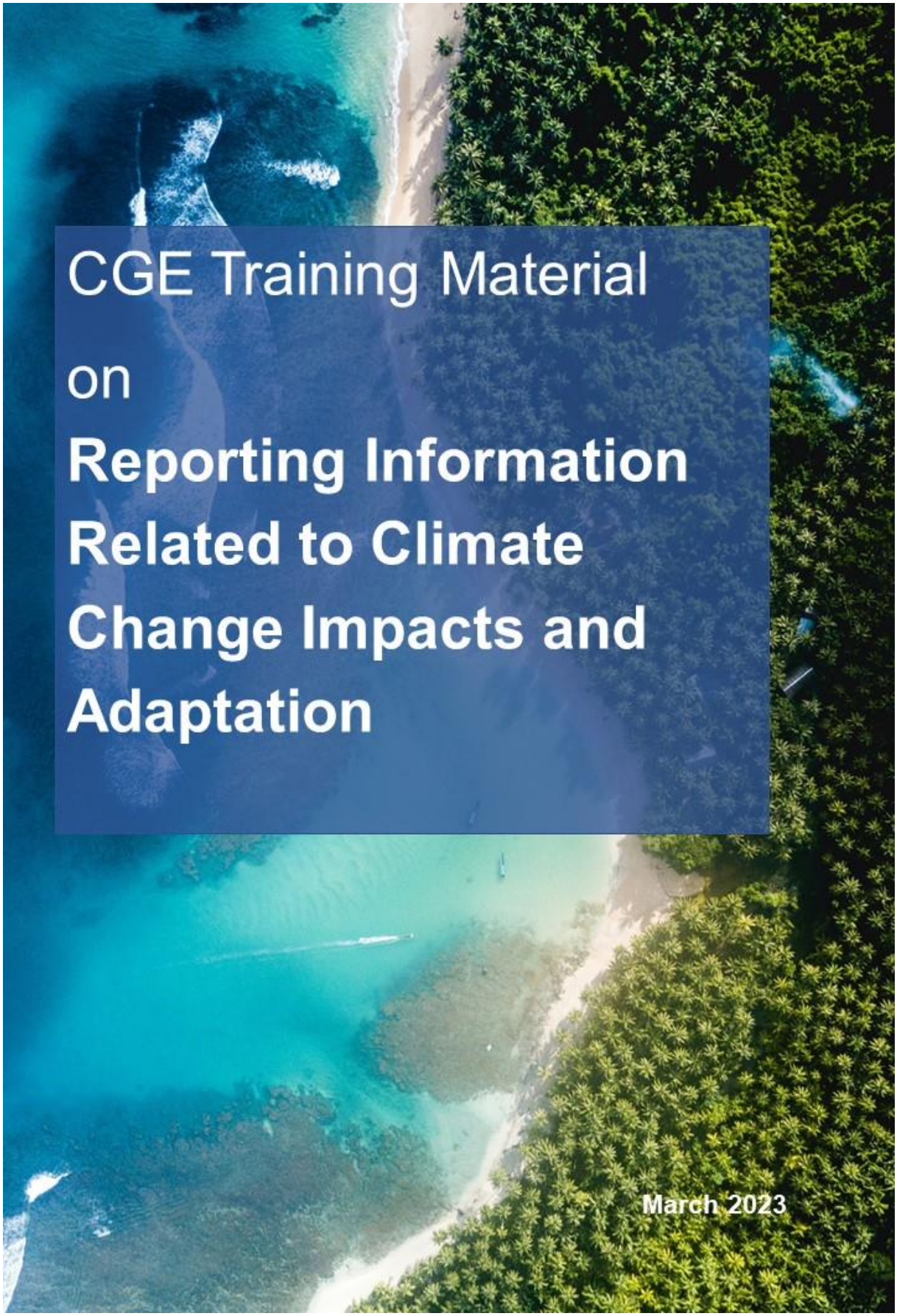
CGE Training Material
on
Reporting Information Related to Climate Change Impacts and Adaptation
March 2023

CGE Training Material on Reporting Information Related to Climate Change Impacts and Adaptation

This training material, developed by the Consultative Group of Experts (CGE), with the support of the secretariat, aims to equip developing country Parties with the latest knowledge on methodological tools and models, which will facilitate the preparation of relevant inputs for reporting information on vulnerability and adaptation in the national communications and biennial transparency reports required by the enhanced transparency framework (ETF) under the Paris Agreement

Decision 18/CMA.1 and its annex, as well as future relevant decisions, remain the authoritative source and constitute the basis for the requirements under the enhanced transparency framework and its modalities, procedures and guidelines (MPGs).

The training material strives to reflect the MPG requirements as accurately as possible. The CGE strongly encourages countries that are planning to use the training material to do so in conjunction with the MPGs contained in decision 18/CMA.1 and its annex, and any relevant decisions thereafter.

The CGE intends to undertake periodic updates to take into account feedback from the readers and practitioners, as well as to correct remaining errors, in any.

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Foreword

This training material, prepared by the Consultative Group of Experts, is a toolkit for Parties to use when providing strategic information on each of the elements included in decision 18/CMA.1, annex, chapter IV “Information related to climate change impacts and adaptation under Article 7 of the Paris Agreement” of the modalities, procedures and guidelines of the enhanced transparency framework under the Paris Agreement.

As well as identifying types of information that can be useful for Parties to consider when reporting information on vulnerability and adaptation in their national communications and biennial transparency reports, the document presents a common approach to reporting on each of the elements in the above-mentioned decision, comprising an introduction to the element, including general views on meaning and cross-references with other guidelines or adaptation-related documents under the United Nations Framework Convention on Climate Change; models, methodologies, initiatives and good practices from international organizations and centres on adaptation, making special emphasis on the recent findings of the Intergovernmental Panel on Climate Change; and case studies and examples of how Parties are already communicating and reporting in these topics.

The adaptation section of the biennial transparency report (A-BTR) plays a critical role in informing future cycles of the global stocktake, integrating the constellation of adaptation-related documents, providing a key input for reviewing the progress of the global goal on adaptation, contributing to a collective learning process and making adaptation more visible.

This document emphasizes the relevance and role of adaptation reporting for and by developing country Parties in the context of the overall adaptation provisions and the enhanced transparency framework under the Paris Agreement, including information on reporting at different scales, and based on climate-resilient development pathways.

It provides technical assistance to Parties, in particular the developing country Parties, when preparing their A-BTRs, by supporting narratives on how adaptation is happening; the effectiveness of interventions, including an analysis about the adequacy of resources; and encourage countries to choose to report more and better. At the same time, it contributes to the exchange of ideas and methodologies of existing adaptation communities and organizations providing support.

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Chapter 1: Introduction, context and overall approach on reporting on adaptation

1.1. The Consultative Group of Experts and the enhanced transparency framework

As a constituted body of the United Nations Framework Convention on Climate Change (UNFCCC), the Consultative Group of Experts (CGE) plays a key role in providing technical advice and support to developing country Parties on enhancing their institutional and technical capacity to prepare and submit national communications (NCs), biennial update reports, national greenhouse gas (GHG) inventories and biennial transparency reports (BTRs), with a view to enhancing transparency over time.[1]

The first session of the Conference of the Parties serving as the meeting of the Parties to the Paris Agreement (CMA) decided that the CGE will support the implementation of the enhanced transparency framework (under the Paris Agreement) (ETF).[2] The purpose of the ETF is to provide a clear understanding of climate change action and support, as well as to provide an overview of aggregate financial support provided, and to inform the global stocktake (GST). This function acquires special meaning in the context of the first GST, which will conclude by 2023 and the process and results of which will guide the preparation of the first BTRs to be submitted by 31 December 2024.

The CGE focuses special attention on the challenges, constraints and needs of developing country Parties, with the aims of building mutual trust and confidence, promoting enhanced implementation, and improving the frequency and quality of reporting over time as a collective experience and learning process.

In 2020 the CGE developed a technical handbook on preparing for implementation of the ETF under the Paris Agreement, which aims to improve awareness and understanding among national experts and practitioners in developing country Parties of the ETF and its modalities, procedures and guidelines (MPGs), and published a second edition of the handbook in 2023, capturing the transparency related outcomes from COP 26 and COP 27.

1.2. Adaptation in the enhanced transparency framework

Article 13, paragraphs 5–6, of the Paris Agreement clearly state that reporting on adaptation under the ETF involves both the action and support functions. Even though the provision of such information by Parties is on a voluntary basis, it is an opportunity to increase the visibility of the efforts and actions that countries are carrying out regarding adaptation, including those relate to averting, minimizing and addressing loss and damage associated with climate change impacts, as well as a way of contributing to the collective learning process on adaptation.

[1] This was reaffirmed in the revised terms of reference of the CGE pursuant to decision 14/CP.26.

[2] As stated in decision 18/CMA.1 the CGE shall serve the Paris Agreement, to support the implementation of the enhanced transparency framework under Article 13 of the Paris Agreement by, inter alia: (a) facilitating the provision of technical advice and support to developing country Parties, as applicable, including for the preparation and submission of their biennial transparency reports and facilitating improved reporting over time; (b) providing technical advice to the secretariat on the implementation of the training of the technical expert review teams.

Improving reporting on adaptation over time has several additional benefits, including building institutional capacity in developing countries in terms of the adaptation policy cycle (planning, implementation, and monitoring and evaluation), and boosting the dynamic between the national and collective dimensions of adaptation action under the Paris Agreement.

Despite the fact there is a set of instruments through which Parties already communicate and report on adaptation, much less attention has been focused on reporting on adaptation compared with mitigation.

This training material seeks to contribute to avoiding the excessive overlap of existing instruments (see table 1.1, below) by helping developing country Parties to build a more strategic perspective on how to use these instruments for reporting the national narrative on adaptation in view of the adaptation policy cycle in the specific country.

As reflected in table 1.1 and figure 1.1, the current communication and reporting instruments under the UNFCCC do not explicitly include provisions for loss and damage, other than in the context of the voluntary reporting concerning Article 7 of the Paris Agreement, as reflected in the MPGs. However, many national communications and adaptation reporting instruments include relevant information on climate change impacts and adaptation. Accordingly, this training material also seeks to help interested Parties to provide information concerning loss and damage in a consistent manner by providing examples of emerging good practices, models, methodologies and initiatives.

Table 1.1. Adaptation provisions in UNFCCC documents

Adaptation related instruments	Mandate	Adaptation provisions
National communications (NC)	Articles 4 and 12 (para. 1(b)–(c)) of the Convention. Decisions 17/CP.8, 1/CP.16	• Methodological approaches for assessing vulnerability and adaptation to climate change, as well as evaluation of adaptation strategies and measures. • Reporting should include the scope of the vulnerability and adaptation assessment; a description of approaches, methodologies and tools used; vulnerability to impacts in key areas; evaluation of strategies and measures for adapting; policy frameworks, such as national adaptation programmes, plans and policies.
National determined contributions (NDC)	Articles 3 and 7 (para. 11) of the Paris Agreement; Decision 4/CMA.1 Decision 9/CMA.1	• NDC as a vehicle of Adaptation Communication (Article 7, para.11, of the PA). Decision 9/CMA.1 includes purpose, elements, linkages and other provisions. • Mitigation co-benefits resulting from its adaptation action and/or economic diversification plans in decision 4/CMA.1
Biennial transparency reports (BTRs)	Decision 18/CMA.1	Chapter IV. Information related to climate change impacts and adaptation under Article 7 of the Paris Agreement. A. National circumstances, institutional arrangements and legal frameworks B. Impacts, risks and vulnerabilities C. Adaptation priorities and barriers

		D. Adaptation strategies, policies, plans, goals and actions to integrate adaptation into national policies and strategies E. Progress on implementation of adaptation F. Monitoring and evaluation G. Information related to loss and damage H. Cooperation, good practices, experience and lessons learned I. Any other information
National adaptation plans (NAPs)	Decision 5/CP.17 *LEG Guidelines for National Adaptation Plans*	A. Lay the groundwork and address gaps B. Preparatory elements C. Implementation strategies D. Reporting, monitoring and review
Adaptation communications	Article 7, paragraph 10 and 11, of the Paris Agreement Decision 9/CMA.1 "Draft supplementary guidance for voluntary use by Parties on the adaptation communication"	(a) National circumstances, institutional arrangements and legal frameworks; (b) Impacts, risks and vulnerabilities; (c) National adaptation priorities, strategies, policies, plans, goals and actions; (d) Implementation and support needs of, and provision of support to, developing country Parties; (e) Implementation of adaptation actions and plans; (f) Adaptation actions and/or economic diversification plans, including those that result in mitigation co-benefits; (g) How adaptation actions contribute to other international frameworks and/or conventions; (h) Gender-responsive adaptation action and traditional knowledge, knowledge of indigenous peoples and local knowledge systems related to adaptation; (i) Any other information related to adaptation.

Note: Adapted from table 3 of document FCCC/SB/2022/5/Add.1 (https://unfccc.int/documents/615352).

Regarding nationally determined contributions (NDCs) and adaptation, the latest NDC synthesis report elaborated by the UNFCCC secretariat stated that as of 23 September 2022 the NDC registry contained 166 latest available NDCs, representing 193 Parties to the Paris Agreement, including 142 new or updated NDCs communicated by 169 Parties. Of that number, most Parties (80 per cent) included an adaptation component in their NDC and some of the adaptation components (13 per cent) were designated as adaptation communications (ADCOMs).

Specifically, the Parties provided information on adaptation-related research; vulnerabilities; adaptation measures, in particular national adaptation plans (NAPs) and sectoral actions; contingency measures; synergies with mitigation and other global frameworks; and monitoring and evaluation of adaptation. In comparison with Parties' initial NDCs, more of the updated and new NDCs contain adaptation information. The adaptation components of the NDCs, where included, indicate increased focus on national adaptation planning, in particular on formulating and implementing NAPs. The new or updated NDCs include more information than previously on time-bound quantitative adaptation targets and the associated indicator frameworks; more specific links between adaptation efforts and efforts towards achieving the Sustainable Development Goals (SDGs); and more specific information on synergies and co-benefits between adaptation and mitigation.

In terms of adaptation priorities, the NDCs illustrate that Parties continue to focus on freshwater resources; food production and nutrition security; terrestrial and wetland ecosystems; key economic sectors and services; human health; disaster risk management; urban areas and human habitats; coastal and low-lying areas; ocean ecosystems; and livelihoods and poverty.

Figure 1.1. Types of adaptation information under UNFCCC arrangements

Type of information	BTR	Adaptation Com.	NAPs	NatCom/ AI Parties	NatComs of NAI Parties
National circumstances, institutions, legal frameworks	X	X	X		X
Impacts, risks, vulnerabilities	X	X	X	X	X
Priorities and barriers related to adaptation	X	X	X		X
Strategies, policies, plans, goals, steps to integrate adaptation into other policies	X	X	X	X	X
Support needed/support received	X	X	X		
Progress in implementation of adaptation	X	X	X	X	X
Monitoring and evaluation	X	X	X	X	X
Information related to averting, minimizing and addressing loss and damage associated with climate change impacts	X				
Cooperation, good practices, experiences, lessons learned	X	X	X		
Adaptation-related economic diversification/ mitigation co-benefits of adaptation	X	X			
Contributions to other international frameworks		X	X		
Gender perspective and/or traditional, indigenous and local knowledge	X	X	X		

Source: CGE Technical Handbook on ETF, 2023

The MPGs provide an outline of information related to climate change impacts and adaptation, including information related to averting, minimizing and addressing loss and damage associated with climate change impacts, that Parties should consider including when preparing the adaptation section of the BTR (A-BTR).

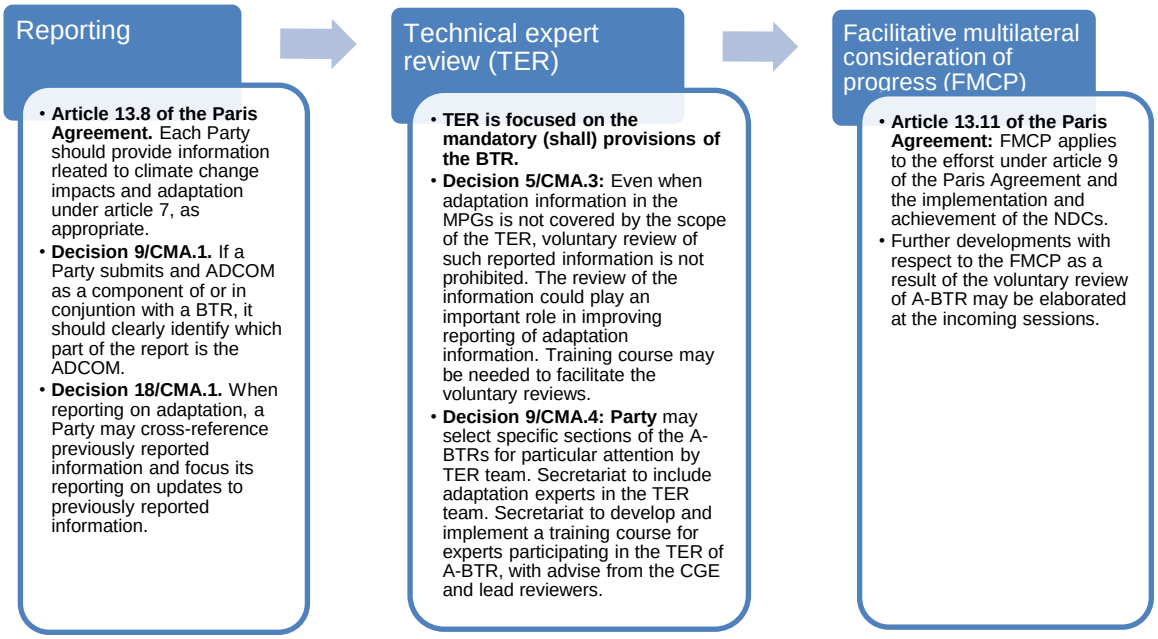
In order to build trust and promote effective implementation, the ETF provides flexibility for those Parties that need it in the light of their capacities. The MPGs detail the flexibility provisions, including the scope, frequency and level of detail of reporting, and the scope of the review. It is up to the developing country Party to determine the flexibility provisions it wishes to apply, indicating the capacity constraints and the estimated time frames for improvement.

Even though the A-BTR is submitted on a voluntary basis, the specific flexibility in the ETF and the MPGs helps the least developed countries (LDCs) and small island developing States (SIDS), in that they may submit the A-BTR and other information (e.g. national inventory report; information to tracking progress made in implementing and achieving NDCs; financial, technology and capacity-building support needed and received) at their discretion.

Article 13 of the Paris Agreement provides the core structure of the ETF, which includes reporting, the technical expert review and a facilitative, multilateral consideration of progress. Figure 1.2 presents an overview an overview of the way A-BTRs are currently processed within the ETF.

Article 13 of the Paris Agreement and various decisions of the CMA have identified the information to include in the A-BTR as part of the adaptation reporting process, and its relationship with the ADCOM (which, in accordance with Article 7, para. 11, of the Paris Agreement, shall be submitted as a component of or in conjunction with other communications or documents). Subsequently, the CMA allowed for a voluntary review of the information reported on adaptation to be carried out as a way to improve the national and collective exercise of reporting.

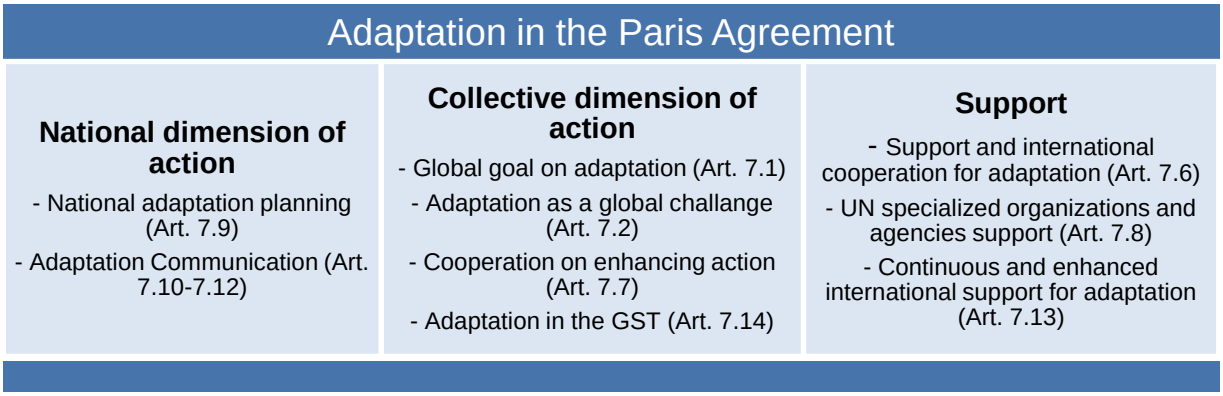
Figure 1.2. Adaptation reporting through the stages of the enhanced transparency framework



1.3. Other provisions related to adaptation in the Paris Agreement

The Paris Agreement recognizes the critical role of adaptation in the global effort to respond to climate change. Article 7 sets out the most relevant features of the Paris Agreement in terms of both national and collective dimensions of action. Although the ETF seems to be more aligned with the national dimension of action, it interacts with collective processes under the Paris Agreement, such as the GST (Article 14) and the global goal on adaptation (GGA) (Article 7, para. 1).

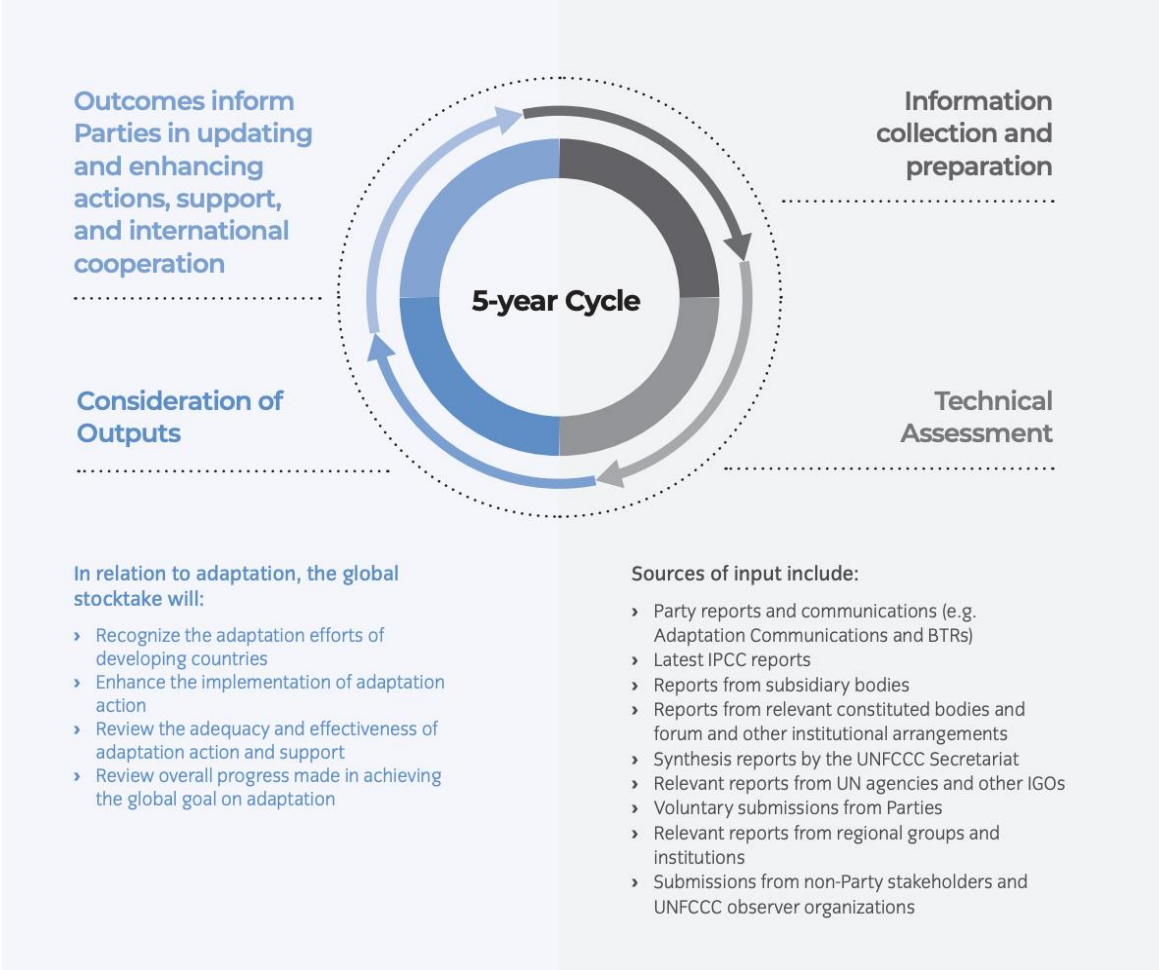
Figure 1.3. Adaptation in the Paris Agreement



Adaptation is one of the key elements of the GST in order to ensure that it is a comprehensive and facilitative process in terms of equity and the best available science (Article 14 of the Paris Agreement). The GST may also take into account, as appropriate, efforts related to averting, minimizing and addressing loss and damage associated with the adverse effects of climate change.

Decision 19/CMA.1 establishes the modalities of the GST, including a three-step approach based on information collection and preparation; technical assessment; and the consideration of outputs (figure 1.4). During the first stage, two of the main sources of input to be gathered, compiled and synthesized at the collective level are (1) the overall effect of the NDCs and their implementation, and (2) the state of adaptation efforts, support, experience and priorities. These sources should be reflected in synthesis reports prepared by the UNFCCC secretariat.

Figure 1.4. Adaptation in the global stocktake



Source: 25 Years of Adaptation under the UNFCCC, report by the Adaptation Committee

There are other sources to be considered, such as the reports and communications from Parties. The first BTRs will not be available in time for the first GST, but there are other adaptation-related documents (e.g. those included in table 1.1 above) that remain critical for this first collective assessment. However, the adaptation section of the BTRs will be an important source of input for the next cycle of the GST, as will the best available science (particularly the findings of the Intergovernmental Panel on Climate Change (IPCC)).

The GST is mandated to encompass recognition of the adaptation efforts of developing countries; enhancement of the implementation of adaptation action through ADCOMs; the review of the adequacy and effectiveness of adaptation and support; and the review of the overall progress in achieving the GGA (Article 7, para.14, of the Paris Agreement).

The recognition of adaptation efforts of developing countries occurs at different points in the process, such as the preparation of thematic synthesis reports by the secretariat with the guidance of the Adaptation Committee (AC) and the Least Developed Countries Expert Group (LEG) (decision 11/CMA.1).[3] The adaptation efforts will also be recognized during the high-level events of the GST, and the secretariat has been requested to prepare a report summarizing the process. The adaptation section of the BTRs will be a key source of information on the adaptation efforts of developing country Parties (MPGs, para. 105), starting from the second cycle.

ADCOMs play an important role as a source of input for the GST, but also as a way of enhancing implementation. The relationship between the ADCOMs and the BTRs is profound to the extent that the elements established in decisions 9/CMA.1 and 18/CMA.1 are very similar. However, the purpose of the documents and the nature of the information may be different (see table 1.2).

A relationship could be inferred between the nature of the information and the vehicle chosen for the ADCOM (see annex 1). Countries that have already submitted ADCOMs in their NDC or NAP may understand that communicating adaptation actions has a reporting mirroring effect in the BTRs. For that reason, the information included in these ADCOMs may be primarily ex-ante and that in the BTR ex-post. At the same time, decision 9/CMA.1 recognizes that the BTR may be one of the vehicles of the ADCOM.

Table 1.2. ADCOM and A-BTR

	ADCOM	A-BTR
Purpose/ utility	• Increasing the visibility and profile of adaptation and its balance with mitigation; • Strengthening adaptation action and support for developing countries; • Providing input to the Global Stocktake; • Enhancing learning and understanding of adaptation needs and actions.	• Identifying and gaining recognition of adaptation efforts of developing countries; • Setting the scene or telling the story of national adaptation; • Developing the country narrative of progress in relation to the information provided in other adaptation related instruments and planning processes; • Targeting support needs to meet adaptation priorities, including challenges, gaps and barriers to adaptation; • Providing information about good practices, experiences and lessons learned in the implementation of adaptation actions.

[3] The AC and the LEG have prepared two synthesis reports so far. The first one on "How developing countries are addressing hazards, focusing on relevant lessons learned and good practices" and the second one is a "Draft synthesis report on efforts of developing countries in assessing and meeting the costs of adaptation".

Nature of information	Both *ex ante* and *ex post,* but Parties are invited to prioritize *ex ante* information (decision 9/CMA.1, para. 8). A relationship could be inferred between the nature of the information and the vehicle chosen for the ADCOM.	Mainly *ex post*
	If the A-BTR is chosen as a vehicle of ADCOM the nature of information may vary. [a]	
Frequency or cycle	Not mandatory but frequency may vary according to the vehicle chosen.	A-BTR is not mandatory but BTR submission must occur every two years.

Note [a]. The idea of "vehicle documents" (i.e. the documents that may host the ADCOM) reached predominance during the negotiations of the Ad Hoc Working Group on the Paris Agreement agenda on "Further guidance in relation to the adaptation communication, including, inter alia, as a component of nationally determined contributions, referred to in Article 7, paragraphs 10 and 11, of the Paris Agreement" from 2016 to 2018. Pursuant to Article 7, para.11 of the Paris Agreement, the ADCOM shall be submitted as a component of or in conjunction with other communications or documents, including an NAP or an NDC. Decision 9/CMA.1 incorporates the BTR as another possible ADCOM vehicle.

The third process that converges in the GST is the review of the adequacy and effectiveness of adaptation and support. As assessed by the AC and the LEG in the report "Methodologies for reviewing the adequacy and effectiveness of adaptation and support" (AC-LEG/INFO/3), the review seeks to enhance the coherence and synergies of the components of the GST and ensure that useful information is being provided to the people who will undertake the various assessments that will ultimately enable mutual learning and further progress towards achieving the goals of the Paris Agreement. The information A-BTR is catalytic in terms of promoting the implementation of effective adaptation action, as well as enhancing support to meet the needs identified by developing country Parties. Nevertheless, both the AC and the LEG recognize that there are limits on how, and to what effect, the adequacy and effectiveness of adaptation and support can be reviewed and there is no one-size-fits-all methodology to do it. The work of the AC and the LEG on methodologies for reviewing the adequacy and effectiveness of adaptation and support is ongoing.

Even though there is no agreement on how best to measure the adequacy of support, it could be said that the support is "adequate" if it meets a country's adaptation needs. However, to some extent, the adequacy of support also speaks to the effectiveness of action. Some issues that may be considered when referring to effectiveness of action are listed in the IPPC report *Adaptation Needs and Options* (IPCC, 2018), namely institutional learning; needs assessment; potential for effective coordination, communication and cooperation within and across levels of government and sectors; robustness of institutions to attend to the needs of diverse stakeholders and foster their engagement in adaptation decisions and actions; and access and development of relevant information.

In addition, there is no single metric that can be considered at the global level, so such a review will need information from individual or national assessments at different scales, including a range of methodologies. The complex nature of assessing progress on adaptation is reflected in the fourth aspect under the GST: the review of overall progress in achieving the GGA.

The GGA involves three components: enhancing adaptive capacity; strengthening resilience and reducing vulnerability to climate change, with a view to contributing to sustainable development; and ensuring an adequate adaptation response in the context of the global temperature goal referred to in Article 2 of the Paris Agreement. As recognized by the AC in its technical paper, there is a diverse literature on how to assess adaptation progress and how to aggregate or collate adaptation information from different scales. The challenges are methodological, empirical, conceptual and political, and there are various trade-offs, such as the tension between aggregating information and recognizing context-specific conditions of adaptation. These challenges are closely related to the process of building information at the national level and communicating and reporting it to the UNFCCC.

