



United Nations

FCCC/TP/2016/6



Framework Convention on
Climate Change

Distr.: General
13 September 2016

English only

Opportunities and options for enhancing adaptation actions and supporting their implementation: reducing vulnerability and mainstreaming adaptation

Technical paper by the secretariat

Summary

This technical paper provides an initial exploration of opportunities and options for reducing vulnerability and mainstreaming climate change adaptation, including through the process to formulate and implement national adaptation plans as identified by Parties and non-Party stakeholders through their practical experiences. It is primarily based on discussions held at the technical expert meetings on adaptation, which took place on 24 and 25 May 2016 in Bonn, Germany, in conjunction with the forty-fourth sessions of the subsidiary bodies. The paper is intended to contribute to the understanding of how good practices and lessons learned can lay the foundation for the enhanced implementation of pre-2020 adaptation actions and beyond.

GE.16-15788(E)



* 1 6 1 5 7 8 8 *

Please recycle



Contents

	<i>Paragraphs</i>	<i>Page</i>
I. Introduction	1–2	3
A. Key messages.....	3	3
B. Mandate and background.....	4–7	4
C. Objective, scope and structure of the paper	8–12	4
D. The Paris Agreement, the global goal on adaptation and enhanced action prior to 2020	13–15	5
II. The adaptation process, key stages, gaps and challenges.....	16–42	6
A. Assessment of impacts, vulnerability and risk.....	17–20	7
B. Adaptation planning and mainstreaming in development planning processes	21–27	8
C. Implementation of adaptation	28–31	9
D. Monitoring and evaluation, and learning	32–36	11
E. Means of implementation: finance, technology and capacity-building	37–42	13
III. Opportunities for enhancing adaptation actions	43–68	13
A. Opportunities for enhancing assessments of impacts, vulnerability and risk..	44–50	14
B. Opportunities for enhancing adaptation planning and mainstreaming in development planning processes.....	51–58	16
C. Opportunities for enhancing implementation	59–63	19
D. Opportunities for enhancing monitoring and evaluation	64–66	21
E. National adaptation plans as a vehicle for adaptation planning and implementation	67–68	22
IV. Options for supporting enhanced adaptation action	69–98	24
A. Finance and investments.....	70–75	24
B. Technology and capacity-building support.....	76–78	27
C. Sustaining a knowledge and learning system	79–80	29
D. Strengthening multi-level governance	81–86	30
E. Promoting multi-stakeholder engagement and cooperative action on adaptation.....	87–96	33
F. Harnessing the UNFCCC potential for enhancing adaptation actions	97–98	37

I. Introduction

1. The first technical expert meetings (TEMs) on adaptation under the technical examination process on adaptation (TEP-A) were held in May 2016 and form the primary basis for this technical paper. The goal of the initial TEMs was to take a broad view of adaptation challenges, recognizing that subsequent TEMs and associated technical papers will focus on specific issues and provide more detailed discussion of opportunities and options.

2. Reducing vulnerability and mainstreaming climate change adaptation, including through the process to formulate and implement national adaptation plans (NAPs), is a dynamic, iterative and often complex process. It includes vulnerability assessments, adaptation planning, implementation, monitoring and evaluation, and learning. Opportunities and options to enhance adaptation action exist at each stage of the process.

A. Key messages

3. The key messages of this technical paper are:

(a) Dialogue between policymakers/decision makers and the scientific community provides an opportunity to undertake more targeted assessments and make more effective and informed adaptation decisions. Such dialogue can address challenges related to the availability and interpretation of scientific data, uncertainties of climate scenarios and the development of adaptation decision support tools. Boundary organizations can provide an interface to facilitate discussion between the science, policy and practitioner communities. While there are many examples of effective information-sharing and cooperation between these groups, there is still a need for climate services that are more demand-driven and address the needs of decision makers;

(b) Financial resources, technology development and transfer and capacity-building are essential for scaling up adaptation efforts. For many developing countries, financial, technological and capacity-building support is critical. There is already an array of institutions and processes that provide technical and capacity-building assistance and funding to developing countries. Nonetheless, it is crucial to explore new opportunities to mobilize additional support to developing country Parties, in particular financial support, so that they may address their adaptation needs;

(c) While the private sector is increasingly engaged in adaptation efforts, stronger linkages between the private and public sectors could further support the acceleration of adaptation action. Further work is also needed to improve the understanding of the private sector's full potential in addressing adaptation;

(d) Emerging monitoring and evaluation frameworks provide opportunities to learn about the adequacy, effectiveness and efficiency of adaptation efforts and support. Monitoring and evaluation also supports the learning processes by reviewing good practices and lessons learned, including lessons learned from failed actions;

(e) NAPs are emerging as a powerful vehicle to assemble various adaptation efforts into coherent and sustainable national strategies. The process to formulate and implement NAPs seeks to reduce vulnerability and mainstream adaptation and to provide an opportunity to address synergies between adaptation and development;

(f) There are a number of challenges to the development and implementation of NAPs in developing countries, including those related to finance, capacity-building and technology development and transfer. For many countries (both developed and developing) establishing institutional structures and coordination for climate change adaptation remains a key challenge;

(g) Engagement of, and coordination across, multiple levels of governance, including regional, national, subnational and local levels, is often critical to enhancing adaptation efforts and can provide opportunities to catalyse transformational change. Such engagement and coordination can be enabled through various mechanisms, including the provision of funding, the integration of adaptation into planning processes and the co-production of multidisciplinary knowledge.

B. Mandate and background

4. The Conference of the Parties (COP), at its twenty-first session, requested the secretariat to prepare annually a technical paper on opportunities to enhance adaptation action, as well as options to support their implementation. The paper is to be prepared on the basis of TEMs on adaptation that are being organized as part of the 2016–2020 TEP-A.¹

5. The TEP-A was launched to identify concrete opportunities for strengthening resilience, reducing vulnerabilities and increasing the understanding and implementation of adaptation actions in the context of enhancing action prior to 2020. It seeks to:

(a) Facilitate the sharing of good practices, experiences and lessons learned;

(b) Identify actions that could significantly enhance the implementation of adaptation actions, including actions that could enhance economic diversification and have mitigation co-benefits;

(c) Promote cooperative action on adaptation;

(d) Identify opportunities to strengthen enabling environments and enhance the provision of support for adaptation in the context of specific policies, practices and actions.²

6. The TEP-A is jointly organized by the Subsidiary Body for Scientific and Technological Advice and the Subsidiary Body for Implementation and conducted by the Adaptation Committee.³ It is a collective effort by all Parties and by non-Party stakeholders aimed at facilitating implementation of adaptation actions in a coherent manner.

7. The umbrella theme for the 2016 TEP-A, “Reducing vulnerability and mainstreaming climate change adaptation, including through the process to formulate and implement national adaptation plans”, was broken down into two separate topics, with each being addressed during a one-day TEM. The 2016 TEMs⁴ took place in conjunction with the forty-fourth sessions of the subsidiary bodies, on 24 and 25 May 2016 in Bonn, Germany. Topic 1 was on enhancing the implementation of adaptation action with emphasis on gaps, needs, challenges, options and opportunities for implementation on the ground; means of implementation, including for the improvement of climate information services and understanding of scientific information at the national level; and good practices for reducing vulnerability. Topic 2 was on effective policy frameworks and institutional arrangements for adaptation planning and implementation, including for multi-level governance and monitoring and evaluation.

C. Objective, scope and structure of the paper

8. The objective of this technical paper is to provide an initial exploration of opportunities and options for reducing vulnerability to climate change impacts and

¹ Decision 1/CP.21, paragraph 129(b).

² Decision 1/CP.21, paragraphs 125 and 127.

³ Decision 1/CP.21, paragraph 126.

⁴ Further information is available at <unfccc.int/9542>.

mainstreaming adaptation. It is based on information provided at the TEMs referred to in paragraphs 1 and 4 above. In addition to the presentations made at the TEMs, it also draws on the associated discussions, relevant submissions from Parties and other relevant sources of information.

9. Here, opportunities and options represent lessons learned, best practices and emerging conclusions from practical experiences regarding what works and what does not work in the adaptation process. The paper seeks to highlight experiences that can lay the foundation for the effective implementation of pre-2020 adaptation actions and beyond. It also seeks to identify how best practices can be replicated and scaled up taking into account national circumstances and specific climate impacts.

10. While the paper provides an overview of the presentations and discussions that took place at the TEMs, and incorporates other relevant sources of information, it should not be interpreted as implying that there is consensus among Parties on any of the issues or options covered. It includes key messages arising from knowledge and experiences to date, provides key findings to assist further work on adaptation and highlights some of the remaining gaps that should be further investigated with follow-up activities and reports.

11. The paper consists of four chapters. Following this introductory chapter, chapter II provides information on some of the main gaps and challenges communicated by countries along the key stages of the adaptation process. Chapter III highlights opportunities and options to reduce vulnerability and enhance adaptation action, including principles and objectives of monitoring and evaluation, while chapter IV elaborates on some of the mechanisms, approaches and options that support and enhance the implementation of adaptation actions.

12. The technical paper was prepared by the secretariat in consultation with the Adaptation Committee.

D. The Paris Agreement, the global goal on adaptation and enhanced action prior to 2020

13. Over the years, adaptation building blocks have been designed under the UNFCCC (see figure 1). The Paris Agreement established, for the first time, a global adaptation goal of “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”.⁵

14. This goal provides additional context for vulnerability assessments and adaptation actions by governments and other actors. A special report on the impacts of global warming of 1.5 °C and related global greenhouse gas emission pathways, being prepared by the Intergovernmental Panel on Climate Change (IPCC) in response to the invitation of the COP,⁶ will be released in 2018.

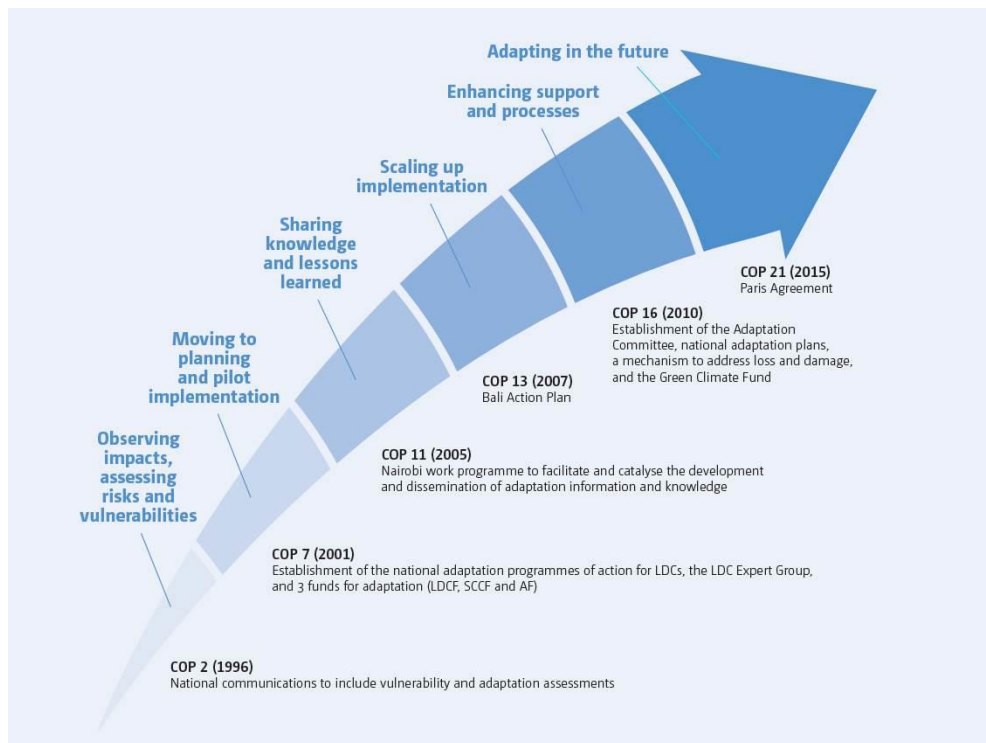
15. The specific needs and special circumstances of developing country Parties, especially those particularly vulnerable to climate change, are recognized as one of the basic tenets of the Paris Agreement. The Agreement pledges “continuous and enhanced international support”⁷ to developing countries for adaptation.

⁵ Article 7, paragraph 1, of the Paris Agreement.

⁶ Decision 1/CP.21, paragraph 21.

⁷ Article 7, paragraph 13, of the Paris Agreement.

