteristic.
Fulfils a new function	Yes	Yes
Can be tracked/ monitored	Potentially (limited): limited, likely subjective tracking is possible.	Potentially: note that data constraints are likely to be considerable.
Can be targeted to specific regions, groups or sectors	Potentially: depending on how goal is phrased, implementation is supported and if/how progress is assessed.	Potentially: depending on how goal is phrased, implementation is supported and if/how progress is assessed.

3.2 Universal individual commitments/contributions/actions

The 2015 agreement could reiterate or strengthen universal individual (i.e. country-specific) provisions included in the UNFCCC regarding adaptation. For example, Article 4.1b of the UNFCCC indicates that Parties are to “formulate, implement, publish and regularly update national and, where appropriate, regional programmes containing measures to ... facilitate adequate adaptation to climate change”. In addition, countries are to “co-operate in planning for adaptation” (Article 4.1e) and “take climate change

considerations into account...in their relevant social, economic and environmental policies and actions” (Article 4.1f).

Including provisions in the 2015 agreement for adaptation commitments, contributions or actions by individual Parties would strengthen the signal that adaptation is an important component of climate responses. By indicating at the international level that national-level action is required, it could therefore help to catalyse domestic action on adaptation. Table 8 (below) summarises the characteristics of the current proposal for universal individual commitments, contributions or actions.

Given the heterogeneous nature of adaptation, as well as differing national circumstances of countries, any such commitments/contributions/actions would be likely to vary widely between different countries. For example, a commitment/contribution/action could focus on institutional, policy, planning, financial and/or specific adaptation actions. As such, actions undertaken under a universal individual commitment/contribution/action could be similar with those proposed e.g. under an (I)NDC or via the NAP process.

The legal nature of the 2015 agreement may, however, influence the type of commitment, contribution or action undertaken. In particular, it may be politically difficult for countries to put forward an outcome or impact-related commitment/contribution/action. This is because while countries can determine their individual adaptation activities, they cannot always determine the outcome of these activities.

Indeed, recent analysis from the IPCC (2014a) indicates that even high levels of adaptation actions will not be sufficient to ensure only low risks of climate change in some countries and sectors. For example, high levels of adaptation are expected to reduce climate risks, but in the long-term (2080-2100) under a 2°C warming scenario, these risks will remain at “medium” levels for crop productivity in Africa, and at high levels for heat-related mortality in Asia (IPCC, 2014a). Further, a *force majeure* may mean that a country’s actions are not, or are less, effective than anticipated. One of the criticisms of the Hyogo Framework for Action is that its monitoring focuses on input indicators, and does not measure whether the strategic objective of reducing risks has been met (UNISDR, 2013).

Table 8. Universal individual commitments, contributions or actions – summary characteristics

Sends increased international political signal on importance of adaptation	Yes
Directly enhances resilience	No: although could potentially do so; any commitments, contributions or actions may be focused on inputs or immediate outputs rather than longer-term resilience.
Directly enhances adaptation action	Yes
Directly recognises national adaptation efforts	Yes
Directly encourages improved planning	No: could potentially do so depending on the content of the commitment, contribution or action.
Develops improved international institutions	Potentially: depending on how the content of the commitment, contribution or action.
Encourages improved national or sub-national institutions	Potentially: depending on the content of the commitment, contribution or action.
Encourages increased stakeholder involvement	Potentially: depending on the content of the commitment, contribution or action.
Improves information availability	Potentially: depending on the content of the commitment, contribution or action.
Fulfils a new function	No: similar provisions already exist in the UNFCCC.
Can be tracked/ monitored	Potentially: Note that input or output indicators will be easier to track than outcome or impact indicators.
Can be targeted to specific regions, groups or sectors	Yes

3.3 Adaptation component of (I)NDCs

The concept of nationally determined contributions (NDCs) was agreed at COP 19 (UNFCCC 2013b). Intended nationally determined contributions (INDCs) are to be proposed in advance of the 2015 agreement, and are meant to give a prior indication of a given country's efforts. The Lima Call for Climate Action invites all Parties to "consider including an adaptation component in their intended nationally determined contributions" (UNFCCC, 2014a). The negotiating text from COP 20 outlines possible aspects of the adaptation component of an (I)NDC. These include information on specific adaptation actions or programmes that are planned or implemented. Other possible aspects of (I)NDCs could address issues that have been noted as barriers to enhanced adaptation actions. These include: institutional aspects at the national level (e.g. integrating adaptation within national development planning, strengthening governance and enabling environments)

- Planning aspects (e.g. undertaking a national adaptation plan (NAP) process);
- Financial aspects (e.g. developed countries to formulate adaptation support plans); or
- Information-related aspects (e.g. developing countries to showcase their adaptation efforts and needs).

Several provisions related to adaptation-related institutions, planning, information or finance are already included in the UNFCCC and subsequent COP decisions (e.g. UNFCCC Art 4, 12/CP.18). The subsections below outline how the institutional and planning aspects are currently treated under the UNFCCC, how this could be changed, and how such a change could enhance national adaptation.²¹

3.3.1 Institutional aspects

The adaptation-related institutions that have been set up under the UNFCCC are outlined in Section 2.2. All Parties are already free to use adaptation guidelines set-up by the LEG (2012) should they choose. Guidance on institutional aspects are included in the NAP process documentation²². Further, the Adaptation Committee's 2014 thematic report has shown that institutional arrangements play a crucial role in facilitating the integration of adaptation issues into planning and implementation of development policies, strategies and projects (Adaptation Committee, 2014b). This report also indicates that NAPs "offer a promising platform" to strengthen institutional capacity (Adaptation Committee, 2014b). There is therefore likely to be several similarities between undertaking a NAP process and including institutional issues relating to adaptation in an (I)NDC. The National Adaptation Plan guidelines (LEG, 2012a) explicitly include steps relating to institutional aspects, such as building capacity to integrate climate change into planning. Parties choosing to include an adaptation component in their (I)NDC could reference the national and sub-national institutional aspects of the adaptation process that they are undertaking.

Analyses of experience with adaptation planning to date have suggested a range of national-level institutional recommendations to help countries improve their adaptation responses. These include recommendations related to co-ordination and policy coherence; and the need for flexibility to respond to a changing policy and natural environment (see e.g. Adaptation Committee, 2014b, CGIAR 2014, EEA 2014, OECD 2009). They also highlight challenges (see e.g. Mullan et al., 2013) related both to funding national adaptation activities and how to assess progress in reducing vulnerability to climate change.

Improved co-ordination of adaptation efforts within a country should help to ensure policy coherence and reduce the risk of "maladaptation" (OECD, 2009; CGIAR, 2014) explicitly recommends "increased capacity for integrated approaches to adaptation planning ... in order to assess the relationships and trade-offs" between different sectors. Some adaptation strategies, e.g. within the EU, have explicitly highlighted the need to integrate adaptation strategies into sector plans (e.g. forestry and transport), and for co-ordination, e.g. with policies on disaster risk management (EC 2013). Experience from the Climate Investment Funds has indicated that for some developing countries it is effective to place a co-ordination unit within the Ministry of Finance, as this can reinforce the importance of climate change in the national development agenda (CIF, 2015). The 2015 agreement could highlight some of these lessons learned to date, and encourage further lesson-sharing (e.g. by maintaining an up-to-date website of lessons learned or by encouraging information exchange on lessons learned in workshops held in the margin of the climate negotiations).

Several analyses have highlighted the importance of involving local actors within adaptation-related institutional planning, in general (e.g. Adaptation Committee, 2014b; CGIAR, 2014). Others highlight the importance of involving sub-national governments specifically (e.g. DENR, 2012) in adaptation planning and actions.

As the 2015 agreement focuses on action undertaken by countries but in an international context, the level of detail that it could enter into regarding the national planning and institutional process within individual

²¹ The issue of provision of finance for adaptation actions, while important, is outside the scope of this paper.

²² Developing countries are invited to follow these guidelines in addition to LDC Parties. LEG (2012a).

countries is likely to be very limited. For example, the 2015 agreement could encourage countries to enhance their national planning process by encouraging all countries to use appropriate technical guidelines, such as those established by the LEG (2012a), to develop national adaptation plans, and to learn from the experience of countries that have developed NAPs (Kreft et al., 2011). These guidelines include specific steps on integrating climate change adaptation into national and sub-national development and sectoral planning as well as on promoting co-ordination and synergy at the regional level and with other multilateral environmental agreements. Table 9 (below) provides an outline summary of characteristics of the current proposal for institutional-focused adaptation (I)NDCs.

Table 9. Institutional-focused adaptation (I)NDCs – summary characteristics

Sends increased international political signal on importance of adaptation	Potentially: depending on what is included, specifically if an adaptation component is mandatory for (I)NDCs or if a number of influential Parties choose to include an adaptation component.
Directly enhances resilience	No: could potentially do so depending on if and what is included within an adaptation component for (I)NDCs.
Directly enhances adaptation action	No: could potentially do so depending on if and what is included within an adaptation component for (I)NDCs. Possible national institutions and co-ordination could be aimed towards enhancement of adaptation action.
Directly recognises national adaptation efforts	Yes
Directly encourages improved planning	No: could potentially do so depending on if and what is included within an adaptation component for (I)NDCs. Possible national institutions and coordination could be aimed towards increasing effective adaptation planning.
Develops improved international institutions	No: proposed structure does not include provision(s) related to institutions on the international level.
Encourages improved national or sub-national institutions	Yes
Encourages increased stakeholder involvement	Potentially: depending on if and what is included within an adaptation component for (I)NDCs. Dependent on how individual Parties address an adaptation component of (I)NDCs; manner of implementation will differ between Parties.
Improves information availability	Potentially: depending on if and what is included within an adaptation component for (I)NDCs. Dependent on how individual Parties address an adaptation component of (I)NDCs and register/share information and knowledge.
Fulfils a new function	Potentially: depending on how it is phrased. Note that institutional aspects are included in the NAP process (which developing countries are invited to follow, see LEG 2012a); many developed countries already have an adaptation plan or strategy in place.
Can be tracked/ monitored	Potentially: depending on if and what is included within an adaptation component for (I)NDCs. Dependent on how individual Parties address an adaptation component of (I)NDCs and decide to track/monitor progress of related institutions.
Can be targeted to specific regions, groups or sectors	Yes

3.3.2 *Planning aspects*

Considerable work has already been done at the national and international levels to guide improved adaptation planning. For example, technical guidelines for the National Adaptation Plan process have been developed (LEG, 2012a). These detailed technical guidelines (more than 130pp of steps and key questions) were developed for LDCs and COP 19 indicated that they can also be used by other Parties (UNFCCC, 2013c). COP 20 invited Parties to forward to the UNFCCC their NAPs as well as outcomes related to the process to formulate and implement NAPs (UNFCCC, 2014b). As well as institutional aspects, the guidelines also explicitly include planning aspects, such as a step for “addressing capacity gaps and weaknesses in undertaking the NAP process” (LEG, 2012a). Uncertainties in the nature and extent of local or regional climate change could complicate and/or extend planning adaptation actions (Ngwadla and Karlsen, 2015). To date, provisions in the UNFCCC context relating to countries’ adaptation actions or have often been couched in quite tentative terms. For example, the CAF adopted at COP16 “invites all Parties to enhance action on adaptation” (UNFCCC, 2010). This may be because – unlike climate mitigation - the benefits of adaptation (or disadvantages of not adapting) may be most strongly felt at the local (e.g. sub-national) level.

