ONLINE COMPENDIUM

Formulating, Implementing and Financing a Successful NAP process

NAP-GSP
NATIONAL ADAPTATION PLAN GLOBAL SUPPORT PROGRAMME

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United Nations Institute for Training and Research

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Acronyms

AF	Adaptation Fund
ASAP	Adaptation for Smallholder Agriculture Program
BTR	Biennial Transparency Report
CFU	Climate Funds Update
DAC	Development Assistance Committee
ETF	Enhanced Transparency Framework
ETS	Emissions Trading System
GCB	Green Climate Bonds
GCF	Green Climate Fund
GEF	Global Environmental Facility
GHG	Greenhouse Gas
GIZ	Deutsche Gesellschaft für Internationale Zusammenarbeit GmbH
GSP	Global Support Programme
IPCC	Intergovernmental Panel on Climate Change
LDC	Least Developed Country
LDCF	Least Developed Countries Fund
LDCs	Least Developed Countries
LEG	Least Developed Countries Expert Group
MERL	Monitoring, Evaluation, Reporting, and Learning
MTEF	Medium-term expenditure framework
NAP	National Adaptation Plan
NDC	Nationally Determined Contributions

NAPA	National Adaptation Programme of Action
NGO	Non-Governmental Organization
NIR	National Inventory Report
NMHS	National Meteorological and Hydrological Services
ODI	Overseas Development Institute
OECD	Organisation for Economic Co-operation and Development
PBCRG	Performance-based Climate Resilience Grants
PMR	Partnership for Market Readiness
PPCR	Pilot Program for Climate Resilience
PPP	Public-Private Partnership
RBF	Results-Based Financing
SCCF	Special Climate Change Fund
SIDS	Small Island Developing States
TCFD	Task Force on Climate-related Financial Disclosures
UNDP	United Nations Development Programme
UNEP	United Nations Environment Programme
UNEP-FI	United Nations Environment Programme Finance Initiative
UNFCCC	United Nations Framework Convention on Climate Change
WHO	World Health Organization

ABOUT THE NATIONAL ADAPTATION PLAN GLOBAL SUPPORT PROGRAMME (NAP-GSP)

The adverse impacts of climate change are becoming increasingly more acute, particularly for non-LDCs and other developing countries.[1] This further exacerbates the wellbeing of the poorest and most vulnerable, meaning adaptation is now crucial to their survival and protection. Between 2016 and 2019, the National Adaptation Plan Global Support Programme (NAP-GSP) assisted non-LDC developing country governments to identify technical, institutional, and financial needs to integrate climate change adaptation into national development planning.

The Programme was financed by the Global Environment Facility (GEF), Least Developed Countries Fund (LDCF), and the Special Climate Change Fund (SCCF), and was jointly implemented by the United Nations Development Programme (UNDP) and the United Nations Environment Programme (UNEP). To date, it remains one of the thought leaders in the field of adaptation mainstreaming and significantly participated in discussions at global and regional levels, in close partnership with the United Nations Framework Convention on Climate Change (UNFCCC) Secretariat, UN agencies such as the Food and Agriculture Organization of the United Nations (FAO) and the United Nations Institute for Training and Research (UNITAR), and other organizations.

Over the years, the NAP-GSP supported 47 non-LDCs to advance their NAP processes through stocktaking exercises, stakeholders' consultations

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[1] The term "country" is used to indicate Parties to the UNFCCC and does not imply the expression of any opinion on the part of UNEP concerning the legal status of any region, country, territory, city or area or of its authorities, or concerning the delimitation of frontiers or boundaries.

ABOUT THIS ONLINE COMPENDIUM

and dialogues, capacity assessments, roadmaps, and mobilization of climate finance for adaptation planning. Regional training workshops improved the capacities of and fostered knowledge exchange between 380 practitioners from 96 non-LDC developing countries. It enhanced the exchange of essential experiences globally to ensure the perpetuation of good practices relevant to medium- and long-term planning and budgeting processes.

The NAP-GSP substantially contributed to the growing momentum of climate change adaptation actions providing the opportunity for non-LDCs representatives to participate at key international events. It further supported countries to increase their capacity for accessing and mobilizing adaptation finance – both domestically and internationally. This substantially strengthened their adaptation planning capacities for increased resilience to climate change.

This publication consolidates and presents the knowledge that the NAP-GSP accumulated over the past years. The compendium is partitioned into the two broad phases of the NAP cycle: preparation and formulation and implementation and monitoring.

These phases are complemented by a chapter covering the financial requirements, sources, and utilization for a continuously effective and successful NAP process. Each chapter is informed by case studies, examples, links to external sources, and interactive reflection points.

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PHASE 1
NAP PREPARATION & FORMULATION

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PHASE 1: NAP PREPARATION & FORMULATION

The first chapter of this compendium will build the foundation or refresh understanding of the NAP process: why it is important for countries to adapt and why they should be invested in developing a sound NAP. It will give a tour through the NAP process and its elements, how it is embedded in and connected with other important development and climate action strategies at national, district, or provincial level, and provide guiding case studies from countries engaged in the NAP process and supported by the NAP-GSP.

1. SETTING THE BASELINE

1.1. THE SCIENCE AND POLICY BEHIND CLIMATE ACTION

Today we have ample scientific evidence about the threats of climate change, yet this has not always been the case. As the knowledge base has built up over years, we have missed multiple opportunities to act and reverse the trend. The climate science of today is complex, interdisciplinary, and not always easy to grasp. The good thing is that basic facts about climate change easily fit into a 5-point framework.[2]

1. IT'S HAPPENING	2. IT'S US	3. WE ARE SURE	4. IT'S BAD	5. WE CAN FIX IT
Days are becoming hotter, winters shorter, extreme events are more severe, frequent, and uncertain. And sea level is rising. We are shifting from a stable climate into a volatile future[3].	Climate has been changing before but never so fast and on such a scale. Burning fossil fuels, land-use change, and other human activities are key drivers of climate change [4].	Science is certain and public leaders call to action[5]. And yet, climate denialism is on the rise supported by the fossil fuel lobby and those who don't want to lose their status quo benefits[6].	Climate change can make this planet much less inhabitable within a century or less. For many vulnerable groups, it is already a question of survival, while others are forced to migrate[7].	The most common strategies to address climate change are mitigation, adaptation and loss and damage. There are experimental options like geoengineering, but they come with complex risks[8].
Global mean temperature for 2020 (January to October) was 1.2°C above preindustrial levels (1850–1900)[9].	In the last 30 years, we have emitted more GHG emissions than from 1751 until 1990[10].	97% of scientists agree that climate change is primarily human-induced[11].	By 2100 temperature may rise above 3°C based on current trends[12].	Humanity can go carbon-neutral by 2050[13] but the chances are rapidly shrinking.

Based on recognizing the need to address the growing human impact on the climate, the international community joined forces under the United Nations Framework Convention on Climate Change (UNFCCC), ratified by 197 countries in 1994. Following thousands of meetings, interim documents, and failed commitments, a new deal, the Paris Agreement was signed in 2015, uniting 191 states (as of 2021) in a common effort to keep global temperature rise below 1.5°C by the end of the century as compared to pre-industrial levels[14].

Until recently, mitigation has remained our best bet in preserving a livable climate. However, as of today, even if we achieve the ambition of the Paris agreement, such an increase will still pose a great threat to many species, ecosystems, and human settlements[15].

As of 2020, the probability of warming by at least 2°C based on the current trajectory stood at 97%[16] and throughout this century we will have to deal with a degree of change that has previously occurred over thousands of years[17].

During 2020 alone, over 50 million people across the globe have suffered from floods, droughts, or storms, while wildfires had severe impacts in Australia, Brazil, Russia, and the United States[18]. This means that while greenhouse gas (GHG) emissions should drop drastically, we are falling way behind and therefore should rapidly learn how to adapt, including to the already vivid and emerging impacts of climate change that are outcomes of GHG emissions throughout the previous decades.

Taking those risks into consideration, the Paris Agreement emphasizes the need for both climate change mitigation and adaptation. Article 7 of the agreement outlines necessary climate adaptation activities, specifically highlighting the need for action at the national level.

"Investing in climate adaptation is the best response to our triple health, economic, and climate crises. Successful adaptation will be instrumental in creating a more sustainable, biodiverse, healthier, and fairer world, in which we all live within the limits of the resources of the planet."

To date, a common vocabulary of have been shaped within the international community, with key terms presented below.

Think about what makes those terms similar and different and then try to match each of them with a definition, without looking at them.

CONCEPT	DEFINITION[20,21]
ADAPTATION	Changes in response to immediate or future climate change to avoid harm or harness benefits
ADAPTIVE CAPACITY	The ability to adjust to climate change, moderate damage, and benefit from, or cope with, the consequences
EXPOSURE	"The presence of people, livelihoods, environmental services and resources, infrastructure, or economic, social, or cultural assets in places that could be adversely affected"
HAZARD	"The potential occurrence of a natural or human-induced physical event that may cause loss of life, injury, or other health impacts, as well as damage and loss to property, infrastructure, livelihoods, service provision, and environmental resources".

MALADAPTATION	Changes that inadvertently increase vulnerability to climatic change
MITIGATION	Reducing GHG emissions or enhancing their sinks
RESILIENCE	The ability to deal with hazards quickly and efficiently by modifying basic structures and functions
VULNERABILITY	The degree to which a system is susceptible to, or unable to cope with adverse effects of climate change

Adaptation means learning to live in a world that has changed and keeps constantly changing. It can take many shapes and forms, depending on the unique context of a community, organization, country, or region. For example, adaptation can be[22]:

PROACTIVE	Before the impact occurs
AUTONOMOUS	Changing along with the climate, often unconscious
PLANNED	A result of a deliberate policy decision
REACTIVE	After the impacts have been observed
PRIVATE	By individuals, households, or private companies
PUBLIC	By governments at all levels, usually targeting collective needs

There is no 'one-size-fits-all-solution' to adaptation and approaches may include technical solutions like building flood defenses or setting up early warning systems, as well as nature-based solutions such as switching to drought-resistant crops, which build upon natural processes and capacities of ecosystems to address climate change.

Ecosystem-based adaptation is one of the most effective pro-poor approaches to climate change adaptation by way of enhancing the adaptive capacity of the most vulnerable communities – especially women, the elderly,

"Ecosystem-based adaptation provides multiple benefits in terms of poverty alleviation through livelihood opportunities, carbon storage and biodiversity conservation[23]."

and children – as well as the resilience of ecosystems and their services (fresh water, food security, climate regulation, etc.) through restoration of natural capital and biodiversity conservation, restoration and/or regeneration measures. Other solutions involve redesigning communication systems, business operations, and government policies. Climate change adaptation takes place across various regions, sectors, ecosystems, and levels, and thus requires a coherent system that unites all elements and keeps evolving.

Mainstreaming and integrating adaptation into regional, national, sub-national, sectoral, and local development policies, processes, and budgets at all levels and stages, should form the basis of national adaptation planning.

Many nations and communities are already working to strengthen climate resilience, but considerably greater action and ambition will be needed to cost-effectively manage the risks, both now and in the future.

1.2. THE COST OF CLIMATE CHANGE, THE BENEFITS OF ACTION, AND THE COST OF INACTION

Climate change comes with its costs and benefits, spread across space and time. Today we know that the lack of action on climate change, insufficient adaptation, and maladaptation can lead to significant economic losses, while on the contrary, timely action could generate tangible benefits.

According to one estimate, the net present value of not addressing climate change could amount to US$54 trillion by 2040 under 1.5°C temperature rise and US$69 trillion under 2°C rise[24]. Meanwhile, transitioning to a low-carbon, sustainable development path could deliver a direct economic gain of US$26 trillion

Photograph © Des Byrne, Climate Change!

through to 2030 compared to business-as-usual, while providing 65 million low-carbon jobs[25].

The Global Center on Adaptation estimates that US$1.8 trillion investment in early warning systems, resilient water, infrastructure, and agriculture, as well as mangrove protection can create US$7.1 trillion of avoided costs, paired with non-monetary social and environmental benefits[26].

There are many similar estimates with different numbers and the outcomes will often depend on the methodology used, the time horizon, the discount rate applied, or the types of impacts considered. They are not always the most reliable source for decision-making, but they provide useful insights on the magnitude of risks and opportunities. And while impacts of climate change span far beyond the economic realm and are not always easily countable, it remains important to continuously evolve our understanding of both monetary and non-monetary dimensions of climate change, while ensuring adequate finance to support effective adaptation planning.

Adaptation finance is critical to enhance adaptation planning and implementation and limit climate damages, particularly in developing countries. Chapter 3 will provide you with deeper insights into adaptation finance, including frameworks, actors, or sources, for example.

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2. ESSENTIAL ELEMENTS OF THE NAP PROCESS

This chapter will now look at the origin and evolution of the NAP process, its purpose and objectives, target groups, links to NAPAs and NDCs, and examples of the NAP process in other countries.

2.1. WHY SHOULD YOUR COUNTRY INVEST IN THE NAP PROCESS?

Climate change adaptation is now common in policy formulation and planning across the world, but levels of engagement and the quality of instruments are vastly different from country to country. The National Adaptation Plan (NAP) process, established in 2010 under the Cancun Adaptation Framework, plays a central role in helping countries to approach climate change adaptation strategically, coherently, and consistently, while also being an important driving force behind global climate action.The Paris Agreement underscores the importance of national-level adaptation planning processes by committing all countries to report on progress made[27].

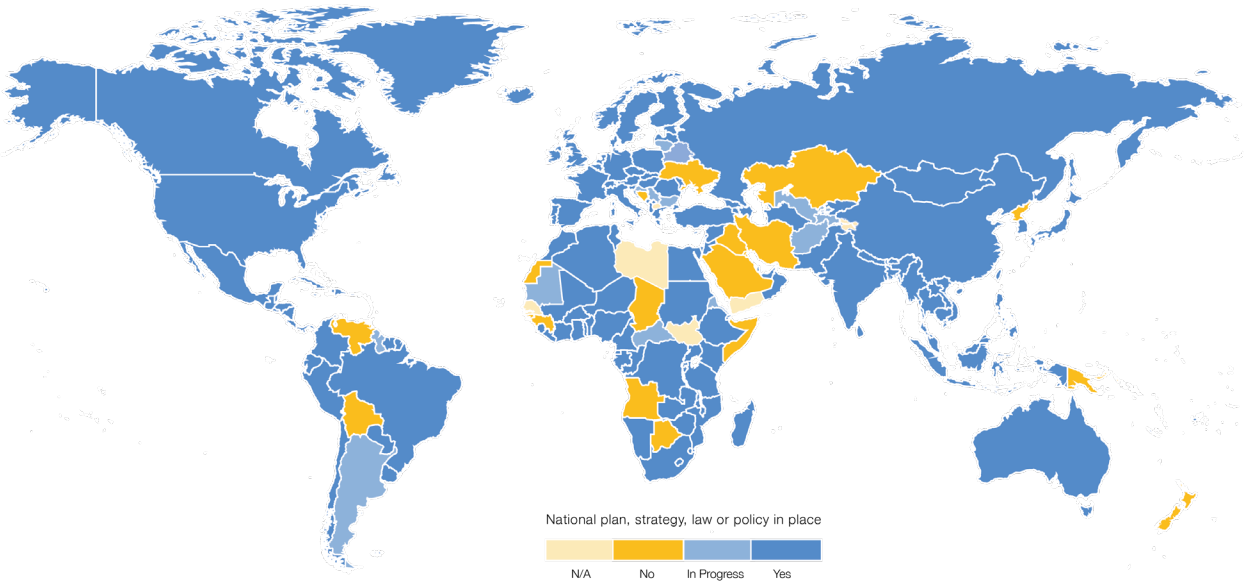

Figure 1 Adaptation planning worldwide[30]

"Each party shall, as appropriate, engage in adaptation planning processes and the implementation of actions, including the development or enhancement of relevant plans, policies and/or ontributions[28]."

To date, 72% of its 190 signatories have adopted at least one national-level adaptation instrument (a plan, strategy, policy, or law), while a small fraction does not currently have such an instrument in place or are in the process of developing one. Most developing countries have started formulating NAPs as a key mechanism, yet they can be at very different stages of this process[29].

The NAP process provides a basis for identifying and prioritizing adaptation options, implementing them, and tracking progress and results. It allows establishing the systems and capacities that integrate adaptation into a country's strategic development while ensuring it is an ongoing practice rather than an ad hoc exercise. Key reasons why countries should engage in the NAP process include[31]:

1 Improve decision-making and choose a resilient path

By integrating climate adaptation into development plans and budgets, decision-makers can direct investments into resilient solutions. This helps to adjust national development pathways, lower vulnerabilities, avoid stranded assets, and harness climate benefits.

2 Access finance

An ongoing NAP process increases the scope of available finance opportunities and the likelihood of having different types of climate initiatives and projects funded, as it serves as an extra assurance that financial flows can be effectively managed.

3 Live up to the commitments

Most countries have included adaptation commitments in their Nationally Determined Contributions (NDCs). They can also use their NAP process to develop their adaptation communication or prepare the adaptation section of their biennial transparency report.

