



Global Water
Partnership

Addressing Water in National Adaptation Plans

WATER SUPPLEMENT TO THE UNFCCC NAP
TECHNICAL GUIDELINES

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Addressing Water in National Adaptation Plans

Water Supplement to the UNFCCC NAP Technical Guidelines
Second Edition, April 2019

About the Global Water Partnership

The Global Water Partnership (GWP) is an international network of 13 Regional Water Partnerships, 65 Country Water Partnerships, and more than 3,000 Partner organisations in 183 countries. Its vision is a water-secure world. Its mission is to advance the governance and management of water resources for sustainable and equitable development through integrated water resources management (IWRM). IWRM is a process that promotes the coordinated development and management of water, land, and related resources in order to maximise economic and social welfare in an equitable manner, without compromising the sustainability of vital ecosystems and the environment.

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Foreword

Welcome! Reading these lines, you are probably someone who is driving the National Adaptation Plan process in at least one country – possibly in more than one. Or you are someone who works on water management and who needs to engage with the National Adaptation Plan process. In either case, you are holding this Water Supplement to the UNFCCC NAP Technical Guidelines in your hands because you know that managing water is key for countries to adapt to climate change successfully – and possibly because you find it an awfully difficult thing to get right.

You are not alone. And you should not be.

The Conference of the Parties established the process to formulate and implement NAPs close to a decade ago, in 2010. Right from the start, focusing on the national adaptation planning process has succeeded in bringing together not only the whole range of government players, but also non-governmental organisations from across civil society and the private sector. The climate community knows: reducing vulnerability to climate change requires understanding, adapting, and applying technical know-how – in all its dimensions, including the social, political-economic, environmental, and financial dimensions. And it involves integrating climate change adaptation into development planning processes and strategies across all relevant sectors – at all levels.

It is a difficult task. The most difficult part may well be the consensus building that is so critical for different parts of a country to act ‘in sync’ with one other. And when you bring the perspective of water – is there enough? For everyone? Too much? Who gets to have what and when? And who is accountable? – consensus building meets some very real challenges. Because the most critical of resources that we have – water – is limited and must be shared, so must the accountability for water to be available, accessible, and sustainable. At the same time, water’s potential for destructive impact is enormous, but investing in longer-term disaster risk reduction does not always align with political expediency – without a paradigm shift, true resilience cannot be achieved.

This is why we, the Global Water Partnership, volunteered with UNFCCC to build this NAP Water Supplement, now in its second edition. In over 20 years of our work we have seen countries succeed or fail in development, respectively, when they did or did not take the time and energy needed for robust water management – for agreeing on the right governance and management principles, and setting up the institutions and inclusive mechanisms necessary to make decisions about water.

We structured the NAP Water Supplement along the lines of the four elements recommended by the UNFCCC Technical Guidelines for the National Adaptation Plan process. We added examples. And we drew on the experience of the more than 3,000 partners and 60+ Country Water Partnerships that come together under the umbrella of the Global Water Partnership.

In writing this NAP Water Supplement, we see one important limitation – that only you, the readers and users, can address: National Adaptation Planning is ‘national’ only. Water, on the other hand, transcends boundaries. Effective management of water resources will – in practically all cases – involve collaboration across national boundaries. The water community has developed mechanisms and institutional solutions – and the invitation is for the climate community to use them!



Monika Weber-Fahr

GWP Executive Secretary and CEO

Preface

Urgent transformational change is required to avoid global catastrophe and limit the damage from climate risks. The Intergovernmental Panel on Climate Change warns that the window of opportunity to make changes is closing fast. If current emissions trajectories continue, global temperature rise compared to pre-industrial levels could surpass 1.5°C in as little as 12 years, beyond which significantly worse climate risks threaten to perpetuate massive poverty for hundreds of millions of people, as well as generate irreversible changes in vital ecosystems. Most at risk are the world's poorest, living in countries with weak water governance systems, weak institutions, inadequate regulatory regimes, and poor water infrastructure.

Water is a crucial environmental resource central to national economic development and livelihoods activities, alongside providing a range of context-dependent direct and indirect benefits, be they cultural, spiritual, environmental, or social. Water is also a critical pathway through which countries encounter climate risks, in terms of slow-onset droughts, acute floods, and other such disasters. Least Developed Countries in particular may lack adaptation capacities to harness the beneficial aspects of water under a changing climate, or to mitigate water-related climate risks.

Climate change hazards present challenges for water resources planning, management, and use. Major droughts, on average, reduce per-capita GDP growth by half a percentage point, and in vulnerable economies a 50 percent reduction in drought effects could lead to a 20 percent increase in per-capita GDP over a period of 30 years. Drought also ranks, in monetary terms, as the most destructive disaster affecting agriculture. And a dry shock in the first 1,000 days of a child's life means they are more likely to grow up mentally and physically stunted, undernourished, and unwell.

Partial estimates on the scale of global economic losses related to water insecurity are astounding: US\$260 billion per year from inadequate water supply and sanitation, US\$120 billion per year from urban property flood damages, and US\$94 billion per year from water insecurity for existing irrigators (OECD, 2018a). Climatic variability has negative impacts on water availability and quality, and jeopardises social stability and jobs for the younger generations. Water scarcity, food insecurity, and social instability can trigger and intensify migration patterns and gender inequalities. Climate change will only exacerbate these challenges.

As the world races to find technically and politically acceptable solutions to curtail global carbon emissions, an already warming climate demands accelerated efforts to adapt. Concrete guidance for water-related adaptation is needed, moving from siloed and fragmented approaches to more integrated ones with water as a connector across sectors. This approach has the potential to foster societal progress away from a fossil-fuel-dependent economic development model that escalates global warming and climate hazards, toward a low-carbon and climate-resilient development pathway in which the entire value chain of water is valued and recognised.

Such a shift requires major changes: transforming the way adaptation is planned, deployed, and managed. It is not too late to start, and water provides a tremendous opportunity. Water management is context specific, yet water is the common thread connecting key global and national goals: Nationally Determined Contributions, National Adaptation Plans, Sustainable Development Goals, and national development plans.

As the urgency to adapt is paramount, this second edition of the NAP Water Supplement provides countries, water managers, and development practitioners with additional guidance to raise the profile of water in adaptation and implement integrated water management measures to enhance resilience to climate change risks. With countries preparing for the second generation of their Nationally Determined Contributions, the document also provides a reference point for countries to take stock and reflect on the water-related adaptation challenges that need increased ambition in planning beyond 2020.

Executive summary

This second edition of the NAP Water Supplement accompanies the United Nations Framework Convention on Climate Change (UNFCCC) National Adaptation Plan (NAP) Technical Guidelines prepared by the Least Developed Countries Expert Group of the UNFCCC.

Water is the most-cited pathway through which countries experience climate impacts, and also the most-often-prioritised sector through which countries seek to build resilience in their economies, their populations' livelihoods, and their natural ecosystems, as indicated in a 2016 UNFCCC study of 162 Nationally Determined Contributions. Acknowledging that well-planned, climate-responsive water management strategies and actions provide significant opportunities to build resilience, the NAP Water Supplement offers guidance for integrating water perspectives in countries' NAP processes. It draws on advances in climate science and developments in planning under uncertainty, and is grounded in experiences and lessons learned from incorporating water perspectives in adaptation planning and implementation. Furthermore, the NAP Water Supplement approaches integration of water in the NAP process to reinforce implementation of the Paris Agreement via scale-up and delivery of Nationally Determined Contributions, and to reinforce achievement of the Sustainable Development Goals, in particular Goal 6 on water, alongside the Sendai Framework for Disaster Risk Reduction, and many others which involve water as a critical part.

The NAP Water Supplement aims to support developing countries to:

- incorporate water-related adaptation needs and opportunities in the formulation and implementation of NAPs
- enhance the integration of water-related adaptation in development policies, programmes and plans
- strengthen the resilience of economies, livelihoods, and natural ecosystems by reducing water-related climate vulnerabilities, and building adaptive and transformative capacities.

The purpose of the NAP Water Supplement is to:

- enable the identification, prioritisation, financing, and implementation of water-related adaptation strategies and projects
- establish a framework for integrating water perspectives into planning, implementing, and monitoring adaptation actions that promotes climate resilience, in ways that are embedded with medium-to-longer-term development processes
- empower stakeholders involved in using or managing water to participate effectively and efficiently in the process to formulate and implement NAPs
- strengthen gender considerations in water-related adaptation planning and implementation
- help non-water specialists to understand the issues related to water security in the context of climate change.

The NAP Water Supplement is intended for use by:

- those leading the NAP process at a national level
- water planners and managers responsible for addressing adaptation in water resources management and water-dependent economic sectors
- those who provide support to countries to achieve a coherent and strategic response to adaptation planning.

List of acronyms

AF	Adaptation Fund
APFM	Associated Programme on Flood Management
ASAP	IFAD's Adaptation for Smallholder Agriculture Programme
BMZ	German Federal Ministry of Economic Cooperation and Development
CAKE	Climate Adaptation Knowledge Exchange
CCORAL	Caribbean Climate Online Risk and Adaptation Tool
COP	Conference of the Parties
CPEIR	Climate Change Public Expenditure and Institutional Review
CRIDA	Climate Risk Informed Decision Analysis
DAE	Direct Access Entity
FAO	Food and Agriculture Organization of the United Nations
GCCA	The EU's Global Climate Change Alliance
GCF	Green Climate Fund
GDP	Gross Domestic Product
GEF	Global Environment Facility
GFCS	Global Framework for Climate Services
GHG	Greenhouse gas
GIZ	German Corporation for International Cooperation
GWP	Global Water Partnership
HLPW	High Level Panel on Water
ICCTF	Indonesia Climate Change Trust Fund
ICF	UK Department for International Development's International Climate Fund
IDMP	Integrated Drought Management Programme
IFAD	International Fund for Agricultural Development
IKI	German International Fund's International Climate Initiative
IMF	International Monetary Fund
IPCC	Intergovernmental Panel on Climate Change
ISFL	BioCarbon Fund Initiative for Sustainable Forest Landscapes
IWRM	Integrated Water Resources Management
LAPA	Local Adaptation Plan of Action
LDC	Least Developed Country
LDCF	Least Developed Countries Fund
LEG	Least Developed Countries Expert Group
MDG-F	Millennium Development Goals Achievement Fund

M&E	Monitoring and evaluation
MSP	Multi-stakeholder partnership
NAP	National Adaptation Plan
NAPA	National Adaptation Programme of Action
NDA	National Designated Authority
NDC	Nationally Determined Contribution
ODI	Overseas Development Institute
PER	Public Expenditure Review
PoA	Programme of Action
PPCR	Pilot Program on Climate Resilience
PROVIA	Programme of Research on Climate Change Vulnerability, Impacts and Adaptation
SCCF	Special Climate Change Fund
SDG	Sustainable Development Goal
SNAP	Stocktaking for National Adaptation Planning
TCFD	Task Force on Climate-Related Financial Disclosures
TEC	GWP Technical Committee
UNDP	United Nations Development Programme
UNECE	United Nations Economic Commission for Europe
UNEP	United Nations Environment Programme
UNESCO	United Nations Educational, Scientific and Cultural Organization
UNFCCC	United Nations Framework Convention on Climate Change
UNISDR	United Nations Office for Disaster Risk Reduction
UNITAR	United Nations Institute for Training and Research
WASH	Water, sanitation, and hygiene
WMO	World Meteorological Organization
WWC	World Water Council

1. Introduction

1.1 About this document

Key messages

- Adaptation in water is crucial for strengthening the resilience of economies, livelihoods, and natural ecosystems by reducing water-related climate vulnerabilities and building adaptive and transformative capacities.
- Water is the common thread connecting key global and national ambitions and commitments: NDCs, NAPs, SDGs, the Sendai Framework for Disaster Risk Reduction, and national development plans.
- The NAP Water Supplement recognises that countries follow the UNFCCC NAP Technical Guidelines while engaging in the NAP process, specifically via the four elements outlined by the Technical Guidelines: (A) Laying the groundwork and addressing gaps; (B) Preparatory elements; (C) Implementation strategies; and (D) Reporting, monitoring, and review.
- The NAP Water Supplement will assist countries to incorporate water-related adaptation needs and opportunities in the formulation and implementation of NAPs, NDCs, and SDGs.
- The NAP Water Supplement provides guidance on how to enhance the integration of water-related adaptation in development policies, programmes, and plans.

This Water Supplement to the UNFCCC NAP Technical Guidelines (referred to hereafter as the NAP Water Supplement) accompanies the United Nations Framework Convention on Climate Change (UNFCCC) National Adaptation Plan (NAP) Technical Guidelines prepared by the Least Developed Countries Expert Group (LEG) of the UNFCCC. This document is the second edition of supplementary guidelines on water, updating and replacing the first edition, *National Adaptation Plan Process – Water Supplement to the Technical Guidelines*, published in 2015.

The NAP Water Supplement takes an outcome-oriented approach in referring to activities that target building climate resilience through the management and development of water resources. The goal of managing and developing water resources is to harness water's productive potential, mitigate its destructive risks, and improve the sustainability of its natural resource base. In the context of a changing climate, water is one of the most prominent pathways through which climate impacts are experienced, and management of the resource provides countries and communities with significant opportunities to build adaptive capacity – not only to withstand climate impacts, but to transform to more resilient states.

The NAP Water Supplement considers water as a means to an end: a critical input to economic development, livelihood security, and environmental sustainability. The NAP Water Supplement therefore considers water resources broadly, to include water supply along with all water-related sectors such as agriculture, energy, transport, public health, and disaster risk management.

The NAP Water Supplement aims to support developing countries to:

- incorporate water-related adaptation needs and opportunities in the formulation and implementation of NAPs, Nationally Determined Contributions (NDCs), National Communications, and Sustainable Development Goals (SDGs)
- enhance the integration of water-related adaptation in development policies, programmes and plans
- strengthen the resilience of economies, livelihoods, and natural ecosystems by reducing water-related climate vulnerabilities and building adaptive and transformative capacities.

1.2 Using the document

The information in the NAP Water Supplement has been organised into eleven chapters, with Chapter 2 through Chapter 10 broadly outlining areas where the Global Water Partnership, through its work on the ground supporting 27 countries on NAPs and/or other national climate adaptation and disaster risk reduction planning processes since 2014, finds that there is a clear need to integrate water in national development and adaptation planning processes. The NAP Water Supplement recognises that countries follow the UNFCCC NAP Technical Guidelines while engaging in this process, specifically via the four elements outlined in the Technical Guidelines:

Element A. Laying the groundwork and addressing gaps

Element B. Preparatory elements

Element C. Implementation Strategies

Element D. Reporting, monitoring, and review.

To facilitate use of the NAP Water Supplement alongside the UNFCCC NAP Technical Guidelines, the titles for individual sections in Chapters 2 through 10 include boxes indicating which element and activity number (from the Technical Guidelines) the information relates to. The overall mapping is outlined in Annex 1. An overview of the elements and activities in the UNFCCC NAP Technical Guidelines is provided in Annex 2.

Key messages from each chapter are summarised in light green boxes at the start of each chapter. Darker green boxes present case studies on country experiences. Blue boxes provide definitional or conceptual information.

The chapters in the NAP Water Supplement are as follows:

Chapter 1 provides background information on NAP formulation and implementation processes, as well as some context on the development of this NAP Water Supplement.

Chapter 2 explains why there is a need to integrate water in NAPs.

Chapter 3 discusses the roles of stakeholders in integrating water in the NAP process and highlights what actions are needed to ensure stakeholder involvement.

Chapter 4 explains how to integrate water security and climate resilience in national development.

Chapter 5 discusses gender considerations in integrating water in NAPs.

Chapter 6 gives an overview of the activities involved in climate risk and vulnerability assessment that consider water-related risks and vulnerabilities.

Chapter 7 discusses the identification, prioritisation, and implementation of adaptation actions.

Chapter 8 explores how to develop knowledge and capacity for planning and implementing water-related adaptation.

Chapter 9 discusses financing water-related planning and projects in NAP formulation and implementation.

Chapter 10 discusses monitoring and evaluation of integrating water in NAPs.

Chapter 11 lists helpful tools and resources that support integration of water perspectives in the NAP formulation and implementation process.

1.3 Water and NAPs in context: the Paris Agreement, the SDGs, the Sendai Framework

The NAP process was established under the UNFCCC in 2010 as part of the Cancun Adaptation Framework. The process enables Parties to the UNFCCC to formulate and implement NAPs as a means of identifying medium- and long-term adaptation needs and developing and implementing strategies and programmes to

address those needs. It is a continuous, progressive, and iterative process that follows a country-driven, gender-sensitive, participatory, and fully transparent approach. NAP processes are largely funded through domestic government revenues, with support from bilateral and multilateral providers, climate financiers such as the Green Climate Fund (GCF) and the private sector (IISD, 2017).

The objectives of NAPs, as defined by the 17th Conference of the Parties (COP17) to the UNFCCC (UNFCCC, 2012a), are to:

- reduce vulnerability to the impacts of climate change by building adaptive capacity and resilience
- facilitate the integration of climate change adaptation into relevant new and existing policies, programmes, and activities, in particular in development planning processes and strategies, within all relevant sectors and at different levels, as appropriate.

Water is a major pathway through which countries experience climate impacts, and it offers countries important channels to serve the two objectives of the NAP.

Since COP17, there have been a number of milestones in the international development and climate resilience agenda that have re-enforced the importance of the NAP process. These milestones have an important bearing on how the NAP process can be undertaken effectively and efficiently, and financed at the national level – both generally, and in terms of addressing water perspectives throughout the process.

- **The ratification of the Paris Agreement in 2016, the mutually re-enforcing nature of NDCs and NAPs, the prominence of water in the NDCs, and dedicated financial support for NAP processes.** The Paris Agreement aims to limit global temperature rise this century to well below 2°C above pre-industrial levels and to pursue efforts to limit the temperature increase to 1.5°C. The Paris Agreement also aims to increase the ability of countries to deal with the impacts of climate change through adaptation. The Nationally Determined Contributions (NDCs) – country commitments on mitigation and, voluntarily, adaptation that were submitted to the UNFCCC before the 2015 Paris Conference – were established as a formal mechanism of the international climate action architecture upon the ratification of the Paris Agreement. The NDCs are complementary to National Communications – a type of report periodically submitted to the UNFCCC by countries that have ratified the Paris Agreement – that describe national circumstances, the national greenhouse gas (GHG) emissions profile, possible mitigation and adaptation options, and identified needs. The NDC takes the National Communication, which outlines what can be done, a step further, by laying out what a country commits to do.

A country's NDC, National Communications, and NAP can be mutually reinforcing. The NDC and National Communication offers a powerful framework for setting out national climate action priorities. They highlight national adaptation needs and gaps in the global arena, facilitating mobilisation of partnerships, capabilities, and finance for NAP implementation. NAP implementation contributes to action on the National Communication as well as NDC delivery.

A 2018 GWP analysis of 80 NDCs reveals that water drives climate adaptation action: 89 percent of surveyed countries prioritise investing in water infrastructure, institutions, or governance as a key climate action priority, while practically all countries indicate some kind of water action as necessary for adaptation (GWP, 2018a). The analysis shows that while countries prominently highlight the need to climate-proof water supply and build resilient water infrastructure, few are paying attention to critical ingredients that will make these ambitions sustainable in the long term: strengthening water governance through robust water management institutions, and taking integrated approaches to their water management. The NAP Water Supplement aims to bring these ingredients into the NAP process.

As per the Paris Agreement, the NDCs will undergo a global stocktake every five years starting in 2020, with the intention of scaling up country commitments. Assessment of adaptation needs and capacities as part of the NAP process can inform the appraisal of the adaptation component of the NDCs as well as National Communications, and their subsequent raised ambition.

Moreover, platforms such as those facilitated by the NDC Partnership at the national and global levels have brought forth a high level of integration across sectors – and the water sector can help further. Water is a connector across many productive sectors and is also a binding thread when it comes to disaster risk reduction. Water-specific cross-sector integration mechanisms can further solidify coordination for adaptation planning and NDC delivery, and have been emphasised in the NAP Water Supplement.

Finally, the GCF Readiness and Preparatory Support Programme provides dedicated finance, up to US\$3 million per country, for the formulation of NAPs and/or other country-driven national adaptation planning processes based on the assessment of a country's circumstances and needs by the country's National Designated Authority (NDA), or GCF focal point, taking into consideration the UNFCCC NAP Technical Guidelines, and the importance of coordination and complementarity with other NAP-related initiatives. The support from the GCF Readiness and Preparatory Support Programme can be applied to establish and strengthen required institutional frameworks and build capacity for the NAP process or equivalent country-driven national adaptation planning process, as well as for subsequent implementation of projects and programmes identified in the plans. As of March 2019, a total of 26 proposals worth US\$69 million have been approved for NAPs under the GCF Readiness and Preparatory Support Programme. Of these, 22 proposals, worth a cumulative US\$11.9 million, have been disbursed. A total of 74 proposals from 73 countries are included in the portfolio. LDC, SIDS, and Africa comprise over 64 percent of this portfolio.

National adaptation planning processes undertaken in careful, inclusive ways can lead to sound policy and capability foundations for subsequent implementation of projects and programmes identified in the plans. The NAP Water Supplement is designed to facilitate this translation of adaptation plans to projects, policies, and programmes.

- **The adoption of the SDGs, and for the first time, a global goal on water, as part of the 2030 Agenda for Sustainable Development in 2015.** The global endorsement of a water goal as part of the 17 SDGs brought recognition to the necessity for managing water resources in an integrated manner. Within SDG 6, target 6.5.1 is dedicated to integrated water resources management (IWRM). It establishes the need for action at four levels: an enabling environment; institutions and participation; management instruments; and financing. Governments seeking to achieve the SDGs in concert are finding that such progress is not possible without effective, inclusive, and sustainable access to water. In the context of a changing climate, adaptation considerations become part and parcel of integrated approaches to water resources planning, and it is critical that the adaptation efforts take integrated approaches when it comes to water-related action as well. The NAP Water Supplement seeks to enable policymakers and practitioners to align national adaptation planning from a water perspective with related country SDG processes and targets.
- **The adoption of the Sendai Framework for Disaster Risk Reduction in 2015.** The Sendai Framework reflects a shift to focus on disaster risk governance and the underlying drivers of risk. It sees disaster risk reduction as a policy concern that cuts across many sectors. This shift is critical; currently, close to 90 percent of disaster related development assistance focuses on emergency response, reconstruction and rehabilitation, while only 10 percent goes to disaster risk reduction (Kellett and Caravani, 2013). Globally, water-related disasters account for almost 90 percent of the 1,000 most devastating natural disasters since 1990 (UNESCO, 2009), with a significant portion of these being floods or droughts that are exacerbated by or caused by climate change (UNISDR, 2004). Damages attributed to water-related disasters amount to 15–40 percent of annual GDP for some countries (UNESCO, 2012). The NAP Water Supplement recognises that water-related adaptation planning and implementation can benefit directly from the elements outlined in the Sendai Framework, and therefore aims to achieve synergy at the national level between adaptation planning under the NAP process and disaster risk reduction under the Sendai Framework process. In particular, the NAP Water Supplement folds in the following elements of the Sendai Framework: the need for improved understanding of disaster risk in all its

dimensions of exposure, vulnerability, and hazard characteristics; the strengthening of disaster risk governance, including national platforms; accountability for disaster risk management; preparedness to ‘build back better’; recognition of stakeholders and their roles; and mobilisation of risk-sensitive investment to avoid the creation of new risk.

In addition to global and country commitments in the NDCs, the 2030 Agenda and the SDGs, and the Sendai Framework, the NAP Water Supplement encourages countries to consider other recognised approaches and principles for development and climate resilience that present opportunities for mutual reinforcement with the NAP process. For example, the Habitat III New Urban Agenda, endorsed by the UN General Assembly in 2016, recognises that urban centres worldwide, especially in developing countries, have characteristics that make these urban centres and their inhabitants especially vulnerable to climate change impacts via water – in terms of extreme weather events, flooding, water scarcity, droughts, water pollution, vector-borne diseases, and sea level rise. UNESCO (2019) estimates that the urban population ratio in some regions surpasses 70 percent today and projects that population growth in the coming decades will be higher in urban centres, particularly in megacities or metropolitan areas with over 10 million inhabitants. Considering a spatial-demographic lens while evaluating the challenges and opportunities to build resilience via water becomes important in these urban contexts.

More generally, the recommendations of the 2016–2018 High-Level Panel on Water (HLPW, 2018)¹ lay out broad foundations for action that are useful to consider while integrating water into national adaptation planning:

- **Understand water.** Commit to making evidence-based decisions about water, and cooperate to strengthen water data.
- **Value water.** Use HLPW Principles on Valuing Water to sustainably, efficiently, and inclusively allocate and manage water resources and deliver and price water services accordingly.
- **Manage water.** Implement integrated approaches to water management at local, national, and transboundary levels, strengthen water governance, and ensure gender equality and social inclusion.

Importantly, the process to formulate and implement NAPs benefits from the experiences of the past, such as the National Adaptation Programmes of Action (NAPAs), a process initiated in 2001 which focused on urgent and immediate adaptation needs – those for which further delay could increase vulnerability or lead to increased costs at a later stage – in the Least Developed Countries (LDCs). The implementation of projects in NAPA priority areas is ongoing, with financing from different sources, including the Global Environment Facility’s Least Developed Countries Fund, the Special Climate Change Fund, and the Adaptation Fund.

At the country level, NAPs should evolve out of existing adaptation and resilience-building processes, often within a wider climate change response that may include disaster risk reduction, disaster risk management, climate change mitigation planning, and climate finance.

Many developing countries consider adaptation as their main priority because of the significant impacts climate change is expected to have on national development, sustainability, and security.

¹ The HLPW was convened by the United Nations Secretary-General and President of the World Bank Group. The HLPW consisted of 11 sitting Heads of State and Government and one Special Adviser, to provide the leadership required to champion a comprehensive, inclusive, and collaborative way of developing and managing water resources, and improving water and sanitation related services.

1.4 Purpose of the NAP Water Supplement

The purpose of the NAP Water Supplement is to:

- enable the identification, prioritisation, financing, and implementation of water-related adaptation strategies and projects
- establish a framework for integrating water perspectives into planning, implementing, and monitoring adaptation actions that promotes climate resilience, in ways that are embedded with medium-to-longer-term development processes
- empower stakeholders involved in using or managing water to participate effectively and efficiently in the process to formulate and implement NAPs
- strengthen gender considerations in water-related adaptation planning and implementation
- help non-water specialists to understand the issues related to water security in the context of climate change.

The NAP Water Supplement is intended for use by:

- those leading the NAP process at a national level
- water planners and managers responsible for addressing adaptation in water resources management and key water use sectors
- those who provide support to countries to achieve a coherent and strategic response to adaptation planning.

1.5 Why update the NAP Water Supplement?

The first edition of the NAP Water Supplement from 2015 is being updated to align with the three major global milestones in the international development and climate resilience agenda – the Paris Agreement, the SDGs, and the Sendai Framework – all of which reinforce the importance of the NAP process, and influence how the NAP process can be undertaken effectively and efficiently, and financed – at the national level.

Additionally, this update incorporates two specific learning points from the use of the first edition of the NAP Water Supplement and other supplements to the UNFCCC NAP Technical Guidelines:

- a need for better coordination in adaptation planning across sectors
- opportunities for increased specificity in the NAP Water Supplement to facilitate its operationalisation.