Assessments of country experiences to date on national adaptation planning have identified some relevant emerging lessons learned. These include that data and information are important in developing a national adaptation plan. Furthermore, the data types and information best suited for a functionally tailored response to the national context is significant, as well as addressing data gaps. For example, the focus of the many adaptation projects in Malawi is on agriculture and governance, both of which were identified as priority actions in its NAPA (Prevention Web, 2015). Though Annex I countries’ national adaptation strategies have some features in common with NAPs, but they are not synonymous and in many cases predate the Cancun framework. The UK’s National Adaptation Programme also addresses the highest-order risks identified by a national climate change risk assessment (HMG, 2013). However, some analyses, e.g. EEA (2014), indicate that data and information are not pre-requisites to developing a plan. Other lessons learned include that prioritising different risks and adaptation activities is difficult in the absence of standardised methods for different sectors (CGIAR, 2013). Indeed, prioritising national adaptation options “is seldom applied” by European countries (e.g. EEA, 2014).

Including text in the 2015 agreement that encourages adaptation planning would give further profile to this important issue. It is unlikely that the (international) 2015 agreement would be prescriptive about the exact steps that (individual) countries would need to undertake. Thus, any text regarding the NAP process is likely to be facilitative. As such, it would be difficult to assess the impact that such a text (vs autonomous national developments, and also affected by the level of finance available) would have in increasing adaptive capacity in countries (see Table 10).

Table 10. Planning-focused adaptation contributions – summary characteristics

Sends increased international political signal on importance of adaptation	Potentially: depending on what is included, specifically if an adaptation component is mandatory for (I)NDCs.
Directly enhances resilience	No: could potentially do so indirectly depending on what is included and how individual Parties decide to address planning with regards to a possible adaptation contribution for (I)NDCs.
Directly enhances adaptation action	No: could potentially do so indirectly depending on what is included and how individual Parties decide to address planning with regards to a possible adaptation contribution for (I)NDCs.
Directly recognises national adaptation efforts	Yes
Directly encourages improved planning	Yes
Develops improved international institutions	Potentially (indirectly): depending on what is included and the extent to which there are additions/changes to planning guidelines offered by the UNFCCC.
Encourages improved national or sub-national institutions	Potentially: depending on what is included and the manner by which Parties address these issues. Likely that different Parties will develop national and sub-national institutions.
Encourages increased stakeholder involvement	Potentially: depending on what is included and if/how guidance on stakeholder involvement is addressed.
Improves information availability	Potentially: depending on what is included and how planning is addressed.
Fulfils a new function	Potentially: institutional aspects are included in the NAP process (which developing countries are invited to follow); most developed countries already have an adaptation plan or strategy under development or in place.
Can be tracked/ monitored	Potentially: qualitative metrics are most likely for tracking/monitoring planning processes.
Can be targeted to specific regions, groups or sectors	Yes

3.4 International-level institutions for governing adaptation

The Geneva negotiating text (UNFCCC, 2015) outlines different proposed options for international institutional arrangements for adaptation. One option is that the current institutional arrangements shall support Parties in implementing adaptation. Another is that new international institutional arrangements such as a subsidiary body for adaptation or adaptation registry should be developed. These are discussed below.

3.4.1 Continuing with the current international institutional arrangements

Several institutional arrangements focusing on adaptation have already been established under the UNFCCC process. These include individual institutions (e.g. Adaptation Committee), institutional arrangements (e.g. the Nairobi Work Programme) or funds (e.g. the Adaptation Fund). As outlined in these reports (see Briner et al 2014, Adaptation Committee 2013), some of the current institutional architecture for adaptation is relatively recent. While these institutions and arrangements have led to a number of

outputs, “time is needed before the effectiveness of these institutions and arrangements can be fully assessed” (Briner et al., 2014).

In addition to adaptation-specific institutions, there are several bodies under the Convention that deal with adaptation as well as other issues. For example, the UNFCCC’s Subsidiary Body for Scientific and Technological Advice (SBSTA) and Subsidiary Body for Implementation (SBI) both work on adaptation-related issues. Thus, SBSTA 41 (2014) activities included a report on lessons learnt and good practices relating to adaptation planning processes. In addition, SBSTA co-ordinates the Nairobi Work Programme (NWP). The work of the “Consultative Group of Experts” (CGE) is under the SBI, and includes work including identifying best practices and lessons learnt in compiling national reports under the UNFCCC, as well as in developing training materials on vulnerability and adaptation assessments (SBI, 2014c).

In addition to adaptation-specific institutions, climate finance channelled through the Green Climate Fund (GCF) will fund adaptation activities in developing countries. The GCF aims for a 50:50 balance between mitigation and adaptation over time (GCF, 2014a). Further, half of the adaptation expenditure will be focused on LDCs, SIDs and Africa (GCF, 2014b). The GCF has also established indicators of performance management results for adaptation. These indicators include one related to improving co-ordination and coherence of adaptation actions in countries, and another on mainstreaming adaptation into governments and societies (GCF, 2014b). Having indicators against which the adaptation expenditure of the GCF will be explicitly screened should help encourage increased allocation of resources to these areas. In addition, funding has been earmarked for readiness activities such as engaging with stakeholders, ensuring institutions to meet the accreditation requirements of the GCF, and developing a project pipeline (GCF, 2014c). However, while pledges of more than USD10bn were made to the GCF in late 2014, disbursement has not yet started.

Continuing with the current international institutional arrangements for adaptation thus has the potential to build on their existing outputs and outcomes to continue to enhance adaptation planning and action in countries. However, given the early stage of some international institutions and arrangements, the extent to which this potential will be realised is uncertain. If this option is taken forward, text in the 2015 Agreement could encourage use of existing institutions, arrangements and guidance. Text in the 2015 agreement could also indicate that a review of the effectiveness of these institutions, arrangements and guidance will be carried out in [x] years. Including a review mechanism (or sunset clause) would facilitate subsequent changes. In cases in which the decisions that established existing institutions already provide for review mechanisms, it may be useful to provide guidance on further review of interlinkages between such institutions in the future. Table 11 (below) provides an outline summary of characteristics of the current proposal for continuing with existing international institutions.

Table 11. Continuing with existing international institutions – summary characteristics

Sends increased international political signal on importance of adaptation	No
Directly enhances resilience	No: could potentially do so indirectly, as a number of current institutions have provisions indirectly related to enhanced resilience (e.g. the NWP and the Adaptation Committee).
Directly enhances adaptation action	No: could potentially do so indirectly, as a number of current institutions have provisions indirectly related to enhanced adaptation actions and planning (e.g. the Adaptation Committee and guidance for the NAP Process).
Directly recognises national adaptation efforts	No: could potentially do so indirectly, as some current institutions provide guidance related to adaptation efforts on the national level.
Directly encourages improved planning	No: could potentially do so indirectly, as a number of current institutions have provisions indirectly and directly related to improved planning, especially at the national level. It will take time to assess effectiveness of planning.
Develops improved international institutions	No: maintaining current institutions does not develop improved institutions without explicit changes.
Encourages improved national or sub-national institutions	Potentially: depending on effectiveness of implementing current mandate; likely that different Parties will develop national and sub-national institutions that address adaptation in differing manners.
Encourages increased stakeholder involvement	Potentially: depending on effectiveness of implementing current mandate; likely that individual Parties will develop processes that relate to stakeholder involvement differently.
Improves information availability	Potentially: depending on effectiveness of implementing current mandate; likely that individual Parties will develop processes that relate to recording and making available knowledge differently.
Fulfils a new function	No: maintaining current institutions does not develop improved institutions without explicit changes.
Can be tracked/ monitored	Potentially: assessment of international institutional arrangements is possible, most likely qualitative in nature.
Can be targeted to specific regions, groups or sectors	Yes

3.4.2 Develop new international institutions – including for enhanced learning

As outlined in Section 2 and the Annex to this paper, there are already several international institutions in place under the UNFCCC that focus on adaptation. Nevertheless, there are specific proposals included in the Geneva text for new international institutions as options to enhance adaptation (as well as a proposed option to have no new institutional arrangements for adaptation). The proposals for new institutional arrangements are for: a subsidiary body for adaptation; an adaptation registry; an international clearing house and registry; and a global knowledge platform. Thus, three of these new proposed institutions include knowledge-sharing components. The importance of knowledge-sharing to address information gaps is widely acknowledged, including in the UNFCCC context (UNFCCC, 2014c).

International institutions that disseminate information about adaptation actions, such as a clearing house or registry, can facilitate enhanced adaptation planning and implementation. Information about climate risks, adaptation opportunities, adaptation actions and their effectiveness are important inputs to a national

adaptation plan (LEG, 2012a). By highlighting potential climate impacts on individuals and communities, increased information awareness can be an important driver for change (e.g. USAID, 2014; CIF, 2014). In particular, knowledge-sharing platforms that are easily accessed throughout the world (e.g. online platforms) may help to overcome challenges faced in connecting knowledge with action at various scales. Such platforms could also help to foster relationships between actors across different scales (Wyborn, 2015).

Details of the functions of these proposed new international institutions in relationship to information exchange and how they would function are scarce. However, it is likely that the possible functions of these new arrangements overlap to some extent with each other, as well as with some existing arrangements. The Adaptation Committee's remit also includes sharing of relevant information, knowledge, experience and good practices. In addition, the NWP was established to facilitate and catalyse the development and dissemination of information and knowledge to support adaptation policies and practices and includes an annual exchange of views with different stakeholders via the Focal Point Forum. Further, the recently-established UNFCCC "NAP Central" website aims to provide examples and case studies, and a platform for exchanging experiences, lessons and best practices in the formulation and implementation of adaptation plans, (UNFCCC, 2015b). In addition, several other adaptation-related knowledge-sharing or learning mechanisms have been established e.g. the UNDP-facilitated Adaptation Learning Mechanism, which is itself a GEF-funded project (ALM, 2015). The "NAP Central" by mandate and many of the mentioned institutions by default have been focused on LDCs and developing country Parties to date. Applying them across a broader range of Parties would require significant scaling up and inherent assessment of institutional structures. Nevertheless, the potential gains from increased remote sharing of information could be significant.

However, while a lack of information can constrain adaptation actions, ensuring that information is available is not in itself sufficient to drive adaptation actions (IPCC, 2014b). Nevertheless, there are now several publications highlighting lessons learnt in how to enhance adaptation actions, policies or implementation (e.g. Adaptation Committee, 2014b; LEG 2012b). Further, there is a wide and growing literature highlighting experience with vulnerability assessments, adaptation planning and implementation (e.g. UNFCCC, 2014c; USAID, 2014). As the characteristics of successful adaptation actions are likely to vary site to site, institutional and process lessons relating to adaptation activities may be more transferrable than information about the specific actions. Before creating a new institution or arrangement, it will be important to identify what gap such an institution would fill, and whether a new institution is the most efficient way of filling such a gap. Table 12 (below) provides an outline summary of characteristics of current proposals for new international adaptation institutions.