4 Move forward on the UN Sustainable Development Goals

Effective climate action can provide multiple co-benefits such as overcoming water scarcity, providing decent jobs, creating a sustainable food system, among others. The process can also help to better operationalize SDGs on the national level.

5 Safeguard against disaster risks

The NAP process can help countries better manage disaster risks in line with the Sendai Framework for Disaster Risk Reduction.

Based on the current trends, progress in national adaptation planning is expected to continue, not least because of rising climate awareness; however, tracking adaptation progress remains challenging[32].

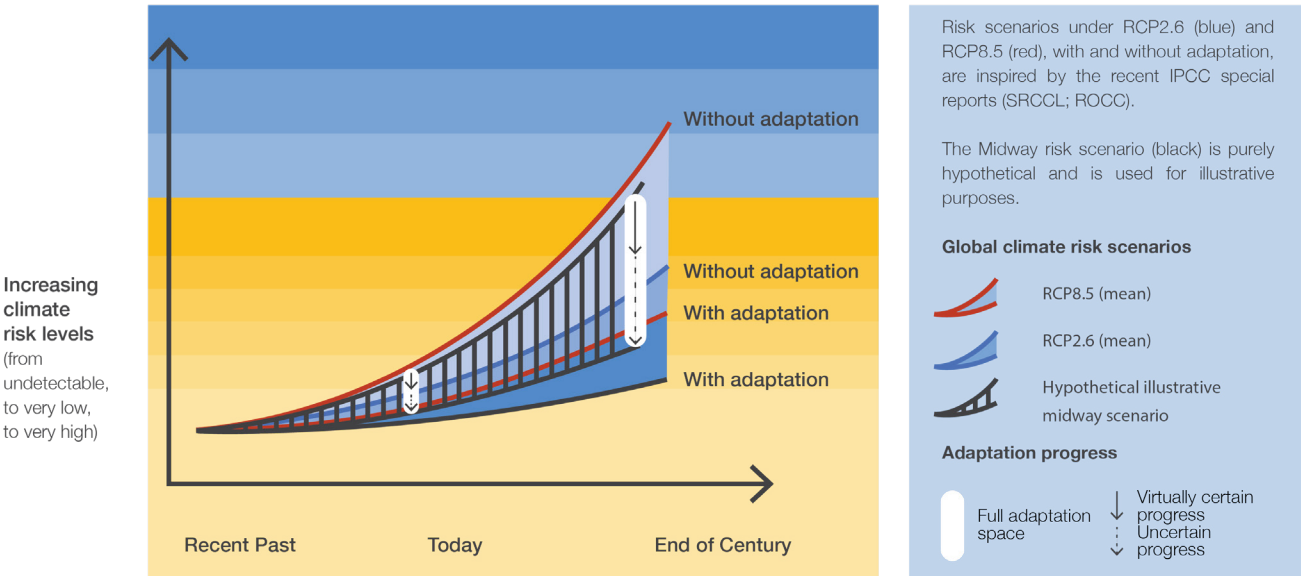

Figure 2 Progress in national-level adaptation against different climate risk scenarios[33]

Beyond the state action, successful adaptation will requires involving multiple stakeholders such as national, regional, multilateral, and international organizations, the public and private sectors, and civil society.

2.2. PURPOSE AND OBJECTIVES OF THE NAP PROCESS

The NAP process has been established as one way to facilitate effective adaptation planning in LDCs and non-LDCs developing countries. This process aims to increase the resilience of people, places, ecosystems, and economies to the climate change impacts. It also seeks to make adaptation a part of the standard development practice in each country that will consider the climate change adaptation needs and embed them in official development plans, with sufficient resources devoted to adaptation. The objectives of the NAP process are:

- to reduce vulnerability to the climate change impacts by building adaptive capacity and resilience; and
- to facilitate the integration of climate change adaptation in relevant policies, programmes, and activities (e.g., development planning processes and strategies) within relevant sectors and at different levels[34].

The purpose of addressing adaptation through the NAP process is to enable the planning, prioritization and implementation of different strategies, policies, projects, and programmes for reducing vulnerability to climate change, building capacity for adaptation, and integrating adaptation into development.

This involves investments to increase capacity in priority areas for the country, or investments for certain sectors or locations. The investments should strengthen institutional, human, social, and systemic planning capacities[35]. Note that the NAPs are not a one-off investment, as the NAP process should be continuous, progressive, and iterative. It requires building a strong evidence base, improving skills and capacity, and adopting learning by doing[36].

Enhanced action on climate adaptation outlined in a NAP should be based on the following guiding principles:

- Undertaken in accordance with the Convention.
- Follows a country-driven, gender-sensitive, participatory, and transparent approach that takes into consideration vulnerable groups, communities, and ecosystems.
- Based on and guided by the best available science and traditional and indigenous knowledge, where appropriate, with the aim to integrate adaptation in relevant social, economic, and environmental policies and actions.
- Not be prescriptive or result in the duplication of undertaken efforts in a country yet facilitates country-owned and country-driven action.

2.3. ORIGIN AND EVOLUTION OF THE NAP PROCESS

2.3.1. ORIGIN OF THE NAP PROCESS

The NAP process was formally established within the Cancun Adaptation Framework in 2010, which was the result of the 16th Conference of the Parties to the UNFCCC. It was established to help countries integrate adaptation in their development decisions to ensure that it is not treated as a separate environmental issue. The NAP process has also been established to ensure that countries view adaptation in the medium and longer terms, which is a shift from the project-based adaptation interventions focused on short-term needs to more strategic and programmatic approaches to adaptation. Many countries have worked to identify adaptation needs and integrate them into their pre-2010 decision-making processes. The NAP process builds on previous work and seeks to scale up adaptation[37].

In simple terms, the NAP process is a strategic process that enables countries to identify and address their medium- and long-term priorities for climate change adaptation. Led by national governments, the NAP process includes an analysis of current climate variability and future climate change and an assessment of vulnerability to its impacts. This provides a basis for identifying and prioritizing adaptation options, their implementation, and tracking progress and results. The NAP process puts in place the systems and capacities needed to make adaptation an integral part of a country's development planning, decision making and budgeting, while ensuring that it is ongoing practice rather than a separate exercise[38].

[40] Vertical integration is the process of creating intentional and strategic links between national and sub-national adaptation planning, implementation and monitoring & evaluation (M&E). It is not a single step in the NAP process, yet it is an ongoing effort to ensure that local realities are reflected in the NAP, and that the NAP enables adaptation at sub-national levels. Source: Dazé, A., Price-Kelly, H. and Rass, N., 2016. Vertical Integration in National Adaptation Plan (NAP) Processes: Guidance Note. International Institute for Sustainable Development. Winnipeg, Canada. Available online at: www.napglobalnetwork.org

2.3.2. EVOLUTION OF THE NAP PROCESS – A TIMELINE[39]

2010 | NAP Process Established

With the objective of strengthening actions on adaptation to climate change in developing countries, the NAP process was formally established in 2010.

2012 | Technical Guidance Developed

Technical guidelines are released by the Least Developed Countries Expert Group (LEG), which is the UNFCCC body providing support and help to Least Developed Countries (LDCs) in their NAP process. Supplementary guidance is developed for the NAP-related issues such as vertical integration[40], horizontal integration[41], finance, and climate services.

2013 | Capacity Building and Technical Assistance

The first NAP Expo launched the NAP process in LDCs. NAP Expo brings together country representatives, organizations, agencies, and other stakeholders to share their experiences, provide action and support, and identify needs and gaps in the NAP process. The joint UNDP and UN Environment NAP Global Support Programme (NAP-GSP) is launched to assist LDCs and developing countries in national planning and financing.

2014 | NAP Global Network

The NAP Global Network is established at the 14th Conference of the Parties to the UNFCCC in Lima, Peru by representatives of seven developing countries (Brazil, Jamaica, Malawi, Peru, Philippines, South Africa, and Togo,) and four bilateral agencies from developed countries (Germany, Japan, UK, and US). The aim of the NAP Global Network is to provide a global platform for learning and knowledge exchange, technical assistance, and coordination of donors.

2015 | Paris Agreement and the NAP Process

At the 21st Conference of the Parties to the UNFCCC in Paris, France, 195 countries adopted the Paris Agreement as a global agreement to combat climate change and its negative impacts. The Agreement states that *"each party shall, as appropriate, engage in adaptation planning processes and the implementation of actions, including the development or enhancement of relevant plans, policies and/or contributions."* This obliges countries to act, thus positioning the NAP process on the central place in meeting the Paris Agreement goals. At the same meeting, the Green Climate Fund (GCF) is requested to accelerate support for the formulation and implementation of NAPs.

2016 | GCF and the NAP Process

GCF approves financial support for the formulation of NAPs as a response to the request made at the 21st Conference of the Parties to the UNFCCC in Paris. Each of the developing countries can access up to US$ 3 million for "national adaptation planning and other adaptation planning processes" via the Readiness and Preparatory Support Programme.

2021 | Continued NAP Progress and COVID-19

Steady progress, yet slower than desired, is noticed in NAPs among the countries. The UNFCC data from 2019 indicates that 120 developing countries have initiated and are advancing their NAP processes. Countries are undertaking vulnerability assessments, establishing institutions for adaptation planning, identifying, and prioritizing adaptation options, or securing resources for the implement of identified options. 32 countries had secured GCF funding for NAPs, and 22 countries have submitted their NAP to the UNFCCC as of 2021.

41 Horizontal integration is the process of integrating climate change adaptation within all relevant sectors, thus providing and guiding cross-sectoral adaptation.

The COVID-19 pandemic has disrupted NAP processes globally. Through lockdowns, stakeholder consultations could not take place as planned and NAP support teams were prevented from meeting key stakeholders. However, NAP processes continue in all countries by committed country staff, consultants working from home on technical reports, and team discussions and stakeholder consultations increasingly taking place through virtual meetings. NAP teams are fast adapting to the new work arrangements and apply innovative solutions for communications and virtual interaction. Furthermore, the NAP-GSP is strengthening its engagement to support country-driven NAP processes to contribute to country-level COVID-19 response strategies[42].

2.4. LNKS TO NAPAS AND NDCS

The NAP process is not the first attempt by the UNFCCC to facilitate planning of climate change adaptation. In 2001, LDCs were invited to develop their National Adaptation Programmes of Action (NAPAs) that aimed to identify urgent and immediate adaptation needs. As of December 2017, 51 countries had completed and submitted their NAPAs to the secretariat[43].

The key difference between NAPAs and NAPs is that while NAPAs are focused on short-term adaptation needs and priorities, the NAP process is intended to identify and address medium- and long-term adaptation needs. Therefore, NAP processes in LDCs should build on the experiences of their previously developed NAPAs. Apart from NAPAs, numerous countries already developed certain adaptation plans and/or integrating adaptation into decision making before 2010 and the NAP introduction. These approaches included developing national adaptation strategies, sector-based plans or plans at sub-national levels. The ongoing NAP process provides an opportunity to pull these efforts together and build on their achievements in a coordinated approach[44].

The COP, in 2001, also established a Least Developed Countries Fund (LDCF) for funding the preparation and implementation of NAPAs as well as an LDC Expert Group (LEG) to give technical support and advice to the LDCs[45].

Since the NAPAs were designed more than 10 years ago, new scientific achievements from the global scientific community (Regional and Global Climate Models, Coordinated Regional Downscaling Experiment - CORDEX, Coupled Model Intercomparison Project Phase - CMIP) have added to the knowledge about climate change and its impacts, and numerous LDCs have increased their awareness and capacity to plan for medium- and long-term adaptation. The NAP process is designed to offer LDCs the opportunity to make a more considered approach and work towards transformational change in their capacity to address adaptation. While the NAPA process was designed to produce one national adaptation programme of action, the NAP process is designed to create a comprehensive system through which countries will be able to integrate climate change adaptation into national planning, and to produce national adaptation plans on an ongoing basis[46].

Nationally determined contributions (NDC) are developed to communicate a country's contribution to

meeting the goals of the Paris Agreement. The NAP process can help in identifying the NDC adaptation goals and translate them into action. NDCs and NAPs are complementary processes and should be aligned to strengthen climate change adaptation on national level. If countries already included adaptation in their NDC, it should be aligned with the NAP process to avoid duplication and ensure coherent implementation. While the NDC is a country's pledge and may outline adaptation goals (the 'what'), the NAP is a domestic planning process that can define 'how' to implement NDC adaptation goals. The alignment of these two policy processes accordingly has significant implications for national climate change policy governance and coordination. For ambitious climate actions it is still crucial to take a holistic approach by acknowledging the connections between adaptation and mitigation that are supported by the alignment of NDC and NAP processes, and to consider further agendas (e.g., Sustainable Development Goals[47]). By seeking alignment of these policies and using the expertise drawn from the NAP process and linking it with NDCs can accelerate enhanced adaptation action[48].

According to Article 7.9 of the Paris Agreement, all Parties shall engage in adaptation planning processes, as appropriate. Furthermore, they should periodically report an adaptation communication to the UNFCCC secretariat, as part of or alongside other documents such as NAP, NDC and/or national communication[49]. Figure z illustrates possible links between a mutually supportive NAP process and NDC and it includes implications for national climate change policy governance and coordination, national transparency frameworks and adaptation-related reporting to the UNFCCC[50].

Aligning the NAP process with the NDC can accelerate enhanced adaptation action:

1. The NAP process can inform possible future iterations of the NDC adaptation goals as well as 'how' the goals of NDC adaptation are to be implemented.
2. The NDC can serve as an overarching vision and framework for the NAP process.
3. The components of NDC adaptation can raise the profile of the NAP and increase political support for adaptation.
4. Linking the NAP process with the development of future NDCs could identify adaptation-mitigation co-benefits.
5. The NAP process can help align the NDC to broader sustainable development goals and other agendas, such as the Sendai Framework for Disaster Risk Reduction and the Convention on Biological Diversity.
6. Establishing coherent governance structures at the national level by linking NAP processes and NDCs could avoid duplication of efforts and make efficient use of limited resources.
7. Linking the NAP process with NDC implementation facilitates access to finance, technology, and capacity building for adaptation.
8. Aligning the NAP and NDC processes can help streamline countries' transparency frameworks51,52, (Figure 3).

Based on recognizing the need to address the growing human impact on the climate, the international community joined forces under the United Nations Framework Convention on Climate Change (UNFCCC), ratified by 197 countries in 1994. Following thousands of meetings, interim documents, and failed commitments, a new deal, the Paris

Agreement was signed in 2015, uniting 191 states (as of 2021) in a common effort to keep global temperature rise below 1.5°C by the end of the century as compared to pre-industrial levels.

2.5. NAP AND SUSTAINABLE DEVELOPMENT GOALS

The NAP process recognizes the link between adaptation and sustainable development planning with a focus on integrating adaptation for ensuring climate-resilient outcomes. The Sustainable Development Goal 13 (Taking Urgent Action to Fight Climate Change) is focused on building adaptive capacity and resilience as well as integrating climate change into national policies, strategies, and planning, which is in line with the objectives of the NAP process. The NAP process also supports the implementation of SDGs and related targets on *"Strengthening the means of implementation and revitalizing the global partnership for sustainable development"* in the following ways:

- Building respect for each country's policy space and leadership on adaptation, and
- Convening North-South and South-South cooperation for building capacity to implement NAPs with the potential to climate-proof the SDGs[54].