2. The case for integrating water in the NAP and in development processes

Key messages

- Integrated approaches to water resources management help countries strengthen their water security and therefore adapt to climate change, reduce disaster risk, and advance towards development goals, both now and in the future.
- The economic cost of inaction around climate impacts on water could be very high, and governments should protect their development goals and ambitions from being derailed by climate change.
- There is widespread consensus on the urgent need for immediate action to tackle climate change, as demonstrated by the global commitment in the Paris Agreement.
- A succinct and well-argued case for water in adaptation planning and development processes – to contribute to water security and climate-resilient growth and development – helps to ensure buy-in from high-level decision-makers for reinforcing climate action strategies by integrating planning and preparation of water-related investments.
- Economic arguments for the benefits of water security and climate-resilient growth and development, and the potential costs of inaction, will highlight clearly the case for careful planning and the need for investments, in forms that high-level officials can readily grasp.
- Communications around these economic arguments must address real-world problems, advocate practical and implementable solutions, and persuade the target audience to do what they know must be done.

2.1 The critical role of water security in building climate resilience

Making a case for water security and climate-resilient development

A.1.a, A.1.c

Efforts to effectively integrate water as a channel for building climate resilience in the development and implementation of the NAP may be better supported and more carefully planned if there is a clear case made to do so. Water is a critical pathway through which climate impacts are experienced. Climate change can alter four aspects of the water cycle: overall water availability, including amounts of surface and groundwater; patterns and predictability of precipitation, glacier melt, and groundwater recharge; water quality; and the frequency and severity of extreme events such as droughts and floods. These impacts influence all aspects of water security: its availability for basic life and environmental functions and for essential livelihoods activities; our ability to harness water's productive potential, as an input to and as a connector across productive and service sectors; our ability to mitigate its destructive risks; and the sustainability of its natural resource base. Water security underpins sustainable development, and therefore warrants dedicated consideration in planning for strengthening climate resilience.

Box 1 explains the concept of water security, which is referred to throughout the NAP Water Supplement.

Box 1. Water security

Water security is the availability of adequate and reliable water resources of acceptable quality to provide water services for all livelihood, social, and environmental activities and to maintain a functioning water platform for growth, coupled with an acceptable level of water-related risks such as floods, droughts, and pollution to people, the environment, and economies. Water security also encompasses the ability and capacity to access (financially, socially, and legally) and use water, including in situations where there are shared waters (GWP, 2014).

The *Asian Water Development Outlook* (ADB and APWF, 2016) sets out five interdependent key dimensions of water security that are globally applicable:

- household water security – providing all people with reliable, safe water and sanitation services
- economic water security – the productive use of water to sustain economic growth in food production, industry, and energy sectors of the economy
- urban water security – creation of better water management and services to support vibrant and liveable water-sensitive cities
- environmental water security – supporting the health of rivers, wetlands, and freshwater ecosystems
- resilience to water-related disasters – resilient communities that can adapt to change and reduce risk from water-related natural disasters.

The *Strategic Framework for Water Security and Climate Resilient Development* (AMCOW, 2012) provides guidance on how to make the case for building climate resilience through water. It highlights that:

- Ensuring water security through more effective water management contributes to development goals, climate change adaptation, and disaster risk reduction, both now and into the future.
- The economic cost of inaction could be very high, and governments should protect their development goals and ambitions from derailment by future climate change.
- A succinct and well-argued case for water security and climate-resilient growth and development helps to ensure buy-in from high-level decision-makers and planning teams for increased investment and reinforced water and climate strategies.
- Economic arguments for the benefits of water security and climate resilience, and the potential costs of inaction, will highlight clearly the case for investment, in terms that high-level officials can readily grasp.
- Communications about the case must address real-world problems, advocate practical and implementable solutions, and persuade the target audience to do what they know must be done.

The expected outputs from making the case for water security and climate-resilient growth and development could include (AMCOW, 2012):

- A short briefing note or similar identifying the high-level commitments that are aligned with improvements and investments in water security and climate resilience.
- A macroeconomic appraisal of the benefits of water security and climate-resilient development, including the costs of inaction.
- A summary for policy-makers on the scientific evidence for climate change and its impacts, in a format which can be readily digested by non-specialists.
- Expression of strengthened government commitment to protect national development goals and ambitions against derailment by water and climate impacts.

Box 2. CASE STUDY: Making the economic case for adaptation in Kenya

To better understand the economic impacts of climate change, Kenya undertook an analytical study in collaboration with the Stockholm Environment Institute and with funding from the UK Department for International Development and Danish International Development Agency.

The study assessed climate impacts and economic costs of climate change for Kenya, considering key productive sectors of the economy as well as non-market sectors such as health and ecosystems, and analysed the costs and benefits of adapting to climate impacts over different timescales.

The study findings provided a sobering warning to high-level decision-makers on the potential economic impacts of climate change. Annual losses of 2.6 percent of GDP are predicted to occur by the 2030s. Extreme events will likely have an increasingly dramatic impact on infrastructure and the built environment, and other key sectors such as agriculture, industrial processing, manufacturing, tourism, infrastructure, and health will also be impacted.

Adapted from AMCOW (2012).

Vision and mandate for integrating water in the NAP process

A.1.c

The purpose of creating a national vision and mandate for integrating water in the NAP process is to provide overall direction for what the process is to achieve and why, and to secure political commitment and administrative support to undertake the process.

The overarching goal is to build climate resilience by improving water security. It is helpful to elaborate what this means for the specific national circumstances, and particularly, for different stakeholder groups. Increased water security and improved climate resilience through integration of water in the NAP process automatically contributes to objectives such as improving water management approaches, delivering adaptation commitments in a country's NDC, implementing action prioritised in the country's National Communication, delivering on the Sendai Framework for Disaster Risk Reduction, and achieving a country's SDG targets related to water and climate resilience, possibly along with other related SDG goals. By understanding the broader landscape of national development priorities, pressures, and drivers, it is possible to incorporate relevant objectives into the vision and mandate for integrating water in the NAP process.

The process of arriving at a national vision must include creation of a shared and defined 'climate change problem situation' as well as opportunities to tackle climate change. Arriving at a national vision may not be a straightforward process. When people disagree it can be helpful to move to a higher level where there is wider basis for agreement. Different stakeholder groups share deeper values and interests in the bigger picture. Starting out by developing multiple visions for the future is a good way of finding shared ambitions and reaching agreement on an overall direction forward (Brouwer et al., 2015).

Box 3 illustrates an example of a national mandate for the NAP process, via the case of Tanzania.

The national mandate can be created through an act, directive, executive order, or policy issued by the national government to guide action on adaptation. The content of the mandate should:

- establish clear responsibilities for government agencies (lead agency, coordination, reporting, etc.) and all other stakeholders
- specify key actions, milestones, and outputs (e.g. assessments, plans, implementation, monitoring and evaluation), frequency, and follow-up actions.

Creating a national mandate can take a long time, so other activities in the NAP process may be initiated in parallel. If there are already national policies on climate change or adaptation that effectively drive the NAP process then it is possible that no new mandate is needed. It is important to note that while creation of a national mandate for the NAP process indicates political commitment for national adaptation planning, the mandate alone is not sufficient to ensure that the NAP process takes place successfully; buy-in within

the administrative system, supported by public awareness of the importance of the NAP process, is critical for follow-up on the created mandate and real implementation of the NAP.

Box 3. CASE STUDY: Mandate for the NAP process in Tanzania

In Tanzania, the NAP process is led by the Vice President's Office Division of Environment. The overall policy framework is the National Environmental Policy of 1997. The 2004 Environmental Management Act is a legal framework for environmental management, and it directly covers the issue of adaptation planning, including new efforts under the NAP process. The Environment Minister is empowered by the Act to take measures to address climate change and oversee the NAP process for Tanzania. The Act also empowers sectors and Local Government Authorities to undertake various environmental and climate change roles and responsibilities.

It is also helpful to consider how the core principles of the NAP process (see Box 4) can be taken into account in the water-related aspects of adaptation planning.

Box 4. Guiding principles for the NAP process

The core principles of the NAP process include:

- continuous planning process at the national level with iterative updates and outputs
- country-owned, country-driven
- not prescriptive, but flexible and based on country needs
- building on and not duplicating existing adaptation efforts
- participatory and transparent
- enhancing coherence of adaptation and development planning
- supported by comprehensive monitoring and review
- considering vulnerable groups, communities, and ecosystems
- guided by best available science
- taking into consideration traditional and indigenous knowledge
- gender-sensitive

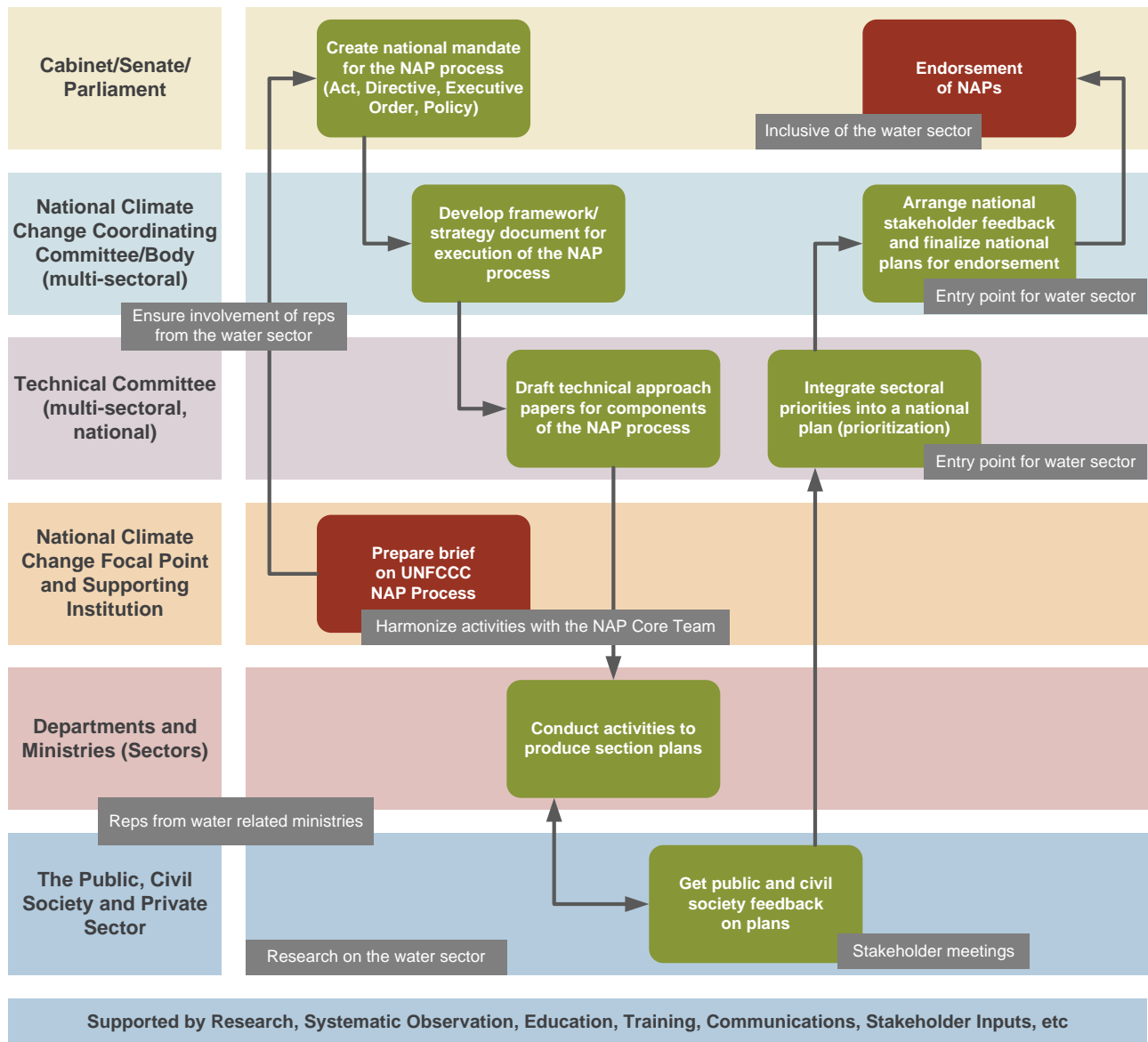
Adapted from UNFCCC (2012b).

Entry points for water in the NAP process

A.1.b, A.1.c

There needs to be a clear specification, at the national level, of roles and responsibilities for organising the overarching NAP process and for organising how the water sector will contribute to the NAP process. The UNFCCC NAP Technical Guidelines outline considerations for organising the overarching process and describe a possible flow of responsibilities. The flow of responsibilities is adapted in Figure 1 to show the potential entry points for water perspectives to be integrated into the overarching NAP process. It will be important to establish and mandate the responsible entities for the water sector (e.g. task force, working groups and focal points) to represent the sector in the core NAP team and lead the preparations to integrate water perspectives. Clear roles and responsibilities for cross-sector coordination should also be established through discussion between the sectors and the NAP core team.

Figure 1. Possible flow of responsibilities for the NAP process and entry points for integrating water.
 Source: UNFCCC (2012a).



Water security as a cross-sector issue

C.4.a

Effectiveness of the NAP process at the national and subnational levels can be promoted by identifying opportunities for multiple sectors to collaborate and synergise in integrating water in the adaptation planning process. Water is a cross-cutting and sector-connecting resource, and water security is a cross-sector issue. Building climate resilience through water naturally requires cross-sector coordination. Coordination can be achieved through participatory approaches to engage policy-makers across sectoral ministries and ministries of planning and finance; marginalised and vulnerable groups; rural communities; and non-governmental stakeholders including those from the agriculture, forestry, fisheries, energy, health, and industrial sectors.

Several other multilateral and bilateral development and research institutions have also drafted supplementary materials to the UNFCCC NAP Technical Guidelines (www4.unfccc.int/sites/NAPC/Guidelines/Pages/Supplements.aspx). These supplementary materials cover in more depth methods and approaches for adaptation planning in key sectoral and thematic issues.

Supplements particularly relevant to integrating water perspectives into the NAP process include, but are not limited to:

- the UN Food and Agriculture Organization's Addressing agriculture, forestry and fisheries in National Adaptation Plans
- the World Health Organization's Guidance to protect health from climate change through health adaptation planning
- the Convention on Biological Diversity's Promoting synergies in addressing biodiversity and climate change adaptation issues
- Conservation International's Tool for integrating ecosystems into climate change adaptation planning.

3. Stakeholder and public involvement

Key messages

- Stakeholder perspectives on the urgency of climate risks to water security vary depending on their roles and remits.
- Bridging the divides among the water, development, and climate communities is essential.
- Efforts should be made to build on existing stakeholder platforms that are already widely accepted and influential.
- Stakeholder analysis will contribute to understanding the interests and levels of influence of different stakeholders with regards to water security and climate-resilient development in a particular country.
- Institutional mapping can be used alongside stakeholder analysis to gain an understanding of the institutional framework that informs decision-making on water management and related investments.
- Influence mapping, which outlines both normative and ‘in-practice’ relationships – that includes political economy considerations not directly related to climate change or water, for example – can further inform strategies for integrating water perspectives in the NAP.

3.1 Engaging effectively in the NAP process

Considering water in planning stakeholder and public engagement

A.1.b, A.3.c

Stakeholder and public engagement in the NAP process should be well planned to effectively develop a shared vision for the NAP process and its goals, build a common understanding of climate vulnerabilities, identify and implement adaptation actions, carry out monitoring and review, and iteratively learn to improve the NAP process. The process of ensuring stakeholder participation follows three broad steps (AMCOW, 2012):

1. **Stakeholder identification** is the initial process of drawing up a long list of potential stakeholders, which should aim to identify a broad base of stakeholders spanning a range of sectors, planning levels, and mandates. A ‘stakeholder’ refers to an individual, community, group, or organisation with an interest, or stake, in particular outcomes related to water, climate, and development.
2. **Stakeholder analysis** is the process of systematically reviewing the characteristics of stakeholders, the information and value they can add to the NAP process, and how the NAP process is relevant to and can benefit the stakeholders. This leads to a defined stakeholder base and potential roles for stakeholders in the NAP formulation and implementation process.
3. **Stakeholder engagement** is the process of mobilising a coherent stakeholder base, including defining and iteratively refining roles within the base and establishing a mutual understanding of the terms of reference for engagement in the NAP process.

AMCOW (2012) provides guidance on how to achieve each of these three steps.

The private sector is an important stakeholder, as it is a major player in the water management context: due to the role of water in value chains of products and services in, for example, water supply, hydropower, agriculture, or tourism; and due to risks imposed by climate impacts on water, such as flood and drought. Engaging the private sector early in the NAP process can improve the likelihood of private sector investment in the implementation of adaptation actions, by informing the private sector’s perception of climate risks, aligning its incentives with resilience outcomes and intended adaptation actions, and by creating the necessary institutional structures and investment environment during the NAP process (IISD, 2017).

Efforts should be made to accommodate marginalised and vulnerable groups, including stakeholders that could bring forth concerns of women, youth perspectives, and opportunities to increase benefits for these groups. Efforts should also be made to bring important and high-level political decision-makers on board, and to identify key stakeholders involved in important national development processes, including those linked to global agendas such as the SDGs, in order to achieve broad coherence in these various effort streams, improve efficiency and effectiveness, and avoid overlap in work. Finally, efforts should be made to include stakeholders involved in operationalising the NAP, i.e. translating the NAP to specific policy processes or projects, including domestic and international financiers of such policy processes and projects.

Approaches for engaging stakeholders and the public can range from informing, where there is a one-way flow of information to stakeholders, to partnership approaches, where there are joint responsibilities and two-way flows of information, as outlined in Table 1. Fully participatory (see Box 5, Box 6, and Box 7 for examples) approaches can yield greater commitment and buy-in from stakeholders and the public than informing approaches, although typically more time and resources are required to reach out to the same number of people with participatory approaches as with informing approaches. It is therefore necessary to consider what types of engagement process is desirable and is feasible to be employed with different groups of stakeholders and the public to make stakeholder and public engagement in integrating water in the NAP process as effective as possible while allocating the time, preparing the budget, and securing resources for stakeholder engagement.

Table 1. Degrees of stakeholder engagement and some examples of corresponding methods

Degree of engagement	Example methods of engagement
Information (the public has access to information)	Brochures, flyers, press conferences, info-centres, exhibitions, open-house events, internet distribution, cultural events, special (education) events for target groups, infotainment in mass media, talk shows in mass media
Consultation (the public has an opportunity to express views and statements)	Calls for written comments, interviews, public debates, hearings, organisation of surveys, public pools, internet discussions (e-forums), questionnaires
Discussion (direct interaction between the public and government bodies)	Workshops, seminars, round tables, specialised conferences
Shared decision (the public contributes to the decision-making process)	Negotiations resulting in voluntary agreements, stakeholders as members of advisory boards, organisation of public vote (referendum), collaborative modelling (see Box 7)

Box 5. The power of multi-stakeholder partnerships

Due to the cross-cutting impacts of climate change and water stress, it is critical that all affected interest groups – including government, business, academia, and civil society – come together as a **multi-stakeholder partnership (MSP)** in the NAP development process. The necessity for an MSP-approach is clear: inclusive, integrated platforms and processes are crucial for bringing about inclusive, integrated responses to climate and development challenges. However, the question of *how* to develop, run, facilitate, and maintain these sorts of partnerships is far from straightforward. There is now increasing research devoted to mechanics of designing and implementing MSPs in ways that deliver real progress.

MSPs function in a wide variety of different ways, from short-term consultations around specific issues to long-term collaborations. But they generally have the following characteristics:

- 1) a shared problem or opportunity,
- 2) involvement from all those affected by the problem/opportunity, and
- 3) actors from different sectors and/or scales.

The Centre for Development Innovation at Wageningen University has developed an MSP Guide to help practitioners design MSPs in ways that are best suited a given problem. The guide outlines seven principles that make MSPs effective:

1. Embrace systemic change
2. Transform institutions
3. Work with power
4. Deal with conflict
5. Communicate effectively
6. Promote collaborative leadership
7. Foster participatory learning

Adapted from Wageningen University & Research, 2016.

Stakeholder engagement can serve a variety of purposes, including raising awareness, educating, disseminating, and knowledge exchange. The needs of stakeholders and the public who are influenced by, or who themselves influence, water-related climate risks and adaptation should be considered within the planning of engagement activities. This may highlight a need for targeting a larger audience than might otherwise be considered; for example, it will be important to reach out to both men and women in rural communities, young people, indigenous communities, and people with disabilities.

These basic principles should be considered while choosing methods of stakeholder engagement:

- **Appropriateness:** Ensuring information is relevant and applicable, has been tested in the field, and rigorously proven through research and development
- **Accessibility:** Building on current capacity of practitioners rather than requiring major upgrades in individual, organisational, or technical ability
- **Equity:** Respecting cultural needs and gender issues, not discriminating against users or providers because of their remote locations.

The communication and dissemination aspects of the engagement process could involve a variety of media for maximum outreach, including print, radio, TV, mobile phones (text message services, apps), e-learning materials, and social media. The participatory elements of the engagement process could involve meetings, interviews, workshops, task delegation, and task sharing.

Box 6. CASE STUDY: Stakeholder engagement in Malawi's NAP process

Malawi launched its process to formulate and implement NAPs in 2014. The core team, consisting of 12 multi-sectoral members, is spearheading the process and reporting to Malawi's National Climate Change Technical Committee on progress.

Malawi realised that it is critical to identify and involve stakeholders across sectors and levels both within and outside of the government. The identified stakeholders developed a structure for multi-sectoral participation throughout the entire process. The extensive consultations involved in the stakeholder engagement process can lead to increased public awareness of and political buy-in to climate change science, policy, sustainable development priorities, and actions. Furthermore, Malawi's NAP team established that stakeholder engagement provides a good platform for developing a good governance framework to guide and provide a structure for the NAP. Malawi conducted a NAP training workshop as part of the NAP launch event in September 2014. The workshop offered an opportunity to plan and develop activities to support long-term adaptation planning. Furthermore, it facilitated the stakeholder dialogue to determine the institutional arrangements for the process to formulate and implement NAPs. One of the objectives of the workshop was also to engage political decision-makers and policy-makers at the very start.

Malawi is also engaging various international stakeholders, including development partners such as the National Adaptation Plan Global Support Programme, Global Water Partnership, German Corporation for International Cooperation (GIZ), and the United Nations Development Programme. In order to make use of previously acquired knowledge, Malawi is building on the work of its NAPA teams.

Adapted from UNFCCC (2015a).

Box 7. Collaborative modelling – an option for shared decision-making while integrating water in the NAP process

Stakeholders in the NAP process must be effectively engaged during the development of a national vision for integrating water in the NAP process, and in the process of developing the NAP. This is particularly important to ensure ownership of the NAP process from all stakeholders and enable robust implementation of adaptation actions. Collaborative modelling, mobilised in water resources planning to improve decision-making processes by bringing those that develop analytical models to resolve complex water management problems together with stakeholders (including importantly the private sector, which is a significant water user and also can be a significant source for adaptation financing) and decision-makers, can be an option for developing a national vision for integrating water in the NAP process.

Typically, technical experts and stakeholders are both involved in the NAP process but their pathways tend to be separate, with periodic intersections. In most cases, the intersections take place at the beginning of the NAP process, when creating a shared vision, and at points where recommendations emerging from analytical models are presented for discussion and decision-making. For example, technical experts build analytical models to provide the NAP process with high-quality information on climate hazards, vulnerabilities, risks, adaptation options, and implementation strategies, while stakeholders engage in consultations to help ground-truth vulnerabilities and evaluate adaptation options. Stakeholders often have few options but to accept the results obtained by the experts. This runs the risk of stakeholders perceiving models as 'black boxes' about which they have little understanding and trust, leaving them sceptical of the outcomes and decisions made.

In contrast, collaborative modelling builds stronger connections between technical experts and stakeholders in a structured process where both jointly search for solutions. Stakeholders formally learn more about the models, how they are developed and used, and their potential and limitations. And modellers spend time away from their computer screens, listening to stakeholders and seeking ways of building criteria that are of interest to stakeholders into their models. As a result, stakeholders feel part of the process as their knowledge, interests, and needs are actively considered and valued. Together, modellers and stakeholders share learning, build consensus, and create trust in the solutions developed and in the decision-making process.

Collaborative modelling as a framework to support integration of water into the NAP can be particularly useful when there are diverse and conflicting stakeholder interests, and when there are conflicting facts, limited knowledge, or high uncertainty about climate change projections, impacts via water, and adaptation options. Different types of collaborative modelling approaches, each of which may be adapted to suit a particular climate risk and socio-political context, are described in GWP (2017a).

Adapted from GWP (2017a).

Briefing stakeholders and the public on the NAP process

A.1.a

Addressing water in the NAP process requires continuous engagement and communication with relevant stakeholders across multiple sectors, policy-makers, and the public. Briefings about the NAP process should include both men and women, and emphasise the participation of stakeholders that can bring forth interests and concerns faced differently by women and men, such as women's groups and civil society organisations.

NAP briefings help all parties to understand the current state of the NAP. They provide an opportunity for knowledge sharing about the water-related adaptation challenges and opportunities facing multiple sectors and stakeholders, the importance of climate change risks and vulnerabilities related to water, and their consequences for water security, food security, ecosystems, poverty, gender equality, rural livelihoods, trade, and growth.

The way in which these initial briefings are carried out may vary for different groups of people involved and should be designed sensitively. See Chapter 11 on helpful tools and resources for references that describe some possible approaches for stakeholder participation.

Using effective engagement to define a strategy for integrating water in the NAP process

A.1.e

One of the objectives of early engagement with stakeholders is to collaboratively define a strategy for integrating water in the NAP process. The strategy should include provision for making cross-sector links and for assessing and planning for interdependent impacts and adaptation measures that would be missed with a single-sector approach.

Box 8. CASE STUDY: Participatory approaches to Zambia’s Integrated Water Resources Management and Water Efficiency (IWRM/WE) Plan offer lessons for its NAP process

Zambia has faced challenges in managing its water resources, resulting in supply shortages, pollution, inadequate information for decision making, inefficient use, lack of financing, and limited stakeholder awareness and participation. As part of its water sector reform in the 1990s, Zambia adopted the 1994 National Water Policy, which identified an IWRM approach as a prerequisite for addressing these issues.

In the context of the National Water Policy and the 2002 international target to prepare national IWRM plans, the Zambian Ministry of Energy and Water Development began developing the IWRM/WE Plan to provide a “unified implementation plan that supports both the reforms of water resources management as well as all other interrelated/multi sectoral aspects of IWRM and water efficiency, in a coordinated, effective and efficient manner”.

In 2003, GWP initiated the Partnership for Africa’s Water Development to support the development of IWRM plans. This Partnership shared many objectives with the existing Zambian Water Resources Action Programme, and the Government of Zambia decided to harmonise the two initiatives. GWP Zambia was requested to facilitate the process within the Partnership framework, and in December 2003 the project was launched under the leadership of the Ministry of Energy and Water Development.

GWP Zambia organised a multi-stakeholder consultation process to identify priority issues and the constraints of managing, using, and developing water resources at sectoral, provincial, and catchment levels. The results were fed into the preparation of programmes, ensuring that the interventions and initiatives proposed were capable of addressing the most pressing water management needs. The buy-in gained from this participatory approach was also required to encourage the multi-stakeholder support deemed essential for plan implementation.