Figure 1
Timeline of the design of the adaptation building blocks under the UNFCCC



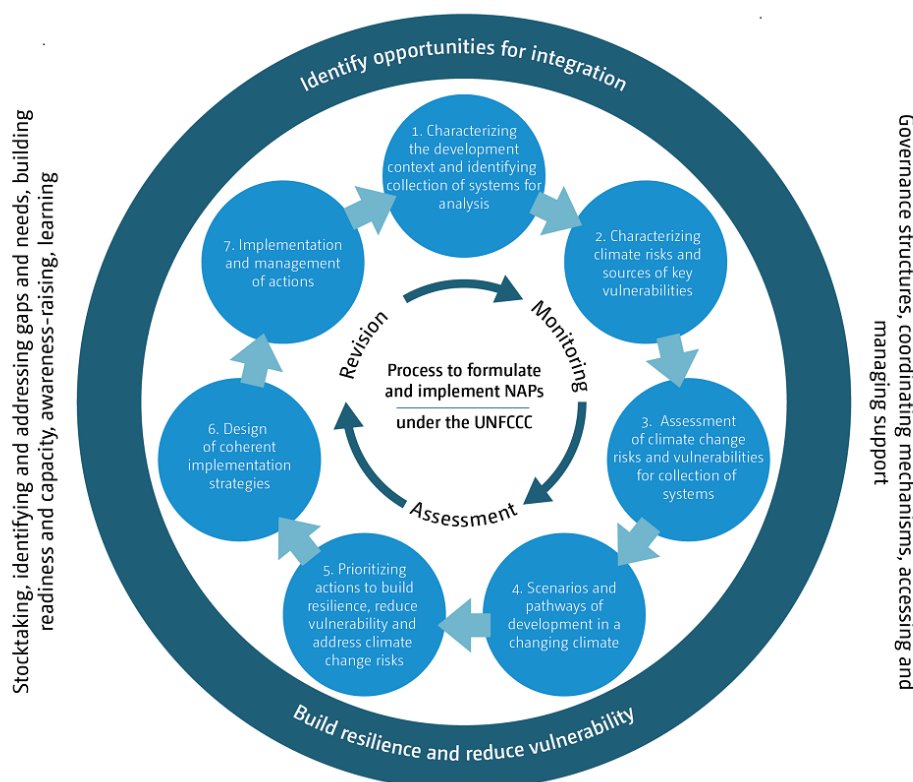
Source: Adaptation Committee. 2015. *Enhancing Coherent Action on Adaptation 2012–2015: 2015 Overview Report*. Available at <http://unfccc.int/files/adaptation/application/pdf/or_highres.pdf>.

Abbreviations: AF = Adaptation Fund, COP = Conference of the Parties, LDCs = least developed countries, LDC WP = least developed countries work programme, LDCF = Least Developed Countries Fund, SCCF = Special Climate Change Fund.

II. The adaptation process, key stages, gaps and challenges

16. In discussing approaches to reduce vulnerability and mainstream adaptation, it may be helpful to refer to four key stages in the adaptation process: (1) assessment of climate change impacts, vulnerabilities, risks and resilience options; (2) adaptation planning; (3) implementation of adaptation actions; and (4) monitoring and evaluation (see also figure 2). Efforts to mainstream adaptation in development planning processes should be initiated early in the process to align adaptation with development priorities. Learning and sharing good practices and experiences is integral to each stage of the adaptation process. Gaps and challenges have been identified by Parties and non-Party stakeholders at all stages of the adaptation process.

Figure 2
The adaptation planning and implementation process



Source: FCCC/SBI/2015/INF.14, figure 3.
Abbreviation: NAPs = national adaptation plans.

A. Assessment of impacts, vulnerability and risk

17. Assessment of impacts, vulnerability, risk and resilience is often a starting point for adaptation planning and can be updated on a regular basis as new data, information and methods of analysis emerge. Assessments require knowledge of historical climate trends and projections of future climate, as well as the capacity in data analysis and interpretation. In addition, involvement of all potentially affected stakeholders is necessary in order to develop an accurate understanding of vulnerabilities.

18. Assessment of current vulnerability and risks provides a starting point in informing the development of adaptation actions, and is especially important when information on future climate impacts is not available owing to the lack of location-specific climate change scenarios and/or lack of experience in interpreting uncertainties of climate projections, the assessment of current vulnerability and risks provides a starting point in informing the development of adaptation actions. An example of such incremental approach is offered by the national adaptation programmes of action (NAPAs), which were established in 2001 as a means for the least developed countries (LDCs) to communicate their urgent and immediate adaptation needs in a manner that is easy to understand, action-oriented and country-driven. Steps in the preparation of NAPAs include the assessment of vulnerability to current climate variability and extreme events and of areas where risks would increase as a result of climate change. As such, almost all the LDCs have gone through an initial vulnerability analysis with the help of NAPAs.

19. Ongoing challenges remain for conducting assessments, including challenges related to the provision and use of climate services. The West African Agrhymet Regional Centre of the Permanent Interstate Committee for Drought Control in the Sahel identified the following barriers to the use of climate services in decision-making:⁸

- (a) Absence of climate data because of limited observational networks and their decline;
- (b) Low investment in climate services and lack of qualified human resources;
- (c) Low consideration of user needs;
- (d) Low level of awareness of the socioeconomic benefits of a decision based on climate services and good quality information.

20. Assessments should also cover transboundary aspects, as indicated by some Parties in their intended nationally determined contributions (INDCs).⁹ For instance, one Party whose territory includes four major rivers of West Africa, all of which are threatened by climate change, noted that its geographical position could make it a shelter for neighbouring countries, in particular nomadic pastoralists, which would further increase the pressure on river basins already affected by drought and changing rainfall patterns. Two major food exporters reported on their contribution to global food security and the global risk induced by the vulnerability of their agriculture and livestock sectors.

B. Adaptation planning and mainstreaming in development planning processes

21. Effective adaptation to climate change requires planning to ensure that the long-term effects of a changing climate are taken into account. Countries are making progress with their planning for adaptation. Experiences indicate that planning is an iterative process that can sometimes take several years before policy decisions are taken and institutional frameworks are formalized.

22. Coordination between different ministries and departments is important. However, as reported in the INDCs, in many developed and developing countries, establishing institutional structure and coordination for climate change adaptation remains one of the key challenges. In addition, continuity of the adaptation efforts is not always guaranteed in situations where a new leadership and/or administration take over.

23. For example, Japan's experience with developing its NAP revealed several challenges,¹⁰ including difficulty in securing effective coordination between and within ministries; uneven availability of necessary information across sectors; dealing with the uncertainty in IPCC emissions scenarios and mitigation pathways and dealing with uncertainty; and prioritizing financing when immediate priorities overshadow long-term adaptation needs. Similar challenges were identified during the stocktaking exercise that took place in Myanmar while preparing the NAP: limitations in institutional arrangements, including the lack of a coordinating body to follow up priority projects or to act as a broker for external funding; lack of an institutional body responsible for raising awareness for

⁸ Presentation made by Agrhymet at the TEM on 24 May 2016. Available at <http://unfccc.int/files/focus/adaptation/technical_expert_meeting/application/pdf/20160524_kaire.pdf>.

⁹ See document FCCC/CP/2016/2.

¹⁰ Presentation made by the Ministry of the Environment of Japan at the TEM on 25 May 2016. Available at <http://unfccc.int/files/focus/adaptation/technical_expert_meeting/application/pdf/20160525_akio_takemoto.pdf>.

resource mobilization and liaising with external and internal funding institutions; and limitations in generating assessments and managing relevant climate data and information.¹¹

24. Mainstreaming should lead to the integration of adaptation objectives, strategies, policies, measures or operations in such a way that they become a part of national and regional development policies, processes and budgets at all levels and stages.¹² An integrated, holistic approach to adaptation through mainstreaming can help countries to simultaneously meet their development and adaptation objectives.

25. Policymakers, in particular in central agencies such as finance and planning ministries, would need to understand the relevance of climate change and adaptation for development and poverty reduction and ensure a coherent response across all sectors of the economy.¹³ In addition, when adaptation initiatives are conducted in isolation from ongoing national planning and implementation activities, there is potential for resources to be wasted in creating institutional arrangements that duplicate existing functions.

26. Challenges associated with efforts for mainstreaming adaptation into development planning include: lack of awareness and knowledge of adaptation, in particular in line ministries, leading to the issue being considered in the periphery of other development issues; involving and coordinating stakeholders across various levels of governance and sectors; linking local impacts with national-level responses; and maintaining leadership and political will.

27. Mainstreaming adaptation can address both long-term and urgent adaptation measures, recognizing that individual adaptation projects may need to be designed and implemented to address urgent needs before a formal adaptation strategy is in place.

C. Implementation of adaptation

28. Adaptation can be achieved through various measures, including technologies (e.g. sea walls, water desalination), alternative practices and techniques (e.g. modified siting of new infrastructure, hydropower planning), institutional responses (e.g. institutional coordination in planning disaster risk reduction and recovery policies, setting up weather warning systems) and behavioural responses (training emergency response teams, changing crops for planting depending on seasonal weather forecasts, reducing electricity use in times of heatwaves and reduced electricity outputs); and on various scales (see figure 3). While there has been a tendency to focus on technologies that can assist with adaptation, there is a growing recognition that other means (e.g. institutional, behavioural) also play an important role. Ecosystem-based adaptation is an example of alternatives to technological approaches.

29. The implementation of adaptation means progressing from project-level to programmatic adaptation that is integral to development. Project-level adaptation has been the most common and well-documented adaptation implementation to date. However, in

¹¹ Presentation made by the Ministry of Transport and Communication of Myanmar at the TEM on 25 May 2016. Available at <http://unfccc.int/files/focus/adaptation/technical_expert_meeting/application/pdf/20160525_hrin_nei_thiam.pdf>.

¹² Lim and Spanger-Siefred (2005 cited in: Least Developed Countries Expert Group (LEG). 2012. *National Adaptation Plans: Technical Guidelines for the National Adaptation Plan Process* (p.13).) Available at <https://unfccc.int/files/adaptation/cancun_adaptation_framework/application/pdf/naptchguidelines_eng_high_res.pdf>.

¹³ Poverty-Environment Facility of the United Nations Development Programme (UNDP) and the United Nations Environment Programme (UNEP). 2011. *Mainstreaming Climate Change Adaptation into Development Planning: A Guide for Practitioners*. Available at <<http://www.unep.org/pdf/mainstreaming-cc-adaptation-web.pdf>>.

recent years there has been a move from discrete projects to more programmatic approaches, as highlighted in INDCs and NAPs (see box 1 for more information on the INDCs).

Box 1

Intended nationally determined contributions and adaptation planning and implementation

A total of 137 Parties included an adaptation component in their intended nationally determined contributions (INDCs) (85 per cent of all submitted INDCs). The information provided demonstrates that Parties are moving to full-scale planning and implementation of adaptation and strengthening and scaling up existing efforts. The adaptation component of INDCs sheds some light on how Parties see adaptation evolving according to the national vision and goals. It also reveals criteria that Parties use in prioritizing actions, for example: timing or urgency; efficacy; co-benefits, in particular poverty reduction, sustainable development and mitigation; social inclusiveness; technological feasibility; and cost, including economic costs and benefits.

Source: FCCC/CP/2016/2.

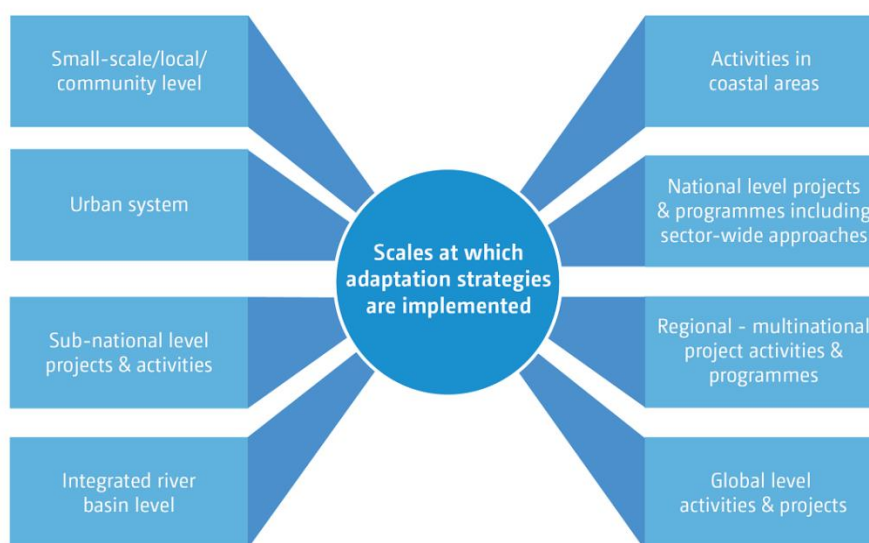
30. The same gaps and challenges that are identified in the assessment and planning phases also impede the implementation of adaptation plans that have been developed at the national, subnational and community levels and by the private sector. Resource, institutional and capacity barriers are further multiplied by institutions and stakeholder groups that have to be involved in the implementation. The lack of experiences in dealing with climate uncertainties delays adaptation actions. The scale and financial implications of the necessary adaptation actions make stakeholders wary of major investments under added uncertainties of climate projections. The difference in timescales between medium- and long-term adaptation plans and pressing short-term issues poses a significant problem for prioritizing adaptation.¹⁴

31. With regard to INDCs and nationally determined contributions (NDCs), the results of a survey¹⁵ conducted by the United Nations Development Programme (UNDP) in April 2016 in developing countries reveal that respondents expressed uncertainty around the next steps required to move from submitted INDCs to NDC implementation; that is, translating the INDCs into concrete policies, programmes and projects. Respondents also highlighted the need for support for the development of NDC implementation plans, including guidance from technical experts and the sharing of experiences between countries. The need to develop the capacities of national and subnational stakeholders was also expressed.