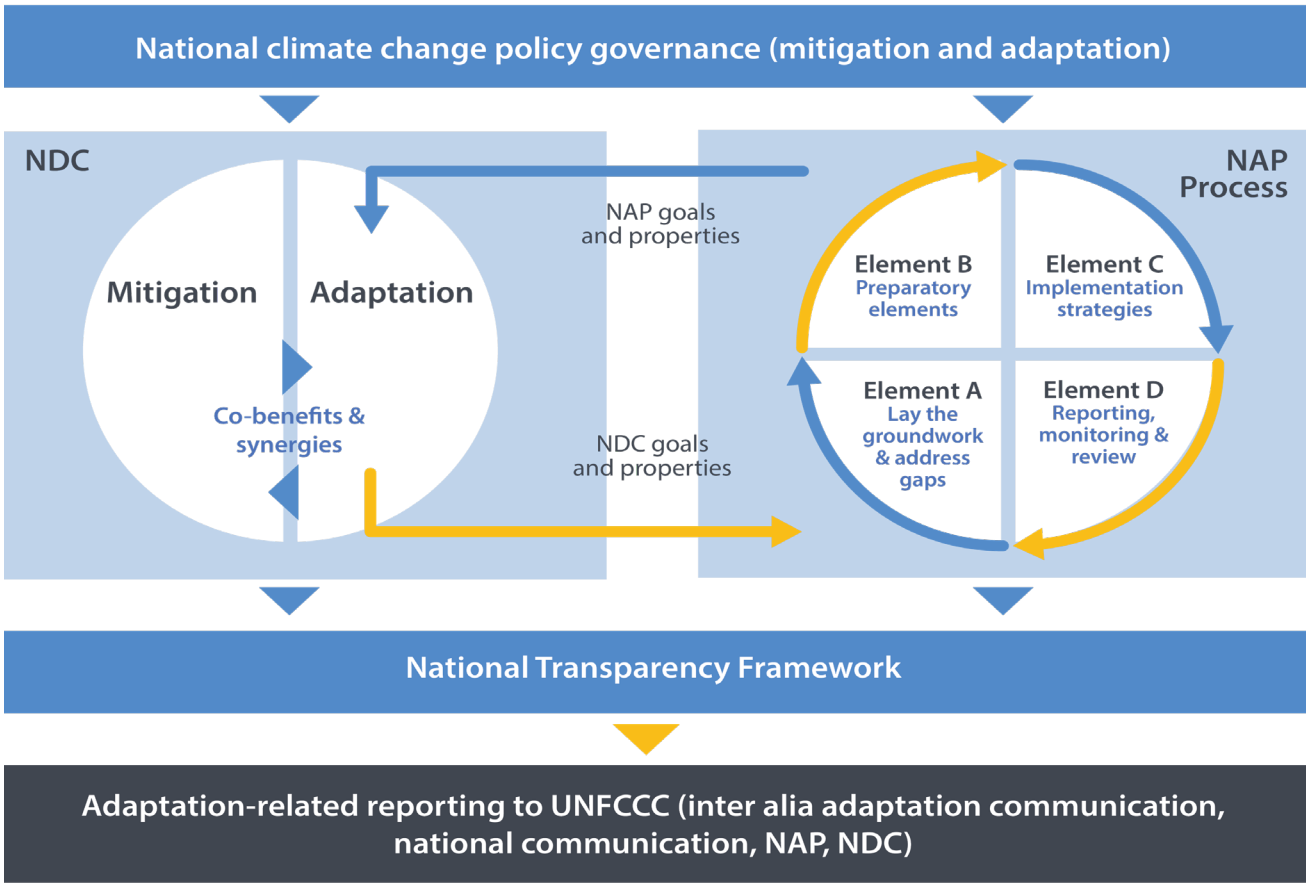

Figure 3 A Mutually Supportive NAP and NDC Process[53]

PHASE	ACTIVITIES
A **Laying the groundwork and addressing gaps**	1. Initiating and launching of the NAP process: 2. Stocktaking: identifying available information on climate change impacts, vulnerability and adaptation and assessing gaps and needs of the enabling environment for the NAP process: 3. Addressing capacity gaps and weaknesses in undertaking the NAP process: 4. Comprehensively and iteratively assessing development needs and climate vulnerabilities
B. **Preparatory elements**	1. Analyzing current climate and future climate change scenarios 2. Assessing climate vulnerabilities and identifying adaptation options at the sector, subnational, national, and other appropriate levels: 3. Reviewing and appraising adaptation options: 4. Compiling and communicating national adaptation plans: 5. Integrating climate change adaptation into national and subnational development and sectoral planning:
C. **Implementation strategies with following activities**	1. Prioritizing climate change adaptation in national planning. 2. Developing a (long-term) national adaptation implementation strategy. 3. Enhancing capacity for planning and implementing adaptation. 4. Promoting coordination and synergy at the regional level and with other multilateral environmental agreements.
D. **Reporting, monitoring and review with following activities**	1. Monitoring the NAP process. 2. Reviewing the NAP process to assess progress, effectiveness, and gaps. 3. Iteratively updating the national adaptation plans. 4. Outreach on the NAP process and reporting on progress and effectiveness (Figures x and y).

2.6. NAP CORE STAGES

Initial guidelines for NAP formulation provide a list of activities that can be undertaken for NAP development under the following four elements[55,56].

When looking at the general cycle of the NAP process with its key elements, two broad phases can be distinguished (Figure 6):

- **Development phase** that includes actions taken to initiate, coordinate and maintain the NAP process on a continuous basis. Most costs associated with the development phase are related to activities led by governments, while some costs may be associated with the activities of other stakeholders; and
- **Implementation phase** that encompasses the preparation and implementation of individual adaptation actions prioritized through the NAP process. Financing to cover the costs during this phase is needed by a wide array of actors, including different sectors and levels of government, civil society, and the private sector. Obviously, however, the financing needs required during the implementation phase are substantially higher than those of the development phase[57].

During these phases, different actions can be performed. They can be related to policy (e.g., adjusting development plans), implementation of no-/low-regret options (e.g., avoid building in high-risk areas), implementing technical solutions (e.g., dyke construction), performing research (e.g., regional climate modelling) and capacity development (e.g. training technical staff in ministries in interpreting climate data). Figure 6 shows the **key elements that require financing throughout a NAP process** and displays the iterative nature of the two phases. Activities related to developing implementation strategies (C) and reporting, monitoring and review (D) link the development and implementation phases.

The crosscutting aspects of capacity development, institutional strengthening and stakeholder engagement are also highlighted. In addition, the figure shows that the preparation and implementation of adaptation actions refer to different climate-sensitive sectors, thus this process usually involves engagement and leadership of a wide range of government ministries[58]. Additional information on the technical guidelines for the NAP process, prepared by the Least Developed Countries Expert Group (LEG), can be found here.

In the context of the project cycle, the NAP process consists of planning, implementation, and monitoring and evaluation (M&E) – and they are supported by capacity development, financing, institutional arrangements, and information sharing among different stakeholders. In the planning phase, vulnerabilities and risks related to climate are assessed, options for risk management are identified and prioritized, and strategies for their implementation are developed.

During the implementation phase, these strategies are further refined, and have secured financing and necessary technical and human resources to

undertake the priority actions. Progress, results, and lessons from the implementation phase are tracked and reported in the monitoring and evaluation (M&E) phase[60].

M&E tries to identify the implementation achievements of the policies, plans, interventions, and investments related to adaptation, as well as the results (i.e., outcomes and impacts) of those achievements. M&E can determine if and how adaptation interventions are reducing vulnerability and improving the national capacity to prepare for and respond to climate change impacts across sectors and levels[61]. While the technical guidelines for the NAP process note four elements to the NAP process (A, B, C, D) (Figure 1), they easily correspond to the three phases described above, with phases A and B corresponding to "planning," phase C to both "planning" and "implementation" and phase D to "M&E" (see above)[62].

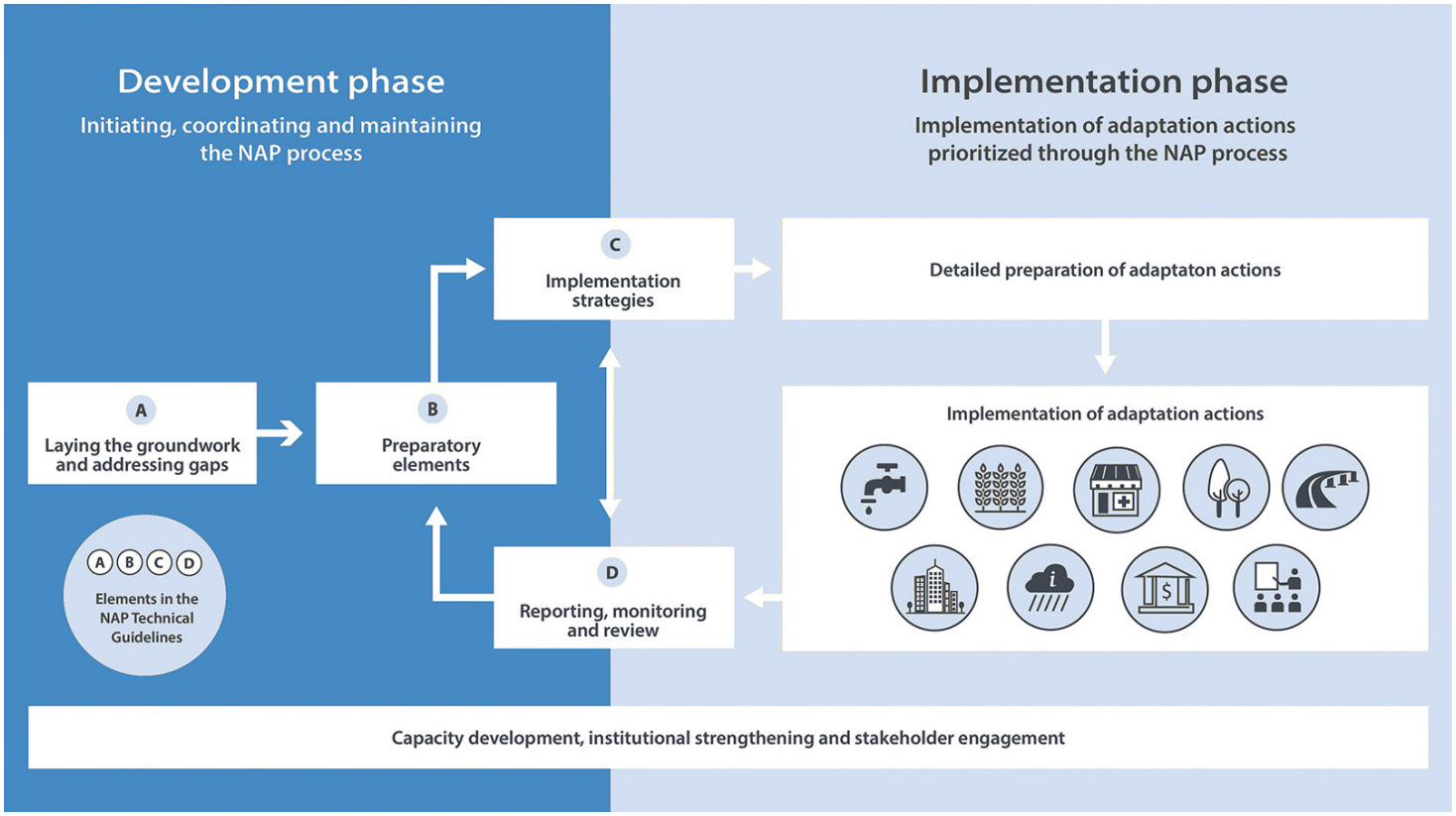

Figure 4 The General NAP Cycle Overview with Key Elements[59]

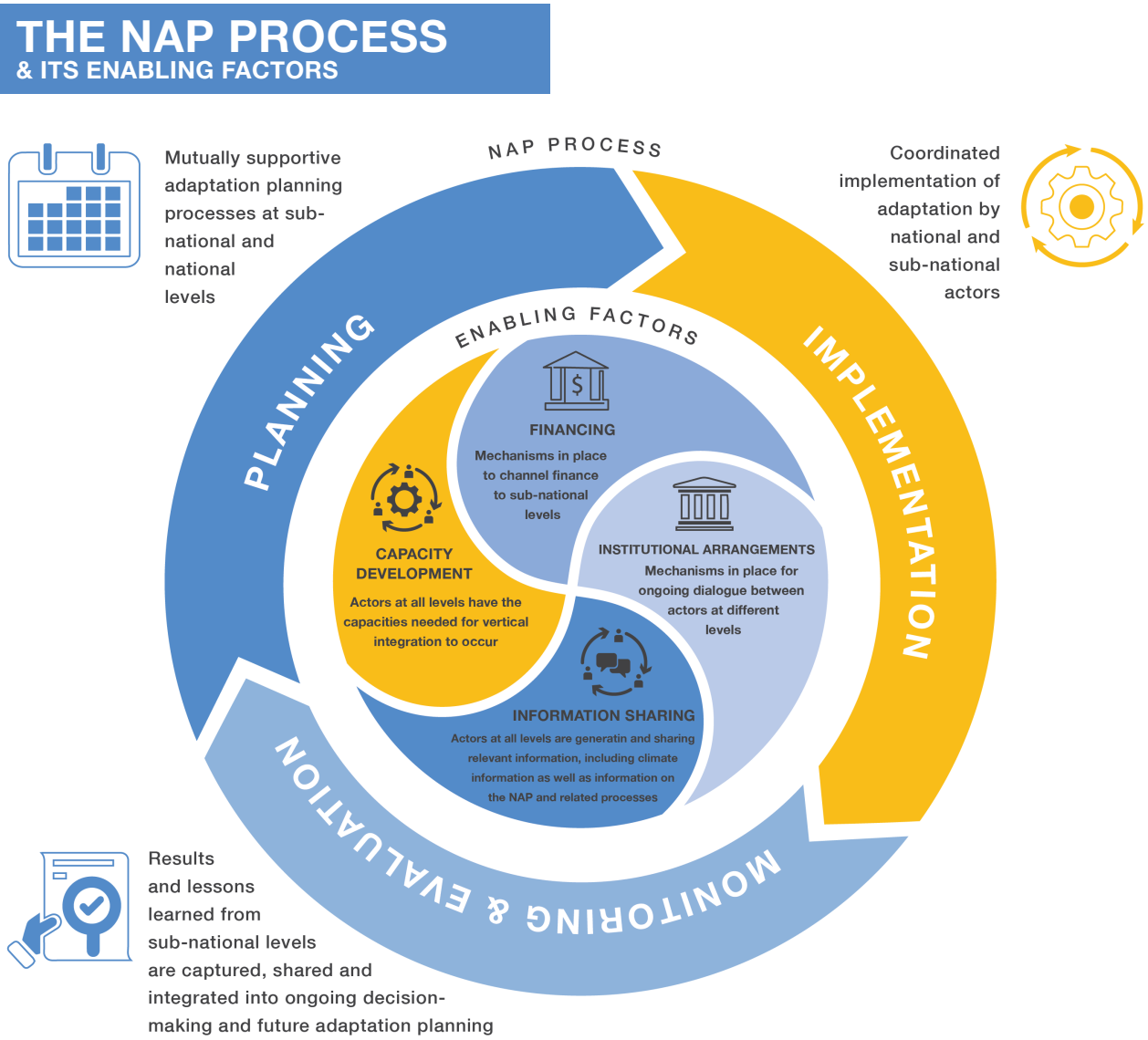

Figure 5 The NAP Process and its Enabling Factors

3. INCLUSION AND PARTICIPATION

3.1. WHY IT MATTERS

People's adaptation needs differ depending on their gender, socioeconomic status, geographical location, age, cultural background, and many other factors. There are socially defined differences in roles, responsibilities, and decision-making capacities, all of which influence adaptive capacity and vulnerability to climate change. Without an understanding of these factors, most vulnerable people may be left out.[64] That is why inclusion is a central theme to effective adaptation planning.

Mainstreaming inclusion means incorporating the perspectives, knowledge, needs, concerns, and challenges of all groups into the NAP process. Inclusion begins with a realization that many of those who are impacted by climate change also have disproportionately low responsibility for causing the emissions responsible for climate change in the first place and little voice in changing the ways it works. While adaptation may be more expensive in developed countries, the burden is higher in developing countries when assessed against their gross domestic products, adding to their limited capacities and resources[65].

3.2. KEY ISSUES AND CONCEPTS

It is important to differentiate the key concepts you will be working with in this context, these are inclusion, diversity, equity, and justice.[66]

CONCEPT	DEFINITION
INCLUSION	Inclusion means authentically bringing traditionally excluded individuals and or groups into processes, activities, and decision/policymaking in a way that shares power and ensures equal access to opportunities and resources. It builds a culture of belonging by actively inviting the contribution and participation of all people. Every person's voice adds value, and it is important to create balance in the face of power differences.
DIVERSITY	Diversity aims at representing the full variety of identities and differences (race, ethnicity, gender, disability, socio-economic status, etc.), collectively and individually. It allows to, understand, and draw on a variety of perspectives, which enriches everyone's understanding of the issue and is a prerequisite for effective inclusion.
EQUITY	Equity is focused on providing fair approach and equality of opportunity, ensuring that everyone has equal opportunities to advance on their livelihoods. It draws our attention to the disproportionate impacts of climate change on different groups, and the unique power of different actors to engage in effective climate action. Equity is also tightly linked to the concepts respect and dignity.
JUSTICE	Climate justice begins with a recognition that adverse impacts of a warming climate are not felt equitably among people[67]. Currently, 10% of the global population are responsible for 50% of emissions, mostly located in the global north[68]

It is important to ensure that stakeholders working on inclusivity are present at different levels, identifying and strategically eliminating barriers to participation. This should also cover organizational mechanisms for smooth adaptation efforts, such as flexible time, mobility considerations, accessibility of facilities for both the NAP process as such and the adaptation planning outcomes. For example, job announcements may need to be distributed across non-traditional channels or channels that are prioritized by different the commonly excluded action. In recent years have seen the rise gender-responsive NAP processes, which strive to go beyond mere identification of issues and towards their effective integration at every stage, including planning, implementation, and monitoring and evaluation.

Gender and inclusion should also be considered via such crosscutting dimensions as institutional arrangements, capacity development, adaptation finance and distribution of information[69,70]. Below, you can find an infographic that presents five key steps for gender-responsive NAP process. Taking an inclusive approach exemplified through gender responsiveness of adaptation is about asking at least three key questions, as presented below[72].