GWP Zambia led an awareness-raising campaign targeted at parliamentarians and the media. The publicity helped to maintain the momentum of the process. A capacity building programme was initiated among stakeholders with specific responsibilities for developing and implementing the IWRM/WE plan. This improvement to technical and analytical capacity of public sector officials was essential to get input from government departments, including Economic Planning, Finance, Agriculture, and Energy.

The IWRM/WE Implementation Plan was completed in 2008 and serves as a single reference document for all stakeholders on priority water-related interventions to support socio-economic growth. The government used the IWRM/WE Plan to guide the implementation of the country’s Fifth National Development Plan 2006–2010, which resulted in ten IWRM/WE programmes being adopted, unlocking water security-improving investments totalling US\$51 million, financed by the World Bank and Africa Development Bank. The close relationship between the two processes means that the IWRM/WE Plan provides the long-term framework for water related programmes to be incorporated into the NDP planning cycle, and therefore guides the identification of projects and allocation of funding from a variety of sources beyond the five years of the Fifth National Development Plan.

As such, the IWRM/WE Plan also had a significant influence on the formulation of the Sixth National Development Plan 2011–2015 and its revision in 2014. Indicative sector budget and financing was set for the Development Plan’s implementation period, including an expenditure allocation for water management and development activities as outlined in the IWRM/WE Plan.

The IWRM/WE Plan process in Zambia offers valuable lessons for Zambia's ongoing NAP process in terms of stakeholder involvement and integration in national development processes. Zambia derives its NAP mandate from the 2016 National Climate Change Policy, which establishes a comprehensive framework for coordinating a national response to climate change, including planning, implementation, monitoring, reporting, and evaluation of resilience-building activities, including integration and mainstreaming of climate change into NDPs. The National Climate Change Policy recognises that climate change impacts a range of sectors including agriculture, environment, energy, water, education, and health, and requires coordinated involvement of all stakeholders – in public and private sectors, including civil society organisations, NGOs, and academia – throughout climate action planning and implementation to ensure stakeholder ownership and ultimately ensure sustainability of outcomes. The Policy thus provides a strong basis for participatory and integrated approaches to Zambia's NAP process.

Adapted from GWP (2015)

Raising awareness of integrating adaptation in development planning

A.3.b

Climate change adaptation initiatives present an opportunity to further develop and support the achievement of the SDGs. In order to maximise the potential for this to happen, it will be helpful to identify the stakeholders responsible for policy planning and programming across the water sector and other relevant sectors and raise their awareness of the connections between development and adaptation objectives. Awareness might be raised through workshops, publications, and other communications methods.

Box 9. Nepal's Working Group approach in its NAP process

Learning from its National Adaptation Programmes of Action (NAPA) and Local Adaptation Plans of Action (LAPAs), the Strategic Program for Climate Resilience (prepared under the Pilot Program for Climate Resilience), and other adaptation initiatives, Nepal uses the Working Group approach to expedite its NAP process.

Working Groups have multiple functions in streamlining the NAP process. They (i) initially reviewed and provided analytical inputs on and finalised documents such as stocktaking reports, capacity gaps and needs, and vulnerability, risk and development priorities; (ii) now actively engage in identifying, selecting, and prioritising theme-based adaptation options to include in the NAP; (iii) provide inputs in communicating NAP-related information; (iv) integrate climate change adaptation into existing and new policies, strategies, programmes and activities; (v) actively engage in formulating the NAP implementation strategy and reporting, monitoring, and reviewing framework; (vi) coordinate the whole NAP process of the respective theme or cross-cutting area and align it with national and international initiatives such as the SDGs, Sendai Framework, New Urban Agenda, and other global agendas supporting climate resilience and sustainable development.

In line with the national mandate and practices, the then-Ministry of Population and Environment (now Ministry of Forests and Environment) officially invited nine other concerned ministries to form and coordinate the functions of the following working groups:

Thematic Working Groups

Agriculture and Food Security
 Climate-Induced Disasters
 Forests and Biodiversity
 Public Health & WASH
 Tourism, Natural and Cultural Heritage
 Urban Settlements & Infrastructure
 Water Resources & Energy

Coordinating Ministries

Ministry of Agriculture Development
 Ministry of Home Affairs
 Ministry of Forests and Soil Conservation
 Ministry of Health
 Ministry of Culture, Tourism & Civil Aviation
 Ministry of Urban Development
 Ministry of Energy

Cross-cutting Working Groups

Gender & Marginalized Communities
 Livelihoods & Governance

Ministry of Women, Children & Social Welfare
 Ministry of Federal Affairs & Local Development

Each Ministry formed the concerned thematic and cross-cutting Working Groups, coordinated by its respective Joint-Secretary with a designated official (an Under-Secretary or Section Officer) to function as the Member-Secretary that coordinates the functions of the Working Group. A total of 201 members in nine Working Groups were actively engaged in the NAP process as of May 2017.

The Water Resources & Energy Working Group's members represent government institutions, associations of local bodies, NGOs, federations, networks, community-based organisations, indigenous communities and women, academia, the private sector, and hydropower organisations. Out of 17 members, 8 are from government ministries and departments. A number of workshops and meetings were organised between May 2016 and May 2017 to engage the members in enhancing their knowledge and understanding of the NAP process. This approach was adopted to build human resources as a part of the NAP process, and ensure integration of adaptation into new and existing policies and programmes with the active engagement of the concerned lead ministries. The workshops, accompanied by the enhanced understanding and capacity of Working Group members, provided opportunities to engage additional stakeholders when necessary during the NAP process. The whole process moved under the coordination of the UNFCCC focal point, the then-Ministry of Population and Environment, now the Ministry of Forests and Environment.

The Working Group approach allowed meaningful engagement of the private sector. Over 50 percent of the members of the Tourism, Natural and Cultural Heritage Working Group are private sector representatives that actively mobilise the NAP process for reducing climate change impacts on tourism and natural and cultural resources.

Adapted from Government of Nepal (2016).

Disseminating climate change and adaptation information

B.1.c, B.4.b, B.4.c, D.4.a, D.4.b

The findings from key stages in integrating water in the NAP process should be disseminated to all stakeholders and the public. This should include:

- **Projected climate change impacts via water, associated vulnerabilities, and risks.**
 Communications could be tailored for different types of stakeholders to ensure that the level of information provided is appropriate for the way in which the recipient is likely to understand and use it.

■ **The endorsed NAP and its supporting documents.**

It might be helpful to link the NAP Central website (www4.unfccc.int/sites/napc) to more specific water-related websites to increase awareness around integrating water in the NAP and more generally promote adaptation through water management. There are opportunities for countries to present their activities on integrating water in the NAP process in the international climate negotiation context, for example along the UNFCCC's Conferences of Parties, Subsidiary Body for Scientific and Technological Advice, and LEG meetings. Sharing lessons learned and good practices through South–South communication is highly recommended.

■ **Progress and effectiveness of NAP actions that build water security.**

This might include a summary of the results of the monitoring and evaluation work carried out, general awareness raising of adaptation planning, and dissemination of success stories.

Providing the appropriate level of information for the target audience is important in getting these issues across. The Associated Programme for Flood Management (WMO and GWP, 2015) has provided guidance on preparing advocacy strategies as instruments for bridging the gap between science and policy and to enhance citizen participation in decision-making. ODI (2008) has also provided a relevant note on communicating evidence through policy briefs, and the characteristics of policy briefs that influence decision-makers.

National and international knowledge sharing

C.3.c

Sharing experiences of water-related adaptation planning and implementation can take place at the subnational, national, and international levels, representing exchanges of knowledge among communities, local governments, government departments, and different countries. Experience-sharing can provide valuable opportunities for learning and relationship-building. This can be particularly useful in transboundary basins, to promote coordination of adaptation strategies and activities at the basin level.

Facilitating these outreach, learning, and cooperation activities can be achieved by ensuring public access to data and information on the NAP process, promoting public and stakeholder participation in the process, and creating opportunities for knowledge exchange through workshop hosting, for example. Opportunities for South–South learning should be harnessed to find ways of learning from others with similar and contrasting situations.

There are several fora that offer opportunities for sharing adaptation experience:

- GWP organises regional workshops for exchanging country experiences and building capacity to access GCF resources for water-related adaptation planning and project preparation (see Box 20). <https://www.gwp.org/en/GWP-SouthernAfrica/GCFPartners/>
- The NAP Global Support Programme supports LDCs in advancing NAPs and facilitates knowledge sharing through workshops, meetings and information sharing (see Box 22). www.globalsupportprogramme.org/nap-gsp
- The UNFCCC's Least Developed Countries Expert Group (LEG) organises training workshops and meetings on NAPs. www.unfccc.int/process/bodies/constituted-bodies/least-developed-countries-expert-group-leg
- The UNFCCC's Adaptation Committee provides a source of technical support and knowledge sharing. www.unfccc.int/process/bodies/constituted-bodies/adaptation-committee-ac
- The UNFCCC hosts an Adaptation Knowledge Portal. www4.unfccc.int/sites/NWP/Pages/Home.aspx

4. Adaptation and sustainable development

Key messages

- Water drives climate adaptation. Analysis of the adaptation components of NDCs of 80 countries reveals that 9 out of every 10 countries prioritise investing in water infrastructure, institutions, or governance.
- Attention to water, however, needs to be greatly increased in the adaptation planning stages. Just over a third of countries explicitly embrace integrated approaches to water resources management. In a context of increased water stress and reduced predictability due to climate change, it becomes critical to balance water management priorities across the range of productive sectors (agriculture, energy, transport, and livelihoods, among others), incorporate disaster risk reduction priorities, and consider needs of ecosystems and the environment. Integrated approaches to water management – measured via the SDG indicator 6.5.1 – can help analyse trade-offs and tap into synergies among these objectives.
- SDG indicator 6.5.1 establishes the need for action at four levels: enabling environment; institutions and participation; management instruments; and financing. Under a changing climate, governments seeking to achieve the SDGs in concert are realising that water-related adaptation considerations become part and parcel of overall adaptation planning, and that integrated approaches to water management, in particular, help maximise resilience benefits while mitigating chances of unintended maladaptation.

4.1 The SDGs

The 2030 Agenda for Sustainable Development was adopted by Parties at the UN General Assembly in September 2015. The Agenda set out the 17 SDGs, covering a wide range of development issues. Water security and climate resilience are relevant to all of the SDGs, with particularly strong connections to the following goals:

- SDG 2 on zero hunger. Food production relies on water availability, from rainfed agriculture to irrigation and beyond.
- SDG 5 on gender equality. This goal includes targets on ending discrimination against women and girls, on ensuring women's participation in leadership and decision-making, and on ensuring access to and ownership of natural resources.
- SDG 6 on clean water and sanitation. This goal includes a high-level target on implementing IWRM.
- SDG 7 on affordable and clean energy. With a drive to increase the share of renewable energy in the global energy mix, there are strong links between hydropower in particular and IWRM.
- SDG 13 on climate action. This goal is consistent with the aims of the Paris Agreement and calls for improved education, awareness raising, and capacity building on climate change mitigation and adaptation.
- SDG 14 on life below water. Freshwater systems for fisheries and healthy aquatic ecosystems rely on reliable quantity and quality of water.
- SDG 15 on life on land. Life on land includes freshwater life, such as in inland wetlands, and the ecosystems supporting it.
- SDG 17 on partnerships for the goals, which identifies that partnerships between governments, the private sector, and civil society are required to achieve the SDGs.

4.2 Integrating adaptation in sustainable development

What are the main water-related development objectives?

A.4.a

Integrating water-related adaptation and climate resilience in sustainable development requires some understanding of the main water-related development objectives, policies, plans, and programmes. This can be developed through taking stock of the information available on development plans. This activity should consider national, regional, and international frameworks (for example, transboundary agreements) as well as plans for disaster risk reduction. Information should be compiled on the status, timelines, focus, coverage, and financing of the development initiatives.

Integrating water-related adaptation in development

A.4.b, B.5.a, B.5.c

Work can be done to identify and assess the links between adaptation needs and development goals and the critical role that water plays in achieving these goals. The integration of water-related climate change adaptation into existing national and subnational planning processes requires an understanding of the planning and policy processes in order to find appropriate entry points for integration.

Links between the national and subnational policies and programmes and international processes can also be identified and enhanced, such as the 2030 Agenda, the Paris Agreement, the Convention on Biological Diversity including the Aichi Biodiversity Targets, and the Sendai Framework for Disaster Risk Reduction. The UNFCCC's Integrative Framework for NAPs and SDGs (NAP-SDG iFRAME) could be used to support this work, as it provides an integrated approach towards country-driven and country-specific descriptions of systems to achieve adaptation as well as SDG targets (Lavender, 2017). The UNDP and UNEP (2011) guide on mainstreaming climate change adaptation into development planning also provides relevant guidance. It is also important to make links with transboundary water agreements and legislation.

Adaptation planning needs to take into account other national and subnational programmes, such as NAPAs and their variants, the Local Adaptation Plans of Action; Nationally Appropriate Mitigation Actions; green low-carbon growth or development strategies; programmes for low-carbon and climate-resilient pathways; disaster risk reduction plans; and plans and programmes for fostering water security and sectoral development.

Water security influences many aspects of planning, and the links between climate change and water security must be addressed in development and investment planning and financing. This can be done by considering existing planning mechanisms and cycles and then finding suitable entry points for integrating adaptation and building resilience through water. This is likely to be an ongoing process, involving government and non-government stakeholders, the private sector, and the development community.

The aim is to support the integration of adaptation into development activities. Work can be done to screen existing development and sectoral policies, strategies, and plans through a climate lens to determine whether they might lead to maladaptation or missed opportunities. The assessment should also include the analysis of whether or how current policies and development efforts are at risk from climate change. It is appropriate to consider what actions may be necessary to make development interventions more sustainable and climate resilient.

It goes without saying that the integration of water-related adaptation in development requires coordination with other sectors in which water forms an important input.

Table 2 sets out some linkages between water-related adaptation and the SDGs, highlighting the importance of the role played by water-related adaptation in the global development agenda.

Table 2. Water in support of the SDGs

SDGs	Supporting achievement of the SDGs
1. End poverty in all its forms everywhere	Water is essential to economic development, including productive livelihoods for the urban and rural poor. Putting in place required infrastructure and management instruments to reduce water scarcity induced by climate change, and taking measures to reduce risk from climate change-induced floods, droughts, and other water-related disasters, can play a significant role in enabling the poor to escape the poverty traps in which they would otherwise be entrenched despite being engaged in productive activity.
2. End hunger, achieve food security and improved nutrition, and promote sustainable agriculture	Water and land management are inextricably linked, and a combination of improved water and land management will play an important role in increasing climate-resilient agricultural production and food security. The gender dimensions of water management are particularly relevant, given the role women play in agricultural activity and caregiving in families.
3. Ensure healthy lives and promote well-being for all at all ages	Better management of water at local levels can help improve water quality and combat water-borne and water-related diseases in the context of increased flooding, reduced water availability, and raised water temperatures. Access to safe water and sanitation reduces child mortality and increases maternal health.
4. Ensure inclusive and equitable quality education and promote life-long learning opportunities for all	Travelling farther to collect water due to climate change-exacerbated water scarcity, and the effects of water-related disease, can consume time children otherwise spend in school.
5. Achieve gender equality and empower all women and girls	Women are disproportionately affected by the household tasks involving collecting and using water, which might be increasingly unreliable, in terms of available quantity and quality, due to climate change. Provision of water can increase time available for women to participate in other social and economic activities.
6. Ensure availability and sustainable management of water and sanitation for all	The management of water resources needs to take into consideration changing and less predictable precipitation patterns due to climate change in order to ensure availability of water and sanitation for all, including for livelihoods, the environment, and the economy.

SDGs	Supporting achievement of the SDGs
7. Ensure access to affordable, reliable, sustainable and modern energy for all	Water is central in hydropower development, and fundamental to other energy infrastructure throughout the life cycle of its development and operation. Increased uncertainty around the timing and amounts of water availability directly affects energy security.
8. Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all	Water is essential to economic development, which can create productive livelihoods for the poor. Water insecurity, exacerbated by climate change, can proliferate unemployment and induce migration.
9. Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation	Resilient infrastructure can protect against water-related disasters that become more frequent due to climate change. Technological innovation can improve water use efficiency, enhance water quality, and increase water reuse. Innovations in water infrastructure and water resources management instruments and modalities can allow for continued performance in a context of a changing and more unpredictable climate.
10. Reduce inequality within and among countries	Coordination across sectors and inclusion of all users within basins (national and transboundary) underpins integrated water resources management that allows for sustainable use and promotes benefit sharing – both of which are important in the context of a changing climate in which water availability, in terms of both amount and timing, become less predictable. A significant proportion of the world’s river, lake, and aquifer systems are transboundary, with inequalities among countries in level of development, water access and use, availability of water-related information, and technical capacity, all of which have implications for how benefits from shared waters are harnessed and distributed.
11. Make cities and human settlements inclusive, safe, resilient and sustainable	Management of water-related hazards reduces the economic burden of climate change-induced and climate change-exacerbated floods, droughts, and storms to urban and built environments. Water management plays an important role in the circular economy, particularly under a changing climate.
12. Ensure sustainable consumption and production patterns	Water is essential to many economic sectors and enhanced water use, efficiency, and stewardship have benefits for all. Synergies need to be urgently tapped into and trade-offs carefully considered as water availability becomes more unpredictable under a changing climate.

SDGs	Supporting achievement of the SDGs
13. Take urgent action to combat climate change and its impacts	Water is the primary medium through which climate change is felt, and it is central to the sectors most prioritised by countries to minimise negative impacts and to seize adaptation opportunities.
14. Conserve and sustainably use the oceans, seas and marine resources for sustainable development	Improved management of water resources, from source to sea, enhances the quality and quantity of waters reaching the marine environment.
15. Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss	Sustainable management and use of water resources supports freshwater life, ecosystems services, and green growth and underpins sustainable development.
16. Promote peaceful and inclusive societies for sustainable development, provide access to justice for all and build effective, accountable and inclusive institutions at all levels	Effective water governance is a cornerstone of developing and managing water resources, and of the delivery of improved water services at different levels of society in the context of increased competition around the resource base under climate change.
17. Strengthen the means of implementation and revitalize the global partnership for sustainable development	Water is a leading priority for the adaptation agenda for LDCs, yet capacities on the ground and resources allocated to water-related adaptation actions are far below the levels needed. Partnerships are required to facilitate transfer of knowledge, build capacity, and enable access to finance.

Box 10. CASE STUDY: Integrating adaptation in development planning in Cambodia

Since ratification of the UNFCCC in 1995, the Government of Cambodia has undertaken various measures to address climate change risks and vulnerabilities. Highlights of measures undertaken include publication of the initial national communication to the UNFCCC in 2002; establishment of the National Climate Change Committee in 2006; publication of a NAPA in 2007; launch of the Climate Change Strategic Plan for 2014–2023 in 2013; preparation of Sectoral Climate Change Strategic Plans and Action Plans by line ministries from 2014; launch of the process to formulate and implement NAPs in 2014; and targeted initiatives for mainstreaming climate change into subnational development plans in 2015.

The National Strategic Development Plan for 2014–2018 states the importance of implementing the Climate Change Strategic Plan. It contains indicators related to climate change, with a major focus on increasing public spending to mainstream climate change issues into national and subnational planning. The preparation and implementation of the Sectoral Strategic Plans, Sectoral Action Plans, and NAPs represent significant advancements in integrating adaptation into development planning processes.

5. Gender, water, and climate resilience

Key messages

- Climate change often exacerbates gender inequalities in water resources management that stem from a number of underlying socio-economic barriers limiting women's equal participation in decision-making around water and their access to water.
- Gender considerations in adaptation via water resources management should be addressed from the outset of the NAP process; a gender analysis of the NAP process at the NAP inception stage is a critical first step.
- Proactive inclusion of stakeholders, both men and women, that can draw out women's interests and concerns throughout the NAP process is key.
- While inclusion of gender and social experts as part of the core team that leads the NAP process is critical, time and resources for mainstreaming gender considerations in the NAP process must be dedicated to truly achieve a paradigm shift towards inclusive, gender-equal adaptation planning and subsequent project and programme design and implementation.

5.1 Strengthening gender considerations

Gender in water-related adaptation

All activities

Systemic inequalities exist around the gendered roles and responsibilities in managing water and related resources. On the one hand, these inequalities adversely impact women's and girls' well-being, workforce opportunities and outcomes, and wider roles within the home and community. On the other, they persistently hold back society from achieving its full potential for reducing poverty, promoting shared growth, and creating an inclusive, peaceful, and prosperous world.

Gender inequality in water resources management results from a number of underlying socio-economic barriers that limit women's equal participation and access. Women are more likely than men to be extremely poor; women are highly dependent on natural resources for their livelihoods; they often bear the family responsibility for tilling land, gathering firewood and fodder, caring for livestock, and transporting water; and they often have unequal access and rights to land and natural resources because of traditional customs and inheritance laws that favour men. Climate change often exacerbates the consequences of these inequalities. Heightened uncertainty and increased variability around the timing and availability of water and increased extreme events magnify the water-related vulnerabilities faced by women and girls.

Gender considerations in water-related adaptation should be addressed from the outset of the NAP process. This will help with developing a full appreciation of water-related climate impacts on men and women, experienced differently due to gendered roles and responsibilities, and subsequently help design effective adaptation interventions. Folding gender considerations into the NAP process will, at the minimum, help ensure that the process of developing and implementing the NAP will not exacerbate or perpetuate gender inequalities. Further, it can help elevate gender equality around water use and management as an important and deliberative objective of the NAP process, leading to improved overall resilience for both women and men. Integrating gender in NAP formulation and implementation can facilitate both men and women to actively and effectively contribute to adaptation and vulnerability reduction, and have equal access to opportunities and potential benefits generated from climate change responses (UNFCCC, 2015b).

There may be some areas where gender-differential concerns are prominent and others where, depending on the context, they could be relevant and thus explored. A gender analysis is the first step towards identifying the gender dimensions and equality or inequality situation in a given context. A gender analysis helps achieve this by highlighting the differences between and among women, men, girls, and boys in

terms of their relative distribution of resources, opportunities, constraints, and power in that particular context. Simply put, gender analysis explores the nature of gender differences. Performing a gender analysis at the outset of the NAP process will allow a country to undertake, as part of NAP development and implementation, actions that are better suited to remedy gender-based inequalities and meet the needs of different population groups.

A number of analytical frameworks and tools are available to guide gender analyses. A gender specialist with a good understanding of the socio-economic dynamics in a given context can recommend the most suitable gender analysis frameworks and tools for the context at hand. As an example, the Harvard Analytical Framework (Overholt et al., 1985) provides a general framework with some guiding questions that can help to consider how to integrate gender in development programmes and projects. Some of these questions are adapted here to consider in the context of integrating water in adaptation planning:

A. Assessing women's needs

1. What needs and opportunities exist for increasing women's productivity and/or production?
2. What needs and opportunities exist for increasing women's access to and control of resources?
3. What needs and opportunities exist for increasing women's access to and control of benefits?
4. How do these needs and opportunities relate to the country's other general and sectoral development needs and opportunities?
5. Have women been directly consulted in identifying such needs and opportunities?
6. Do the objectives of the NAP adequately reflect women's needs?
7. Have women participated in setting those objectives?
8. How can the NAP be adjusted to increase women's access to and control of resources and benefits?

B. Identifying impacts on women

1. Might the NAP reduce women's access to or control of resources and benefits?
2. Might it adversely affect women's situation in some other way?
3. If there is a planned effect on the activities of women (e.g. location of activity, remunerative mode, technology), is this feasible, and what positive or negative effects would there be on women?
4. If there are no planned changes to the activities of women, is this a missed opportunity for women's roles in the development process?
5. How can the NAP be adjusted to increase positive effects and reduce or eliminate the negative ones?

C. Managing the NAP process

1. Are there appropriate opportunities for women to participate in project management positions in formulating and implementing the NAP?
2. Does the organisation responsible for formulating the NAP have the institutional capability to support and protect women during the change process?
3. Is it possible to trace funds for women from allocation to delivery with a fair deal of accuracy?
4. Does the NAP have a management information system which will allow it to detect the effects of the operation on women?
5. Does the NAP's monitoring and evaluation system explicitly measure the project's effects on women?
6. Are women involved in designing the data requirements?
7. Are women involved in the collection and interpretation of data?
8. Are data analysed so as to provide guidance to the updating of the NAP?

Building on gender analyses, there are many approaches and tools available for integrating gender into adaptation planning and implementation. UNFCCC (2015b) provides an overview of a selection of these tools, which are also referenced in Chapter 11 of this report. In addition, GWP's Gender Action Piece (GWP, 2017b) provides an approach for integrating gender in water resources management, with four action areas (see Box 12).

Box 11. CASE STUDY: Integrating gender in Mauritania's NAPA

One of the objectives of Mauritania's NAPA is equality between men and women, noting that climate change has different impacts on men and women, and in most cases, the adverse effects of the change disproportionately affect women. For example, with the increasing frequency of drought experienced in Mauritania, it is women who have to walk longer distances to collect water and firewood or develop new income-generating activities, such as weaving and tie-dyeing. Women are often the chief guardians of vital local and traditional knowledge. Thus, they need to be recognised as key stakeholders in the consultation and decision-making processes, even though they have not been represented in great numbers. The objective of Mauritania's first NAPA project approved for implementation is improving the living conditions and incomes of women and young people in a sustainable way by developing agricultural value chains.

Adapted from the Global Environment Facility Project Identification Form for the project Support to the Adaptation of Vulnerable Agricultural Production Systems in Mauritania, referenced in UNFCCC (2015b).

Box 12. Action areas for gender equality and inclusion in water resources management

GWP's 2017 Gender Action Piece outlines four action areas for supporting gender equality and inclusion in water resources management and use. These are:

- **Action area 1:** Institutional leadership and commitment
Inclusive water programmes and policies lead to greater economic, environmental, and social sustainability. Governments and businesses can support the realisation of these benefits by making gender equality and inclusion a core business goal. This requires improved capacity and leadership and gender-relevant climate resilience capacity building.
- **Action area 2:** Gender and inclusion analysis that drives change
The collection and analysis of disaggregated data is important for understanding the impacts of any intervention on all members of communities: women and men, boys and girls, transgender people, people with disabilities, and marginalised people. The analysis must then influence the development of legal frameworks, plans, programmes, projects, monitoring, and evaluation.
- **Action area 3:** Meaningful and inclusive participation in decision-making and partnerships
Including people who will be affected by a water management decision requires effort to raise the voices of women, young people, people with disabilities, and marginalised people. This requires the identification of context-specific channels to engage these people in decision making and partnerships; target them for information sharing; and facilitate communications to all groups of people at regional, national, and local levels.
- **Action area 4:** Equal access to and control of resources
Significant efforts are needed to ensure that access to and control of land and water resources is inclusive. This requires that legal and cultural barriers are addressed to ensure equitable benefit sharing in light of differentiated needs and concerns.

Adapted from GWP (2017b).