¹⁴ IPCC. 2014. *Climate Change 2014: Impacts, Adaptation, and Vulnerability. Part A: Global and Sectoral Aspects. Contribution of Working Group II to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change*. Available at <http://ipcc-wg2.gov/AR5/images/uploads/WGIIAR5-AnnexII_FINAL.pdf>.

¹⁵ The results were distributed to countries that participated in the UNDP NDC regional dialogues and subregional training workshops. Responses were received from 72 respondents (66 valid) representing 58 developing countries (17 from Asia-Pacific, 10 from Latin America and the Caribbean, 23 from Africa, 4 from Europe, and 4 from the Middle East); 11 of these countries were small island developing States and 19 were LDCs. Further information is available at <<http://www.undp.org/content/undp/en/home/librarypage/climate-and-disaster-resilience-/country-needs-support-for-implementation-of-nationally-determine.html>>.

Figure 3
Scale at which adaptation strategies are implemented



Source: Least Developed Countries Expert Group in collaboration with the Global Environment Facility and its agencies. 2009. *Step-by-step Guide for Implementing National Adaptation Programmes of Action*. Available at <<http://unfccc.int/6110>>.

D. Monitoring and evaluation, and learning

32. Monitoring and evaluating and learning from adaptation plans, policies, programmes and actions is an important element for Parties engaging in national adaptation planning processes and implementation of actions, as recognized in Article 7, paragraph 9(d), of the Paris Agreement.

33. Monitoring and evaluation can be viewed as a mechanism for ensuring adequacy, effectiveness and efficiency and also as a tool for learning (see figure 4).¹⁶ Monitoring and evaluation can answer the following set of questions: (1) does resource allocation for adaptation reflect prioritized adaptation needs? (2) are policies and plans implemented in a cost-effective and efficient manner? (3) are assigned institutions adequate and effective in planning and implementing adaptation? and (4) are cooperative links and networks helpful?

34. As a tool to support continuous learning, monitoring and evaluation could help to answer a different set of questions: (1) what progress has been made to implement strategic adaptation policies or plans? (2) is the country over time becoming less vulnerable or more resilient to the impacts of climate change? and (3) what adaptation tools and processes have been successful and which ones deserve rethinking?¹⁷

35. According to the Organisation for Economic Co-operation and Development (OECD), there are two main prerequisites for the monitoring and evaluation of adaptation:¹⁸

¹⁶ Van den Berg RD and Feinstein O (eds.). 2009. *Evaluating Climate Change and Development*. World Bank Series on Development. Volume 8.

¹⁷ Presentation made by the Organisation for Economic Co-operation and Development at the TEM on 25 May 2016. Available at <http://unfccc.int/files/focus/adaptation/technical_expert_meeting/application/pdf/20160525_mullan_oecd.pdf>.

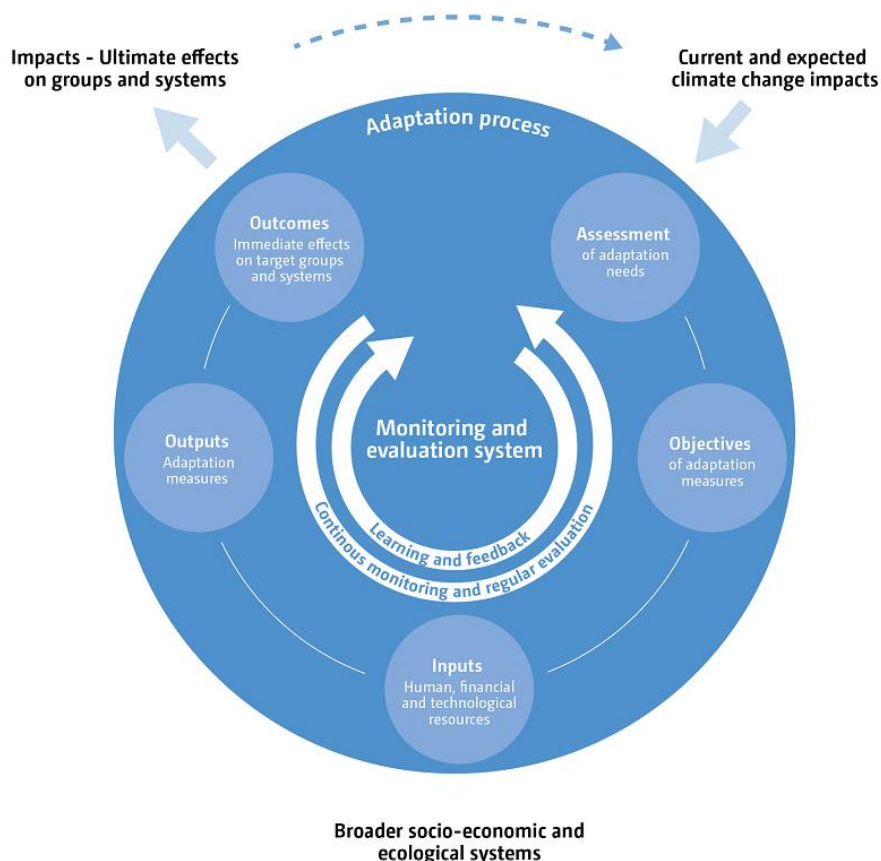
¹⁸ As footnote 17 above.

(a) Data availability and capacity, including climate and socioeconomic data to detect, predict and respond to climate change; capacity to use the data to monitor and evaluate the climate vulnerability;

(b) Coordination (bringing together information providers and users; establishing clear roles and responsibilities). One of the first challenges in establishing a monitoring and evaluation framework can be bringing stakeholders on board and getting buy-in. For example, the Republic of Moldova reported that different sectors responded differently to its monitoring and evaluation initiative, with some being very responsive while others were not eager to cooperate. It further noted that establishing the monitoring and evaluation framework required considerable resources, including expertise and financial resources.¹⁹

36. Monitoring and evaluation of adaptation poses multiple challenges. Measuring output and outcome variables for adaptation projects is often more uncertain than for other types of initiatives. Additionally, the potential synergies between adaptation and other development and disaster risk reduction workstreams necessitate that monitoring and evaluation of adaptation efforts review the entire process, including integrative components with overlapping beneficial impacts.

Figure 4
Monitoring and evaluation of adaptation



Source: Adaptation Committee. 2015. *Enhancing Coherent Action on Adaptation 2012–2015: 2015 Overview report*. Available at <http://unfccc.int/files/adaptation/application/pdf/or_highres.pdf>.

¹⁹ Presentation made by the Ministry of Environment of the Republic of Moldova at the TEM on 25 May 2016. Available at <http://unfccc.int/files/focus/adaptation/technical_expert_meeting/application/pdf/20160525_druta_moldova.pdf>.

E. Means of implementation: finance, technology and capacity-building

37. Successful implementation of adaptation measures often requires large investments. Lack of financial resources and capacity to support adaptation initiatives and projects is a common challenge for many developing countries and especially for the LDCs. This poses barriers to planning, integration, implementation and learning from adaptation efforts.

38. According to the United Nations Environment Programme (UNEP), adaptation finance flows have increased in recent years, but the current level of available finance remains far below that needed to meet the financial needs of developing countries. There is a significant and widening gap between the amount of funding needed to support adaptation efforts and the amount of funding available for such support. Indeed, current adaptation costs are likely to be at least 2 to 3 times higher than international public finance for adaptation. To meet future needs, UNEP suggests that the total finance for adaptation in 2030 would have to be approximately 6–13 times greater than international public finance today.²⁰

39. Many developing countries emphasized that they are and will be undertaking adaptation with domestic support, giving a clear signal that countries are already investing significant resources in adaptation. Many underlined the need for international finance, technology transfer and capacity-building support in line with the principles of the Convention. Such support will determine the ability of Parties to safeguard developmental gains, carry out their mitigation actions and use their domestic resources for developmental purposes.

40. While it is recognized that the private sector can play an important role in complementing public sector funding, Parties have also identified new challenges related to conceptualizing the private sector's engagement in adaptation and understanding the links between private and public sector support activities. The private sector's investment in adaptation can be difficult to quantify and further work is needed to improve the understanding of the private sector's full potential in addressing adaptation.

41. While greater levels of mitigation can reduce the need for additional adaptation efforts, failure to mitigate will result in higher adaptation costs and in some adaptation options being no longer viable.

42. Experiences and learning-by-doing have revealed opportunities for addressing adaptation challenges effectively and for making progress with the adaptation process. Some lessons learned and emerging best practices that present opportunities for enhancing adaptation actions are presented in chapters III and IV.

III. Opportunities for enhancing adaptation actions

43. The focus of this chapter is placed on information that can help to enhance adaptation action in the short term. Attention is also given to identifying those activities that have the potential to be scaled up and to understanding how discrete actions related to the adaptation process can be combined into comprehensive strategies and frameworks.

²⁰ UNEP. 2016. *Adaptation Finance Gap Report*. Available at <<http://web.unep.org/adaptationgapreport/sites/unep.org.adaptationgapreport/files/documents/agr2016.pdf>>.

A. Opportunities for enhancing assessments of impacts, vulnerability and risk

44. The established global warming limit helps to frame impacts, vulnerability and risk assessments in support of adaptation planning and scaling up adaptation efforts (see the example in box 2). In addition, climate and impact data need to be interpreted in specific socioeconomic contexts that define vulnerability and help determine adaptation and resilience measures.

45. There is significant uncertainty about the point (or threshold) at which a climate change impact has a particular level of consequence²¹ for a particular location and related social and economic structures. A risk management framework provides a means to enable a systematic analysis of risks and possible interventions to reduce threats. Risk management refers to the plans, actions or policies implemented to reduce the likelihood and/or consequences of risks or to respond to consequences²² and is a fundamental concept in adaptation. Governments and businesses use risk assessment and management tools to identify physical and financial risks and to determine relevant strategies and investment plans.²³

Box 2

Agrhymet – Assessing the risk of a 2 °C global temperature increase on agriculture and food security in West Africa

Created in 1974, Agrhymet offers hydrological and meteorological services and technical and capacity-building support with a focus on agriculture and food security.^a The West Africa region is recognized as being highly vulnerable to climate change. Extreme weather events, including drought, floods and heatwaves are the primary climate risks in the region. Under a 2 °C scenario, projected climate change impacts include a 5 to 50 per cent decline in agricultural yields by 2050 (without considering adaptation measures), which would put more than 20 per cent of the population at risk of hunger. This loss translated into economic losses is projected to be between 2 and 4 per cent of gross domestic product. Analysis shows that restoring 10 per cent of agricultural land per year in the Sahel and West Africa through climate-smart agriculture practices would require an investment of USD 50 million to USD 170 million per year and provide an estimated return on investment of between 50 and 70 per cent.

Note: Based on the presentation made by Agrhymet at the technical expert meeting on 25 May 2016. Available at <http://unfccc.int/files/focus/adaptation/technical_expert_meeting/application/pdf/20160524_kaire.pdf>.

^a Agrhymet is a specialized agency of the Permanent Interstate Committee for Drought Control in the Sahel involving 13 West African countries: Benin, Burkina Faso, Cabo Verde, Chad, Côte d'Ivoire, Gambia, Guinea, Guinea-Bissau, Mali, Mauritania, Niger, Senegal and Togo.

46. Encouraging a focused dialogue between the scientific community and policymakers/decision makers provides an opportunity to strengthen the science, policy and

²¹ As footnote 14 above.