There are several possible approaches for assessing collective progress on adaptation action and support: a commonality among them being the increasing relevance of the information communicated and reported by countries, not only as a source but also as a road map for understanding the specific adaptation narrative of each country.

For instance, comparing action and support (received and provided) reported in an A-BTR against information communicated in a NAP, NC and NDC could be a way to understand the level of progress at the national level and also to inform an assessment of collective progress. An example of the latter is the annual *Adaptation Gap Report* published by the United Nations Environment Programme (UNEP), which assesses the status and progress of global adaptation planning, finance and implementation. Another approach to consider is establishing climate risk baselines using the vulnerability and risk assessments communicated and reported as a common element appearing in all adaptation-related documents.

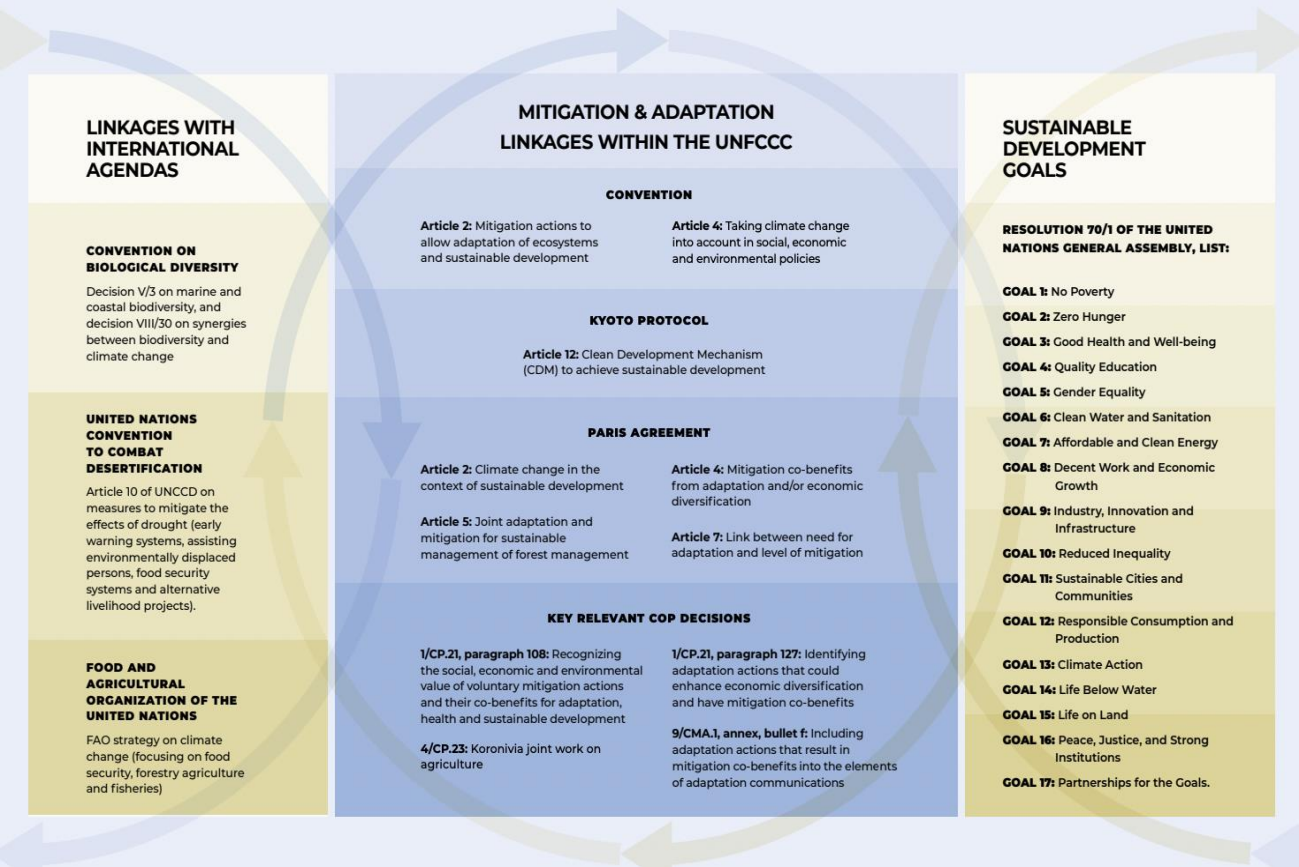
In other words, assessing the information included in an element of the A-BTR against the elements in another adaptation-related document is already a way of understanding progress. Along this path, the monitoring and evaluation system acquires additional importance, as discussed in chapter 7.

Another feature of the Paris Agreement (Article 7, para. 4) is the relationship between adaptation and mitigation in terms of recognition that additional adaptation efforts will be needed, and the costs will incrementally increase if mitigation ambition is not set high enough. In this regard, the Paris Agreement also recognizes the importance of averting, minimizing and addressing loss and damage associated with the adverse effects of climate change, including extreme weather events and slow onset events, and the role of sustainable development in reducing the risk of loss and damage.

Other aspects of the Paris Agreement also address adaptation: Article 5 encourages Parties to take action to implement and support alternative policy approaches and positive incentives to reduce emissions from deforestation and forest degradation through an integrated approach to sustainable management of forests; and Article 4 refers to mitigation co-benefits resulting from adaptation actions and/or economic diversification plans that can contribute to mitigation outcomes.

The AC identified at least three ways of understanding the relationship between mitigation and adaptation: the adaptation actions with consequences for mitigation; the mitigation actions with consequences for adaptation; and the inter-relationships including sustainable development.

Figure 1.5. Linkages under the UNFCCC and with other international agendas



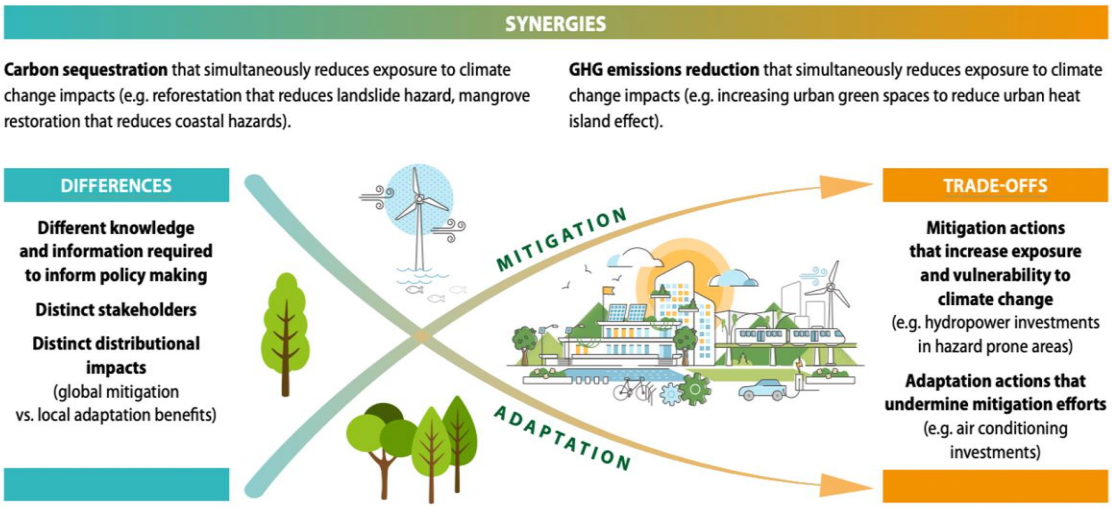
Source: Information paper on linkages between adaptation and mitigation Information paper by the Adaptation Committee

A report by the Organisation for Economic Co-operation and Development (OECD, 2021) also explores adaptation–mitigation linkages as well as potential trade-offs (figure 1.6). Linkages are increasingly recognized in NAPs and NDCs in agriculture, forestry and other land use sectors although they are less frequently mentioned in the waste sector. Countries are also fostering the importance of nature-based solutions as a way to address climate change challenges comprising both mitigation and adaptation.

Examples of measures based on the linkages and synergies between mitigation and adaptation include forest or mangrove restoration; urban green space expansion, including parks and green roofs; and management of soil quality in agriculture.

Trade-offs should also be considered: for example, urban green space expansion without proper housing densification strategies can decrease urban density and lead to higher transport emissions; and hydropower plants can reduce GHG emissions during electricity consumption, but their construction also involves GHG emissions and may harm biodiversity and forest areas, as well as increase water-related climate risks, such as water resources quality and/or quantity.

Figure 1.6. Aligning climate change mitigation and adaptation policies: differences, synergies and trade-offs



Source: *OECD, 2021*

The contribution of Working Group II to the Sixth IPCC Assessment Report[4] (AR6) relies on the concept of **climate-resilient development** as a way of understanding the process of implementing mitigation and adaptation measures to support sustainable development. The AR6 affirmed that in the near term (2021–2040) loss and damage will be substantially reduced if global warming is limited to 1.5°C, but cannot be eliminated (very high confidence). Thus, in this time frame, controlling the magnitude and rate of climate change and its risks will rely on mitigation and adaptation actions. Projected adverse impacts and related loss and damage will escalate with every increment of global warming (very high confidence).

1.4. Adaptation at different scales

Adaptation action is already happening at different scales: local, national, regional, international and transboundary. However, national adaptation has been predominant in the light of international cooperation patterns, including the Party-driven nature of the UNFCCC process (Benzie et al., 2018).

At the same time, climate extremes are causing impacts across national boundaries, including transboundary risks in different sectors. This is not unknown by Parties and stakeholders, as stated in a report by the World Adaptation Science Programme (WASP, 2020). Transboundary adaptation is part of planning but sometimes is not identified as such. One of the main reasons for adopting and strengthening transboundary approaches to adaptation is to avoid maladaptation: a purely national perspective may fail to address climate risks with cascading impacts across the borders or, even worse, to increase climate risks to other areas by increasing vulnerability or GHG emissions.

Even if adaptation at each scale deals with different challenges, all of them require evidence-based knowledge and cooperation, including financial support. Multilateral cooperation under the UNFCCC comprises the collective assessment of progress, addressing the common

[4] https://www.ipcc.ch/report/ar6/wg2/

question of how to collate or aggregate adaptation action across the different scales. A more systemic approach to climate risks needs to be complemented with a climate-resilient pathway as addressed by the IPCC where mitigation, adaptation and loss and damage interlink. Including more dimensions in the context of the GGA and the first GST provides a better idea about climate risks in multiple domains such as trade, biophysical factors, migration and finance (Benzie et al., 2018).

Reporting challenges and rules vary, depending on the scale being addressed. Even though the ETF is mostly based on national-level action, there is nothing to prevent a Party from reflecting the progress made at other scales during its reporting exercise. A more comprehensive look at the report can also help the people compiling the report to think about the collective processes of the GGA and the GST more holistically.

1.5. Strategic reporting

Strategic reporting involves the developing country Party identifying and assessing its specific gaps and needs when reporting on its adaptation actions. Such gaps and needs could be related to the exercise of reporting itself, with data and information gaps; or could be deeper, including the planning, implementing and monitoring process. In all cases, the identified gaps and needs should clearly reflect the main adaptation narrative of the reporting Party, including its strategic mid- and long-term adaptation priorities.

The ETF is intended to be a joint capacity-building process by virtue of its commitment to improve transparency through mutual and continuous learning. In order to build capacities, the gaps and needs of the Parties must be assessed, including those of information and data, which are among the gaps and needs most frequently identified by the Parties in their NDCs.

However, it must be recognized that even in a process of improved reporting capacities, some of the gaps may remain. Thus, developing countries face growing uncertainties related to the climate, human and ecological systems, as well as imperfect reporting processes, which this document aims to address.

Chapter 2: National circumstances, institutional arrangements and legal frameworks

Decision 18/CMA. MPGs
A. National circumstances, institutional arrangements and legal frameworks

Paragraph 106*. Each Party should provide the following information, as appropriate:*
(a) National circumstances relevant to its adaptation actions, including biogeophysical characteristics, demographics, economy, infrastructure and information on adaptive capacity;
(b) Institutional arrangements and governance, including for assessing impacts, addressing climate change at the sectoral level, decision-making, planning, coordination, addressing cross-cutting issues, adjusting priorities and activities, consultation, participation, implementation, data governance, monitoring and evaluation, and reporting;
(c) Legal and policy frameworks and regulations.

2.1. Introduction to the element

Section A of the MPGs covers a common element of all reporting instruments, namely, national circumstances, institutional arrangements and legal frameworks. In developing this element, special attention should be given to adequately cross-referencing national circumstances, institutional arrangements and legal frameworks that could already have been described in the mitigation section of the BTR, or as a general description for the BTR as a whole. Cross-referencing should ensure that the information in both/all sections remains consistent and well-articulated.

Moreover, the purpose of including a specific adaptation element when reporting on national circumstances, institutional arrangements and legal frameworks is to present enough national context so that readers can gain a better understanding of the specificities of the adaptation policy cycle in each country. In this regard, when thinking about how much information the A-BTR should provide on these general issues, the answer is that this will depend on the key national circumstances, institutional arrangements and legal frameworks within the vulnerability and adaptation scope, including adaptive capacity.

Regarding national circumstances, the narrative should include references to social, economic and geographical aspects of the country that inform the context of vulnerability, without developing a full vulnerability assessment, because that exercise will be dealt with in the next element. For example, mentioning the main geographical characteristics (e.g. coastal, arid, semi-arid, mountainous) is useful so that readers can understand the adaptation context.

In addition, information on socioeconomic issues, such as poverty level, inequality, gender disaggregated data or the main economic sectors, provides context about vulnerabilities and adaptation needs. Providing specific references to the particular vulnerabilities of the country to the adverse effects of climate change is an important aspect of this section.

Regarding institutional arrangements and legal frameworks, it is important to describe such issues in the context of the adaptation narrative, for example indicating specific arrangements

for adaptation action, or at least how adaptation functions are being performed within larger and/or overall arrangements.

2.2. Methodologies, initiatives and good practice

2.2.1. National circumstances relevant to adaptation actions

This subsection should describe the features of the country, including biogeophysical characteristics, demographics, economy, infrastructure and information on adaptive capacity. Tables, maps and infographics can be helpful in presenting the information in a more legible and organized manner.

Information presented can include quantitative and qualitative data, and it is usual to incorporate references to national documents and relevant ad hoc studies. Providing gender-disaggregated data is useful to give initial context to more in-depth gender analysis that can be further developed in later elements.

Since national circumstances is a common element of all reporting instruments, consistency with previous reports is also highly desirable, in particular regarding specific structured aspects that are likely to remain largely the same from report to report.

2.2.2 Institutional arrangements and governance

This subsection should develop the narrative of the institutional arrangements and governance of adaptation, including for assessing impacts, addressing climate change at the sectoral level, decision-making, planning, coordination, addressing cross-cutting issues, adjusting priorities and activities, consultation, participation, implementation, data governance, monitoring and evaluation, and reporting.

As with national circumstances, narratives describing institutional arrangements should be consistent with previous reports, although in this case it is quite possible that dynamic changes have occurred in the arrangements from report to report (e.g. the creation of new institutions or development of old ones). In this situation, consistency can be ensured by recalling previous arrangements reported before and indicating in which ways and when changes have occurred including, for example, the context or the basis for such decisions.

Regarding institutional arrangements for adaptation, the AC (2014) indicated that:

> "There is no single definition for institutional arrangements for adaptation and the term is used in many different forms and contexts. (...) institutional arrangements are interpreted as those structures, approaches, practices or rules set in place by stakeholders at all levels to steer adaptation action including for: assessing impacts, vulnerability and risks; planning for adaptation; implementation of adaptation measures; and monitoring and evaluation of adaptation."

This definition is in line with the idea of describing institutions and their relationships in the context of the adaptation policy cycle.

Moreover, the AC said that:

> "National adaptation frameworks are usually led by a designated national institution or agency or jointly by several governmental institutions. Measures to improve institutional arrangements for adaptation range from regional to local, and sectoral to cross-cutting initiatives including: modification and development of legislation, establishment of scientific and advisory bodies, sharing of information and practices, awareness raising, training, engineering and infrastructural changes. In non-Annex I Parties, there is a great variety of institutional arrangements for adaptation which are referred to in some NAI national communications. Many NAI Parties have created specific institutional frameworks dedicated to combating climate change. These include interministerial climate change coordination committees, technical working groups undertaking specific studies on inventories, mitigation, vulnerability and adaptation, and climate research centres coordinating national studies. The participation of stakeholders, including non-governmental organizations (NGOs), is recognized as an important means of ensuring continuity of climate change activities."

Reporting on adaptation-related institutional arrangements could also address specific arrangements at the subnational, regional or international level that are relevant for the reporting country.

2.2.2.1 Institutional arrangements for reporting in adaptation

One specific area of institutional arrangements that can be included in the A-BTR, beyond policymaking and adaptation implementation, is the institutional arrangements for reporting in adaptation. The CGE has reviewed several good experiences worldwide that provided robust approaches to data collection, analysis, synthesis and reporting.

In this regard the CGE (2020) stated that "Institutional arrangements will vary among countries depending on the national circumstances, priorities for action and demands for informing stakeholders involved in the implementation of action and reporting. In some countries, a single organizational structure may be responsible for all themes, objectives and outputs, whereas in other countries these responsibilities may be divided among different independent organizations", and that institutional arrangements can be organized around five separate components, as follows:

1. **Organizational mandates**: including terms of reference designed to guarantee that the needed decisions and resources are in place to provide for adequate reporting;
2. **Expertise**: the team of national experts that should be capable of regularly gathering and processing data in order to produce the agreed outputs in a timely manner;
3. **Data flows**: the definition of needs, uses and resources of data, including national statistics and specific ad hoc data collections;
4. **Coordination, systems and tools:** managing the collection, analysis, quality assurance/quality control, summarizing and archiving of data, including the development and maintenance of workplans, engagement tools, databases, data analysis, indicators and reports;
5. **Stakeholder engagement**: including the public, local governments and communities, businesses and other decision-makers. The greater the engagement the better (and

more useful) the transparency system will be for evidence-based decision-making and the production of reports.

2.2.3 Legal and policy frameworks and regulations

This subsection the A-BTR incorporates information regarding the legal and policy frameworks and regulations in place regarding adaptation. It should include climate change laws and any specific climate change regulations, and the characteristics that explicitly address adaptation should be highlighted, whether there is one stand-alone piece of regulation, or whether adaptation is covered in a specific section of a broader legal framework. Examples of the latter include adaptation chapters of national climate change laws, or specialized references to climate change adaptation in sectoral regulations.

Other areas of legal development, for example disaster risk management, can substantially contribute to the legal and policy framework on adaptation, even if climate change adaptation is not mentioned explicitly.

In most cases, information on regulations can be included in specific tables that present the development of the legal framework in, for example, a chronological way, including the precise reference for each legal instrument, whether a parliamentary act, an executive decree, a constitutional reference, or administrative decisions. Some of those instruments may also describe overall policy and programmatic frameworks, such as NAPs adopted, climate change policies, or other sectoral policies explicitly or implicitly addressing climate change adaptation.

2.2.4 Capacity-building and capacity gaps and needs

Although the issue of capacity gaps and needs can be explicitly addressed in the section of the A-BTR on priorities and barriers, it might be useful to address some aspects of capacity-building and development in the subsection on institutional arrangements.

Information provided in this subsection may include references to previous capacity gaps and needs that have subsequently been overcome by institutional and capacity-strengthening processes.

There are many capacity-building activities that could be referenced, such as human resource strengthening, including the progressive incorporation of staff in both quantitative and qualitative ways (i.e. by including specific knowledge and/or specialization). Mentioning other capacity aspects, such as processes and tools, helps to build an adequate institutional context for adaptation planning and implementation. In this sense, data collection and analysis – in particular in the context of institutional arrangements for monitoring, evaluating and reporting on adaptation – can provide a great deal of clarity and understanding of the adaptation transparency processes at the national and local level.

The Paris Committee on Capacity-building (PCCB) (2022) has provided for a specific toolkit for assessing capacity-building gaps and needs to implement the Paris Agreement, explaining that:

"Assessments of capacity gaps and needs are undertaken at different levels (subnational, national, sectoral, regional) and for specific purposes (national assessments, mitigation, adaptation, gender, health, etc.) in line with the level at which it occurs. Assessments should be country-driven, inclusive processes in which stakeholder engagement plays a prominent role. An important first step in developing an assessment is understanding why one is needed, for whom the capacity is required as well as what capacities are needed. Answering each of these three questions helps to define the purpose, object and boundaries of the assessment, which can in turn help establish the scale and scope of the assessment. Assessments normally involve a step-by-step approach that allows the assessment team to identify the gaps and needs and then develop strategies and take action to address them. The first step in such an assessment is to gain an understanding of existing capacities, then to determine what the capacity needs are based on existing or proposed policy and programmes. Once existing capacity and future needs are determined the capacity gaps can be identified and strategies and actions to address them can be developed."

Box 2.1. Avoiding the duplication of information relating to national circumstances
(*Reporting adaptation through the biennial transparency report*, UNEP DTU Partnership, 2020)

"The guidance provided for each section of the BTR…all request information about the country's national circumstances. This poses a challenge for authors of the various sections of the BTR, who will need to coordinate where information is situated in the document, and in what format, in order to avoid the duplication of information, which could otherwise happen up to three times in a full BTR. To solve this, it is likely that authors will have two broad options:

- Information about a country's national circumstances will be situated in a single chapter within the BTR that bears relevance to the whole report (i.e. not just adaptation)…
- Each chapter of the BTR will possess its own national circumstances section. However, under this format, it would then be up to the authors to find a means of distinguishing between aspects of the national circumstances that are relevant to adaptation, and what are relevant to mitigation, in order to minimize duplication."

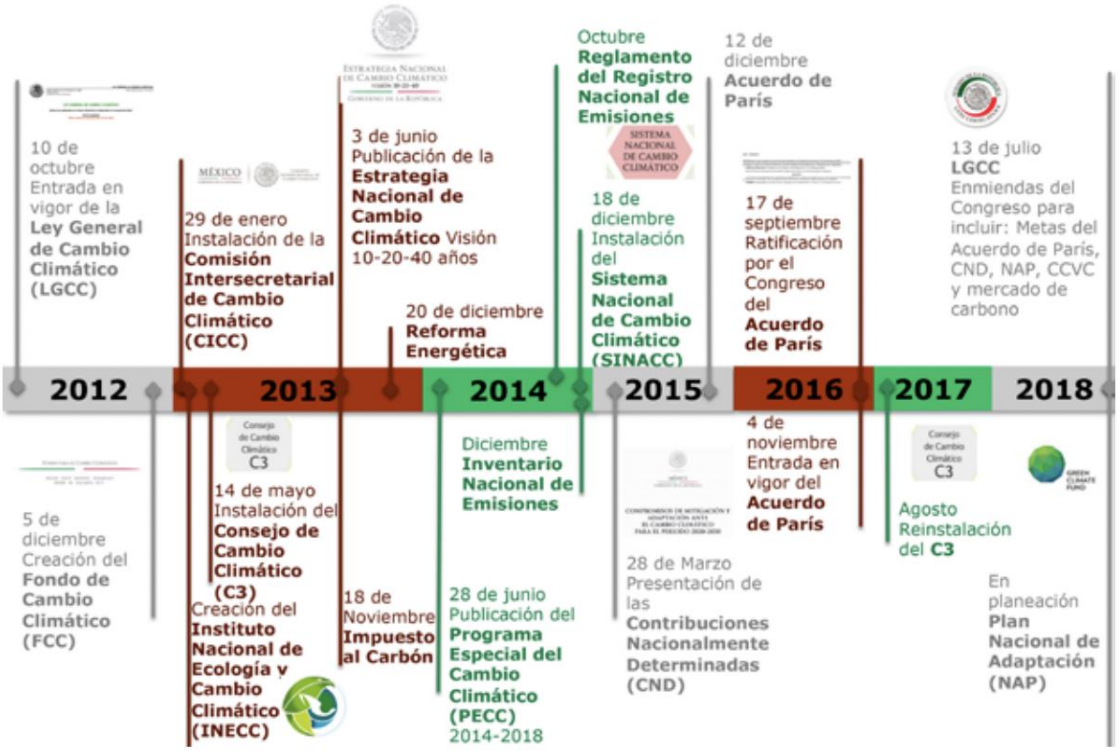
2.3. Examples of national circumstances, institutional arrangements and legal frameworks

Mexico's NC6 reported this element by focusing on the information relating to adaptation including geographical and climate information (figure 2.1), the socio-demographic and economic situation, the General Law on Climate Change, climate governance and climate policy instruments (figure 2.2) in the three levels of government (federal, state and municipal). Figure 2.3 illustrates the main institutional arrangement on climate change of Mexico, including the Adaptation Policies Working Group.

Figure 2.1. Ecosystems in Mexico

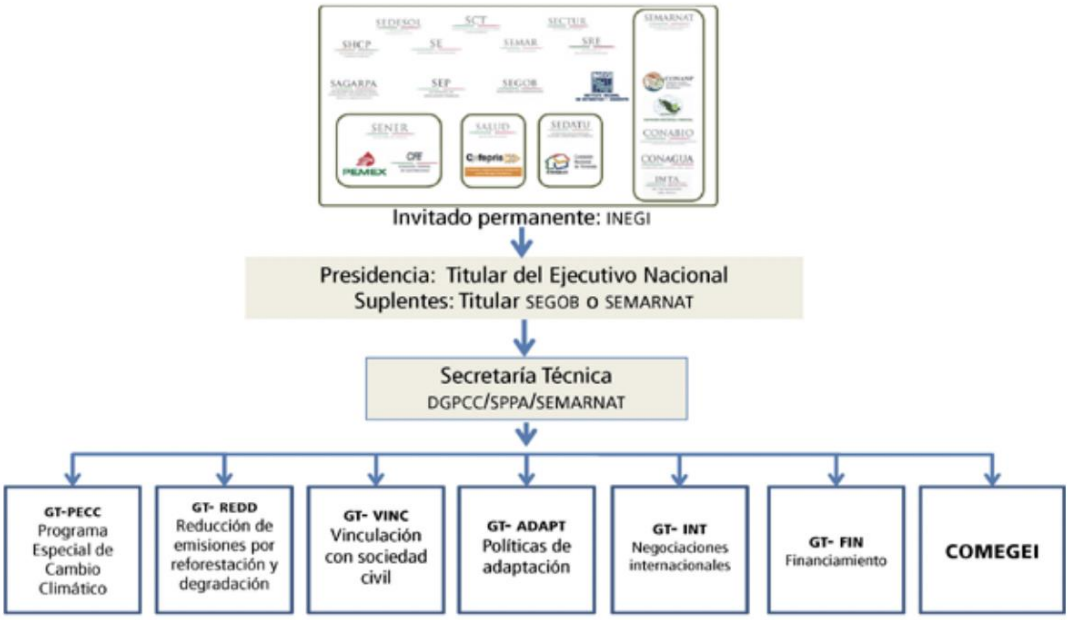
Source: CONABIO, NATCOM Mexico, 2018, p. 38

Figure 2.2. Public policies evolution in Mexico, including legal frameworks



Source: NATCOM Mexico, 2018, p. 66

Figure 2.3. The national inter-secretary commission on climate change of Mexico

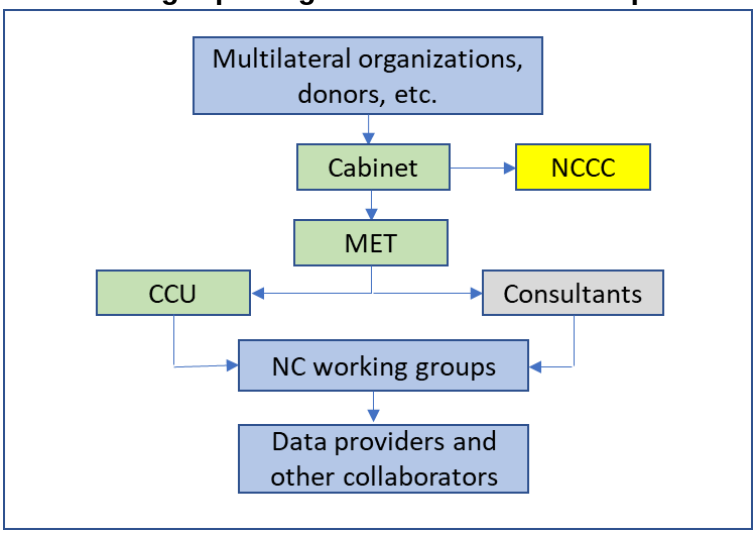


Source: NATCOM Mexico, 2018, p. 69

Namibia's NC4 includes information on national circumstances, geography and climate, as well as circumstances by area or sector of the economy. The reference to the institutional arrangements explains that the multi-sectoral National Climate Change Committee (NCCC) and the Climate Change Unit (CCU) share responsibility for coordinating the production of the reports (figure 2.4).

Namibia also undertook an internal exercise to understand whether the national institutions could respond to needs relating to reporting to the UNFCCC. This could be a useful practice to recommend to other Parties: the institutional arrangements on adaptation could be assessed periodically or when preparing the A-BTR.

Figure 2.4. Institutional arrangements for climate change activities in Namibia, including reporting and data collection aspects



Source: NATCOM Namibia, 2020, p. 26

Chapter 3: Impacts, risks and vulnerabilities, as appropriate

Decision 18/CMA.1. MPGs
B. Impacts, risks and vulnerabilities, as appropriate

Paragraph 107*. Each Party should provide the following information, as appropriate:*
(a) Current and projected climate trends and hazards;
(b) Observed and potential impacts of climate change, including sectoral, economic, social and/or environmental vulnerabilities;
(c) Approaches, methodologies and tools, and associated uncertainties and challenges, in relation to paragraph 107(a) and (b) above.

3.1. Introduction to the element

This chapter analyses and provides technical guidance on reporting on impacts, risks and vulnerabilities. Even if these concepts seem similar, each of them relates to a specific conceptual framework, so it is necessary to clarify each definition and use. Countries could use one or more of these concepts when reporting on adaptation; however, it is essential that any reporting clearly indicates whether each of the elements is an impact, a risk or a vulnerability. In that regard, the IPCC provides the definitions of each element in its AR6.

> **Impacts**: The consequences of realized risks on natural and human systems, where risks result from the interactions of climate-related hazards[5] (including extreme weather/climate events), exposure, and vulnerability. Impacts generally refer to effects on lives, livelihoods, health and well-being, ecosystems and species, economic, social and cultural assets, services (including ecosystem services) and infrastructure. Impacts may be referred to as consequences or outcomes, and can be adverse or beneficial.

Impacts are understood to be concrete effects or outcomes of a climate change related process or event. For example, if there is an intense drought in a cattle-rearing area, impacts could be the number of cattle lost and the amount of income that breeders will not receive in relation to that cattle loss.

> **Risks**: The potential for adverse consequences for human or ecological systems, recognizing the diversity of values and objectives associated with such systems. In the context of climate change, risks can arise from potential impacts of climate change as well as human responses to climate change. Relevant adverse consequences include those on lives, livelihoods, health and well-being, economic, social and cultural assets and investments, infrastructure, services (including ecosystem services), ecosystems and species. In the context of climate change impacts, risks result from dynamic interactions between climate-related hazards with the exposure and vulnerability of the affected human or ecological system to the hazards. Hazards, exposure and vulnerability may each be subject to uncertainty in terms of magnitude and likelihood of occurrence, and each may change over

[5] "Hazard: The potential occurrence of a natural or human-induced physical event or trend that may cause loss of life, injury or other health impacts, as well as damage and loss to property, infrastructure, livelihoods, service provision, ecosystems and environmental resources. See also Impacts and Risk." (IPCC AR6).