6. Climate risk and vulnerability assessment

Key messages

- Assessments of climate impacts, vulnerabilities, and associated risks are powerful tools for providing evidence to decision-makers.
- It is important to ensure that evidence is generated using both bottom-up techniques (e.g. community vulnerability assessments and engagement with subnational stakeholders) as well as top-down studies (e.g. sector-wide climate impact studies).
- A gap analysis of the existing information base, complemented by engagement with stakeholders, will highlight geographical areas and sectors that are lacking baseline evidence on vulnerability to the climate or the potential impacts of climate change.
- Maximum use should be made of existing studies, expert elicitation, indigenous knowledge, and stakeholder engagement, as a first step to providing a qualitative overview of current and future climate vulnerabilities; more detailed studies should be commissioned only when necessary.
- Approaches to impact, adaptation, and vulnerability assessments should be tailored to specific sectors and to the nature of the problem being addressed. They may involve the use of sector-specific tools, hotspot mapping, community-level analyses, and natural disaster modelling.

6.1 Establishing a climate baseline

Analysing the current climate

A.2.b, B.1.a

Available analyses of the current state of the climate and water-related climate impacts at national and regional levels should be synthesised. This can help to identify adaptation and development needs. Work should also be carried out to understand any transboundary water and climate change issues, as well as available knowledge on the gender dimensions of water-related climate impacts and adaptation.

Characterising current and past climate is an important step in understanding directions and magnitude of climate change. With the help of meteorological experts, climate variables, indices, and patterns can be analysed. The aim is to understand any shifts, current climate variability, trends, and extremes that stem from climate change.

The Climate Services Supplement to the UNFCCC NAP Technical Guidelines (WMO, 2016) provides an overview of the type of support that national meteorological and hydrological services can provide to understand climate trends and indices in support of the NAP process. This support can include the provision of data (for example, on daily temperature and precipitation), calculation of indices, and analysis of extremes such as droughts, floods, and cyclones. As further sources of information, the Associated Programme on Flood Management (www.floodmanagement.info) and Integrated Drought Management Programme (www.droughtmanagement.info) can provide tailor-made support through help desks, drawing on an authoritative network of organisations involved in flood and drought management respectively. For example, a handbook of drought indicators and indices has been released (WMO and GWP, 2016).

Analysis of monitored climate variables to calculate indicators helps to interpret climate impacts on water-dependent systems and subsectors. Core indices for analysing data on temperature and precipitation at the regional and global levels are available (e.g. see Annex 4 of the UNFCCC NAP Technical Guidelines).

The climatic and hydrological indicators that are selected for use in the NAP process should be driven by country- and basin-specific vulnerabilities and be selected on the basis of their relevance to the sector or subsector under investigation. Table 3 provides some examples of indicators that are relevant to water management and water-dependent sectors.

Table 3. Examples of water-related indicators useful in assessing the current climate

Water system	Proxy indicators
General	<ul style="list-style-type: none"> ■ Basin water yield ■ Annual precipitation ■ Low flow (Q90) ■ High flow (Q10) ■ Base flow ■ Groundwater level ■ Soil moisture ■ Water deficit indices ■ Freshwater withdrawal as a proportion of available freshwater resources ■ Renewable freshwater resources per person
Irrigation and drainage	<ul style="list-style-type: none"> ■ Annual net irrigation deficit ■ Reference crop evapotranspiration (ET_o)
Urban water supply and sanitation	<ul style="list-style-type: none"> ■ Runoff capture reliability ■ Aquifer recharge rate ■ Groundwater level
Rural water supply and sanitation	<ul style="list-style-type: none"> ■ Minimum base flow ■ Rainfall pattern
Flood management	<ul style="list-style-type: none"> ■ Runoff reliability ■ Probability of occurrence and magnitude of floods (flood regime) ■ Rainfall pattern ■ Peak flow
River ecology	<ul style="list-style-type: none"> ■ Natural river regime, deviation from it, and sources of deviation ■ Base flow
River basin management and multipurpose infrastructure	<ul style="list-style-type: none"> ■ Basin water yield ■ Basin hydrologic budget
Drought management	<ul style="list-style-type: none"> ■ Standardised precipitation index ■ Climatic cycles such as El Niño-Southern Oscillation

Where national studies on trends are not available, there are an increasing number of global analyses that can be drawn upon as a first step. For example, the Aqueduct Water Risk Atlas Global Maps (www.wri.org/publication/aqueduct-global-maps-21) provides GIS-based mapping tools to assess different indicators such as baseline water stress, inter-annual variability, seasonal variability, flood, and drought occurrence. The Aqueduct tool draws on data from the UN Food and Agriculture Organization's AQUASTAT (www.fao.org/aquastat), which may also inform analyses. See the appendices in USAID (2016) for detailed

listings of existing tools, data, and resources on previous climate change studies, climate-related hazards, climate data and data visualisations, sources for indicator data, and examples of vulnerability assessments.

Analysis of recent climate-related extremes such as droughts, floods, and cyclones can reveal significant vulnerability and exposure to current climate variability. Impacts of water and climate-related extremes can include loss of life, disruption of water supply, reduced rainfed production, increased irrigation demands, damage to infrastructure, and impacts on ecosystems. It is also important to systematically assess existing natural capital that provides regulating or moderating functions for water, because changes in these services can affect risk. Also valuable would be assessments of key groundwater recharge areas, water storage capacity of soils, and key forest, wetlands, or mangrove areas that provide flood regulation services.

A good starting point to assess the current levels of water-related hazards and the effects they are already having on economic sectors and livelihoods is to review the work of national disaster management agencies together with the national meteorological and hydrological services. Bringing in stakeholders from a range of priority sectors dependent on water, such as agriculture, energy, and industry (among others), will provide a forum for collating past and current experiences of water-related hazards on a range of sectoral activities. This should ideally be supplemented with engagement at local levels to capture the impacts of water-related hazards on communities reliant on water for livelihood activities and ecosystem services. In many countries, national and sectoral studies on water-related hazards will already be available and can be reviewed.

Box 13. Global Framework for Climate Services (GFCS)

The World Climate Conference-3 held in Geneva in 2009 decided to establish the GFCS, a United Nations-led initiative spearheaded by the World Meteorological Organization, to guide the development and application of science-based climate information and services in support of decision-making in climate-sensitive sectors. The vision of the GFCS is to enable society to better manage the risks and opportunities arising from climate variability and change, especially for those who are most vulnerable to such risks. This will be done through the development and incorporation of science-based climate information and prediction into planning, policy and practice. The GFCS places emphasis on hazard analysis through the use of historical and real-time hazard data and meteorological, hydrological and climatological forecasts and trend analysis. This analysis, in combination with the analysis of exposure and vulnerability, helps in effective risk assessment, which facilitates effective decision-making to promote societal resilience in the priority areas of the GFCS. The GFCS is designed as an end-to-end system that uses observations, technology and scientific understanding as inputs to the development of climate services to meet user requirements. The scope and thrusts of the GFCS include five initial Priority Areas, namely agriculture and food security, disaster risk reduction, energy, health, and water.

Source and further information:

GFCS website <http://www.wmo.int/gfcs/>

Climate services for supporting climate change adaptation: Supplement to the Technical Guidelines for the National Adaptation Plan Process WMO, 2016. www.wmo.int/gfcs/node/925

6.2 Assessing future impacts and vulnerabilities

Analysing climate projections

A.2.b, B.1.b

An important activity in adaptation planning is developing as complete an understanding as possible of the projected changes in climate. Characterising future climate risks requires analysis of climate projections. This could be a highly technical activity for which it is appropriate to engage climate specialists for expert input.

Projections of future climate can be used to compute projected values of water-related climate indicators (such as those listed in Table 3). This would help to provide an initial characterisation of water-related climate impacts, vulnerabilities, and risks for both current and future risks. According to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change (IPCC, 2014), rising temperatures, changes in rain patterns, and increased frequency of extreme events will have direct and negative impacts on water-dependent subsectors including reduced water supply, disruption of food production, damage to infrastructure, alteration of ecosystems, and consequences for human well-being. Impacts from recent climate-related extremes already reveal significant vulnerability and exposure of many water-related or water-dependent systems to current climate variability. Table 4 provides a list of some example water-related climate impacts on economic systems, rural livelihoods, and ecosystems. Data on local, national, or regional projections (e.g. Coordinated Regional Climate Downscaling Experiment projections from www.cordex.org) can be used where available, and if not, international climate projections from IPCC (2013) can be referred to.

Analysis should cover short-, medium- and long-term climatic hazards and impacts, including slow onset events (e.g. sea level rise and increasing temperatures of the atmosphere and sea water) and sudden onset extreme events and climate hazards that affect water-dependent sectors (e.g. temperature extremes, droughts, and floods). The analysis should also cover an appropriate range of scenarios, including combinations of different emissions pathways and different socio-economic development scenarios (e.g. population growth, economic development).

The consideration of different emissions pathways and the uncertainty associated with these pathways is particularly important when planning adaptation measures that involve long-lived infrastructure such as dams and water transfer schemes. Such infrastructure is inherently exposed to climate risks through its longevity, high initial capital cost, and the challenges and costs associated with retrofitting. Figure 2 shows global temperature projections for two emissions scenarios, showing the range of possible futures. Indicative infrastructure lifetimes, based on construction in the year 2000, are plotted onto the projections, showing the range of climate futures that the infrastructure may be subjected to over its lifetime. When future climate change over the design life of infrastructure is considered, especially in a context where past hydrological models are no longer accurate guides for the future, the level of uncertainty in the robustness of long-lived water infrastructure can be great.

Figure 2. Indicative timescales of a range of infrastructure development set against global temperature change projections. Note that infrastructure lifetimes are indicative and will vary considerably in practice. Source: HR Wallingford (2014).

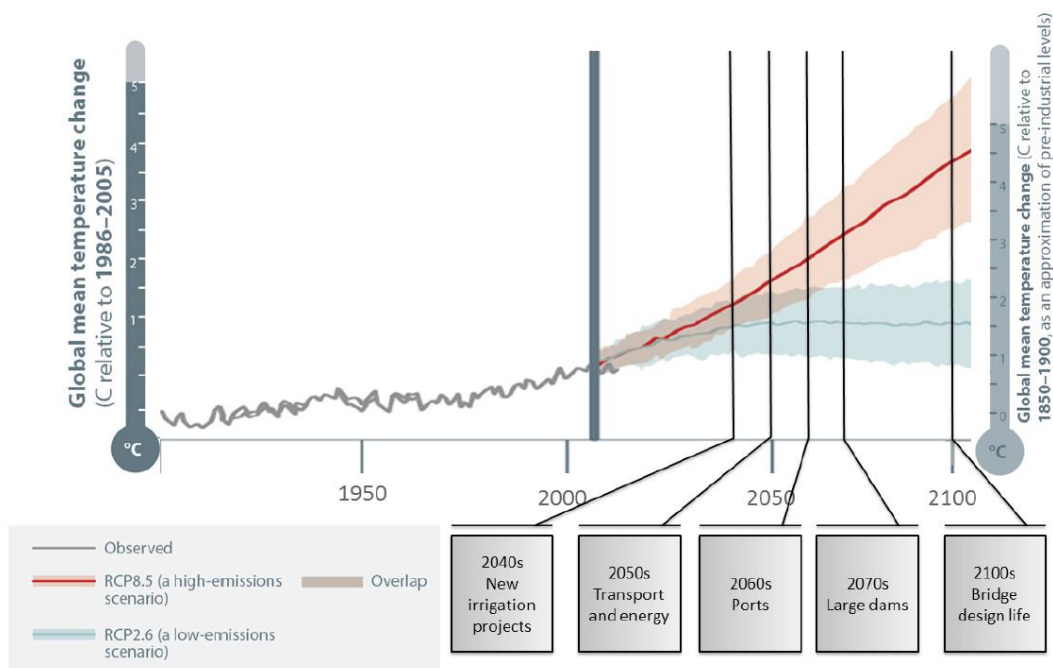


Table 4. Water-related climate impacts on economic systems, rural livelihoods, and ecosystems

		Increasing aridity	More frequent/intense floods	More frequent/prolonged drought	Increasing variability (seasonal and inter-annual)	Increasing temperature annual
Economic systems	Hydropower and thermal power	Loss of average generation from hydropower facilities with reducing streamflow.	Risk of hydropower/supply dam failure with increasing flood peak. Risk of increased sediment retention in reservoirs, reducing power generation.	Failure of generation during drought periods, decrease in productivity.	Uneven power generation with impacts on electricity supply. Impacts predictability and renders business planning and investments more difficult. Increased sediment retention in reservoirs, reducing power generation.	Increased cooling requirements for thermal stations. Increased evaporation rates at reservoirs.
	Irrigation	Increased irrigation needs and demand (due to an increase of dryland surfaces) to higher evapotranspiration and to higher crop water requirements.	Irrigation reduced by sedimentation.	Increased needs and demand for irrigation.	Impacts predictability and business planning and makes investments more difficult.	Increased irrigation needs (increased evaporation reduces availability of water and increases the need for water; increased plant metabolic rates increase crop water requirements).

		Increasing aridity	More frequent/intense floods	More frequent/prolonged drought	Increasing variability (seasonal and inter-annual)	Increasing temperature
	Industry	Low levels of water can lead to shortages in water supply and discontinuous access to energy for productive purposes; may impact water quality by reducing dilution effect.	Might affect or destroy industrial infrastructure. Can interrupt operations.	Can lead industries that depend on water to interrupt or suspend activities; can diminish water quality, impacting industrial production.	Impacts predictability and renders business planning and investments more difficult.	May increase water input required for industrial production. May affect worker health in industries such as mining. Impacts on ecosystems may also reduce appeal of eco-tourism and affect ranching activities.
	Municipal supply	Low levels of water can lead to shortages in water available for municipal supply or impact water quality. Can increase groundwater extraction and can impact groundwater storage.	Might affect or even destroy municipal water supply infrastructure, leading to interruption in supply; negatively affects water quality.	Might affect the levels of water supplied; might lead to quotas per head; negatively affects water quality.	Impacts predictability; increases turbidity and water quality.	Increases the demand for water in urban centres; impacts water quality by increasing algal/microbial/invasive aquatic plan growth rate; risk of water-borne disease increases.

		Increasing aridity	More frequent/intense floods	More frequent/prolonged drought	Increasing variability (seasonal and inter-annual)	Increasing temperature
	Navigation	Low levels of water in navigable rivers and lakes can limit navigation options.	Flood-waters can render rivers temporarily un-navigable; might destroy river banks and make navigation difficult (massive objects obstructing the river, etc.).	Low levels of water in navigable rivers and lakes can limit navigation options.	Impacts predictability and renders business planning and investments more difficult; increases sediment transport and may affect navigability.	Increases invasive aquatic plant growth rate.
Rural livelihoods	Subsistence farming and pastoralism	Decreased soil fertility and yields impact the livelihoods of communities depending on rainfed agriculture. Can lead to movement of population (internal or international migration), and increase competition with host communities.	Can lead to the destruction of farming assets (crops, farming infrastructure) and death of cattle and livestock. Can lead to pre- or post-disaster displacements (internal or international migration), and increase competition with host communities.	Droughts cause food insecurity and famines, killing humans and decimating livestock. Can lead to pre- or post-disaster displacements (internal or international migration), and increase competition with host communities.	Affects agricultural timing including planting and harvesting.	Warmer temperatures are associated with yield decline; increase likelihood of pest infestation and increased crop stress.
	Fisheries	Low levels of water can impact fishing opportunities by diminishing or	Can reduce fish populations through stranding on the floodplain.	Can cause decline in fishing opportunities and in fisheries outputs.	Can affect survival and diversity of fish populations, impacting	Can affect survival and diversity of fish populations, impacting

		Increasing aridity	More frequent/intense floods	More frequent/prolonged drought	Increasing variability (seasonal and inter-annual)	Increasing temperature
		reducing diversity of fish populations.			outputs of fishing and fish farming.	outputs of fishing and fish farming.
	Settlement and supply	Loss of wooded vegetation can impact the energy security of rural villagers who depend on charcoal and fuel-wood.	Might lead to loss of lives, destruction of property and of livelihood means (such as small business, trading routes), as well as of basic infrastructure (school, hospitals, water supply infrastructures, roads for connectivity). Risk of food insecurity and water-borne diseases.	Might affect the levels of water supplied to rural communities; might lead to quotas per head.	Affects predictability.	Increases the demand for water in rural communities.
Ecosystems	Aquatic biodiversity	Reduction in flooded area, risk of reduction of vegetation density. Potential impact not only on flora but also on fauna. Aridity can amplify eutrophication, reduce water quality. Reduced water availability can also affect inland coastal	Sedimentation and landslides resulting from increased flooding can cause degradation of aquatic habitats.	Droughts might affect or destroy aquatic species (fauna or flora).	Affects biodiversity – fauna or flora which are attuned to natural variability but not to the changes in flow patterns and variabilities due to climate change.	Affects biodiversity (fauna or flora).

	Increasing aridity	More frequent/intense floods	More frequent/prolonged drought	Increasing variability (seasonal and inter-annual)	Increasing temperature
	salinity, and coastal integrity, which can degrade or destroy aquatic ecosystems.				
Ecosystem goods and services	Reduced water availability affects the ability of ecosystems to provide ecosystem goods or services.	Might destroy ecosystems, making ecosystem services dysfunctional.	Droughts affect the ability of ecosystems to provide ecosystem goods or services.		Risk of thermal stratification in lakes increasing algal productivity and microbial mineralisation and reducing oxygen dissolution, impacting water quality, lake biodiversity, and ecosystem services.
Catchment land quality	Leads to soil loss and land degradation.	Leads to increased erosion, soil loss, and land degradation.	Increases the pressure over the catchment.	Leads to increased erosion, soil loss, and land degradation.	

Adapted from World Bank (2017).

It is important to recognise the levels of uncertainty and confidence associated with climate projections and the subsequent calculation of water indicators. Uncertainty expresses the degree to which a value is unknown, and can arise from quantifiable errors in data on uncertain projections of human behaviour. Confidence expresses the level of confidence in the correctness of a result. The level of uncertainty in climate projections for key parameters relating to water security (e.g. changes in precipitation) is high compared to projections of temperature change, which complicates adaptation planning for water.

Accumulating uncertainty (or propagation of uncertainty), whereby the uncertainty (or error) of a variable propagates to the uncertainty associated with a function based on that variable, is also an important issue for water-related climate indices. As scenarios move from the General Circulation Model, or climate model, outputs through the hydrological and hydraulic models to derive scenarios of river flows and water networks, uncertainties accumulate. The climate models themselves contain a wide range of uncertainties, especially related to rainfall patterns, which often show contradictory directions of change across different models. This can make projections difficult to interpret, as a positive to negative range in rainfall changes may occur. In practice, many planners use an envelope of scenarios to cover the range of uncertainty across emissions scenarios and different climate models. When uncertainty is large, being over-precise is unhelpful. It is better to capture uncertainty than to focus on producing a precise single central estimate.

For applications such as investment decision-making for long-lived infrastructure, a much more rigorous approach is required. This can involve stress testing potential options using a large number of different plausible scenarios. For a new dam this might involve simulating the effects of a large number of different plausible drought sequences using hydrological and water resources models to understand the sensitivity of the system to climate before stepping back and identifying options which reduce sensitivity. This type of approach avoids the pitfalls of taking a deterministic approach to climate change scenarios, in which one central estimate is used as a 'best guess'.

While treating uncertainty at the project design stage can be complex, considering it during earlier adaptation planning stages can be even more challenging, and in most cases is dependent on the skills and experience of the few individuals leading it, rather than systematic and reproducible approaches to planning. The Climate Risk Informed Decision Analysis methodology can provide guidance for water resources planning and design for future uncertainties (Mendoza et al., 2018). As a stepwise framework that can be applied at all levels of planning, study, or design, this methodology can be useful for both national-level planning (or NAP development) and project-level design (or NAP implementation).

Box 14. Analysing current and future climate scenarios: key questions and activities

Key questions

- What climatic patterns and climate scenarios are most important in terms of adaptation for water resources management?
- What risks does climate change hold for the water resources management and related sectors?
- What are major current water-related climate hazards? What is the country's vulnerability to these hazards?
- What is the estimated range of uncertainty for possible future climate scenarios?
- What are appropriate indices of climate- and water-related trends which could support water sector planning and decision-making?

Indicative activities

- a. Analyse the current climate to identify trends in variables and indices that could be used to support planning and decision-making in the water sector.
- b. Characterise broad future climate risks to the water sector and levels of uncertainty using scenario analysis at the national level, or as part of a regional analysis, including through climate and socio-economic scenarios.
- c. Communicate projected climate change information to all stakeholders and the public.

Assessing vulnerabilities, risks, and impacts

B.2.a

Assessment of water-related vulnerabilities, risks, and impacts of climate change at different levels is an important step in planning appropriate adaptation strategies. Vulnerability is “the degree to which a system is susceptible to, and unable to cope with, adverse effects of climate change, including climate variability and extremes” (IPCC, 2007). The degree of vulnerability is derived from a given system’s exposure² and sensitivity³ to changes in climate and climate variability, the potential impact that relates to that change, and the adaptive capacity⁴ of the system to cope with this impact. Risk is an expression of the combination of the probability of occurrence of a hazard and the consequences or impacts attributed to the hazard occurrence. A hazard is a physical phenomenon such as a flood, drought, sea level rise, or increase in temperature, while a consequence or impact is the social, economic, or environmental effect.

Climate change risks are cross-sectoral and affect systems at multiple scales (local, subnational, national, and international); vulnerability and risk assessment, therefore, require collaboration among a range of actors, including government agencies, NGOs, and stakeholders in multiple sectors (FAO, 2017). Risks and vulnerabilities should be assessed through participatory and data-driven approaches at multiple geographical levels (including local, regional, national, and transboundary levels). Risks might be expressed in terms of economic loss or damage, risks to people (e.g. life and welfare), or risks to the environment.

There are a range of different risk and vulnerability assessment methods, as summarised in the UNFCCC NAP Technical Guidelines. Some focus on specific water subsectors, while others have a regional focus. For example, the Strategic Framework for Climate Resilient WASH (GWP and UNICEF, 2017), alongside its accompanying technical briefs and learning modules (www.gwp.org/en/WashClimateResilience), enables water, sanitation, and hygiene (WASH) infrastructure and services to be resilient to climate-related risks, and in turn, also ensures that WASH programming is designed to contribute to building community resilience to climate change. The Adaptation Gap Report on Health (UNEP, 2018) provides further insights on adaptation needs at the intersection of water and public health. In another example, the Caribbean Climate Online Risk and Adaptation Tool (CCCCC, 2017) is a web-based tool that countries in the Caribbean are embedding in their development planning processes as a comprehensive approach to integrating climate change risk assessment and resilience building into their decision-making processes. Decision-makers follow a stepwise process to determine whether their activity – plan, programme, or project – is likely to be influenced by climate change, and if it is a priority for further investigation, understand the climate influence at each stage of their activity, and design action to increase climate resilience.

Regardless of the approaches used, there are some common issues to take into account. Risk and vulnerability assessments should consider cross-sector issues as well as the sensitivity and adaptive capacity of women and men, youth, the disabled, and marginalised community groups. It is also important that they systematically assess existing natural capital that provides regulating or moderating functions for water, thereby reducing climate vulnerabilities and aiding risk reduction. It is also important to ensure that there is a broad stakeholder involvement in risk and vulnerability assessments; that the chosen method is carried out in a transparent way; that the steps are recorded for later reference; and that the results are communicated to all stakeholders.

In this regard, various international conventions that countries are signatory to can provide useful mandates and frameworks to assess vulnerabilities, risks, and impacts, and subsequently inform adaptive courses of action. Particularly relevant for integrating water in the NAP process could be the Ramsar Convention on Wetlands, the UNECE Global Convention on the Protection and Use of Transboundary Watercourses and International Lakes, the UN Watercourses Convention, the UN Convention to Combat Desertification, and the Convention on Biological Diversity.

² Exposure refers to the situation of people, infrastructure, housing, production capacities, and other tangible human assets located in hazard-prone areas (UNISDR, 2016).

³ Sensitivity refers to the degree to which a system is affected by climate variability or climate change (IPCC, 2007).

⁴ Adaptive capacity includes socio-economic, institutional, and technical factors which determine the capacity of the system or an individual to plan and implement adaptation measures (Lavell et al., 2012).

The output of the risk and vulnerability assessment should be a compilation of the risks and vulnerabilities and explanation of their context, causes, trends, and projected future changes. It can be helpful to quantify magnitude, timing, likelihood, geographical distribution, thresholds for change, and potential for adaptation in the results.

Climate change will have impacts – positive, negative, and varying in scale and intensity – on water supplies, water infrastructure, and water demand. Key water-related risks include increased poverty and health impacts due to lack of access to safe drinking water; loss of rural livelihoods and income due to insufficient access to irrigation water; reduced agricultural productivity; loss of terrestrial and inland water ecosystems; and loss of biodiversity along with the ecosystem goods and services it provides for livelihoods. In addition, the risks of more frequent and intense floods and droughts can have major economic costs. Some examples of water-related climate impacts are provided in Annex 2.

Box 15. CASE STUDY: Climate risk and vulnerability assessment in the Philippines

The Philippines is one of the most vulnerable countries to the impacts of climate change and natural hazards. The Philippines generated high-resolution flood hazard maps for different rainfall scenarios, showing, among other parameters, the extent of flooded area, depth of flood waters, and period of flooding. The flood hazard maps provided a visualisation of future flood events using data gathered from high-resolution data from satellite images and remote sensing and validated by field surveys and river measurements and characterisation. Climate projections were used to produce climate-adjusted flood hazard maps for the locations most at risk.

The preparation of the climate-adjusted flood hazard maps used the integrated river basin approach by including water from upstream in modelling riverine flooding. In particular, the methodology involved watershed rainfall-runoff modelling, the results of which were used as inputs to flood modelling. Watershed rainfall-runoff modelling analyses the relationships among land use, land cover, soil conditions, and watershed management conditions. These are the factors that will be used to generate information on total rainfall runoff from the watershed. Climate change was considered with simulations of the rainfall return periods applied on predicted land cover changes and respective rainfall-runoff for the years 2013, 2020, and 2050. The major step in flood modelling is characterising the rivers through several surveys. These river measurements are inputs to the flood model, along with setting of boundary conditions and other parameters.

The modelling initiatives are backed by solid field data gathering and validation and used state-of-the-art high resolution data from satellite images and remote sensing. The watershed rainfall-runoff model will be used to determine the effects of various land cover conditions on rainfall runoff behaviour for rainfall events with return periods of 5, 25, 50, and 100 years. The results for 2030 were used for establishing the trends in land cover changes. The study used observed rainfall data collected from April–May and June–July 2013, and synthetic rainfall data based on the 24-hour rainfall intensity duration frequency curves from the Philippine Atmospheric, Geophysical and Astronomical Services Administration. Return periods (or recurrence intervals) of 5, 25, 50 and 100 years were used to model events with a 12-hour duration rainfall event and a maximum intensity. Changes in peak flows were examined for the years 2013, 2020, and 2050.

In the wake of increasing severity of flooding events, the need to plan and manage the consequences has now become a major imperative. While the usual response is to go for capital investments such as constructing dams and elevating man-made structures, the flood modelling approach of the Philippines highlights instead the need to restore rivers themselves and concentrate on building the capacities of communities to manage their risks of flooding. This initiative of hazard mapping and vulnerability assessment will serve as valuable input for governments to mainstream climate change adaptation into land-use planning and zoning, especially when used for regulating future settlements and devising development activities for the country.