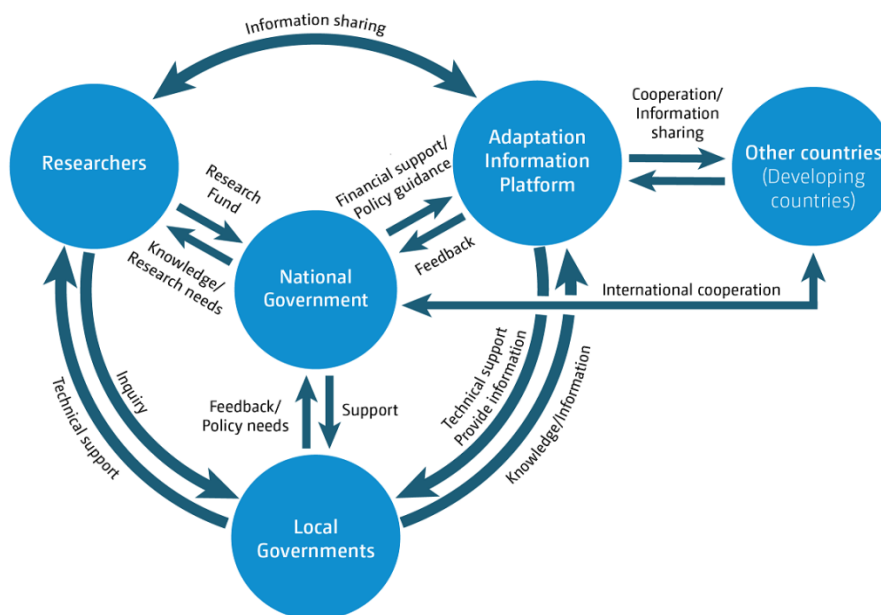
²² This definition of “risk management” is taken from the IPCC Working Group II Fifth Assessment Report Glossary. Available at <http://ipcc-wg2.gov/AR5/images/uploads/WGIIAR5-Glossary_FGD.pdf>.

²³ International Energy Agency. 2015. *Making the Energy Sector More Resilient to Climate Change*. Available at <<http://www.iea.org/publications/freepublications/publication/making-the-energy-sector-more-resilient-to-climate-change.html>>.

practice interface for more targeted assessments and more effective and informed adaptation decisions. Discussions during the TEMs regarding support for decision-making through climate science clearly highlighted the importance of having a mechanism to develop and sustain a dialogue between scientists and policymakers/decision makers. Intensive and continuous dialogue between the scientific and policymaking communities is urgently needed to build effective adaptation support tools and identify risk management strategies. Figure 5 illustrates how the science, policy and practice interface functions in Japan.

47. Boundary organizations, which exist at the interface between science, policy and practice and facilitate interaction between those communities, can be useful in helping decision makers to make informed decisions. For example, UKCIP (formerly known as the UK Climate Impacts Programme), a multidisciplinary organization, does this by bridging, translating and synthesizing information; understanding different motivations and needs and developing appropriate communication approaches; and providing practical support to practitioners, such as tools and guidance, accessible science and a help desk function. The Notre Dame Global Adaptation Initiative is another example of a boundary organization, which informs strategic, operational and reputational decisions regarding supply chains, capital projects and community engagement. It supports countries in measuring not only their vulnerability but also their readiness to take on adaptation investments. Countries could benefit from their own version of boundary organizations, and climate finance could provide support for establishing or strengthening such organizations at the national or regional levels.

Figure 5
Japan’s adaptation information platform



Source: Presentation made by Japan at the technical expert meeting on adaptation on 25 May 2016. Available at <http://unfccc.int/files/focus/adaptation/technical_expert_meeting/application/pdf/20160525_akio_takemoto.pdf>.

48. Existing experiences²⁴ with the facilitative role of boundary organizations demonstrate that the ability of decision makers to make informed decisions based on the best available science can be enhanced by:

- (a) Placing importance on listening to decision makers, understanding their motivation and making use of their existing strengths;
- (b) Promoting peer-to-peer learning;
- (c) Putting more effort into linking science, policy and practice;
- (d) Identifying funding opportunities to establish and sustain boundary organizations in countries and/or regions.

49. The needs and knowledge of local communities also need to be well captured as they are at the front line of climate change impacts. Engaging local communities through a participatory process right at the beginning of the adaptation efforts and throughout the planning and adaptation phase is therefore important. This endeavour is pursued by the Global Network of Civil Society Organisations for Disaster Reduction, which works together with local communities to capture local knowledge of all threats, everyday and extraordinary, and collates data which can be analysed by age, gender and other socioeconomic factors. The data can also be used to inform local, national and global policies, plans and projects, conduct local monitoring of progress of all post-2015 frameworks, including adaptation, and support and strengthen local action and learning.²⁵

50. The language in which data and information are shared needs to be adapted to the needs of stakeholders. For example, smallholder farmers in Mali receive text messages suggesting crop types to plant based on rain patterns observed before 1 June. While most farmers would not be able to interpret the climate data if they were transmitted to them, they readily understand information on crops and can integrate this into their farming practices.

B. Opportunities for enhancing adaptation planning and mainstreaming in development planning processes

51. Complementarity of adaptation planning approaches is desirable and encouraged, for example between the so-called top down and bottom-up approaches. Successful adaptation planning will often require a careful mix of the two approaches. In addition, adaptation planning may have variable and specific outputs at a given point in time, including comprehensive national adaptations plans, programmes and policies. The structure and form of the NAPs will vary by country, and may include sectoral plans and subnational plans to provide the necessary guidance in addressing adaptation needs.²⁶

52. While sectoral approaches to adaptation planning generally prevail, the nexus approach (see box 3), which integrates interlinked sectors, is gaining importance and attention. The nexus approach linking water, energy, agriculture and environment is a pertinent example. Adaptation is a complex concept that requires stepping out of habitual scopes of sectors, rigid government levels and stakeholder groups.

²⁴ Presentation made by UKCIP at the TEM on 24 May 2016. Available at <http://unfccc.int/files/focus/adaptation/technical_expert_meeting/application/pdf/20160524_pringle.pdf>.

²⁵ Presentation made by Caritas Internationalis at the TEM on 25 May 2016; and Global Network of Civil Society Organisations for Disaster Reduction. 2015. *Everyday Disasters and Everyday Heroes*. Available at <gndr.org/images/newsite/PDFs/Frontline_FINAL_EN.pdf>.

²⁶ LEG. 2012. *National Adaptation Plans: Technical Guidelines for the National Adaptation Plan Process*. Available at <http://unfccc.int/resource/docs/publications/publication_ldc_nap_techguidelines.pdf>.

Box 3

The rationale for taking a nexus approach linking water, energy, food security and environment

The nexus approach recognizes that there are complex and dynamic interdependencies between sectors. Many countries and institutions have embraced the nexus approach linking water, energy, agriculture and environment. Rapid economic growth, expanding populations and increasing prosperity are driving up demand for energy, water and food, especially in developing countries. By 2050, the demand for energy will nearly double globally, with water and food demand estimated to increase by over 50 per cent. The ability of existing water, energy and food systems to meet this growing demand, meanwhile, is constrained given the competing needs for limited resources. Informed planning for future development requires an understanding of numerous connections presented by the energy, water, food and environment nexus. As for any adaptation approaches, solutions are devised through the active engagement of a broad range of stakeholders.

53. In addition to cross-sectoral integration, integration across themes such as disaster risk reduction and sustainable development are also needed to implement adaptation successfully and avoid maladaptation.

54. There is recognition that adaptation, disaster risk reduction and sustainable development have many synergies. The linkages between development and disaster risk reduction provide a number of avenues for enhancing societal resilience to natural disasters and climate change and thus represent an opportunity for adaptation. For example, a special report by the IPCC highlights the benefits of considering disaster risk in national development planning if strategies to adapt to climate change are adopted.²⁷ In addition, incorporating adaptation into multi-hazard risk management may be an effective strategy for the efficient integrated management of natural hazards and future climate risks.²⁸ The experience of Pacific island countries in developing a joint national action plan for climate change and disaster risk management can generate replicable good practices in other regions (see box 4 for further information).

Box 4

Joint national action plan^a

Since 2010, Pacific island countries have taken steps to develop and implement an integrated action plan, or joint national action plan (JNAP), for climate change and disaster risk management. By developing JNAPs countries seek to mainstream both disaster risk management and climate risk into national and subnational planning and budgetary processes. A JNAP is developed as part of a suite of national instruments to support a country's national efforts for sustainable development and resilience. Three different pathways have been used in the region to facilitate the integration of adaptation and disaster risk management in development. Many countries focused on developing their JNAP linked to their national sustainable development strategies or equivalent (for example, in Cook Islands, Tonga and Tuvalu). Some (for example, Palau and Vanuatu) started by strengthening the coordination between the activities of their national disaster management office and the national agency/focal point addressing climate change, and others decided to focus on sectoral-level mainstreaming and implementation (for example, Solomon Islands).

²⁷ IPCC. 2012. *Special Report on Managing the Risks of Extreme Events and Disasters to Advance Climate Change Adaptation*. Available at <<http://www.ipcc-wg2.gov/SREX/>>.

²⁸ As footnote 14 above.

^a Secretariat of the Pacific Regional Environment Programme. 2013. *JNAP Development and Implementation in the Pacific: Experiences, Lessons and Way Forward*. Available at <<https://www.sprep.org/attachments/Publications/CC/JNAP.pdf>>.

55. Efforts to mainstream adaptation into development policies, programmes and funds contribute to a successful and comprehensive adaptation planning and implementation process as they help in prioritizing adaptation. Once entry points have been identified, such linkages allow for comprehensive, holistic and development-focused adaptation. Many countries have already integrated climate change adaptation into either their national plans and policies or some of their sectoral plans and others are in the process of doing so.²⁹ Parties also reported on the opportunity to align national adaptation strategies with regional adaptation strategies and action plans.

56. Establishing financial cycles for adaptation and integrating them with the relevant level of planning and budgeting facilitates consistency of adaptation efforts. For example, in Ghana a national climate change adaptation strategy was developed with wider consultations and budgetary considerations. Training and capacity-building programmes for planning and budgeting adaptation actions are also offered.³⁰ The European Union (EU) has incorporated spending on climate action into its whole budget, with a minimum of 20 per cent of the Multiannual Financial Framework (2014–2020) reserved for climate-related expenditure.³¹

57. Ultimately, countries should start with those adaptation approaches that fit their particular situations. For example, in Costa Rica,³² in order to define adaptation goals and decide on the strategy for implementation, a dialogue at the national level was launched focusing on adaptation action contained in INDCs and their link to NAPs. In the Philippines, a joint adaptation and mitigation action is being pursued in the agriculture sector. The initiative aims at supporting agriculture and fisheries, building resilience and improving capabilities to respond to disasters. Implementation is envisaged through mainstreaming adaptation into sectoral plans and policies and a specially designated office was created to oversee the mainstreaming. The Netherlands, with 60 per cent of its land prone to flooding, decided in 2010 to better prepare its population to the adverse impacts of climate change and launched the Delta Programme. Initially a mitigation and adaptation initiative, it has over the years increasingly focused on adaptation to address flooding and water management. The Delta Programme led to the nomination of a Delta commissioner and the introduction of a coordinated decision-making process across agencies and with the engagement of civil society, the business community and organizations with specialized water expertise. In addition, a Delta Act was adopted and a special fund established.

58. Regardless of the approaches pursued, experiences demonstrate that some key elements common to all adaptation planning approaches support effective adaptation. Box 5 highlights some of these elements derived from the Netherlands experience with its Delta Programme.

²⁹ As footnote 14 above.

³⁰ Presentation made by the Environmental Protection Agency of Ghana at the TEM on 24 May 2016. Available at <http://unfccc.int/files/focus/adaptation/technical_expert_meeting/application/pdf/20160524_amoah.pdf>.

³¹ Submission by the Netherlands and the European Commission on behalf of the European Union and its member States. Available at <http://www4.unfccc.int/submissions/Lists/OSPSubmissionUpload/75_219_130989808402430269-NL-02-03-%20WS2%20submission%20TEP.pdf>.

³² Presentation made by the Ministry of Environment and Energy of Costa Rica at the TEM on 24 May 2016. Available at <http://unfccc.int/files/focus/adaptation/technical_expert_meeting/application/pdf/20160524_girot.pdf>.

Box 5

Lessons learned from the Netherlands Delta Programme

The Delta Programme has demonstrated the importance of developing a holistic long-term vision and related policy objectives to drive adaptation efforts. Securing a mandate through a legal Act helped to ensure long-term stability and the delineation of roles and responsibilities. Long-term stability is also favoured by the establishment of a dedicated fund. Evidence shows that anchoring the vision and objectives in national policy frameworks combined with regional strategies allows for the development of integrated measures supported by the engagement of national, regional and local governments, as well as local developers. Coordinated decision-making, multi-governance stakeholder engagement and an institutional arrangement to act as the interface between science and policy enhance cooperation and coherence of actions. Accountability is also important and an annual report is provided to the Netherlands Parliament. The programme has also demonstrated that governance and technological innovations can be key to advancing adaptation.