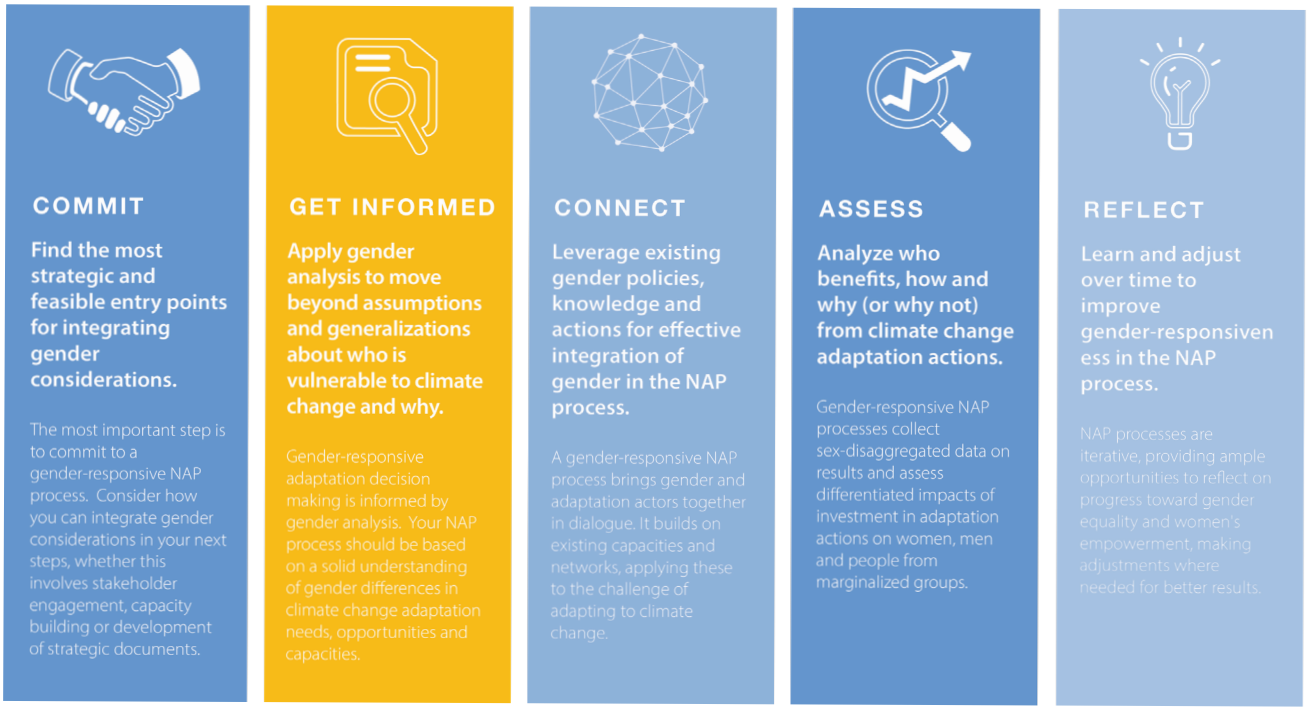

Figure 6 Integrating gender considerations throughout the NAP process[71]

WHO MATTERS?	WHO DECIDES?	WHO BENEFITS?
Consider differences in needs, possibilities, and their representation.	**Can all groups equally access decision-making & influence outcomes?**	**How are benefits of decisions distributed between groups?**
Gaps in access to education, literacy and earning and income limits opportunities to learn about effective adaptation options and realising one's potential as an agent of change.	Marginalized group are often under-represented in climate-vulnerable sectors across different levels, preventing consideration of their needs and their capacity to influence the decisions in the NAP process.	As much as vulnerability, adaptation benefits are not equally distributed, while there is a risk of increasing vulnerability of one group at the benefit of the other (e.g., under unfair distribution of resources).

When adaptation is approached as a purely technical issue, the questions explored above may be non-existent at the table discussions, leading to completely different adaptation outcomes. This has far reaching consequences for the general ability of society to deal with climate change, as its adaptive capacity and resilience is determined by the collective capabilities much more than individual strength. Effective inclusion requires a deeply reflexive approach to who is left out, when and why. Inclusive NAP process can bring wide-ranging societal benefits and ensure a more robust and effective adaptation pathways.

4. GROUNDWORK

4.1. LAUNCHING THE PROCESS

Initiating and launching of the NAP process should at least include the following[73]:

ACTIVITY	DESCRIPTION
BRIEF TO POLICY MAKERS ON CLIMATE ADAPTATION	Helping policymakers to make informed and sound decisions as early in the process as possible. It should cover both climate change science, as well as milestones and priorities relevant to the NAP process nationally and in a broader international context.
DESIGNATE A COORDINATION MECHANISM	The government agency (or agencies) or institutions responsible for spearheading the process. Includes mobilizing dedicated human resources and ensuring that the designated coordinating mechanism has the tools and means to reach the NAP governmental and non-governmental stakeholders.
CREATE A NATIONAL VISION & MANDATE FOR THE NAP PROCESS	Many countries that have embarked on a NAP-like process have created formal and binding national instrument in the form of a decree (Norway), an Act (United Kingdom) or an executive order (the U.S.).
OPERATIONALIZE THE NAP PROCESS	Includes funding, financial, technical, and other capacities necessary to kickstart and support the process
DEFINE THE NAP FRAMEWORK, STRATEGY, & ROADMAP	Develop a strategic document that would elaborate on specific goals and objectives for the national process and other elements of the national mandate for the NAP process

4.2. STOCKTAKING KNOWLEDGE, CAPACITIES, AND GAPS

This stage requires implementation of activities focused on understanding the status quo and issues that need to be resolved in the near future to ensure an effective NAP process and an enabling environment to make it happen.

ACTIVITY	DESCRIPTION
CONDUCT A STOCKTAKING	Consider what has been done to support adaptation in the past and what are the current processes and activities in place.
SYNTHESIZE DATA	Bring together insights on available current and future climate analyses at the broad national and/or regional level
CONDUCT A GAP ANALYSIS	Assess strengths and weaknesses regarding capacity, data, and information, and required resources to effectively engage in the NAP process
ASSESS POTENTIAL BARRIERS	Barriers to adaptation planning are any institutional, material, cultural or policy constraints that are likely to interfere with the development of a NAP as framed by the country's vision and approach. Barriers to implementing adaptation are "obstacles that tend to delay, divert, or temporarily block the adaptation process, but which can be overcome

Photograph © Rwanda Environment Management Authority (REMA)

4.3. ALIGNMENT WITH DEVELOPMENT PRIORITIES

To ensure an effective start, it is essential to establish linkages between climate planning and broader national priorities and strategy. Further, when developing theories of change, it is important make sure they are applicable to real life and can be used in both planning and implementation.

There are important interlinks between effective adaptation planning and alignment with the national priorities. Foremost, preparation for such alignment allows to understand the extent to which national strategies and structure of the economy are resilient to climate change. It also allows to ensure that adaptation takes place not as an ad-hoc activity but as an integral part of national policymaking and governance, making it less dependent on pollical cycles and changes in present preferences. Such embedding of NAP process into the national policy context and budgeting, while increasing ownership and allows for a more meaningful engagement of policy makers with key adaptation topics.

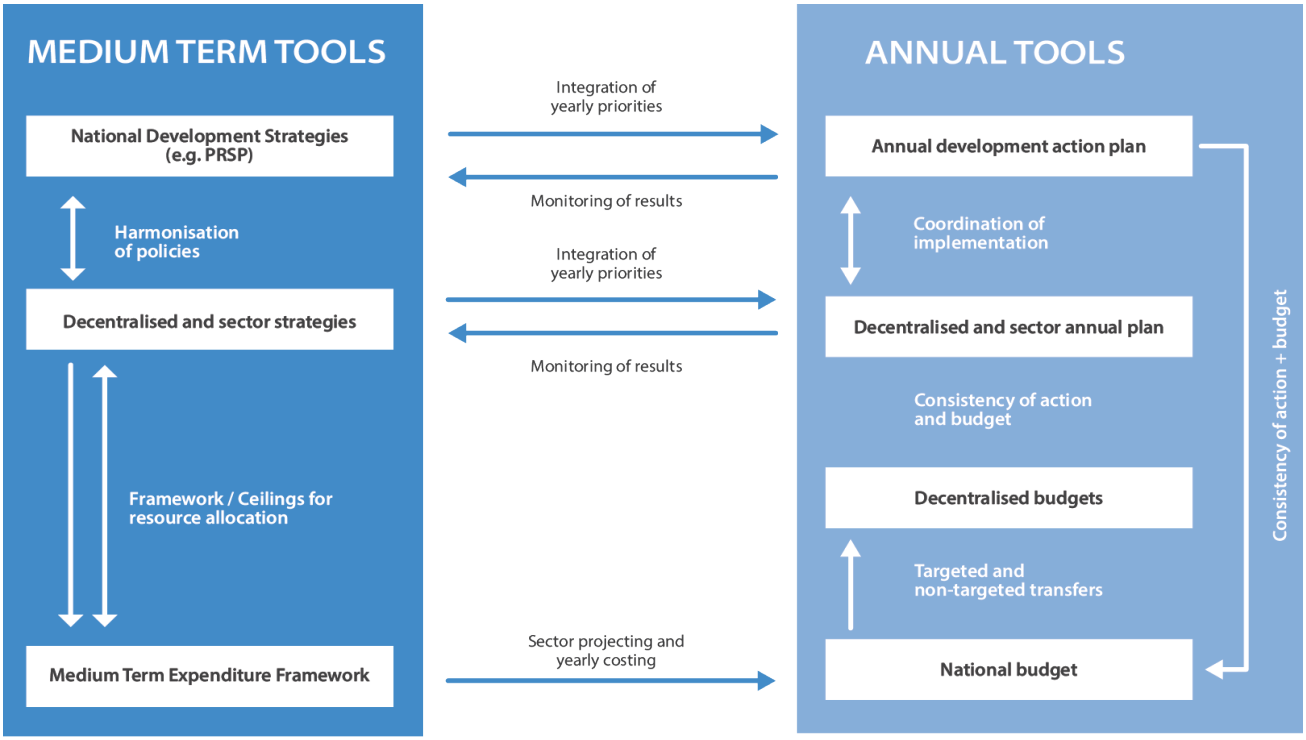

Figure 7 Links between medium-term and annual planning and budgeting tools[75]

5. PREPARATION

5.1. CLIMATE SCENARIOS AND GATHERING INITIAL DATA

The NAP process encompasses steps for identifying medium- and long-term adaptation needs and for developing and implementing strategies and programmes to address those needs[74].

TYPE	USES
HISTORICAL	Historical observations that can be used to assess long-term trends, variability, and extremes. Historical data can be used to generate context-specific climate indicators and high-impact event indices. Climate indices help to establish thresholds and probabilities of occurrence for specific climate-related hazards, such as heatwaves, droughts, or floods at the very local scale[77].
PRESENT	The routine provision of consistent and comparable information on the state of the climate (real-time monitoring of hazards). Information on climate anomalies occurring at 'weekly', 'ten days', 'monthly', 'seasonal' and 'inter-annual' timescales are essential for sector applications. This is useful within a country or region because it raises awareness and understanding of the effects of climate variability and change on a specific sector or location[78].
PROJECTED	Projections generated from climate models used to estimate future changes of relevant climatic contributing factors. When putting things into perspective, it is always important to consider the time scale and the target period in question.

Climate analysis for NAPs can be produced through institutions such as National Meteorological and Hydrological Services (NMHSs). At the national level, because of the key role that NMHSs play in observing, collecting, and providing access to hydrological, weather, and climate information, they are a critical resource for developing and implementing NAPs. NMHSs contributions extend from operating the national hydro-meteorological observing networks that provide the principal inputs for science-based climate action, through to the quality control, processing, analysis, and interpretation of climate data for decision support. NMHSs should be able to provide information on historical trends, variability, and extremes through their monitoring of observed daily temperature, precipitation, cryosphere (snow cover, sea ice, glaciers), and sea level. In addition to NMHS data, many global and regional climate datasets from research centres, data hubs, reanalysis and climate modelling centres, and satellite agencies from the WMO network are also available. Therefore, to be effective, NMHSs need to continually engage with stakeholders from the NAP process and sectors affected by climate, such as agriculture, disaster risk reduction, energy, transport, health, and water, among others.[79]

77 Historically, climatological standard normals were calculated every 30 years for 30-year periods (1901–1930, 1931–1960, 1961–1990 and so on). However, there is also a need for more frequent calculations of climatic normals in a changing climate. A more recent averaging period, such as 1981–2010, would be viewed by many users as more 'current' than 1961–1990. Therefore, now climatological standard normals are calculated every ten years for 30-year periods at the start of every decade). Source: WMO (2018). Guide to Climatological Practices. Available at: https://library.wmo.int/doc_num.php?explnum_id=5541

National Climate Outlook Forums/National Climate Forums (NCOF/NCF) facilitate the provision of standardized climate products based on high quality climate information from Global Producing Centres (GPCs), Regional Climate Centres (RCCs) and Regional Climate Outlook Forums (RCOFs) at relevant timescales at the national level. The NCOF/NCF process is also expected to help communicate climate information, including climate outlooks along with the associated uncertainties in a consistent and effective manner. The sustained interaction enabled by NCOFs would ultimately lead to a risk management approach that makes use of probabilistic forecasts building resilience in climate-sensitive sectors[80].

To achieve the above on an ongoing basis requires establishing a coordination mechanism to enable different types of institutions and actors to collaborate and work together to co-design, co-produce, and deliver and use climate services. A National Frameworks for Climate Services (NFCS) is a mechanism for enabling the coordination and collaboration required to ensure that all the elements of the value chain for the production and application of effective climate information services are effectively addressed through the identification of gaps, needs, and priorities for implementation[81].

Aggregation of scientific findings concerning national and local conditions enrich national, regional, and global data sets and assessments. Such data are a crucial input for climate research, on which the IPCC process, as well as forecast systems for managing climate variability and change, depend. As better data and information are made available through globally aggregated data sets and models, they can enhance local decision-making processes; and as local data and processes improve, they can feed back into global initiatives, thereby generating a virtuous cycle of both local and global benefits for decision making.

Common lack of information on the current and past state of the climate due to the absence or limited coverage of observation networks or inadequacy of data hamper the quality and availability of information needed to underpin climate analysis for assessing the potential future risks related to climate change.

Information on past and present weather and climate conditions is based on instrumental observations. Many countries struggle to maintain their observing networks, leading to a general decline in availability of local observed data such as daily temperature and precipitation data. The analyses performed with lower-quality data do not make the inference less scientific, but it does increase uncertainties. Historical data on temperature and precipitation are important for assessing the robustness of projections of future climate to the extent to which the projected climate changes correspond with the historical trends.

While there are elaborate tools and instruments on long-term impacts of climate change developed over the past two decades, we still lack the data collected at the local scale. Despite the growing number of supported national adaptation projects, there is also still little evidence of actual reduction of risks posed by climate change from the implemented activities. This is true because climate risk identification is not supported by scientific analysis that can help to demonstrate the effectiveness of climate actions. This underscores the need for climate science to be part of climate decision-making and investment.

Context-specific climate information can generate more effective results at the local level, increasing the effectiveness of climate actions. It also increases the likelihood of actions achieving their intended results.

Ultimately, adequate data, information and knowledge management are essential for setting baselines, assessing climate change vulnerabilities, opportunities, and risks, developing adaptation strategies and options at sectoral, subnational, and national levels, as well as being able to submit objective and scientifically-sound funding proposals.

While the identification of key climatic and non-climatic contributing factors that a country faces and their impacts in relation to evolving climate vulnerabilities and risks should form the core of the adaptation process, they commonly stay published in a single document (adaptation plan) without being integrated into other plans, policies, and budgets. The cases where climate adaptation has become an "everyday business" are still rare[82].

5.2. LEARNING TO DECIDE: CRITERIA, METHODS, AND TOOLS

Shifting from present systems of management, decision-making, and monitoring developed for a stable world into those that are fit for unique, ever-evolving conditions of climate change is a complex challenge. Simple tools such as the cost-benefit analysis (CBA) do not allow to address the complexity of options and criteria influencing them, while decision-makers often lack knowledge and skills to use more advanced tools that would allow them to work with a robust and adaptive portfolio of options.

This regards anything from adequate analysis of the most vulnerable communities, groups, and ecosystems to choices regarding development priorities when selecting among multiple alternatives. CBA, CEA, and MCDA have a long history of being used to design projects and devise policies, but policymakers have found it difficult to effectively use them in the contexts of uncertainty. This created the need for using a greater diversity of methods, tools, and approaches.

Key decision support tools used today in climate adaptation are provided below, however it should be noted that development of tools in this context is going through rapid expansion, with some advanced tools been complemented by more recent versions of them[83]. For example, Iterative Risk Management is increasingly enhanced through novel methodologies, such as Multi-Scale Relational Risks & Opportunities and Dynamic Risks and Opportunities Simulation Evaluation[84].

Meanwhile, Robust Decision Making makes more sense in its multi-objective variation, which allows to make decisions that perform well under a variety of different future under multiple criteria or objectives, which allows to integrate perspectives of different stakeholders.