Table 12. New international adaptation institutions – summary characteristics

	Subsidiary body for adaptation	Adaptation registry	Adaptation clearing-house and registry	Global knowledge platform
Sends increased international political signal on importance of adaptation	Potentially: several int'l institutions dealing with adaptation already exist, but establishing a subsidiary body focused on this issue may raise its profile further.	Potentially: based on structure, reporting requirements and implementation.	Potentially: based on structure, reporting requirements and implementation.	Potentially: a number of knowledge-sharing and informational platforms already exist. An additional knowledge platform could provide an increased signal on adaptation, depending on its structure, reporting requirements and implementation.
Directly enhances resilience	No: could potentially do so indirectly depending on what is included, the mandate of the body and relationship to other int'l institutions dealing with adaptation.	No: could potentially do so indirectly by matching needs and funders among other functions.	No: could potentially do so indirectly by matching needs and funders among other functions.	No: could potentially do so indirectly by matching needs and pre-existing knowledge/ know-how.
Directly enhances adaptation action	No: could potentially do so indirectly depending on what is included and the relationship the body has to individual Parties reporting. Countries already can report their adaptation actions and needs via their National Communications (NCs).	No: could potentially do so indirectly depending on what is included and the relationship the body has to individual Parties for reporting.	No: could potentially do so indirectly depending on what is included and the relationship the body has to individual Parties for reporting.	No: could potentially do so indirectly depending on what is included – what aspects of adaptation are reported and the extent to which Parties use the platform for adaptation planning and implementation.
Directly recognises national adaptation efforts	No: could potentially do so indirectly depending on what is included and the extent to which individual Parties are required to report.	Yes	Yes	Yes
Directly encourages improved planning	No: could potentially do so indirectly depending on what is included and the extent to which individual Parties are required to report and/or follow guidance.	No: could potentially do so indirectly depending on what is included and the relationship the body has to individual Parties for reporting on planning processes.	No: could potentially do so indirectly depending on what is included and the relationship the body has to individual Parties for reporting on planning processes.	No: could potentially do so indirectly depending on what is included – what aspects of adaptation are reported and the extent to which Parties use the platform for adaptation planning and implementation.

	Subsidiary body for adaptation	Adaptation registry	Adaptation clearing-house and registry	Global knowledge platform
Develops improved international institutions	Potentially: unclear whether this new international institution would be an improvement over existing int'l institutions that address adaptation.	No: does not directly require new or improved int'l institutions.	No: does not directly require new or improved int'l institutions.	No: does not directly require new or improved int'l institutions.
Encourages improved national or sub-national institutions	Potentially: though there are many pre-existing institutions dealing with adaptation, a subsidiary body it may further encourage improvements within national and/or sub-national institutions.	Potentially: depending on what is included and the relationship the body has to individual Parties for reporting adaptation information.	Potentially: depending on what is included and the relationship the body has to individual Parties for reporting adaptation information.	No: proposal does not directly address national- or sub-national level institutions.
Encourages increased stakeholder involvement	Unclear: not specified in the proposal.	No: criterion not relevant to the proposal.	No: criterion not relevant to the proposal.	No: criterion not relevant to the proposal.
Improves information availability	Potentially: depending on what is included and the extent to which individual Parties are required to report and/or follow guidance.	Potentially: depending on registry structure.	Potentially: depending on registry structure.	Potentially (likely): depending on the structure and use of the platform.
Fulfils a new function	Unclear: not specified in the proposal.	Partially: countries already can report their adaptation actions and needs via their NCs	Partially: countries already can report their adaptation actions and needs via their NCs	Unclear: not specified in the proposal.
Can be tracked/monitored	Yes	Yes	Yes	Yes
Can be targeted to specific regions, groups, sectors	Unlikely: not specified in the proposal.	Unlikely: unless certain activities were disqualified from submitting information.	Unlikely: unless certain activities were disqualified from submitting information.	Potentially: depending on the structure and use of the platform.

3.5 Evolution of the NAP Process

The Geneva text (UNFCCC, 2015a) includes several options that relate to Parties undertaking a NAP process, or improvements/extensions to the NAP process. Thus, there are options for Parties to undertake a NAP process (paragraph 51, options 1, 8, 9 and 10), for adaptation responses to be informed by the NAP process (51.8a) or to build on adaptation mechanisms and processes under the Convention (51.7fii). There is also an option for the NAP process to not be mandatory (51.8b). The first option would potentially establish NAPs as a main vehicle by which countries' adaptation responses on the national level are developed and integrated into national development planning.

COP 20 invited Parties to present their NAPs and related outcomes to the UNFCCC (UNFCCC 2014), which may provide more visibility to the process and facilitate easing of bottlenecks previously identified for funding and implementation. Aside from the negotiations, there have been country-led initiatives to support the development of NAPs. Furthermore, the NAP Global Network was launched at COP 20. It is a group of developing and developed countries (Germany, Jamaica, Japan, Peru, the Philippines, Togo, the UK and the USA) that aims to enhance bilateral support under the NAP process (UNFCCC, 2015c).

There has been considerable national level adaptation planning by Parties, as noted in section 2.3.2. At present LDCs and developing country Parties are the target audience for the NAP process, but most Parties have national adaptation strategies. These strategies have many similarities with the process set out by the NAP process technical guidance (LEG, 2012a), such as mainstreaming. Thus, the effect of requiring all Parties to guide national adaptation actions through the NAP process guidelines is unclear. It largely depends on the extent to which engagement with the NAP process is required versus suggested guidance. Furthermore, the modalities through which this effort is achieved will determine whether it is efficient and effective for Parties.

In the options presented in the Geneva negotiating text, it is important to consider the value-added from potentially altering the NAP process to “build on adaptation mechanisms and processes under the Convention.” At its inception, the NAP process was expressly noted as reducing the burden of documentation preparation and publication, as well as adding greater levels of flexibility following lessons learnt from the NAPA experience (LEG, 2012b). Thus, engaging in the NAP process is only technically desirable if the process following the Post-2015 agreement is not limited by financial or capacity bottlenecks, e.g. through more frequent reporting under the NAP process.

There are a number of institutions already in place under the UNFCCC that are involved in the NAP process directly and have overlaps between them, such as the LEG and the SBSTA (LEG, 2012a; SBSTA, 2014). Thus, building on mechanisms and processes under the convention is technically feasible, but a review of existing mechanisms and institutions may be more efficient and effective before modalities related to the NAP process are considered for reform. For example, at present the LEG is developing a tool for monitoring, reviewing and assessing progress of the NAPs, as well as to identify gaps in the NAP process undertaken by LDCs (UNFCCC, 2013).

There is an important link between decisions taken on the NAP process and elements of other options that have been proposed in the Geneva negotiating text. How the NAP process is agreed could significantly influence the manner in which potential universal individual commitments/contributions/actions and an adaptation component of (I)NDCs are made functional.

A common feature within most options identified in the negotiating text seems to be establishing international guidance to enhance policies and co-ordinate planning for greater resilience on the national level. This effort could be achieved in part by an enhanced process for Parties to present and report on implementation of NAPs (e.g. through flexible guidance and extension of learning platforms, such as the “NAP Central”). The options at present allow for the submission of NAPs to be invited or requested or to be established as a commitment within a core international agreement. Assuming monitoring and evaluation is kept efficient, reporting on the implementation of NAPs could serve to strengthen the sharing of national best practices, subsequently strengthening adaptation globally. However, it may be difficult to ensure that lessons learnt are readily available to and employed by policymakers and investors in different circumstances (GEF IEO, 2013; Kato et al., 2014). Table 13 (below) provides an outline summary of characteristics of the current proposal for evolution of the NAP Process.

Table 13. Evolution of the NAP Process – summary characteristics

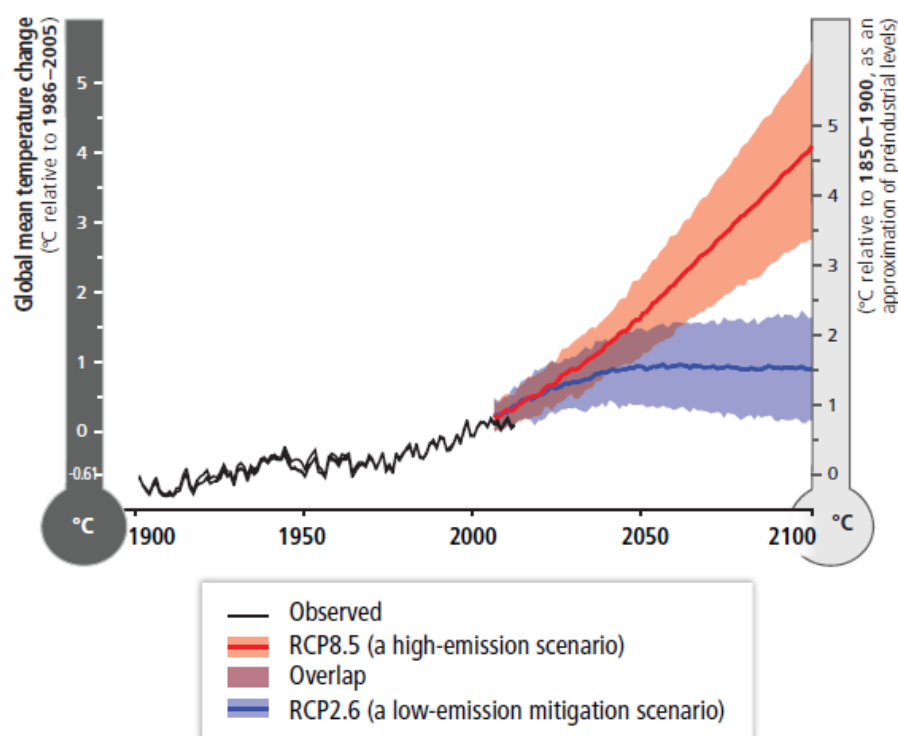
Sends international political signal on importance of adaptation	Yes: note that this signal has already been provided for LDCs, as well as for developing country Parties.
Directly enhances resilience	No: could potentially do so depending on how it is implemented and how many Parties that are not specifically invited to undertake the NAP Process (i.e. non-LDC and non-developing country Parties) use the guidelines.
Directly enhances adaptation action	No: could potentially do so depending on the manner of implementation.
Directly recognises national adaptation efforts	Yes
Directly encourages improved planning	Yes
Develops improved international institutions	No: proposal is focused on national and sub-national institutions.
Encourages improved national or sub-national institutions	Potentially: depending on what is included. NAP Technical guidelines include institutional guidance.
Encourages increased stakeholder involvement	Potentially: depending on what is included and guidance on stakeholder involvement.
Improves information availability	Potentially: depending on what is included and how information is gathered and shared between Parties.
Fulfils a new function	No: enhances similar provisions that exist in the UNFCCC for developing countries, and actions that many developed countries have undertaken autonomously.
Can be tracked/ monitored	Potentially: depending on what is included. The NAP Process is relatively new and it will take time to assess progress and identify areas for potential improvement.
Can be targeted to specific regions, groups or sectors	Yes

3.6 Relationship between mitigation, adaptation and finance

Paragraph 6 of the negotiating text includes an option outlining that “the level and pace of mitigation ... will determine the extent to which Parties will need to adapt... and associated costs thereof.... Some Party submissions have also suggested that there should be an explicit link between mitigation, adaptation and finance in the 2015 agreement (UNFCCC, 2015e, 2015f). This sub-section explores the potential link between mitigation and adaptation (and related costs).