Adapted from UNFCCC (2015a).

Box 16. CASE STUDY: Vulnerability assessments in Lesotho

Lesotho commissioned in-depth climate risk and vulnerability assessments at three community councils to set the stage for future proactive adaptation. The goal was to enable the local communities to better prepare for the climate impacts identified in previous studies, by developing detailed climate risk and vulnerability maps in key sectors: agriculture, water resources, livestock, forests, and relevant socio-economic data for the community councils.

The methodology involved use of various models and data, and the engagement of stakeholders. The models were used to generate hazard maps for soil erosion, droughts, floods, heat units, and crop yield. For soil erosion the main variable was erosion potential, computed as a product of vegetation cover, slope, soil type, and land use. The drought and heat unit hazard maps were generated using gridded climate data from observations and model forecasts, calibrated to the specific altitude. Climate data were also used as inputs for the evaluation of crop suitability and yield potential using various climate and crop models. The hazard mapping was then followed by an integrated hotspot mapping based on the different input layers to determine the overall combined risk (calculated as a function of vulnerability and hazards). A graduated colour scale (on a scale of 0 to 3, with 0 representing no vulnerability and 3 representing high vulnerability) was then used to demarcate risks over the community councils.

Stakeholders from community leadership and district-level authorities were engaged throughout the process, with the aim to create awareness on climate change and adaptation and to get them to apply the results of the vulnerability mapping in their planning. One of the key findings from the study was that cultivated areas are facing the highest risks from floods, drought, and soil erosion as compared to other land use types (settlements, rangelands, forests, industrial lands, and rivers).

The outcomes of the vulnerability mapping were used to generate a toolkit to be used for adaptation planning, implementation, and training. The toolkit consists of a vulnerability mapping report providing background, methodology and findings; downscaled climate change projections; metadata on all maps generated for the project; and a geographic information system. The country is planning to extend the mapping to cover all regions.

Adapted from UNFCCC (2015a).

6.3 Ranking climate change risks and vulnerabilities

Ranking risks and vulnerabilities

B.2.b

Climate change risks and vulnerabilities can be ranked with respect to their threats or impacts. This ranking subsequently informs the development and prioritisation of adaptation options within the NAP. The UNFCCC NAP Technical Guidelines list some common criteria that could be used for ranking, including the magnitude of the potential impact, the probability of occurrence, the reversibility, and the urgency of action. Criteria should be selected in consultation with water stakeholders and may involve the elicitation of expert judgement.

The ranking process can be a complex task requiring a broad perspective. It is necessary to be aware that trying to preserve the status quo can be potentially maladaptive in the long term. Relying mainly on the current status of how water is used across different sectors to frame the priority issues could result in countries trying to make incremental adaptations (if solely focused on no-regret or low-regret approaches) that would fail to recognise when these strategies could be severely challenged (or become increasingly costly) over the long term. For instance, an economy that is heavily reliant on the agriculture sector today and facing projected significant increases in water stress, rainfall variability, and more frequent droughts may be tempted to 'climate-proof' its agriculture sector by making costly investments in augmenting freshwater supply, which over time could be a very costly and maladaptive strategy. There may be a need to consider the options for transformational change in order to become genuinely adapted to future climate conditions.

7. Identifying, prioritising, and implementing adaptation actions

Key messages

- Identification and evaluation of potential adaptation options must be supported by appropriate data, information, and analysis. Simple screening tools, existing impact and vulnerability assessments, stakeholder engagement, and expert elicitation can all offer rapid insights into climate risks and shed light on possible adaptation actions without the need to commission detailed, time-consuming studies.
- Careful consideration should be given to the selection of criteria for prioritising implementation of adaptation actions. The aim is to define criteria that evaluate the potential to build water security and climate resilience. The criteria should take into account national priorities and conditions such as development needs, climate vulnerabilities and risks, gender considerations, marginalised groups, and experiences with the implementation of plans made to date.
- Although the NAP process is anchored at the national level, folding in transboundary considerations in the context of regional climate impacts and shared surface and groundwater resources can expand the range of resilience benefits, and importantly, avoid unintentional maladaptive consequences.
- Articulation of the ‘climate rationale’ of a resilience-building water project is key to accessing GCF funding. A country may choose to strengthen its capabilities to articulate the climate rationale as part of the NAP process, supported by the GCF’s Readiness and Preparatory Support Programme.

7.1 Identifying adaptation options

Building on existing adaptation activities

A.2.a, C.1.b

A stocktaking of ongoing and past water-related adaptation activities can provide a sound basis for formulating new adaptation plans. To do this, it is necessary to compile information on past and ongoing adaptation and disaster risk management projects, programmes, policies, and related capacity development efforts. It might be helpful to refer to previous or existing NAPAs. In this process, instruments such as the Stocktaking for National Adaptation Planning (SNAP) tool developed by GIZ and BMZ (2014) can help in the assessment of a country’s current adaptation needs and capacities and take stock of past and ongoing activities. The tool assesses seven success factors of adaptation, based on the UNFCCC NAP Technical Guidelines as well as GIZ’s experience in adaptation to climate change worldwide, in order to evaluate a country’s adaptation performance in detail. It is also appropriate to take stock of whether gender considerations have been addressed previously and, if so, how successfully. Opportunities for building on and complementing existing previous or ongoing adaptation, disaster risk management, or development activities can then be identified.

Identifying adaptation options

B.2.c

Adaptation options that address risks and vulnerabilities must be identified. Adaptation options may include management and operational strategies, infrastructural changes, policy adjustments, or capacity building. Some actions may involve adjusting current development activities (climate-proofing or building resilience), while others may be new, or require major transformations in operations (UNFCCC, 2012a). Other considerations include the spatial scale of the action (local to regional), and an indication of its timing and urgency, based on the expected level and severity of the impacts. The timing is influenced by the timescales for each option to be implemented and to then take effect. The effectiveness of previous and existing adaptation options may have a bearing on the selection of options for the future.

It might be helpful to group the adaptation options into categories of the type or nature of adaptation, so that there is a clear understanding of the different approaches to address the different dimensions of building resilience. Table 5 provides some examples of water management approaches that build resilience. Table 6 provides some examples of adaptation options categorised into information systems, institutional systems, and infrastructure systems that can help to implement these approaches. There are further examples in the IPCC's Working Group II Fifth Assessment Report (Noble et al., 2014) and in UNEP-DHI's (2017) guide on adaptation technologies for increased water resilience.

While acknowledging that the NAP is a national process, it is important to consider the regional nature of climate change and resulting impacts, and the transboundary nature of the hydrological cycle, including surface waters and groundwater in many cases. For example, over 90 percent of Africa's surface water is in transboundary basins. With the exception of island states, every African country has territory in at least one transboundary river basin, and transboundary aquifers underly over 40 percent of the continent. For countries where water has a prominent transboundary aspect, options for building resilience to climate change will be considerably smaller if limited to actions undertaken by individual countries only – and even run the risk of maladaptive consequences when viewed at basin scale. Table 6 outlines regional dimensions to national approaches for water-related adaptation actions, where cross-border cooperation and collaboration can expand the resilience benefits beyond a single country's borders.

Table 5. Examples of water management approaches that build resilience

Resilience characteristics	Examples of water management approaches that build resilience
Preparedness to manage and cope with change and shocks	Flood and drought early warning systems, emergency response plans, flood and drought management plans and policies, urban planning and development, storage, system operating rules, land use management, watershed management, preservation of natural infrastructure
Robustness to withstand change and shocks	Well-designed and resilient storage and flood and drought management infrastructure, appropriate operating rules, functioning ecological infrastructure, coordinated institutional systems, local community response systems, relevant information systems
Diversity and redundancy to ensure continuation of functionality	Linked water systems and regional power pools operated at different assurance, diversity in water and energy supply sources, diversity in crops and irrigation practices relevant to climate systems, excess institutional capacity, shared information systems
Integration or connectedness within and across water-related subsectors and across geographic regions to allow for optimisation of water use and benefits of scale	Coordinated hydropower generation, regional power pool, conjunctive use of surface and groundwater, rainwater harvesting, basin level or multi-level planning, multipurpose infrastructure, integration of natural and built infrastructure, water-related policy harmonisation, water-food-energy nexus approach

Resilience characteristics	Examples of water management approaches that build resilience
Adaptability of a system to change	Flexible institutional arrangements, flexible infrastructure design, responsive flood and drought mitigation strategies, policies that facilitate technology adoption and climate smart actions, policy and support that enables livelihood adaptability
Transformability of a current system to one more suited to a changing climate	Flexible policy and legislation, regularly revised strategies, learning institutions that can reorganise, infrastructure systems that can be altered or operated in different ways, community and country resources to enable changes

Adapted from World Bank (2017)

Table 6. Water-related actions at national and regional levels that can build resilience

		Level of required actions		
		National	Regional	
Water management systems	Information systems	Data monitoring and sharing systems	Data collection, verification, and quality control; use of shared information for preparedness to flood and drought; data dissemination and sharing with relevant sectors, local stakeholders, and regional entities; harmonisation of national practices with regional protocols	Agreement on data collection and sharing protocol; regional platform/mechanisms available for exchange
		Decision-support information systems and early warning systems	Provision of data for calibration; use of analytical tools for preparedness and robustness of development projects; national preparedness plans and information dissemination schemes developed or harmonised; national plans informed by basin-wide models and jointly developed tools	Joint development of modelling and analytical tools; forums for dialogue that use tools for development prioritisation and planning; implementation of early warning systems and information dissemination to national or local constituents

		Level of required actions		
		National	Regional	
Water management systems	Institutional systems	Flexible policy and legal instruments	Law enforcement, policy implementation, and management actions	Regional policy implementation; agreement on climate-informed water/benefit sharing, abstraction limits, storage and release, and other regional protocols
		Institutionally and financially sustainable water resources organisations	Sub-basin organisations manage local processes and carry out sub-basin level management functions; national structures coordinate, allocate, and develop plans among sectors/ministries, carry out information and investment functions, and communicate with stakeholders for accountability purposes	Agreement on organisation mandate; capacity building within organisation; financial sustainability measures; working partnerships with national governments and other regional bodies
	Infrastructure systems	Basin-scale, resilience-targeted investment planning	Development of national plans for water management and development; tailoring and prioritising of investments to local needs and norms; coordination of national project prioritisation and planning with regional agreements and processes	Basin-wide dialogue to jointly prioritise interests and evaluate cross-border and cross-sector trade-offs; agreement on regional investment plans that ensure system preparedness, robustness, redundancy, and adaptability; regional resource mobilisation
		Robust infrastructure investment implementation	Preparation and implementation of national investments in collaboration with regional counterparts to share risk and optimise benefits; sustainable operation of national infrastructure in coordination with other users; restoring and maintaining ecosystems services and natural infrastructure; targeted preparation studies to ensure robustness and adaptability to a changing climate; stakeholder consultations to ensure optimisation of benefits and minimisation of impacts	Transboundary coordination in investment planning, implementation and operation; preparation, operation, and restoration of joint-infrastructure investments; enabling of optimal operation of investments in the region

Adapted from World Bank (2017).

7.2 Ranking and prioritising adaptation options

Appraising adaptation options

B.3.a, B.3.b, C.1.a

The adaptation options for inclusion in the NAP need to be selected from the list of potential adaptation options. This requires selection of an appraisal methodology and criteria against which the adaptation options can be appraised.

The UNFCCC NAP Technical Guidelines list some common types of appraisal methodologies that could be equally applicable for evaluating water-related adaptation options. The UNEP-DHI (2017) guide on adaptation technologies includes information on prioritising and selecting adaptation options in the water-specific context. AMCOW's (2012) technical background document on water security and climate-resilient development explains how to implement both single-criterion and multi-criteria assessment approaches for evaluating adaptation options to build climate resilience through water (see Box 17).

Box 17. CASE STUDY: Multi-criteria assessment for prioritising NAPA options in Bhutan

Multi-criteria assessment was applied to determine the prioritisation of adaptation options in the development of Bhutan's NAPA. The assessment was carried out with the participation of representatives from the most climate-sensitive sectors, including agriculture, biodiversity, forestry, natural disaster, infrastructure, health, and water resources. This ensured that weightings assigned to options were a fair reflection of the views of a broad range of stakeholders.

Initially, 17 adaptation options were identified, which were then screened to obtain a total of nine using the following simple criteria designed to rapidly sift options:

- climate change risks and the level or degree of adverse effects
- demonstrated fiscal responsibility (or cost effectiveness)
- level of risk associated with choosing not to adapt
- complements country goals, such as overcoming poverty, enhancing adaptive capacity or other environmental agreements.

The remaining nine options were subjected to a multi-criteria assessment for prioritisation, whereby the stakeholder group assigned scores of 1–5 on each of the following criteria for each option. The first three criteria represent benefits and the fourth represents costs:

- human life and health saved/protected by the intervention
- arable land with associated water supply (for agriculture/ livestock) and productive forest (for forestry/forest products collection) saved by the intervention
- essential infrastructure saved by the intervention (e.g. existing and projected hydropower plants, communication systems, industrial complexes, cultural and religious sites and main tourist attractions)
- estimated project cost.

The results for this scoring were then weighted according to an agreed importance of each criterion as determined by the stakeholder group to give a total score for each option. Finally, the scores were adjusted on the basis of whether the option was local, regional, or national to rank the options in order of priority. These priorities were used to make the case for funding the two highest-priority options: a disaster management strategy, and the artificial lowering of Thorthomi Glacier Lake.

In this multi-criteria assessment, the costs of implementation had a relatively low weight (0.2) compared to the benefits (0.8), indicating that achieving beneficial outcomes had a greater value than the costs incurred in doing so.

Adapted from AMCOW (2012).

Careful consideration should be given to the selection of criteria for prioritising implementation of adaptation actions. The aim is to define criteria that evaluate the potential to build water security and climate resilience. The criteria should take into account national priorities and conditions such as development needs, the climate vulnerabilities and risks, gender considerations, marginalised groups, and experience of the implementation of plans made to date. Box 18 gives the initial list of generic issues to consider that is provided in the UNFCCC NAP Technical Guidelines. Criteria could include the economic, ecosystem, and social costs and benefits; time frame; whether the option would have political buy-in; the sustainability of the option; whether it brings co-benefits; and whether there would be a possibility for unintended (positive and negative) impacts as a result of implementing the adaptation option.

Box 18. Considerations in the development of criteria for prioritising adaptation implementation

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

Adapted from UNFCCC (2012a).

Once the appraisal method and criteria have been selected, they can be applied in order to establish a ranking and prioritisation of adaptation options. The process should result in a list of adaptation options for taking forward in the draft NAP.

7.3 Transboundary and regional cooperation

Promoting transboundary and regional synergies

C.4.b, C.4.c

Identifying and promoting collaboration and synergy in assessment, planning and implementation of water-related adaptation with other countries in the region can help to ensure the effectiveness of plans, given that nationally-driven adaptation efforts could forego opportunities for increased resilience benefits across the hydrological basin. Also, the fact that the majority of climate impacts are regional, i.e. experienced across national borders, means that collaboration among countries could serve to share lessons and best practices and harness benefits of scale. Transboundary synergies might be achieved through involvement in regional commissions, groups, conventions, etc. that facilitate regional collaboration. It might be helpful to consider other development processes (e.g. the SDGs, or disaster risk reduction initiatives aligned to the Sendai Framework) to facilitate cross-national dialogue and collaboration in adaptation planning. Table 6 describes adaptation activities that are decided and undertaken at national level, and those that ideally are undertaken at transboundary or regional level or incorporate regional hydrological perspectives.

There is also a need to identify and promote opportunities for synergy with other multilateral environmental, economic, and infrastructure operational agreements in the formulation of respective plans, in capacity building, and during implementation. These might include, for example, any transboundary water agreements, power pools and energy (including hydropower) management, irrigation development and management, industrial development, or similar.

The World Bank (2017) report on climate resilience in Africa and the role of cooperation around transboundary waters draws attention to the critical role of transboundary water cooperation for adapting to climate change in Africa in particular, with transferrable lessons in the global context. The report provides a conceptual framework for understanding the links between climate change, socio-economic development, water resources, and transboundary cooperation in Africa.

Box 19. CASE STUDY: Transboundary cooperation on adaptation to drought risk in the Niger Basin

The Sahel region in Africa has long been exposed to climate variability and droughts, and there are well established regional cooperation initiatives to manage these risks and invest in monitoring:

- The Permanent Interstate Committee for Drought Control in the Sahel (CILSS) was established in 1973 to invest in addressing food security and drought risk.
- The Agrometeorology, Hydrology, Meteorology (AGRHYMET) Regional Center is a specialised institution of the Permanent Interstate Committee and focuses on drought monitoring and associated capacity building.
- The Niger Basin Authority (previously the River Niger Commission) was established in 1964 for transboundary cooperation in the Niger Basin. The Authority received funding from the French Development Agency and African Water Facility for the Niger-HYCOS project in 2005, to set up a hydrometric monitoring network in the basin.
- The Niger Basin Authority established the Niger Basin Observatory. Participating countries agreed to a data exchange protocol for sharing hydrology, environmental, and socio-economic data. This protocol constitutes the basis of the Observatory to serve as a reliable and sustainable data exchange platform of the Authority. Through the nine national units anchored to this platform, the Observatory can appropriately collect, compile, analyse, and disseminate water and climate data, as well as disseminate reliable information to governments and other stakeholders. Key services provided by the Observatory that contribute to resilience-building actions include issuing flow forecasts; summarising and analysing planned water abstractions; and availing hydrology and socio-economic data to inform riparian dialogue water management related issues, trade-off evaluation at the basin scale, and preparation of basin investment plans.

Adapted from World Bank (2017).

UNECE (2015) highlighted important considerations in managing water and climate change adaptation in transboundary basins. These included:

- Adaptation in a transboundary basin presents both challenges and opportunities. The challenges include being able to achieve strong cooperation between riparian countries, sectors, and stakeholders. The opportunities include the potential to pool available data, models, and resources.
- Proper institutional arrangements and the application of the principles of integrated water resources management are essential elements for transboundary cooperation in climate change adaptation. A basin organisation can play a crucial role in climate change adaptation and should be given a mandate to address it.
- A flexible legal framework, such as a transboundary agreement, can support the development and implementation of adaptation strategies and measures.
- A joint group of experts from all riparian countries should be set up for a basin-wide assessment of problems, priorities, and solutions and for developing joint scenarios, modelling, and vulnerability assessments.
- A vulnerability assessment is especially important at the transboundary basin scale, as reducing vulnerability in one part of the basin can affect vulnerability elsewhere in the basin. Developing a common understanding of the vulnerability in a basin is necessary to provide a basis for elaborating a basin-wide adaptation strategy and plan to address climate change impacts.

- Comprehensive information and data from the entire basin are needed for developing the strategy and identifying the vulnerabilities and impacts. The collection and sharing of the necessary data, information, and models from the entire basin and across the water cycle therefore have to be ensured.

7.4 Building a balanced portfolio of measures

Integrating adaptation options in the NAP

B.4.a

The prioritised adaptation options should be integrated in the draft NAP, with the overall aim of building a balanced portfolio of measures. It is important to consider sector-specific and cross-sector adaptation options, options at different scales, and alignment with national planning priorities and development programmes. It is also important to consider the range of subsector adaptation options available, and any combinations of subsectors – with action around information systems, infrastructure systems, and institutional systems – that yield particularly valuable adaptation benefits. In water, some examples of subsectors include, but are not limited to, coastal management; floods; droughts; water supply; drainage, sanitation, and health; irrigation; hydropower; and ecosystems and wetlands.

The stakeholders who have been involved in contributing to the process of integrating water in the NAP should be given the opportunity to review and provide comment on the draft NAP. It might be helpful to have stakeholder events to explain and discuss the decision-making process in compiling the draft NAP.

The draft NAP then needs to be updated to take account of the review comments. The final version of the NAP should then go through a process of endorsement with central government to ensure that there is a national mandate for implementing the NAP.

Developing a strategy for implementing the NAP

C.2.a, C.2.b

A NAP implementation strategy should be defined to set out how and when the actions in the NAP are to be implemented. Water-related adaptation actions and other sectoral adaptation actions should be aligned to the overall NAP implementation strategy. The strategy should consider budget needs, resource mobilisation, resource requirements, gender, age, ethnicity, and cultural balance issues. A financing and investment strategy should be defined to identify potential sources of funding for the adaptation actions and to establish an action plan for applying for and mobilising funding (see Chapter 9 on financing the NAP). The strategy should consider potential climate-related risk-transfer mechanisms, including insurance (GWP, 2018b; see Boxes 25 and 26).

Once funding is secured, adaptation actions can be implemented. Best-practice project, programme, and portfolio management should be applied to implement the actions and ensure that the benefits are realised. Adaptation should be integrated as far as possible into all water security policies, programmes, and projects.

8. Knowledge and capacity development

Key messages

- Limited embedded capacity within national institutions mandated to act on climate change and on water management often poses a challenge in the NAP process.
- While the immediate solution would be to tap into external experts to provide technical guidance to this country-driven process, the NAP process will only truly yield lasting resilience benefits if embedded capacity is built within national institutions and local implementing agencies. It is important that the NAP process builds in time and space for strengthening embedded capacity.
- Often the root behind the knowledge and capacity gap is a coordination gap. It is critical, therefore, to identify as part of the NAP process the sources of existing information, both within and outside a country, and the mechanisms that can be mobilised to move, access, and utilise such information.

8.1 Enhancing capacity for adaptation planning

Capacity for the integration of water in the NAP process

A.1.d, B.5.b

The UNFCCC NAP Technical Guidelines explain how LDC Parties can access funding, capacity building, and technical support for the preparation of their NAPs. There may be specific means by which support can be provided for integrating water into the NAP process. This could be, for example, funding for water specialists to spend time working on contributions to the NAP; equipment such as computing or monitoring instrumentation; or support to build the capacity of water managers to understand how they can contribute to the NAP process.

The gaps in capacity for integrating climate change and water security into planning should be assessed and a plan prepared for addressing these gaps. It is important to note that buy-in within a country's administrative system is critical for undertaking the NAP process and its subsequent implementation in a meaningful way, and that understanding and capacity within the administrative system is a key ingredient to build buy-in. UNITAR (2015) has developed a skills assessment framework for capacity gap evaluation. The framework is structured around model assessment questions relating to the desired institutional capacities for the designing and implementation of the NAP. Through the gathering and analysis of information on a country's existing skills profile, the tool highlights the skills gap that a country may want to address for its national adaptation planning.

Capacity development can be delivered through various formats including guidance materials, training of trainers, continuing professional development, and peer-to-peer learning, and benefit from newer media formats such as e-learning and social media. It could also be helpful to strengthen coordination mechanisms for integrating water-related adaptation in development planning.

Addressing gaps in capacity and information

A.2.c, A.3.a

It is important to understand what gaps there are in relation to capacity, data and information, and resources required to effectively integrate water in the NAP process. Once the gaps are understood, they can be addressed, which will create a much stronger position from which to integrate water into the NAP process.

Gaps in capacity can be assessed through a participatory process. The assessment should cover individual, organisational, and enabling environment dimensions of capacity. The capacity of water-related stakeholders should be assessed through discussion and consultation with them. Discussions can explore the level of the existing institutional knowledge base, skills, instruments, institutional arrangements, and

enabling policy environment to enable the individuals and institutions to plan, implement, and monitor adaptation measures.

Gaps in data and information could relate to:

- past, current, and future climate, climate-related impacts, and vulnerabilities
- hydrological data and information (observational and empirical measurement)
- scenarios on how climate change may affect water resources
- adaptation measures; identify whether there are gaps in understanding what adaptation measures could successfully address climate impacts, whether and how adaptation measures are successful, and how to implement adaptation measures
- cross-sector interdependencies; identify whether there is robust and reliable information and evidence on cross-sector interdependencies in relation to climate impacts and adaptation
- stakeholder involvement and targeting throughout the NAP process, including communities, the public, and gender considerations; for example, is sex-disaggregated data available?
- economic and development indicators; for example, is there sufficient, high quality data for understanding progress on the SDGs and their targets at different geographical levels within the country?
- linkages among key decision-makers, including government institutions mandated to work on climate change, focal points for various climate change funds, and sectoral ministries.

It is also useful to understand whether there are any gaps in the resources required to integrate water in the NAP process. Are any relevant groups prevented from participation due to people, time, or budget constraints?

Capacity development can be delivered through various formats including guidance materials, training of trainers, continuing professional development, and peer-to-peer learning, and benefit from newer media formats such as e-learning and social media. The plan should explore financing options for capacity development activities, including the GCF Readiness and Preparatory Support Programme (see Box 24).

Box 20. CASE STUDY: Regional partnerships support information sharing and capacity building, enabling countries to access GCF resources for water-related adaptation planning and project preparation

A total of 180 participants representing 42 countries took part in two regional technical workshops, in Africa and in Asia, on Project Preparation for Climate Resilient Water Projects for the GCF in 2018. The participants comprised GCF National Designated Authorities (NDAs), Direct Access Entities (DAEs), and decision-makers in water ministries and agencies. Through interactive, hands-on exercises over several days, the NDAs, DAEs, and water decision-makers worked on a total of 74 country-prioritised water project ideas to sharpen their climate rationale and paradigm shift potential. Convened by GWP in collaboration with continental partners, with technical inputs from the GCF and World Meteorological Organization, the workshops revealed a number of points:

- Water-related adaptation project concept notes and proposals for submission to the GCF require tremendous strengthening of the climate rationale – and the GCF Readiness and Preparatory Support Programme can be a useful resource for this.
- Integrated approaches to designing water-related adaptation projects can shed light on opportunities for expanding overall impact by tapping into co-benefits of adaptation and mitigation via considering a combination of options across water subsectors, synergising with mainstream development outcomes, integrating cross-sectoral activities via water's role as a connector, taking advantage of pre-crisis risk reduction strategies to mitigate overall financial

and economic costs, and ensuring sustainability of results via an emphasis on a governance regime that is conducive to resilience-targeting water resources management in the context of a changing, and highly uncertain, climate.

- Adoption of such integrated approaches to designing water-related adaptation projects, in the context of the GCF, requires working relationships among the country NDA, any DAEs, the water ministry and mandated agencies, which in many contexts may not be a given, and therefore needs to be fostered.
- NDAs, DAEs, and water ministries in countries are growing their experience in accessing and engaging with the GCF, with some starting to implement GCF-supported projects. Participants of the workshops were therefore eager to continue collaborating after the workshops, to share experiences and support one another as they advanced their project ideas to GCF concept note stage.

Addressing expressed demand from the participants, the workshops launched the Project Preparation Partnerships for Climate Resilient Water Projects for the GCF in Africa and in Asia. The Partnerships provide platforms for regional coalitions of NDAs, DAEs, and water ministries and agencies, along with regional institutions, climate and development financiers, the private sector, and other entities that are committed to working together to enable countries to access the technical and financial support they need to prepare and implement climate-resilient water projects efficiently and effectively. The Partnership provides a structured resource for African countries to continue accessing strategic and technical support to improve country readiness and prioritise and prepare climate-resilient water projects via a facilitated, flexible mechanism that enables demand-driven technical assistance for NDAs, DAEs, and national water agencies.