Different approaches will work well in different circumstances, depending on the characteristics of the adaptation options being considered, data availability, and the time and skills available to the decision-maker. To help identify the appropriate method for policy development or a particular adaptation project,

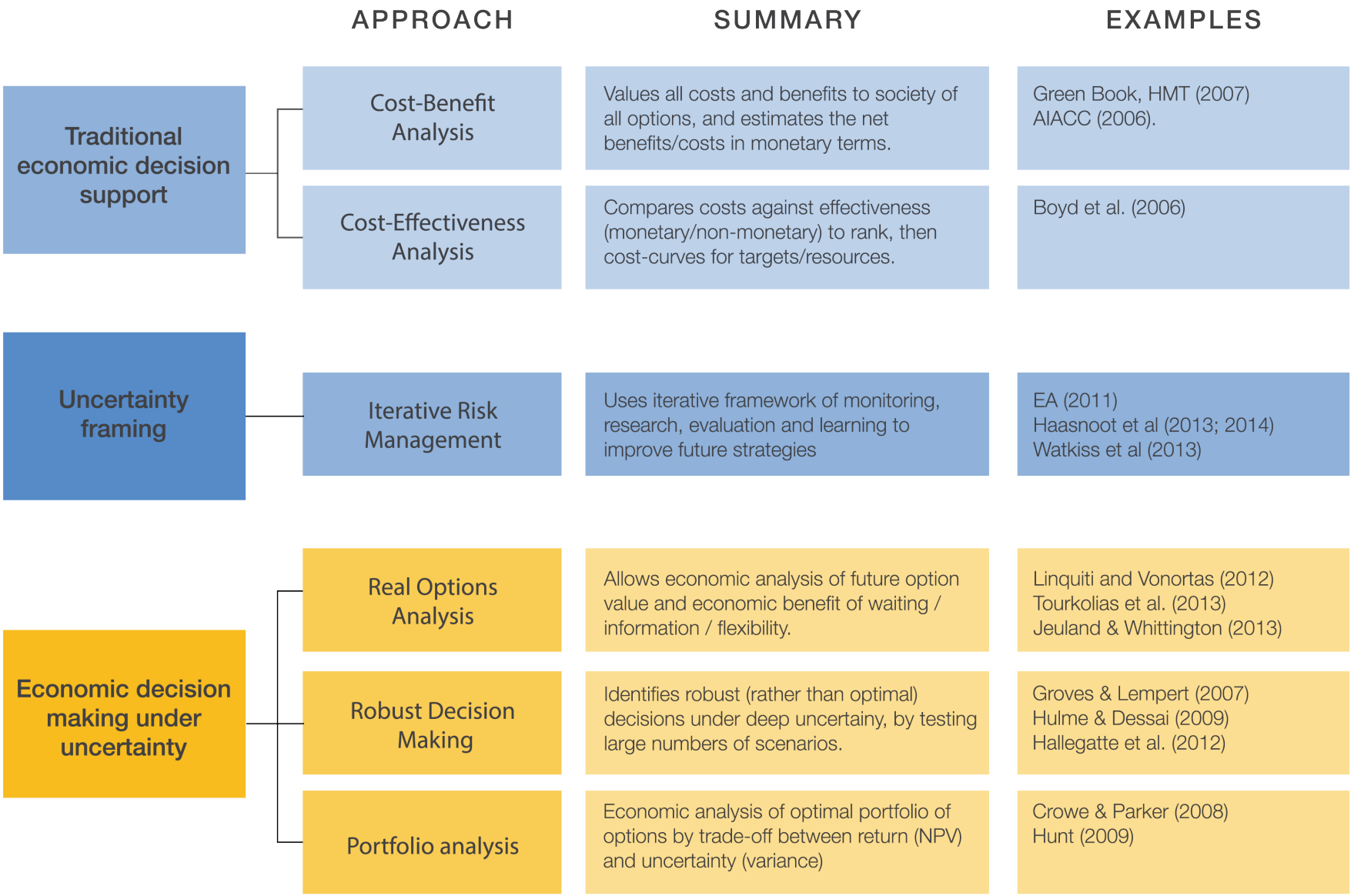

Figure 8 Key decision support tools in climate adaptation planning

the figure presents a simple framework, helping to see which method will perform well considering the characteristics of the available options.

Adaptation options differ according to their scale, level of uncertainty, and data availability, which will significantly influence the choice of the method. Some adaptation context may benefit from or require using to two or three methods to gain extra perspective or increase certainty about a certain topic or option in question. Different tools may be also specifically suited per level of available expertise or context in question[85], e.g., researchers have identified tools used specifically at the community level and focused on participatory processes and collaborative decision-making[86].

In recent years the field of adaptation planning has witnessed a fast progress complex tools specifically designed for contexts of deep uncertainty. Frameworks such as Dynamic Adaptive Policy Pathways allow to a plan policy actions or investments with set objectives yet changing conditions, allowing to make alternations under changes in the tipping points.

On the example of an adaptation pathways map and a scorecard the colours in the scorecard mark the actions: A (red), B (orange), C (green), and D (blue), while a decision needs to be made at every path divergence before the tipping point is reached. A resulting map provides insight into policy options, the sequencing of actions over time, potential lock-ins, and path dependencies.

While use of such frameworks requires preliminary training it can be crucial to harness more advanced tools to deal with the complexity of climate change. Among multiple other cases, adaptation pathways have been developed for EU RISES[87], BASE[88] and Thailand[89]. It is best if different methods and tools are united under a single adaptation platform, allowing users to make use of parts or the whole.

EXAMPLE OF REPRESENTATION OF ADAPTATION PATHWAYS OVER TIME

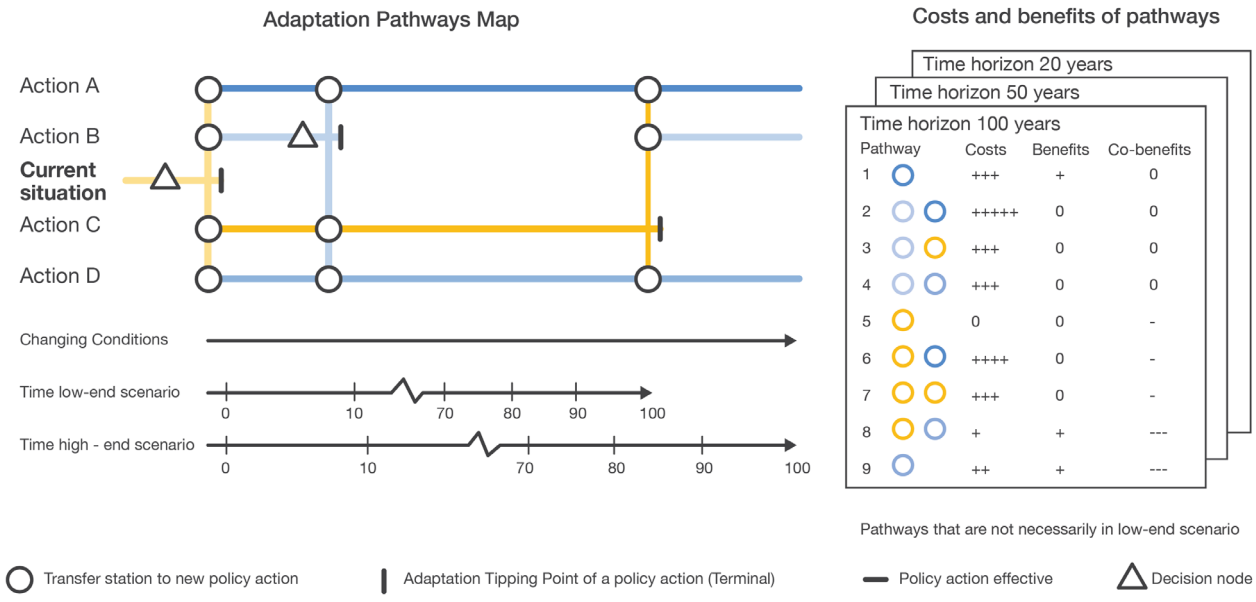

Figure 10 Dynamic Adaptive Policy Pathways framework for adaptation planning[90]

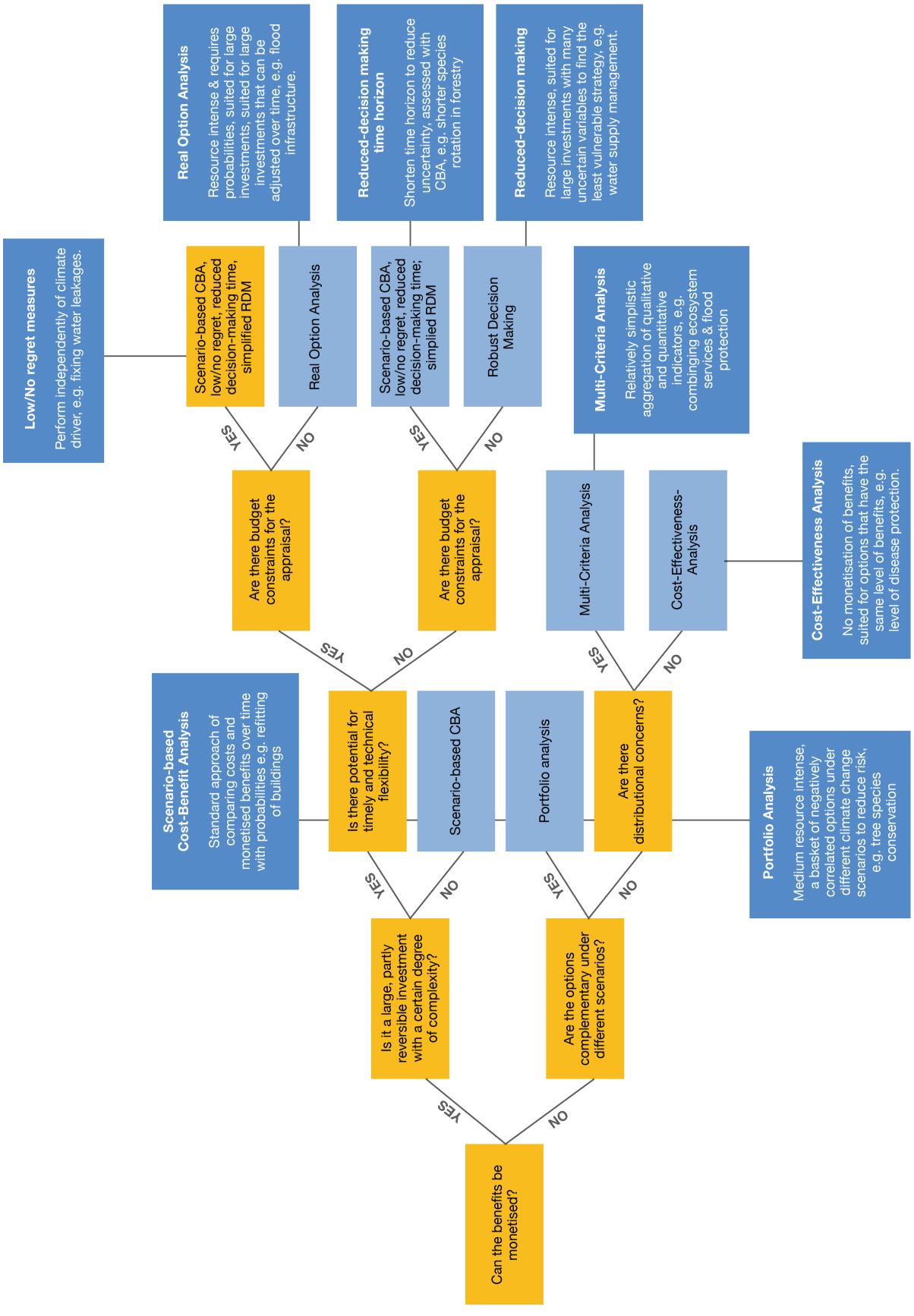

Figure 9 Framework to identify suited appraisal methods

5.3. FROM COMPILATION TO COMMUNICATION

NAP process requires a strategic approach to communications, where the right messages are used via the relevant channels to reach the appropriate audiences and generate meaningful engagement with all the stakeholders.

"Strategic communications are key to achieving the goals of the NAP process, from the initiation to communicating the results of adaptation actions throughout monitoring and evaluation. There are three key factors for effective strategic communications.[91,92.]

SET CLEAR & MEASURABLE OBJECTIVES	KNOW YOUR AUDIENCE	TAILOR YOUR MESSAGE & CHANNELS
For example, your key objectives could be: • Building high-level support • Engaging citizens and raising awareness • Sharing information across ministries • Communicating adaptation priorities	Break your audience into specific groups. These could include: • Parliamentarians • Local authorities • Communities • Civil society • Private sector • Vulnerable groups	When developing your messaging, consider your audiences: • Values • Interests and motivations • Information needs • Preferred and available channels • Frequency of communication

5.4. PREPARING AND FORMULATING THE NAP

We have now looked at the different aspects that need to be taken into consideration during adaptation planning. This can range from data and information, adaptation decision making tools as well as ensuring that no stakeholder is left out of the process. It is now time to consolidate everything that we have researched, learned through multiple stakeholder consultations, and together decided to act on, and start the drafting of our NAP. It is critically important to thoroughly formulate our intentions with regards to national adaptation planning objectives. There are a few key points to consider while formulation the NAP:

- Typically, adaptation plans only briefly identify the proposed interventions, so a detailed design of the adaptation measures is necessary as this will clarify the costs and the necessary implementation arrangements. Once there is a good analysis of the costs, accessing the necessary funds for implementation is the next step, either from domestic or international climate financing sources.
- The next step is to procure the materials and labor to implement the adaptation measures, generally involving the private sector and public procurement rules.``Depending on the institutional arrangements in the country, there may be a need to convince other sector agencies to become involved in implementing adaptation measures.

At each step, collect the necessary data on adaptation investments that will subsequently inform the evaluation of adaptation progress and effectiveness in the review stage.

5.5. PLANNING FOR HORIZONTAL, VERTICAL, & CROSS- SECTORAL INTEGRATION

Integrating climate change adaptation across different levels of government is one of the main objectives of the NAP process. Vertical and horizontal integration is not a single step in the NAP process—it is an ongoing effort to ensure that diverse realities are reflected in the NAP and that the NAP enables adaptation at sub-national levels. It is enabled by institutional arrangements, information sharing, capacity development, and financing for actors at all levels[93].

In national adaptation planning, vertical integration represents "*the process of creating intentional and strategic linkages between national and sub-national adaptation planning, implementation and monitoring & evaluation".*

The process depends on several factors, such as decentralization of development planning, technical capacity at sub-national levels and defined timescales. Numerous countries already have undertaken institutional arrangements that link national and sub-national planning through local development planning within the framework of various national strategies. Where they exist, a NAP should consider how to utilize these mechanisms to support vertical integration in the NAP process. If these mechanisms do not exist, it should be considered what institutional arrangements are needed to facilitate this engagement[94].

It is important to integrate learning from the Local Adaptation Plans of Action (LAPAs) into the NAP process. LAPAs can be defined as the *"approach to integrated adaptation planning that enables and empowers communities to understand and respond effectively to the changing and uncertain future climatic conditions"*[95].

An example of the application of the learning from LAPAs in the NAP process comes from Nepal, where both LAPA and NAP teams work together on local and national adaptation strategies. This process includes the local population analyzing climate change vulnerabilities and identifying adaptation priorities for their local environment, which are later integrated into development plans at district and national levels through an iterative process[96].

The NAP process can also enable a cross-sectoral and integrative approach to integrate disaster risk reduction and climate change adaptation and to mainstream both into other activities on sustainable development.

Development organizations such as UNDRR, UNDP, or UNEP, have developed initiatives for integrating climate change adaptation and disaster risk reduction in development planning with lessons-learned and good practices emerging in areas of governance, institutional frameworks, climate and disaster risk assessment, risk reduction measures, gender, and social and financial incentives. These provide important insights to inform countries that are developing or will be developing NAPs[97].