Figure 2 shows that higher levels of global emissions are expected to lead to higher levels of temperature rises, and therefore increased climate impacts. The different implications of the various emissions scenarios become increasingly clear after mid-century. A qualitative link between adaptation and finance is included in Article 4.4 of the UNFCCC, which indicates that “developed country Parties and other developed Parties included in Annex II shall also assist the developing country Parties that are particularly vulnerable to the adverse effects of climate change in meeting costs of adaptation to those adverse effects”. If an explicit link can be made in the 2015 agreement between the mitigation efforts by Parties and the needs for adaptation and finance, this could provide an economic incentive for increased levels of mitigation.

Figure 2. Global average temperature increases associated with different emission scenarios



Source: IPCC (2014)

However, while there is a relationship between global emission levels and expected climate impacts, establishing a functional and measurable link between adaptation, mitigation and finance would be technically challenging for a number of different reasons. The link between a given long-term temperature goal under the UNFCCC framework and individual nationally determined contributions to mitigation is indirect. The level of climate change is the result of aggregate emissions over the long-term, while many Parties have not yet established their (I)NDCs, and those that are available extend only to 2030. There is therefore no certainty on the global long-term emissions pathway. Further, for a given emissions pathway there is also uncertainty about the resulting level of climate change resulting from our imperfect knowledge of how the climate system will respond. Figure 2 highlights that in a low-emission scenario, global average temperature rises by 2100 could range from less than 1 degree Celsius to more than 2 degrees (or from 3.5 to more than 5.5 degrees Celsius in a high-emissions scenario). Differences in the climate impact associated with such a variation in temperature rises can be significant. For example, the IPCC (2014a) indicates that risks to “unique and threatened systems” (e.g. coral reefs) are moderate to high at a less than 1°C average temperature rise, but are very high at a an average temperature rise of 2°C or more. Moreover, some potential impacts may exhibit threshold behaviour and may be irreversible on historical timescales if such thresholds are crossed (e.g. the melting of large ice-sheets).

In addition, as outlined above, adaptation needs are affected by the extent and nature of climate change, as well as by a country’s geography, regulatory environment, and socio-economic changes. Adaptation costs will therefore be influenced both by national factors within a government’s control (such as coastal zone management) and international factors outside a government’s control (such as sea-level rise). This is explicitly recognised in the IPCC 5th Assessment report (e.g. Hijioka et al., 2014) as well as in some countries’ National Communications (Republic of Malawi, 2011). Distinguishing international from other

factors will be technically challenging (Nurse et al., 2014), but may be needed if international finance is to be directed towards adaptation needs caused by actions outside a government's control.

There can also be considerable uncertainty regarding the local and regional climatic implications of a given emissions pathway (IPCC, 2014). This is more pronounced for some regions than it is for others. For example, the IPCC indicates that there is "low confidence" in future precipitation projections and freshwater availability at a sub-regional scale in Asia (Hijioka et al., 2014). This means that policy-makers will need to consider a wide range of potential future climate futures in their adaptation planning. In contrast, the IPCC indicates that there is high confidence that sea-level rise poses a key climate change threat to low-lying islands. In such cases, adapting to saline intrusion is likely to be important, although there is "a paucity of evidence" linking this to groundwater reserves at present (Nurse et al., 2014). It is thus difficult to link future global emissions scenarios to expected climate change impacts, particularly at a national or sub-national level.

Thus, from a technical perspective, although there is a clear causal link between cumulative CO₂ emissions and climate risks, there are significant uncertainties associated with translating a given level of expected cumulative emissions to an estimate of global climate impacts. There can be additional uncertainties in estimating specific local/sub-regional physical climate impacts and their economic implications. Further, there is not a straightforward link between climate impacts and adaptation needs (and costs) because these latter are affected both by climate and non-climate factors. In addition, it is unclear regarding at what level of climate risks (e.g. temperature rise greater than 2 °C) a link between adaptation finance and mitigation would be made; who would pay; and when. The potential for moral hazard arising from any such financing mechanism would also need to be addressed. Table 14 (below) provides an outline summary of characteristics of the current proposal for relating adaptation needs to mitigation and finance levels.

Table 14. Relating adaptation needs to mitigation and finance levels – summary characteristics

Sends increased international political signal on importance of adaptation	Yes: links mitigation and adaptation levels.
Directly enhances resilience	No: could potentially do so indirectly depending on what is included; however, a functional link will be challenging on a technical level and will take time to make a first assessment of whether such a link enhances resilience.
Directly enhances adaptation action	No: could potentially do so indirectly depending on what is included; however, a functional link will be challenging on a technical level and will take time to make a first assessment of whether such a link enhances effective and efficient adaptation action.
Directly recognises national adaptation actions	No: proposed structure is not disaggregated to the national level.
Directly encourages improved adaptation planning	No: proposed structure does not include provision(s) related to this characteristic.
Develops improved international institutions	No: not the focus of this proposal.
Encourages improved national or sub-national institutions	No: proposed structure is not disaggregated to the national or sub-national level.
Encourages increased stakeholder involvement	No: proposed structure is not disaggregated to the national level where stakeholder involvement is most relevant for adaptation planning.
Improves information availability on adaptation actions	No: proposed linkage is at an aggregate level and does not explicitly include an information component.
Fulfils a new function	Potentially: dependent on the specifications. However, establishing a functional and measureable link will be technically challenging.
Can be tracked/ monitored	No: too many uncertainties to make a direct link that is effectively monitored (quantitatively or qualitatively) over time.
Can be targeted to specific regions, groups or sectors	No: proposed structure is not at a disaggregated level.

4. Conclusions

The projected extent of climate change means that adaptation efforts will need to be enhanced to protect vulnerable populations from the impacts of climate change. These impacts can be both local (e.g. changes in precipitation patterns) and global (e.g. sea-level rise). While the general direction of climate impacts for a region may be known, there can be significant uncertainty at national and sub-national levels about expected impacts. This will lead to uncertainties for those involved in planning and implementing adaptation activities.

Many countries have several years' experience with developing their adaptation responses. This is particularly the case for Least-Developed Countries (LDCs), based on their experience with developing and implementing National Adaptation Programmes of Action (NAPAs). More recently, LDCs and other countries are developing National Adaptation plans (NAPs) under the UNFCCC framework, as well as national adaptation strategies (outside the UNFCCC framework). The iterative, non-prescriptive and

flexible structure of the NAP process reflects learning from the limitations of the one-off structure of the NAPAs. Lessons learned from this experience include:

- Adaptation to climate change will need to evolve over time, so includes process as well as action components;
- Mainstreaming adaptation into legislative measures and sectoral planning is important and is occurring increasingly, and requires capacity;
- The appropriate adaptation responses and processes will depend upon countries' circumstances and localised conditions.

Both mitigation and adaptation need be taken into account in the 2015 agreement, in a manner that appropriately reflects their characteristics. Although both mitigation and adaptation are important components of a country's response to climate change, there are significant differences between the two. For example, the benefits of adaptation actions are most pronounced at the local level, i.e. in proximity to where the adaptation action has occurred. Nevertheless, some secondary effects of localised adaptation efforts (e.g. regarding agricultural production) may be felt nationally or internationally. In contrast, the benefits of mitigation are global. The timescales needed to adapt (or to assess effectiveness of adaptation actions) may also differ from mitigation. Thus, in many cases, failure by country A to adapt to a particular climate impact (e.g. sea-level rise) will cause more negative impacts (e.g. flooding) for country A than for other countries. In such cases, it is unclear whether there is a need for international provisions to protect country B from country A's potential non-action.

It can be difficult to attribute the impacts of specific adaptation actions. Mainstreaming adaptation efforts can ensure that adaptation is captured in national and local policies across sectors; however, it makes it more complicated to track and evaluate adaptation-related impacts. In addition, the effects of adaptation actions may only be realised with a significant time delay. This impedes short-term assessments of their impacts. Further, there is not necessarily a straightforward link between inputs to an adaptation response, and the associated outcome, e.g. as a result of an extreme weather event. These differences between mitigation and adaptation mean that it may be difficult to develop meaningful and implementable provisions for adaptation that parallel those being set up for mitigation.

Adaptation is multi-dimensional, affecting many sectors, stakeholders and even time periods. The 2015 agreement presents an opportunity to increase the profile, extent and effectiveness of adaptation responses at the national level by incorporating this multi-dimensionality. Yet, achieving this goal is complicated by two issues. Firstly, some of the proposals put forth in the Geneva negotiating text are unclear in terms of definitions, how they could be implemented and how they would achieve the desired result. There is also not necessarily a direct link between the output of a given proposal (e.g. establishing a subsidiary body on adaptation) and enhancing countries' resilience to climate change. Parties' proposals differ as to whether adaptation efforts under the 2015 agreement will be geared towards *guiding* Parties' planning and implementation of adaptation efforts or towards *providing information* that Parties can use in their implementation of adaptation. This means that it is not straightforward to determine the specific effects of individual text proposals or options. This paper has explored what the written proposals could entail in practice. Secondly, there are significant gaps in the knowledge base regarding successful adaptation approaches, the definition of adaptation and how it can be assessed most effectively, especially on a non-localised scale.

The influence of the 2015 agreement on adaptation responses will in part depend on the legal nature of the 2015 agreement, the provisions relating to adaptation included in this agreement and whether/how national-level adaptation responses (e.g. commitments, contributions, actions) are inscribed in that

agreement. One example is the question of (I)NDCs – in particular, whether Parties will include adaptation elements in their (I)NDC, and if so, how. It would be difficult for the international community to prescribe what should be included in any adaptation component of an (I)NDCs. Further, it is not clear to what extent an international agreement can directly influence adaptation practices that are under national or sub-national jurisdiction. For example, it would be difficult for the international community to prescribe what should be included in any adaptation component of an (I)NDC. Nevertheless, an international agreement could provide an important signal to Parties regarding the importance of adaptation action. It could also facilitate enhanced adaptation actions, e.g. by encouraging Parties to identify, share and implement best practices for adaptation planning, co-ordination, prioritisation and implementation and by encouraging mobilisation of adaptation finance.