The Partnerships continue to receive technical support from continental convenors of the workshops. In Africa these were the Infrastructure Consortium for Africa, African Water Facility, Africa Climate Change Fund, Climate Resilience Infrastructure Development Facility, and the Development Bank of Southern Africa. In Asia these were the Asia Pacific Adaptation Network, the Asia Pacific Water Forum, the Japan International Cooperation Agency, and the Asian Institute of Technology Regional Resource Centre for Asia and the Pacific.

Box 21. CASE STUDY: Capacity development in Nepal

In 2012, the Government of Nepal established the three-year Nepal Climate Change Support Programme. Part of the objective of the programme was to enhance the capacity of government and non-government institutions to implement adaptation.

To kick-start the Programme, Nepal conducted detailed capacity needs assessment at the central, regional, district, and village levels. At the central level, the assessment involved engagement of relevant government ministries and other institutions and the review of available information. At the regional, district, and village levels the assessment focused on existing capacity for delivery of services, to produce a capacity development plan for government and non-government institutions. The assessments enabled identification of key considerations for capacity building: leadership, policy and legal framework, mutual accountability mechanisms, public engagement, human resources, financial resources, physical resources, and gender and conflict sensitivity.

Activities on capacity building in the Programme included:

- support in the formation and operationalisation of Climate Change Coordination Committees at regional (2), district (14), municipality (7), and village (90) levels
- support to 816 capacity development activities/events related to these Committees, including training, training of trainers, policy facilitation, orientation, logistic support, and exposure visits for the stakeholders at regional, district, municipality, and village levels
- support to the local government to engage service providers and the private sector and develop incentive mechanisms
- support to the Government in the preparation of a climate change strategy (supporting a coordination mechanism at the central level and workshops, orientation, and training for district people; incorporating incentives for the private sector in climate change adaptation; developing fund flow mechanisms)
- support in expansion of the role of the Multi-Stakeholder Climate Change Initiatives Coordination Committee and establishment of Climate Change Adaptation Funds at 14 District Development Committees
- development and implementation of climate change adaptation projects with a collaborative approach/model (training NGOs and the private sector on climate change adaptation; entrepreneurship development; exposure visits; policy incentives; training on equitable benefit sharing; leadership training; training on fiduciary risk; fiduciary risk assessment).

An assessment of the outcomes of the Programme found that:

- there have been noticeable changes in people's livelihoods and project beneficiaries
- community members have developed confidence and a sense of security due to their improved knowledge on climate change risks and the acquired skills to adapt to climate change
- institutional mechanisms are fully functional in the Programme areas, thus providing a platform for stakeholders to coordinate the implementation of Local Adaptation Plans of Action
- District Development Committees have internalised climate change adaptation planning by elevating climate change within their institutional arrangements
- local planning processes now capture climate change actions.

In addition to the Nepal Climate Change Support Programme, the Government of Nepal has implemented other programmes that include components of strengthening the capacity of the country to effectively undertake adaptation planning and implementation. The government launched the process to formulate and implement NAPs in October 2015, and will build on this established capacity.

Adapted from UNFCCC (2015a).

Training on integrating water in the NAP process

C.3.b

The NAP process is ongoing in nature, with continuous evolution and regular updating of the NAP to respond to new developments and needs. It therefore needs a continuous programme for building the capacity of national experts, institutions and systems to ensure that water is integrated in the NAP process and that resilience is strengthened through water as a key component of everyday life. Implementing training on integrating water in the NAP process on an ongoing basis at sectoral and subnational levels will help to facilitate water-related adaptation planning at subnational levels. The NAP Global Support Programme offers a comprehensive regional training programme on NAPs (see Box 22).

Box 22. The NAP Global Support Programme (NAP-GSP)

The NAP-GSP is a joint UNDP–UN Environment programme to assist developing countries in advancing NAPs. The NAP-GSP has been set up to help countries bring greater focus and attention to medium- and long-term climate change adaptation planning as well as budgeting.

The main areas of work are:

- assisting countries to think through what it means to integrate climate into planning and budgeting and develop a plan of action that specifies what needs to be done and the resources required
- providing in-country and virtual support on stocktaking of capacity gaps and needs, as well as of ongoing adaptation plans and activities, to identify entry points for NAP support; UNDP and UN Environment, together with programme partners, provide training on the NAP process for multi-stakeholder groups, economics of adaptation, and understanding climate information in the context of development planning
- assisting countries to integrate vulnerable sectors, thematic areas, subnational approaches, and legal issues into adaptation planning and budgeting by supporting sectoral and cross-sectoral stock-taking, assessments, and application of appropriate tools and guidelines.

NAP-GSP has a regional training programme on the NAP process and hosts regular training workshops on a variety of NAP issues, from appraising adaptation options to understanding climate finance. It also hosts specific events on water in climate change adaptation.

Adapted from the NAP-GSP website (www.globalsupportprogramme.org/about-nap-gsp-0).

8.2 Strengthening capacity for implementation**Strengthening the enabling environment**

A.2.d

The enabling environment (legislation, policy, developing the evidence base, and adequate financing and capacity) is important to ensure adaptation is effective and investments are well-targeted. This is particularly important for water-related adaptation, as existing policy frameworks and legislation are often weak and there can be under-financing and a lack of capacity in many cases. Without systematic consideration of the enabling environment as part of adaptation planning, specific adaptation projects and programmes are likely to face setbacks and the results can be undermined (OECD, 2013).

In order to understand and strengthen the enabling environment it is necessary to first identify and document the barriers to doing this. Barriers could include limited technical and financial resources, capacity gaps, lack of data and information, coordination and management issues, political constraints, institutional capacity, and social issues.

The other side of understanding and strengthening the enabling environment is to identify and document enablers and opportunities, not only for addressing climate change but also for improving gender equality, environmental stewardship, and cross-sector links and their role in achieving the SDGs and economic

development. The successful delivery of a water-secure and climate-resilient outcome will achieve more than the sum of these two parts.

Strengthening institutional and regulatory frameworks

C.3.a

The long-term success of building climate resilience through water can be supported by strengthening institutional and regulatory frameworks for addressing water-related adaptation at national and sectoral levels. This might require strengthening stakeholder engagement processes or policy formulation processes, for example. It might also extend to building capacity within institutions at the national and local levels for implementing water-related adaptation.

A plan should be prepared for addressing gaps in institutional and technical capacity for integrating water in the NAP process. OECD (2003) provides a framework for assessing capacity for climate actions, and refers to the following types of capacity:

- **Individuals:** The skills and performance of individuals is the basis of the success of any action or policy. This requires individual motivation, clear objectives, skills and training, incentives, and appropriate responsibility.
- **The organisation's management capacity:** The performance of organisations is also a key measure of institutional capacity.
- **National systems for networking:** Country-wide actions usually require the cooperation of many different organisations.
- **The regulatory framework, public sector setting, and public governance:** The governance and effectiveness of the public sector in fulfilling its main functions.
- **Social norms, values and practices:** The broader cultural, economic, and social environment.

9. Accessing finance

Key messages

- A range of funding sources are available to finance the NAP process. Addressing water in adaptation planning and implementing resilience-building water investments can benefit from combining different funding sources.
- Many water projects are eligible for climate finance, but access to available finance may be challenged by limited country-level understanding of evolving modalities and requirements of climate funds and weak country-level institutional coordination.
- Climate resilience and water projects are traditionally designed to harness adaptation benefits; however, integrated approaches to adaptation planning and project design can shed light on mitigation co-benefits of water projects, which could expand the range of eligible funding sources.
- Climate finance is valuable on its own, and importantly, also to help leverage larger amounts of funding from traditional international financing institutions and the private sector, so that water investments can advance at the scale required for NAP implementation.

9.1 The NAP process from a financing perspective

Estimating financing needs for the NAP process

A.1.d, B.3.a, C.1.a

Financing is needed throughout the entire NAP process. It is helpful to distinguish between two broad phases of the NAP process, for which the type of activities funded and the scale of required financing differ significantly (IISD, 2017).

- **The development phase** includes actions taken to initiate, coordinate and maintain the NAP process on a continual basis.
- **The implementation phase** encompasses the detailed preparation and implementation of individual adaptation actions prioritised through the NAP process.

The iterative nature of the NAP process means that elements of its development and implementation phases may occur, and therefore require financing, at the same time. Figure 3 shows the key elements in the two phases that require financing. Financing needs associated with the implementation phase are significantly greater than those of the development phase.

Identifying potential sources of finance for the NAP process

A.1.d, C.2.a, C.2.b

Although a wide range of financing sources for the NAP process exist, the diversity of funders and scale of potential financing available for its development and implementation phases differ significantly (as shown in Figure 4). A limited number of sources (primarily domestic public finance, bilateral providers, and multilateral funds) provide dedicated support for the development phase of the NAP process. In contrast, more diversified financing (domestic and international, public, and private) could be available to support the implementation phase of the NAP process. This trend is consistent with the expectation that greater financing will be required to support the implementation phase of the NAP process. It should be noted, though, that at present finance directly labelled as NAP support is primarily oriented toward its development phase.

Figure 3. The NAP process: key elements requiring finance. Source: IISD (2017).

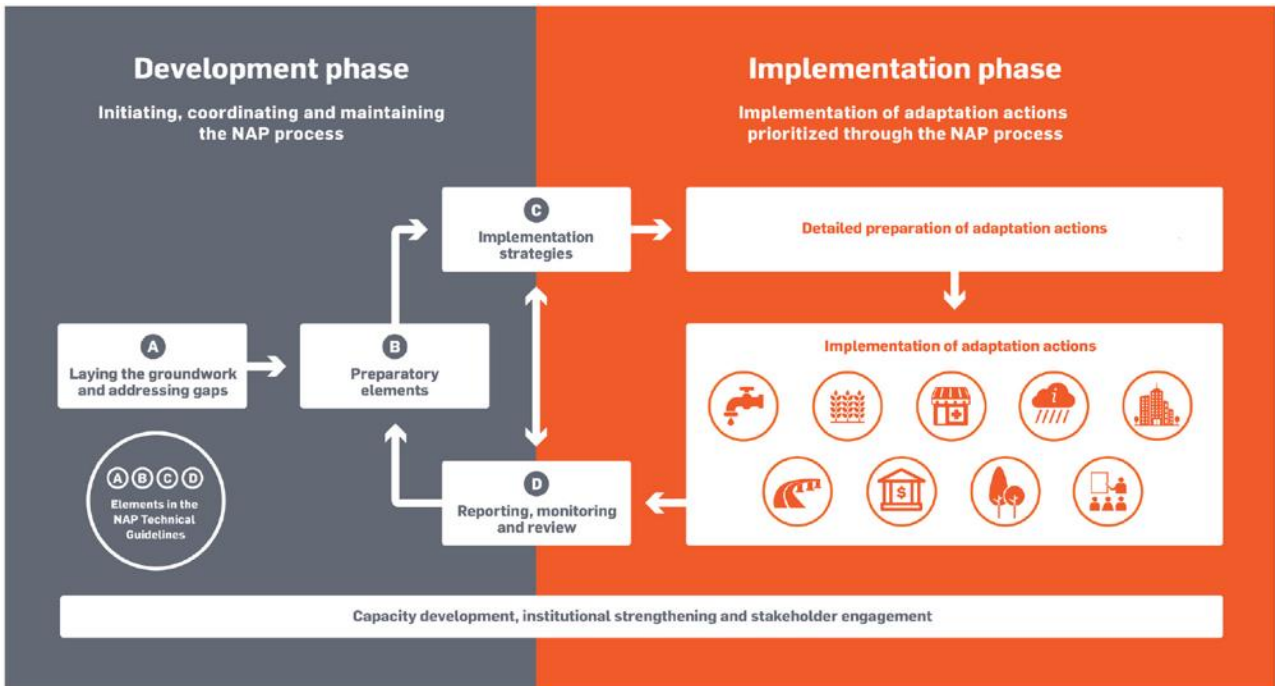
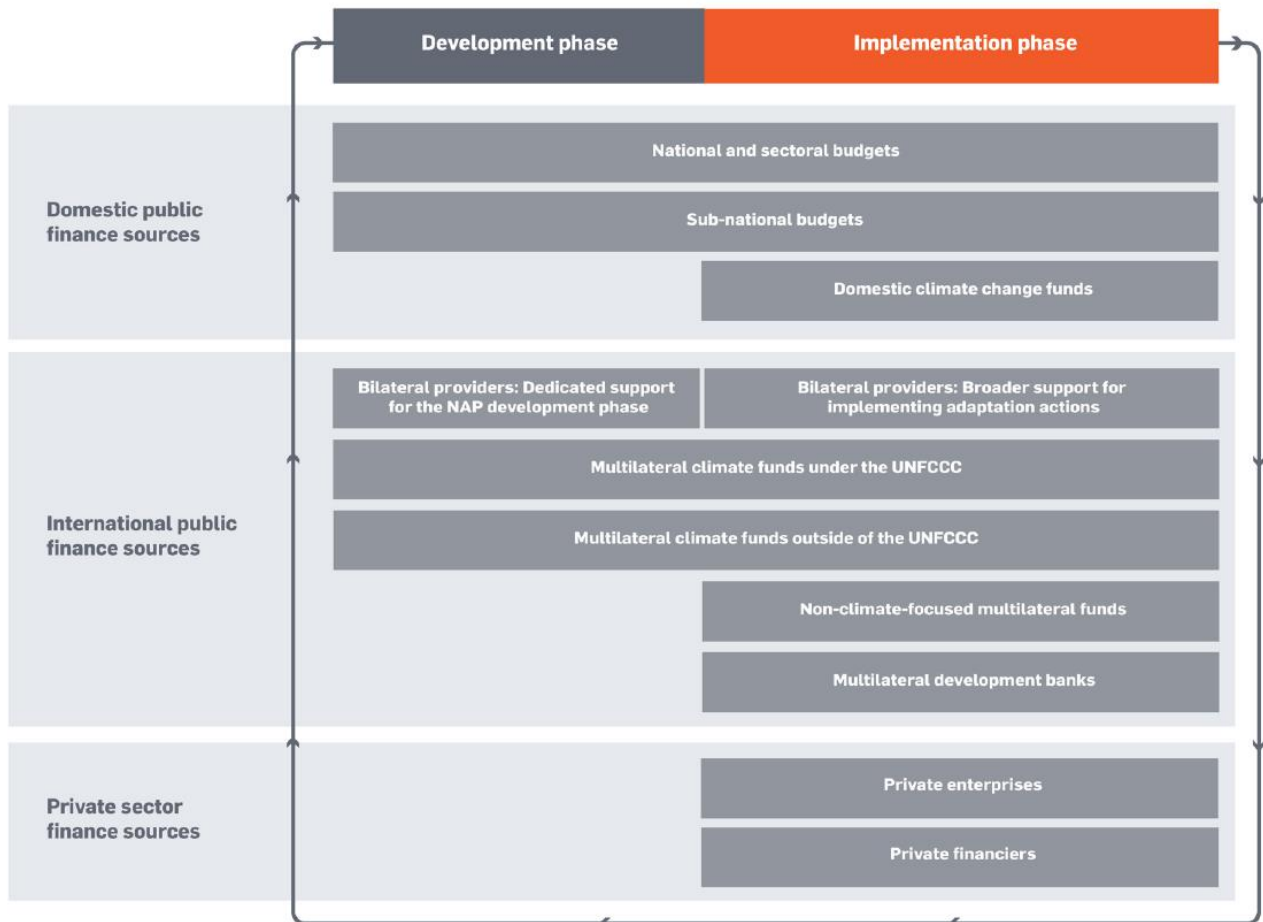


Figure 4. Potential sources of finance for the NAP process. Source: IISD (2017).



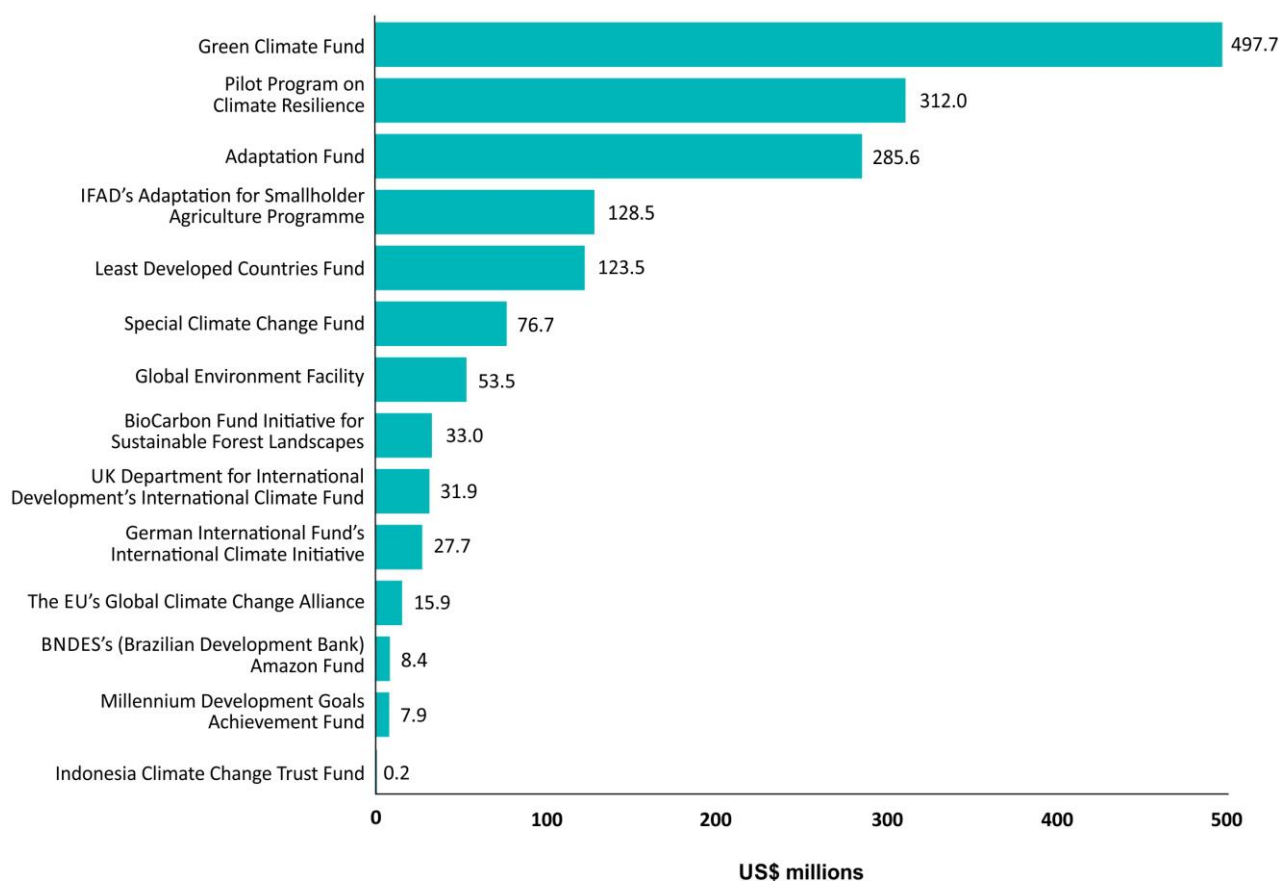
9.2 Financing water-related planning and projects in the NAP process

Financing water and climate initiatives: the track record

A.1.d, C.2.a, C.2.b

There are a number of dedicated climate funds that have specific responsibilities to focus on climate change projects, taking risks, and providing innovation (Nakhouda and Norman, 2014). The GCF was intended as the key conduit of climate financing since its conception in Cancun in 2010, but it has taken several years to become fully operational. In 2017, it provided a significant funding boost within the framework of the dedicated multilateral climate funds for the water sector. Looking at the data for the funds in aggregate (see Figure 5), its importance is clear: between 2006 and 2017, a total of US\$1.6 billion was allocated to 187 water projects, of which 153 were focused on adaptation. Two-thirds went through the UNFCCC climate funds (the GCF, the Global Environment Facility (GEF), the Least Developed Countries Fund (LDCF), the Special Climate Change Fund (SCCF), and the Adaptation Fund (AF) and the rest through a variety of funds such as the German International Fund's International Climate Initiative (IKI), the UK Department for International Development's International Climate Fund (ICF), and the Pilot Program on Climate Resilience (PPCR), one of the World Bank's Climate Investment Funds. Significantly, on average, projects funded by the GCF were larger (US\$39 million) than those by other funds, for example compared to the replenished Adaptation Fund (US\$8 million).

Figure 5. Approved spending for water and climate resilience by different climate funds, 2006–2017.
Source: Hedger (2018) based on Hedger and Patel (2018).



Note: Excludes electricity-generating related products but includes a small number (c30) of projects relating to energy use for irrigation, etc.

It should be noted that there are currently a number of different approaches for classifying water projects in these specific climate funds, depending on how far water management extends into river basins, ecosystems, and coastal protection and what the focus is. Under the GCF classification, water security falls within the results area of "Increased resilience and health and well-being, and food and water security". An examination of all the GCF approved projects suggests that around half can be seen as relating to water,

but only a small percentage relates to core water management issues for people (Hedger, 2018). The Pilot Program on Climate Resilience, meanwhile, seems to closely link water to agriculture, including sustainable water and land management practices. When links to mitigation are included, categorisation is all the more complex, and these projects are generally labelled as cross cutting.

Accounting for expenditure on climate-related water projects by funds that do not exclusively address climate change is also complex, as these funds include a wider range of flows. Expenditures by multilateral development banks cover their own accounts as well as external resources that they have responsibility for managing; for 2016, it was reported that adaptation constituted 26 percent (US\$7.4 billion) of their total climate spend, of which 35 percent (US\$2.6 billion) was spent on water and waste-water systems, some 13 percent of the total on climate (MDBs, 2017). Other water-related sectors included agricultural and ecological resources, crop and food production, and coastal and riverine expenditure. The Organisation for Economic Co-operation and Development's database on official development assistance (www.oecd.org/dac/financing-sustainable-development/development-finance-data) shows that water supply and sanitation received US\$3.2 billion, or 14 percent, of climate-related development finance in 2016. Again, this database covers a wide range of funds – bilateral as well as multilateral. The main point, however, is that spending on water projects is a small proportion of total climate finance flows in all databases, and tracking spending is challenging (Watson, 2016).

The private sector is increasingly engaged, although apart from within the insurance sector, this is largely limited to assessments of the impacts of climate change on the production and supply systems of consumables, as well as the potential for investment in remodelling infrastructure and in emerging economies such as Brazil. The private sector is not targeting LDCs or core SDG-type needs. The private sector recognises opportunities for investment in water infrastructure, but not principally in the poorest countries where vulnerability to climate change is most acute. The private sector has not favoured the water sector due to uncertainties regarding revenues and the potential for political interference; instead, water has traditionally relied on the 'three Ts': tariffs, taxation, and transfers (grants) (WWC and OECD, 2015). In the NAP process, it can be valuable to consider the private sector's role to indirectly influence or even actively lobby for the enabling institutional environment that the government can help establish, which can then incentivise private sector participation in resilience-building water investments.

Particular constraints to increasing private sector involvement in the water sector include policy uncertainty, the sector's normal short-term operating mode, and the lack of clear technological packages suitable for investment (Buchner, 2016). Overall, there seems to be a lack of clearly defined products and viable investment opportunities related to climate adaptation and resilience, as well as knowledge gaps about how to incorporate climate change risks into investment or financing decision-making. There are also concerns about variability in funding flows and uncertainties on investments (CPI, 2014). Countries that have the greatest need for investment are often perceived as risky and as having governance issues. Low-income countries often lack the institutional framework, administrative capacity, or political stability to implement appropriate macro-economic policies or adaptation strategies (IMF, 2017).

Analysts are starting to explore the exposure of companies to climate change, and the possible subsequent change of their value. The Financial Stability Board Task Force on Climate-Related Financial Disclosures (TCFD) establishes guidelines for companies to report their climate exposure and implications. However, these are voluntary; their widespread application remains limited to date and few companies disclose the effects of extreme events. Borrowing costs and insurance premiums by and large do not reflect increased climate risks. Yet the big three rating agencies (S&P Global, Fitch Group, Moody's) are starting to incorporate climate risk into credit scores. There is increasing evidence that environmental, social, and governance considerations taken by the private sector lead to better risk adjustments and improved performance.

Blended finance that uses a range of instruments and mechanisms to improve the risk profile of investments and leverage contributions from different sources offers a promising approach to bridge the financing gap in developing countries and support the 2030 Agenda. By using public or private funds, including concessional tools, blended finance offers the potential to mobilise additional capital flows to

emerging and frontier markets and attract new sources of funding to address the biggest global challenges (OECD, 2018b). Blended finance could improve access to finance and lower the costs of investment for infrastructure and affordability of services, particularly for the poor (OECD, 2017). In reality, however, it remains to be seen whether such a financing approach will help low-income countries, as it has been estimated that only US\$2.9 billion (3.6 percent of the private finance mobilised using blended finance from 2012 to 2015) flowed to low-income countries, which represents US\$728 million per annum (Attridge, 2018).

There is a growing consensus that insurance, risk transfer, and sharing mechanisms have an important and growing role to play, particularly in offsetting the economic impacts associated with extreme events. What is less clear is the extent to which such instruments encourage adaptation programmes and policies that would serve to minimise future loss and damage and, hence, contribute to sustainable development. GWP (2018b) outlines emergent thinking on how climate insurance can contribute to resilience, if part of a wider adaptation strategy: First, the insurance industry can be a potentially major capital investor in resilient infrastructure, thereby influencing the investment behaviour of financial markets. This could lead globally to higher resilience, and from the insurance industry's perspective, lower claims and increased insurability through more affordable premiums. Second, reductions in insurance premiums can incentivise investment in resilience and adaptation measures. One proposal is that premiums could be reduced in proportion to an achieved-level of mitigation or adaptation. Third, an idea yet to be implemented, is to convert catastrophe bonds into resilience bonds in order to encourage investments in risk reduction (Hermann et al., 2016). Lower coupon pricing would be offered to reflect an expected reduction in future losses.

Accessing finance for water-related adaptation planning and projects

C.2.a, C.2.b

Box 23. The appetite–design gap for water-related adaptation actions

In the UNFCCC's 2016 synthesis of NDCs of 161 countries, water emerges as the leading sector for adaptation, emphasised by 137 developing countries. Proposed actions in the NDCs include: hard infrastructure and protection measures; conservation measures; groundwater and waste water management, risk assessment, and precaution; and institutions, policy, and regulations. But every country is different, requiring its own package of water actions, and countries classify actions in varying ways depending on their approaches to national planning.

A survey conducted by GWP of 80 developing countries' NDCs found that while two-thirds of the countries outline a general portfolio of water projects in their NDCs, only one in ten cite what could be called a detailed project proposal, and these originated either from domestic water planning processes or had emerged from previous climate funding proposals. Over 80 percent of countries ask for support on finance, technology, and capacity-building to implement their adaptation actions. But limited costing exercises have been undertaken so far, and generating a pipeline of projects fit for funding is also challenging (Hedger and Nakhooda, 2015; OECD, 2015; Blended Finance Taskforce, 2018). Countries, in their NDCs, attribute weak capacity for project preparation and promotion as a critical reason behind this appetite–design gap for water-related adaptation actions.