Note: Based on the presentation made by the Ministry of Infrastructure and Environment of the Netherlands at the technical expert meeting on 24 May 2016. Available at <http://unfccc.int/files/focus/adaptation/technical_expert_meeting/application/pdf/20160524_lilian_vanderaarsen.pdf>.

C. Opportunities for enhancing implementation

59. Answering the following questions can assist in analysing opportunities for enhancing implementation and adaptation measures: (1) what is the most appropriate strategy for the implementation of adaptation activities, including timing, target areas/beneficiaries, responsible authorities and sequencing of activities? (2) how can the implementation build on and complement existing adaptation activities? and (3) What are the potential costs of implementing the NAPs or other adaptation plans and how can these costs be met?³³

60. Designing and implementing policies that encourage adaptive practices and investments in resilience building is necessary to motivate adaptation actions, despite uncertainties regarding the magnitude and timing of climate change impacts. Emerging policies and measures that governments consider to incentivize adaptation include design and safety standards, zoning with assigned vulnerability criteria to regulate siting of construction, economic incentives that allow businesses to receive a return on their investments in resilience, support for innovation/research and development in resilient techniques and technologies.

61. Businesses do not use the term adaptation but conceptualize and address it through risk assessment and risk management tools as any other risk. One of those tools is offered by standards. Both mandatory and voluntary standards could play a critical role in catalysing adaptation action. For example, design and safety standards for equipment and infrastructure, often developed in private regulatory regimes, can be adapted to withstand the extreme weather events of the future and thus become important instruments of adaptation. The global economy and the everyday work of most industries are regulated by standards, and many of those will need to be 'climate proofed'. Businesses deal with various standards in their daily operations and adaptation standards may help to bring businesses on board in adaptation awareness and actions. Standards could contribute to

³³ As footnote 26 above.

mainstreaming adaptation into businesses' actions and practices.³⁴ Box 6 further illustrates the views of the private sector on standards.

Box 6

DNV GL sharing a private sector view on standards

Emerging efforts to standardize adaptation to climate change have provided an opportunity to: (1) integrate adaptation considerations in the way businesses operate; (2) facilitate monitoring and evaluation of adaptation; and (3) scale up adaptation efforts.

Standards promote coherence and facilitate sharing of best practices; they enable knowledge and technology transfer. They also shape demand and enhance innovation. There are formal standards developed by recognized national and international standards organizations. These standards gain legitimacy through voluntary consensus standard setting. There are also other types of standards, including norms, rules, guidelines and industry recommended practices.

Note: Based on the presentation made by DNV GL at the technical expert meeting on 25 May 2016. Available at <http://unfccc.int/files/focus/adaptation/technical_expert_meeting/application/pdf/20160525_stclair_dnvgl.pdf>.

62. A programmatic approach can be of value to implement adaptation measures that address medium- and long-term adaptation needs since a well-designed programme can accommodate uncertainties, changing circumstances and shifts in agenda. While the single-project approach can also yield benefits, these are often of shorter-term nature than the programmatic approach. Before choosing the most relevant approach to addressing their adaptation needs, countries would need to assess the advantages and disadvantages of each approach within the larger context of national development planning. Box 7 offers lessons learned from the Pilot Program for Climate Resilience.

63. Prioritization of adaptation in the broader context of national development planning will help policymakers and relevant stakeholders select the most important adaptation measures to be implemented for a country or region given competing development needs. It will enable the identification of high-priority and feasible adaptation measures that will build on and complement existing adaptation activities, and fit with the national vision on adaptation as well as national goals for environmental, social and economic development. The selection of the most appropriate or relevant adaptation strategies would include considerations of a set of criteria that is in line with national goals for sustainable development. The process would need to take into account where climate impacts are likely to be most severe and which people or which systems are most vulnerable. The criteria to be used at the national level may include: timing/urgency for action, including giving priority to pre-2020 action; cost and cost-benefit; efficacy through the identification of 'no regrets' solutions and flexibility and robustness.³⁵

Box 7

Lessons learned from the Pilot Program for Climate Resilience

The Pilot Program for Climate Resilience, an initiative under the Climate Investment Funds, aims at mainstreaming climate resilience into core development planning for transformation at scale. The first round targeted 28 countries with a funding range per country of USD 30–110 million. Some important lessons have been learned from the

³⁴ Presentation made by DNV GL at the TEM on 25 May 2016. Available at <http://unfccc.int/files/focus/adaptation/technical_expert_meeting/application/pdf/20160525_stclair_dnvgl.pdf>.

³⁵ As footnote 25 above.

first round of the program's implementation, including the following: institutional coordination at the highest level is the key for successful implementation; adaptation requires going beyond current variabilities to address slow onset and longer-term climate trends, adaptation also requires moving beyond 'low regrets', win-win and incremental measures. User-oriented customized climate services are necessary for adaptation and can be developed by harnessing universal data, hydrometeorological data and technological innovation. Countries are beginning to see the benefits of tracking overall national progress towards resilient development. An agreed upfront monitoring and reporting framework (embedded in national processes) enables progress to be measured and managed.

Note: Based on the presentation made by the World Bank at the technical expert meeting on 24 May 2016. Available at <http://unfccc.int/files/focus/adaptation/technical_expert_meeting/application/pdf/20160524_kanta_kumari.pdf>.

D. Opportunities for enhancing monitoring and evaluation

64. A monitoring and evaluation framework should be integral to the adaptation process and be designed at the onset of adaptation plans and initiatives. This would allow visions of desirable outcomes to be integrated with the concrete tools that would be used to measure such outcomes. It is also advisable to use the monitoring and evaluation frameworks of the United Nations Sustainable Development Goals whenever applicable for adaptation. The Republic of Moldova's experiences in developing a national adaptation monitoring and evaluation framework is shared in box 8.

65. Monitoring and evaluation is more than just the design of indicator frameworks. A portfolio of monitoring and evaluation tools is needed to assess the adequacy, effectiveness and efficiency of adaptation efforts. The OECD identifies different types of tools for monitoring and evaluation: climate change risk and vulnerability assessments (against the baseline); indicators to monitor progress on adaptation priorities; project and programme evaluations to identify effective adaptation approaches; and national audits and climate expenditure reviews to examine whether public expenditures on adaptation are aligned with set goals and are allocated in a cost-effective manner.

66. Given the complexity of the parameters that need to be assessed and the lack of data, there is a strong argument for starting with existing data. In addition, participatory and qualitative approaches to monitoring could help to address data gaps. In any case, knowledge-sharing and joint knowledge development and interpretation make it easier for different sector experts to work together. Consultation processes when all relevant ministries and stakeholders are involved improve understanding and build confidence.

Box 8

Example of development of a national adaptation monitoring and evaluation framework in the Republic of Moldova

In the Republic of Moldova, the monitoring and evaluation framework has been designed as a key component of the national adaptation process, which is set by the national climate change adaptation strategy and action plan. Monitoring is undertaken to assess whether sectors are becoming less vulnerable. It is done through tracking success in developing and implementing national and sectoral action plans and tracking the implementation of adaptation goals set for each sector. The implementation of adaptation actions is being monitored at three levels: (1) the micro level, that is, projects at the sectoral level; (2) the meso level, that is, sector-based progress using aggregated data to assess the efficiency of adaptation planning; and (3) the macro level focusing on cross-sectoral assessment and monetary value of losses. The Party is currently nominating a focal point for each sector, finalizing the establishment of the task force and defining indicators. While indicators are being developed for each level, they will not be the only tool and reporting will be required to track expenditures. The first assessment will be the baseline assessment.

The Republic of Moldova has developed guidance on how to mainstream adaptation into sectors. It has also organized intersectoral activities and events to raise awareness and explain the process and its objectives in order to highlight good practices in some sectors and persuade other sectors of the benefits of mainstreaming adaptation.

Note: Based on the presentation made by the Ministry of Environment of the Republic of Moldova at the technical expert meeting on 25 May 2016. Available at http://unfccc.int/files/focus/adaptation/technical_expert_meeting/application/pdf/20160525_druta_moldova.pdf.

E. National adaptation plans as a vehicle for adaptation planning and implementation

67. Countries recognize that the process to formulate and implement NAPs provides an opportunity to address synergies between adaptation and development. Thus, NAPs are seen by many Parties as a vehicle that helps to articulate countries' adaptation needs in the light of their development priorities, prepare countries for adaptation implementation, facilitate implementation on the ground through programmatic approaches and signal to others that adaptation implementation is on course (see its essential functions in figure 6). The process to formulate and implement NAPs encompasses not only government agencies and ministries, but also local authorities, communities, the private sector, non-governmental organizations and other relevant stakeholders. It also offers an opportunity to link national and subnational planning processes to local knowledge and experience. Boxes 9 and 10 present the experiences of Grenada and Myanmar, respectively, in conducting the process.

Box 9

Grenada's national adaptation plan

Grenada initiated the process to formulate and implement a national adaptation plan (NAP) in February 2015 through broad consultations, building on the 2007–2011 climate change policy and action plan. A mandate was developed and adopted by the Cabinet in May 2015. The NAP development will be aligned with the updated climate change policy and development policies and plans, and to the extent possible with the technology needs assessment and the second national communication. The NAP formulation is expected to be completed in the third quarter of 2016. The geographic setting facilitates interaction between the Cabinet and the community and several

awareness-raising activities have been successfully conducted, including through engaging schools and community groups and establishing community liaison officers.

Note: Based on the presentation made by the Climate Change Focal Point of the Government of Grenada at the technical expert meeting on 25 May 2016. Available at <http://unfccc.int/files/focus/adaptation/technical_expert_meeting/application/pdf/20160525_duncan_grenada.pdf>.

68. The Myanmar experience documented in box 10 demonstrates how countries could build on previous and current efforts related to vulnerability assessment and reducing vulnerability, the development of adaptation options and projects as well as capacity-building and enabling initiatives to develop a comprehensive NAP and come up with a clear picture of how to implement it. This highlights how the country articulates its NAPA and NAP efforts.

Box 10

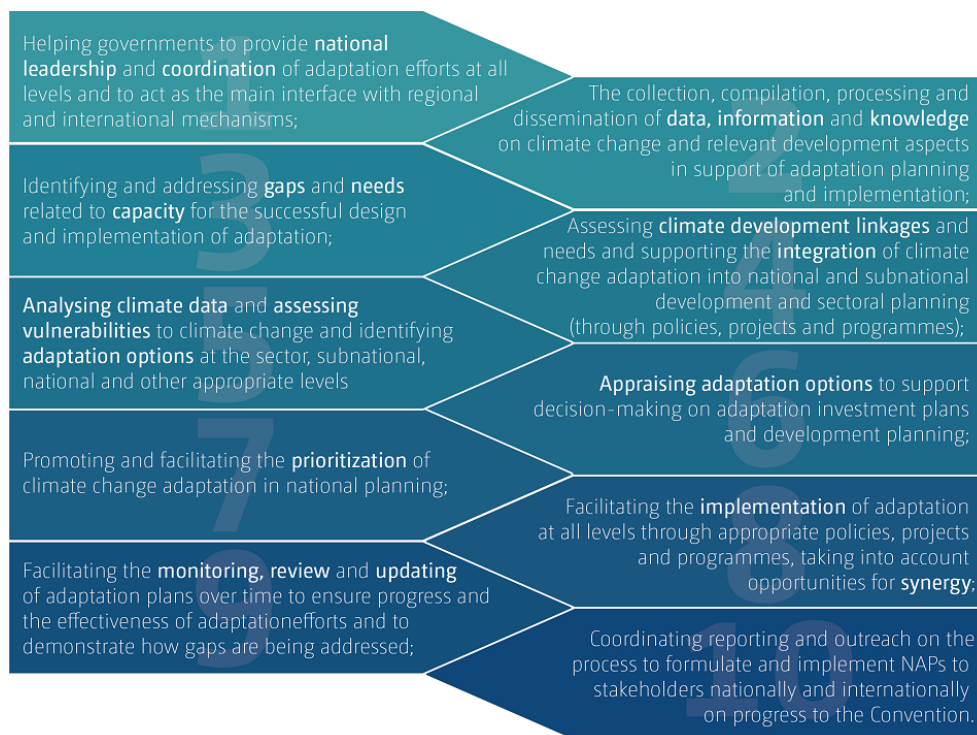
Myanmar's experience in moving from national programmes of action to national adaptation plans

Myanmar's national adaptation programme of action (NAPA) allowed the identification of priority sectors for climate adaptation (e.g. agriculture, forestry, public health). Implementation is ongoing. Recently, Myanmar embarked on the national adaptation plan (NAP) process, during which a stocktaking analysis was conducted to identify current information on impacts, risk, vulnerability and adaptation as well as gaps and barriers. Myanmar has also developed a road map, which lays out activities to be undertaken in the short and long term. In the short term, Myanmar intends to develop a climate change strategy and action plan and strengthen the country's technical capacity, including for mainstreaming adaptation and linking adaptation and disaster risk management. The institutional coordination structure for the NAP, with two governance bodies - a policy arm and a technical support and coordination unit - was formally established in 2016 with a mandate to mainstream climate change adaptation at all levels.