A common challenge is moving from generic documents into sectoral and subnational planning, connected to a lack of willingness to engage from certain stakeholders, the presence of conflicting agendas, and complex governance structures, which highlight the necessity for both vertical and horizontal coordination. Here are a few key entry points to consider for vertical and horizontal integration[98]:

INSTITUTIONAL ARRANGEMENTS	Current decentralization	Dialogue mechanisms	Functional optimization	Institutional flexibility
INFORMATION SHARING	Information sharing mechanisms		Matching scale to need Bridging perspectives	
CAPACITY DEVELOPMENT	Understanding skill gaps at every level		Cross-level resource mobilization	
PLANNING	Streamlining integration of sub-national perspectives into the NAP		Commitment to diversity and inclusion	
IMPLEMENTATION	Horizontal and vertical prioritization		Leveraging regional and local funding	
MONITORING & EVALUATION	Sub-national data integration, aggregation, and synthesis		Cross-level system update, learning, and integration	

REFERENCES PHASE 1

[2] Nicholas, K (2014). Climate Science 101: Five things everyone needs to know. Available at: https://www.kimnicholas.com/climate-science-101.html

[3] IPCC (2018). Global Warming of 1.5 °: an IPCC special report on the impacts of global warming of 1.5 °C above pre-industrial levels and related global greenhouse gas emission pathways, in the context of strengthening the global response to the threat of climate change, sustainable development, and efforts to eradicate poverty. Geneva, Switzerland: Intergovernmental Panel on Climate Change. Available at: https://www.ipcc.ch/report/sr15/

[4] Jorgenson, A. K., Fiske, S., Hubacek, K., Li, J., McGovern, T., Rick, T., ... & Zycherman, A. (2019). Social science perspectives on drivers of and responses to global climate change. Wiley Interdisciplinary Reviews: Climate Change, 10(1), e554. Available at: https://onlinelibrary.wiley.com/doi/full/10.1002/wcc.554

[5] Chan, S., Boran, I., van Asselt, H., Iacobuta, G., Niles, N., Rietig, K., ... & Wambugu, G. (2019). Promises and risks of nonstate action in climate and sustainability governance. Wiley Interdisciplinary Reviews: Climate Change, 10(3), e572. Available at: https://onlinelibrary.wiley.com/doi/full/10.1002/wcc.572

[6] Cann, H. W., & Raymond, L. (2018). Does climate denialism still matter? The prevalence of alternative frames in opposition to climate policy. Environmental Politics, 27(3), 433-454. Available at: https://rsa.tandfonline.com/doi/abs/10.1080/09644016.201 1439353

[7] McLeman, R. (2018). Thresholds in climate migration. Population and Environment, 39(4), 319-338. Available at: https://link.springer.com/article/10.1007/s11111-017-0290-2

[8] Trisos, C. H., Amatulli, G., Gurevitch, J., Robock, A., Xia, L., & Zambri, B. (2018). Potentially dangerous consequences for biodiversity of solar geoengineering implementation and termination. Nature Ecology & Evolution, 2(3), 475-482. Available at: https://www.nature.com/articles/s41559-017-0431-0

[9] World Meteorological Organization (2020). Provisional Report on the State of the Global Climate 2020. Available at: https://library.wmo.int/index.php?lvl=notice_display&id=21804#.YColW88zb0q

[10] Stainforth, T., Charveriat, C., Bodi, E., Filipova, T. (2020). Green Deal for All. Institute for European Environmental Policy. Available at: https://ieep.eu/uploads/articles/attachments/3b534d44-4434-4ec7-af0b-7f6eb6c37882/Green%20Deal%20for%20All%20-%20FINAL%20PP.pdf?v=63756080686

[11] Cook, J., Oreskes, N., Doran, P. T., Anderegg, W. R., Verheggen, B., Maibach, E. W., ... & Rice, K. (2016). Consensus on consensus: a synthesis of consensus estimates on human-caused global warming. Environmental Research Letters, 11(4), 048002. Available at: https://iopscience.iop.org/article/10.1088/1748-9326/11/4/048002/meta

[12] UNEP (2021). Adaptation Gap Report 2020. Available at: https://reliefweb.int/report/world/adaptation-gap-report-2020
[13] UNEP (2020). Emissions Gap Report 2020. Available at: https://www.unenvironment.org/emissions-gap-report-2020

[14]UNFCC (2015). Paris Agreement. Available from: https://unfccc.int/sites/default/files/english_paris_agreement.pdf

[15] IPCC (2018). Global warming of 1.5°C. Available at: https://www.ipcc.ch/sr15/download/

[16] Climate Action Tracker (2020). The CAT Thermometer. Available at: https://climateactiontracker.org/global/cat-thermometer/

[17] Nolan, C., Overpeck, J. T., Allen, J. R., Anderson, P. M., Betancourt, J. L., Binney, H. A., ... & Jackson, S. T. (2018). Past and future global transformation of terrestrial ecosystems under climate change. Science, 361(6405), 920-923. Available at: https://science.sciencemag.org/content/361/6405/920

[18] UNEP (2021). Adaptation Gap Report 2020. Available at: https://reliefweb.int/report/world/adaptation-gap-report-2020

[19] Saghir et al. (2020). State and Trends in Adaptation Report 2020. Available at: https://gca.org/reports/state-and-trends-in-adaptation-report-2020/

[20] Least Developed Countries Expert Group (2012). National Adaptation Plans. Technical guidelines for the national adaptation plan process. Bonn: UNFCCC secretariat. Bonn, Germany. December 2012. Available at: https://unfccc.int/files/adaptation/cancun_adaptation_framework/application/pdf/naptechguidelines_eng_high__res.pdf

[21]IPCC (2007). AR4 Climate Change 2007: The Physical Science Basis. Available at: https://www.ipcc.ch/report/ar4/wg1/

[22] IPCC (2001). TAR Climate Change 2001: The Scientific Basis. Available at: https://www.ipcc.ch/report/ar3/wg1/

[23] UNDP (2020). Nature-based climate solutions. Available at: https://www.undp.org/content/undp/en/home/librarypage/climate-and-disaster-resilience-/UNDP-Issues-Brief-on-Nature-Based-Climate-Solutions.html

[24] Warren, R., Price, J., Graham, E., Forstenhaeusler, N., & Vanderwal, J. (2018). The projected effect on insects, vertebrates, and plants of limiting global warming to 1.5°C rather than 2°C. Science, 360(6390), 791–795. doi: 10.1126/science.aar3646

[25] Hinojosa et al. (2018). Unlocking the inclusive growth story of the 21st century: accelerating climate action in urgent times. The Global Commission on the Economy and Climate. Available at: https://newclimateeconomy.report/2018/

[26] Saghir et al. (2020). State and Trends in Adaptation Report 2020. Available at: https://gca.org/reports/state-and-trends-in-adaptation-report-2020/

[27] UNFCC (2015). Paris Agreement. Available from: https://unfccc.int/
[28] UNFCCUNFCCC (2015). Paris Agreement. Available from: https://unfccc.int/sites/default/files/english_paris_agreement.pdf

[29] UNEP (2021). Adaptation Gap Report 2020. Available at: https://reliefweb.int/report/world/adaptation-gap-report-2020

[30] UNEP (2021). Adaptation Gap Report 2020. Available at: https://reliefweb.int/report/world/adaptation-gap-report-2020

[31] NAP Global Network (2019). The National Adaptation Plan (NAP) Process: Frequently Asked Questions. Available at: https://napglobalnetwork.org/2019/12/the-national-adaptation-plan-nap-process-frequently-asked-questions/#:~:text=The%20NAP%20process%20was%20formally,as%20a%20separate%20environmental%20issue

[32] UNEP (2021). Adaptation Gap Report 2020. Available at: https://reliefweb.int/report/world/adaptation-gap-report-2020

[33] UNEP (2021). Adaptation Gap Report 2020. Available at: https://reliefweb.int/report/world/adaptation-gap-report-2020

[34] Least Developed Countries Expert Group (2012). National Adaptation Plans. Technical guidelines for the national adaptation plan process. Bonn: UNFCCC secretariat. Bonn, Germany. December 2012. Available at: https://unfccc.int/files/adaptation/cancun_adaptation_framework/application/pdf/naptechguidelines_eng_high__res.pdf

[35] Least Developed Countries Expert Group (2012). National Adaptation Plans. Technical guidelines for the national adaptation plan process. Bonn: UNFCCC secretariat. Bonn, Germany. December 2012. Available at: https://unfccc.int/files/adaptation/cancun_adaptation_framework/application/pdf/naptechguidelines_eng_high__res.pdf

[36] United Nations Development Programme (2021). Supporting developing countries to advance national adaptation plans (NAPs). Available at: https://www.adaptation-undp.org/supporting-developing-countries-advance-national-adaptation-plans-naps-0 (accessed on 29th January 2021)

[37] NAP Global Network (2019). The National Adaptation Plan (NAP) Process: Frequently Asked Questions. Available at: https://napglobalnetwork.org/2019/12/the-national-adaptation-plan-nap-process-frequently-asked-questions/#:~:texth=The%20NAP%20process%20was%20formally,as%20a%20separate%20environmental%20issue (accessed 29th January 2021)

[38] NAP Global Network (2019). The National Adaptation Plan (NAP) Process: Frequently Asked Questions. Available at: https://napglobalnetwork.org/2019/12/the-national-adaptation-plan-nap-process-frequently-asked-questions/#:~:text=The%20NAP%20process%20was%20formally,as%20a%20separate%20environmental%20issue (accessed 29th January 2021)

[39] Based on the information from: The National Adaptation Plan (NAP) Process: Frequently Asked Questions. Available at: https://napglobalnetwork.org/2019/12/the-national-adaptation-plan-nap-process-frequently-asked-questions/#:~:text=The%20NAP%20process%20was%20formally,as%20a%20separate%20environmental%20issue (accessed 29th January 2021)

[42] UNFCCC (2021). National Adaptation Planning (NAP) process offer to support national post□ COVID19 recovery efforts. Available at: https://unfccc.int/sites/default/files/resource/UNEPUpdatetoUNFCCCNAPTechnicalWorkingGroup.pdf (accessed 10th February 2021)

[43] United Nations Framework Convention on Climate Change (2021). National Adaptation Programmes of Actions. Available at: https://

unfccc.int/topics/resilience/workstreams/national-adaptation-programmes-of-action/introduction (accessed 30th January 2021)

[44] NAP Global Network (2019). The National Adaptation Plan (NAP) Process: Frequently Asked Questions. Available at: https://napglobalnetwork.org/2019/12/the-national-adaptation-plan-nap-process-frequently-asked-questions/#:~:text=The%20NAP%20process%20was%20formally,as%20a%20separate%20environmental%20issue (accessed 30th January 2021)

[45] United Nations Framework Convention on Climate Change (2021). National Adaptation Programmes of Actions. Available at: https://unfccc.int/topics/resilience/workstreams/national-adaptation-programmes-of-action/introduction (accessed 30th January 2021)

[46] Least Developed Countries Expert Group (2012). National Adaptation Plans. Technical guidelines for the national adaptation plan process. Bonn: UNFCCC secretariat. Bonn, Germany. December 2012. Available at: https://unfccc.int/files/adaptation/cancun_adaptation_framework/application/pdf/naptechguidelines_eng_high__res.pdf (accessed 30th January 2021)

[47] Adaptation community (2021). NAP & NDC: Aligning NAP and NDC for coherent Climate Adaptation Action. Available at: https://www.adaptationcommunity.net/nap-ndc/ (accessed 30th January 2021)

[48] NAP Global Network (2021). NDC-NAP Alignment. Available at: https://napglobalnetwork.org/themes/ndc-nap-linkages/ (accessed 30th January 2021)

[49] Adaptation Community (2021). NAP & NDC. Available at: https://www.adaptationcommunity.net/nap-ndc/ (accessed 3rd February 2021)

[50] GIZ (2020). The Role of the NAP Process in Translating NDC Adaptation Goals into Action Linking NAP processes and NDCs. Available at: https://www.adaptationcommunity.net/wp-content/uploads/2017/10/The-Role-of-the-NAP-Process-in-Translating-NDC-Adaptation-Goals-into-Action.-Linking-NAP-processes-and-NDCs.pdf (accessed 3rd February 2021)

[51] GIZ (2020). The Role of the NAP Process in Translating NDC Adaptation Goals into Action Linking NAP processes and NDCs. Available at: https://www.adaptationcommunity.net/wp-content/uploads/2017/10/The-Role-of-the-NAP-Process-in-Translating-NDC-Adaptation-Goals-into-Action.-Linking-NAP-processes-and-NDCs.pdf (accessed 3rd February 2021)

[52] Adaptation Community (2021). NAP&NDC. Available at: https://www.adaptationcommunity.net/nap-ndc/ (accessed 3rd February 2021)

[53] Adaptation Community (2021). NAP&NDC. Available at: https://www.adaptationcommunity.net/nap-ndc/ (accessed 3rd February 2021)

[54] NAP Global Network (2021). The NAP process and the Sustainable Development Goals - Strengthening the means of implementation. Available at: https://napglobalnetwork.org/2015/09/sdgs/ (accessed 17th February 2021).

[55] United Nations Framework Convention on Climate Change (2021). Overview - National Adaptation Plans. Available at: https://unfccc.int/topics/resilience/workstreams/national-adaptation-plans/overview (accessed 29th January 2021)

[56] UNFCCC (2012). The National Adaptation Plan Process - A brief overview. Available at: https://unfccc.int/files/adaptation/application/pdf/nap_overview.pdf (accessed 3rd February 2021)

[57] NAP Global Network (2017). Financing National Adaptation Plan (NAP) Processes: Contributing to the achievement of nationally determined contribution (NDC) adaptation goals. Available at: https://www4.unfccc.int/sites/NAPC/Documents/Supplements/napgn-en-2017-financing-nap-processes.pdf (accessed 03rd February 2021)

[58] NAP Global Network (2017). Financing National Adaptation Plan (NAP) Processes: Contributing to the achievement of nationally determined contribution (NDC) adaptation goals. Available at: https://www4.unfccc.int/sites/NAPC/Documents/Supplements/napgn-en-2017-financing-nap-processes.pdf (accessed 03rd February 2021)

[59] NAP Global Network (2017). Financing National Adaptation Plan (NAP) Processes: Contributing to the achievement of nationally determined contribution (NDC) adaptation goals. Available at: https://www4.unfccc.int/sites/NAPC/Documents/Supplements/napgn-en-2017-financing-nap-processes.pdf (accessed 03rd February 2021)

[60] NAP Global Network (2019). The National Adaptation Plan (NAP) Process: Frequently Asked Questions. Available at: https://napglobalnetwork.org/2019/12/the-national-adaptation-plan-nap-process-frequently-asked-questions/#:~:text=The%20NAP%20process%20was%20formally,as%20a%20separate%20environmental%20issue (accessed 29th January 2021)

[61] NAP Global Network (2018). sNAPshot Monitoring and Evaluation in the NAP Process: Opportunities, challenges and emerging solutions. Available at: https://napglobalnetwork.org/wp-content/uploads/2018/01/napgn-en-2018-snapshot-monitoring-and-evaluation-in-the-nap-process-opportunities-challenges-and-emerging-solutions.pdf (accessed 3rd February 2021)

[62] UNFCCC (2012). The National Adaptation Plan Process - A brief overview. Available at: https://unfccc.int/files/adaptation/application/pdf/nap_overview.pdf (accessed 3rd February 2021)

[63] NAP Global Support Programme (2021). Supporting Burundi to Advance their NAP Process. Available at: https://www.globalsupportprogramme.org/projects/supporting-burundi-advance-their-nap-process

[64] https://napglobalnetwork.org/wp-content/uploads/2019/05/napgn-en-2019-infographic-addressing-gender-equality-in-climate-change-adaptation.pdf

[65] UNEP (2021). Adaptation Gap Report 2020. Available at: https://reliefweb.int/report/world/adaptation-gap-report-2020

[66] https://www.fordfoundation.org/about/people/diversity-equity-and-inclusion/

[67] https://yaleclimateconnections.org/2020/07/what-is-climate-justice/

[68] https://www.oxfam.org/en/pressroom/pressreleases/2015-12-02/worlds-richest-10-produce-half-carbon-emissions-while-poorest-35

[69] https://napglobalnetwork.org/themes/gender/

[70] https://napglobalnetwork.org/wp-content/uploads/2019/06/napgn-en-2019-infographic-acting-on-the-gender-action-plan-gap.pdf

[71] https://napglobalnetwork.org/wp-content/uploads/2019/06/napgn-en-2019-infographic-acting-on-the-gender-action-plan-gap.pdf

[72] https://napglobalnetwork.org/resource/infographic-addressing-gender-equality-in-climate-change-adaptation/

[73] https://unfccc.int/files/adaptation/cancun_adaptation_framework/application/pdf/naptechguidelines_eng_high__res.pdf

[74] https://www.adaptationcommunity.net/download/ms/mainstreaming-guides-manuals-reports/NAPAlign_25.11.14.pdf

[75] https://www.adaptationcommunity.net/download/ms/mainstreaming-guides-manuals-reports/NAPAlign_25.11.14.pdf

[76] Mason et al. (2015). Accessing and Using Climate Data and Information in Fragile, Data-Poor States. Available at: https://www.iisd.org/system/files/publications/accessing-climate-data-information-fragile-data-poor-states.pdf?q=sites/default/files/publications/accessing-climate-data-information-fragile-data-poor-states.pdf

[78] WMO (2017). WMO Guidelines on Generating a Defined Set of National Climate Monitoring Products. Available at: https://library.wmo.int/doc_num.php?explnum_id=4213

[79] WMO (2018). Guidance on Good Practices for Climate Services User Engagement. Available at: library.wmo.int/doc_num.php?explnum_id=4550

[80] WMO (2018). National Climate Outlook Forums and National Climate Forums. Available at: http://www.wmo.int/pages/prog/wcp/ccl/opace/opace3/documents/NCOF-Concept-Note_28022018.pdf

[81] WMO (2018). Step-by-step Guidelines for Establishing a National Framework for Climate Services. Available at: https://gfcs.wmo.int/step-by-step-guidelines-nfcs

[82] UNEP (2021). Adaptation Gap Report 2020. Available at: https://reliefweb.int/report/world/adaptation-gap-report-2020

[83] Watkiss, P., Hunt, A., Blyth, W., & Dyszynski, J. (2015). The use of new economic decision support tools for adaptation assessment: A review of methods and applications, towards guidance on applicability. Climatic Change, 132(3), 401-416.