Among the countries that request international support and have no project details for their water-related adaptation actions, 80 percent have self-scored as 'medium-low' or 'low' in terms of progress made in the implementation of IWRM – the approach recommended by SDG 6.5.1 for ensuring efficient, sustainable, and inclusive water security outcomes (UN Environment, 2018). For countries requesting international support, it would be prudent to consider – during both NAP development and implementation – interventions that would also lead to appropriate strengthening of management and governance structures for water. These would thereby increase the likelihood that financing, when secured, can result in tangible projects and that projects will be successful in the long term.

Adapted from GWP (2018a).

While globally, financing has been made available for climate action, both from public and private sources, the amount secured by water-related adaptation planning and projects is nowhere near the scale needed. Millions have been delivered but billions are needed (Hedger and Patel, 2018). Countries must decide what their water adaptation needs are, and use the NDC process to generate concrete action plans and project proposals, in alignment with the adaptation component of the NDC. National governments must frame complicated implementation programmes that integrate domestic spending with secure external financial and technical support. Where countries, at national and local levels, lack understanding of what makes projects attractive to investors, capacity building needs to be prioritised to help countries in project development phases to design climate-resilient infrastructure projects that appeal to funders. Regulatory frameworks need to be strengthened to improve investor confidence and create incentives for investment.

Reaching a stage where countries are able to access funds for water-related adaptation planning and projects itself requires support. Support for this upstream capacity and institution building has been formalised as support for 'readiness', which the GCF, German Corporation for International Cooperation (GIZ), United Nations Development Programme, and the NDC Partnership are making initial efforts in.

Box 24. The GCF's Readiness and Preparatory Support Programme

The GCF's Readiness and Preparatory Support Programme can provide funding of up to US\$3 million per country to support the formulation or strengthening of their NAPs and other country-driven adaptation planning processes. This Programme also makes available up to US\$1 million annually per country to:

- develop strategic frameworks for engagement with the GCF, building on existing strategies and plans and country-driven national adaptation processes (this could be the NAP process, or a country equivalent)
- identify priority sectors for climate action
- identify and develop a pipeline of potential GCF projects
- strengthen potential Direct Access Entities for GCF accreditation
- strengthen the National Designated Authority for the country
- share information and experiences.

For more information, please refer to the GCF's *Empowering countries* web page www.greenclimate.fund/how-we-work/empowering-countries.

Box 25. Climate rationale: Unlocking GCF finance for resilience-building water projects

As a financial mechanism for the Paris Agreement, the GCF is mandated to support countries to transition to low-emission and climate-resilient development. This means that the GCF is able to provide financial support for activities that support adaptation or transformation in response to greenhouse-gas-induced climate risks. Articulation of a ‘climate rationale’, therefore, is a critical component of any proposal submitted to the GCF. A strong climate rationale is one that:

- is based on credible science and robust assessment of climate impacts and risks
- presents a set of optimal interventions that comprehensively addresses underlying climate risks
- integrates interventions into decision-making for long-term, low-emission climate-resilient development.

Weak climate rationales are one of the most common reasons why water-related projects seeking GCF funding are not able to make it past the concept note stage. In water, and especially in LDCs, data gaps and lacking analytical capacity are big challenges. The World Meteorological Organization’s regional climate centres, and its support to national meteorological and hydrological services, can provide useful resources for countries in their NAP process to create the scientific articulation of climate impacts and risks they face. This scientific basis of climate impacts and risk forms the foundation upon which climate rationales for specific water projects can be subsequently elaborated as proposals are prepared for submission to the GCF. Since development of this scientific basis of climate change is a fundamental step for countries to be able to access GCF financing for their adaptation and mitigation needs, activities to strengthen the information systems, capabilities, and institutional structures needed for the development of this scientific basis can be supported by the GCF under its Readiness and Preparatory Support Programme.

Box 26. CASE STUDY: Pacific Catastrophe Risk Assessment and Financing Initiative (PCRAFI)

PCRAFI is a joint initiative of the Geoscience Division of the Secretariat of the Pacific Community, the World Bank, and the Asian Development Bank, with financial support from the Government of Japan, the Global Facility for Disaster Reduction and Recovery, and the African Caribbean Pacific – European Union (ACP-EU) Natural Disaster Risk Reduction Programme, and technical support from AIR Worldwide, New Zealand GNS Science, Geoscience Australia, Pacific Disaster Center, OpenGeo, and the Global Facility for Disaster Reduction and Recovery Laboratories. PCRAFI provides Pacific island countries with disaster risk modelling and assessment tools. It also engages in a dialogue with the countries on integrated financial solutions for the reduction of their financial vulnerability to natural disasters and to climate change. The initiative is part of the broader agenda on disaster risk management and climate change adaptation in the Pacific region.

Since 2016, PCRAFI has provided Pacific island countries with insurance against tropical cyclones, earthquakes, and tsunamis. Vanuatu, Tonga, the Marshall Islands, Samoa, and the Cook Islands were the first policy-holders to join PCRAFI in 2016. Germany, Japan, UK, and USA collaborated with the World Bank Group and the Pacific island countries to found the Initiative, which is now expanding to include additional countries. New products will also be developed with the support of InsuResilience.

Adapted from the PCRAFI website (<http://pcrafi.spc.int>) and GWP (2018b).

Box 27. CASE STUDY: Immediate insurance payouts after tropical cyclones and excess rainfall events in Caribbean countries

In the past decade, governments and citizens in the Caribbean have witnessed first-hand the impacts of more frequent and more intense weather events due to climate change. This is highlighted by the example of Hurricanes Matthew, Irma, and Maria, which, in just 2016 and 2017, resulted in over 3,700 fatalities and damages of over US\$170 billion.

Countries in the region have been encouraged by rapid response and payouts from their insurance with CCRIF SPC (formerly the Caribbean Catastrophe Risk Insurance Facility; now a segregated portfolio company or SPC). Following Tropical Storm Kirk in 2018, CCRIF SPC paid out US\$5.8 million to Barbados on its Excess Rainfall policy, bringing the cumulative payouts Barbados received from the facility since 2007 to US\$19.3 million.

Since its inception in 2007, CCRIF has made 37 payouts totaling US\$136.3 million to 13 member governments – all within 14 days of the end of the event. Its membership at the end of 2018 stood at 20 countries – 19 Caribbean governments and one Central American government.

CCRIF SPC is an example of an ex-ante financing instrument that allows immediate injections of liquidity in the aftermath of disasters, when a parametric insurance policy is triggered. Immediate response ensures continuity of government operations and enables critical infrastructure to be quickly restored, addressing, most importantly, the urgent needs of the affected population.

CCRIF SPC is able to make rapid payouts because its insurance products are parametric. This means that payments are made based on the intensity of an event (in the case of Tropical Storm Kirk, the volume and distribution of rainfall) and the amount of loss caused by the event calculated in a pre-agreed model. The hazard levels are applied to pre-defined government exposure to produce a loss estimate. The modelled loss estimate is then compared to characteristics of the country's policy – based on the country's risk profile and amount of premium the government pays – to determine if the policy is triggered, and if so, the value of the payout. The parametric nature of the policy means that loss adjusters do not have to be relied on to estimate damage after an event, which could take months or years. Governments do not have to provide detailed asset values and other information prior to starting their insurance coverage, and have to sign just one form during the entire claims process. Calculation of payouts is objective, based on a few simple input parameters published widely in the public domain by the globally mandated body responsible for estimating those particular parameters, and a set of formulae which form part of the policy. A country's risk profile, which drives policy pricing, is uniformly defined and not subjective.

CCRIF SPC is the first multi-country risk pool in the world, and is also the first insurance instrument to successfully develop a parametric policy for hurricanes and excess rainfall (and earthquakes) backed by both traditional and capital markets. CCRIF SPC's policies are renewed annually.

CCRIF was developed under the technical leadership of the World Bank and with a grant from the Government of Japan. It was capitalised through contributions to a Multi-Donor Trust Fund by the governments of Canada, the UK, France, Ireland, Bermuda, the EU, the World Bank, and the Caribbean Development Bank, as well as through membership fees paid by participating governments. In 2014, another Multi-Donor Trust Fund was established by the World Bank to support the development of CCRIF SPC's new products for current and potential members, and facilitate the entry for Central American countries and additional Caribbean countries. This currently channels funds from various donors, including Canada, the USA, the EU, Germany, and Ireland. In 2017, the Caribbean Development Bank, with resources provided by Mexico, approved a grant to CCRIF SPC to provide enhanced insurance coverage to the Bank's Borrowing Member Countries that insure through CCRIF SPC against tropical cyclone and excess rainfall risks (and earthquakes).

Adapted from the CCRIF SPC website (www.ccrif.org/content/about-us and www.ccrif.org/news/ccrif-make-1st-payout-201819-policy-year-barbados).

10. Monitoring and evaluation

Key messages

- Monitoring and evaluation is a vital step in assessing the value that undertaking the NAP process has added. It is most effective if it is built around existing monitoring processes and indicators, rather than new mechanisms.
- Building time for reflection and learning into the NAP development and implementation process, with the aim of harnessing lessons and ‘learning as you go’ to allow dynamic improvement of the NAP process, will:
 - identify what worked well and what needs strengthening
 - help to tailor the NAP process to national, local, and basin contexts and actors
 - highlight successful partnerships that should be built upon
 - provide a forum for consensus on the way forward
 - disseminate good practice for future related activities.
- Expenditure monitoring and review can be a valuable initial tool for understanding the realities of undertaking the NAP process.

10.1 Defining monitoring metrics and indicators

Developing a monitoring and evaluation plan

A.1.b, A.1.e, D.1.a

The monitoring and evaluation plan for tracking progress on NAP development and implementation should incorporate specific measures on how water is being integrated in the process.

A useful reference for monitoring and evaluation of national adaptation at all levels (including the NAP development process and implementation) is the GIZ and IISD (2015) guidebook on developing national adaptation monitoring and evaluation systems.

The monitoring of integrating water in the NAP process can be undertaken at different levels:

- monitoring water-related adaptation planning as part of the NAP (including its gaps)
- how water-related needs are addressed in the NAP
- building water security through mainstreaming adaptation in sectoral policies, programmes and plans
- implementation and results of the water-related adaptation actions.

The choice over the focus of the monitoring has implications on the monitoring process, and different data collection and indicators are likely to be required for each of the levels above. It is also important to enhance monitoring capacities and ensure that capacity development results are part of the general monitoring framework.

It will be necessary to identify what areas will be evaluated through qualitative and quantitative performance measures as part of monitoring and assessment of progress, effectiveness, and gap analysis for integrating water in the NAP process and for delivering water-related adaptation.

Metrics for measuring effectiveness

D.1.b, D.1.c

Specific metrics for documenting progress, measuring and communicating levels of effectiveness, and assessing gaps should be defined, emerging out of an inclusive process involving the range of stakeholders that were involved in creating the shared vision for the NAP. These metrics should be revisited and refined during the NAP process – for example, based on the vulnerability and risk assessments and the evaluation and prioritization of adaptation options. It will also be necessary to establish a data collection plan to ensure that there is provision for collecting the data required to evaluate these metrics. This process will

need to consider costs and time frame to ensure that it is possible and practical to carry out the monitoring. Metrics or indicators should be defined through a participatory process and should include gender-sensitive metrics. The early involvement of stakeholders in the design of the monitoring and evaluation system is critical to foster ownership and collaboration from the start. Forming a working group focused on the monitoring and evaluation of adaptation is one option for ensuring sustained involvement of different sectors and levels to ensure effective monitoring of the process (Ospina, 2018).

AMCOW (2012) identifies some example indicators of adaptation and water security. These include:

- projects that conduct and update risk and vulnerability assessments
- early warning systems developed
- number of targeted institutions with increased capacity to reduce risks
- number of people suffering losses from extreme weather events
- number of local risk reduction actions or strategies
- health and social services responsive to climate risks
- physical infrastructure improved to deal with risk
- ecosystem services maintained or improved under climate change
- number of natural resource assets with improved resilience
- percentage of households and communities with more secure livelihood assets
- percentage of targeted population with sustained climate-resilient livelihoods
- number of policies introduced or adjusted to address climate change risks
- water stress, relative water scarcity, and economic water scarcity
- water poverty indicators
- seasonal storage index and inter-annual shortfall index
- virtual water / water footprinting.

The output of this activity is a monitoring and evaluation protocol that sets out what data will be collected, how often, and how it will be analysed to monitor and evaluate progress, success, and/or benefits. It is important to design this protocol at an early stage in the NAP process. The protocol should include provision for collecting gender disaggregated data and should consider the requirements for reporting on the NAP process to the UNFCCC.

The monitoring and evaluation protocol should then be implemented by collecting information on the metrics throughout the NAP process. Monitoring and evaluation should be done at all geographical scales of implementation and at all stages of the NAP process.

10.2 Progress reviews, learning lessons, and updating plans

Reviewing activities that integrate water in the NAP process

D.2.b

Monitoring data should be reviewed regularly to evaluate the success of efforts to integrate water in the NAP process. This could be achieved with a peer-review process with national or international water and climate experts, and should involve stakeholder participation. If the evaluation concludes that there could be improvements to the way in which water is integrated in the NAP process (including all stages of development and implementation of the NAP), these findings can be fed into the process of updating the NAP and should also feed directly into the management of ongoing adaptation projects and programmes.

Expenditure monitoring and review can also be a useful monitoring tool for addressing water in the NAP, in the context of assessing action versus ambition, progress on implementation, and integrity and accountability of programmes and projects. Public expenditure reviews (see Box 27) can provide a useful starting point for setting a baseline and establishing indicators for monitoring progress on climate adaptation via water.

Continual review of emerging science

D.2.a

Since the NAP process is ongoing and will involve regular updates of the NAP, it will be necessary to compile and synthesise information on new assessments and emerging science, as well as the results and outcomes of water-related adaptation activities, to support the review and update of the water elements in the NAP and related outputs. This will require regular review of international and national science as well as reporting on experiences of the NAP process. Reports on adaptation projects that have been implemented can be a good source of information on benefits and lessons learned.

Updating the NAP

D.3.a, D.3.b

The national mandate will specify the frequency for the review and update of the NAP. At each opportunity for update, the learning from monitoring and review of water-related adaptation activities can be fed into the process for updating the NAP. The purpose of the updating process is to keep up to date with scientific understanding and technological capability as well as to incorporate lessons learned from experiences in implementing water-related adaptation. Stakeholders should continue to be engaged throughout the updating process.

When reviewing and updating the water-related elements of the NAP process (both planning and implementation of adaptation), the work should be, as far as possible, aligned with relevant development plans. Coordinating development programmes, policies, and strategies with the ongoing adaptation process will create multiple benefits in terms of building climate resilience, water security, and sustainable development.

Box 28. CASE STUDY: Experience in climate change and water-related public expenditure reviews

Climate Change Public Expenditure and Institutional Reviews (CPEIRs) have been instigated in some countries to provide a specific focus on the integration of climate change-related expenditures in the national budget. A CPEIR has an important process function, acting as a starting point for longer term government-led stakeholder dialogue and learning involving the public and private sectors, academia, civil society, and international development partners.

Two pilot CPEIRs have recently been carried out in Nepal and Bangladesh and three more are starting in Asia. The reviews cover:

- national and sector policy
- institutional arrangements for coordination of climate change work
- patterns in public expenditure affected by climate change
- methods for taking account of climate change in national budgeting
- financing options, including from the private sector
- arrangements for monitoring and evaluating climate change expenditure.

They also assess expenditure at the local level, including expenditure patterns and management processes, using official data available and supplementing this with sample surveys.

Water public expenditure reviews have been increasingly used by the World Bank as instruments to engage its client countries on the allocation of fiscal resources and financing of water services. The World Bank has produced over 40 such reviews, responding to the need for improving long-term sustainability in financing water services. In many countries, water services are financed from national budgets, which places the Ministry of Finance at the heart of water sector investment decision-making on new investments and managing recurrent costs. Water public expenditure reviews are therefore a valuable exercise in understanding the existing financing mechanisms and initiating a dialogue on possible reforms to improve resilience and efficiency.

A recent World Bank public expenditure review for Egypt identified the following:

- low cost recovery from water services
- a decreasing proportion of funds allocated to recurrent costs, increasing the sector's liabilities in the long term
- inequitable distribution of water services in rural southern areas
- rearrangement of budget planning and allocation needed for reallocating budget appropriations between departments and within agencies and water user groups
- a water supply and sanitation sector that is moving towards corporatisation but must address a public debt overhang.

Adapted from AMCOW (2012).

Box 29. CASE STUDY: Grenada's approach to iterative learning in its NAP process

Prior to beginning its NAP process with an official mandate in 2015, many individual sectors in Grenada conducted consultative processes to identify possible adaptation actions. Various national policies and plans, such as the National Growth and Poverty Reduction Strategy, the National Agriculture Plan 2015, the Integrated Coastal Zone Policy, and the National Strategic Plan for Health (2016–2025) consequently incorporated climate change adaptation. Grenada's NAP process builds on these existing plans, practically launched with a participatory workshop using the SNAP tool to identify the country's point of departure for the NAP process.

Grenada's approach to the NAP is primarily sector-driven. Since most of Grenada's sectors are interlinked and interdependent, a broad consultative process was undertaken to develop the NAP in 2016. To avoid overlap among sectors, outline responsibilities, and ensure accountability, over 160 Grenadian stakeholders from various ministries, the private sector, and academia, as well as NGOs and community-based organisations including women's and youth groups, developed, prioritised, and drafted existing and newly identified adaptation actions and turned them into sector-specific adaptation plans. The process was iterative and collaborative; for instance, stakeholders from the National Disaster Management Agency, the Grenada Meteorological Services, and the Ministry of Finance, Planning Economic Development and Physical Development met at nine sectoral workshops and other bilateral meetings. Grenada's NAP was approved by its Cabinet in November 2017.

Grenada's NAP document serves as an umbrella that outlines a strategic, coordinating framework for building climate resilience in the country. It is a five-year plan (2017–2021), specifying twelve multi-sectoral Programmes of Action, and recognising the need to develop an enabling environment for climate adaptation while setting programmatic priorities. Grenada has aligned its NAP and the adaptation component of its NDC, allowing for streamlining of adaptation in political decisions and national budgeting. It is a living document that will be updated and revised regularly to provide guidance for the country's adaptation processes.

Some learnings from Grenada's reflection on its NAP process, as of 2018:

- **Keeping the process lean and prioritising actions eases its implementation.** Sectoral adaptation plans can be comprehensive, but capacities for implementation are not necessarily sufficient. In light of limited resources, Grenada decided to identify a few manageable and affordable activities for a five-year period. As such, it could achieve a lot more as compared to a comprehensive plan that would have simply overburdened departments.
- **The timeframe must be realistic and manageable.** The Government of Grenada set a five-year timeframe for implementation of the NAP document to ensure that the identified activities can

be realistically implemented. An updated NAP is due in 2022, according to the current NAP document.

- **Establishing Climate Change Focal Points in relevant line ministries and statutory bodies** strengthens institutional capacity and promotes ownership for adaptation needs within sectors. Selecting Focal Points and conducting trainings in climate change knowledge and risk analysis were important parts of Grenada's strategy to improve its institutional capacity and to strengthen ownership for the NAP process. Joint efforts of the Ministry of Climate Resilience and the Ministry responsible for Planning were key for successful mainstreaming of activities with adaptation aspects.
- **Sustainable results take time.** Sharpening the 'climate lens' and mainstreaming in Grenada takes time. It was important not to rush the stakeholders through the process, since they had to assess the above-mentioned policies already in place, how to effectively connect, and how to close gaps between them through the NAP process in its five-year implementation time.

As of 2018, Grenada is moving into Element C of the NAP process recommended by the UNFCCC NAP Technical Guidelines, which focuses on NAP implementation strategies. The learnings so far inform the implementation strategies as follows:

- **Financing:** Although committed to facilitating local adaptation to climate change, Grenada is cautious to avoid diverting scarce domestic resources from ongoing development priorities. While the government plans to use domestic public financing for a number of NAP adaptation actions, the country requires international funding to implement larger and more comprehensive adaptation programmes. Among such programmes, internal capacity building and institutional strengthening, within realistic timeframes and at achievable levels of ambition, is of utmost importance to Grenada. In February 2018, the GCF Board approved the Climate-Resilient Water Sector in Grenada (G-CREWS) project, which will support these two goals in the water sector, by implementing Grenada's Programme of Action on Water from its NAP.
- **Monitoring:** A Programme of Action on Monitoring and Evaluation has been included in the NAP document with the intention of monitoring the progress in implementing the NAP measures and its results. However, Element D of the NAP process (reporting, monitoring, and review) is still in the fledgling stages. Every two years, together with the NDC reporting, a short progress report on the NAP process will be produced. The Ministry of Climate Resilience together with the cross-sector Climate Change Focal Point network will coordinate the compilation of the report, with contributions from all responsible entities. The National Climate Change Committee will oversee the reporting and consultations over the findings and recommendations. The report will include new findings on climate change and vulnerabilities in Grenada; progress and obstacles in achieving goals and indicators; and recommendations for future steps and measures.

Adapted from GIZ (2018).

11. Tools and resources

11.1 Generally applicable tools and resources

The National Adaptation Plan process: A brief overview. UNFCCC, 2012.

www.unfccc.int/resource/docs/publications/publication_ldc_napp_2013.pdf

This brief provides an introduction to the NAP process and how it may be undertaken at the country-level.

The Stocktaking for National Adaptation Planning (SNAP) tool. GIZ and BMZ, 2014.

www.adaptationcommunity.net/?wpfb_dl=148

The SNAP tool developed by GIZ helps to initiate a process that leads to the formulation, communication, implementation, and monitoring of NAPs. It aims to help identify a common point of departure from which stakeholders can begin formulating a road map for the NAP process in their country.

11.2 The case for integrating water in the NAP and in development processes

Climate resilience in Africa: The role of cooperation around transboundary waters. World Bank, 2017.

www.openknowledge.worldbank.org/handle/10986/29388

This report aims to draw attention to the critical role of transboundary water cooperation for adapting to climate change in Africa. The report provides a conceptual framework for understanding the links between climate change, socio-economic development, water resources, and transboundary cooperation in Africa.

Water and climate change adaptation in transboundary basins: Lessons learned and good practices.

UNECE, 2015.

www.unece.org/index.php?id=39417

This publication illustrates important steps and lessons learned as well as good practices to take into account when developing a climate change adaptation strategy for water management in the basin or transboundary context.

11.3 Stakeholder and public involvement

Tools for institutional, political, and social analysis of policy reform: A sourcebook for development practitioners. World Bank, 2007.

www.openknowledge.worldbank.org/handle/10986/6652

This World Bank sourcebook is targeted at practitioners and provides an overview of numerous analytical techniques, including stakeholder analysis and organisational mapping, which can support the development of adaptation plans. Chapter Seven of the sourcebook provides an overview of the tools and their application at different levels of planning.

Collaborative modeling for decision support in water resources: Principles and best practices. Langsdale et al., Journal of the American Water Resources Association, 2013.

www.onlinelibrary.wiley.com/doi/epdf/10.1111/jawr.12065

This guidance document on how to conduct an effective collaborative modelling process was developed by a task committee set up by the Environmental Water Resources Institute of the American Society of Civil Engineers and by the U.S. Army Corps of Engineers' Institute for Water Resources. The guidance comprises a set of principles and best practices intended for use by water resources modellers and conflict resolution professionals.

The MSP Guide: How to design and facilitate multi-stakeholder partnerships. Wageningen University & Research, 2016.

www.mspguide.org

This guide provides a practical framework for the design and facilitation of collaborative processes that work across the boundaries of business, government, civil society, and science. The guide links the underlying rationale for multi-stakeholder partnerships, with a clear four phase process model, a set of

seven core principles, key ideas for facilitation, and 60 participatory tools for analysis, planning, and decision-making.

The traditional knowledge advantage: Indigenous peoples' knowledge in climate change adaptation and mitigation strategies. IFAD, 2016.

www.ifad.org/documents/38714170/40320989/traditional_knowledge_advantage.pdf

The long record of adaptations to climate change practised by indigenous peoples, such as the use of traditional management techniques to cope with scarce and climate-sensitive resources and enhance their resilience, can also provide example for other communities, especially when triangulating scientific and indigenous knowledge. This publication lists experiences and gives recommendations on working with indigenous communities to support adaptation strategies, build resilience, and sustain livelihoods and traditional ways of life.

A framework for stakeholder engagement on climate adaptation. CSIRO, 2009.

https://research.csiro.au/climate/wp-content/uploads/sites/54/2016/03/3_CAF_WorkingPaper03_pdf-Standard.pdf

This document provides a framework to identify best practice methods for engaging with stakeholders on the issue of climate change adaptation.

The climate change advocacy toolkits. Southern Voices on Climate Change, 2015.

www.southernvoices.net/en/news/programme-news/687-the-advocacy-toolkits.html

These toolkits have tools that may be used to influence policy processes by informing research and advocacy strategies; to strengthen capacity by identifying issues for learning by civil society and other actors; and to promote dialogue by providing an agenda for discussion with government and other stakeholders. The overall goal of these tools is to ensure that national policies and plans meet the needs and fulfil the rights of the most vulnerable people to adapt to climate change.

11.4 Adaptation and sustainable development

Making water a part of economic development: The economic benefits of improved water management and services. SIWI, 2005.

www.siwi.org/publications/making-water-a-part-of-economic-development-the-economic-benefits-of-improved-water-management-and-services

Presenting the macroeconomic case for the benefits of water can be a powerful argument among financial planners. This report set out some high-level arguments for investing in water and would be a useful resource for water planners to identify the types of facts, figures, and methodologies which can be used to present a case for resilience.

Mainstreaming climate change adaptation into development planning: A guide for practitioners. UNDP and UNEP, 2011.

www.undp.org/content/undp/en/home/librarypage/environment-energy/climate_change/adaptation/mainstreaming_climatechangeadaptationintodevelopmentplanningagui.html

This guide is designed to assist advocates and practitioners engaged in mainstreaming climate change adaptation. It should be seen as an invitation for mainstreaming specialists and adaptation experts to partner and bring added value to the overall endeavour.

Formulating climate change scenarios to inform climate-resilient development strategies: A guidebook for practitioners. UNDP, 2011.

www.undp.org/content/dam/aplaws/publication/en/publications/environment-energy/www-ee-library/environmental-finance/low-emission-climate-resilient-development/in-focus/formulating-climate-change-scenarios/UNDP-Formulating-v8-web.pdf

This guidebook provides technical guidance on the development of climate change scenarios for climate change impact assessments. It provides an introduction to the principles for developing climate change scenarios.

NAP Align: Recommendations for aligning national adaptation plan processes with development and budget planning. GIZ, 2014.

www4.unfccc.int/sites/NAPC/Documents/Supplements/GIZ%20NAPAlign%2025.11.14.pdf

This tool is designed to help countries align their NAP processes with their overall national development goals. It highlights the importance of taking both the planning procedures and the budgeting framework of the country into consideration in the earliest stages of the NAP process.

The role of the 2015 Agreement in enhancing adaptation to climate change. OECD and IEA, 2015.

<http://doi.org/10.1787/5jrxg3xb0h20-en>

This OECD/IEA Climate Change Expert Group Paper clarifies the roles and potential for synergies with multilateral environmental agreements, compares the NAPAs and NAPs, and lists lessons learned from national adaptation strategies. It also provides a list of existing institutions and arrangements for climate change adaptation that can help clarify how the UNFCCC addresses the subject.

Water and climate change adaptation: Policies to navigate uncharted water. OECD, 2013.