Experiences with the NAPA and early experience with the NAP indicate that the following elements are important for long-term adaptation planning: ensuring political support at the highest level, strengthening capacity-building, promoting coordination across sectors, mainstreaming adaptation into development planning processes; enhancing technology; and sustaining financial support.

Note: Based on the presentation made by the Ministry of Transport and Communication of Myanmar at the technical expert meeting on 25 May 2016. Available at <http://unfccc.int/files/focus/adaptation/technical_expert_meeting/application/pdf/20160525_hrin_nei_thiam.pdf>.

Figure 6
Ten essential functions of the process to formulate and implement national adaptation plans



Source: Least Developed Countries Expert Group. 2015. *Best practices and lessons learned in addressing adaptation in least developed countries, volume 3*. (p.15). Available at <http://unfccc.int/files/adaptation/application/pdf/leg_bp11_volume3.pdf>.

IV. Options for supporting enhanced adaptation action

69. A wide range of actors have key roles to play in adaptation, including all levels of government, non-governmental organizations, businesses and the private sector, and civil society. In addition, international and regional organizations provide valuable technical, financial and coordinating support to adaptation efforts on the ground. This section highlights how enabling factors and activities may help to enhance adaptation planning and implementation.

A. Finance and investments

70. The Adaptation Committee identified several categories of support available to countries, especially developing countries, to help them with their adaptation planning and implementation and in particular through the process to formulate and implement NAPs.³⁶ Financial, technical and capacity-building assistance are among the key categories of support.

71. The roles of various players in adaptation financing, including dedicated funds established under the Convention and its Kyoto Protocol, multilateral and bilateral

³⁶ Adaptation Committee. 2015. *Enhancing Coherent Action on Adaptation 2012–2015: 2015 Overview Report*. Available at <http://unfccc.int/files/adaptation/application/pdf/or_highres.pdf>.

assistance as well as private sector investments and support have been recognized. Funding for adaptation under the Convention and its Kyoto Protocol is available through the Least Developed Countries Fund (LDCF) and the Special Climate Change Fund (SCCF), managed by the Global Environment Facility, as well as the Green Climate Fund (GCF) and the Adaptation Fund. The COP has requested the LDCF, the SCCF and the GCF to provide funding for the process to formulate and implement NAPs, and these funds have started to make arrangements to offer countries such support. Further information on the GCF is provided in box 11.

72. The Adaptation Fund's direct access modality was the first of this kind to be fully operational among climate funds. Through direct access, accredited national implementing entities are able to directly access financing and manage all aspects of climate adaptation and resilience projects, from design through to implementation and monitoring. The Adaptation Fund has accredited 23 national implementing entities throughout the world. Of those, 40 per cent are in the LDCs and small island developing States (SIDS). To date, the Adaptation Fund has 18 approved projects from national implementing entities in 13 countries.

Box 11

The Green Climate Fund

The Green Climate Fund (GCF), which recently entered into operation, is expected to play a significant role in financing adaptation, as it seeks to reach an equal split between adaptation and mitigation. By 8 July 2016, USD 10.3 billion had been pledged to the GCF.^a The trend for the period 2011–2015 is one of growth, and includes the approval of the first eight projects of the GCF, four of which are adaptation projects. In addition, the GCF also provides support for national adaptation plan (NAP) formulation. At the 13th meeting of the GCF Board, the decision was made to support the formulation of NAPs through the GCF Readiness and Preparatory Support Programme. In response to guidance from the Conference of the Parties, the Board decided that the Executive Director can approve up to USD 3 million per country under the Readiness and Preparatory Support Programme for NAP formulation or other adaptation planning processes. It also decided that project proponents can apply for up to USD 1.5 million to support project preparation activities such as pre-feasibility and feasibility studies, environmental, social and gender studies and risk assessments.^b

^a GCF. 2016. *Status of Pledges and Contributions made to the Green Climate Fund*. Available at <http://www.greenclimate.fund/documents/20182/24868/Status_of_Pledges.pdf/eef538d3-2987-4659-8c7c-5566ed6afd19>.

^b GCF Board document GCF/B.13/32/Rev.01, pages 7 and 13. Available at <http://www.greenclimate.fund/documents/20182/226888/GCF_B.13_32_Rev.01_-_Decisions_of_the_Board__thirteenth_meeting_of_the_Board__28-30_June_2016.pdf/c93a0291-28c1-4bfc-bc22-cf4c590c3c83?version=1.2>.

73. Multilateral and bilateral technical support and investments make a significant contribution to developing countries' efforts on adaptation. According to a report by the UNDP, total bilateral and multilateral finance for climate change adaptation reached USD 25 billion in 2014, of which USD 22.5 billion targeted developing countries, highlighting a steady rise over the past five years.³⁷ An example of a multilateral assistance initiative with expanding scope and budget is the multilateral development banks' Pilot Program for Climate Resilience (PPCR). It finances technical assistance and investments to support countries' efforts to integrate climate risks and resilience into core development planning

³⁷ UNEP. 2016. *The Adaptation Gap Report 2016*. Available at <<http://web.unep.org/adaptationgapreport/2016>>.

and implementation. The first phase of the PPCR (2008–2014) involved 11 pilots comprising 9 stand-alone country pilots and 2 regional programmes. A second phase of the PPCR has been initiated and as at May 2015, 10 new countries were receiving PPCR funding to prepare their strategic programmes.³⁸

74. The Global Climate Change Alliance+ is an initiative of the EU, providing technical and financial support to the LDCs and SIDS to integrate climate change into their development policies and budgets, and to implement adaptation projects and programmes, with a focus on supporting countries that have climate policies or plans in place, or that intend to do so. Hence, countries that are embarking on the NAP process and are undertaking activities that contribute to the formulation of their NAPs are good candidates.³⁹

75. In addition to dedicated funds, multilateral and bilateral financing, private sector financing for adaptation is gaining importance and recognition (see box 12 for an example of a private sector adaptation-related initiative). Beyond management of its own exposure to climate risks, different kinds of private finance – debt, equity, insurance products – hold potential for helping to bridge the adaptation finance gap. However, data gaps and difficulties in measuring and reporting private financial flows persist; thus it is difficult to assess the real extent of private sector financing for adaptation.⁴⁰ Climate-resilience activities are often integrated into development interventions or business activities, and therefore adaptation-related investments are difficult to identify and classify. Outside of a purely adaptation-related context, private sector contributions – from foreign direct investment, private debt, remittances and official development assistance – make up the largest components of financial inflows to developing countries.

Box 12

Corporate support to climate-resilient agriculture: a look at the Olam Livelihood Charter

The corporate sector represents USD 4 trillion annually in global food retail sales.^a It operates throughout the value chain, including inputs and farming, storage and transport, processing and purchasing and trading. Olam International is an agribusiness operating from seed to shelf in 70 countries, supplying food and industrial raw materials to over 16,200 customers worldwide. This company developed the Olam Livelihood Charter, an initiative that aims to build resilient smallholder supply chains by improving the livelihoods of farmers, their communities and environment. Support is provided through: finance to help farmers make longer-term investments in their farms and overcome constraints and rebuild when affected by climate events; information communication and technology to improve traceability and mapping; training, including to introduce more productive climate-smart agriculture techniques; facilitation of market access; and investment into communities to improve the resilience of the broader community and longer-term development. However, Olam International, as well as others in the corporate sector, are well aware that they cannot do it alone and need the intervention of the public sector, including for increasing land tenure security for suppliers, addressing poor weather information, investing in local and crop-specific scientific research, improving transport infrastructure and increasing collaboration on extension services.

Note: Based on the presentation made by PricewaterhouseCoopers at the technical expert meeting on 24 May 2016. Available at

³⁸ Adaptation Committee. 2015. *Navigating the Landscape of Support for the Process to Formulate and Implement National Adaptation Plans: 2015 Overview for developing countries*. Available at <http://unfccc.int/files/adaptation/application/pdf/nap_highres.pdf>.

³⁹ As footnote 38 above.

⁴⁰ As footnote 38 above.

<http://unfccc.int/files/focus/adaptation/technical_expert_meeting/application/pdf/20160524_stephenson.pdf>. Further information is available at <olamgroup.com/sustainability/olam-livelihood-charter/>.

^a Data from the United States Department of Agriculture Economic Research Service. Available at <<http://www.ers.usda.gov/topics/international-markets-trade/global-food-markets/global-food-industry.aspx>>.

B. Technology and capacity-building support

76. Over the last several years capacity-building efforts have focused on providing access to climate data; developing, testing and scaling up new approaches to mobilizing climate finance and promoting climate finance readiness, and on planning and managing adaptation investment. In recent years, capacity-building efforts have also been directed at INDC and NAP development and implementation. Strengthening institutions, communities and individuals to plan and implement adaptation is the critical factor in successful adaptation.

77. In order to supplement national capacity-building efforts, bilateral and multilateral institutions are also helping to support regional capacity-building, which is proving to be very effective in information exchanges between countries (see box 13 for an example of a bilateral initiative). Such countries also learn from each other and develop regional networks of cooperation, coordination and support.

Box 13

Support to national adaptation plans through the National Adaptation Plan Global Network

The National Adaptation Plan Global Network (NAP Global Network) was launched in December 2014 by Brazil, Germany, Jamaica, Japan, Malawi, Peru, the Philippines, South Africa, Togo, the United Kingdom of Great Britain and Northern Ireland and the United States of America. The International Institute for Sustainable Development serves as the secretariat. The network strives to: (1) increase engagement of and improve coordination among bilateral development partners on national adaptation plan (NAP) support; (2) facilitate capacity-building and technical exchange on challenges related to designing and implementing NAPs; and (3) support in-country activities on the development and implementation of NAPs.

The NAP Global Network is currently exploring options for increasing domestic resources for adaptation by using savings from fossil fuel subsidy reform and revenues from fuel duties.

Note: Based on the presentation made by the United States Department of State at the technical expert meeting on 24 May 2016. Available at <http://unfccc.int/files/focus/adaptation/technical_expert_meeting/application/pdf/20160524_ryder-rude.pdf>. Further information is available at <<http://www.napglobalnetwork.org/>>.

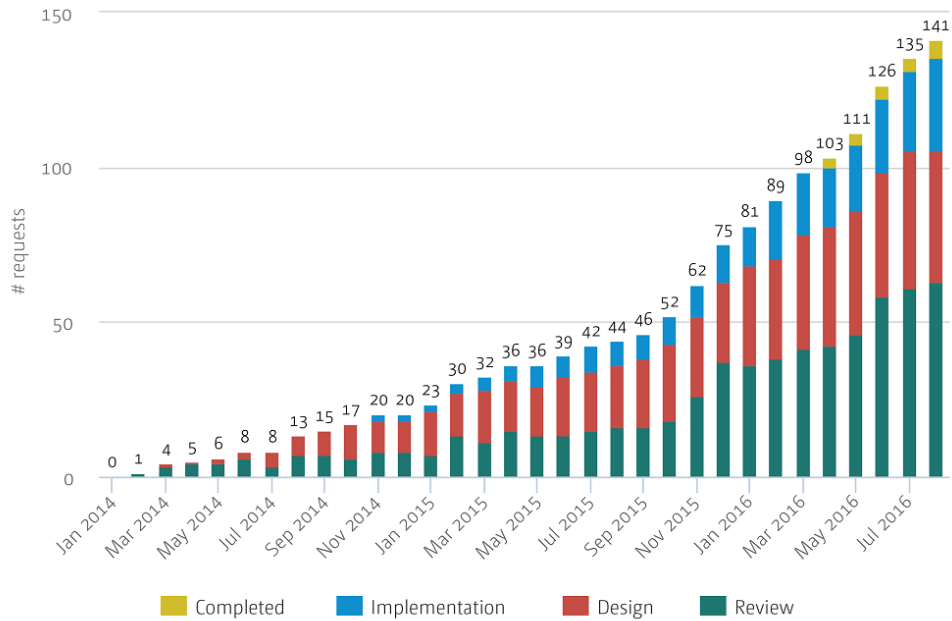
78. The Technology Mechanism established under the Convention is a good starting point to address technological needs. Through its two components, the Technology Executive Committee⁴¹ and the Climate Technology Centre and Network (CTCN),⁴² the Technology Mechanism responds to countries' needs for technology development and

⁴¹ Further information is available at <http://unfccc.int/ttclear/pages/tec_home.html>.

⁴² Further information is available at <<https://www.ctc-n.org/>>.