[84] Salas, J., & Yepes, V. (2019). MS-ReRO and D-ROSE methods: Assessing relational uncertainty and evaluating scenarios' risks and opportunities on multi-scale infrastructure systems. Journal of cleaner production, 216, 607-623.

[85] Dittrich et al. (2016). A survey of decision-making approaches for climate change adaptation: Are robust methods the way forward? https://www.sciencedirect.com/science/article/abs/pii/S0921800915004887

[86] Nkoana, E. M., Verbruggen, A., & Hugé, J. (2018). Climate change adaptation tools at the community level: An integrated literature review. Sustainability, 10(3), 796.

[87] https://www.deltares.nl/en/projects/rises-3

[88] https://www.deltares.nl/en/projects/bottom-climate-adaptation-strategies-towards-sustainable-europe-base

[89] https://www.deltares.nl/en/projects/development-of-a-flood-early-warning-system-and-an-adaptive-flood-risk-management-plan-for-sukhothai-district-yom-river-basin

[90] https://www.deltares.nl/en/adaptive-pathways/

[91]https://link.springer.com/article/10.1007/s10584-019- 02445-2

[92] https://napglobalnetwork.org/themes/strategic-communications/

[93] https://napglobalnetwork.org/themes/vertical-integration/

[94] Dazé, A., Price-Kelly, H. and Rass, N., 2016. Vertical Integration in National Adaptation Plan (NAP) Processes: A guidance note for linking national and sub-national adaptation processes. International Institute for Sustainable Development. Winnipeg, Canada. Available online at: www.napglobalnetwork.org

[95] Regmi BR, Karki G (2010) Local adaptation plan of action (LAPA). Tiempo 76:21–25

[96] Dazé, A., Price-Kelly, H. and Rass, N., 2016. Vertical Integration in National Adaptation Plan (NAP) Processes: A guidance note for linking national and sub-national adaptation processes. International Institute for Sustainable Development. Winnipeg, Canada. Available online at: www.napglobalnetwork.org

[97] Prevention Web (2021). DRR4NAP: Integrating Disaster Risk Reduction into National Adaptation Planning. Available at: https://www.preventionweb.net/events/view/55715?id=55715 (accessed 17th February 2021).

[98] https://napglobalnetwork.org/wp-content/uploads/2016/11/napgn-en-2016-vertical-integration-in-national-adaptation-plan-processes-a-guidance-note-for-linking-national-and-sub-national-national-adaptation.pdf

PHASE 2
IMPLEMENTATION & MONITORING

Photograph © Eduardo Romero, Mangrove

PHASE 2: NAP IMPLEMENTATION AND MONITORING

7. NAP IMPLEMENTATION BASICS

7.1. WHAT IS NAP IMPLEMENTATION?

NAP implementation allows countries to make adaptation a long-term priority and supports the establishment of national climate policy and governance. It requires a clear understanding of priorities, supporting policy measures and adaptation choices, harnessing necessary skills and capacities to ensure process quality and continuity, a comprehensive financing strategy, as well as well-aligned institutional arrangements, oversight, and mechanisms to embed learning mechanisms. The NAP process should consider multiple temporal (short, medium, and long-term) and spatial (local, regional, and global) scales, as adaptation is not a sole effort of every country but a node within a complex international climate governance setting. Adaptation is not simply about building resilience in a particular country or city but about seeing the connections that make it possible. When implementing NAP activities, it is important to consider the risks of maladaptation, which can occur as results of inaccurate information, lock-ins or ineffective learning. Also, the impacts of adaptation in one place should not decrease possibilities for adaptation or vulnerability in another location, which may happen under unequally distributed resources or unconsidered externalities. The temporal aspect is crucial: some adaptation measures (such as building a seawall to protect from the rising sea) may be effective over the short-term but may become inefficient over the medium or long-term. This complexity calls for establishing a clear plan of activities for NAP implementation.The central guiding document for the NAP implementation phase is the "National Adaptation Plan". The UNFCCC website currently represents 21 submitted NAPs from developing countries since 2016, including 4 by the LDCs. Currently, this represents a minority of countries that are most vulnerable to climate change[99]. Click here to see if your country has submitted its National Adaptation Plan to the UNFCCC. The NAP process refers to the formulation, implementation, and review of NAPs. Element C of the Technical Guidelines regards the design of implementation strategies of the national adaptation plans. The main outputs of Element C should be the development of 1) a strategy for implementing the NAPs and 2) concrete activities to implement priorities identified in the NAPs. NAP roadmaps, through four main steps, can be used to guide this process. The result of the NAP process entails building capacity and long-term resilience in an equitable, fair, robust, and inclusive manner.

Countries face challenges at all stages in the NAP process, particularly in moving from adaptation planning to actual implementation on the ground via visible investments which are designed and executed to strengthen the resilience of vulnerable people and communities (see Figure 11 below). Adaptation activities require systematic investments on the ground that make a visible difference to vulnerable individuals and communities (right-hand side of the graph).

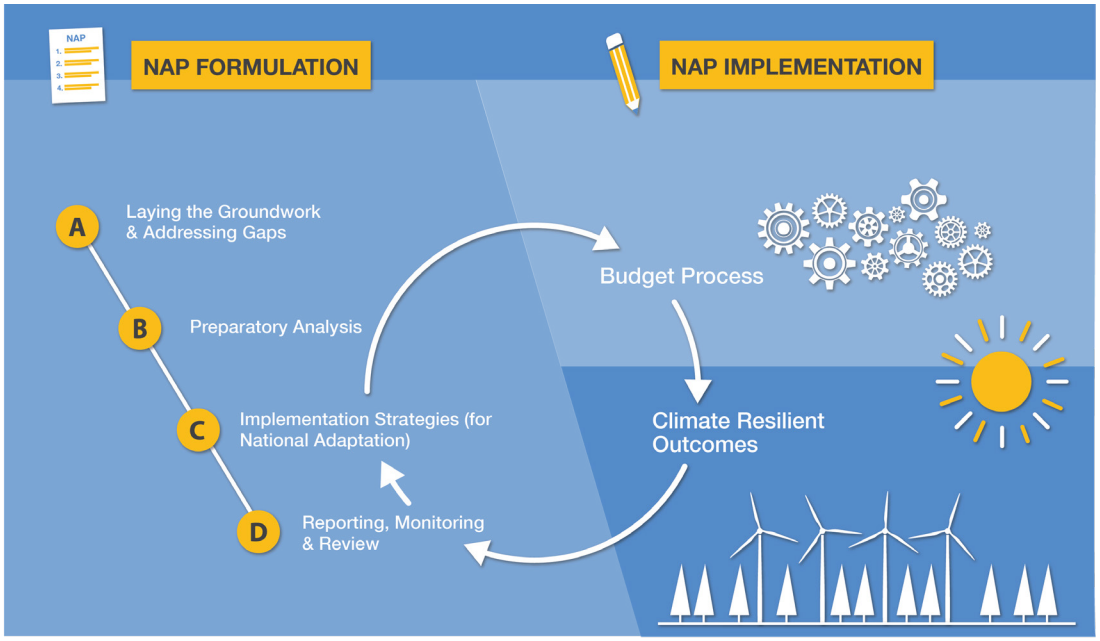

Figure 11 The connection between NAP formulation and implementation[100]

The specific actions to be implemented will depend on the activities prioritized in the national adaptation plan and may cover establishing new regulations, targeted engagement, and outreach, improving access to information or specific practices, and investing in infrastructure and technology, among others. NAP implementation takes place via a combination of actions that take place through top-down and bottom-up approaches. The figure below outlines the interplay between top-down and bottom-up dynamics of adaptation governance, providing a review of key actors and functions at every level, the flows of information between levels, and sources of data and knowledge that serve as a foundation for decision-making. This creates an interdependent environment where every decision and every actor contribute to the overall outcome.

Roles played by different parties and outcomes of their activities will often depend not on the approach chosen, but on the people using it. The State can be an actor behind decentralization, while strong and focused leadership by a particular local organization can lead to limited inclusion (or vice versa). This means that top-down and bottom-up approaches are to be taken as general markers to understand the sources of decision-making and common patterns, rather than as universal definitions.

POLYCENTRICITY	The NAP process can help countries better manage disaster risks in line with the Sendai Framework for Disaster Risk Reductio. A complex form of governance where decision-making takes place simultaneously by multiple entities and features both collaborative and competitive relationships[102]

To understand what it takes to form a governance regime, we need to consider how different elements interact with each other. Combinations of top-down and bottom-up action may be different in every case and are negotiated between actors in a polycentric setting with stakeholders whose capacities, areas of influence and interests form a particular governance model (see an example of factors in Figure 12 below).

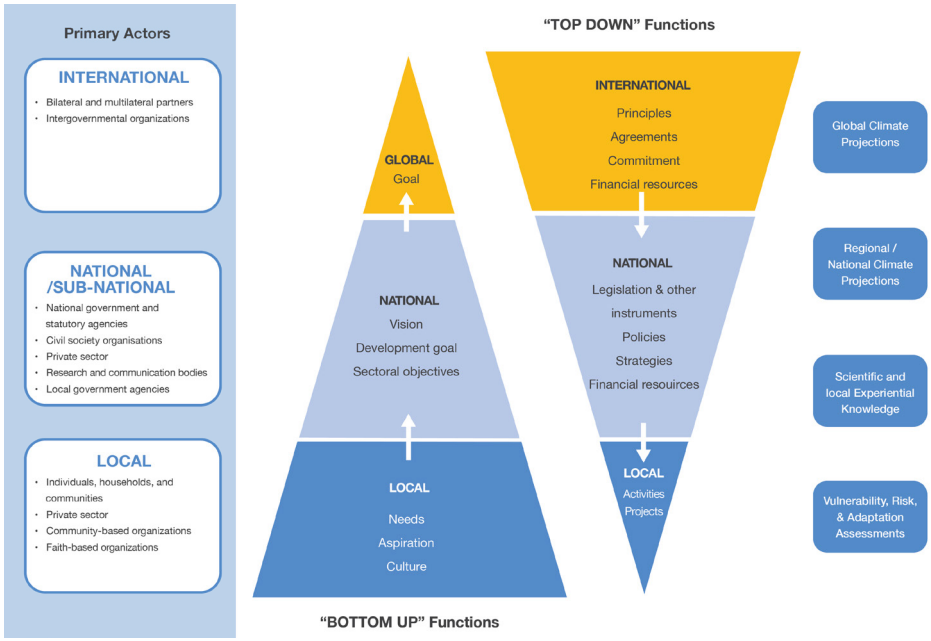

Figure 12 The interplay between top-down and bottom-up adaptation efforts[101]

Successful adaptation governance requires an understanding of practices at different levels, relationships between actors and across levels, as well as the linkages between particular actors, interests, or issues that span different mandates. Understanding and managing this complexity form the basis for a sound NAP implementation process and climate change adaptation in general.

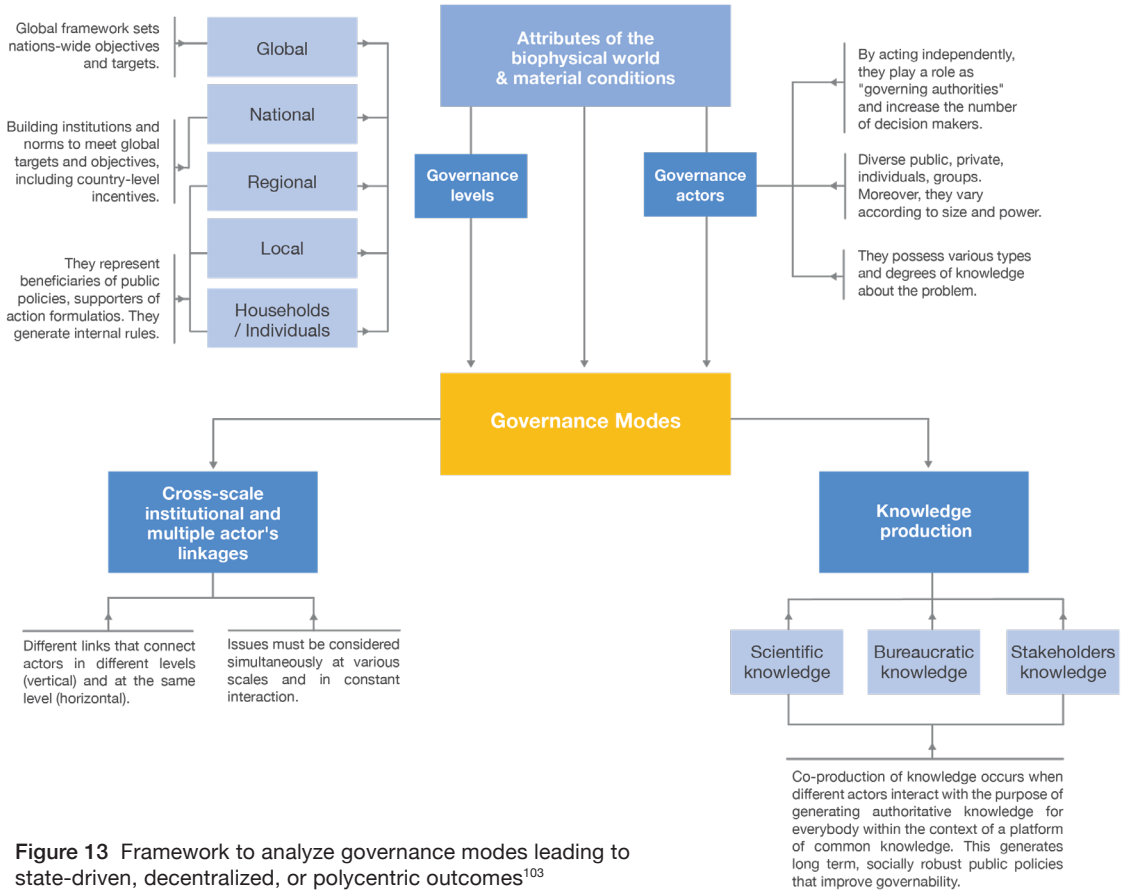

Figure 13 Framework to analyze governance modes leading to state-driven, decentralized, or polycentric outcomes[103]

7.2. TOP-DOWN: STRATEGY,POLICIES, OPTIONS, & COORDINATION

Top-down implementation stems from select sources of expertise, power of law, and authority. It tends to centralize decision-making, standardize procedures, use advanced analytical tools, and mainstream knowledge to create a long-term vision and strategy within a rather slow national process.

For the past decade, the integration of adaptation into national priorities has been on the rise in most countries. The top-down approach to adaptation is under significant influence of national political regimes and structures, social and economic situations, cultures and value systems, vulnerabilities to climate, as well as differing perspectives of powerful actors[104].

National governments or their authorities often take the lead in defining a NAP policy and legal framework, as well as adaptation priorities, including those for different sectors, and at the local and regional level. Such decision-making allows for a coherent national approach and clear definition of stakeholder roles but does not always guarantee coordination of actor priorities or consideration of local needs and vulnerabilities.

DRC is a vivid example of a country highly vulnerable to climate change that produces a tiny share of global carbon emissions (0.09%). The country deals with high population growth and multiple challenges that are expected to be exacerbated by climate change, such as food insecurity, water stress, increased climate migration and eroding social networks, among others. As part of the NAPA process, DRC has implemented four projects to address key adaptation needs, including:

- NAPA-ASA (Agricultural Sector Adaptation) 2010-2013: to improve the resilience of four pilot provinces
- NAPA-ASA 2 (Agricultural Sector Adaptation) 2015-2019: to share lessons learned with other provinces
- NAPA-AFE (Adaptation Women and Children) 2015-2020: focused on improving the resilience of women and children to climate change
- NAPA Coastal Zone 2015-2020: combating coastal erosion in Kongo Central and Muanda provinces.

Building on the identification of gaps and barriers to an effective NAP process (institutional coordination capacity, policy fragmentation, limited domestic finance) DRC used a US$ 1.3 million grant from GCF to mainstream implementation of the Policy, Strategy and Action Plan on Climate Change[105]. The project has helped facilitate the NAP process through improving integration with national priorities and supporting more sound decisions on climate finance. The Ministry of Environment and Sustainable Development (MESD) has facilitated creating a multisectoral and multidisciplinary framework paired with policy documents to guide action at the provincial level. NAP implementation is overseen by a steering committee including the Department of Sustainable Development (DSD), under MESD, the National Designated Authority (NDA) of the GCF, and the Ministries of Planning and Budgeting[106]. Sectoral ministries are responsible for NAP in particular sectors. The first National Adaptation Plan was officially issued in January 2021, featuring a set of options for further implementation[107]. DRC has put significant focus on integrating development and sectoral priorities with adaptation measures, such as improving access to drinking water and sanitation, combating soil erosion and deforestation. The authorities have learned to leverage international support to build institutional capacity, invest in the resilience of climate-vulnerable sectors, and develop adaptive capacity at the livelihood level and among smallholder farmers. Along with the significant progress made in the past decade, recent analyses highlight the need for strengthening monitoring and evaluation of finance flows, a more strategic approach to climate finance, and scaling up experiences learned to date[108,109].