> time and space due to socio-economic changes and human decision-making. In the context of climate change responses, risks result from the potential for such responses not achieving the intended objective(s), or from potential trade-offs with, or negative side-effects on, other societal objectives, such as the Sustainable Development Goals (SDGs). Risks can arise for example from uncertainty in the implementation, effectiveness or outcomes of climate policy, climate-related investments, technology development or adoption, and system transitions.

Risks are not actual outcomes; rather, they are possible outcomes that relate to the uncertainty/probability of climate hazards in the context of the interaction between vulnerable elements and such hazards. Using the same example of cattle breeding, a risk could be the chance of having an intense drought, in the context of the interaction of the cattle with its agro-ecosystem. There could be a high risk of drought-related impacts if drought is frequent on pasture land, but there could be a higher risk of drought-related impacts if drought is equally frequent but pasture is on degraded land.

> **Vulnerability**: The propensity or predisposition to be adversely affected. Vulnerability encompasses a variety of concepts and elements, including sensitivity or susceptibility to harm and lack of capacity to cope and adapt.

The concept of vulnerability has long been considered part of climate change adaptation, as well as in the IPCC evolving conceptual framework. Vulnerability is a complex concept that refers to a condition of the subject in question, whether a community, an ecosystem, a territory, and so on. Such conditions make the subject more or less susceptible to the same climatic effect.

For example, if neighbouring cattle breeders suffer an intensive heat wave, the cattle belonging to the breeder whose land has more tree area and thus better shade and better access to water will be less impacted, because the cattle are less vulnerable than those of the neighbour whose land does not have enough shade or water.

The three concepts (impacts, risks and vulnerability) can be also addressed using a territorial or a sectoral approach: it is up to reporting Parties to decide which approach is most suitable for their circumstances. Examples of reporting techniques include a national vulnerability map, a district risk assessment or a water sector impact assessment, or a combination of techniques (e.g. a district water vulnerability map).

It is important to recognize that climate change is a progressive challenge, where the degree of change evolves over time in relation to the amount of past, present and future concentration of GHGs in the atmosphere.

In this regard, paragraph 107[6] of the MPGs requests Parties to provide information on current and projected climate trends and hazards, as well as observed and potential impacts. It is

[6] Paragraph 107 of decision 18/CMA.1 states: "Each Party should provide the following information, as appropriate:
(a) Current and projected climate trends and hazards;
(b) Observed and potential impacts of climate change, including sectoral, economic, social and/or environmental vulnerabilities;
(c) Approaches, methodologies and tools, and associated uncertainties and challenges, in relation to paragraph 107(a) and (b) above."

highly recommended that this time-based approach is clearly indicated in the information reported. A specific time frame can be described for each approach; for example, present/observed (1991–2020) or future/projected (2051–2080).

When using a future/projected approach it is recommended that scenarios are described in terms of GHG concentrations, global mean temperature, and/or IPCC emission scenarios (e.g. future/projected impacts in relation to a 2.5°C global mean temperature).

Box 3.1. How to use climate change scenarios in impact, risk and vulnerability assessments

The AR6 defines a "scenario" as a "plausible description of how the future may develop based on a coherent and internally consistent set of assumptions about key driving forces (e.g., rate of technological change, prices) and relationships. Note that scenarios are neither predictions nor forecasts, but are used to provide a view of the implications of developments and actions."

In this regard when a climate scenario is used to describe future plausible impacts, risks and vulnerabilities, such descriptions are referring to what could/can happen, but they are never what will actually happen, because there is always a degree of uncertainty.

Moreover, beyond descriptions and assessments, scenarios can help with planning adaptation actions. As the American Planning Association (APA) explains:

> "Scenario planning enables professionals, and the public, to respond dynamically to an unknown future. It assists them with thinking, in advance, about the many ways the future may unfold and how they can be responsive, resilient and effective, as the future becomes reality.
>
> "Scenario planning is a process to support decision-making that helps (...) planners navigate the uncertainty of the future in the short and long term. A scenario planning process begins by scanning the current reality, projected forecasts, and influential internal and external factors to produce a set of plausible potential futures (i.e. scenarios). It then develops a series of initiatives, projects, and policies (i.e. tactics) that may help support a preferred scenario, a component of a scenario, multiple scenarios, or all scenarios. Indicators that a scenario component is likely to occur (i.e. tipping points or triggers) may be established to alert planners that the likelihood of a scenario becoming a reality is higher, prompting them to take action on appropriate tactics such as allocating funding and moving into implementation." (APA, 2022)

Scenarios for impacts, risk and vulnerabilities can be constructed at the national/local level using global reference scenarios and projections, such as those developed by the IPCC in the AR6, defined as follows:

a. **Socioeconomic scenarios**: describe a possible future in terms of population, gross domestic product and other socioeconomic factors relevant to understanding the implications of climate change;
b. **Emission scenarios**: plausible representations of the future development of emissions of substances that are radiatively active (e.g. GHGs or aerosols) based on a coherent and internally consistent set of assumptions about driving forces (such as demographic and socioeconomic development, technological change, energy and land use) and their key relationships;
c. **Concentration scenarios**: derived from emission scenarios to create a plausible

representation of the future development of atmospheric concentrations of substances that are radiatively active (e.g. GHGs, aerosols, tropospheric ozone), plus human-induced land-cover changes that can be radiatively active via albedo changes, and often used as input to a climate model to compute climate projections;

d. **Climate projection**: a simulated response of the climate system to a scenario of future emissions or concentrations of GHGs and aerosols and changes in land use, generally derived using climate models. Climate projections depend on an emission/concentration/ radiative forcing scenario, which is in turn based on assumptions concerning, for example, future socioeconomic and technological developments that may or may not be realized.

To summarize, a socioeconomic scenario informs an emission scenario, which then informs a concentration scenario, the latest of which is needed as an input to develop a climate projection.

Climate projections are quasi-essential inputs to develop a robust future impact, risk and/or vulnerability assessment. It is suggested that practitioners use two climate scenarios as a minimum when developing future assessments; for example, a 1.5°C temperature scenario and another higher temperature scenario.

Impacts, risk and vulnerabilities can be reported using several possible representations and syntheses. Two common approaches are maps or tables. Maps are quite relevant in these assessments because the complexity and heterogeneity of each territory often explains different degrees of impact, risk and vulnerability and, depending on the extension of the territory, a map can also account for significant differences in terms of observed or projected climate variability.

Whether maps or tables are used, these assessments present a synthesis of complex and diverse information, which may include several sources, and that may also include significant gaps. In this regard it is recommended that all sources, models and assumptions are clearly described in the report, and that uncertainties and gaps are identified and qualified. In addition to providing the necessary level of integrity, increasing the transparency of these technical details can facilitate a coherent update and/or enhancement in future reports.

Table 3.1 combines all the concepts and approaches described. Practitioners can choose a mix of such elements when reporting on impacts, risks and vulnerabilities (e.g. a national water sector observed impact map or a transboundary projected climate change risk assessment, presented in a table format):

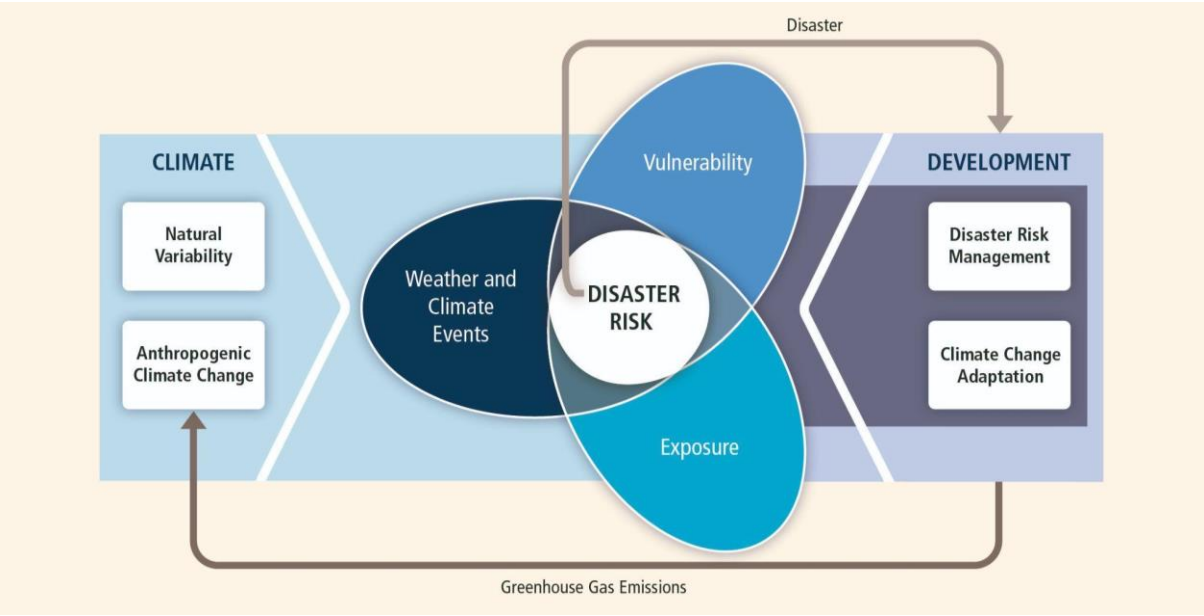
Table 3.1. Approaches to impact, risk and vulnerability

Concept	Geographic scope	Sector	Time frame	Representation
a. Impact b. Risk c. Vulnerability	a. Regional b. Transboundary c. National d. Subnational e. Local	a. Integrated b. Multiple c. Single	a. Present/ observed (year/s) b. Future/ projected (year/s; emissions, temperature, concentration scenario)	i. Maps ii. Tables

3.2. Models, methodologies, initiatives and good practice

The IPCC has a well-established view on these concepts, having achieved a consolidated framework during the preparation of the *Special Report on Managing the Risks of Extreme Events and Disasters to Advance Climate Change Adaptation* (figure 3.1).

Figure 3.1: Climate disaster risk conceptual framework



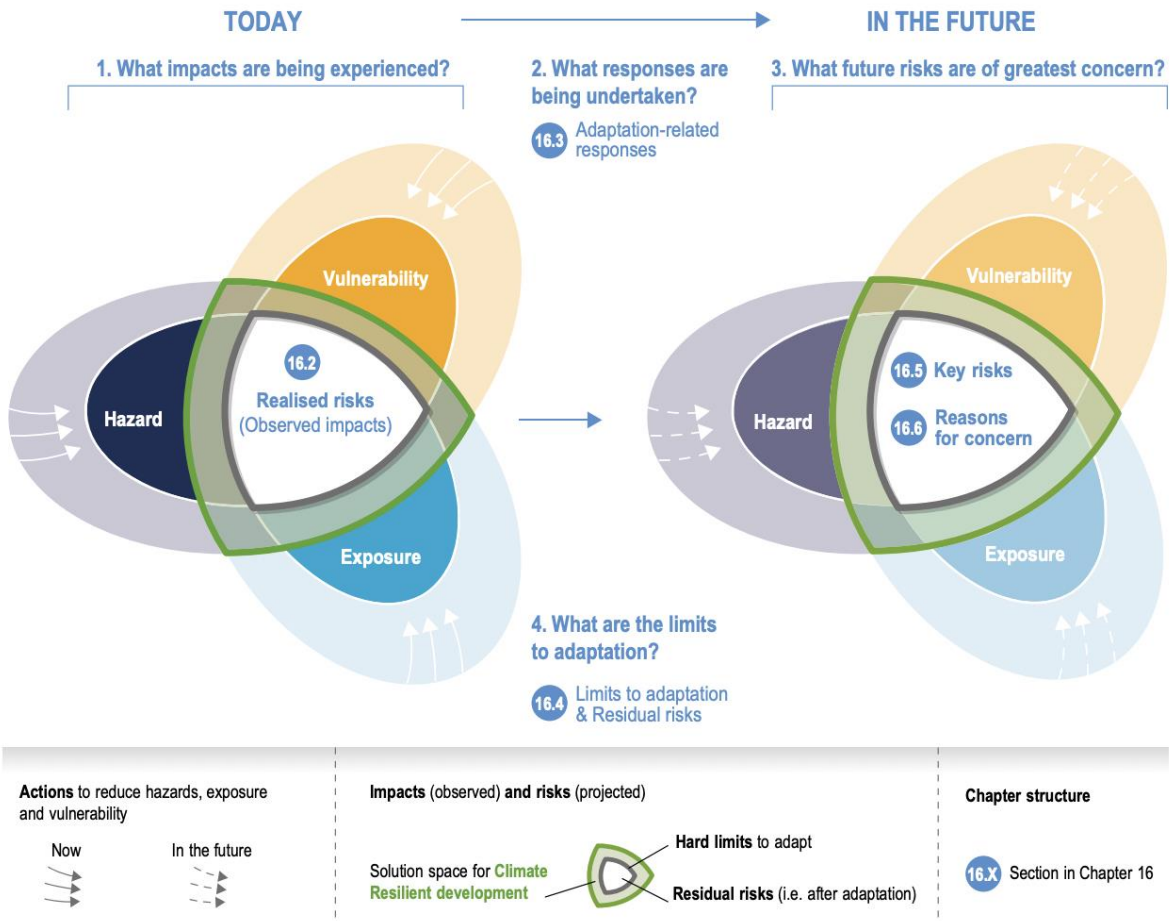
Source: IPCC, Special Report on Managing the Risks of Extreme Events and Disasters to Advance Climate Change Adaptation, 2012,

This framework has been subject to ongoing refinement, including a dynamic approach released in the AR6 in 2022, illustrated in figure 3.2.

Using a climate disaster risk conceptual framework can help Parties to analyse the concepts of impact, risk and vulnerability in a dynamic manner. In particular it can provide a better understanding of the relationship between the concepts in the context of climate change adaptation.

However, for the purpose of reporting under paragraph 107 of the MPGs, it is recommended that a single concept approach is used for the assessments, even in cases where all three concepts are reported. In this regard, Parties can report on impacts, vulnerabilities and risks independently without ignoring or diminishing the clear relationships between them.

Figure 3.2. Key risks across sector and regions

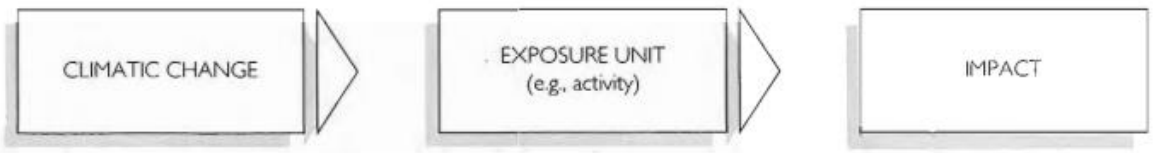


Illustrative storyline of the chapter highlighting the central questions addressed in the various sections, from realised risks (observed impacts) to future risks (key risks and reasons for concern), informed by adaptation-related responses and the limits to adaptation. The arrows illustrate actions to reduce hazard, exposure and vulnerability, which shape risks over time. Accordingly, the green areas at the centre of the propeller diagrams indicate the ability for such solutions to reduce risk, up to certain adaptation limits, leaving the white residual risk (or observed impacts) in the centre. The shading of the right-hand-side propeller diagram compared with the non-shaded one on the left reflects some degree of uncertainty about future risks. The figure builds on the conceptual framework of risk–adaptation relationships used in SROCC (Garschagen et al., 2019).

Impacts

The *IPCC Technical Guidelines for Assessing Climate Change Impacts and Adaptations (1994)* included the "impact approach" as the simplest and most straightforward assessment approach. This approach involves a "cause and effect" pathway requiring a climate event that acts on an "exposure unit" and thus has a specific impact. Impact assessments can also include direct and indirect impacts, as well as a "chain of impacts".

Figure 3.3. Schema of the impact approach



Box 3.2. Steps to prepare an impact assessment

- Step 1: Define the exposure unit, generally as a specific territory (e.g. a city, a country, a basin) and/or sector (water, agriculture, human health, etc.).
- Step 2: Identify the climate events that have affected and/or can affect the exposure unit in a certain period of time, whether observed or projected.
- Step 3: Identify the impacts of these climate events, understood as effects and/or outcomes. Impacts should be very concrete and can be clustered into economic, social and/or environmental impacts.

Risks

In the IPCC Special Report *Managing the Risks of Extreme Events and Disasters to Advance Climate Change Adaptation* (2012) the concept of risk became a cross-cutting approach for climate assessments. In particular, the issue of uncertainty and probability of occurrence are key elements that drive the analysis. Climate change will transform the frequency and intensity of climate events, and such changes will create new risk levels.

To achieve a robust risk assessment there is a need to determine the "likelihood" and "consequence" of an event, because climate change affects both aspects in a progressive way into the future.

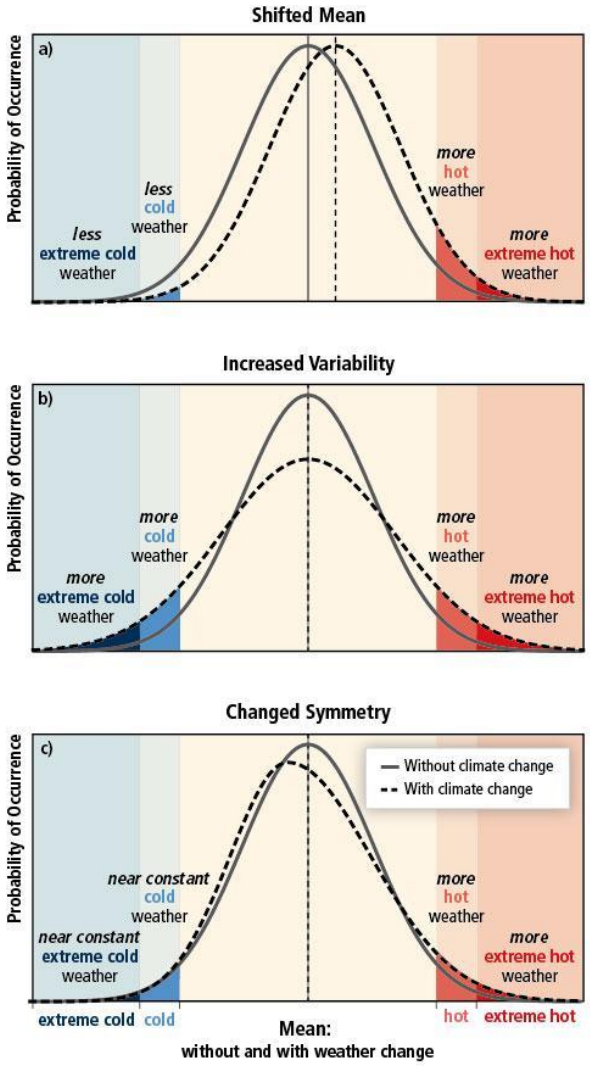
A simple approach to performing a risk assessment is to list all possible climate-related events and establish a level of probability and a level of consequence, then integrate both variables to identify the level of risk (e.g. using a matrix as shown in table 3.2).

Table 3.2. Risk assessment matrix

		Consequence				
		C1	C2	C3	C4	C5
Likelihood	L1	Low	Moderate	High	Extreme	Extreme
	L2	Low	Moderate	Moderate	High	Extreme
	L3	Low	Low	Moderate	High	Extreme
	L4	Low	Low	Moderate	Moderate	High
	L5	Low	Low	Low	Moderate	Moderate

It is important to remember that climate change will affect the distribution of probability of certain events and, in particular, there can be major changes in extreme events even if the mean changes remain relatively minor, as illustrated in figure 3.4.

Figure 3.4. The effect of changes in temperature distribution on extremes



Box 3.3. Steps for developing a risk assessment

- Step 1: Define the exposure unit, generally as a specific territory (e.g. a city, a country, a basin) and/or sector (water, agriculture, human health, etc.).
- Step 2: Identify the climate hazards that have affected and/or can affect the exposure unit in a certain period of time, whether observed or projected.
- Step 3: Indicate a level of probability for each climate hazard (can be quantitative such as "a 1 in a 100 years event", or qualitative, such as "highly likely").
- Step 4: Analyse the level of vulnerability of the exposure unit, and thus define the level of consequence the climate hazard will have upon the exposure unit.
- Step 5: Prepare a double-entry matrix using likelihood and consequence for each climate hazard, thus achieving a relative risk assessment for all climate hazards affecting the exposure unit.

Vulnerability

In the Third Assessment Report (2001), the IPCC included the traditional climate change vulnerability concept, which comprises exposure, sensitivity and adaptive capacity:

> "Vulnerability is a function of the character, magnitude, and rate of climate variation to which a system is exposed, its sensitivity, and its adaptive capacity."

As already discussed, the concept of vulnerability is complex and relates to a specific subject, in terms of how this subject is intrinsically susceptible to climate change and thus more prone to higher or lower impacts.

When performing a vulnerability assessment each of the three variables of the function must be assessed and integrated: (1) exposure can be captured as the key contextual physical variable of the subject, such as its geography and/or climate; (2) sensitivity can be captured by identifying key conditions of the subject that enhance the chances of negative impacts, in particular sensitivity can refer to key fragile socioeconomic aspects when dealing with a community-level assessment and/or to key fragile ecosystem aspects when dealing with an ecosystem-level assessment; and (3) adaptive capacity can be capture by identifying key dynamic conditions of the subject that diminish the chances of negative impacts, and can refer to knowledge and/or institutional strength when dealing with a community-level assessment and/or key resilient ecosystem aspects when dealing with an ecosystem-level assessment.

Box 3.4. Steps for developing a vulnerability assessment

- Step 1: Define the exposure unit, generally as a specific territory (e.g. a city, a country, a basin) and/or sector (water, agriculture, human health, etc.). Vulnerability assessment may also use a more complex exposure unit such as a community and or ecosystem.
- Step 2: Define the exposure characteristics of the exposure unit. Characteristics may include climate variability and change, but also key geographic aspects (e.g. a coastal community or a mountainous region).
- Step 3: Define the key sensitivity aspects of the exposure unit, these aspects refer to climate hazards (i.e. whether the subjects in the exposure unit are more or less affected due to their susceptibility).
- Step 4: Identify the key adaptive capacities that the subjects in the exposure unit have already developed. Such capacities can be at the individual, institutional or systemic level, and may include knowledge, processes, planning and so on.
- Step 5: Combine the exposure, sensitivities and adaptive capacities previously identified in an integrated assessment. Integration can be presented as a sum of the levels of exposure and sensitivities, minus the level of adaptive capacity.

3.4. Examples of impact, risk and vulnerability assessments

Uruguay's coastal flooding impact map, prepared in the context of its NAP for the coastal sector, includes present and future scenarios (figure 3.5). The assessment used a "return period" approach, whereby floods were mapped using the probability of reaching a certain level once in 5, 10, 25, 50 and 500 years.

Figure 3.5. Coastal flooding impact map by Uruguay

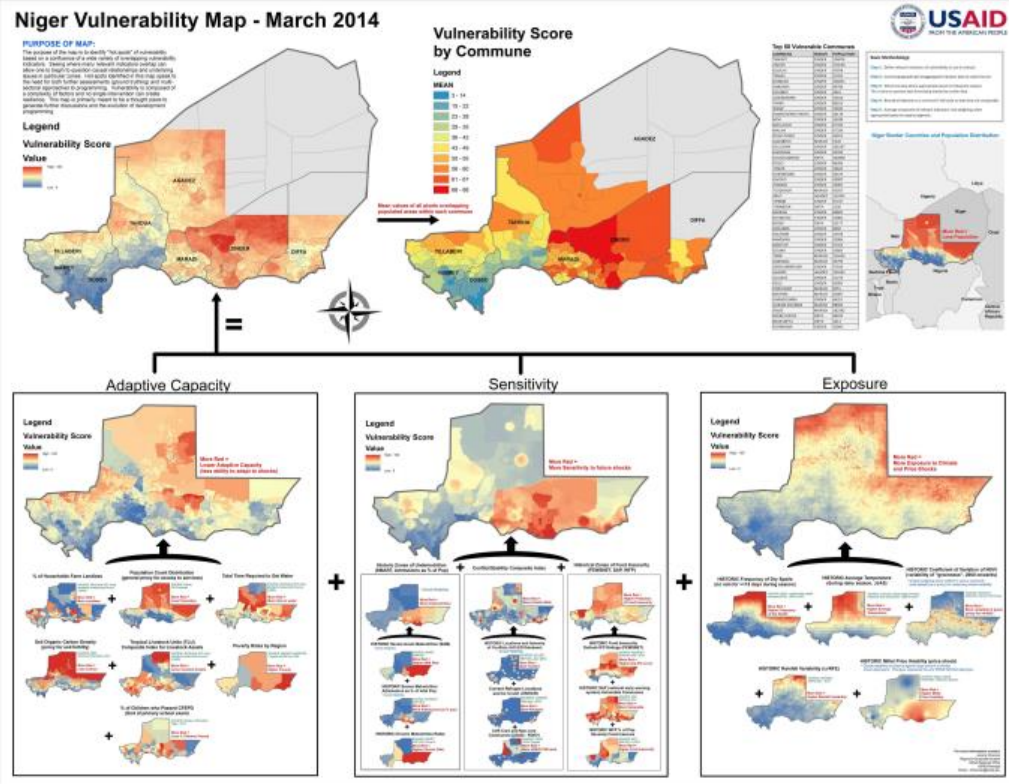
Nauru's Port Climate Risk Assessment was developed in the context of preparing a project funding proposal to the Green Climate Fund (GCF) by the Asian Development Bank, which performed a climate risk assessment, including the likelihood and consequences of certain events (see table 3.3). Those events that were very likely to happen and produce important consequences were identified as "high risk".

Table 3.3. Risk assessment findings, Nauru

Hazard	Risk Statement	Risk Category L	C	R
Existing (Present Day) Risk				
Temperature / heat wave	High temperatures negatively impact on the workforce, reducing efficiency by increasing cargo-handling times.	L2	C2	M
Extreme rainfall events	Heavy rainfall causes flooding of port land and/or buildings, reducing efficiency and increasing handling times. The flooding may also result in damage to cargo, and can represent a risk to workplace safety.	L3	C2	L
Waves / mean sea level	Waves and sea spray corrode structures, resulting in the need for regular maintenance.	L1	C2	M
	Adverse wave conditions and/or currents mean ships are unable to hold position, which means good cannot be loaded or unloaded.	L1	C3	H
	Adverse wave conditions prevent the transfer of cargo between ship and barge, and increase the potential for damage to cargo. There is also an increased safety risk for port workers.	L1	C4	E
	Adverse weather conditions result in damage to the moorings or the fuel transfer system, which results in closure of the port.	L2	C4	H
Wave overtopping / storm surge	Wave run-up and/or overtopping of the shoreline leads to inundation of buildings, and results in increased incidence of loss or damage of cargo. There is also an increased safety risk for personnel working at the port.	L3	C3	M
	Where wave overtopping results in inundation of the port lands there is a reduction in efficiency (or prevents) shore-based activities at the port (e.g. transport of cargo/containers within the port), and results in increased incidence of loss or damage of cargo. There is also an increased safety risk for personnel working at the port.	L2	C2	M
	Wave overtopping causes damage to shore-based infrastructure, which may result in inability to (or less efficient) transfer of cargo between ship and shore.	L2	C3	M
Future (Climate Change) Risk				
Increased temperatures / incidence of heat waves	High temperatures negatively impact on the workforce, reducing efficiency by increasing cargo-handling times.	L1	C3	H
Increased intensity & frequency of extreme rainfall events	Heavy rainfall causes flooding of port land and/or buildings, reducing efficiency and increasing handling times. The flooding may also result in damage to cargo, and can represent a risk to workplace safety.	L2	C2	M

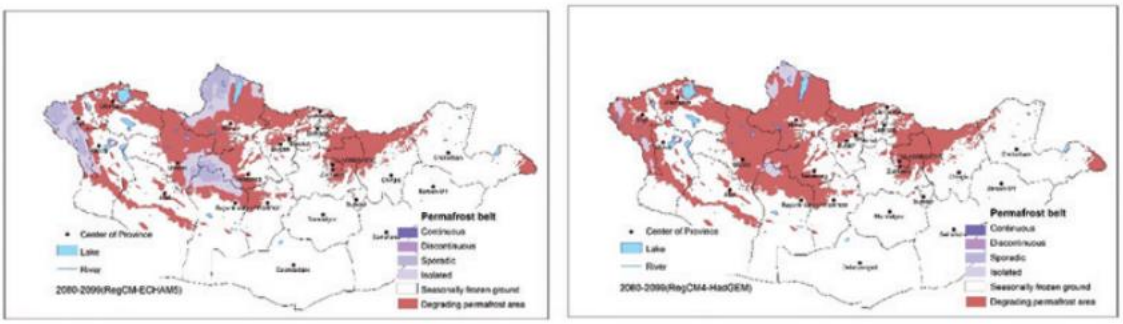
Niger developed its vulnerability map with support provided by the United States Agency for International Development (USAID). The map (see figure 3.6) was developed using the traditional IPCC approach of "vulnerability = exposure x sensitivity x adaptive capacity". In this case, adaptive capacity included variables such as education, poverty and services; sensitivity included variables such as malnutrition and food insecurity, and conflicts; and exposure included rainfall, frequency of dry spells, temperature, and so on.

Figure 3.6. Niger vulnerability map



Mongolia's NC3 provided sector-specific climate change impact assessments (figure 3.7), including those for water, forestry, permafrost, soil, pastures, biodiversity and agriculture.

Figure 3.7. Future changes of permafrost in Mongolia



In its NC4, the Republic of Korea developed both a vulnerability assessment and a risk assessment, using its vulnerability assessment tool system (VESTAP) for supporting the establishment of adaptation measures. Based on a web-based service, users may conduct regional vulnerability assessments using 32 items in seven categories, as shown in figure 3.8.

Figure 3.8. Vulnerability assessment tool to build a climate change adaptation plan item list

Sector	Vulnerability assessment Items	Sector	Vulnerability assessment Items
Health (9)	Health vulnerability by flood	Marine/ Fishery(1)	Vulnerability of the fishing industry (aquaculture industry) by changes in water temperature
	Health vulnerability by typhoons	Disaster (4)	Infrastructure vulnerability by flood
	Health vulnerability by heat waves		Infrastructure vulnerability by hot waves
	Health vulnerability by cold waves		Infrastructure vulnerability by heavy snows
	Health vulnerability by the rise of ozone concentration		Infrastructure vulnerability by setup
	Health vulnerability by fine dust	Agriculture (5)	Vulnerability of cropland soil erosion
	Health vulnerability by other air pollutants		Vulnerability of cultivation/breeding facilities
	Epidemic vulnerability by insects and rodents		Vulnerability of rice productivity
	Health vulnerability by waterborne mediated diseases		Vulnerability of apple productivity
Forestry (7)	Landslide due to heavy rain		Vulnerability of livestock productivity
	Vulnerability of forest road by landslides	Water management (3)	Vulnerability of flood control
	Vulnerability by wildfire		Vulnerability of irrigation
	Pine trees' vulnerability by pests		Vulnerability of water quality and aquatic ecology
	Vulnerability of pine trees and matsutakes	Ecology (3)	Vulnerability of needle leaf trees
	Vulnerability of forest productivity		Insects' vulnerability
	Vulnerability of forest vegetation by drought		Vulnerability of needle leaf trees

※ Source: VESTAP

Chapter 4: Priorities and barriers

Decision 18/CMA.1. MPGs
C. Adaptation priorities and barriers

Paragraph 108. *Each Party should provide the following information, as appropriate:*
(a) Domestic priorities and progress towards those priorities;
(b) Adaptation challenges and gaps, and barriers to adaptation.

4.1 Introduction to the element

This chapter provides technical guidance on reporting on adaptation priorities and barriers.