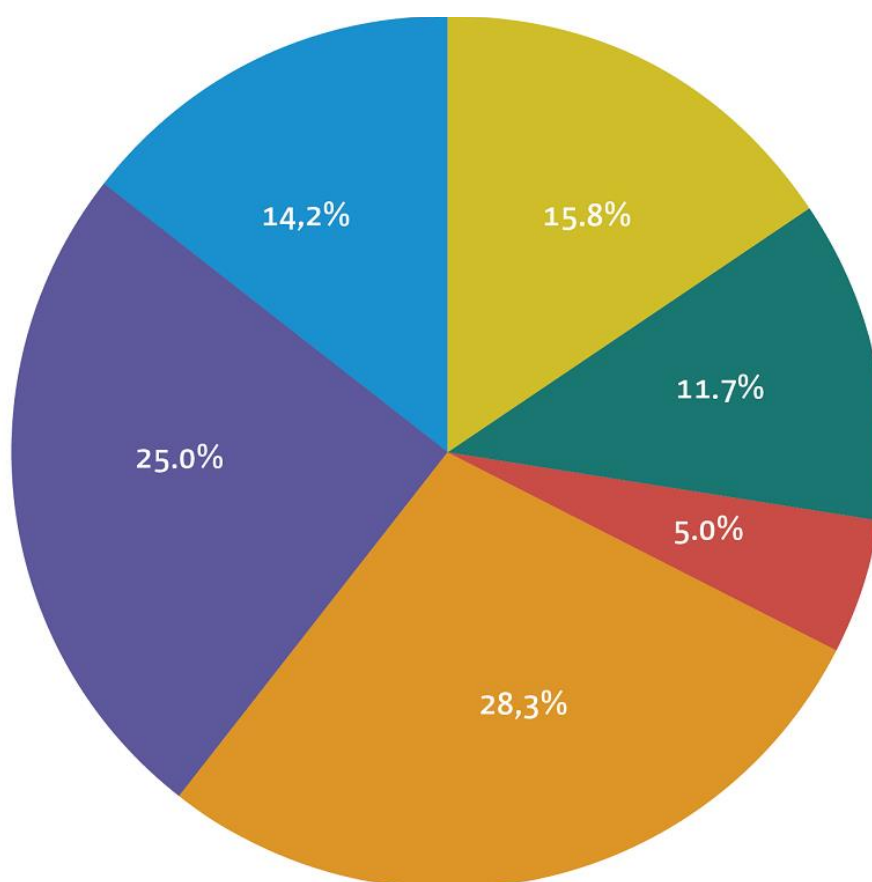
transfer at both the policy and the implementation level. The CTCN is the implementation arm of the mechanism and offers technical assistance to developing countries. Figures 7 and 8 provide an overview of the CTCN technical assistance portfolio and type of requests received.

Figure 7
Overview of the Climate Technology Centre and Network technical assistance by stage



Source: Climate Technology Centre and Network. Available at <<https://www.ctc-n.org/technical-assistance/request-visualizations>>.

Figure 8
Overview of the Climate Technology Centre and Network technical assistance portfolio: distribution of requests by type of assistance



Source: Climate Technology Centre and Network. Available at <<https://www.ctc-n.org/technical-assistance/request-visualizations>>.

C. Sustaining a knowledge and learning system

79. By definition, an adaptive system is a learning system. As such, generating and sharing knowledge should result in activities that are embedded in any adaptation process. It is also important to recognize that communication is a two-way information transfer and that as much can be learned from sharing failures as from sharing successes. Box 14 provides an example of how knowledge management can be sustained through regional cooperation, by highlighting the experience of the International Centre for Integrated Mountain Development.

Box 14

Knowledge management through regional cooperation – the experience of the International Centre for Integrated Mountain Development

The International Centre for Integrated Mountain Development (ICIMOD) in the Hindu Kush Himalayan Region offers several lessons on how adaptation action can be enhanced through regional intergovernmental learning and knowledge-sharing.^a ICIMOD aims at assisting mountain people in understanding climate change and globalization trends, adapting to them, and making the most of new opportunities, while

addressing upstream-downstream issues. Bridging the information gap through a consultative policy engagement process is another critical task where ICIMOD is involved. It coordinates several related projects and assists in bridging the knowledge gap in the region through activities that contribute to scientific understanding. In order to enhance the capacity of communities and institutions, ICIMOD develops need assessments for capacity enhancement, organizes institutional capacity enhancement activities for local and national institutions, and develops leadership skills enhancement programmes for women professionals.

Regional cooperation in the Himalayan Region highlights the following critical elements for the policy framework conducive to adaptation: (1) bridging knowledge gaps – two-way information flow mechanisms; (2) mechanisms for supporting cross learning and participatory knowledge generation; (3) strengthening efforts for diversification of livelihood options; (4) supporting risk management mechanisms at the community level; and (5) enhancing local response mechanisms (local governance), including effective delivery mechanisms.

Note: Based on the presentation made by ICIMOD at the technical expert meeting on adaptation on 25 May 2016. Available at <http://unfccc.int/files/focus/adaptation/technical_expert_meeting/application/pdf/20160525_choudhury_icimod.pdf>.

^a ICIMOD is a regional intergovernmental learning and knowledge-sharing centre that serves the eight regional member countries of the Hindu Kush Himalayan Region – Afghanistan, Bangladesh, Bhutan, China, India, Myanmar, Nepal and Pakistan.

80. The knowledge base, which includes both traditional knowledge and scientific information, needs to be shared with different end users in a format adapted to their respective needs. Finding the right means to communicate information, for example through Internet alerts, radio and television broadcasts, or SMS messages on mobile phones, can be as challenging as generating the necessary information. Lack of money to use information and communications technology could lead to a failure in information dissemination. Organizing visits to vulnerable communities to assess which means of information dissemination work and which ones do not work could help to resolve this problem. Various means of communication may also help in securing diverse responses. When national and local weekly radio programmes provided advance warning to communities in Mali regarding upcoming extreme events, listeners informed relatives and friends of these communities living abroad, who reacted by sending money to their family and friends to help them to prepare. Radio programmes have also proved effective in situations where community members were not literate.

D. Strengthening multi-level governance

81. Adaptation requires coordination across multiple levels of governance, including the regional, national, subnational and local levels. National government engagement with subnational and local authorities can help to catalyse transformational change. Some good practices include:

- (a) The provision of funding or direct access to funding as a means to facilitating the linkage of local and national adaptation planning;
- (b) The integration of climate change adaptation considerations into sectoral and development planning processes of local government institutions;
- (c) The promotion of co-production of knowledge through an inclusive, multidisciplinary and structured process, which is a strong impetus to harmonize top-down

and bottom-up approaches. Such processes also enable consideration of the multisectoral dimension of climate change in adaptation actions.⁴³

82. Canada's experience provides an example of ways to operationalize some of these good practices. Canada has established an adaptation platform involving representatives of the federal government, territorial governments, indigenous communities, academia and professional organizations. This group meets twice a year to define the adaptation priority areas, and together members seek to address these priorities, including by setting up thematic working groups. This institutional arrangement has proved to be effective in engaging multiple levels of government and non-government stakeholders.

83. Particular attention should be given to coordination between national government and cities. Cities are home to more than half of the world's population and much of the world's industry. By 2050, more than 70 per cent of the population – 6.4 billion people – is projected to live in urban areas.⁴⁴ Cities are also particularly vulnerable to climate change – both because extreme weather events can be especially disruptive to complex urban systems and because so much of the world's urban population live in low-lying coastal areas, particularly in Asia. Cities would need to be involved in adaptation dialogues from the planning stage and be assisted in their adaptation efforts. Cities need national tools downscaled to the local level, and the authority to implement them.⁴⁵

84. Regional cooperation is another governance level that can contribute greatly to enhancing national-level adaptation efforts. As demonstrated during the NAPA process in the LDCs, regional cooperation has the potential to enhance the effectiveness and longer-term impact of adaptation planning by:

(a) Addressing the need to strengthen capacity for conducting adaptation planning and implementation;

(b) Helping to broaden the knowledge base on adaptation by engaging a regional pool of experts and tapping into experience, best practices and lessons learned from the region;

(c) Providing the opportunity to share costs and pool resources in processes that can be carried out jointly (e.g. generating climate change scenarios);

(d) Addressing any mismatch between ecosystem/landscapes and political boundaries;

(e) Avoiding negative transboundary impacts, especially on shared river basins or other ecosystems.⁴⁶

85. Promotion of good practices across regions requires documentation and sharing of information in areas where replication could work well. Box 15 presents a new regional programme, the Africa Adaptation Initiative.

Box 15

Africa Adaptation Initiative

One example of a new regional programme that was launched specifically to address adaptation to climate change is the Africa Adaptation Initiative. It was established in response to a mandate by African Heads of State at the 25th African Union Summit in June 2015 to enhance adaptation efforts in Africa in the context of the UNFCCC process and the Green Climate Fund. The main reasons for this initiative are the

⁴³ See document FCCC/SBSTA/2015/4.

⁴⁴ OECD. 2014. *Cities and Climate Change*. Paris: OECD Publishing.

⁴⁵ As footnote 43 above.

⁴⁶ As footnote 25 above.

urgency of adaptation and the need to enhance support to scale up and accelerate adaptation actions in Africa.

The Africa Adaptation Initiative is to focus on four areas: (1) enhancing climate information services; (2) strengthening policies and institutions; (3) supporting the implementation of concrete adaptation on the ground; and (4) increasing the flow of finance and investments to support the implementation of concrete adaptation programmes and projects.

The initiative aims to provide regulatory and political guidance to address adaptation and loss and damage needs in Africa and to facilitate access to technical support and funds for the development and implementation of the adaptation component of intended nationally determined contributions and national adaptation programme of action projects. Thus far, a technical working group has been established to guide the operationalization of the programme. Partnerships with institutions/organizations with a proven track record of implementing activities on adaptation and loss and damage are to be developed in the near future to carry out the work on the ground.

Note: Based on the presentation made by the African Group at the technical expert meeting on 25 May 2016. Available at <http://unfccc.int/files/focus/adaptation/technical_expert_meeting/application/pdf/20160525_omari_aai.pdf>.

86. Regional cooperation around transboundary issues relating to adaptation is increasing. Political will, local and institutional set-up (or local ownership) and financial commitment among countries, and sharing transboundary elements can be crucial to ensure successful coordinate action to reduce vulnerability. Time investment is often crucial in building collaborative partnerships. Box 16 presents the work of the Zambezi River Commission in carrying out transboundary adaptation in a shared river basin across eight countries.⁴⁷

Box 16

Zambezi basin strategic planning in the context of a changing climate

The benefits of cooperation along the Zambezi river basin have become apparent over the years. In 2004, the Zambezi Watercourse Commission Agreement was reached to promote the equitable and reasonable utilization of the water resources of the Zambezi watercourse as well as its sustainable development. Four years later, in 2008, an integrated water resources management strategy for the Zambezi was developed. Recently, new opportunities for transboundary cooperation have been identified, including disaster risk reduction activities, hydropower and irrigation interventions to increase resilience. The experience of the Zambezi Watercourse Commission in managing the shared river basin shows that the design of a hydropower irrigation project based on historical data may not adequately consider the risks associated with future flows and more extreme floods and droughts due to the changing climate. In addition, the value of ecosystem goods and services has not been fully taken into consideration in economic assessments of hydropower and irrigation projects.

Despite the benefits of this cooperation, challenges remain. There has been a lack of significant investment in infrastructure in the past 30 years and limited coordinated development. In addition, climate change impacts are being felt. Analysis cited by the Intergovernmental Panel on Climate Change categorized the Zambezi basin as

⁴⁷ Countries involved include: Angola, Botswana, Malawi, Mozambique, Namibia, the United Republic of Tanzania, Zambia and Zimbabwe.

exhibiting the worst potential effects of climate change among 11 major African basins, given that the Zambezi river flow is already highly sensitive to variations in climate.

Note: Based on the presentation made by the Zambezi Watercourse Commission at the technical expert meeting on 25 May 2016. Available at <http://unfccc.int/files/focus/adaptation/technical_expert_meeting/application/pdf/20160525_evans_kaseke.pdf>.

E. Promoting multi-stakeholder engagement and cooperative action on adaptation

87. Comprehensive adaptation planning and implementation requires the participation of all stakeholders: institutions, businesses and civil society. As noted in paragraphs 46, 49 and 67 above, inclusive dialogue, partnerships and participatory approaches are needed at all stages of the adaptation process. Engagement across levels helps to increase the credibility of the proposed actions and secure stakeholder buy-in.