<http://doi.org/10.1787/9789264200449-en>

A comprehensive report comparing the range of different policies and strategies used by member countries to implement climate change adaptation. Provides a useful introduction to the range of potential policy and strategy options which are available to mainstream climate change adaptation into planning processes.

Integrating climate change adaptation into development co-operation: Policy guidance. OECD, 2009.

www.oecd.org/environment/cc/44887764.pdf

This policy guidance document is a benchmark for confronting the challenge of integrating adaptation within core development activities.

Mainstreaming climate change adaptation into development planning. Adaptation Knowledge Platform and SEI, 2012.

<https://mediamanager.sei.org/documents/Publications/mainstreaming%20climate%20change.pdf>

This report describes the entry points at different planning levels for the integration of adaptation options.

The NDC Adaptation Toolbox. GIZ, 2018.

www.adaptationcommunity.net/nap-ndc/ndc-adaptation-toolbox

This toolbox offers various instruments – organised along a generic policy/programming cycle covering planning, implementing, monitoring, and evaluation – to achieve coherence in a country's NAP and NDC processes. It comprises mainly tools developed by GIZ to enable the NAP process, now packaged to facilitate the development and implementation of adaptation measures needed to achieve NDC adaptation goals.

11.5 Gender, water, and climate resilience

The Pacific gender & climate change toolkit. Pacific Climate Change Portal, 2015.

www.pacificclimatechange.net/document/pacific-gender-climate-change-toolkit-complete-toolkit

This toolkit provides practical advice to address the needs of designing and implementing activities that ensure full gender incorporation.

Guidelines for gender sensitive programming / Guidelines for a gender sensitive participatory approach. ICIMOD, 2009.

www.icimod.org/?q=16947

Resources for including gender perspectives throughout the whole planning process.

Climate Change Gender Action Plans (ccGAPs). IUCN.

www.genderandenvironment.org/works/ccgaps

Provides steps for targeting actions to make strategies and programmes gender sensitive across sectors.

Gender mainstreaming for health managers: A practical approach. Facilitators' guide and participant's notes. WHO, 2011.

www.who.int/gender-equity-rights/knowledge/health_managers_guide/en/

This manual's Gender Responsive Assessment Scale provides a framework for assessing five levels of gender responsiveness.

Mainstreaming gender in Green Climate Fund Projects. GCF and UN Women, 2017.

[www.greenclimate.fund/documents/20182/194568/Guidelines -
GCF Toolkit Mainstreaming Gender.pdf](http://www.greenclimate.fund/documents/20182/194568/Guidelines_-_GCF_Toolkit_Mainstreaming_Gender.pdf)

This manual reviews the GCF Gender Policy and related programming provisions, including readiness support directly relevant to NAP formulation and implementation. It is intended to be used by climate change adaptation planners and project proponents from governments, international, and national direct access entities, and civil society organisations. The manual focuses on the minimum set of tools and methodologies – including gender analysis, gender assessment and action plans, and gender-responsive results or logical frameworks – needed to meet the core requirements of the GCF project cycle, also useful to a broad range of climate change mitigation and adaptation initiatives.

11.6 Climate risk and vulnerability assessment

Climate Risk Informed Decision Analysis (CRIDA): Collaborative water resources planning for an uncertain future. Mendoza et al., 2018.

www.agwaguide.org/docs/CRIDA_Nov_2018.pdf

A stepwise guidance for water resources planners, managers, and engineers to apply to water resources planning and design for future uncertainties. As a framework that is consistent with planning approaches used by a majority of national water management agencies, CRIDA can be adopted in a modular or stepwise fashion to incorporate addressing of uncertainty into existing decision-making processes.

Integrating climate change adaptation into development planning. Training manual. GIZ and BMZ, 2011.

www.oecd.org/dac/environment-development/45856020.pdf

A practice-oriented training based on an Organisation for Economic Co-operation and Development Policy Guidance, providing examples and case studies related to agriculture and climate change adaptation. Contains training material for making vulnerability assessments.

PROVIA guidance on assessing vulnerability, impacts and adaptation to climate change. Consultation document. UNDP, 2013.

www.adaptation-undp.org/resources/training-tools/provia-guidance-assessing-vulnerability-impacts-and-adaptation-climate

The Global Programme of Research on Climate Change Vulnerability, Impacts and Adaptation (PROVIA) has produced guidance on selecting methods for vulnerability, impact, and adaptation assessment. The guidance includes information on methods and tools for stakeholder participation and engagement in climate adaptation.

Climate change information for effective adaptation: A practitioner's manual. GIZ, 2009.

https://gc21.giz.de/ibt/var/app/wp342deP/1443/wp-content/uploads/filebase/climateinformation/ci-guides-manuals-reports/Climate_Change_Information_for_Effective_Adaptation.pdf

This manual addresses non-climate science experts and is intended to be helpful for practical work on adaptation. It describes the concrete steps of how to obtain climate change information, how to interpret it adequately, and how to communicate the resulting knowledge in a careful and responsible way.

How to do climate change risk assessments in value chain projects. IFAD, 2015.

www.ifad.org/documents/10180/30b467a1-d00d-49af-b36b-be2b075c85d2

This document provides step-by-step guidance for building climate risk analysis into the value chain project cycle.

Climate change data and risk assessment methodologies for the Caribbean. Technical note. IDB, 2016.

<https://publications.iadb.org/bitstream/handle/11319/6453/Climate%20Change%20Data%20and%20Risk%20Assessment%20Methodologies%20for%20the%20Caribbean.pdf>

This report provides technical guidance on risk assessment methods and tools in the Caribbean context. It

provides a listing of existing tools and data that can be used for climate risk assessment in the Caribbean, with some internationally applicable references.

Caribbean Climate Online Risk and Adaptation Tool (CCORAL). CCCCC, last updated 2014.

<http://ccoral.caribbeanclimate.bz>

CCORAL is an online support system for climate-resilient decision-making for planning, programmes, and projects. It helps users undertake quick screening of their activities, understand any climate influences, and apply climate risk management processes with tools in the CCORAL toolbox.

AR5 climate change 2014: Impacts, adaptation, and vulnerability. IPCC, 2014.

www.ipcc.ch/report/ar5/wg2

The IPCC's Fifth Assessment Report provides an overview of the global and regional climate change impacts and adaptation options. The chapter on freshwater resources is of particular relevance to this NAP Water Supplement.

Climate vulnerability assessment: An annex to the USAID climate-resilient development framework.

Technical report. USAID, 2016.

www.climatelinks.org/resources/climate-vulnerability-assessment-annex-usaid-climate-resilient-development-framework

This report provides a conceptual framework for carrying out vulnerability assessment and provides listings of tools and resources that can be used throughout the vulnerability assessment process.

Climate services for supporting climate change adaptation: Supplement to the Technical Guidelines for the National Adaptation Plan Process. WMO, 2016.

www.wmo.int/gfcs/node/925

This publication introduces climate- and weather-related tools and services available for supporting national-level adaptation planning, including for water management.

HelpDesk for integrated flood management. APFM.

www.floodmanagement.info/ifm-helpdesk

A broad range of tools on integrated flood management available from the WMO and GWP Associated Programme on Flood Management (APFM), with the possibility to seek advice from a network over 30 expert organisations.

HelpDesk for integrated drought management. IDMP.

www.droughtmanagement.info/ask

A broad range of tools on integrated drought management available from the WMO and GWP Integrated Drought Management Programme (IDMP), with the possibility to seek advice from a network over 30 expert organisations.

Applications of integrated drought management. IDMP.

www.droughtmanagement.info/pillars

Provides an overview of applications and measures of integrated drought management, structured into three pillars: drought monitoring and early warning systems; vulnerability and impact assessment; and drought preparedness, mitigation, and response.

Guidelines and tools for integrated drought management. IDMP.

www.droughtmanagement.info/find/guidelines-tools

Guidelines and tools include the *Handbook of drought indicators and indices*, *National drought management policy guidelines*, *Drought monitoring and early warning*, and *Benefits of action and costs of inaction: Drought mitigation and preparedness*.

Guidance Document Selecting Measures and Designing Strategies for Integrated Flood Management.

APFM, 2017.

https://www.floodmanagement.info/publications/guidance%20-%20selecting%20measures%20and%20designing%20strategies_e_web.pdf

This WMO/GWP Associated Programme on Flood Management (APFM) publication outlines the approach and steps to develop and evaluate well-balanced and well-motivated strategies to cope with the risk of

flooding. The design of strategies covers the full range of possible structural and non-structural measures, including structural protection and mitigation measures, planning and building codes, emergency management, raising of risk awareness and preparedness, risk-sharing and the like.

Tools series on flood management. APFM.

www.floodmanagement.info/tools

The Flood Management Tools Series of the WMO/GWP Associated Programme on Flood Management (APFM) is composed of short technical publications intended to give quick guidance on relevant material about specific aspects of flood management to flood management practitioners. The tools cover a broad range of flood-related issues within the framework of an integrated approach to flood management.

Flood management in a changing climate. APFM, 2009.

www.floodmanagement.info/portfolio-item/flood-management-in-a-changing-climate

This tool describes how climate variability and climate change affect the hydro-meteorological parameters that determine the magnitude and frequency of flooding. The tool also provides an outlook of how respective municipal authorities, national flood planners, emergency response authorities, and the public at large can take advantage by putting integrated flood management into practice as part of adaptation strategies.

Integrated flood management as an adaptation tool for climate change: Case studies. APFM, 2011.

www.floodmanagement.info/portfolio-item/ifm-as-an-adaptation-tool-for-climate-change-case-studies

This tool introduces strategies for climate change adaptation in the context of flood management. Nine case studies are extracted from the USA, UK, France, Germany, the Netherlands, Japan, China, South Korea, and the EU.

11.7 Identifying, prioritising, and implementing adaptation actions

Methodology for Effective Decision-making on Impacts and Adaptation (MEDIATION).

www.mediation-project.eu

The European Union MEDIATION project has developed a toolbox for climate change adaptation planning containing a range of highly relevant tools. This includes tools on decision-making for adaptation, which cover both traditional decision-making approaches as well as specialist approaches including robust decision-making and real options analysis.

Climate Adaptation Knowledge Exchange (CAKE).

www.cakex.org

CAKE is the world's largest and most used source of climate adaptation case studies and resources.

Tools, maps, models and data. CCAFS.

www.ccafs.cgiar.org/resources/tools-maps-models-and-data

Resources on climate change, agriculture, and food security.

Beyond downscaling: A bottom-up approach to climate adaptation for water resources management.

AGWA, 2014.

www.alliance4water.org/Beyond

Chapter Four of this publication provides an overview of a range of approaches for identifying and evaluating adaptation strategies for water management. These include no-regret/low-regret, precautionary principle/safety margins, sensitivity analysis, benefit-cost analysis, stochastic optimisation, adaptive management, real options, and robust decision-making. The document also outlines key considerations for adapting water management to an uncertain climate, and outlines tools which can help implement these principles.

The vulnerability sourcebook. GIZ, 2016.

www.adaptationcommunity.net/vulnerability-assessment/vulnerability-sourcebook

This sourcebook, available in English, French, and Spanish, provides step-by-step guidelines to conduct vulnerability assessments and monitor changes in vulnerability over time. Repeated assessments are a tool

for monitoring and evaluating the effectiveness of adaptation. Examples and lessons learned from pilot applications in Burundi, Mozambique, Pakistan, and the Plurinational State of Bolivia are provided.

Economic approaches for assessing climate change adaptation options under uncertainty. GIZ, 2013. www.adaptationcommunity.net/ndc_adaption_toolbox/economic-approaches-assessing-climate-change-adaptation-options-uncertainty

This study looks at approaches for the economic assessment of climate change adaptation options. It provides an overview of experiences and a review of the most common and promising methodological approaches for economic assessments and their uncertainty. Included as further resources are Excel templates for cost-benefit and multi-criteria analyses. The *Cost benefit analysis template IMACC* is designed to compare up to three adaptation options according to their net present value and their internal rate of return.

Guidance on water and adaptation to climate change. UNECE, 2009.

www.unece.org/fileadmin/DAM/env/water/publications/documents/Guidance_water_climate.pdf

The UN Economic Commission for Europe's Convention on the Protection and Use of Transboundary Watercourses and International Lakes has produced a primer on adapting water resources management to climate change. This provides information on the key risks that water resources management faces and approaches to manage these risks.

Assessing the costs and benefits of adaptation options: An overview of approaches. UNFCCC, 2011.

www.unfccc.int/files/adaptation/nairobi_work_programme/knowledge_resources_and_publications/application/pdf/2011_nwp_costs_benefits_adaptation.pdf

This report from the UNFCCC Nairobi Work Programme on Impacts, Vulnerability and Adaptation to Climate Change offers guidance on assessing costs and benefits for adaptation, explaining options for appraisal in the context of climate change adaptation. It also presents case studies on the application of various techniques.

11.8 Knowledge and capacity development

The GWP IWRM ToolBox. GWP.

www.gwp.org/en/ToolBox

The IWRM ToolBox is a free and open database with a library of background papers, policy briefs, technical briefs, and perspective papers as well as huge sections of case studies and references. The ToolBox also contains a wealth of tools for water management which support climate change adaptation, and should be a primary resource for those involved in the NAP process when identifying adaptation options.

Institutional capacity and climate actions. OECD, 2003.

www.oecd.org/env/cc/21018790.pdf

Provides a framework for assessing institutional capacity for climate adaptation.

Capacity Development for Adaptation to Climate Change & GHG Mitigation (C3D+). UNITAR.

www.weadapt.org/knowledge-base/c3d

A project that is coordinated by the United Nations Institute for Training and Research with financial support provided by the European Commission and the Austrian Development Agency. The website provides access to tools and a forum for building capacity in climate change adaptation and mitigation.

11.9 Accessing finance

Financing National Adaptation Plan (NAP) processes: Contributing to the achievement of nationally determined contribution (NDC) adaptation goals. Guidance note. IISD, 2017.

www.iisd.org/reader/napgn-en-2017-financing-nap-processes

This guidance note aims to assist countries with the development of strategies for securing funding for the entire NAP process – from its initiation to the implementation, monitoring, and evaluation of prioritised adaptation actions. It describes the NAP process from a financing perspective; presents the range of potential sources of finance and identifies which sources may be appropriate for different phases of the

NAP process; and suggests practical steps that countries might take throughout the NAP process to increase their likelihood of securing finance from the NAP process.

Climate Funds Update. ODI.

www.climatefundsupdate.org

Climate Funds Update is a website that provides information on the growing number of dedicated multilateral climate finance initiatives designed to help developing countries address the challenges of climate change. Through independent research, ODI collects and analyses current details on key climate funds detailing: what the funds support and their governance structures; who is pledging and depositing to these funds; where the finance is being spent and on what. It also presents analysis on key trends and introductory briefings to important issues for international public climate finance.

Climate insurance and water-related disaster risk management – Unlikely partners in promoting development? Perspectives paper. GWP, 2018.

www.gwp.org/globalassets/global/toolbox/publications/perspective-papers/11_climate_insurance_perspectives_paper.pdf

This perspectives paper contributes to emerging discussions around the role of insurance and other risk transfer and sharing mechanisms in encouraging adaptation programmes and policies that would serve to minimise future loss and damage, and hence, contribute to sustainable development.

Financing climate change adaptation in transboundary basins: Preparing bankable projects. Working paper. World Bank, 2019.

www.openknowledge.worldbank.org/handle/10986/31224

This report is a guide for those working on climate change adaptation in transboundary river basins who seek to understand and advance the financing of transboundary water and climate initiatives. It highlights the challenges and opportunities countries and river basin organisations face in accessing financial resources for climate adaptation in transboundary river basins. Recognising that understanding of special risks and complexities of transboundary river basin projects is critical for project proposals that will attract public and private financing partners, the report outlines basic characteristics and criteria for the preparation of bankable transboundary project proposals.

11.10 Monitoring and evaluation

Monitoring & evaluation for climate change adaptation: A synthesis of tools, frameworks and approaches. SEA Change CoP and UKCIP, 2013.

www.ukcip.org.uk/wp-content/PDFs/SEA-change-UKCIP-MandE-review.pdf

This report presents a comprehensive summary of existing frameworks and practical guidance for monitoring and evaluation of climate change adaptation relevant to international development.

Measuring effective and adequate adaptation. Issue paper. IIED, 2016.

<https://pubs.iied.org/10171IIED>

This issue paper defines the components of effective and adequate adaptation and recommends a way of reviewing progress. It is based on the idea that methods and tools to assess the effectiveness and adequacy of adaptation also need to support learning and improvement in the adaptation activities, and to be flexible enough to capture local contexts and allow aggregate assessments at different scales over time.

National-level adaptation M&E support tools. GIZ, 2016.

www.adaptationcommunity.net/monitoring-evaluation/national-level-adaptation

Monitoring and evaluation needs to ensure that investment in adaptation to climate change actually contributes to climate-resilient sustainable development. This page provides GIZ support tools available for the monitoring and evaluation of adaptation to climate change at the national level.

Developing national adaptation monitoring and evaluation systems: A guidebook. GIZ and IISD, 2015.

www.adaptationcommunity.net/ndc_adaption_toolbox/developing-national-adaptation-monitoring-evaluation-systems-guidebook

This guidebook builds on publications, tools, and examples, especially from countries that have recently or

are currently developing national adaptation monitoring and evaluation systems. It directs readers to relevant sections of the UNFCCC NAP Technical Guidelines, as well as to monitoring and evaluation tools that have been specifically designed for monitoring the process to formulate and implement NAPs. The agriculture sectors and other sectors that are dependent on natural resources are covered through country case studies from Kenya and Morocco.

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Annex 1: Mapping of the information in the NAP Water Supplement to the elements and activities in the UNFCCC NAP Technical Guidelines

NAP Water Supplement content		UNFCCC NAP Technical Guidelines element and activity reference
1.	Introduction	
2.	The case for integrating water in the NAP and in development processes	
2.1	The critical role of water security in building climate resilience	
	<i>Making a case for water security and climate-resilient development</i>	A.1.a, A.1.c
	<i>Vision and mandate for integrating water in the NAP process</i>	A.1.c
	<i>Entry points for water in the NAP process</i>	A.1.b, A.1.c
	<i>Water security as a cross-sector issue</i>	C.4.a
3.	Stakeholder and public involvement	
3.1	Engaging effectively in the NAP process	
	<i>Considering water in planning stakeholder and public engagement</i>	A.1.b, A.3.c
	<i>Briefing stakeholders and the public on the NAP process</i>	A.1.a
	<i>Using effective engagement to define a strategy for integrating water in the NAP process</i>	A.1.e
	<i>Raising awareness of integrating adaptation in development planning</i>	A.3.b
	<i>Disseminating climate change and adaptation information</i>	B.1.c, B.4.b, B.4.c, D.4.a, D.4.b
	<i>National and international knowledge sharing</i>	C.3.c
4.	Adaptation and sustainable development	
4.1	The SDGs	
4.2	Integrating adaptation in sustainable development	
	<i>What are the main water-related development objectives?</i>	A.4.a
	<i>Integrating water-related adaptation in development</i>	A.4.b, B.5.a, B.5.c
5.	Gender, water, and climate resilience	
5.1	Strengthening gender considerations	
	<i>Gender in water-related adaptation</i>	All activities
6.	Climate risk and vulnerability assessment	
6.1	Establishing a climate baseline	
	<i>Analysing the current climate</i>	A.2.b, B.1.a
6.2	Assessing future impacts and vulnerabilities	
	<i>Analysing climate projections</i>	A.2.b, B.1.b
	<i>Assessing vulnerabilities, risks, and impacts</i>	B.2.a
6.3	Ranking climate change risks and vulnerabilities	
	<i>Ranking risks and vulnerabilities</i>	B.2.b

7.	Identifying, prioritising, and implementing adaptation actions	
7.1	Identifying adaptation options	
	<i>Building on existing adaptation activities</i>	A.2.a, C.1.b
	<i>Identifying adaptation options</i>	B.2.c
7.2	Ranking and prioritising adaptation options	
	<i>Appraising adaptation options</i>	B.3.a, B.3.b, C.1.a
7.3	Transboundary and regional cooperation	
	<i>Promoting transboundary and regional synergies</i>	C.4.b, C.4.c
7.4	Building a balanced portfolio of measures	
	<i>Integrating adaptation options in the NAP</i>	B.4.a
	<i>Developing a strategy for implementing the NAP</i>	C.2.a, C.2.b
8.	Knowledge and capacity development	
8.1	Enhancing capacity for adaptation planning	
	<i>Capacity for the integration of water in the NAP process</i>	A.1.d, B.5.b
	<i>Addressing gaps in capacity and information</i>	A.2.c, A.3.a
	<i>Training on integrating water in the NAP process</i>	C.3.b
8.2	Strengthening capacity for implementation	
	<i>Strengthening the enabling environment</i>	A.2.d
	<i>Strengthening institutional and regulatory frameworks</i>	C.3.a
9.	Accessing finance	
9.1	The NAP process from a financing perspective	
	<i>Estimating financing needs for the NAP process</i>	A.1.d, B.3.a, C.1.a
	<i>Identifying potential sources of finance for the NAP process</i>	A.1.d, C.2.a, C.2.b
9.2	Financing water-related planning and projects in the NAP process	
	<i>Financing water and climate initiatives: the track record</i>	A.1.d, C.2.a, C.2.b
	<i>Accessing finance for water-related adaptation planning and projects</i>	C.2.a, C.2.b
10.	Monitoring and evaluation	
10.1	Defining monitoring metrics and indicators	
	<i>Developing a monitoring and evaluation plan</i>	A.1.b, A.1.e, D.1.a
	<i>Metrics for measuring effectiveness</i>	D.1.b, D.1.c
10.2	Progress reviews, learning lessons, and updating plans	
	<i>Reviewing activities that integrate water in the NAP process</i>	D.2.b
	<i>Continual review of emerging science</i>	D.2.a
	<i>Updating the NAP</i>	D.3.a, D.3.b
11.	Tools and resources	

Annex 2: UNFCCC NAP Technical Guidelines

National Adaptation Plans

Table of steps, building blocks and sample outputs under each of the four elements of the NAP process

Steps	Checklist of building blocks	Sample NAP outputs
 Element A. Lay the groundwork and address gaps		
1. Initiating and launching of the NAP process	a) Briefing on NAP process-adaptation challenges & opportunities b) Coordinating mechanism c) National vision and mandate for NAPs d) Access to technical and financial support e) NAP framework/strategy and road map	<ul style="list-style-type: none"> • Mandate for the NAP process • Framework and strategy for climate change adaptation • Funded project to support operations of the NAP process • Road map for the NAP process
2. Stocktaking: identifying available information on climate change impacts, vulnerability and adaptation and assessing gaps and needs of the enabling environment for the NAP process	a) Stocktaking of adaptation activities b) Synthesis of available knowledge on impacts, c) vulnerability and adaptation d) Capacity gap analysis e) Barriers analysis	<ul style="list-style-type: none"> • Report on synthesis of available information • Geospatial database in support of the NAP process • Knowledge-base of observed climate impacts, vulnerabilities and potential interventions • Gap and needs analysis report • Barrier analysis report
3. Addressing capacity gaps and weaknesses in undertaking the NAP process	a) Building institutional and technical capacity b) Opportunities for integrating adaptation into development c) Programmes on climate change communication, public awareness-raising and education	<ul style="list-style-type: none"> • Strategy document(s) for capacity-building, awareness-raising, communication and education • NAP website
4. Comprehensively and iteratively assessing development needs and climate vulnerabilities	a) Compile development objectives, policies, plans and programmes b) Synergy between development and adaptation objectives, policies, plans and programmes	<ul style="list-style-type: none"> • Report on stocktaking of development/adaptation activities • Report on approaches for ensuring synergy between development and adaptation



Element B. Preparatory elements

1. Analysing current climate and future climate change scenarios	a) Analysis of current climate b) Future climate risks and uncertainty/Scenario analysis c) Communicating projected climate change information	<ul style="list-style-type: none"> • Report on climate analysis • Report on climate risks/Projected climate changes • Strategy for climate information services
2. Assessing climate vulnerabilities and identifying adaptation options at sector, subnational, national and other appropriate levels	a) Climate vulnerability assessment at multiple levels b) Ranking climate change risks and vulnerabilities c) Scoping adaptation options	<ul style="list-style-type: none"> • Vulnerability and adaptation assessment report
3. Reviewing and appraising adaptation options	a) Appraisal of adaptation options	<ul style="list-style-type: none"> • Report on appraisal of adaptation options • Sectoral and subnational plans or strategies
4. Compiling and communicating national adaptation plans	a) Draft national adaptation plans b) Finalize NAPs and process endorsement c) Communicate NAPs at national level	<ul style="list-style-type: none"> • Draft NAPs for review • Endorsed NAPs
5. Integrating climate change adaptation into national and subnational development and sectoral planning	a) Opportunities and constraints for integrating climate change into planning b) Building capacity for integration c) Integration of adaptation into existing planning processes	<ul style="list-style-type: none"> • Report on integration of adaptation into development



Element C. Implementation strategies

1. Prioritizing climate change adaptation in national planning	a) National criteria for prioritizing implementation b) Identify opportunities for building on existing adaptation activities	<ul style="list-style-type: none"> • Report on prioritization of adaptation in national development
2. Developing a (long-term) national adaptation implementation strategy	a) Strategy for adaptation implementation b) Implementation of NAPs through policies, projects and programmes	<ul style="list-style-type: none"> • Implementation strategy for the NAPs
3. Enhancing capacity for planning and implementing	a) Strengthening long-term institutional and regulatory frameworks	<ul style="list-style-type: none"> • National training and outreach programme(s)

adaptation	<ul style="list-style-type: none"> b) Training at sectoral and subnational levels c) Outreach on outputs nationally & promotion of international cooperation 	
4. Promoting coordination and synergy at the regional level and with other multilateral environmental agreements	<ul style="list-style-type: none"> a) Coordination of adaptation planning across sectors b) Synergy at the regional level c) Synergy with multilateral environmental agreements (MEAs) 	<ul style="list-style-type: none"> • Report on regional synergy • Report on synergy with MEAs



Element D. Reporting, monitoring and review

1. Monitoring the NAP process	<ul style="list-style-type: none"> a) Identify (few) areas of the NAP process to monitor progress, effectiveness and gaps (PEG) b) Define metrics for documenting PEG c) Collect information throughout the NAP process to apply the metrics developed 	<ul style="list-style-type: none"> • Metrics report/Monitoring Plan • Database of metrics
2. Reviewing the NAP process to assess progress, effectiveness and gaps	<ul style="list-style-type: none"> a) Synthesis of new assessments & emerging science and the results and outcomes from implemented adaptation activities b) Evaluate metrics collected to assess progress, effectiveness and gaps of the NAP process 	<ul style="list-style-type: none"> • Evaluation report
3. Iteratively updating the national adaptation plans	<ul style="list-style-type: none"> a) Repeat some steps and update NAPs and related documentation b) Production of updates to the NAP outputs aligned with relevant national development plans 	<ul style="list-style-type: none"> • Updated NAPs
4. Outreach on the NAP process and reporting on progress and effectiveness	<ul style="list-style-type: none"> a) Disseminate the NAPs and related outputs to the UNFCCC secretariat and others b) Provide information in national communications on progress in and effectiveness of the NAP process 	<ul style="list-style-type: none"> • Progress report and information in national communications

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