Within the adaptation policy cycle, priorities should be established after identifying key vulnerabilities, impacts and risk, in order to allow for a detailed adaptation planning and implementation process.

Prioritization is a key aspect in any public policy cycle. It should be conducted within a robust and legitimate context and approved at the most senior level. In this regard it is expected that key institutional leaders, particularly public sector decision-makers, take a leading role in identifying the main adaptation priorities for the country. A strategic aspect of prioritization is that the number of domestic priorities should be capped at, for example, 5, 10 or 15 priorities: beyond a certain number "prioritization" cannot actually happen.

Priorities can include specific sectors, regions, communities or ecosystems that are relevant to the country as a whole and are highly vulnerable to climate change. Priorities can also be focused on specific stages in the adaptation policy cycle: for example, a priority in one country at a certain point in time could be adaptation planning, whereas other countries may be at a more mature stage, with their emphasis on monitoring and evaluation. Prioritization can also include more cross-cutting issues such as enhancing adaptive capacities at the institutional level, or developing certain institutional arrangements, gathering data or enhancing knowledge on specific adaptation areas. Also, in order to ensure a higher degree of legitimacy for the prioritization process, it can be useful to include a narrative of the rationale for the chosen priorities because this may ensure transparency and support from stakeholders (Dale, Christiansen and Neufeldt, 2020).

Barriers to adaptation planning are any institutional, material, cultural or policy constraints that are likely to interfere with the development of a NAP as framed by the country's vision and approach. The *National Adaptation Plans: Technical guidelines for the national adaptation plan process* (NAP Guidelines, 2012) note that barriers to implementing adaptation are "obstacles that tend to delay, divert or temporarily block the adaptation process, but which can be overcome with concerted effort, creative management, change of thinking, prioritization, and any related shifts in resources, land uses, or institutions" (Moser and Ekstrom, 2010).

Barriers are obstacles that can be overcome with focused effort, cooperation and prioritization of action and resources. Whether they are more or less malleable, barriers reduce the effectiveness of adaptation efforts, especially in resource-constrained contexts. Social and

political support can be enablers or barriers for adaptation action, depending on the circumstances (Ekstrom et al., 2011).

In the context of the UNFCCC and the Paris Agreement, the lack of sufficient means of implementation in developing countries (capacity-building, technology transfer and finance) can also be barriers to the adaptation process.

4.1.2 Prioritization in the context of adaptation planning

The NAP Guidelines include a specific step for prioritizing climate change adaptation in national planning. This step implies the definition of national criteria for prioritizing implementation based on, among other things, development needs, climate vulnerability and risk and existing planning.

Box 4.1. NAP Guidelines' advice when defining national criteria for prioritizing

The criteria for ranking climate change risks and vulnerabilities would serve as a good basis for developing criteria to prioritize implementation. Such criteria will take into account national development goals and needs, including:

- Potential to address key vulnerabilities and risks effectively;
- Enhancement of adaptive capacity and resilience at community and national levels;
- Fiscal responsibility (cost-effectiveness);
- The time frame for implementing adaptation activities;
- Institutional capacity to implement the adaptation activities;
- Potential to complement national goals, such as achieving and safeguarding food security in order to enhance adaptive capacity, or protecting and enhancing ecosystem structures and functions for the sustainable provision of ecosystem goods and services;
- Potential to deliver "no regrets" solutions: that is, a positive impact even if climate change impacts do not occur. Those measures are especially useful when the type or degree of climate change impacts is still linked to a high degree of uncertainty;
- Co-benefits or side-effects: whether measures will create positive or negative side-effects for development goals, or where costs can be shared.

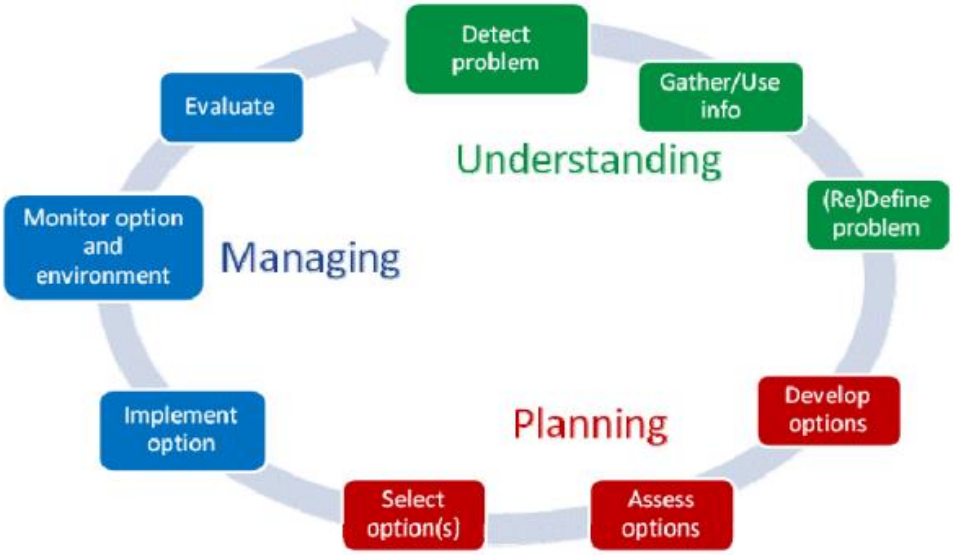
4.2. Models, methodologies, initiatives and good practices

4.2.1. Identifying key barriers in the adaptation phases

Ekstrom et al. (2011) developed a systematic approach to identifying specific barriers that occur at each stage of the adaptation policy cycle based on a nine-stage adaptation process framework with three main stages: understanding, planning and managing (see figure 4.1). Their approach also includes diagnostic questions to ascertain how actors, context and the system that is being managed in the light of climate change contribute to the existence of these barriers. Early recognition of barriers to adaptation planning would be a useful input to the country's NAP process so that the barriers can be addressed directly and immediately. Barriers to implementing adaptation should be addressed as part of the implementation strategy of the NAP, by ensuring that specific activities are targeted towards eliminating the

barriers. A consultative process involving all relevant stakeholders can be used to identify obstacles and their root causes.

Figure 4.1. Stages of adaptation, as a base for identifying barriers



Source: Ekstrom et al, 2011

The approach described by Ekstrom et al. takes into account the key barriers listed in table 4.1.

Table 4.1. Phases of adaptation and key barrier identification (Ekstrom et al, 2011)

Phases	**Key barriers**
Problem detection and initial framing phase	i. Existence of a signal ii. Detection (and perception) of a signal iii. Threshold of concern (initial framing as problem) iv. Threshold of response need and feasibility (initial framing of response)
Information Gathering and use phase	i. Interest and focus (or consensus on these) ii. Availability iii. Accessibility iv. Salience/relevance v. Credibility and trust vi. Legitimacy vii. Receptivity to information viii. Willingness and ability to use
Problem (re)definition phase	i. Threshold of concern (reframing of the problem) ii. Threshold of response need iii. Threshold of response feasibility iv. Level of agreement or consensus
Option development phase	i. Leadership, authority and skill in guiding the process ii. Ability to identify and agree on goals iii. Ability to identify and agree on a range of criteria iv. Ability to develop and agree on a range of options that meet identified

	goals and criteria v. Control over process vi. Control over options
Option assessment phase	i. Availability of data/information to assess options ii. Accessibility/usability of data iii. Availability of methods to assess and compare options iv. Perceived credibility, salience and legitimacy of information and methods for option assessment v. Agreement on assessment approach vi. Level of agreement on goals, criteria, and options
Option Selection phase	i. Ability to reach consensus on selecting option(s) ii. Sphere of responsibility/influence/control over option iii. Threshold of concern over potential negative consequences iv. Threshold of perceived option feasibility v. Clarity of authority and responsibility over selected option
Implementation phase	i. Threshold of intent ii. Authorization iii. Sufficient resources (fiscal, technical, etc.) to implement iv. Accountability v. Clarity/specificity of option vi. Legality and procedural feasibility vi. Sufficient momentum to overcome institutional stickiness, path dependency, and behavioural obstacles
Monitoring phase	i. Existence of a monitoring plan ii. Agreement on and clarity of monitoring targets and goals iii. Availability and acceptability of established methods and variables iv. Availability of technology v. Availability and sustainability of economic resources vi. Availability and sustainability of human capital vii. Ability to store, organize, analyse and retrieve monitored data
Evaluation phase	i. Threshold of need and feasibility of evaluation ii. Availability of needed expertise, data and evaluation methodology iii. Willingness to learn iv. Willingness to revisit previous decisions v. Legal limitations on reopening prior decisions vi. Social or political feasibility of revisiting previous decisions and/or initiate new actions or policies

Moreover, Ekstrom et al. indicate that there are issues of overarching importance (e.g. leadership, resources, information and communication, participation and cultural cognition) which, at certain levels, may significantly affect the development of the adaptation policy cycle and may become sources of barriers.

4.2.2. Gaps and needs related to NAPs

The Conference of the Parties at its twenty-fourth session (COP 24) requested the LEG and the AC to consider gaps and needs related to the process to formulate and implement NAPs and to report on how to address them in their respective reports for COP 25 (decision 8/CP.24, paras. 17–18).

The LEG Technical Brief presented to COP 25 (LEG AC, 2021) compiled the gaps and needs of the LDCs relating to the process of formulating and implementing NAPs and the needs related to adaptation arising from the Paris Agreement, as presented in previous reports of the LEG and the AC. Table 4.2 identifies the main types of gaps and needs, while the full list of gaps and needs in that document is provided in annex 2.

Table 4.2. Main areas for the gap and needs assessment

Accessing financial and other support
Institutional arrangements and coordination
Climate scenarios, science and translation to local context
Risk and vulnerability assessment and risk management
Implementation strategies
Access to and use of technology
Monitoring, evaluation and learning
Linkage with the development agenda
Active learning from practice
Guiding principles

Source: LEG AC, 2020

The AC has published a technical paper on methodologies for assessing adaptation needs that is relevant to all stages of the adaptation policy cycle (see https://unfccc.int/documents/620616). The paper contains key concepts and definitions, provides an overview of existing methodologies and related experience, analyses lessons learned, emerging good practices and gaps, and concludes with recommendations. It also provides a five-step process for assessing adaptation needs.

4.2.3. Barriers for local adaptation

The Community Safety Action for Supporting Climate Adaptation and Development (CASCADE) project developed a tool for identifying and overcoming barriers to climate adaptation. The tool provides resources and a method for municipal officers and experts to deal with the barriers to adaptation (summarized in table 4.3), including how to identify the most important barriers to local adaptation work. The tool is based on a barrier-identification survey at the local level.

Table 4.3. Categories for obstacles as the frame for the survey tool for barrier identification

Categories for obstacles that are relevant to the climate risk assessment process:
1. Conflicting timescales and conflicts of interest
2. Leadership
3. Resources
4. Science
5. Governance and institutional constraints
6. Lack of awareness and communication
7. Attitudes, values and motivations
8. Adaptation process

Source: CASCADE project, 2020

The CASCADE project developed its survey (see annex 3) on the basis of a literature review. For example, Weyrich (2016) identifies nine categories of general barriers to climate adaptation implementation. The survey not only helps to identify key barriers but also provides a way to score them, thus allowing for a prioritization of key barriers in a local adaptation planning and implementation process. The CASCADE publication also includes a set of resources for working on specific barriers identified in the survey.

4.2.4. Knowledge gaps

The Lima Adaptation Knowledge Initiative (LAKI) is a joint action pledge of UNEP and the UNFCCC Secretariat under the Nairobi work programme on impacts, vulnerability and adaptation to climate change. Its objective is to close knowledge gaps impeding climate change adaptation actions in various subregions of the world. For each subregion, UNEP and the UNFCCC secretariat partner with an institution that functions as a subregional coordination entity that organizes completion of a set of stages under the participatory LAKI methodology with the objective of identifying knowledge gaps in order to overcome those gaps in a cooperative manner.

Table 4.4 presents an overview of the LAKI methodology, including the participatory approach to be taken.

Table 4.4. LAKI methodology

Step	Knowledge and participation approach
1. Scoping the knowledge gaps	Scoping paper: Produce a list of knowledge gaps, insights into existing knowledge resources, and information on organizations providing support to close adaptation knowledge. (Scoping paper to be produced from literature review, expert inputs and workshop participants.)
2. Inviting two groups of	A. A multi-stakeholder group including experts in understanding

Step	Knowledge and participation approach
participants	knowledge gaps that impede adaptation; B. A support group including representatives from institutions that could provide various forms of support, including finance and “in kind” support to close knowledge gaps.
3. Categorizing knowledge gaps	In a workshop, participants discuss the scoping paper, adding or deleting gaps. Refined gaps are then categorized in a table ranging from “absence of data” to “action in progress to close knowledge gaps”.
4. Prioritizing knowledge gaps and designing response actions	In a workshop, gaps are prioritized by the multi-stakeholder group, with inputs from the support group, through a quantitative process involving Delphi rounds. This is the core activity of the LAKI process. Participants then express their interest in addressing one or several of the gaps, in view of the organization´s possible submission of an action pledge under the Nairobi work programme.
5. Implementing actions and monitoring	Following the workshop, participants who have expressed interest in undertaking response actions are invited to submit an action pledge under the Nairobi work programme.

4.2.5 Assessment of capacity-building gaps and needs

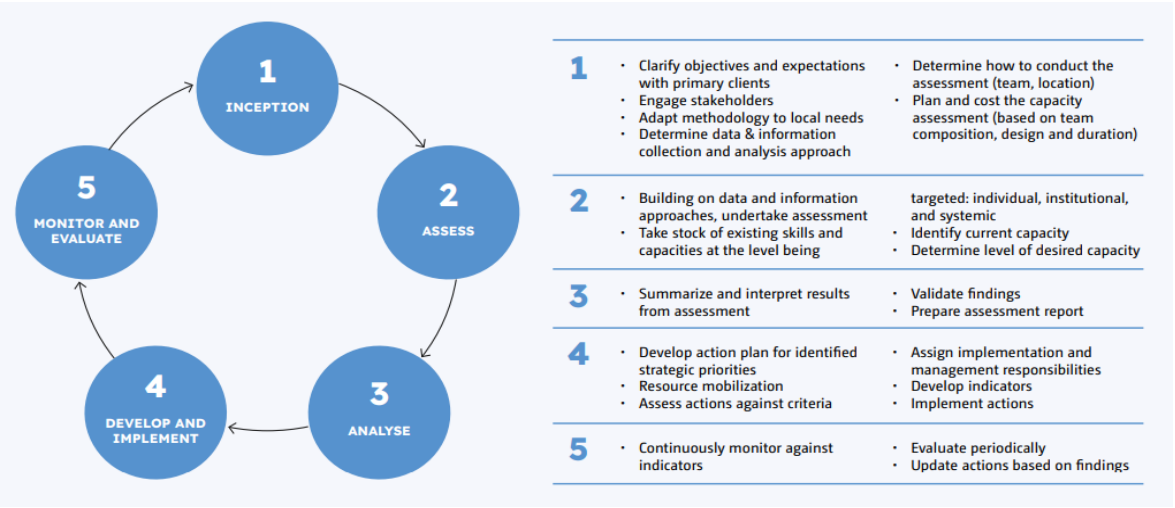
One important area of barriers to adaptation is capacity-building gaps and needs. In 2021, the PCCB produced a toolkit for assessing capacity-building gaps and needs, based on different experiences worldwide.

The PCCB acknowledged that assessing capacity-building gaps and needs is a challenging but vital undertaking and is part of a continuous and iterative process, and the toolkit is intended to be used as part of an assessing cycle (see figure 4.2).

Capacity is not a universal metric because it is based on national circumstances, ambition, access to resources and other factors that impact the outcome of any assessment process. Furthermore, capacity does not exist in a vacuum – it builds on a foundation of experience, obtaining and retaining capacity, while reacting to current and future needs.

The capacity assessment toolkit of the PCCB includes a set of approaches and tools that support the assessment of various dimensions of capacity needed to address the spectrum of actions required to address climate change. It identifies key points and steps involved in the assessment process from design to evaluation, and is supported by case studies, including links to additional information accessed through the UNFCCC Capacity Building Portal and other online resources.

Figure 4.2. Overview of the capacity assessment cycle



Source: PCCB, 2021

4.2.6. Barriers and arrangements to lift barriers at the local level and for specific sectors

The IPCC AR6 identified a list of key barriers to climate adaptation in cities and settlements and for essential infrastructure. However, the list may apply to other sectors and can be useful when organizing barrier information in the A-BTR. Table 4.5 presents a simplified overview of the AR6 findings.

Table 4.5. Barriers to climate adaptation

Examples of barriers to climate adaptation	**Institutional changes to overcome those barriers**
Lack of financial resources	Strategic combination of municipal, regional and national level funds Access to multiple financing mechanisms
Lack of human resources and capacities	Development of formal and informal partnerships, cooperative agreements and inter-agency arrangements
Political commitment and willingness to act	Use of policy windows and extreme events to generate interest and create lasting responses
Uncertainty about future impacts and dynamic interactions	Develop institutional arrangements that acknowledge and reduce uncertainty Facilitate the development of bottom-up initiatives that relate directly to the context of action
Institutional fragmentation and unclear responsibilities	Evaluate existing institutions to diagnose miscoordination Create policy networks that address emerging interdependencies
Legal issues and regulations	Address the legal hurdles to create frameworks that allow for experimental action
Competition of adaptation with other policy agendas and polarization	Prioritization and development of synergies across sectors Mainstreaming adaptation into other sectors
Lack of data, knowledge generation capacity and knowledge exchange	Mobilize multiple strategies for the use of climate information in local decision-making Involve a wide range of stakeholders, with different values and knowledge, in decision-making

Source: IPCC, 2020, WGII, chap. 6, p.969, table 6.7 simplified

4.3. Examples of priorities and barriers identified by countries

Namibia's ADCOM included a section on barriers and challenges for adaptation identified during a national and regional consultation process (figure 4.3).

Figure 4.3. Barriers and challenges to adaptation in Namibia

During the iteration of this AdCom, Namibia hosted extensive national and regional consultations with regard to the implementation of adaptation actions. The stakeholders identified the following barriers and challenges, among others:

- Adaptation activities are mostly donor-driven, and once a project closes, there is no follow-up on the interventions.
- Smallholder farmers still cannot afford appropriate agricultural inputs and implements despite being given government subsidies.
- Some farmers have produced good yields following the adoption of conservation agriculture. However, they face limited access to markets, especially with regard to selling legumes.
- In-depth regional studies are needed for each region, not only on climate adaptation needs, but also on needs related to capacity-building, investment and financial flows relating to climate change.
- With regard to gender and youth, most lead farmers are women, and youth participation is very minimal in this area.

Source: Namibia's ADCOM, 2021

Rwanda's ADCOM comprised key stakeholder consultations in its ongoing NAP readiness activities, revealing areas of improvement, including:

- Multi-stakeholder cooperation and coordination for flood and landslide resilience across national and subnational institutions, civil society and private sector stakeholders;
- Private sector engagement on issues of resilience and adaptation for flood management;
- Enhancing access to finance and the need to mobilize international and domestic resources with emphasis on securing co-financing from national sources;
- Awareness and capacity-building of key stakeholders;
- Building capacity for monitoring and evaluation of existing and upcoming interventions;
- The need for technical studies for effective storm water and landslide management in Kigali City and its rapidly growing fringes.

Timor-Leste's NAP included a section that briefly describes some gaps, barriers and obstacles (table 4.6) when implementing climate change adaptation, mostly focused on policy and institutional landscape.

Table 4.6. Barriers, gaps and obstacles within the policy and institutional landscape in Timor-Leste

Awareness and knowledge on climate change adaptation	Knowledge is lacking among government officials about climate change impacts and the types of policies and actions needed to adapt to changing climate and environmental conditions, as well as how to reduce greenhouse gas emissions.
Communication and coordination across ministries	Technical constraints combined with the fragmentation of responsibilities for climate change, natural resources and disaster risk reduction pose challenges for effective implementation of adaptation measures. The absence of specific legal frameworks and laws defining the responsibilities of individual line ministries and municipal administration offices in terms of climate change adaptation.
Data records, observation and monitoring networks	Weak public health and disaster related data collection and analysis, hindering the assessment of risk and vulnerability at different levels. Surveillance with respect to diseases is rudimentary, and in general there is a lack of research, research capacity, and research support infrastructure for the health sector and other priority sectors. In addition, there is a general lack of data sharing across departments and ministries.
Capacity and human resources at the municipal level	Low capacity at the municipal level limits the opportunities to provide support to communities in the form of technical knowledge to identify hazards and vulnerabilities.
Public expenditure	Low levels of public expenditure on climate change activities, including adaptation.
Capacities for planning and implementing	Lack of technical capacities for adaptation planning and implementation, including the absence of capacity-building programmes.
Monitoring and evaluation	Lack of national monitoring and evaluation system on resilience-building and adaptation to climate change.

Chapter 5: Adaptation strategies, policies, plans, goals and actions to integrate adaptation into national policies and strategies

Decision 18/CMA.1. MPGs
D. Adaptation strategies, policies, plans, goals and actions to integrate adaptation into national policies and strategies

Paragraph 109. *Each Party should provide the following information, as appropriate:*
(a) Implementation of adaptation actions in accordance with the global goal on adaptation as set out in Article 7, paragraph 1, of the Paris Agreement;
(b) Adaptation goals, actions, objectives, undertakings, efforts, plans (e.g. national adaptation plans and subnational plans), strategies, policies, priorities (e.g. priority sectors, priority regions or integrated plans for coastal management, water and agriculture), programmes and efforts to build resilience;
(c) How best available science, gender perspectives and indigenous, traditional and local knowledge are integrated into adaptation;
(d) Development priorities related to climate change adaptation and impacts;
(e) Any adaptation actions and/or economic diversification plans leading to mitigation co-benefits;
(f) Efforts to integrate climate change into development efforts, plans, policies and programming, including related capacity-building activities;
(g) Nature-based solutions to climate change adaptation;
(h) Stakeholder involvement, including subnational, community-level and private sector plans, priorities, actions and programmes.

5.1 Introduction to the element

Reporting on adaptation strategies, plans, policies, goals and actions in place should provide clarity and a common thread on the adaptation policy and planning framework included in different national documents, such as the NAP, the adaptation component of the NDC, the ADCOM, sectoral policies and other planning documents that include adaptation-related issues.

One particular challenge when reporting on this element is its broad and diverse scope. In this regard, some of the items of paragraph 109 of the MPGs imply that a certain degree of overlapping could be employed to overcome such complexity. For example, a strategic suggestion could be to develop a continuous narrative that integrates the national adaptation policy and planning framework while explicitly addressing all the relevant items in an structured manner.

A possible approach to organize such a narrative could be as follows:

- Adaptation priorities (including priority sectors and/or regions) [relates to element 4];
- Adaptation objectives and general adaptation goals [goals can relate to the GGA] [Adaptation outcomes could be included in this section];
- Adaptation policies, plans and programmes;
- Adaptation actions, undertakings, and efforts (including specific goals) [Adaptation outputs could be included in this section].

5.2. Characteristics of the element

5.2.1. Implementing adaptation in accordance with the global goal on adaptation

When building the overall planning narrative, special attention should be focused on linking adaptation actions at the national level with the GGA established in paragraph 1 of Article 7 of the Paris Agreement, which comprises "enhancing adaptive capacity, strengthening resilience and reducing vulnerability to climate change, with a view to contributing to sustainable development and ensuring an adequate adaptation response in the context of the temperature goal...".

An approach to achieving this is to classify adaptation objectives and actions in a way that reflects their contribution to "enhancing adaptive capacity", "strengthening resilience" and "reducing vulnerability". Many actions can apply to more than one of these components and, in particular, it can be difficult to classify some actions regarding whether they are primarily for strengthening resilience[7] (i.e. strengthening the capacity to cope) or reducing vulnerability (i.e. reducing the predisposition to be adversely affected). In both cases the issue takes on an internal aspect of the subject in question, whether it is the country as a whole, a specific community, an ecosystem or an economic sector.

One example of an adaptation action that can be more easily addressed as resilience is enhancing an emergency humanitarian deployment plan regarding climate disasters, because it will strengthen the capacity of the community to cope. On the other hand, an example of an adaptation action that can be easily addressed as vulnerability reduction could be a resettlement plan that includes moving highly vulnerable communities away from a flood-prone area, because this action will definitely reduce the predisposition to be affected. Nevertheless, most adaptation actions could imply a contribution to both increasing resilience and reducing vulnerability.

5.2.2. Development of a structured adaptation planning

Paragraph 109(b) of the MPGs includes a variety of formulations that relate to adaptation planning and implementation. Most of these concepts are related, but each has a specific meaning in the adaptation policy cycle; for example a goal and an objective are related, but are not the same.

Beyond the specific classification in each of the formulations, what matters most in this item is to have a rational, structured and detailed list of all adaptation measures the country has already planned and/or has under implementation (the degree of progress on implementation will be considered in the next chapter). In this regard, it is important to consider including a robust list of relevant adaptation actions to ensure that priorities, main vulnerabilities and barriers are adequately addressed, while considering that those actions can be reported in subsequent BTRs, on a biennial basis.

Adaptation actions can also include specific references to issues relating to paragraph 109(c–g) of the MPGs; for example, whether an adaptation action has a gender perspective or

[7] "Resilience: The capacity of interconnected social, economic and ecological systems to cope with a hazardous event, trend or disturbance, responding or reorganizing in ways that maintain their essential function, identity and structure. Resilience is a positive attribute when it maintains capacity for adaptation, learning and/or transformation." (IPCC AR6, Glossary).

indigenous knowledge, or whether an adaptation action leads to mitigation co-benefits or is a nature-based solution.

Also, adaptation actions may refer to specific institutions or stakeholders involved, and the level of government, territory or sector. Detailed adaptation actions can also inform the level of means of implementation needed (i.e. capacity-building, technology transfer and/or finance) or what may be needed for implementing such actions.

Several approaches can be taken to organize and structure the list of adaptation actions; for example, in relation to sectoral programmes and cross-cutting strategies. Another approach for organizing adaptation actions could be to establish specific adaptation actions per key climate risk. In this regard, in the AR6 the IPCC has presented a synthesis table of selected adaptation options per representative key risk (table 5.1 below) that is a useful and simple way to present the list of adaptation actions.

Table 5.1. Selected adaptation options per representative key risk

Representative Key Risk	Adaptation option
Risk to coastal socio-ecological systems	Coastal accommodation
	Coastal infrastructure
	Strategic coastal retreat
Risk to terrestrial and ocean ecosystem	Restore/create natural areas
	Reduce ecosystem stress
	Ecosystem-based adaptation
Risk associated with physical infrastructure, networks and services	Infrastructure retrofitting
	Building codes
	Spatially redirect development
Risk to living standards and equity	Insurance
	Diversification of livelihoods
	Social safety nets
Risks to human health	Availability of health infrastructure
	Access to health care
	Disaster early warning
Risk to food security	Farm/fisheries improvements
	Food storage/distribution improvements
	Behaviour change in diets and food waste
Risk to water security	Water capture/storage
	Efficient water use/demand
	Efficient water supply/distribution
Risk to peace and migration	Seasonal/temporary mobility
	Cooperative governance
	Permanent migration

Source: AR6, chap. 17, p.2551

Other organization approaches could structure different adaptation actions in terms of priorities, objectives or outcomes. As well as providing technical descriptions of the adaptation actions, it is good practice to include quantitative and/or qualitative goals for those actions.

5.2.3. Nature-based solutions to climate change adaptation

Beyond the requirement for including a detailed list of adaptation actions in the A-BTR, the CMA drew attention to a specific type of adaptation action, namely “nature-based solutions”,

indicating its relevance in the context of climate change policies but also for other environmental policy frameworks, including biodiversity protection.

Nature-based solutions are actions to protect, sustainably manage or restore natural ecosystems that address societal challenges (e.g. climate change, human health, food and water security, disaster risk reduction) effectively and adaptively, simultaneously protecting human well-being and biodiversity benefits. For example, a common problem is flooding in coastal areas that occurs as a result of storm surges and coastal erosion. This challenge, traditionally tackled by constructing (grey) infrastructure such as sea walls or dikes, can also be addressed by actions that take advantage of ecosystem services such as tree planting. Planting trees that thrive in coastal areas – known as mangroves – reduces the impact of storms on human lives and economic assets, and provides a habitat for fish, birds and other plants supporting biodiversity.

5.2.4. Stakeholder involvement

Another specific input in element D is stakeholder involvement, including subnational, community-level and private sector plans, priorities, actions and programmes. It is important to explain how stakeholders were involved in the planning stage of the adaptation policy cycle, including the extent of participation and the tools and processes used for ensuring such participation. Such descriptions should particularly mention stakeholders' involvement at the subnational and community level, because of the importance of adaptation action at these levels. The involvement of the private sector should also be included, because this may be more substantial in adaptation action, given the serious threats climate change poses to investments and value-chains, signalling the need and rationale for urgent climate adaptation.

5.3. Methodologies and good practice

Within the NAP Guidelines the LEG established an operational framework for building a long-term national adaptation planning and implementation strategy. Such a strategy is based on a coherent narrative that builds on priorities, needs and vulnerabilities to develop a precise set of activities including implementation specificities, such as institutional arrangements or means of implementation.

The NAP Guidelines indicate that successful implementation requires an understanding of the "big picture", as well as all the sequential steps that lead to it. A clear long-term implementation strategy will serve as valuable guidance for addressing adaptation at the local and national level. The strategy will need to be focused, have a clear sense of direction and be linked to the national vision for adaptation and development priorities, plans and programmes.

The NAP Guidelines (step 2.c.a) call for a clearly defined strategy for the implementation of adaptation actions, including:

- Adaptation activities to address key vulnerabilities and risks;
- Prioritization of the adaptation activities at the national level;
- A proposed approach for the implementation of activities, such as on a project-by-project basis, a sector-wide or programmatic approach, a resilience approach, through climate-proofing development, an ecosystem-based approach, and so on;
- An overarching strategy for prioritizing the most vulnerable communities or systems of the society;

- Possible sources of funding and other forms of support for the implementation of adaptation activities;
- Overall coordination of the implementation of the plan;
- Options for mobilizing financial, technical and capacity-building support under the multilateral processes and other channels, including at the local, national and regional level;
- Ways and means to instigate and maximize synergies with other plans;
- A sequence for implementation, taking into account currently available resources compared with those required; ongoing and planned adaptation; and relevant development initiatives.

Moreover, for each activity, the strategy should also inform:

- Objective(s), outputs and expected outcomes;
- Target areas or beneficiaries;
- Resources required for implementation, such as data and information; human, institutional and systemic capacity; and financial resources;
- The organization(s) and/or agency(ies) responsible for the implementation and coordination of implementation.

Adopting the specific approaches from the NAP Guidelines, described above, for reporting on element D of the A-BTR may result in the need to develop a key input: namely, a coherent adaptation narrative including a robust strategic structure for adaptation action, that can be reported iteratively from one BTR to the next.

The AC has prepared "Draft supplementary guidance for voluntary use by Parties in communicating information in accordance with the possible elements of an adaptation communication" (AC22/GUID/6B), which introduces national adaptation priorities, strategies, policies, plans, goals and actions as an element included in the annex to decision 9/CMA.1 (see Box 5.1).