The proposals put forward to include adaptation in a 2015 agreement encompass many different aspects, including those relating to adaptation's national and international profile, adaptation-related institutions and/or planning, stakeholder engagement, information exchange, support for adaptation. Some of these proposals would fulfil a new function (e.g. if a quantitative global goal for adaptation was agreed), whereas others would repeat or modify adaptation-related arrangements, tools or institutions already in place. In addition, there is considerable overlap between many of the current proposals. For example, there are many proposals related to improving a country's adaptation planning. These are included in proposals focused on enhancing the National Adaptation Plan process, and could also be part of a planning-focused (I)NDC or a planning-focused national adaptation commitment/contribution/action. Similarly, several information or learning-exchange mechanisms have already been established in the UNFCCC context and elsewhere to date, potentially rendering unclear the benefit of an additional centralised information depository, such as a knowledge platform. However, increasing the information available in current platforms may be a useful alternative. In particular, while the general direction of climate impacts for a region may be known, there is more uncertainty at national and sub-national levels, so making increased information available on expected climate impacts could be useful planning tools for decision-makers.

If countries agree to develop adaptation goals, commitments or contributions, it would be helpful if progress towards these could be tracked on a national scale. Different proposals vary considerably relating to how straightforward it would be to monitor progress towards their aims. For example, it would be relatively simple to track progress towards the implementation of some input-based proposals (e.g. whether or not an adaptation registry has been established, whether countries have submitted an adaptation commitment/contribution/action). In contrast, tracking progress towards other proposals would be more difficult, particularly those focused on adaptation or resilience outcomes (e.g. improving global or national resilience).

If the 2015 agreement could enhance knowledge and knowledge transfer about vulnerabilities, as well as best practises and lessons learned for adaptation, this would help to ensure that adaptation actions implemented are based on the best available knowledge. For example, the importance of local concerns informing national-level planning and prioritisation phases could be enhanced (e.g. through NAP Process guidance and knowledge-sharing). Parties and the UNFCCC, via country-level guidance, may be encouraged to strengthen institutions and capacity to identify and prioritise climate change related risks and identify potential adaptation responses. Mainstreaming could also be enhanced if existing institutions and arrangements for adaptation under the UNFCCC encourage adaptation to be considered in tandem with development planning.

There are already several institutions and arrangements in place that aim to enhance adaptation planning, implementation and information flow at the national level. Several of the international institutions involved in adaptation processes within the UNFCCC were established relatively recently. Thus, it is difficult to predict outcomes from such arrangements and mechanisms, especially when there are interlinkages with mechanisms for finance (e.g. Green Climate Fund), technology (e.g. Technology Executive Committee)

and capacity building influencing adaptation efforts under the UNFCCC structure. Clearer international guidance to support country-driven adaptation approaches and to frame flexible monitoring and evaluation systems could nevertheless help strengthen national adaptation responses. The 2015 agreement could facilitate this through promoting learning between projects, programmes, local communities, countries and sub- and supra-national regions.

Many proposals in the Geneva negotiating text have the potential to enhance adaptation responses, resilience, planning, institutions, co-ordination, as well as information availability and exchange. However, whether such improvements will happen in practice depends on the details of what is included, how the proposals are interpreted and implemented, as well as the interactions between them in the 2015 agreement.

Annex 1

Table A1: Existing institutions and arrangements for adaptation under the UNFCCC

Institution or arrangement (year established)	Function / purpose	Links with other institutions and arrangements
Least Developed Countries Expert Group (2001)	Technical support and guidance for Least Developed Countries (LDCs), especially for NAPAs and NAPs	<ul style="list-style-type: none"> • Invites the GEF and its agencies, relevant organisations and experts to the LEG meetings and events • Collaborates with the TEC, SCF and the CGE • Collaborates with the AC, including on development of NAP Central, NAP Expo, training on NAPs, and the Adaptation Committee task force on NAP • Collaborates with a wide range of organisations through various modalities, such as technical meetings, and sharing of relevant information and materials on the NAP process (e.g. NAP Expo)
NAPAs (2001)	Process for the identification of urgent adaptation needs in LDCs	<ul style="list-style-type: none"> • Supported by the LEG • Proposals for implementation follow GEF guidelines • GEF reports on status of NAPAs to the COP
Nairobi Work Programme (2005)	<p>Knowledge sharing</p> <p>Addresses impacts, vulnerability and adaptation</p>	<ul style="list-style-type: none"> • Responds to needs arising from the Cancun Adaptation Framework and other work streams • Links with the NAP process, research and systematic observation, the AC, LEG and the TM • Provides information to NAPs • Collaborates with >290 partner organisations, global and regional centres and knowledge networks as well as the private sector
Adaptation Committee (2010, as part of the Cancun Adaptation Framework)	Provides technical support and guidance, shares relevant information, promotes synergies and strengthens engagement with organisations, centres and networks	<ul style="list-style-type: none"> • Requested by the COP to develop linkages to the LEG, CGE, TEC, the operating entities of the financial mechanism, Nairobi Work Programme, WIMLAD • Organises special events during SB meetings, contributes to Durban Forum on Capacity Building • Participates in meetings of relevant bodies • Requested by the COP to engage with institutions, organisations, frameworks, networks and centres outside of the UNFCCC • Dedicated meetings between IPCC WGII lead authors and members of the AC • Supports outreach activities with the private sector • Organises Adaptation Forums
National Adaptation Plans (2010, as part of the Cancun Adaptation Framework)	Identification of medium and long-term adaptation needs for all Parties	<ul style="list-style-type: none"> • Receives technical support from the LEG and AC • Receives financial support from the LCDF and SCCF • Receives support from organisations of the National Adaptation Programme Global Support Programme (NAP-GSP)
Warsaw International Mechanism for Loss and Damage (2013)	Promotion of the implementation of approaches to address loss and damage in vulnerable developing countries	<ul style="list-style-type: none"> • Mandated to improve co-ordination of the relevant work of existing bodies under the UNFCCC • Invites Parties to work through the United Nations and other relevant institutions to promote coherence • Invites Parties to strengthen and develop institutions and networks at the regional and national levels
WIMLAD Executive Committee (2013)	Guidance of the WIMLAD	<ul style="list-style-type: none"> • Provisionally the Executive Committee will consist of two representatives from the AC, CGE, LEG, SCF, TEC and CGE

Source: Briner et al. (2014)

References

- Adaptation Committee (2014a), “Fifth meeting of the Adaptation Committee – report on the workshop on the monitoring and evaluation of adaptation”, AC/2014/4, Bonn Germany, 5-7 March 2014, UNFCCC.
- Adaptation Committee (2014b), “Institutional arrangements for national adaptation planning and implementation”, 2014 Thematic Report, UNFCCC.
- Adaptation Committee (AC) (2013), “The State of Adaptation under the United Nations Framework Convention on Climate Change”, 2013 Thematic Report, UNFCCC.
- Alm (adaptation learning mechanism) (2015), “about the adaptation learning mechanism”, webpage, www.adaptationlearning.net/about (accessed 23/02/2015).
- ADB (Asian Development Bank) (2011), “Nepal: Mainstreaming Climate Change Risk Management in Development”, Technical Assistance Report, Capacity Development Technical Assistance (CDTA), November 2011.
- Adger N., H. Adams, L. Evans, S. O’Neill and T. Quinn (2013), “Human resilience to climate change and disasters: Response from University of Exeter”, London, <https://royalsociety.org/~media/policy/projects/resilience-climate-change/parts1-20.pdf>.
- Adger, W.N. (2010), “Social capital, collective action and adaptation to climate change” *Der Klimawandel: Sozialwissenschaftliche Perspektiven*, VS-Verlag für Sozialwissenschaften, Wiesbaden, 327-345.
- ASC (Adaptation Sub-Committee) (2014), “Managing climate risks to well-being and the economy”, Progress Report, Committee on Climate Change, London.
- Kemp-Benedict, E., and Agyemang-Bonsu, W. K. (2008) The Akropong approach to multi-sector project planning. *Futures*, 40(9), 834-840.
- Blythe, J. (2012), “Hits and Misses in Mozambique’s Climate Change Action Plans”, Africa Initiative, Background No. 27, www.africaportal.org/articles/2012/05/04/hits-and-misses-mozambique%E2%80%99s-climate-change-action-plans.
- Bosello, F., Carraro, C. and De Cian, E. (2011), “Adaptation Can Help Mitigation: An Integrated Approach to Post-2012 Climate Policy”, *Notadi Lavoro* 69.2011, Fondazioni Eni Enrico Mattei, Venice, <http://ageconsearch.umn.edu/bitstream/116907/2/NDL2011-069.pdf>.
- Bours, D., McGinn, C. and Pringle, P. (2013), “Monitoring & evaluation for climate change adaptation: A synthesis of tools, frameworks and approaches”, SEA Change Community of Practice and UKCIP, 2013.
- Briner, G., et al. (2014), “Taking Stock of the UNFCCC Process and its Inter-linkages”, *OECD/IEA Climate Change Expert Group Papers*, No. 2014/04, OECD Publishing, Paris, <http://dx.doi.org/10.1787/5js1qf553zf8-en>.
- Brooks, N., Anderson, S., Ayers, J., Burton, I. and Tellam, I. (2011), “Tracking adaptation and measuring development”, IIED Climate Change Working Paper No. 1, November 2011.
- Cardona, O.D., M.K. van Aalst, J. Birkmann, M. Fordham, G. McGregor, R. Perez, R.S. Pulwarty, E.L.F. Schipper, and B.T. Sinh, (2012), “Determinants of risk: exposure and vulnerability”, *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 (IPCC)*, Cambridge University Press, Cambridge, UK, and New York, NY, USA, pp. 65-108.
- Casado-Asensio, J. and Steurer, R. (2013), “Integrated strategies on sustainable development, climate change mitigation and adaptation in Western Europe: Communication rather than co-ordination”, *Journal of Public Policy*, <http://dx.doi.org/10.1017/S0143814X13000287>.
- CGE (Consultative Group of Experts on National Communications from Parties not included in Annex I to the Convention) (2012), “Chapter 9: Integration, Mainstreaming, Monitoring and Evaluation”, *CGE Training Materials for Vulnerability and Adaptation Assessment*, UNFCCC.