88. All stakeholders, and especially the most vulnerable, should be empowered to participate in adaptation planning and implementation. In each context it is important to identify all groups of stakeholders that need to be involved in the adaptation process. These groups may not be the same everywhere but considerations of the most vulnerable have to be taken into account when adaptation measures are planned, designed and implemented. In some countries it may be necessary to step outside cultural boundaries and involve those groups that traditionally do not have too much say in decision-making. The example from Vanuatu set out in box 17 illustrates how considerations of development and adaptation opened a dialogue on the role of women in patrilineal societies that traditionally did not recognize their valuable contribution.

Box 17

Vanuatu floating coconut toolkit

Vanuatu is a vulnerable disaster-prone country. Its adaptation to climate change will depend on its ability to engage all groups and stakeholders in the adaptation process. Vanuatu's rural areas are governed by matrilineal or patrilineal descent societies; in matrilineal societies women have a voice, land and property rights, while in patrilineal descent societies women are excluded from decision-making. To facilitate the recognition of the significant informal roles that women play in patrilineal societies and encourage the participation of women in decision-making, a "floating coconut toolkit" has been used.

The toolkit was developed by the International Women's Development Agency for Melanesian economies. One quarter of the floating coconut portrays the formal economy while the three quarters that is submerged signifies the informal economy, where mostly women are involved.

Through effective bottom-up participation, men became more gender-sensitized on women's roles and responsibilities. Women's unpaid jobs, such as creating gardens, cooking and putting food on the table, caring for children, the sick and elderly, undertaking domestic tasks and collecting fuel and water for the family's maintenance, were highlighted as enabling men's status in these communities. As women reallocate time from domestic chores to productive roles, for example for creating and selling handicrafts, they become income earners and are perceived in a new light. Women become active economic providers, earning money to improve their livelihoods to invest in their children's education and access health services. This strengthens women's adaptive capacity and encourages gender equality and women's participation in decision-making. The toolkit exercise creates gender-sensitive awareness and encourages gender-responsive climate change adaptation and mitigation plans.

Note: Based on the presentation made by the Vanuatu Investment Promotion Authority at the technical expert meeting on 25 May 2016. Available at <http://unfccc.int/files/focus/adaptation/technical_expert_meeting/application/pdf/20160525_andrina_thomas.pdf>.

89. Innovative initiatives that proactively engage stakeholders who may or may not be familiar with adaptation but whose expertise can be very useful should be encouraged at all levels as demonstrated by the climate action hackathon presented in box 18.

Box 18

Climate Action Hackathon – an innovative United Nations Development Programme approach to provide weather information to vulnerable communities in Africa^a

With the goal of creating an innovation-driven crowd-sourced space for big thinkers and techno visionaries to come together, the United Nations Development Programme (UNDP) invited developers, mobile application gurus, students and developers to a three-day hackathon and innovations incubator in May 2016. A total of 23 hackers were selected out of 100 applications. With only three days to learn about the persistent challenges in bringing weather and climate information to African communities and build the computer applications (apps) themselves, the hackers worked around the clock individually or in teams to create prototype models, data visualization tools and end-to-end product designs. Experts from UNDP, research institutes and universities were on hand to facilitate discussions, help hackers to understand the nuanced approaches necessary, and connect broad sets of data with the unique needs of end users. The hackers presented their products to delegates from 10 African national meteorological and hydrological services on the closing day of a larger UNDP-supported multinational workshop on increasing resiliency with tailored weather information services. The app voted the most popular by the African country representatives used a simple design and processes to provide farmers with a call-in mobile app that provided real-time weather information voice messages in local languages. Other apps included a visualization and risk management app that agricultural extension workers could use to easily analyse weather data, a mapping app that African pastoralists could connect with to avoid hazards such as floods and wildfire, and a text app that would allow agricultural extension agents to register farmers on a list to receive tailored texts on weather conditions.

^a Further information is available at <<http://www.undp.org/content/undp/en/home/presscenter/pressreleases/2016/03/24/undp-climate-action-hackathon-accelerates-innovative-approaches-to-provide-weather-information-to-vulnerable-communities-in-africa-.html>>.

90. Public–private partnerships bring insights and new and effective solutions in adaptation planning and implementation. There is an emerging interest in adaptation on the part of the private sector and businesses (see the example in box 19). The key drivers for this are: regulation and governance regimes that encourage vulnerability assessments and adaptation to climate change; recognition of the economic value at risk, with increasingly visible climate impacts on business continuity; and the financial and insurance risks that businesses are experiencing and anticipating owing to the increased frequency and magnitude of extreme events.

Box 19

Endesa – participation of energy companies in adaptation mainstreaming

In 2006 Spain adopted its National Climate Change Adaptation Plan, providing the current framework for carrying out assessment actions to evaluate impacts, vulnerability and adaptation to climate change. The plan’s purpose is to mainstream adaptation to climate change in the planning processes of all the relevant sectors or systems. To achieve this objective, it is important that the development of the plan becomes a major collective project with the participation of all institutions and key players. In 2013 the Ministry of Environment launched the Adapta Initiative with a view to involving the private sector. The objectives of the Adapta Initiative in its first phase were to develop tools that allow the incorporation of risk and vulnerability to climate change into business strategies.

Endesa was selected as a representative of the energy sector. It already had experience with adaptation, which involved identifying possible future risks to its business and defining policies in line with official approaches to adaptation. Participation in the Adapta Initiative allowed Endesa to assess the vulnerability to climate change of its three hydroelectric plants. Despite Endesa’s capacity to deal with large investments, it became clear that the adaptation of hydropower to climate change requires coordination with other public agents (hydrographic confederations and irrigation communities) that do not always have the same priorities.

The Adapta Initiative is entering its second phase. The objective is to propose concrete measures for climate adaptation and to monetize their costs. As a result, this will lead to a sound methodology for determining adaptation measures. A guide will be created for the private sector to allow companies to identify actions to strengthen resilience and reduce their vulnerability.

Note: Based on the presentation made by Endesa at the technical expert meeting on 25 May 2016. Available at <http://unfccc.int/files/focus/adaptation/technical_expert_meeting/application/pdf/20160525_pina_endesa.pdf>.

91. Businesses also form international partnerships to support each other in their adaptation efforts through exchange of information and experiences and cross-fertilization. One such partnership was announced at the Paris-Lima Action Agenda “Resilience” half-day at COP 21.⁴⁸ The Business Alliance for Water and Climate has been launched to reaffirm the crucial role of the sustainable management of water resources for economic development, and to reaffirm the importance of reducing the risks related to the quality and availability of water resources (see box 20 for further information). Water was selected as

⁴⁸ During the same half-day three other major coalitions were launched: the Paris Pact on water and adaptation to the effects of climate change in the basins of lakes, rivers and aquifers; the Megacities Alliance for Water and Climate and the Youth commitment for Water and Climate Change Adaptation. Further information is available at <<http://newsroom.unfccc.int/lpaa/resilience/press-release-lpaa-resilience-1-paris-pact-on-water-and-climate-change-adaptation-announced/>>.

the key priority because of its critical importance for agriculture, food and industry and also because of the strong impacts of climate change on water resources. Ninety per cent of adaptation measures in INDCs address water; according to a report by the Carbon Disclosure Project (CDP), 27 per cent of the responding companies have already seen water risk manifest itself as a detrimental impact on their business in the last reporting year.⁴⁹

Box 20

Business Alliance for Water and Climate

Endorsing companies are committing to publishing and sharing their good practices, and to one or more of the following levels of ambition: (1) analyse and share water-related risks to implement collaborative response strategies; (2) measure water footprint with existing standards; and (3) reduce impacts on water availability and quality in direct operations and all along the value chain.

Suez launched this initiative during the Resilience Day of the Lima-Paris Action Agenda, together with the Carbon Disclosure Project, the World Business Council for Sustainable Development, and the CEO Water Mandate of the United Nations Global Compact. Currently there are 44 organizations involved – 23 of them are business companies. Businesses and other organizations, including non-governmental organizations and local authorities, can join the alliance.

Note: Based on the presentation made by Suez at the technical expert meeting on 25 May 2016. Available at <http://unfccc.int/files/focus/adaptation/technical_expert_meeting/application/pdf/20160524_jp_maugendre.pdf>.

92. Insurance solutions have been recognized as a way to facilitate adaptation to climate change. They can facilitate the construction of social and economic structures and offer an example for cooperation between the public and private sectors. If structured well, insurance solutions not only create incentives to take preventive measures (by way of knowledge transfer and/or deductibles), but also represent an effective tool to finance burdens of proof.

93. The roles of the individual cooperation partners need to be clearly defined based on the competences and resources of each.⁵⁰ The public sector defines the legal and regulatory framework and the socio-political aims. The establishment of weather databases, the development of publicly accessible risk information systems, and knowledge building among the population can also be supported at both the national and the international level. The insurance industry is responsible for the development and implementation of climate insurance solutions. To this end, it provides expertise, risk models, best practices from other countries and risk capital.

94. The insurance scheme can target direct beneficiaries by addressing the risk awareness and resilience of households, with the premise that households have a general understanding of insurance. This approach can lead to high transaction costs and thus comparatively high premium loading. As such, even with substantial premium subsidies, most pilot projects with voluntary insurance for climate risks failed.⁵¹ Microinsurance, while limited in scope, can overcome this challenge on account of their low premiums. In fact, microinsurance schemes have become increasingly important in many developing countries in recent years. Often, these are local or regional group insurance schemes with financing based on mutual solidarity. The climate-related microinsurance initiative led by

⁴⁹ CDP. 2015. *Accelerating Action: CDP Global Water Report 2015*. Available at <<https://www.cdp.net/en/research/global-reports/global-water-report-2015>>.

⁵⁰ Munich RE. Further information available at <<https://www.munichre.com/en/homepage/index.html>>.

⁵¹ Breakout group discussions at the TEMs.

Germany⁵² developed microinsurance products for communities in India and Indonesia based on country studies that provide information on the main risks, at-risk groups and needs for risk management strategies.

95. Insurance can also focus on governments and public institutions as opposed to direct beneficiaries and provide payout and early efforts to fix critical infrastructure to support the reduction of economic costs of climate-induced natural disasters. As illustrated in box 21, insurance initiatives established through international cooperation seek to foster greater protection for those people and assets threatened by climate change risks.

Box 21

InsuResilience – a Group of Seven initiative

At the Group of Seven summit in Elmau, Germany, in June 2015, the member States agreed to launch a climate insurance initiative (InsuResilience), highlighting the importance of financial risk transfer concepts, particularly for emerging and developing countries. The objective of InsuResilience is to give an additional 400 million people in emerging and developing countries access to insurance by the year 2020 to protect themselves against weather-related catastrophes. This will either be organized on a macro level with insurance cover for entire countries (indirect insurance of the population) or on a micro level with insurance policies for individual persons (direct insurance of the population).^a

Note: Based on the presentation made by Munich RE at the technical expert meeting on 24 May 2016. Available at <http://unfccc.int/files/focus/adaptation/technical_expert_meeting/application/pdf/20160524_rauch.pdf>.

^a Further information is available at <<https://www.munichre.com/en/homepage/index.html>>.

96. By encouraging adaptation dialogues at all levels (international, national, regional, city and community), knowledge-sharing and learning that are conducive to enhanced adaptation can be achieved. There is an opportunity to launch a global adaptation dialogue at COP 22 to highlight the importance of dialogue and information-sharing in adaptation. The international-level dialogue could encourage adaptation dialogues at all other levels and could also gather views on how adaptation efforts at all levels fit together into a global effort.

F. Harnessing the UNFCCC potential for enhancing adaptation actions

97. Discussions at the TEMs highlighted the role of the UNFCCC in providing guidance and incentives to regional, national and local levels of adaptation efforts and the opportunity to further explore ways to optimize its unique role. Related discussions also highlighted the necessity to conduct further work in identifying adaptation gaps and needs, including those relating to enhancing coherence for multi-level adaptation and mobilizing resources, and understanding how the UNFCCC can help address these gaps and needs.

98. A well-resourced Adaptation Committee was also seen as having a central role to play in addressing needs and bridging gaps, given that its primary function is to promote the implementation of enhanced action on adaptation in a coherent manner,⁵³ and that it has been mandated at COP 21 to undertake a total of five tasks⁵⁴ that can support the implementation of the adaptation provisions of the Paris Agreement and operationalize the

⁵² The initiative is being conducted by the Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) on behalf of the Federal Ministry for Economic Cooperation and Development.

⁵³ Decision 1/CP.16, paragraph 20.

⁵⁴ Decision 1/CP.21, paragraphs 41, 42 and 45.

global goal on adaptation. The COP requested the Adaptation Committee to conduct these tasks either by itself, jointly with the Least Developed Countries Expert Group, and/or in collaboration with the Standing Committee on Finance. In addition, the TEP-A was recognized as a living process that can also provide a valuable opportunity to address gaps and needs of countries as they seek to scale up and accelerate their adaptation efforts.