Box. 5.1. National adaptation priorities, strategies, policies, plans, goals and actions in ADCOMs

"(a) **National adaptation priorities** can be understood as adaptation-related measures, actions or targets that are important and/or urgent, prioritized on the basis of a vulnerability analysis;

(b) **Strategies** can be understood as articulations of the general direction for adaptation in the medium or long term and can include visions, objectives, targets, guiding principles and timelines. Strategies and other aspects of adaptation can complement one another; for example, an action plan may elucidate how a strategy will be executed, or an implementation strategy can accompany an adaptation plan;

(c) **Policies** may be understood as a national course of action for adaptation, involving statements, documents or decisions that guide efforts to facilitate adaptation;

(d) **Plans** involve, in particular, the process to formulate and implement NAPs, which is a means of identifying medium- and long-term adaptation needs and developing and implementing strategies and programmes to address those needs following UNFCCC guidelines;

(e) **Goals** are the aims of adaptation action. Goals may be elucidated in NAPs, strategies or policies; they may be closely related to priorities, strategies, policies or plans; and they may be expressed in quantitative or qualitative terms and at different levels;

(f) **Actions** can be understood as steps or measures taken to facilitate adaptation and often refer to specific projects. They may be taken in line with priorities, strategies, policies, plans or goals."

5.4. Examples of strategies, policies, objectives, goals and actions

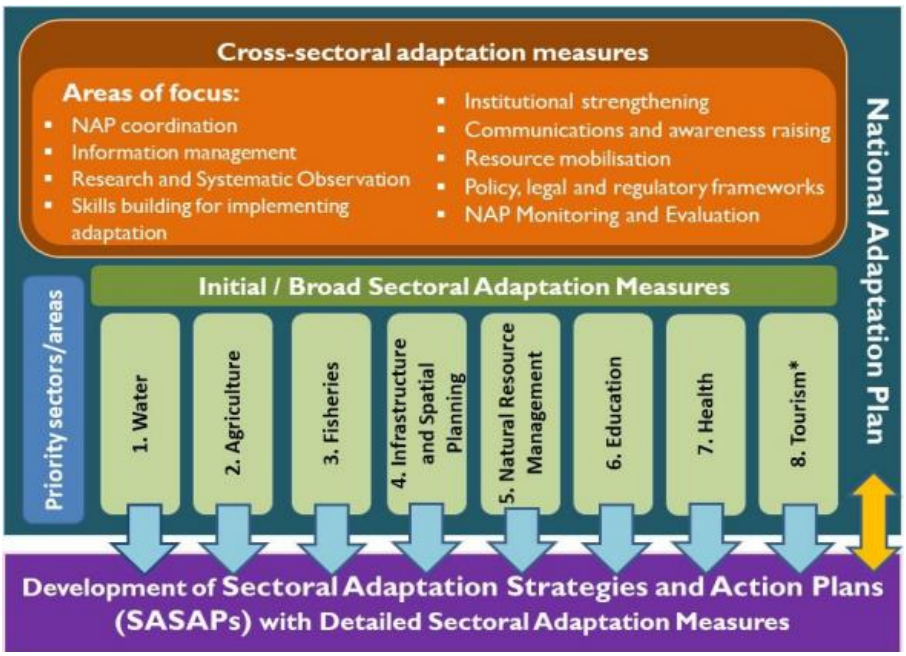
Nigeria's ADCOM identified adaptation strategies and policies for thirteen priority sectors captured in the NASPA-CCN (2011), the NAP Framework (2020) and the NCCPRS (2021), as shown in figure 5.1.

Figure 5.1: Adaptation actions structured by priority sector

Source: Nigeria ADCOM, 2021

Saint Lucia's NAP provides a coherent narrative including outcomes, measures and indicative outputs for priority sectors in Saint Lucia (figure 5.2).

Figure 5.2. NAP Strategy of Saint Lucia



Source: Saint Lucia NAP, 2018

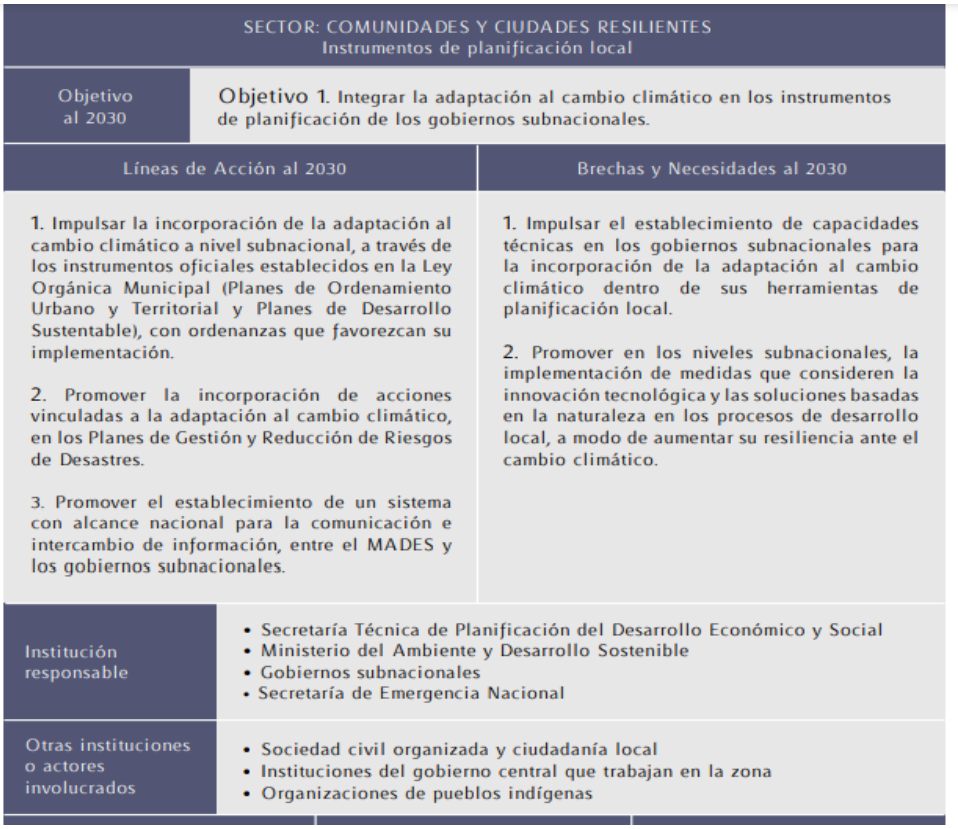
In Angola's first ADCOM and revised NDC there is a list of unconditional and conditional adaptation contributions by priority sector, including response to specific climate change impacts, and a level of investment for each measure, summarized in figure 5.3.

Figure 5.3. Adaptation actions by priority sector in Angola's NDC

Sector	Unconditional Contributions	Impact response	Cost (Million USD)[13]
Agriculture and Fisheries	Conduct studies on the impact of climate change on fishing productivity and coastal economies	Acidification of the sea and fresh water; Rising water temperature and increased salinization	17,70
	Develop community and school gardens	Increased frequency and intensity of heat waves / heat island effect	5,00
	Apply the national collection of local seeds in programs to improve and create adapted local varieties	Change / Loss of biodiversity	7,50
Coastal Zone	Assess the defense capacity of existing protection structures in risk areas, including the analysis of the feasibility of new investments for the construction of protection structures against sea level rise	Sea level rise	2,00
Forest, Ecosystem and Biodiversity	Develop forest fire prevention actions	Increased frequency and intensity of rural fires	4,50
	Improve the management of existing conservation areas and continue the process of creating new areas	Change / Loss of biodiversity	5,80
Water Resources	Develop characterization studies of hydrographic basins and groundwater	Degradation of assimilation and purification of water courses	3,00
	Increase the number of meteorological and hydrometric stations to improve monitoring of rainfall and watersheds	Increased frequency and intensity of extreme precipitation events	10,00
	Implement a water collection and storage system in drought-prone areas to ensure continuity of human supply and watering of livestock	Increased frequency and intensity of periods of drought and water scarcity	4,83

The ADCOM of Paraguay included the preparation of technical spreadsheets that incorporate the objectives by priority sector, the lines of action, the gaps and needs, those responsible and the linkage with other international frameworks (figure 5.4).

Figure 5.4. Sectors, objectives, lines of action, gaps and needs and institutional arrangements for climate adaptation



Chapter 6: Progress on implementation of adaptation

Decision 18/CMA.1 MPGs
E. Progress on implementation of adaptation
Paragraph 110*. Each Party should provide the following information, as appropriate, on progress on:*
(a) Implementation of the actions identified in chapter IV.D above;
(b) Steps taken to formulate, implement, publish and update national and regional programmes, strategies and measures, policy frameworks (e.g. national adaptation plans) and other relevant information;
(c) Implementation of adaptation actions identified in current and past adaptation communications, including efforts towards meeting adaptation needs, as appropriate;
(d) Implementation of adaptation actions identified in the adaptation component of NDCs, as applicable;
(e) Coordination activities and changes in regulations, policies and planning.

Paragraph 111*. Developing country Parties may also include information on, as appropriate, implementation of supported adaptation actions, and the effectiveness of already implemented adaptation measures.*

6.1. Introduction to the element

This element cannot be considered or planned in isolation from section F of the MPGs, which refers to monitoring and evaluation systems (see chap. 7 below). An analysis of element E only could lead to overlapping information and therefore create additional burden, especially for developing countries.

As mentioned in the MPGs, the purpose of section E of the A-BTR is to show progress in the implementation of adaptation actions, policies, efforts and strategies. However, there are different ways to exhibit such progress, as suggested in box 6.1.

Box 6.1. Some ways to understand progress on implementation of adaptation actions

- In the preparation and submission of documents to the UNFCCC, including NAPs, NDCs, ADCOMs, NCs and A-BTRs;
- In the adaptation policy cycle, including planning, implementation and monitoring;
- In sectors or areas based on baselines and goals;
- In the development of regulatory, political and/or institutional frameworks.

These perspectives are not mutually exclusive: rather, they are complementary. Thus, developing a narrative on the progress of adaptation through the policy cycle can also lead to institutional and regulatory progress, and all of these factors are reflected in communications and reporting instruments submitted to the UNFCCC.

Progress in preparing and submitting documents to the UNFCCC is laudable in terms of both the capacities and the resources needed, especially in developing countries. Likewise, it

shows the will of Parties to contribute to the collective process of learning and understanding adaptation action, which is why these efforts are recognized under Article 7, paragraph 3, of the Paris Agreement.

NAPs, NDCs and ADCOMs play a crucial role in drawing attention to the national adaptation policy cycle that could be another focus of the reporting exercise. This approach reflects the narrative that each Party can compile about how adaptation is happening, the institutional progress made and, in turn, how submitting documents to the UNFCCC helps to strengthen that narrative.

Adaptation is not usually linear and, in all cases, it is an iterative process. Therefore, developing a document is not a point of arrival; rather it provides some ideas about the process of achieving objectives and as such it can be useful for understanding how the Party is reducing the impacts of climate change and preparing for the risks it has chosen to assess.

Parties can also refer to their progress in political, institutional and regulatory frameworks: this can be considered as progress in itself, as well as enabling conditions for the implementation of actions. In order to avoid unnecessary overlaps, it is important to take into account the fact that institutional arrangements and legal frameworks are already another component of the A-BTR.

Progress can be also considered through indicators and metrics, as well as by setting targets and baselines. Reviewing the extent to which planned actions have enabled the country to move from a certain point and towards a goal or objective could also comprise both a sectoral and a climate risk approach. At the same time, setting a baseline can help Parties when assessing the effectiveness of their adaptation actions.

6.2. Assessing progress and effectiveness of adaptation

In its AR6 the IPCC affirmed that “effectiveness” refers to the extent to which an action reduces vulnerability and climate-related risk, increases resilience and avoids maladaptation. The effectiveness of adaptation is context specific; it is also linked with sectors and regions. In scenarios of increasing warming, the effectiveness of adaptation decreases and, in some cases, adaptation limits may be reached.

In accordance with Article 7, paragraph 14, of the Paris Agreement, the review of the adequacy and effectiveness of adaptation and support is one of the four components of adaptation in the GST, together with the recognition of adaptation efforts of developing countries, the enhancement of implementation through the ADCOMs and the review of the overall progress in achieving the GGA.

The AC, along with the LEG and jointly with the Standing Committee on Finance, affirmed that when Parties are developing methodologies and recommendations on reviewing the adequacy and effectiveness of adaptation and support, the assessment should consider immediate outputs (e.g. the number of beneficiaries) as well as the outcomes (e.g. the

increase in institutional capacity or the availability and use of climate data), or the impacts of adaptation efforts on well-being.[8]

Since the purpose of the GST is to assess progress in the implementation of all the components of the Paris Agreement, including adaptation, the A-BTRs must serve this process in a comprehensive way, by providing clarity of information on both action and support. When drafting the narrative about the implementation process of specific actions, policies and strategies, Parties may also specify if the actions received support.

There is a potential overlap between the information provided in element (e) of the ADCOM and sections E and F of the A-BTR.[9] Element (e) of the ADCOM refers to the implementation of adaptation actions and plans, including:

(i) Progress and results achieved;
(ii) Adaptation efforts of developing countries for recognition;
(iii) Cooperation on enhancing adaptation at the national, regional and international level, as appropriate;
(iv) Barriers, challenges and gaps related to the implementation of adaptation;
(v) Good practices, lessons learned and information-sharing;
(vi) Monitoring and evaluation.

If a country decides that the A-BTR is the vehicle of the ADCOM during a cycle, there will be no overlap because both documents would coincide. If another vehicle is chosen for the ADCOM, and both documents are differentiated, cross-references can be used to avoid repetitions and report the most novel aspects of the implementation.

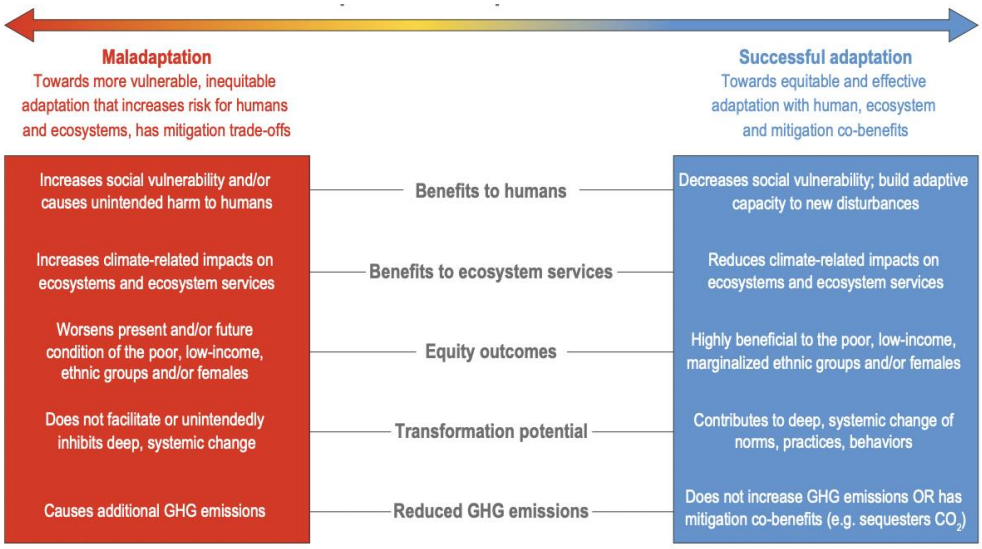
6.3. Adaptation from incremental to transformational, residual risks and maladaptation

Another perspective when reporting progress on the implementation of adaptation lies in understanding and reviewing the success of action. As expressed by the IPCC in the AR6, successful adaptation is associated with a reduction of climate risks and vulnerabilities, balancing the synergies and trade-offs across diverse objectives, perspectives, expectations and values. At the same time, maladaptation refers to current or potential negative effects of adaptation-related responses that increase the climate vulnerability of a system, sector or group, or increase GHG emissions, affecting sustainable development.

The AR6 includes an adaptation–maladaptation continuum so that Parties can assess and score adaptation options from high to low considering the benefits to people, ecosystem services, equity, transformational potential and contribution to GHG emission reductions. In all cases, the assessment is dynamic (see figure 6.1). The AR6 also outlines a set of 24 adaptation options can contribute to successful adaptation or maladaptation (figure 6.2).

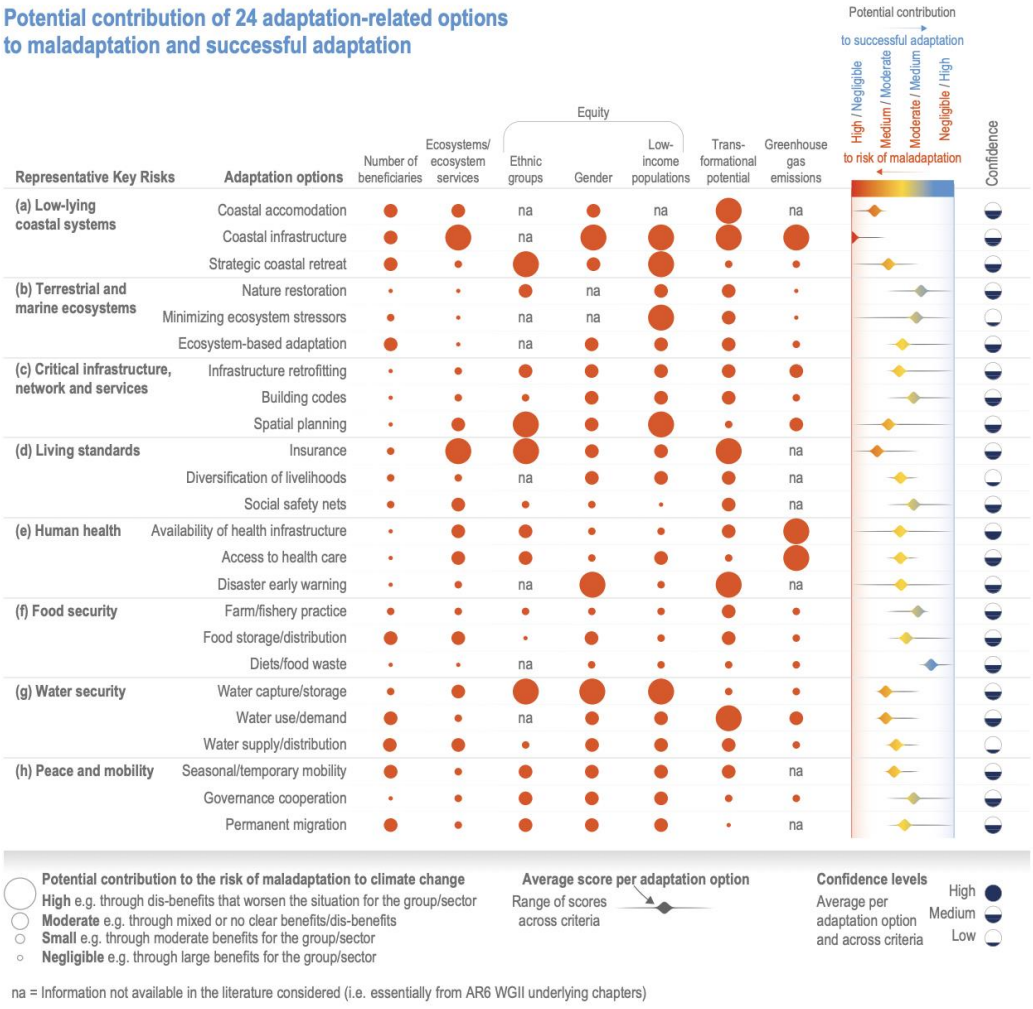
[8] Document AC-LEG/INFO/1 (available at https://unfccc.int/documents/262932) is an early draft of the background paper developed by the AC and LEG when developing methodologies and recommendations on reviewing the adequacy and effectiveness of adaptation and support..
[9] Parties may consult the latest version of the "Draft supplementary guidance for voluntary use by Parties in communicating information in accordance with the possible elements of an adaptation communication" prepared by the AC (AC22/GUID/6B).

Figure 6.1. Adaptation–maladaptation continuum



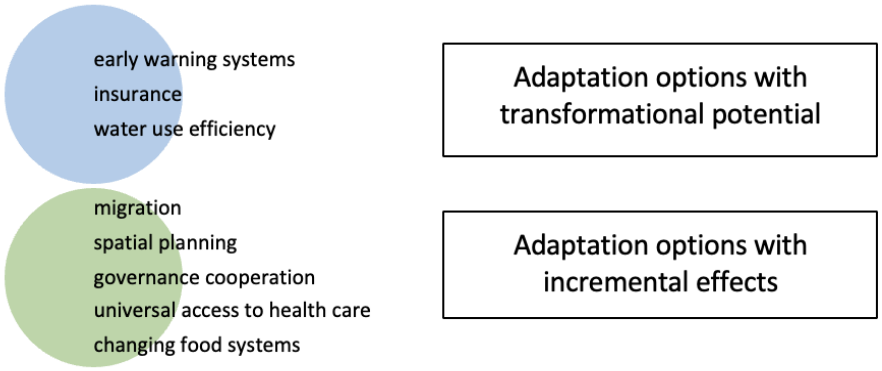
Source: IPCC, 2022

Figure 6.2. Potential contribution of adaptation options to successful adaptation and maladaptation



The IPCC also draws attention to the need for accelerating both incremental and transformational adaptation; in particular by considering the risks associated with the impacts of scenarios where the average global temperature increase goes above 1.5°C. The AR6 defines incremental adaptation as an action or an option that manages to maintain the essence and integrity of a system or process at a given scale; whereas transformational adaptation requires fundamental changes in the main attributes of a social-ecological system in anticipation of climate change and its impacts, as illustrated in figure 6.3.

Figure 6.3. Examples of incremental and transformational adaptation options



Source: IPCC, 2022

Since incremental adaptation may not be sufficient to adjust to the negative impacts of climate change, residual risks (i.e. any remaining risks following adaptation and mitigation actions) may be generated, and the limits of adaptation could be surpassed.

When preparing the A-BTR, Parties may identify the progress made in the implementation of both incremental and transformational adaptation options.

6.4. Climate-resilient development and the Sustainable Development Goals

As mentioned in chapter 1 above, one of the key concepts in the contribution by Working Group II to the AR6 is the idea of **climate-resilient development**, which refers to the process of implementing both mitigation and adaptation measures to achieve sustainable development. Different linkages between mitigation and adaptation can be reported in the A-BTR, including synergies and trade-offs, as a way of understanding progress towards climate-resilient development pathways. At the same time, pursuing adaptation, mitigation and sustainable development in an integrated manner may increase the effectiveness of climate action.

The SDGs represent a collective effort to achieve human and ecological well-being. Hence, the assessment of progress made in achieving the SDG objectives (including the targets), as well as in reporting at the national level can inform the preparation of the A-BTR – not only because of the practice of reporting per se, but also because the process supports synergy and coordination between different areas of government at the national level. At the same time, it can be a helpful way of integrating climate and sustainable development frameworks in accordance with the concept of climate-resilient development.

Some examples of SDG indicators that can be useful when considering progress on implementing adaptation are: the number of deaths, missing persons and directly affected persons attributed to disasters per 100,000 population (indicator 13.1.1); the number of countries that have communicated the establishment or operationalization of an integrated policy, strategy, or plan which increases their ability to adapt to climate change and foster climate resilience and low-emissions development (indicator 13.2.1); and the number of countries that adopt and implement national disaster risk reduction strategies (indicator 11.b.1).

Other SDG indicators that can be useful when assessing progress on implementation are located under goal 2 (end hunger, achieve food security and improved nutrition and promote sustainable agriculture), goal 6 (ensure availability and sustainable management of water and sanitation for all) and goal 15 (protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss).

6.5. Models, methodologies, initiatives and good practice

The NAP Global Network (2021) reviewed available NAP progress reports that were assessing Parties' improvements in implementing adaptation actions. The review found that, in many cases, the stated objectives were not the same as the reported outcomes. There were also differences in the approaches used for evaluating progress made and for communicating results. Moreover, the review measured the implementation status of activities, evaluated the integration of adaptation in development planning, and assessed adaptation outcomes and the NAP process (e.g. considering institutional capacities and coordination). The review summarized the main challenges and gaps resulting from the different case studies (table 6.1), which may be helpful when preparing the A-BTR.

Table 6.1. Approaches to progress reporting on national adaptation plan implementation

Challenges	Gaps
Institutional challenges: discrepancies between sectors regarding the national adaptation plan (NAP) process, misunderstandings on responsibilities, lack of coordination, lack of leadership.	Very little reporting on gender and social inclusion.
Systematic monitoring and evaluation (M&E) of adaptation remains rare in most sectors.	Reporting does not reflect the linkages between climate adaptation planning, implementation and M&E at the national and subnational level.
Unreliable data and lack of data in certain areas.	Disconnection between national and international processes, including NAPs.
Technical difficulties, including software problems.	Limited mention of how the results would be communicated to different stakeholders and communities.

Source: NAP Global Network

The LEG, with the support of the UNFCCC secretariat, produces annual reports providing information on the progress of Parties that are in the process of formulating and implementing NAPs, including on support provided and received.

These LEG reports identify the progress made annually, not only in terms of finalizing and uploading the NAP to the UNFCCC web page, but also looking at how each Party has incorporated the different elements of the NAP Guidelines prepared by the LEG. Likewise, it accounts for the project proposals that received funding from the Green Climate Fund (GCF) for implementing policies, projects and programmes identified in the NAPs.

The implementation of adaptation is one of the key components of the *Adaptation Gap Report 2021* (UNEP, 2021). Some of the questions posed in that report include:

- Is adaptation taking place?
- Where and in which sectors adaptation is happening?
- Is the risk being reduced as a result of the interventions?

The Adaptation Gap Report, published periodically by UNEP, assesses global progress on implementation on the basis of three types of source: (1) funded actions by international organizations (such as OECD), environmental or climate-related funds (the Global Environment Facility (GEF), GCF and the Adaptation Fund), and bilateral donors (France, Germany, Japan, Republic of Korea, Netherlands, Sweden, Switzerland, United Kingdom of Great Britain and Northern Ireland and United States of America); (2) OECD statics labelled as adaptation; and (3) adaptation activities documented in scientific journals (e.g. between 2013 and 2019 using Web of Science, Scopus and Medline).

Even if the sources of the Adaptation Gap Report apply to a global assessment of progress, the Parties may consider in their reports to what extent the provision of finance through different sources has allowed them to advance in the implementation of planned actions. In turn, the three questions listed above are considered relevant to support the Parties' preparation processes, in terms of understanding their own progress and reporting it.

6.6. Examples of progress on implementation of adaptation

South Africa's NC3 shows its progress in mainstreaming climate change adaptation into policies and planning, including sectors that need particular attention from an adaptation perspective such as water, agriculture and forestry, health, biodiversity and human settlements.

For example, South Africa identified a number of adaptation needs within the water sector in response to climate change impacts, including investment in water conservation and water demand management; exploring new and unused resources, particularly groundwater, re-use of effluent and desalination; and including climate change considerations in the water sector's plans and strategies.

The NC3 states that progress has been made in mainstreaming adaptation considerations into the Water for Growth and Development Framework 2030 that provides a medium- to long-term perspective on managing water resources in the country. South Africa has also

developed the Climate Change Adaptation Strategy for Water, incorporating adaptation actions for addressing climate change impacts.

The NC4 of the Republic of Korea included a chapter on climate change impacts and adaptation measures. Since its first report on National Climate Change Adaptation Measures, the Republic of Korea has included implementation plans of climate change adaptation measures at the national level and provided assistance to local governments in establishing their adaptation measures. The outcome was an implementation plan for climate change adaptation measures ranging from the nation to municipal and basic governments.

As part of its NAP monitoring system, Chile prepares progress reports that include an overview of the actions that are being implemented and the amounts invested in each of them, including cross-cutting and sectoral actions. Likewise, it reports the sectoral plans in operation and the associated measures regarding agriculture and forestry, biodiversity, fishing and aquaculture, health, and infrastructure. In the fourth report on its NAP, Chile assessed the level of progress in the announced measures in its NAP as 70 per cent.

Chapter 7: Monitoring and evaluation of adaptation actions and processes

Decision 18/CMA.1 MPGs

F. Monitoring and evaluation of adaptation actions and processes

Paragraph 112*. In order to enhance their adaptation actions and to facilitate reporting, as appropriate, each Party should report on the establishment or use of domestic systems to monitor and evaluate the implementation of adaptation actions. Parties should report on approaches and systems for monitoring and evaluation, including those in place or under development.*

Paragraph 113*. Each Party should provide the following information, as appropriate, related to monitoring and evaluation:*
(a) Achievements, impacts, resilience, review, effectiveness and results;
(b) Approaches and systems used, and their outputs;
(c) Assessment of and indicators for:
(i) How adaptation increased resilience and reduced impacts;
(ii) When adaptation is not sufficient to avert impacts;
(iii) How effective implemented adaptation measures are;
(d) Implementation, in particular on:
(i) Transparency of planning and implementation;
(ii) How support programmes meet specific vulnerabilities and adaptation needs;
(iii) How adaptation actions influence other development goals;
(iv) Good practices, experience and lessons learned from policy and regulatory changes, actions and coordination mechanisms.

Paragraph 114*. Each Party should provide information related to the effectiveness and sustainability of adaptation actions, as appropriate, including on:*
(a) Ownership, stakeholder engagement, alignment of adaptation actions with national and subnational policies, and replicability;
(b) The results of adaptation actions and the sustainability of those results.

7.1. Introduction to the element

In line with paragraph 112 of the MPGs, each Party should report on the establishment of and processes for putting in place monitoring and evaluation systems. The AR6 defines monitoring and evaluation (M&E) as the systematic process of collecting, analysing and using information to assess the progress of adaptation and evaluate its effects during and after implementation.

The “Draft supplementary guidance for voluntary use by Parties in communicating information in accordance with the possible elements of an adaptation communication” (AC22/GUID/6B) differentiates between the two processes involved. Monitoring is considered a process of tracking and reviewing interventions and results by collecting data and using indicators. Hence, in the event that a deviation from the proposed objectives is identified, it can be corrected. Evaluation entails assessing to what extent the proposed objectives were fulfilled, as well as determining the effectiveness and the impact of actions.

The purpose of monitoring, evaluation and learning is to apply knowledge gained from evidence and analysis to improve outcomes and promote accountability. However, it is crucial to note that any M&E system is not an end in itself but a means of achieving an outcome more effectively (USAID CLA Toolkit). Therefore, it is key that a Party knows beforehand what it intends to achieve and learn, in order to collect the appropriate information. One possible way of capturing these intentions is via a "theory of change".

M&E is a crucial stage of the policy cycle regarding adaptation: it appears in the NAP Guidelines associated with reviewing progress and effectiveness (see figure 7.1).

Figure 7.1. Elements and steps for formulating a NAP

TABLE 1. STEPS UNDER EACH OF THE ELEMENTS OF THE FORMULATION OF NATIONAL ADAPTATION PLANS, WHICH MAY BE UNDERTAKEN AS APPROPRIATE[a]

ELEMENT A. LAY THE GROUNDWORK AND ADDRESS GAPS

1. Initiating and launching of the NAP process
2. Stocktaking: identifying available information on climate change impacts, vulnerability and adaptation and assessing gaps and needs of the enabling environment for the NAP process
3. Addressing capacity gaps and weaknesses in undertaking the NAP process
4. Comprehensively and iteratively assessing development needs and climate vulnerabilities

ELEMENT B. PREPARATORY ELEMENTS

1. Analysing current climate and future climate change scenarios
2. Assessing climate vulnerabilities and identifying adaptation options at the sector, subnational, national and other appropriate levels
3. Reviewing and appraising adaptation options
4. Compiling and communicating national adaptation plans
5. Integrating climate change adaptation into national and subnational development and sectoral planning

ELEMENT C. IMPLEMENTATION STRATEGIES

1. Prioritizing climate change adaptation in national planning
2. Developing a (long-term) national adaptation implementation strategy
3. Enhancing capacity for planning and implementation of adaptation
4. Promoting coordination and synergy at the regional level and with other multilateral environmental agreements

ELEMENT D. REPORTING, MONITORING AND REVIEW

1. Monitoring the NAP process
2. Reviewing the NAP process to assess progress, effectiveness and gaps
3. Iteratively updating the national adaptation plans
4. Outreach on the NAP process and reporting on progress and effectiveness

Source: LEG, Technical guidelines for the national adaptation plan process, 2012.