- CGIAR (Consultative Group for International Agricultural Research) (2014), “Climate adaptation and agriculture: Solutions to successful national adaptation plans”, CCAFS Policy Brief 10, June 2014, <https://cgspace.cgiar.org/bitstream/handle/10568/35689/CCAFS%2520Policy%2520Brief%252009.pdf?sequence=1>.
- CGIAR (Consultative Group for International Agricultural Research) (2013), “Planning climate adaptation in agriculture: Meta-synthesis of national adaptation plans in West and East Africa and South Asia”, CCAFS Report No.10, <https://cgspace.cgiar.org/bitstream/handle/10568/33959/Report10.pdf>.
- CIF (Climate Investment Funds) (2015), “Lessons from Phase 1 for Developing Strategic Investment Frameworks for Climate-Resilient Development, Case Study: Samoa’s PPCR Phase 1”, Meeting of the PCCR Sub-Committee, Montego bay, Jamaica, PPCR/SC.14>Inf.3.
- CIF (Climate Investment Funds) (2014), “Zambia’s PPCR strategic program”, retrieved January 15, 2014, from www.climateinvestmentfunds.org/cifnet/investment-plan/zambias-ppcr-strategic-program.
- CIF (Climate Investment Funds) (2013), “Pilot program for climate resilience”, retrieved July 25, 2013, from www.climateinvestmentfunds.org/cif/.
- CIF (Climate Investment Funds) (2009), “The selection of countries to participate in the Pilot Program for Climate Resilience (PPCR): Report of the Expert Group to the Subcommittee of the PPCR”, January 2009.
- Defra (Department for Environment, Food and Rural Affairs) (2010), “Measuring adaptation to climate change – a proposed approach”, Defra, UK.
- DENR (Department of Environment and Natural Resources, the Philippines) (2012), “*Climate Change Adaptation: best practices in the Philippines*”, http://climatechange.denr.gov.ph/index.php?option=com_docman&task=cat_view&gid=17.
- Dessai, S. and Schipper, E. L. (2003), “The Marrakech Accords to the Kyoto Protocol: analysis and future prospects”, *Global Environmental Change*, 13(2): 149-153.
- Dinshaw, A., Fisher, S., McGray, H., Rai, N. and Schaar, J. (2014), “Monitoring and Evaluation of Adaptation: Methodological Approaches”, *OECD Environment Working Papers*, No. 74, OECD Publishing, Paris, <http://dx.doi.org/10.1787/5jxrclr0ntjd-en>.
- EC (European Commission) (2013), “An EU strategy on adaptation to climate change”, Communication from the Commission to the European Parliament, the Council, the European Economic and social Committee of the Regions, COM(2013) 216 final, <http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52013DC0216&from=EN>.
- ECBI (European Capacity Building Initiative) (2010), “Adaptation under the UNFCCC”, Working paper prepared by ecbi partner FIELD with Sumaya Zakieldein, June 2010, <http://pubs.iied.org/pdfs/G03014.pdf>.
- EEA (European Environment Agency) (2014), National adaptation policy processes in European countries – 2014, EEA report No. 4/2014, www.eea.europa.eu/publications/national-adaptation-policy-processes.
- Ellis, J., R. Caruso and S. Ockenden (2013), “Exploring Climate Finance Effectiveness”, *OECD/IEA Climate Change Expert Group Papers*, No. 2013/04, OECD Publishing, Paris, <http://dx.doi.org/10.1787/5jzb44nmnbd2-en>.
- Executive Order no. 13653 (2013), Preparing the United States for the Impacts of Climate Change, signed 1 Nov. 2013, www.whitehouse.gov/the-press-office/2013/11/01/executive-order-preparing-united-states-impacts-climate-change.
- Fankhauser, S., Ranger, N., Colmer, J., Fisher, S., Surminski, S., Stainforth, D. and Williamson, A. (2013), “An Independent National Adaptation Programme for England”, Policy Brief, Grantham Research Institute on Climate Change and Environment and Centre for Climate Change Economics Policy.
- FAO (Food and Agricultural Organisation) (2011), “The state of the world’s land and water resources for food and agriculture (SOLAW) – Managing systems at risk”, Food and Agriculture Organization of the United Nations, Rome and Earthscan, London, www.fao.org/docrep/017/i1688e/i1688e.pdf.

- Ford, J.D., Berrang-Ford, L., Lesnikowski, A., Berrera, M. and Heymann, S. J. (2013), “How to track adaptation to climate change: A typology of approaches for national-level application”, *Ecology and Society*, Volume 18(3), <http://dx.doi.org/10.5751/ES-05732-180340>.
- GCCA (Global Climate Change Alliance) (2013), “From NAPAs to NAPs, NAMAs, LEDs and DRR strategies: the role of country-led climate and disaster risk reduction mainstreaming”, Background paper, GCCA Global Policy Event 2013, Brussels, 18-20 September 2013, European Commission and Global Climate Change Alliance.
- GCF (Green Climate Fund) (2014a), “Green Climate Fund Board takes key decisions on operations and makes progress on ‘Essential Eight’”, 22 February 2014, GCF-PA.02/14, http://gcfund.net/fileadmin/00_customer/documents/pdf/GCF_Press_Release_fin_20140222.pdf.
- GCF (Green Climate Fund) (2014b), “Initial Results Management Framework of the Fund (Progress Report)”, GCF/B.06/04, 9 February 2014, http://gcfund.net/fileadmin/00_customer/documents/pdf/GCF_B0_604_Initial_Results_Management_Framework_find_20140209.pdf.
- GCF (Green Climate Fund) (2014c), “GCF Readiness Newsletter – October 2014: Supporting Countries to Prepare for Paradigm Shifting Investments”, Green Climate Fund (Secretariat), www.gcfund.org/fileadmin/00_customer/documents/Readiness/2014-10-Readiness_Newsletter.pdf.
- GEF (Global Environment Facility) (2014) Conrad, B. and Nielson, S. T. “Evaluating Adaptation to Climate Change – The Challenge of Defining Success”, *The Green Line: focus on the GEF*, GEF Evaluation Office.
- GEF (Global Environment Facility) (2012), “Support for National Adaptation Plans”, LDCF/SCCF Council, November 15, 2012, Washington D.C.
- GEF (Global Environment Facility) (2009), “Joint External Evaluation: Operation of the Least Developed Countries Fund for Adaptation to Climate Change”, LDCF/SCCF Council Meeting, November 2009.
- GEF IEO (Global Environment Facility Independent Evaluation Office) (2013), “Adaptation to Climate Change”, *Fifth Overall Performance Study (OPS5) of the GEF Technical Document*, No. 19, GEF IEO, Washington, DC.
- Ghisu, P. and Ancharaz, V. D. (2013), “Towards an “Aids for Trade Plus” initiative to finance LDCs climate change adaptation needs”, *Bridges Africa*, Volume 2, Number 4, www.ictsd.org/bridges-news/bridges-africa/news/towards-an-%E2%80%9Caid-for-trade-plus%E2%80%9D-initiative-to-finance-lDCs-climate.
- GIZ (Deutsche Gesellschaft für Internationale Zusammenarbeit) (2014), “Pilot Program for Climate Resilience: The PPCR Monitoring and Reporting System”, Germany, <https://gc21.giz.de/ibt/var/app/wp342deP/1443/wp-content/uploads/filebase/me/giz2014-factsheet-ppcr.pdf>.
- GIZ (Deutsche Gesellschaft für Internationale Zusammenarbeit) (2013), “Adaptation made to measure: A guidebook to the design and results-based monitoring of climate change projects”, Second Ed., Germany, https://gc21.giz.de/ibt/var/app/wp342deP/1443/wp-content/uploads/filebase/me/me-guides-manuals-reports/GIZ-2013_Adaptation_made_to_measure_second_edition.pdf.
- Goklany, I.M. (2005), “A climate policy for the short and medium term: stabilization or adaptation?”, *Energy & Environment* 16: 667-680.
- Government of Bangladesh (2011), “Sixth Five-Year Plan (FY2011-2015): Part 2: Sectoral strategies, programmes, and policies”, Planning Commission, Ministry of Planning, Government of Bangladesh, Dhaka, Bangladesh.
- Government of Bangladesh (2009), “Bangladesh Climate Change Strategy and Action Plan 2009”, Ministry of Environment and Forests, Government of the People’s Republic of Bangladesh, Dhaka, Bangladesh.
- Government of Bhutan (2012), “Guidelines for Preparation of the 11th Five-Year Plan (2013-2018)”, Gross National Happiness Commission, Royal Government of Bhutan.
- Government of India (2014), “India’s Progress in Combating Climate Change: Briefing Paper for UNFCCC COP 20 Lima, Peru”, Ministry of Environment, Forests, and Climate Change, http://envfor.nic.in/sites/default/files/press-releases/Indian_Country_Paper_Low_Res.pdf.

- Government of Nepal (n.d.), “Nepal: national capacity self-assessment report and action plan”, Ministry of Environment, Science and Technology, Kathmandu, www.thegef.org/gef/sites/thegef.org/files/documents/document/ncsa-nepal-fr-ap.pdf.
- Hallegatte, S. (2009), “Strategies to adapt to an uncertain climate change”, *Global Environmental Change* 19: 240-247.
- Hijioka, Y., E. Lin, J.J. Pereira, R.T. Corlett, X. Cui, G.E. Insarov, R.D. Lasco, E. Lindgren, and A. Surjan, 2014: Asia. In: *Climate Change 2014: Impacts, Adaptation, and Vulnerability. Part B: Regional Aspects. Contribution of Working Group II to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change* [Barros, V.R., C.B. Field, D.J. Dokken, M.D. Mastrandrea, K.J. Mach, T.E. Bilir, M. Chatterjee, K.L. Ebi, Y.O. Estrada, R.C. Genova, B. Girma, E.S. Kissel, A.N. Levy, S. MacCracken, P.R. Mastrandrea, and L.L. White (eds.)]. Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA, pp. 1327-1370.
- HFA (Hyogo Framework for Action) (2011), *Compilation of National Progress Reports on the implementation of the Hyogo Framework for Action (2009-2011)*, [www.preventionweb.net/english/hyogo/progress/documents/hfa-report-priority1\(2009-2011\).pdf](http://www.preventionweb.net/english/hyogo/progress/documents/hfa-report-priority1(2009-2011).pdf).
- HMG (Her Majesty’s Government) (2013), “The national adaptation programme: making the country resilient to a changing climate”, London: The Stationary Office, www.gov.uk/government/uploads/system/uploads/attachment_data/file/209866/pb13942-nap-20130701.pdf.
- Huq, S. (2011), “Adaptation: Resources Now to Plan and Implement”, International Institute for Environment and Development (IIED), London, UK.
- IEA (2014), *World Energy Outlook 2014*, OECD/IEA, Paris, <http://dx.doi.org/10.1787/weo-2014-en>.
- IIED (International Institute for Environment and Development) (2008) “Supporting Adaptation to Climate Change: What role for Official Development Assistance?”, 14 November 2008, London, www.iied.org/supporting-adaptation-climate-change-what-role-for-official-development-assistance.
- IPCC (2014a): “Summary for policymakers”, *Climate Change 2014: Impacts, Adaptation, and Vulnerability, Contribution of Working Group II to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change* [Field, C.B., V.R. Barros, D.J. Dokken, K.J. Mach, M.D. Mastrandrea, T.E. Bilir, M. Chatterjee, K.L. Ebi, Y.O. Estrada, R.C. Genova, B. Girma, E.S. Kissel, A.N. Levy, S. MacCracken, P.R. Mastrandrea, and L.L. White (eds.)], Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA, pp. 1-32.
- IPCC (2014b), “Chapter 16: Adaptation opportunities, constraints, and limits”, *Climate Change 2014: Impacts, adaptation, and vulnerability, Working Group II Contribution to the fifth assessment report of the intergovernmental panel on climate change, IPCC WGII ar5 chapter 16*.
- IPCC (2014c), “Glossary”, Annex II, *Climate Change 2014: Impacts, Adaptation, and Vulnerability, Contribution of Working Group II to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change* [Field, C.B., V.R. Barros, D.J. Dokken, K.J. Mach, M.D. Mastrandrea, T.E. Bilir, M. Chatterjee, K.L. Ebi, Y.O. Estrada, R.C. Genova, B. Girma, E.S. Kissel, A.N. Levy, S. MacCracken, P.R. Mastrandrea, and L.L. White (eds.)]. Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA, https://ipcc-wg2.gov/AR5/images/uploads/WGIAR5-AnnexII_FINAL.pdf.
- IPCC, (2012), “Glossary of terms,” A Special Report of Working Groups I and II of the Intergovernmental Panel on Climate Change (IPCC): *Managing the Risks of Extreme Events and Disasters to Advance Climate Change Adaptation*, Field, C.B., V. Barros, T.F. Stocker, D. Qin, D.J. Dokken, K.L. Ebi, M.D. Mastrandrea, K.J. Mach, G.-K. Plattner, S.K. Allen, M. Tignor, and P.M. Midgley, Eds. Cambridge University Press, Cambridge, UK, 555-564.
- IPCC (2001), “Climate change 2001: impacts, adaptation and vulnerability, Contribution of Working Group II to the Third Assessment Report of the Intergovernmental Panel on Climate Change”, edited by J. J. McCarthy, O. F. Canziani, N. A. Leary, D. J. Dokken and K. S. White (eds). Cambridge University Press, Cambridge, UK, and New York, USA, 2001.