Some countries develop M&E systems that cover their adaptation policy, while others develop specific systems or indicators that are linked to certain processes, projects, sectors or documents.

The MPGs provide detailed information that should be considered when preparing this section of the A-BTR, in relation to achievements, impacts, effectiveness, results, outputs, indicators and other information associated with implementation that may overlap with section E (see chap. 6 above).

7.2. Purpose, approaches and indicators of M&E

According to the AR6, there are three main purposes for undertaking monitoring and evaluation:

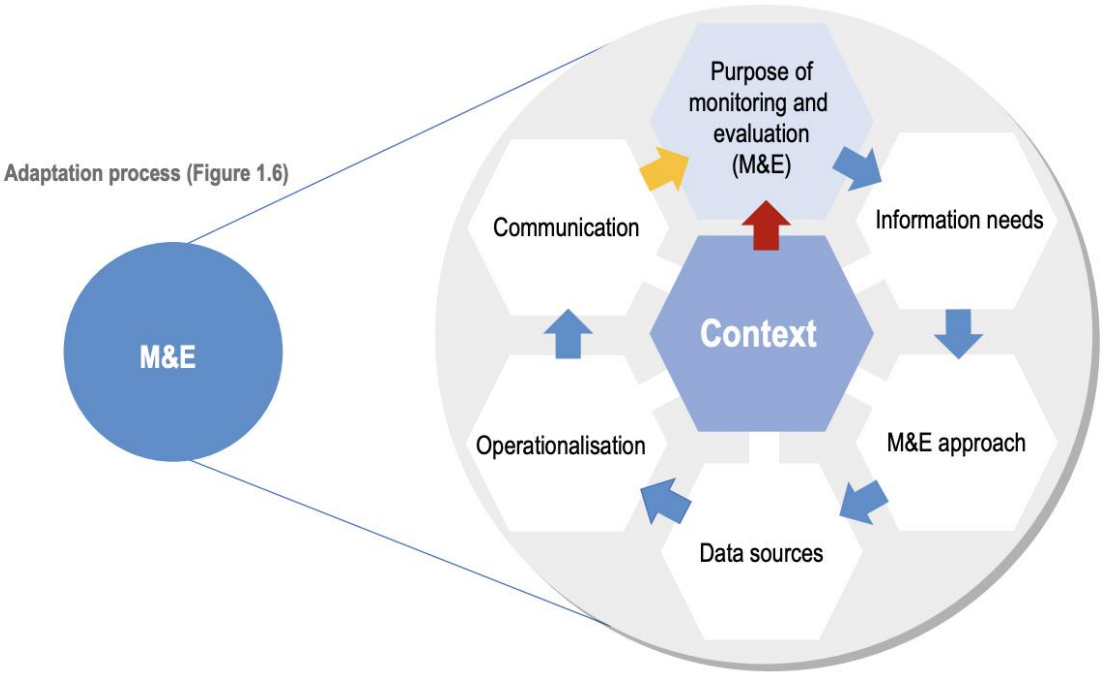
1. Understanding if intended objectives were achieved after responses and its contribution to reducing climate risks and vulnerability or to increase adaptive capacity and resilience;
2. Informing current processes of implementation and future responses;
3. Providing for accountability.

Box 7.1. Specific purposes for adaptation M&E (Leiter, 2017)

- Assessing adaptation processes:
  - Monitoring the integration of adaptation into planning processes;
  - Monitoring the implementation of adaptation programmes, projects or actions;
  - Monitoring the implementation of the NAP process;
  - Tracking which adaptation activities are taking place at national or sub-national level;
- Assessing adaptation outcomes:
  - Assessing the results of adaptation projects or actions;
  - Assessing the results of a programme or portfolio of adaptation projects;
  - Assessing whether vulnerability has been reduced as a result of adaptation programmes, projects or actions;
  - Assessing progress towards adaptation goals, targets or intended outcomes at national level;
  - Assessing whether resilience to climate change has been improved at national level.

Although M&E approaches vary by scale, sector and goals, current efforts are more focused on processes and outputs, rather than outcomes and impacts (e.g. reducing climate risks or vulnerability). Beyond the simplicity or complexity of an M&E system, as a tool it should help Parties identify whether adaptation is happening, recognize its effects and understand in what sense the objectives are being met, as summarized in figure 7.2.

Figure 7.2. Adaptation monitoring, evaluation (M&E) and learning as part of the adaptation process (AR6)



Therefore, when developing an M&E system the context should inform the purpose, and should determine the information required, as well as the approach and the data sources. A communication strategy should be developed to meet the needs of the targeted audience.

When reporting, given the differences between monitoring and evaluation, Parties may take the opportunity to provide an explanation on effectiveness of adaptation responses, including how the objectives of adaptation planning have been achieved and can be improved in the future, considering outcomes and impact evaluation.

7.3. Models, methodologies, initiatives and good practice

There are several tools to assist Parties when preparing M&E systems that can also be helpful when reporting iterative adaptation policy cycles in the A-BTRs. It is crucial that the Party select the system that best accompanies its objectives and purposes, and include relevant information in this section of the A-BTR in order to clarify the path chosen and the progress made.

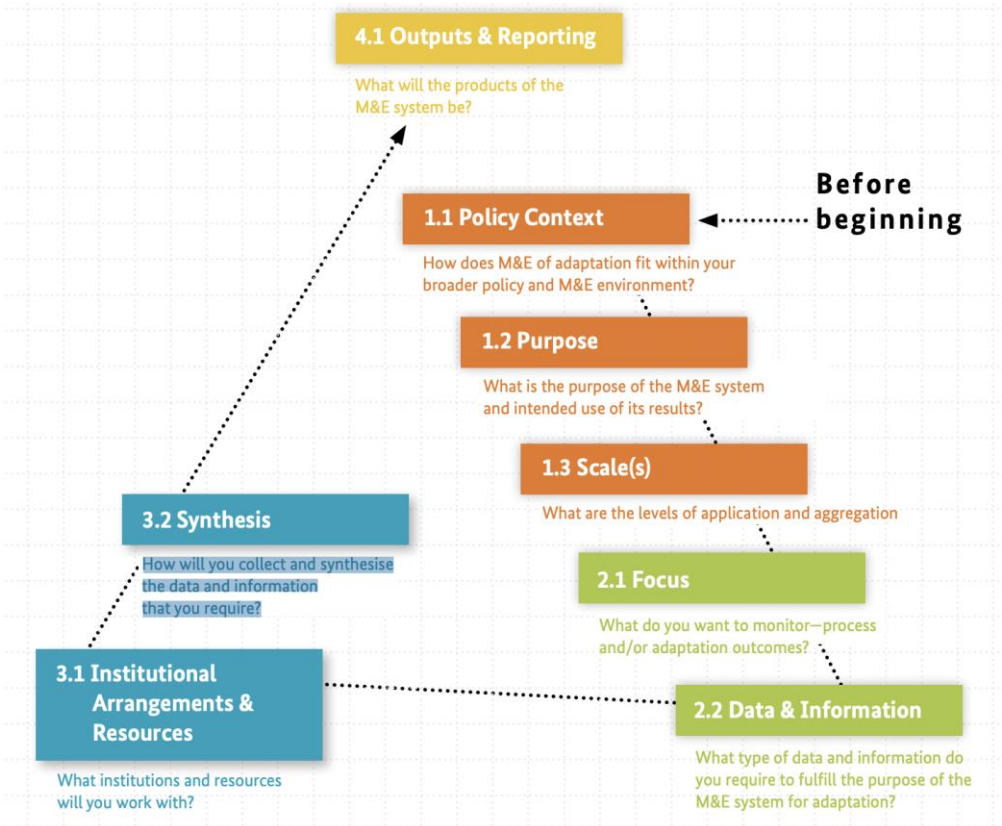
In 2011 the German Agency for International Cooperation (GIZ) and the World Resources Institute (WRI) developed a five-step approach to designing a results framework and developing a results-based monitoring system for adaptation projects: (1) assessing the context of adaptation; (2) identifying the contribution; (3) developing a results framework; (4) defining indicators and baselines; and (5) operationalizing the results-based monitoring system. More recently, GIZ developed MACC (Monitoring Adaptation to Climate Change), an Excel tool that guides users through the five steps, along with a Handbook.

The International Institute for Environment and Development (IIED) has created a conceptual framework for monitoring and evaluating adaptation named Tracking Adaptation and Measuring Development (TAMD). It involves both a framework of nine indicators for assessing institutional climate risk management (institutions, policies and capacities) and a scheme for measuring adaptation and development performance (interventions may improve resilience and adaptive capacity and/or reduce vulnerability).

OECD has also developed methodological approaches to monitoring and evaluation of climate change adaptation based on three challenges: (1) assessing an intervention attribution; (2) establishing baselines and targets; and (3) reconciling the longer time horizons with the shorter assessment cycles. The OECD document also provides an overview of different ways to integrate learning into M&E including building a learning phase into the planning cycles; using participation and involving beneficiaries and key stakeholders in the process; and institutionalizing a learning function within the project or programme team.

The GIZ and IIED Guidebook, Developing National Adaptation Monitoring and Evaluation Systems, provides a series of questions that, depending on the answers, direct users towards different steps for adopting an M&E system most suitable for the Party's objectives (figure 7.3).

Figure 7.3. Guidebook's progression through the questions



Source: GIZ and IIED, 2015

The Progress, Effectiveness and Gaps (PEG) M&E tool developed by the LEG identifies three dimensions of M&E for adaptation: (1) M&E of the process of formulating and implementing NAPs; (2) M&E of adaptation projects, programmes, policies, carried out by funding and implementing agencies; and (3) M&E of adaptation outcomes and impact. The PEG M&E Tool also defines different types of metric for monitoring the process used to formulate and implement NAPs, such as:

1. Metrics for assessing **processes** or an action taken to achieve a goal;
2. Metrics for assessing **inputs** or what have been put into a process to achieve a goal;
3. Metrics for assessing **outputs**, meaning products and services delivered;
4. Metrics for assessing **outcomes** or results;
5. Metrics for assessing **impacts** such as the effects of an outcome.

One of the lessons learned from the tools developed both inside and outside the UNFCCC is the importance of M&E systems being sustainable, as well as the need for adjusting to the objectives of the adaptation policy cycle and the current conditions of each country, including available information and existing capabilities.

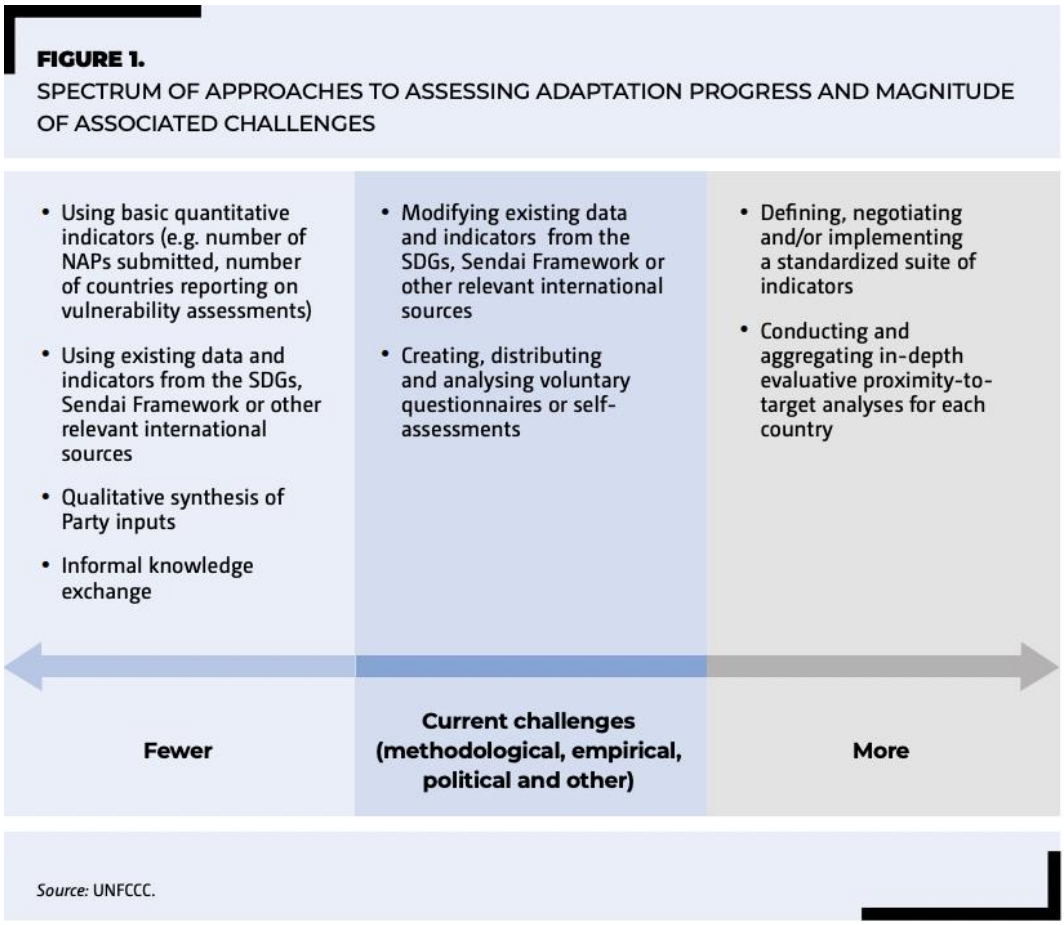
The AC has been conducting work on adaptation M&E for some time, including a workshop held in Nadi, Fiji, in 2013; an expert meeting on national adaptation goals/indicators and their relationship with the SDGs and the Sendai Framework for Disaster Risk Reduction developed in Tokyo in 2018; and the Adaptation Forum on M&E systems at the national and subnational level followed by a technical paper.

Owing to the top-down approaches inherent in the SDGs and Sendai Framework, the AC affirmed that measuring progress on adaptation needs to be defined in different countries considering the context-specific nature of adaptation. Thus, the M&E system should be aligned with a country's objectives on adaptation. Other recommendations include the importance of building technical capacity for data collection; the need to improve national statistical offices' engagement in developing national indicator reporting systems on climate change; and the need for coordination among related actors and the alignment of agendas across agencies reducing reporting burden and improving budget efficiency. Such collaborations between areas also strengthens the understanding and mainstreaming of adaptation.

Current work still considers that M&E remains immature owing to a range of challenges of a different nature: methodological challenges, such as attributing results to specific adaptation interventions or working around the uncertainties and shifting baselines of climate change hazards; empirical challenges, including the lack of data or databases; and conceptual challenges, considering the lack of consensus on definitions of key terms.

The AC was also mandated by the CMA to prepare a technical paper on approaches to reviewing the overall progress made in achieving the GGA. The paper concluded that assessing such progress is intrinsically related to the national advances reflected by Parties in their communications and reporting instruments and their relationships with the long-term goals, including various scales, sectors, different types of risks and dimensions. The AC paper identifies challenges as well as considering methodologies and a spectrum of approaches at the global, supranational, national and subnational level, summarized in figure 7.4.

Figure 7.4. Spectrum of approaches to assessing adaptation progress and magnitude of associated challenges



7.4. Examples of monitoring and evaluation of adaptation actions and processes

Fiji developed a monitoring and evaluation framework for its NAP that includes focusing on climate-related risks and vulnerabilities identified in key systems and sectors; monitoring by tracking progress with implementing actions and delivering results; assessing the effectiveness of the NAP process in delivering intended results; learning about reducing risk and vulnerability from the NAP process and its results; and reporting on NAP-related and other climate-related commitments.

The main elements of its approach include the identification, collection and management of the data/information; tracking progress of the NAP including developing criteria for monitoring adaptation actions applied on exemplar actions; and the process of communicating, learning and reporting.

Fiji's M&E framework uses traffic light colours (red, yellow and green) when summarizing progress in implementing exemplary adaptation actions (table 7.1).

Table 7.1. Summary of progress for six exemplar adaptation actions in Fiji

Exemplar adaptation actions: three system component actions (7.10, 9.2 & 11.4) and three sectoral component actions (13.4, 15.A.2 & 16.9)	Summary of progress (January 2020)		
	Does the PFP provide an enabling environment for the action?	Are actions taking place?	Is progress being made in managing vulnerability?
7.10: Establish standardised approach to collecting information on climate change interventions to facilitate monitoring and evaluation of outcomes relative to policy targets.....	**No enabling environment in place.**	Relevant actions are not all on track.	Some trends in vulnerability increasing.
9.2: Integrate contextually relevant adaptation and disaster risk reduction measures into Divisional Strategic Development Plans and Provincial Strategic Development Plans.....	Enabling environment in place to partially implement the action.	Relevant actions are not all on track.	Scope to increase low-regrets actions.
11.4: Review and integrate climate and disaster issues into Financial Sector Development Plan to improve climate literacy, build capacity and transfer technology.....	Enabling environment in place to partially implement the action.	Relevant actions are not all on track.	Scope to increase low-regrets actions.
13.4: Repair and reconstruct through "build back better" concept of health infrastructure affected by disasters, particularly TC Winston and 2017 landslides in Qamea and St Giles Hospital.	Enabling environment in place to partially implement the action.	Relevant actions are not all on track.	Decisions partially or inconsistently accounting for climate change projections.
15.A.2: Conduct comprehensive assessment of all Fiji's water and sanitation infrastructure and resources in order to meet current and future needs in light of climate change projections.....	Enabling environment in place to partially implement the action.	Relevant actions are not all on track.	Decisions partially or inconsistently accounting for climate change projections.
16.9: Expand Tree-Planting Campaign to encourage voluntary tree and/ or mangrove planting activities as part of school curricula, community stewardship, and Corporate Social Responsibility.	No enabling environment in place.	Relevant actions are not all on track.	Scope to increase low-regrets actions.

Likewise, to assess the achievements in implementation of adaptation measures, the framework includes an input, process-based (activity–output) and results-based (outcome–impact) analysis. Examples of the evaluation of achievements in implementing adaptation actions 15.A.2 and 16.9 are shown in table 7.2.

Table 7.2. Evaluation of achievements in implementing adaptation actions (Fiji's M&E framework for its NAP)

Achievements in implementing adaptation actions (January 2020)					
Adaptation action	Input	Process-based measures		Results-based measures	
		Activity	Output	Outcome	Impact
15.A.2: Conduct comprehensive assessment of all Fiji's water and sanitation infrastructure and resources in order to meet current and future needs in light of climate change projections.....	Joint nation-wide assessment of water and sanitation infrastructure by Water Authority of Fiji (for urban water supply networks) and Department of Water and Sewerage (for rural water supply systems).	Deployment of water, sanitation and hygiene (WASH) assets and infrastructure survey teams to visit all populated areas.	Amount of urban and rural WASH infrastructure prioritized for upgrading or replacement.	Comprehensive urban and rural WASH infrastructure inventory in place, with prioritization for necessary upgrading/ climate-proofing.	Resilient WASH services in operation during and following disaster events.
16.9: Expand Tree-Planting Campaign to encourage voluntary tree and/or mangrove planting activities—as part of school curricula, community stewardship and corporate social responsibility.	Ministry of Forestry to provide and/or facilitate access to seedlings and suitable land for school, community and/ or corporate tree-planting activities under national Tree-Planting Campaign.	Propagation of suitable and adequate tree species in government nurseries and allocation of land for planting.	Number of seedlings supplied to schools, community and/ or corporate tree-planting activities, and number of hectares of land allocated for tree-planting.	Schools, communities, and corporate bodies actively and voluntarily involved in national Tree-Planting Campaign activities.	Enhanced coastal protection and carbon sequestration.

Brazil's NAP foresees a four-year cycle of implementation with revisions after the last year of each cycle. One of the goals of the NAP was to develop and deploy the NAP M&E system. The report of progress highlights the process of monitoring and evaluating the implementation goals; identifying actions implemented by government partners in the framework of the NAP guidelines; recognizing synergies with other national policies and international frameworks (e.g. the SDGs and the Sendai Framework); and collecting and testing of information on adaptation carried out by the private sector.

During the reporting periods, Brazil's Ministry of Environment distributed information collection cards to the other ministries seeking better understanding of implementation actions in terms of the ministry's status, use of guidelines, responsibilities by areas and the relationship with the SDGs and other frameworks. Information collection cards also included goals, objectives, sectors of the NDC and, for each action, its status, cost, sources, responsible parties, deadlines, risks and risk control.

The M&E system of Brazil also comprised a consultation process with the business sector and its engagement in the NAP. Hence, a questionnaire was developed, covering companies' perceptions about the risks and impacts associated with climate change; companies' adaptation strategies and measures; and how the federal government can help the business sector in implementing the agenda.

The self-assessment by Brazil shows that the first cycle of the NAP achieved its main purpose of promoting better understanding about climate risk management, taking advantage of emerging opportunities, avoiding loss and damage, and building adaptation opportunities and instruments.

Peru's NAP incorporates an M&E system with different approaches, involving an aggregated set of indicators, indicators applicable to territories and sectors, and indicators of the plan. Within the system, the climate change adaptation management indicator is used for determining the adequacy of adaptation measures or processes in terms of transforming inputs into outputs (output – input). It measures annually the performance of the measures or processes for the achievement of the three specific priority objectives of the NAP.

The indicator on damage, alterations and losses due to the effects of climate change is classed as a result indicator (impact). It measures effectiveness and evaluates the achievement of the desired results through the products (products – results). Every five years it is used for assessing changes generated by the implementation of interventions, including the impacts on people (deaths, injuries, missing and affected) resulting from hazards associated with climate change, and the direct economic losses in sectors and in resources.

Lessons learned include the opportunity to accommodate the M&E system to the objectives of each NAP and to the existing capacities, potentially increasing their complexity over time in terms of the type of indicators, the levels of aggregation and the information coverage.

7.5. Institutional arrangements

Strong institutional arrangements are critical to enabling countries to provide reliable, comprehensive and regularly updated information that meets the requirements of the ETF, including the A-BTR, and serves national decision-makers and action-implementing stakeholders (CGE Handbook on institutional arrangements to support MRV/transparency of climate action and support, 2020).

According to the CGE, institutional arrangements can be organized around five components, can evolve over time, and comprise different agencies and stakeholders (see figure 7.5).

Figure 7.5. Key components of institutional arrangements

Source: CGE, 2020

Some countries have developed specific M&E institutional arrangements while others have climate governance applicable to climate change policies. In all cases, the following steps may be applied:

- Lay the foundations for reliable and regular data flows;
- Define data needs and data uses;
- Manage the delivery of the required data sets from a range of data providers on a regular basis;
- Continuously improve data access and data quality, and reduce uncertainty;
- Develop and maintain relevant data sets and databases including national statistics and government data; measurement data; and company reports and surveys;
- Manage historical data;
- Build linkages with other international frameworks such as the SDGs and Sendai Framework;
- Verify data compilation.

Table 7.3 reflects one possible tabular format for reporting data collection applicable to both mitigation and adaptation.

The quality and reliability of data are also key aspects for ensuring sustainable M&E systems and its improvement over time.

Table 7.3. Basic template for collating climate action data

Action ID	A unique ID for the action				
Title	A clear and descriptive title for the action				
Objective	The primary objective of the action				
Description	A detailed description of the action				
Action Type	Mitigation / Adaptation / Cross-cutting	**Adaptation Priority**	Low / Medium / High	**Mitigation Priority**	Low / Medium / High
Status of implementation	Planned / In progress / Implemented	**Start date**	The start date or expected start date for the action	**Full implementation date**	The date or expected date of implementation of the action
Sector category	Sectoral categories covered, mitigation and/or adaptation	**Institution responsible**	Institution responsible for monitoring the progress of the action	**Lead stakeholder**	Primary contact point(s) for the action
Activities covered	Activities included or excluded: e.g., for mitigation: gases, fuels; for adaptation: subsectors/activities	**Mitigation scenario**	With existing measures / With additional measures	**Type of policy instrument**	Economic / Fiscal / Voluntary agreements / Regulatory / Information / Education / Research / Project / Planning / Other
Estimated Action Costs	Cost of the action, including currency units	**Geographical area included**	Locations covered by the action (regions, cities, post codes, grid reference)	**Methodologies and assumptions**	Methodologies used to estimate impacts and costs
Constraints	Any constraints to completing the action			**Constraint type**	Financial / Technical / Human resources
Related SDGs	Any SDGs that the action addresses				
Related NDC target	Any targets in the NDC that the action addresses				
Related national strategies	Any national strategies that the action contributes to				
Wider impacts	Positive or negative wider impacts of the action outside the scope of the intended objectives				
Related challenges	Vulnerabilities or loss and damage that this action addresses				
Related Indicators	Linked indicators to track progress against project objectives, GHG mitigation or adaptation targets or wider impacts				
Expected results	Estimate of outcomes at different milestones based on the selected indicators for tracking progress				

Action support									
Name of supporter	**Status**	**Type of instrument**	**Type of funding**	**Recipient**	**Amount**	**Cost unit**	**Year**	**Description of support activity**	**Data source**
Name of the organization providing the support	Needed / Pledged / Committed / Received / Disbursed / Financial close	Financial (conditional grants, concessional loans, equity finance, export credit, grants, non-concessional loans) / Capacity-building / Technology support / General	Bilateral cooperation / Blended funding / Domestic funding / Multilateral cooperation	Organization(s) receiving the support	Value of the support	Unit or currency of support	The year in which the support was or will be provided	Type of support (mitigation, adaptation or cross-cutting), sectors covered, type of technology or equipment transferred	Source(s) of information that relate to this support

Source: CGE, 2020

Chapter 8: Information related to averting, minimizing and addressing loss and damage associated with climate change impacts

Decision 18/CMA.1 MPGs

G. Information related to averting, minimizing and addressing loss and damage associated with climate change impacts

Paragraph 115. *Each interested Party may provide, as appropriate, information related to enhancing understanding, action and support, on a cooperative and facilitative basis, to avert, minimize and address loss and damage associated with climate change impacts, taking into account projected changes in climate-related risks, vulnerabilities, adaptive capacities and exposure, including, as appropriate, on:*

(a) Observed and potential climate change impacts, including those related to extreme weather events and slow onset events, drawing upon the best available science;
(b) Activities related to averting, minimizing and addressing loss and damage associated with the adverse effects of climate change;
(c) Institutional arrangements to facilitate the implementation of the activities referred to in paragraph 115(b) above.

8.1. Introduction to the element

As affirmed in the AR6, hazards, exposure and vulnerability linked to climate change, generate impacts and risks that can surpass the capacity for adaptation and result in loss and damage. Equally, lower levels of global warming would avoid some of the limits to adaptation, and reduce economic and non-economic loss and damage. Current global warming has already caused widespread loss and damage that is unequally distributed, generating effects that are exacerbating pre-existing poverty and vulnerability, particularly in developing countries (see figure 8.1).

Residual risks will continue to rise alongside further global warming. Although comprehensive risk management and adaptation measures may limit loss and damage, the latest science as synthesized in the IPCC AR6 is clear that loss and damage is not fully avoidable through mitigation and adaptation responses, increasing the strategic relevance of loss and damage.

The Paris Agreement recognizes the importance of averting, minimizing and addressing loss and damage associated with the adverse effects of climate change, including extreme weather events and slow onset events, and the role of sustainable development in reducing the risk of loss and damage.

Article 8, paragraph 4, of the Paris Agreement identifies the following areas of cooperation and facilitation to enhance understanding, action and support:

- Early warning systems;
- Emergency preparedness;
- Slow onset events;

- Events that may involve irreversible and permanent loss and damage;
- Comprehensive risk assessment and management;
- Risk insurance facilities, climate risk pooling and other insurance solutions;
- Non-economic losses;
- Resilience of communities, livelihoods and ecosystems.

8.2. Institutional progress under the Convention and the Paris Agreement

The COP 19 established the Warsaw International Mechanism for Loss and Damage associated with Climate Change Impacts (WIM) to address these matters, including extreme events and slow onset events, in developing countries that are particularly vulnerable to the adverse effects of climate change.

The main functions of the WIM are:

- Enhancing knowledge and understanding of comprehensive risk management approaches to address loss and damage;
- Strengthening dialogue, coordination, coherence and synergies among relevant stakeholders;
- Enhancing action and support, including finance, technology and capacity-building.

COP 19 also established the WIM Executive Committee to guide the implementation of these functions of the WIM. Related institutional developments include establishing five thematic expert groups as listed below.

- Expert group on slow onset events;
- Expert group on non-economic losses;
- Technical Expert Group on Comprehensive Risk Management;
- Task Force on Displacement;
- Expert group on action and support.

The Santiago network, established by decision 2/CMA.2 (COP 25), brings together relevant organizations, bodies, networks and experts with the aim of implementing approaches for averting, minimizing and addressing loss and damage at the local, national and regional level in developing countries that are particularly vulnerable to the adverse effects of climate change. The functions of the Santiago network were agreed at COP 26; namely, to facilitate the provision of needs-based technical assistance in developing countries. And at COP 27 the institutional arrangements of the network and the process to select a host were decided. The WIM Executive Committee annual reports published in 2021 and 2022 include information on the progress in terms of providing technical assistance under the Santiago network. Until the Santiago Network becomes fully operational, the UNFCCC secretariat has been requested to provide support for developing countries that are particularly vulnerable to the adverse effects of climate change that may seek to benefit from technical assistance available.

Fiji Clearing House for Risk Transfer, as a repository of information on insurance and risk transfer, seeks to catalyse action and support by non-state actors, in particular the insurance industry, by connecting countries' needs with providers of solutions. The Fiji Clearing House provides several tools for achieving its aims, such as Risk Talk – a tool to build an interactive

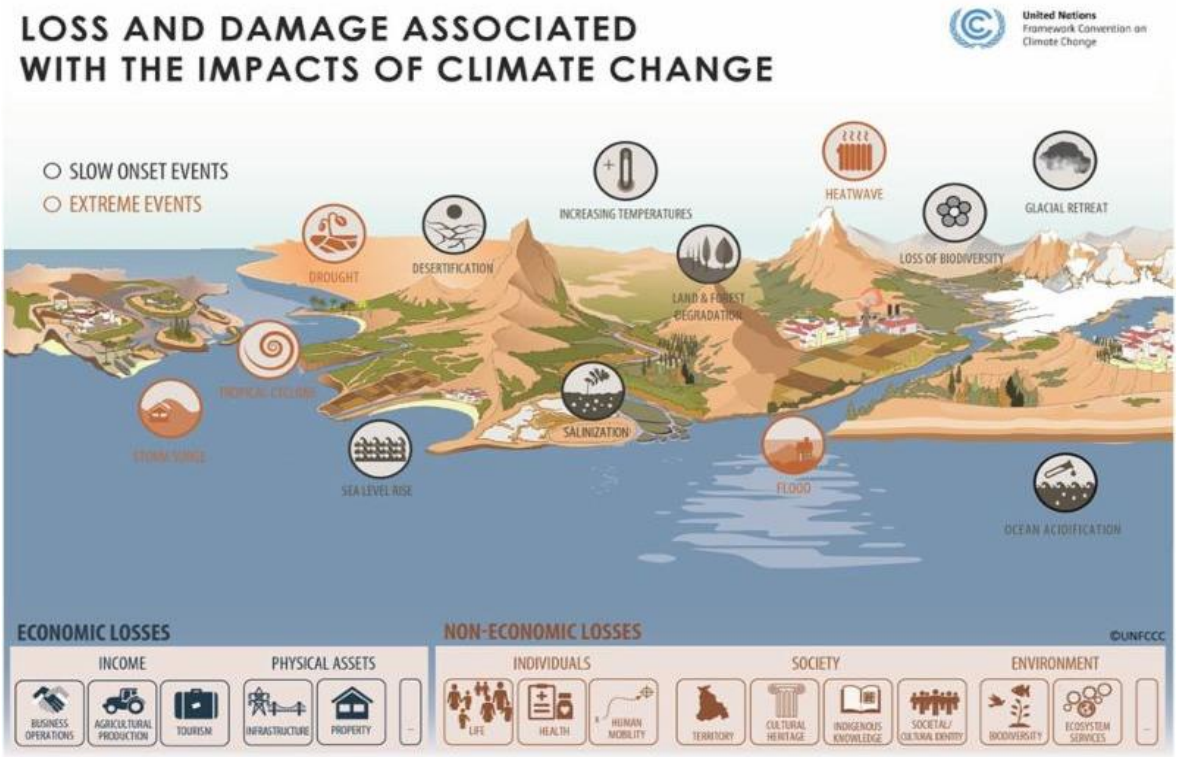
online community that provides the opportunity to make questions and receive specific solutions – and a knowledge centre providing publications, case studies, funding opportunities and tutorials.