- Kato, T., J. Ellis and C. Clapp (2014), “The Role of the 2015 Agreement in Mobilising Climate Finance”, *OECD/IEA Climate Change Expert Group Papers*, No. 2014/07, OECD Publishing, Paris, <http://dx.doi.org/10.1787/5js03h9ztlbr-en>.
- Kelly, M. and N. Adger, (2000), “Theory and Practice in Assessing Vulnerability to Climate Change and Facilitating Adaptation” *Climatic Change*, 47: 325 – 352.
- Kissinger, G. and Namgyel, T. (2014), “NAPAs and NAPs in Least Developed Countries”, LDC Paper Series, ecbi Publications and Policy Analysis Unit for the LDC Group.
- Kissinger G, Lee D, Orindi V.A., Narasimhan P., King’uyu S. M. and Sova C. (2013), “Planning climate adaptation in agriculture”, Meta-synthesis of national adaptation plans in West and East Africa and South Asia, CCAFS Report No. 10. Copenhagen, Denmark: CGIAR Research Program on Climate Change, Agriculture and Food Security (CAAFS).
- Klein, R.J.T., S. Huq, F. Denton, T.E. Downing, R.G. Richels, J.B. Robinson and F.L. Toth, (2007), “Inter-relationships between adaptation and mitigation”, *Climate Change 2007: Impacts, Adaptation and Vulnerability. Contribution of Working Group II to the Fourth Assessment*.
- Report of the Intergovernmental Panel on Climate Change, M.L. Parry, O.F. Canziani, J.P. Palutikof, P.J. van der Linden and C.E. Hanson, Eds., Cambridge University Press, Cambridge, UK, 745-777.
- Kreft, S., Kaloga, A. O. and Harmeling, S. (2011), “Towards effective guidelines and modalities”, discussion paper, Germanwatch e.V. and WWF International. www.germanwatch.org/klima/ad-naps.htm.
- Lamhauge, N., Lanzi, E., and Agrawala, S. (2011), “Monitoring and evaluation for adaptation: lessons from development co-operation agencies”, Draft paper prepared for discussion at the OECD Joint DAC-EPOC Task Team on Climate Change and Development Co-operation in June 2011, OECD Publishing, Paris.
- LEG (LDC Expert Group) (2012a), “National Adaptation Plans: Technical guidelines for the national adaptation plan process”, December 2012, UNFCCC, https://unfccc.int/files/adaptation/cancun_adaptation_framework/application/pdf/naptechguidelines_eng_high_res.pdf.
- LEG (Least Developed Countries Expert Group) (2012b), “Best Practices and Lessons Learned in Addressing Adaptation in the Least Developed Countries”, volume 2, UNFCCC, http://unfccc.int/resource/docs/publications/ldc_publication_bll_2012.pdf.
- LEG (Least Developed Countries Expert Group) (2002), “Annotated Guidelines for the Preparation of National Adaptation Programmes of Action”, UNFCCC Publishing, http://unfccc.int/files/cooperation_and_support/ldc/application/pdf/annguide.pdf.
- Li, J., Mullan, M. and Helgeson, J. (2014), “Improving the Practice of Economic Analysis of Climate Change Adaptation”, *Journal of Benefit Cost Analysis*, 5(3), 445-467.
- Levina, E. and Tirpak, D. (2006), “Adaptation to Climate Change: Key Terms”, COM/ENV/EPOC/IEA/SLT, OECD Publishing, Paris.
- MECDM (Ministry of Environment, Climate Change, Disaster Management and Meteorology) (2012), “Solomon Islands National Climate Change Policy: 2012-2017”, Final report, June 2012.
- Moser, S. C. (2012), “Adaptation, mitigation, and their disharmonious discontents: an essay”, *Climatic Change*, 111(2), 165-175, <http://link.springer.com/article/10.1007/s10584-012-0398-4/fulltext.html>.
- Mullan, M., et al. (2013), “National Adaptation Planning - Lessons from OECD Countries”, *OECD Environment Working Papers*, No.54, OECD Publishing, Paris, <http://dx.doi.org/10.1787/5k483jpfpsq1-en>.
- Ngwadla, X., Abeysinghe A. C. and Freitas, A. “The 2015 Climate Agreement: Lessons from the Bali Road Map”, European Capacity Building Initiative (ECBI) www.eurocapacity.org/downloads/2015ClimateAgreement.pdf.

- Ngwadla, X. and Karlsen, M. (2015), “Summary Slides: Adaptation in the 2015 Agreement: Implications of Proposals to date.” Xolisa Ngwadla, Marianne Karlsen. OECD CCXG Global Forum, 17-19 March 2015, OECD, Paris, www.oecd.org/environment/cc/CCXG%20Breakout%20A%20summary%20slides%20Adaptation%20in%202015%20Agreement.pdf.
- Nurse, L. A., McLean R. F., Agard, J., Briguglio, L. P., Duvat-Magnan, V., Pelesikoti, N., Tompkins, E. and Webb, A. (2014), “Small Islands”, *Climate Change 2014: Impacts, Adaptation, and Vulnerability. Part B: Regional Aspects, Contribution of Working Group II to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change*, Cambridge University Press, Cambridge, 1613 - 1654.
- ODI (Overseas Development Institute) (2014), “The effectiveness of Climate Finance: a review of the Pilot Program for Climate Resilience”, working paper, April 2014.
- ODI (Overseas Development Institute) (2013), “The Effectiveness of Climate Finance: a Review of the Adaptation Fund”, *Working Paper 373*, March 2013, www.odi.org/sites/odi.org.uk/files/odi-assets/publications-opinion-files/8341.pdf.
- OECD (2015), *National Climate Change Adaptation: Emerging Practices in Monitoring and Evaluation*, OECD Publishing, Paris, <http://dx.doi.org/10.1787/9789264229679-en>.
- OECD (2015), *Climate Change Risks and Adaptation: Linking Policy and Economics*, OECD Publishing, Paris, <http://dx.doi.org/10.1787/9789264234611-en>.
- OECD (2009), *Integrating Climate Change Adaptation into Development Co-operation: Policy Guidance*, OECD Publishing, Paris, <http://dx.doi.org/10.1787/9789264054950-en>.
- OKAPI (2012), “Background Document and Workshop Report: Measuring Progress on Adaptation in Canada”, Final Report, Okapi Environmental Consulting, www.ouranos.ca/media/publication/250_rapportleclerc-en-2012.pdf.
- Okereke, C., Baral P. and Dagnet Y. (2014), “Options for Adaptation and Loss & Damage in a 2015 Climate Agreement”, ACT 2015 Working Paper, http://act2015.org/ACT_2015_Options_for_Adaptation_and_Loss_&_Damage.pdf.
- Osman-Elasha, B. and Downing, T. E. (2007) “Lessons Learned in Preparing National Adaptation Programmes of Action in Eastern and Southern Africa”, unpublished paper, Stockholm Environment Institute.
- O’Brien, G. Devisscher, T. and O’Keefe, P. (2010), “The adaptation continuum: groundwork for the future.” LAP LAMBERT Academic Pub., Saarbrücken, Germany.
- Prevention Web (2015), “Hyogo Framework for Action Progress Reports” website, retrieved from: www.preventionweb.net/english/hyogo/progress/.
- Republic of Malawi (2011), “The Second National Communication of the Republic of Malawi to the Conference of the Parties (COP) of the United Nations Framework Convention on Climate Change (UNFCCC)”, Ministry of Natural Resources, Energy and Environment, Lilongwe, Malawi <http://unfccc.int/resource/docs/natc/mwinc2.pdf>.
- Ribeiro, M., Losenno, C., Dworak, T., Massey, E., Swart, R., Benzie, M. and Laaser, C. (2009), “Design of guidelines for the elaboration of Regional Climate Change Adaptations Strategies”, Ecologic Institute, Vienna.
- Royal Government of Cambodia (2013), “Cambodia Climate Change Strategic Plan 2014-2023”, National Climate Change Committee, Kingdom of Cambodia.
- SBI (Subsidiary Body for Implementation) (2014a), “Compilation and synthesis of sixth national communications and first biennial reports from Parties included in Annex I to the Convention”, Forty-first session, Lima 1-8 December 2014, UNFCCC.
- SBI (Subsidiary Body for Implementation) (2014b) “Information on experiences with the implementation of the remaining elements of the least developed countries work programme”, Forty-first sessions Lima, 1-8 December 2014, UNFCCC, <http://unfccc.int/resource/docs/2014/sbi/eng/misc03.pdf>.