COP 26 established the Glasgow Dialogue between Parties, relevant organizations and stakeholders to discuss the arrangements for funding activities to avert, minimize and address loss and damage associated with the adverse impacts of climate change. The dialogue takes place in the first sessional period of each year of the Subsidiary Body for Implementation (SBI), starting at SBI 56 and concluding at SBI 60 (June 2024).

Averting, minimizing and addressing loss and damage is a complex challenge that requires multidisciplinary interventions (see figure 8.2 for examples of different aspects of interplay). Accordingly, approaches for responding to the loss and damage associated with climate change impacts comprise a mosaic of solutions and risk management options for addressing the specific contexts, concerns or priorities of the affected countries and communities. Assistance for developing countries under the WIM are currently clustered in the following strategic workstreams: non-economic losses; comprehensive risk management approaches; human mobility; action and support; and slow onset events (see figs 8.1–8.2).[10]

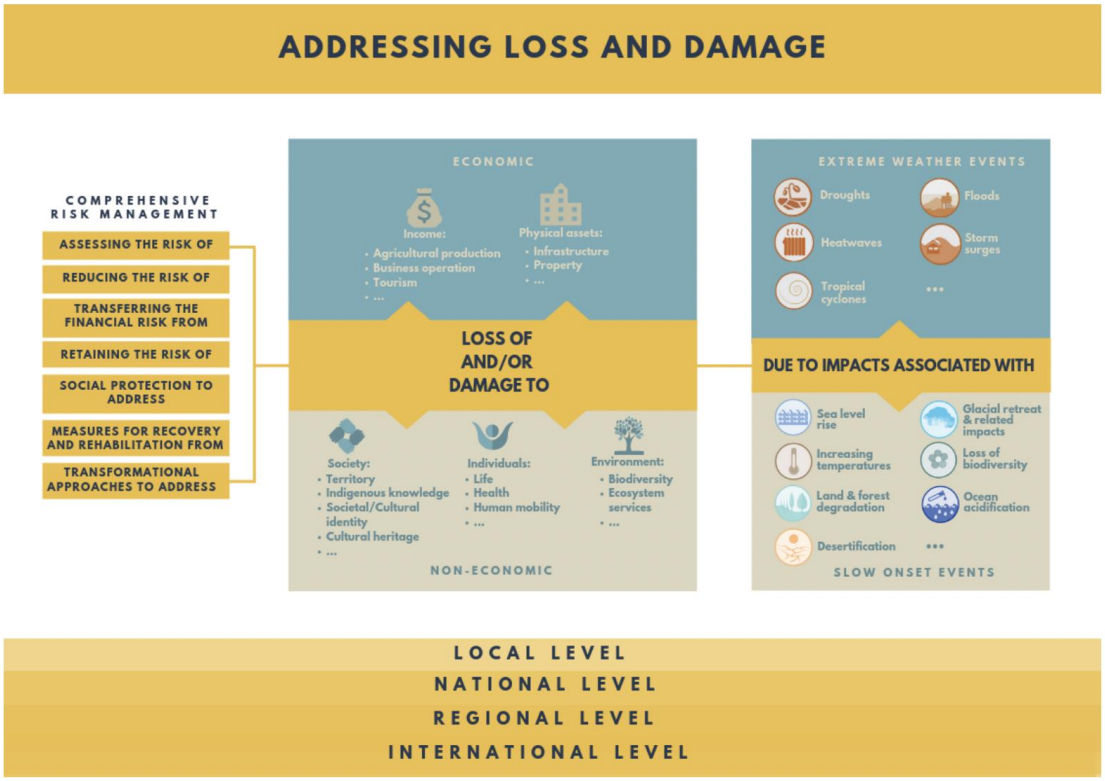
The recent Synthesis report for the technical assessment component of the first global stocktake prepared by the WIM Executive Committee provides a status of the efforts and collective progress in each of these aspects.

Figure 8.1. Overview of loss and damage associated with the impacts of climate change



[10] More information on the approaches to address loss and damage is available at https://unfccc.int/topics/adaptation-and-resilience/workstreams/approaches-to-address-loss-and-damage-associated-with-climate-change-impacts-in-developing-countries#Non-economic-losses.

Figure 8.2. General typologies of approaches to address loss and damage



Source: Technical Paper on Elaboration of the sources of and modalities for accessing financial support for addressing loss and damage, UNFCCC, 2019

Moreover, an increasing number of Parties, in particular developing countries, included loss and damage related considerations and response options in their NDCs.

Box 8.1. Loss and damage in updated and second NDCs

A study by Ryder and Calliari (2021) assessed the latest 164 NDCs recorded in the interim NDCs registry as at 15 September 2021, including 86 updated or second NDCs, and concluded that:

- 32 per cent of the latest NDCs mentioned loss and damage (54 out of 164);
- 54 per cent of NDCs mentioning loss and damage belong to SIDS and LDCs;
- Asia-Pacific and Latin America and the Caribbean are the regions that mention loss and damage the most (38 and 40 per cent respectively);
- The majority of NDCs that mention loss and damage refer to physical and economic loss and damage, but the most recent submissions are also focusing on non-economic losses;
- An increasing number of countries introduced specific approaches to respond to loss and damage such as data gathering, analysis and assessment, institutional set-up, loss and damage financing systems and risk transfer mechanisms.

The latest version of the synthesis report prepared by the UNFCCC Secretariat on the NDCs (FCCC/PA/CMA/2022/4) states that a few Parties (3 per cent) indicated capacity-building needs for addressing loss and damage as an independent pillar in their NDCs. At the same time, of the 30 NDCs submitted in 2022, at least 18 include either considerations or sections on loss and damage; almost all were submitted by developing country Parties.[11]

[11] Bahamas, Bolivia (Plurinational State of), Brazil, Dominica, El Salvador, Equatorial Guinea, Guatemala, Haiti, Indonesia, Mexico, Serbia, Sudan, Thailand, Timor-Leste, Uganda, Uruguay, Vanuatu and Viet Nam. The NDCs are available at https://unfccc.int/NDCREG.

8.3. Models, methodologies, initiatives and good practice

There is a mixture of long-established disaster-related methods developed within the disaster risk reduction community, as well as new approaches already developed within the context of Article 8 of the Paris Agreement, as briefly introduced in this section, to respond to loss and damage.

8.3.1 Disaster Assessment Guidelines from ECLAC

The United Nations Economic Commission for Latin America and the Caribbean (ECLAC) (also known using the Spanish acronym, CEPAL) initially developed a methodological approach for disaster assessment in the 1990s using more than 20 years of previous experience in disaster assessment across the region. This methodology has been further refined, and the most recent version of the Disaster Assessment Guidelines was published in 2014. The methodology has now been applied in more than 90 disaster assessments within the 28 countries in the region and with the support of the World Bank in more than 40 countries outside Latin America and the Caribbean.

The methodology established procedures for estimating the effects and impacts of disasters from a consistent accounting perspective. This innovation allows for a clear separation of additional loss and damage concepts, and makes it possible to integrate and systematize interlinkages from different sectors of the economy, as well as cross-cutting issues such as gender and environment.

The Disaster Assessment Guidelines 2014 discusses frameworks and methodological aspects under sectors including: social (including population, education, health, housing, culture and cultural heritage); infrastructure (including transport, water and sanitation, energy); economy (including agriculture, forestry and fisheries, industries, commerce and tourism); and cross-cutting issues, such as macroeconomics and environment.

The consistency and wide use of the methodology has made it possible to aggregate regional assessments across years. In this regard, in 2012 ECLAC made an aggregated assessment of disasters in 1972–2010, accounting for USD 150 billion in damage and losses amounting to USD 62 billion, where more than half of the loss and damage was due to climate-related events such as hurricanes, drought and flooding.

8.3.2 Desinventar Sendai

Also from Latin America and the Caribbean region, this network of academic, social organizations and the private sector that focuses on social studies of disaster prevention in Latin America was established in the 1990s and developed a project called “Disaster inventory in Latin America” (Desinventar). The network discussed and agreed conceptual frameworks and analytical methodologies that provided communities with a methodological guideline for collecting and systematizing data from large, medium and small disasters at the national, subnational and local level.

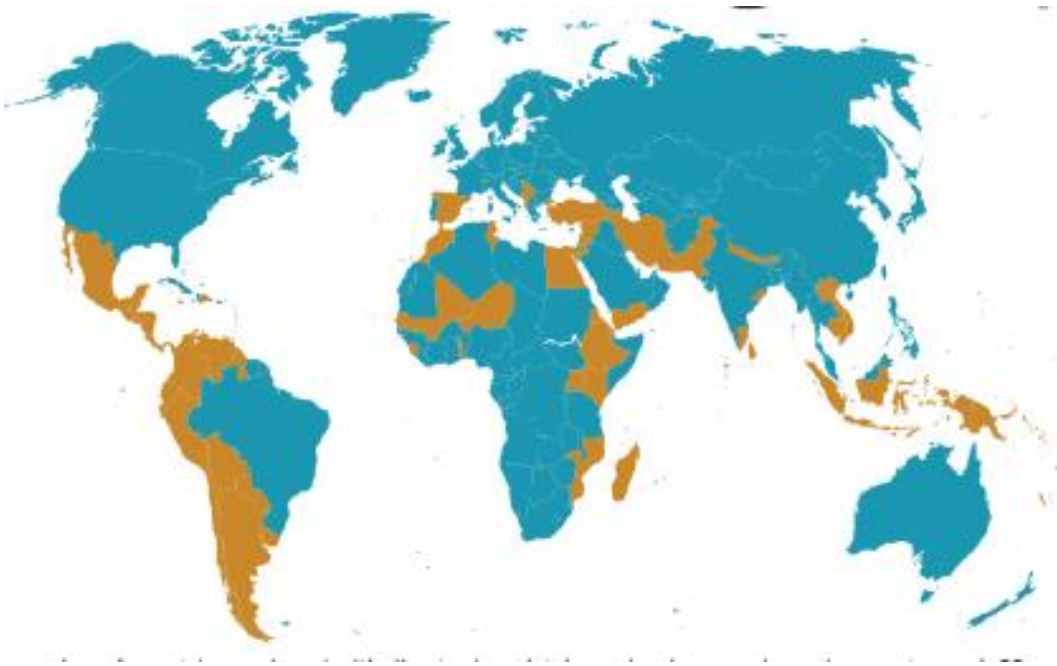
In the context of the development of the Sendai Framework for Disaster Risk Reduction 2015–2030, and with the support of the United Nations Development Programme (UNDP) and the

United Nations Office for Disaster Risk Reduction (UNDRR), the network further developed the methodological guideline and provided free open-source software and manuals on collecting data in an integrated database as well as performing different queries in the database.

The Desinventar Sendai open-source methodology and software permits the homogeneous capture, analysis and graphical representation of information on disaster occurrence and loss. The information compiled and processed can be presented at different timescales and is referenced to a relatively small geographic unit.

According to Desinventar and UNISDR, disaster loss databases are essential for countries to report on targets under the Sendai Framework, which refer to the imperative of reducing disaster losses and impacts. Accounting for losses allows countries to monitor progress against such targets, and can be used as a powerful risk knowledge tool. As for 2016, 89 countries had developed disaster loss databases using this methodology (see figure 8.3).

Figure 8.3. Countries including disaster loss databases



Source: ***Desinventar, 2016***

8.3.3 Handbook for assessing loss and damage in vulnerable communities

In 2017, Van der Geest and Schindler of the United Nations University Institute for Environment and Human Security (UNU-EHS) developed a Handbook for assessing loss and damage in vulnerable communities, with the support of the Asia-Pacific Network for Global Change Research. This publication is primarily concerned with assessing loss and damage in poor, rural areas that are vulnerable to the effects of climate change. The scale of the assessment is at community level; however, the methods can be scaled up for regional or national assessments.

The handbook divides the assessment of loss and damage in vulnerable communities into seven research domains: (1) climatic stressors and perceptions of climatic change; (2) livelihood vulnerability; (3) preventive risk reduction measures; (4) loss and damage related to the impacts of climatic events and changes that actors have not been able to avoid through preventive risk reduction measures; (5) adaptation to climatic changes and their impacts; (6) coping with impacts of climate-related events; and (7) loss and damage related to the costs and adverse side effects of coping and adaptation measures adopted in response to climatic stressors.

The handbook presents different research tools and instruments for studying these seven research domains, including a household questionnaire, which is the principal tool used in the loss and damage assessment. The other tools discussed in the handbook focus on specific domains and have different perspectives and levels of detail. For example, the "participatory evaluation of planned adaptation exercise" looks specifically at the effectiveness of planned adaptation and relief interventions. The personal stories of loss and damage are based on in-depth open interviews with individuals who have experienced climate-related disasters.

The methodology involves conducting a desk study prior to the fieldwork to gain knowledge of the study area, the prevalent climatic stressors and livelihoods, and the specific adverse event or disaster that occurred. This is done through the study of prior research, "grey literature" (e.g. government reports) and online data. Other methods deployed include "participatory rural appraisal" such as focus group discussions, which serve to enhance the researchers' understanding of the dynamics between key research concepts at the onset of the research.

The handbook also includes lessons learned from three case studies in India, Nepal and Pakistan.

8.3.4 Economic integrated assessment models

A significant number of tools and reports address the financial dimension of climate-related loss and damage, including its recognition by multilateral climate change funds, bilateral climate finance support and multilateral development banks.

Economic integrated assessment models (IAMs), which are used for calculating economically optimal responses to climate change mitigation and adaptation in terms of maximizing welfare (i.e. gross domestic product (GDP)) into the future, are discussed in a chapter by Anil Markandya and Mikel González-Eguino, from the Baque Center for Climate Change, titled "Integrated Assessment for Identifying Climate Finance Needs for Loss and Damage: A Critical Review", in *Loss and Damage for Climate Change. Concepts, Methods and Policy Options* (Mecher et al., 2019).

The authors interpret modelled residual damages as unavoided loss and damage, and conclude:

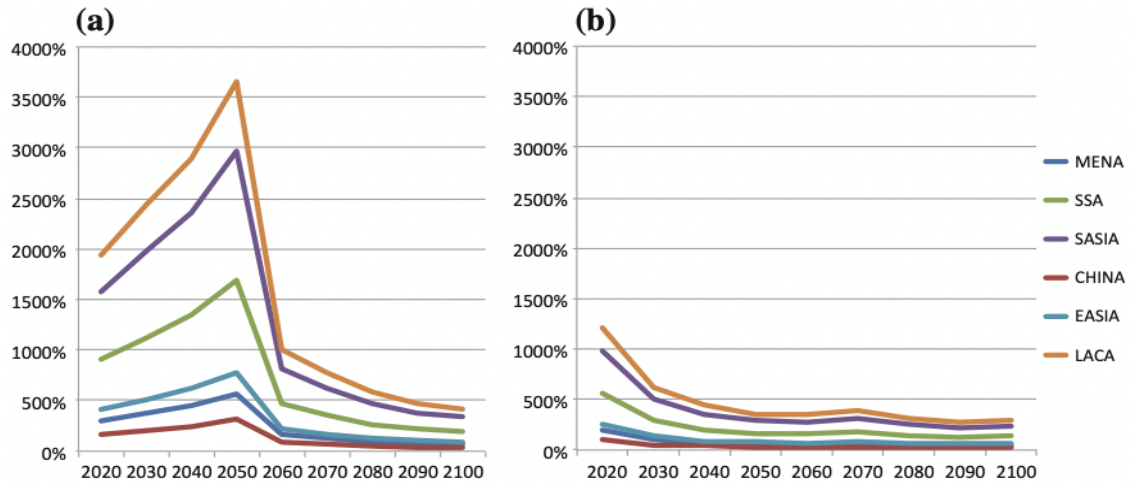
> …first: that residual damages turn out to be significant under a variety of IAMs, and for a range of climate scenarios, this means that if adaptation is undertaken optimally, there will remain a large amount of damages that are not eliminated; second, the ratio of adaptation to total damages varies by region, so residual damages also vary for that reason; third, residual

damages will depend on the climate scenario as well as the discount rate and the assumed parameters of the climate model as well as those of the socioeconomic model.

Also, the authors noted that the level and structure of current limited financial resources is likely to result in adaptation that is significantly below the optimal level and thus likely to result in significant loss and damage.

Their chapter presents the underlying analytics, and reviews the estimates of total climate change damage in the economic IAM literature for different mitigation scenarios as a basis for calculating residual damages (an example is shown in figure 8.4). It also discusses the uncertainties surrounding these estimates and provides interval estimates by region and (where possible) by country for selected countries.

Figure 8.4. Residual costs as a percentage of adaptation costs: (a) low damage/high discount rate; (b) high damages/low discount rate (in 2005 USD billion)



Source: Markandya and Gonzalez-Eguino, 2019

8.3.5. OECD report on approaching climate-related loss and damage from a risk management perspective

The OECD report *Managing Climate Risks, Facing up to Losses and Damages* (2021), which seeks to contribute to the debate on policy and financial instruments, focuses on three types of hazard: (1) slow-onset changes; (2) extreme events; and (3) tipping points, their associated risks of loss and damage, and the potential for cascading impacts. Achieving the Paris Agreement temperature goal and carbon neutrality is at the heart of the report, as is risk management and reduction through policy, finance and technology.

8.3.6. Additional resources

Some latest additional resources also include the following:

- Compendium on comprehensive risk management approaches, WIM ExCom Technical Expert Group on Comprehensive Risk Management
- OECD report “Building Financial Resilience to Climate Impacts”

- Post Disaster Needs Assessments, GFDRR/UNDRR
- Technical Guidance on Comprehensive Risk Assessment and Planning in the Context of Climate Change, UNDRR

8.4. Types of information and data needed to report on loss and damage

Paragraph 115 of the MPGs gives a well-defined scope for reporting information related to averting, minimizing and addressing loss and damage associated with climate change impacts. The scope is divided into two main areas, item (a) in relation to information on observed and potential climate change impacts and item (b) on loss and damage related activities, together with item (c), the institutional arrangements that facilitate such activities.

Regarding item (a), the MPGs describe the reporting scope as "Observed and potential climate change impacts, including those related to extreme weather events and slow onset events, drawing upon the best available science." In this regard, Parties may provide information on impacts using best available science, for example by using the different methodologies and tools presented in section 8.3 above, and the references on impact assessments in section 3.2 above.

Regarding items (b) and (c) the MPGs describe the reporting scopes as "activities related to averting, minimizing and addressing loss and damage associated with the adverse effects of climate change" and "institutional arrangements to facilitate the implementation of such activities", respectively. Such activities may include early warning systems; emergency preparedness; comprehensive risk assessment and management; risk insurance facilities, climate risk pooling and other insurance solutions; and increasing the resilience of communities, livelihoods and ecosystems. The MPGs also refer to activities that relate to slow onset events, which may involve irreversible and permanent loss and damage and/or non-economic losses.

Regarding institutional arrangements, Parties may wish to indicate the existence of specific institutions and/or institutional frameworks for developing such activities (see, for example, references on how to report on institutional arrangements in sections 2.2.2.1 and 7.5 above).

In addition, Puig et al. have developed a policy brief on types of information that can be reported on loss and damage under the ETF (DTU, UCL, ICCCAD, 2019). These elements can be included, on an additional voluntary basis, in the context of the loss and damage element of the A-BTR, as summarized in box 8.2 below.

Box. 8.2. Types of information to report on loss and damage in the under the ETF (based on Puig et al, 2019)

Measurements. These may include databases of vulnerabilities, impacts, and loss and damage metrics, and could involve quantitative and qualitative data. Measurements can be gathered through different tools in a stand-alone approach or integrated-articulated way; such tools can include surveys and questionnaires, appraisals, interviews, literature review and so on.

Costs. Most estimates focus on direct costs, but including indirect costs may be also necessary. A number of estimates of the costs of loss and damage have been put forward; however, these estimates are partial, in that they cover only selected aspects of loss and damage. They are also uncertain, mainly because of data shortcomings and the long time-horizons associated with slow-onset events. Estimates of costs should cover

not only typical costs such as infrastructure, but also policy planning and implementation costs. Ex ante costs should be taken into consideration (preventive measures), but so should the costs associated with the reconstruction, recovery and rehabilitation, including economic and non-economic losses.

Policies. Given the relatively recent institutionalization of loss and damage under the UNFCCC, few countries have set up explicit domestic strategies, policies, plans and actions to manage loss and damage. In the event of having this type of arrangement, it is important to report it, as well as the mainstreaming efforts.

Finance* and capacities. COP27 made progress on finance for responding to loss and damage by establishing new funding arrangements, including a fund, for assisting developing countries that are particularly vulnerable to the adverse effects of climate change, in responding to loss and damage. Recognizing the wide range of sources of support relevant to loss and damage, the new arrangements complement and include sources, funds, processes and initiatives under and outside the Convention and the Paris Agreement. Parties may choose to report on finance and capacity issues related to loss and damage. In this regard the A-BTR also represents an opportunity to collect information related to loss and damage, as reported by Parties.

*This item has been modified from the original concepts included in the Puig et al. source document, due to the loss and damage outcomes achieved during COP 27.

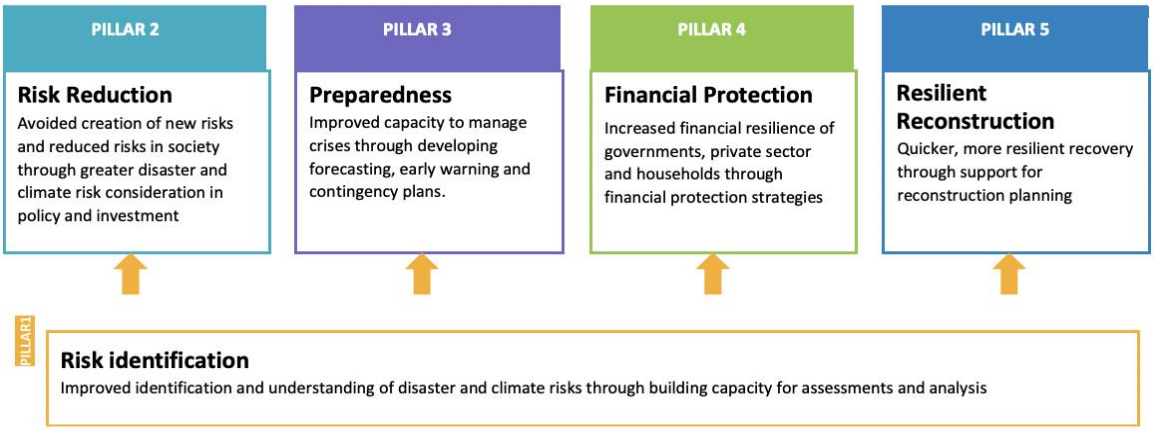
8.5. Examples of information on loss and damage

Sri Lanka's updated NDC included a loss and damage chapter identifying extreme weather events and associated loss and damage, such as droughts in 2011 and 2016, and major floods and landslides in 2011, 2014, 2016 and 2017.

Information on loss and damage is mostly focused on different tools including the Desinventar database; current projects under the Climate Resilience Multiphase Programmatic Approach supported by the World Bank and the Improving Meteorological Observation, Weather Forecasting and Dissemination Project supported by the Japan International Cooperation Agency (JICA); and post-disaster needs assessment work.

Sri Lanka's climate-related loss and damage management approach is consistent with the World Bank's disaster risk management framework (see figure 8.5). This approach allows the country to understand the full spectrum of risk.

Figure 8.5. An operational framework for managing climate and disaster risk



Source: World Bank, 2013

It also includes a set of five actions with different timelines: (1) gap analysis to assess the current status and understanding of loss and damage; (2) strengthening the existing weather and climate forecasting system; (3) improving data management systems to record loss and damage per sector; (4) establishing an overarching nationally appropriate functional institutional mechanism for loss and damage; and (5) developing a comprehensive risk management framework.

Malawi's updated NDC uses the NAP framework to identify annual average losses of 1.7 per cent of its GDP due to disasters related to climate change, particularly floods and drought. The Global Facility for Disaster Reduction and Recovery conducted an economic vulnerability and disaster risk assessment that calculated an average loss of 0.7 per cent of GDP per year as a result of annual flood damage in the Shire River Basin as well as an average economic loss of 1 per cent of GDP annually due to drought.

According to the Department of Disaster Management Affairs of Malawi, almost 870,000 people were affected in March 2019 by floods associated with Tropical Cyclone Idai, with 60 people dead, 3 missing, 672 injured and over 87,000 displaced.

In a similar manner to Sri Lanka, Malawi associates climate change loss and damage with the Sendai Framework strategies, seeking to achieve substantial reduction of disaster risk and losses in lives, livelihoods and health and in the economic, physical, social, cultural and environmental assets of people, businesses and communities.

As with the other examples mentioned in this section, Guatemala's NC3 integrates disaster reduction through the National Strategy for Disaster Risk Reduction, the Sendai Framework, the SDGs and the Paris Agreement.

Guatemala's NC3 includes a loss and damage section identifying the main economic sectors and activities affected by extreme weather events. For example, the country ranks 16th out of 180 in terms of economic losses and deaths due to extreme weather events according to the Climate Risk Index from 2000 to 2019. Likewise, it affirms that it has accumulated economic losses of more than USD 250 trillion in the last decade. Guatemala calculates economic losses by number and type of extreme weather events for 1980–2019 (see figure 8.6).

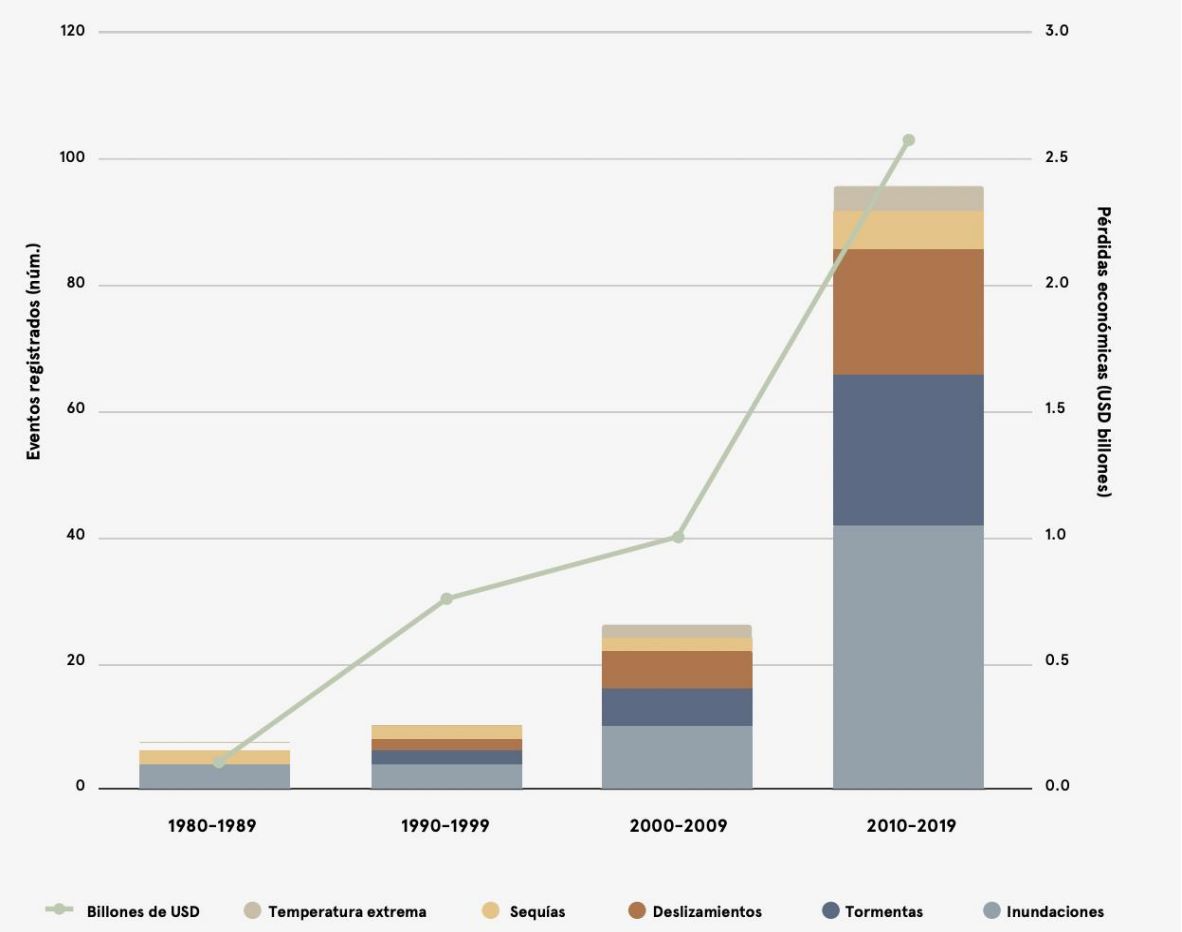
As it is clear from figure 8.6, both the number of events of floods, droughts, storms and landslides, and the monetary cost of those losses, has increased during the period.

Taking the extreme rain events from 1998 to 2020, Guatemala also calculated the economic losses, the number of people affected and mortality. In turn, it estimated the economic impact of the disaster caused by Storm Agatha (USD 989.7 million) and E12 (USD 343.9 million), by sector and subsector.

In addition, ECLAC (2018) estimated the accumulated cost of the impact of climate change for the agricultural sector, water resources, biological diversity and extreme events in Guatemala for 2020, 2030, 2050, 2070 and 2100. When using a discount rate of 0.5 per cent, the cost of climate change in the four aspects by 2030 would be between 3.3 and 4.3 per cent of the GDP of 2008. The cost would increase year on year, accelerating from 2050 to 2100, when it would reach between 37.7 and 63.6 per cent. If there were a 10 per cent increase in the intensity of extreme events compared with the trajectory observed in the last four decades,

the accumulated costs by 2100 would be doubled and would have a long-term growth trajectory.

Figure 8.6. Number and type of extreme weather events and economic losses derived from events in Guatemala, 1980–2019



Chapter 9: Cooperation, good practices, experience and lessons learned

Decision 18/CMA.1 MPGs

H. Cooperation, good practices, experience and lessons learned

Paragraph 116. *Each Party should provide the following information, as appropriate, related to cooperation, good practices, experience and lessons learned:*

(a) Efforts to share information, good practices, experience and lessons learned, including as they relate to:
(i) Science, planning and policies relevant to adaptation;
(ii) Policy innovation and pilot and demonstration projects;
(iii) Integration of adaptation actions into planning at different levels;
(iv) Cooperation to share information and to strengthen science, institutions and adaptation;
(v) Area, scale and types of cooperation and good practices;
(vi) Improving durability and effectiveness of adaptation actions;
(vii) Helping developing countries to identify effective adaptation practices, needs, priorities, and challenges and gaps in a way that is consistent with encouraging good practices;

(b) Strengthening scientific research and knowledge related to:
(i) Climate, including research and systematic observation and early warning systems, to inform climate services and decision-making;
(ii) Vulnerability and adaptation;
(iii) Monitoring and evaluation.

9.1. Introduction to the element

The "Draft supplementary guidance for voluntary use by Parties in communicating information in accordance with the possible elements of an adaptation communication" (AC22/GUID/6B) explains that "good practices can be understood as actions taken by Parties and other actors that have demonstrated success in relation to adaptation and the potential to be replicated. Lessons learned may refer to insights and experience from past adaptation activities that should be taken account when pursuing future activities, such as information about what has or has not worked well when designing or implementing adaptation."

Cooperation on enhancing adaptation at the national, regional and international level is another element of the ADCOM to be considered under implementation of adaptation actions and plans: "It may refer to research collaboration, technology transfer, knowledge-sharing, financing and capacity-building cooperation between different actors such as government agencies at different levels, United Nations and other intergovernmental organizations, multilateral development banks and research institutions."

Potential overlaps must be identified in the information, avoiding duplications and, whether or not a Party decides that the A-BTR is the ADCOM vehicle, the A-BTR can be used as a cross-reference resource and it can build on the basis of what is already communicated or reported, as necessary.

Other potential overlaps arise in cases where the subitems of paragraph 116 of the MPGs are already incorporated in other elements of the A-BTR, such as monitoring and evaluation; integration of adaptation actions into planning; effectiveness of adaptation action; and vulnerability and adaptation. However, the subheadings include some aspects that should be carefully considered since, for example, information provided should not just be about M&E but how it is applied to scientific research and knowledge.

The NAP Guidelines refer to facilitating outreach at the national level and promoting international cooperation, and elaborate on promoting sharing of experiences and good practice in adaptation planning at the regional and international level as part of the launching of the NAP process. One of the main points made is the promotion of synergies with other multilateral environmental agreements, including the three Rio Conventions and other multilateral environmental agreements. National institutional arrangements can be considered to benefit from these synergies, such as the establishment of an inter-institutional body or a coordination mechanism.

The “Guidelines for the preparation of national communications from Parties not included in Annex I to the Convention” (decision 17/CP.8) also refer to cooperation, in particular, the promotion of South–South cooperation.

It should be noted that the information provided by the MPGs includes aspects that may be more innovative in the context of this element (i.e. cooperation, good practices, experience and lessons learned) and oriented towards science and innovation (see MPGs, para. 116(a)(i–ii)). This section may therefore be the right place to provide more context regarding the relationship between science and policy when planning, implementing and monitoring adaptation policy at the national level, including permanent or ad hoc institutional mechanisms for such collaboration.

Likewise, reporting on research and systematic observation is already part of the NCs, including reporting on participation in and contributions to activities and programmes of national, regional and global research networks and observation systems.

The integration of adaptation actions into different levels of the planning process can be described in this section of the A-BTR, generating a more elaborated narrative on how adaptation strategies and policies are articulated at the local, national, regional and transboundary level.

9.2. Regional synthesis of climate-resilient development

The IPCC AR6 synthesizes regional knowledge on how to achieve climate-resilient development, departing from geographic heterogeneity in regional responses of common climate variables as a path to understanding cooperation and promoting sharing experiences and lessons learned. It also provides a synthesis of national development indicators, aggregated to the regional level.

The climate analysis provided in the AR6 reveals that significant variations occur in regional temperature, rainfall and sea surface temperatures for different global regions, as a function of the baseline climatology of each region. This means common indicators of development highlight the diversity of contexts experienced by different global regions, and can therefore

identify what can be considered a challenge and what an opportunity. In many cases, governance, institutions, economic development, capacity and social and cultural factors may be understood as challenges within regions. Some opportunities also arise to pursue climate resilient development, including social protection programmes, economic diversification, investing in education and human capital development, and expanding disaster risk reduction efforts.

9.3. Models, methodologies, initiatives and good practice

The Urban Adaptation Support Tool aims to assist cities, towns and local authorities in developing, implementing and monitoring climate change adaptation plans.

This tool is similar to the NAP Guidelines and is based on lessons learned at different scales:

- Step 1 introduces elements for laying the foundation for a successful adaptation process, such as high-level support; available information; adequate coordination mechanisms and clear roles and responsibilities; financing and funding opportunities; and stakeholder cooperation and awareness;
- Step 2 consists of a risk assessment, including identifying specific reasons for vulnerability. In this step it is important to consider what is happening in the surrounding cities and towns;
- Step 3 invites users to develop a detailed plan of action, identifying how, when and by whom specific adaptation measures should be implemented. At this stage, there is a set of good practice examples available for evaluation and consideration;
- Step 4 invites users to prioritize potential actions on the basis of detailed information and criteria according to each context, for example, with a cost–benefit analysis;
- Step 5 consists of implementation of adaptation actions and usually guided by a dedicated adaptation strategy and an accompanying action plan;
- Step 6 includes monitoring and evaluation to regularly assess the progress of planned actions and check the actual outcomes against the objectives that were set out when developing the strategy.

The Adaptation Research Alliance has published an evidence review on good practice for adaptation action research (AR). In the report, AR is considered a research methodology whereby researchers aim to improve the situation and context in which they are immersed as well as acquiring knowledge. Thus, collaboration between researchers and communities is a key feature of AR, which is seeking to overcome traditional barriers by fostering collaborative and equitable partnerships. AR is also transdisciplinary, bringing researchers from different fields and community members together to co-develop scientific evidence into new interventions.

With a view to pursuing AR through collaborative processes, the Adaptation Research Alliance developed a set of principles (see figure 9.1) to overcome the barriers in adaptation research, such as a disconnect between research and the needs of the most vulnerable, or limited learning from implementation. The twenty projects and initiatives included in its report exemplify the principles, even when their application was unintentional.

The report considers adaptation action to be intertwined with demand- and needs-driven AR and provides as a case study the Rosario Urban Agriculture Programme, which was started by the Municipalidad de Rosario, Argentina, after the economic crisis in 2001. At the

beginning, the project aimed to relieve poverty and hunger, with the local actor beginning to turn abandoned spaces within the city into agricultural farmland. The demand on open spaces evolved, and scientific research pointed out the potential of expanding the programme into vacant and underutilized urban land for agricultural production. As a result of the scientific research, the municipality granted temporary tenure of farmland to the urban poor. The green spaces of urban farmland helped to absorb stormwater during heavy rains in 2007 and, since the city already had an inventory of available land, two additional green vegetable gardens opened, strengthening the city's resilience against flooding. The agriculture programme has expanded considerably during its twenty years of operation, as an adaptation measure and as a case of co-development of solutions based on AR.

Figure 9.1. Principles of adaptation research for impact

1	Research is needs-driven, solutions-oriented and leads to a positive impact on the lives of those at risk from climate change (Who or what is the research for?)
2	Research is transdisciplinary and co-produced with users (How should research be carried out?)
3	Research emphasises societal impact (How is research valued?)
4	Research builds capacity and empowers actors for the long term (What can research enable?)
5	Research processes address structural inequities that leads to increased vulnerability and reduced adaptive capacity of thos at risk (How can research address some root causes of risk?)
6	Learning-while-doing enables adaptation action to be evidence-based and increasingly effective (How can research–action links be strengthened?)

Source: ARA (2021b)

A document prepared in the context of the Arctic Environment Ministers Meeting in 2018 compiles examples of national best practices and solutions employed by the Arctic Council Member States with potential to be replicated in other Arctic States. The examples are drawn from Canada, Finland, Iceland, Norway, Russian Federation, Sweden and the United States.

For example, adaptation and climate resilience is one of the four pillars of the Pan-Canadian Framework. One of the initiatives conducted under this pillar by Canada included the launch of an Indigenous Community-Based Climate Monitoring programme to support indigenous peoples in developing climate impact monitoring projects and initiatives. Another initiative is the development of a Northern Adaptation Strategy, which will identify priorities for action on climate change in the North.

The report also refers to expertise in providing climate and weather services, as well as forecasting and observing ice conditions and operating in various kinds of ice situations, including those relating to the prevention of ice and slush ice flood risks and oil spills. It mentions that Arctic forecasts can be further improved through cooperation between countries.

In particular, transboundary cooperation is a key opportunity for risk management in the Arctic. There are several examples, such as the Finnish–Swedish Transboundary River Commission promoting cooperation between the countries on water issues and developing environmental cooperation in the transboundary river area, as well as the regulation efforts of Finland, Russian Federation and Norway in Lake Inarijärvi to promote climate change adaptation, preserve biodiversity and prevent pollution in the frontier water areas.

As part of its adaptation-related support to LDCs, the LEG prepares periodic reports to showcase best practices and lessons learned by the LDCs, including the processes of formulating and implementing NAPs; integrating adaptation into development planning; establishing effective institutional arrangements; engaging stakeholders; assessing and managing climate risk and vulnerability; and addressing capacity gaps and needs in the process to formulate and implement NAPs.

Figure 9.2 provides an example of initiating and launching a NAP, including the role of the focal points and lead institutions in the process, and the importance of establishing a baseline as well as understanding how the existing initiatives and programmes can fit into the process.

Figure 9.2. Best practices and lessons learned for the process to formulate and implement NAPs

FOCUS AREA I

Initiating and launching the process to formulate and implement national adaptation plans

BEST PRACTICES

- A good starting point for the process to formulate and implement NAPs is for the UNFCCC focal point to explain and promote the process to all relevant stakeholders in the country to ensure full understanding of the opportunities and benefits of embarking on the process.
- Conducting stocktaking of policies, data, information and programmes of current and past adaptation activities at an early stage is useful to establish a baseline and to guide planned activities of the process.
- Having a dedicated lead institution for the process, with a delegated authority to manage the entire process, can be helpful to ensure a well-coordinated, coherent and effective process.
- Identifying how existing programmes can contribute to the process will ensure early success, help achieve a coherent adaptation response for the country and inform how individual efforts can best be scaled up to national level.

LESSONS LEARNED

- The process to formulate and implement NAPs can be initiated from different entry points; over time, all relevant activities will be undertaken.
- A full mandate for the process may take some time to be fully developed and approved. In many cases, countries will start with an interim arrangement.
- Funding is necessary to undertake most of the activities in the process. However, many countries are finding it useful to carry out component activities with funding from different sources until core funding for the whole process is available.
- Stocktaking is more than just compiling lists of funded adaptation projects; it requires synthesizing the information to establish a baseline and assess the main adaptation gaps/needs and the effectiveness of past efforts. Lessons learned in past activities can help avoid past mistakes.

FURTHER READING

NAP Technical Guidelines

- Step A.1: Initiating and launching the NAP process, pp 28-37
- Step A.2: Stocktaking: identifying available information on climate change impacts, vulnerability and adaptation and assessing gaps and needs of the enabling environment for the NAP, pp 38-45

CASE STUDIES

- Experience with getting started by Tanzania
- Experience with launching the process to formulate and implement NAPs by Togo

Source: LDC Expert Group, 2015

9.4. Examples of cooperation, good practice, experience and lessons learned

There are a number of regional collaborations to build climate resilience in the Arab States comprising a variety of institutions, such as the League of Arab States, the Council for Arab Ministers Responsible for Environment and the Islamic Development Bank Group. They cooperate with the United Nations partners in the region on coordinating and facilitating actions that ensure climate and disaster risks do not exacerbate social vulnerability, with actions seen as opportunities to build resilience and stability.

The Arab Climate Resilience Initiative (ACRI, 2011–2017) was a regional initiative of the UNDP Regional Bureau for Arab States, in coordination with regional and national partners, aiming to build resilience against climate risks. The assistance was mainly focused on building knowledge; developing countries' capacities to access climate finance; implementing strategic policies around priority areas such as water security, drought and access to sustainable energy; and establishing partnerships to scale up local actions for climate-resilient development. ACRI convened policy dialogues on climate challenges and solutions in the region, climate change negotiations and the SDGs, and also provided catalytic support for project development and the designing of multi-country initiatives intended to emerge as a regional platform to achieve the SDGs and targets under the Paris Agreement.

The SDG Climate Nexus Facility, coordinated by UNDP in partnership with United Nations Environment Programme Finance Initiative, the World Food Programme, the World Meteorological Organization, UNISDR, the League of Arab States and the Arab Water Council, aims to serve as a multi-country platform to support bottom-up local actions to achieve SDG 13. It supports capacity development and country actions in four key areas: (1) improving science and data on vulnerabilities to climate/disaster risks for decision-making; (2) enhancing tools and technology for risk-informed development; (3) building leadership and governance capacities for taking climate action; and (4) catalysing innovative green finance mechanisms to scale up climate finance for development and crisis prevention/recovery goals.

One of the lessons learned through the work of the SDG Climate Nexus Facility arises from a project on implementing adaptation measures to build the resilience of farmer and pastoral communities in Sudan who focus on rainfed agriculture. The project is building on indigenous knowledge and local skills, and it guarantees community participation and responsiveness while ensuring sustainability, including the use of indigenous methods for constructing boreholes or the distribution of climate-resilient local breeds of goat/sheep to help ensure community buy-in of project interventions. Partnerships with local institutions are also critical for improving and expediting implementation processes.

Public–Private Finance for Climate Adaptation in Chile helps to identify adaptation investment opportunities, as well as to understand the role that the GCF and other sources of climate finance can play in unlocking private sector investments in adaptation where financial barriers are significant. The initiative acknowledges that it is critical to work closely with the local banking sector and business community to create awareness on disclosing exposure to climate change impacts and adaptation measures as part of the bank's routine risk analysis procedures, and to understand which instruments are needed and to remove barriers for deployment of a diversified portfolio of projects.

Chapter 10: Any other relevant information

Decision 18/CMA.1 MPGs

I. Any other information related to climate change impacts and adaptation under Article 7 of the Paris Agreement

Paragraph 117. Each Party may provide, as appropriate, any other information related to climate change impacts and adaptation under Article 7.

10.1. Introduction to the element

As stated in chapter 1 of this training material, Article 7 of the Paris Agreement involves a number of multilateral provisions that are critical to strengthening the adaptation policy cycle at the national level, building resilience and favouring cooperation and the exchange of good practice at the international level.

There are various guidelines on developing adaptation-related documents, such as the "Draft supplementary guidance for voluntary use by Parties in communicating information in accordance with the possible elements of an adaptation communication" (AC22/GUID/6B), that have an element or heading that provides Parties with the flexibility to include any other information that needs to be highlighted and that may not fit in other sections.

In the case of ADCOMs, some of the information the guidance suggests could be provided under the heading of "any other information related to adaptation" includes: sources of information and consultation processes undertaken; transboundary climate risks; progress in translating the global goal on adaptation into domestic action; adequacy and effectiveness of adaptation actions, and/or support provided for adaptation; adaptation co-benefits of mitigation efforts; risks of maladaptation, and the efforts to reduce such risks in adaptation planning; education and training initiatives for adaptation planned or undertaken; adaptation planning and implementation at the subnational level; stakeholder engagement in planning, implementation, monitoring and evaluation; and efforts to engage vulnerable communities.

These themes may also be valid for the preparation of the A-BTR to the extent that many are not clearly incorporated in the MPGs. In all cases, it is important to avoid duplication and find the best place within each document and between documents to tell the Party's adaptation story.

10.2. Other possible contents

Other possible topics are:

- Human mobility, which may also be included under chapter 8;
- Specific adaptation support needs/means of implementation, such as finance, technology transfer and capacity-building (already included in NCs, NDCs and other adaptation-related documents);
- Linkages, synergies and trade-offs with mitigation actions;

- Provisions for consistency between adaptation-related documents under the UNFCCC as well as on how the A-BTR fits into the adaptation policy cycle;
- Reasons for opt in and opt out regarding elements that have or have not been included in the A-BTR;
- Content on “how to read this document”;
- Subnational, local or transboundary case studies.

The inclusion of the gender and/or generational perspective, as well as justice and equity, can also be considered in this item in order to provide a more detailed look at the approach in national adaptation policies. Likewise, these topics can be incorporated as cross-cutting considerations in some or all of the above-mentioned headings.

The incorporation of nature-based solutions can be highlighted in chapter 10, but can also be reported as a cross-cutting component that can be reported under chapter 4 of the MPGs. The Adaptation Gap Report 2020 dedicated a specific chapter on nature-based solutions, and highlighted the importance of considering the lower costs of this kind of solution; stakeholders’ participation; the interaction between biodiversity loss and ecosystem degradation with adaptation actions; the potential of nature-based solutions for reducing specific climate risks, and the need to channel more resources towards this type of policy option.

The AC suggested providing information on synergies by following the outline of table 4 “Potential information synergies between adaptation communications, national communications and biennial transparency reports” of the “Draft supplementary guidance for voluntary use by Parties in communicating information in accordance with the possible elements of an adaptation communication” (AC22/GUID/6B, p.15). That table identifies the areas of information or the elements of the ADCOM mentioned in the annex to decision 9/CMA.1 and whether these topics appear in other adaptation-related instruments, such as the NCs and the BTRs. Table 7 of the same document also provides an overview of resources that could facilitate preparing information for this element of the ADCOM.

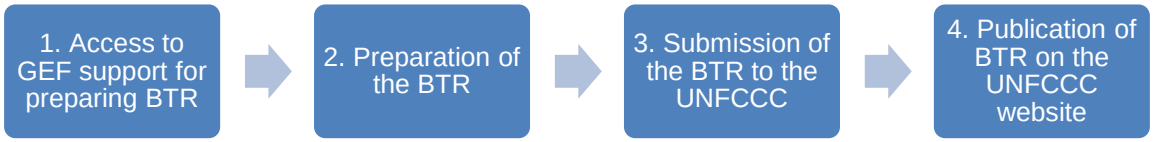
Chapter 11: How to compile information and submit the report

This chapter explains how to compile relevant information, including lessons learned, and provides considerations and guidelines on how to submit the report.

11.1. Overview of the process

The A-BTR process comprises a set of steps that are in dialogue with the other components of the BTR (national inventory report, information for tracking progress in implementing the NDC, support provided by developed countries and support needed by developing countries) according to Article 13 of the Paris Agreement and the MPGs (decision 18/CMA.1).

Figure 11.1. A-BTR process



11.2. Accessing GEF support for preparing BTRs

The ETF established under Article 13 of the Paris Agreement states that support *shall* be provided to developing countries for the implementation of the provisions on transparency of action and support, and for building the transparency-related capacity of developing countries for submitting reports on a continuous basis (Article 13, paras.14–15, of the Paris Agreement).

Additionally, in paragraphs 8–10 of decision 18/CMA.1 (see also decision 7/CMA.2) the GEF is requested to provide support for developing country Parties in preparing their first and subsequent BTRs, and the GEF is also encouraged to consider options for improving the efficiency of the process for providing support for reporting, addressing the challenges in the application process, including the possibility that countries apply for funding for more than one report through the same application in each replenishment period. Decision 18/CMA.1 also urges the GEF to consider options for improving the efficiency of the process for providing support for reporting, including through better streamlining processes and grant agreements.

11.3. Preparing the BTR

When preparing the BTR, the Party will voluntarily choose to include information related to climate change impacts and adaptation under Article 7 of the Paris Agreement (i.e. an A-BTR). If the Party so chooses, it is suggested that all the elements referred to in chapter IV of the MPGs are included, and that the people drafting the report follow this training material in order to identify the type of information necessary for reporting under each of the elements.

It is also suggested that the Party build a national narrative that helps to articulate the information included in the adaptation-related documents (communication and reporting instruments) with the progress of adaptation action at the national level.

A Party may decide to submit an ADCOM as a component of or in conjunction with a BTR, in line with both decision 9/CMA.1 and decision 18/CMA.1. When a BTR is a vehicle of an ADCOM, the part of the report that constitutes an ADCOM should be clearly identified. The ADCOM should be also numbered sequentially (decision 9/CMA.1, para. 10).

In the spirit of avoiding duplication of effort and additional burden for developing countries, a Party may cross reference information related to climate change impacts and adaptation previously reported under Article 7 of the Paris Agreement and focus its reporting on updates to previously reported information.

11.4. Submitting the BTR to the UNFCCC

The A-BTR should be submitted by the Party as part of the BTR, using the online portal maintained by the UNFCCC secretariat.

The Parties shall submit the BTRs in one of the official languages of the United Nations.

If you have any questions related to the submission portal, please email reporting-nai@unfccc.int.

The online portal for submission of BTRs is currently available at the National Reports Submission Portal (NRSP).

11.5. Publication of the A-BTR on the UNFCCC website

According to the MPGs, after a Party submits its BTR through the online portal, the secretariat shall post it on the UNFCCC website and keep it updated.

Annex 1 - ADCOMs by vehicle

(January 2023)

Nr.	Country	Vehicle of the ADCOM			
		NDC	NAP	Stand-alone or any other document	NC
1	Angola	X			
2	Antigua and Barbuda			X	
3	Argentina	X			
4	Australia			X	
5	Austria			X	
6	Benin			X	
7	Brazil	X			
8	Burkina Faso			X	
9	Burundi	X			
10	Canada			X	
11	Chile			X	
12	China	X			
13	Colombia	X			
14	Costa Rica	X			
15	Dominica	X			
16	Ecuador	X			
17	Eswatini			X	
18	European Union			X	
19	Ghana			X	
20	Haiti			X	
21	Indonesia			X	
22	Italy			X	
23	Jamaica			X	
24	Japan			X	
25	Kenya	X			
26	Lebanon	X			
27	Liberia			X	
28	Madagascar			X	
29	Marshall Islands			X	
30	Mauritania	X			
31	Mauritius	X			
32	Mexico			X	
33	Namibia			X	
34	Nepal		X		
35	Netherlands			X	
36	New Zealand				X
37	Nigeria			X	
38	Norway			X	
39	Panama	X			
40	Paraguay	X			
41	Portugal			X	

Nr.	Country	Vehicle of the ADCOM			
		NDC	NAP	Stand-alone or any other document	NC
42	Russian Federation	X			
43	Rwanda			X	
44	Saint Lucia			X	
45	Singapore				X
46	Somalia	X			
47	South Africa	X			
48	Spain			X	
49	Sudan	X			
50	Sweden			X	
51	Switzerland			X	
52	Timor-Leste		X		
53	United Kingdom			X	
54	United States			X	
55	Uruguay	X			
56	Zimbabwe			X	
	TOTAL	**20**	**2**	**32**	**2**

Annex 2 - LEG Technical Brief on gaps and needs related to the process to formulate and implement NAPs

(February 2021)

AREA	**Accessing financial and other support**
Needs	Adequate and effective access to financial support, including from the Green Climate Fund (GCF), as well as other forms of support for the formulation and implementation of national adaptation plans (NAPs)
	Capacity to write proposals for accessing funding under the different windows of the GCF
	Understanding of the latest requirements for GCF funding proposals
	Promotion of funding proposals from multiple stakeholders, including those at the subnational and local government level
	Capacity to ensure that proposals to the GCF for the formulation of NAPs are aligned with the technical guidelines for the formulation and implementation of NAPs, and address both the objectives and guiding principles of the process to formulate and implement NAPs
	Coordination among providers of support at all levels to ensure that their support is coherent and avoids overlaps at the national level and that such support is in line with national priorities and needs
	Systems for ensuring that countries' support needs for a long-term process are met through limited, one-off funding designed for projects over a fixed time frame

AREA	**Institutional arrangements and coordination**
Needs	Establishment or enhancement of institutional arrangements for the process to formulate and implement NAPs in order to foster national leadership and coordination of adaptation efforts at all levels and create a primary interface with regional and international mechanisms
	Establishment or enhancement of legal frameworks for institutional arrangements and coordination
	Establishment or enhancement of systems at the national level to facilitate the flow of resources and information across different levels of government (climate-responsive budgeting)
	Ensuring the existence of stakeholders or focal points within different institutions with clearly defined roles and responsibilities
	Technical guidance and capacity-building for national working groups for the formulation and implementation of NAPs, and the preparation of proposals to access funding from the GCF
	Institutional arrangements and systems for monitoring and evaluation

AREA	**Climate scenarios, science and translation to local context**
Needs	Capacity for national, subnational and sectoral experts to work effectively with climate data and climate change scenarios that facilitate considering long-term climate impacts in decision-making
	Availability and accessibility of climate data and climate change scenarios to underpin effective adaptation assessment, planning and implementation, taking into account specific needs at the national, subnational and sectoral level
	Capacity-building for national, subnational and sectoral experts on the application of climate change scenarios in climate change adaptation decision-making
	Methods and tools for translating climate data and climate change scenarios to the local context
	Ways to effectively translate long-term vision and planning from the national to the subnational level in order to guide assessments
	Capacity to frame, analyse and define baselines, and assess, manage and monitor climate change risk and vulnerability at relevant levels and scales

AREA	Risk and vulnerability assessment and risk management
Needs	Specific methodologies and guidelines that facilitate understanding of the baseline and the progression of vulnerability and risk, which is an important aspect of measuring and assessing progress in reducing vulnerability
	Comprehensive risk and vulnerability assessments covering all key sectors and systems at the national, subnational and sectoral level as well as vulnerability hotspots
	Institutionalization of risk and vulnerability assessment and risk management at all levels of governance and in key sectors
	Ways to build evidence for adaptation additionality arguments in funding proposals to the GCF
	Technical support to identify effective adaptation solutions and actions after the assessment of climate vulnerabilities and risk
	Ways to promote consistency, synergy and coherence among different risk and vulnerability assessment and risk management frameworks
	Ways to improve the quality of assessments over time, for example through peer-review processes
	Identification of areas where participatory approaches can significantly improve risk and vulnerability assessment

AREA	Implementation strategies
Needs	Technical capacity to develop proposals to access funding from the GCF and other sources
	Ways to link the implementation strategy for the NAP with the GCF country programme
	Technical capacity and tools for ranking and prioritizing adaptation options

AREA	Access to and use of technology
Needs	Application of the latest technologies in climate change adaptation planning and implementation (e.g. big data, artificial intelligence and machine learning)

AREA	Monitoring, evaluation and learning
Needs	Promotion of technological developments related to climate change adaptation in climate services, agriculture, water systems, health systems, disaster management, banking and other sectors
	Mobilization of financial resources for the implementation of available technologies
	Capacity-building, training and awareness-raising on available technologies within the least developed countries
	Access to information and experience of other countries in applying different adaptation technologies to facilitate the selection, installation and operation of appropriate technologies for local problems
	Systems to stay abreast of the latest developments in technical guidance and assistance
	Establishment or enhancement of national monitoring and evaluation systems
	Establishment of linkages to broader national monitoring and evaluation systems related to development
	Systematic monitoring and observation relevant to adaptation planning and implementation, and subsequent monitoring and evaluation of adaptation outcomes and impacts
	Methodologies and guidelines for applying quantitative and qualitative metrics and indicators when analysing and assessing vulnerabilities, hazards and systems, including examples thereof
	Development of theories of change in relation to climate change adaptation
	Compilation of information to support monitoring, review and evaluation of progress in addressing adaptation
	Mechanisms to monitor and evaluate the effectiveness of support received

AREA	Linkage with the development agenda
Needs	Capacity to effectively address climate change adaptation in the national context within the broader framework of the 2030 Agenda for Sustainable Development and the Sustainable Development Goals (SDGs)
	Articulation of the co-benefits of climate change adaptation proposals to the GCF
	Understanding of the concept of integrating adaptation into development planning, and of ways to integrate international processes that are relevant to adaptation planning using the appropriate frameworks, such as the SDGs, the Sendai Framework for Disaster Risk Reduction 2015–2030 and the New Urban Agenda
	Identification of effective entry points for the integration of adaptation into development planning
	Prioritization of adaptation in development, including by communicating the development or economic value and benefits of implementing adaptation measures

AREA	Active learning from practice
Needs	Capacity to apply the experience of and lessons learned during adaptation planning and implementation to future adaptation efforts, including by identifying and promoting best practices
	Facilitation of true learning beyond the documentation of experience and lessons learned
	Promotion of learning platforms to facilitate the sharing of experience and learning, especially at the regional level
	Expansion of South–South exchanges to capitalize on experience with similar or common climate shocks

AREA	Guiding principles
Needs	Adequate engagement of multiple stakeholders at the national and subnational level, including civil society, the private sector, financial institutions, city governments and other subnational authorities, youth, local communities and indigenous peoples, in managing adaptation planning and implementation, taking into account elements of successful adaptation (guiding principles)
	Adequate analysis of which communities, groups and ecosystems are the most vulnerable
	Deeper and more consistent consideration of how the general concept of gender sensitivity can be applied to practical actions that lead to a reduction in gender-driven vulnerabilities
	Ways to identify and effectively manage trade-offs between different adaptation actions and approaches, and between development and ecological protection

Annex 3 - CASCADE project survey to identify and prioritize barriers to adaptation at the local level

(1–5 point score, where 1 indicates no challenge and 5 represents significant challenge)

1. Conflicting timescales and conflicts of interest	**Score**
1. There are powerful interests invested in maintaining the status quo	
2. Short-term political cycles lead to a lack of political will	
3. Competition with other priorities	
4. Conflicts between short and long-term needs	
5. Adaptation competes with other more immediate priorities	
6. Other (please specify):	

2. Leadership	**Score**
1. A lack of leadership skills in local government	
2. A lack of leadership on climate issues	
3. Too many leaders on climate change (leaders in different departments; leaders on multiple levels, public and private sector leaders, etc.)	
4. Lack of leaders moving the climate adaptation process forward (“all talk and no walk”)	
5. Other (please specify):	

3. Resources	**Score**
1. Lack of / or high level of competition for local government resources: finances	
2. Lack of / or high level of competition for local government resources: staff time	
3. Lack of / or high level of competition for local government capacities / resources: staff capacities / knowledge	
4. Lack of / or high level of competition for local government capacities / resources: methods or tools	
5. Climate adaptation competes with climate mitigation for resources	
6. Lack of funding for external support to gain technical capacities / expertise	
7. Other (please specify):	

4. Science	**Score**
1. Lack of data for risk assessment	
2. Lack of easy-to-understand scientific data and knowledge	
3. Lack of guidance on how to use the scientific data and knowledge (e.g. overload of information, how to deal with contradicting information, etc.)	
4. The uncertainties related to climate scenarios are too high	
5. The uncertainties related to adaptation interventions are too high	
6. Other (please specify):	

5. Governance and institutional constraints	Score
1. Lack of legislation creating a mandate for action	
2. Institutional fragmentation ("silo-thinking") limits mainstreaming across departments and sectors in terms of responsibilities, without a holistic overview	
3. Inability to find agreement between actors [specify]	
4. Lack of internal collaboration across the local government departments to collect information	
5. Lack of public ownership of land	
6. Lack of external collaboration with stakeholders [multi-level] to understand stakeholder perspectives and needs	
7. Other (please specify):	

6. Lack of awareness and communication	Score
1. Lack of awareness related to climate change	
2. Lack of understanding of how things relate to climate change / narrow perspective	
3. Lack of effort to communicate the links between climate change and other issues	
4. Inability to effectively communicate the need for adaptation internally in local government	
5. Inability to effectively communicate the need for adaptation externally to stakeholders	
6. Other (please specify):	

7. Attitudes, values and motivations	Score
1. Climate skepticism / insufficient concern	
2. Public mistrust of local government	
3. A difference in risk perception between governing authorities and the public	
4. A difference in cultural values	
5. Other (please specify):	

8. Adaptation process	Score
1. Lack of guidance on how to start and follow the process	
2. Challenge to figure out which risks to include in risk assessment	
3. Challenge in selecting criteria and assessing options	
4. Lack of guidance on which actions to take	
5. Other (please specify):	