- SBI (Subsidiary Body of Implementation) (2014c), “Work of the Consultative Group of Experts on National Communications from Parties not included in Annex I to the Convention”, Forty-first session, Lima, 1-8 December 2014, UNFCCC, <http://unfccc.int/resource/docs/2014/sbi/eng/l26.pdf>.
- SBSTA (Subsidiary Body for Scientific and Technological Advice) (2014), “Good practices in and lessons learned from national adaptation planning”, Forty-first session, Lima, 1-6 December 2014, UNFCCC, <http://unfccc.int/resource/docs/2014/sbsta/eng/misc08.pdf>.
- SIDA (2013) César, E., Wingqvist, G. O. and von Walter, S., “Climate change adaptation indicators: A Logic framework assessment and indicator analysis of Sida’s bilateral and regional contributions under the framework of the Climate Change Initiative”, Sida’s Helpdesk for Environment and Climate Change.
- Smit, B. and O. Pilifosova. (2001), “Adaptation to Climate Change in the Context of Sustainable Development and Equity.” In J.J. McCarthy, O.F. Canzianni, N.A. Leary, D.J. Dokken, and K.S. White, eds., *Climate Change 2001: Impacts, Adaptation, and Vulnerability - Contribution of Working Group II to the Third Assessment Report of the Intergovernmental Panel on Climate Change*. Cambridge, U.K.: Cambridge University Press.
- Talafré, J., Sloan, K. K. and Knabe, F. (2008) “Terminal evaluation of the UNEP GEF projects ‘Enabling activities for the preparation of a national adaptation programme of action (NAPA)’”, Final report – Synthesis of findings, UNEP’s Evaluation and Oversight Unit and UNEP DGEF Task Manager, www.unep.org/eou/Portals/52/Reports/NAPA_Final_Report.pdf.
- TEC (Technology Executive Committee) (2014), “Background Paper on Technologies for Adaptation”, Background paper for the UNFCCC Technology Executive Committee (TEC): workshop on Technologies for Adaptation, Bonn, Germany, 4 March 2014, http://unfccc.int/ttclear/misc/_StaticFiles/gnwoerk_static/events_workshops_adaptationtechs/f1b531ab99084107950d65c2c2de1d6d/d02425f42d614aa99c40fe39758b3ded.pdf.
- UNCCD (1994), United Nations Convention to Combat Desertification in those Countries Experiencing Serious Drought and/or Desertification, Particularly in Africa, www.unccd.int/Lists/SiteDocumentLibrary/conventionText/conv-eng.pdf.
- UNFCCC (2015a) “Negotiating text”, Working of the Contact Group on Item 3, Ad Hoc Working Group on the Durban Platform for Enhanced Action, Second session, part eight, 8-13 February 2015, Geneva, Switzerland.
- UNFCCC (2015b), “Elements of Adaptation”, UNFCCC website, retrieved from: <http://unfccc.int/adaptation/items/7006.php#Observation>.
- UNFCCC (2015c), “Lima call for Climate Action Puts World on Track to Paris 2015”, webpage, <http://newsroom.unfccc.int/lima/lima-call-for-climate-action-puts-world-on-track-to-paris-2015/> (accessed 23/02.2015).
- UNFCCC (2014a), “Lima Call for Climate Action”, UNFCCC, Bonn, http://unfccc.int/files/meetings/lima_dec_2014/application/pdf/auv_cop20_lima_call_for_climate_action.pdf.
- UNFCCC (2014b), “National Adaptation Plans”, UNFCCC, Bonn, http://unfccc.int/files/meetings/lima_dec_2014/decisions/application/pdf/auv_cop20_naps.pdf.
- UNFCCC (2014c), “Synthesis report on methods and tools for, and good practices and lessons learned relating to, adaptation planning processes addressing ecosystems, human settlements, water resources and health, and good practices and lessons learned related to processes and structures for linking national and local adaptation planning”, Subsidiary Body for Scientific and Technological Advice, Forty-first session, Lima 1-6 December 2014, UNFCCC.
- UNFCCC (2014d), “Information paper on the national adaptation plan process”, Subsidiary Body for Implementation (SBI), FCCC/SBI/2014/INF.25.
- UNFCCC (2014e), “Submission by Mexico to the Ad-Hoc Working Group on the Durban Platform for Enhanced Action (ADP)”, Submissions from Parties to the ADP in 2014, UNFCCC, http://unfccc.int/files/bodies/application/pdf/submission_by_mexico,_indicative_elements_for_a_lbi.pdf.

- UNFCCC (2014f), “AILAC – Submission to the ADP”, Submissions from Parties to the ADP in 2014, UNFCCC http://unfccc.int/files/documentation/submissions_from_Parties/adp/application/pdf/adp2.4_submission_by_ailac_20140310.pdf.
- UNFCCC (2013a), “National Adaptation Plans”, Decision 8/CP.19, UNFCCC, Bonn, <http://unfccc.int/resource/docs/2013/cop19/eng/10a02r01.pdf>.
- UNFCCC (2013b), “Further Advancing the Durban Platform”, Decision 1/CP.19, UNFCCC, Bonn, <http://unfccc.int/resource/docs/2013/cop19/eng/10a01.pdf#page=3>.
- UNFCCC (2013c), “An overview of the mandates, as well as the progress of work under institutions, mechanisms and arrangements under the Convention”, Ad Hoc Working Group on the Durban Platform for Enhanced Action, FCCC/ADP/2013/INF.2, <http://unfccc.int/resource/docs/2013/adp2/eng/inf02.pdf>.
- UNFCCC (2013d), “Non-economic losses in the context of the work programme on loss and damage”, Technical paper, FCCC/TP/2013/2, <http://unfccc.int/resource/docs/2013/tp/02.pdf>.
- UNFCCC (2012), “Report of the Conference of Parties on its eighteenth session, held in Doha from 26 November to 8 December 2012”, FCCC/CP/2012/8 Decision 12/CP.18. Add.1.
- UNFCCC (2011), “Report of the Conference of the Parties on its Seventeenth session, held in Cancun from 29 November to 10 December 2011”, Conference of Parties, UNFCCC/CP/2011/9/Add.1.
- UNFCCC (2010), “Possible Elements of the Outcome: Note by the Chair”, Ad Hoc Working Group on Long-term Cooperative Action under the Convention”, Thirteenth session, Cancun, 29 November 2010, UNFCCC.
- UNFCCC (2003), “The 10-year strategic plan and framework to enhance the implementation of the Convention”, Decision 3/COP.8, www.unccd.int/Lists/SiteDocumentLibrary/10YearStrategy/Decision%203COP8%20adoption%20of%20The%20Strategy.pdf.
- UNEP (2014), “The Adaptation Gap Report 2014”, UNEP: Nairobi, www.unep.org/climatechange/adaptation/gapreport2014/portals/50270/pdf/AGR_FULL_REPORT.pdf.
- UNISDR (United Nations Office for Disaster Risk Reduction) (2013), “Towards the Post-2015 Framework for Disaster Risk Reduction: Indicators of success: a new system of indicators to measure progress in disaster risk management”, www.unisdr.org/files/35716_newsystemofprogressindicatorsfordrr.pdf.
- UNISDR (2015) “Sendai Framework for Disaster Risk Reduction 2015-2030” (A/CONF.224/CRP.1), www.wcdrr.org/uploads/Sendai_Framework_for_Disaster_Risk_Reduction_2015-2030.pdf
- United Republic of Tanzania (2013), “Process and Roadmap for Formulating National Adaptation Plans for Tanzania”, Submission by the United Republic of Tanzania on the application of the NAP guidelines (decision 5/CP.17, para 7).
- USAID (United States Agency International Development) (2014), “Compendium of lessons learned from ARCC climate change vulnerability assessments”, African and Latin American Resilience to Climate Change Project, October 2014. <http://community.eldis.org/.5c1ba70f>.
- USAID (United States Agency for International Development) (2013), “West Africa Coastal Climate Change National Adaptation Planning Workshop”, Policy Brief, June 18-20, 2013, Accra, Ghana.
- Vermeulen, S., Zougmore, R., Wollenberg, E., Thornton, P., Nelson, G., Kristjanson, P., Kinyangi, J., Jarvis, A., Hansen J., Challinor, A., Campbell, B and Aggarwal, P. (2012). “Climate change, agriculture and food security: a global partnership to link research and action for low-income agricultural producers and consumers”, *Current Opinion in Environmental Sustainability*, 4(1), 128-133.
- Warren, R., Benzie, M., Arnell, N., Nicholls, R., Hope, C., Klein, R. and Watkiss, P. (2012), “Scoping study: Modelling the interaction between mitigation and adaptation for decision making”, UEA/Tyndall Centre, Stockholm Environment Institute, Walker Institute, University of Southampton, University of Cambridge, www.metoffice.gov.uk/media/pdf/t9/AVOID_WS2_D1_39.pdf.
- WCDRR (World Conference on Disaster Risk Reduction) (2015), *Sendai Framework for Disaster Risk Reduction*, www.wcdrr.org/uploads/Sendai_Framework_for_Disaster_Risk_Reduction_2015-2030.pdf.
- Wyborn, C. A. (2015), Connecting knowledge with action through coproductive capacities: adaptive governance and connectivity conservation, *Ecology and Society* 20(1): 11, <http://dx.doi.org/10.5751/ES-06510-200111>.

Glossary

AC	Adaptation Committee
ADB	Asian Development Bank
ADP	Ad hoc Working Group on the Durban Platform for Enhanced Action
AF	Adaptation Fund
AOSIS	Alliance of Small Island States
CAF	Cancun Adaptation Framework
CBD	Convention on Biological Diversity
CCD	Convention to Combat Desertification
CCXG	OECD/IEA Climate Change Expert Group
CDM	Clean Development Mechanism
CGE	Consultative Group of Experts on National Communications from non-Annex I Parties
CIF	Climate Investment Funds
COP	Conference of the Parties to the UNFCCC
EC	European Commission
ECBI	European Capacity Building Initiative
EEA	European Environment Agency
FAO	Food and Agriculture Organisation of United Nations
FM	Financial Mechanism
GCCA	Global Climate Change Alliance
GCF	Green Climate Fund
GCP	Global Carbon Project
GEF	Global Environmental Facility
GEF-IEO	Global Environmental Facility – Independent Evaluation Office
GHG	Greenhouse Gas
G20	Group of Twenty
IEA	International Energy Agency
IIED	International Institute for Environment and Development
(I)NDC	Intended Nationally-Determined Contributions
IPCC	Intergovernmental Panel on Climate Change
KP	Kyoto Protocol
LDC	Least Developed Country
LDCF	Least Developed Countries Fund
LEG	Least Developed Countries Expert Group
MEA	Multilateral environmental agreements
NAI	Developing countries that are not listed in Annex I of the UNFCCC
NAMA	Nationally Appropriate Mitigation Actions
NAPA	National Adaptation Programme of Action
NAP	National Adaptation Plan
NAPCC	National Action Plan on Climate Change
NAP-GSP	National Adaptation Plan Global Support Programme
NC	National Communications
NWP	Nairobi Work Programme
ODI	Overseas Development Institute
OECD	Organisation for Economic Co-operation and Development
PES	Payments for ecosystem services
PMR	Partnership for Market Readiness
PPCR	Pilot Programme for Climate Resilience
SBI	Subsidiary Body for Implementation
SBSTA	Subsidiary Body for Scientific and Technological Advice
SCF	Strategic Climate Fund
SDG	Sustainable Development Goal
SEI	Stockholm Environment Institute

SIDS	Small Island Developing States
TEC	Technology Executive Committee
TNA	Technology Needs Assessment
UN	United Nations
UNCBD	United Nations Convention on Biological Diversity
UNCCD	United Nations Convention to Combat Desertification
UNDP	United Nations Development Programme
UNEP	United Nations Environment Programme
UNFCCC	United Nations' Framework Convention on Climate Change
UNISDR	United Nations' Office for Disaster Risk Reduction
V&A	Vulnerability and Adaptation
WHO	World Health Organisation
WRI	World Resources Institute
WWF	World Wide Fund for Nature

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