Box 1 Streamlining NAP implementation in the Democratic Republic of the Congo (DRC)

Top-down actions are important for (i) effective collection of data and insights ensuring a common national approach; (ii) building an internally coherent and consistent database (ownership and coordination are usually ensured by specific ministries/departments, such as the National Statistics Office, NMHSs, etc.); (iii) understanding of capacities across levels and regions; and (iv) the distribution of nationally channelled resources to actors based on their differentiated needs and vulnerabilities.

As political cycles change there is always a significant risk of a shift in national priorities, which may be particularly challenging for countries with weak institutions and an absence of a strong national adaptation framework[110]. This requires considering top-down action within a broader political, social, and ideological context.

7.3 BOTTOM-UP: URBAN CLIMATE GOVERNANCE & COMMUNITY-BASED ADAPTATION

Bottom-up implementation leverages local capacities, cultural backgrounds, and situated knowledge to generate adaptation outcomes that resonate with the needs of specific local actors or larger communities.

Since adoption of the Paris Agreement, bottom-up climate action has seen a rapid rise, with the involvement of local planning agencies, consultants, and civil society.

Local actors often exemplify high commitment, a good understanding of their needs, and the capacity to generate novel adaptation solutions. However, these actors also often lack the necessary capacities to make use of complex models, financial means, skills, and tools to make sound decisions in the light of uncertainty, while their focus may be limited to a particular type of expertise or a narrow range of issues in question. This makes bottom-up adaptation necessary, yet not a replacement for effective top-down measures. Two of the most common approaches to local-scale climate adaptation action are urban climate governance and community-based adaptation. While the first one builds on the capacities of local authorities, adding perspectives of other actors to shape a bottom-up approach, the latter is much more citizen-driven and significantly defined by the vision of specific community actors and groups.

Urban climate governance recognizes the high potential for cities to address significant drivers of climate change, such as unsustainable lifestyle patterns and outdated energy systems, as well as sources of vulnerability, such as urban heat islands. Urban climate governance is often characterized by a polycentric structure, with significant roles played by city mayors, local and international NGOs, local academic institutions and think tanks, transnational municipal climate networks, as well as active citizens.

Cities are uniquely positioned to facilitate "behavioral, economic, and technological interventions111" for climate adaptation. They have "the power to inspire, to connect and to energize people to take meaningful action in the face of the climate emergency[112]".

As cities across the globe are facing increasing climate pressures, the Paris Agreement has been an important milestone in acknowledging the role of action at the local level (Articles 7.5, 11.2)[113]. Cities are often considered particularly vulnerable to climate change due to the concentration of critical infrastructure and human pressures on the environment. They also face unique challenges, such as heat islands or the potential to suffer great losses in the case of extreme weather events. Cities serve as a great example of possibilities for highlighting how horizontal integration works via coordination between different city departments and local stakeholders, private-public partnerships, and other collaborations that resonate with local needs while helping to address specific climate vulnerabilities.

Many consider cities a great complement to the slow, centralized, and bureaucratic processes occurring at the international and national scale. Mayors can set ambitious climate goals, act quickly and move forward reaching defined targets, while their capacity for networking and climate sharing allows for rapid learning, dissemination, and scaling of impactful solutions. Transnational municipal climate networks, such as the Global Mayors Covenant on Climate & Energy, C40 Cities Climate Leadership Group, and ICLEI have proven particularly impactful in terms of generating wide support from decision-makers and accumulating necessary financial resources, however, the transformative edge of urban climate networks has also been scrutinized[114].

Urban adaptation to climate change is particularly fueled by a rapidly growing body of research focused on multiple domains at the city-climate nexus. Multiple meta-studies integrating knowledge and constant innovation in urban climate governance frameworks make best practices increasingly available to decision-makers[115]. There is also a growing body of research and guidance on urban climate solutions, with an understanding of linkages between actions, outputs, their outcomes, and impacts, as presented in Figure 14 below, allowing to shape a clear intervention logic.

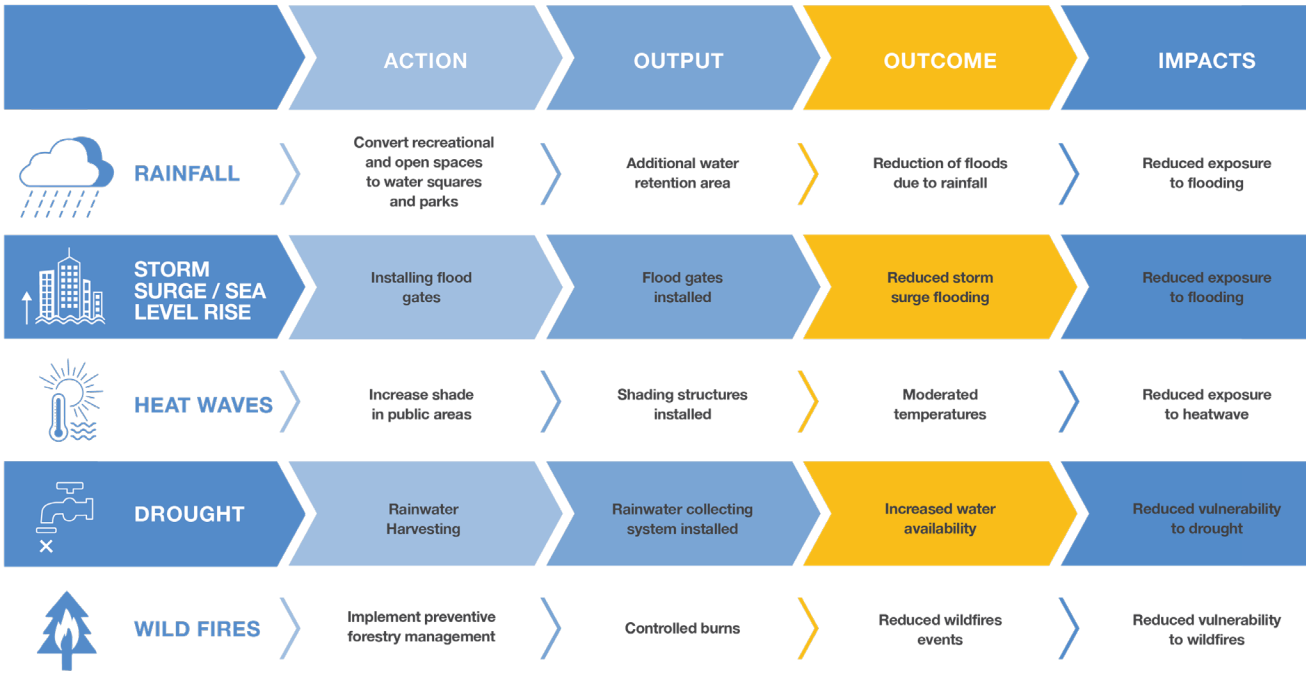

Figure 14 Urban climate risks and intervention logic behind different responses

The critics of current urban adaptation action have focused on the fact that to date much of the urban governance innovation, research, best practices, and insights have been coming from a relatively small share of leading cities that have been able to accumulate large resources and prioritize climate action[116].

For many smaller or secondary cities, however, this often remains a challenge, which may lead to a growing gap in adaptation actions. Inequalities in exposure to risks, as well as access to participation, decision-making, capacity building, and adaptation outcomes are also commonplace at a city level due to unequal power relations and unfair resource distribution[117].

Due to the consequences imposed by a changing climate, Copenhagen may suffer due to more severe cloudbursts, which overwhelm the drainage capacity of the sewers and can lead to flooding. A cloudburst event in 2011 led to over EUR 600 million of damages from flooding prompting city authorities to act on the issue, leading to the development of the Cloudburst management plan, Copenhagen climate adaptation plan and several other strategic and operational documents. The plan to safeguard against impacts of future cloudbursts included:

- Reducing damages from floods by securing basements and other property-level measures
- Expanding green space and restoring waterways to target flows of water
- Building a tunnel to improve drainage capacity and redesigning roads to direct excess rainfall to the sea

Dedicated masterplans covered 8 central city catchments with a total of 34 km^2 and featured 300 projects to be developed over a 20-years' timeframe. The total costs of the developed measures were estimated at EUR 1.7 billion, most of it coming from water charges, and part of it from private investment and city funds. The expected net benefits are EUR 400 million, compared to net costs of EUR 540 million if no nature-based solutions were considered. The highlighted benefits of urban nature-based solutions include flood peak reduction, reduced load on sewage systems, reduced run-offs, and increased biodiversity among others[118].

Today, the city operates as a large experimental hub (consider its Climate Adaptation Living Lab uniting multiple actors) for iterative testing of different climate innovations with the potential to scale up and commercialize. The city has been one of the pioneers in the implementation of Climate-resilient neighborhoods, combining adjustments to infrastructure, urban architectural form and societal learning. For example, a city square in Frederiksberg (independent musicality situated within Copenhagen) has been redesigned for stormwater retention capacity, featuring permeable tiles and recreational facilities to prevent flooding, also enhancing air quality, and mitigating the heat island effect, which reflects the common-place pursuit for capturing multiple co-benefits, along with the adaptation outcomes.

Authorities invest heavily in both mitigation and adaptation, while pursuing a green growth agenda, becoming one of the few cases of rapidly decreasing climate impacts paired with promising sustainable development outcomes. Other noteworthy solutions include multipurpose catchment monitoring, rain gauge test facility, digitalization of cloudburst systems, co-management of the drainage system and GIS-based platform for collaborative adaptation. Meanwhile, citizens are continuously moving towards more sustainable lifestyles and have opportunities to learn specific adaptation actions (such as cloudburst valves), allowing for rapid progress on multiple fronts[119].

Box 2 Copenhagen: weaving nature and technology for climate resilience

In further extending urban climate governance, and adaptation, it will be important to channel some of the resources currently coming directly to national governments to local decision-makers, continuing research on specific urban vulnerabilities, prospective nature-based solutions, and institutional capacity building and learning, as well as facilitating the potential of cities beyond the narrow leadership group.

Urban climate governance still represents a highly coordinated and complex effort. Community-based adaptation comes as an opposite to the organized urban adaptation governance, even if it can often play a central role in this process.

Community-based adaptation has been promoted by a range of NGOs and international agencies to foster participatory and deliberative forms of adaptation governance while empowering communities to learn about climate change and meaningfully engage with its impacts. It often builds on assumptions about low initial capacities and strives to promote low-regret and high-yield actions, such as natural climate solutions.

- Focus on social groups at the local level that are vulnerable to climate change
- Local development that benefits community resilience and adaptative capacity
- Adaptation strategies and tactics with the active involvement of local stakeholders
- Citizen-science, communities of practice, and hybrid forms of knowledge
- Working with existing cultural norms and addressing causes of climate change locally
- High acceptance, ownership, and self-sustainability of initiatives

Box 3 What makes community-based adaptation stand out? [120]

Multiple case studies suggest that the methodologies and approaches utilized by community-based adaptation (CBA) facilitate inclusion and collaborative decision-making, better operationalize vulnerability and build climate resilience beyond technology, focused on knowledge, skills, mutual support, and social learning.Community-based adaptation has been criticized for an overly “romantic” representation of community dynamics with the need to consider the non-homogeneous nature of local groups, differentiated interests, and vulnerabilities, as well as hidden power dynamics. This requires a reflexive application of community-based adaptation, considering its actual representation of local interests and limitations posed by the involvement of certain actors and the non-involvement of others.

Dealing with water stress in Peru caused by the retreat of the Huayatapallana glacier, the CBA supported increased cultivation of native potato and quinoa varieties with lower water requirements compared to previous arrangements, while increasing the nutritional value of food.

Across 20 villages in India, local Adivasi (tribal) women were provided with training about their rights and opportunities for increasing resilience to climate change. The project led to five times higher participation from local women, as compared to baseline levels, allowing women to express their concerns about local climate change issues that required attention.

The Vanuatu NGO Climate Change Adaptation Programme united multiple national and international NGOs, which learned from each and developed a common approach to building climate change resilience in Vanuatu. The collaboration allowed the development of a shared understanding of community resilience to include such aspects as consideration of basic needs, risk-taking, diversity, inclusion, networking etc. The developed framework was used as a common reference for NGOs dealing with different projects and donors. The process allowed links between traditional knowledge and contemporary science insights, as well as strengthened civil society participation and advocacy. The project covered communities across 11 islands in 4 provinces. It led to greater consideration of community perspectives and lessons learned within the National Advisory Board on climate change and disaster risk reduction.

Box 4 Examples of community-based adaptation[121]

Current experience suggests that with sufficient yet respectful support from state and other actors that have access to significant resources, bottom-up climate action can help to improve local climate resilience, generate useful knowledge, and lead to social innovations beyond generic top-down approaches. Today, community-based adaptation experiences are increasingly shared, replicated, and upscaled nationally and internationally.

Country experiences to date have shown that combining top-down and bottom-up approaches may lead to improved links between adaptation planning and implementation[122], while dissemination of multi-scalar activities and establishment of polycentric governance leads to further diffusion of the boundary between top-down and bottom-up approaches to the NAP process.

Photograph © UNEP

7.4 CLIMATE SCIENCE AND INFORMATION SERVICES FOR NAP IMPLEMENTATION

NAPs serve as a vehicle for the implementation of climate services, while sound climate science and information can facilitate NAP implementation. NAPs benefit from information on climate variability, trends and extremes and contain provisions that promote the climate services needed to achieve desired climate-related development outcomes[123].

NAP implementation involves decisions related to climate risk management, which must be based on reliable, relevant, usable, and timely climate information. Climate services provide insights on past, present and potential future climate, supporting decisions across different sectors and scales. Climate services are thus necessary for an effective NAP process, assessment of climate vulnerabilities, identification of adaptation options, and development of activities that improve resilience to climate change. Climate information is essential across each of the four elements of the NAP process, as presented in Table 1 below.

ELEMENT	SIGNIFICANCE	EXAMPLE
A	Producers of climate information can archive past losses, provide in situ and space-based Earth system observing networks for the monitoring and detection of hazards, real-time monitoring of hazards and development of historical databases.	Use of historical and real-time observational records to formulate drought indices.
B	NMHSs and Regional Climate Centres (RCC) synthesize available analyses of current and future climate, understand vulnerabilities, projected climatic changes, and associated impacts.	Facilitating appraisal and prioritization of adaptation options.
C	In producing information on weather and climate it is possible to identify priority regions based on analysis of their vulnerability to weather and climate extremes and target where strengthening is needed.	Collecting information on vulnerable regions and production of Early Warning Systems (EWS).
D	Climate information and services can assist countries in reviewing past adaptation efforts, the current NAP process to assess progress, effectiveness, and gaps. Indicators will create a favorable knowledge base for return on investment.	Providing users with the relevant information to iteratively update the NAP and to create a favorable environment.

Table 1 Significance of climate services to the NAP process[124]

Seasonal forecasts can support the NAP process Element C specifically in Step 2: Developing a (long-term) national adaptation implementation strategy[125], assisting users in planning for capital investments, designing climate-resilient equipment and buildings, as well as considering sectoral impacts. They also help summarize and explain extreme weather events, e.g., describe or update an important predicted event such as a strong El Niño.

Climate indices are another example of a clim ate information product that helps countries with NAP implementation. They are widely used to characterize climate features and detect changes and may apply to individual climatological stations or describe a particular aspect of the climate of an area. Indexes usually combine several elements into characteristics of, for example, droughts, heat waves and large-scale circulation patterns. Using climate indices to develop climate indexes allows evaluating the vulnerabilities of different sectors. If climate indices show rising temperatures projected from a changing climate for a given agricultural region, and that region is known to be particularly reliant on a crop that is sensitive to temperature, NAP decision-makers should be able to identify climate actions that could address the risk of agricultural productivity loss from this climate-induced scenario. Since gradually rising temperatures can lead to lower crop yields, measures should seek climate-resilient outcomes that can protect the agricultural yield from the expected changes. Here, climate indices allow countries to expand on Element C - Step 1: Prioritizing Climate Change Adaptation in National Planning and Step 3: Enhancing Capacity for Planning and Implementation of Adaptation. Leveraging context-specific knowledge that is scientific and objective helps to determine what climate actions are viable and effective within the range of prevailing climate variability and extremes, as well as under anticipated future climate conditions.

Photograph © UNDP

8. SECTOR-TAILORED ACTIVITIES

8.1. FORESTRY, AGRICULTURE, AND FISHERIES

75% of the food globally comes from 12 plant and 5 animal species making the global food system highly vulnerable to climate change[123].

Feeding the growing global population amidst climate change is a complex challenge. Farmers, fisherman, and foresters are employed in one of the most climate-vulnerable sectors, highly affected by climate change yet with limited capacities for effective responses. Improving the adaptive capacity of these actors requires rethinking the global food system to make it low-carbon, sustainable, and climate-resilient. This is particularly important considering its rapidly growing impact on the environment (see Figure 17 below).

Figure 5 demonstrates negative impacts on each of the three systems (biosphere, food system, health) via colors that radiate outwards. During the past 50 years, the health and food systems have become bigger relative to the biosphere, with growing populations requiring higher volumes of food. We are currently producing enough food per capita

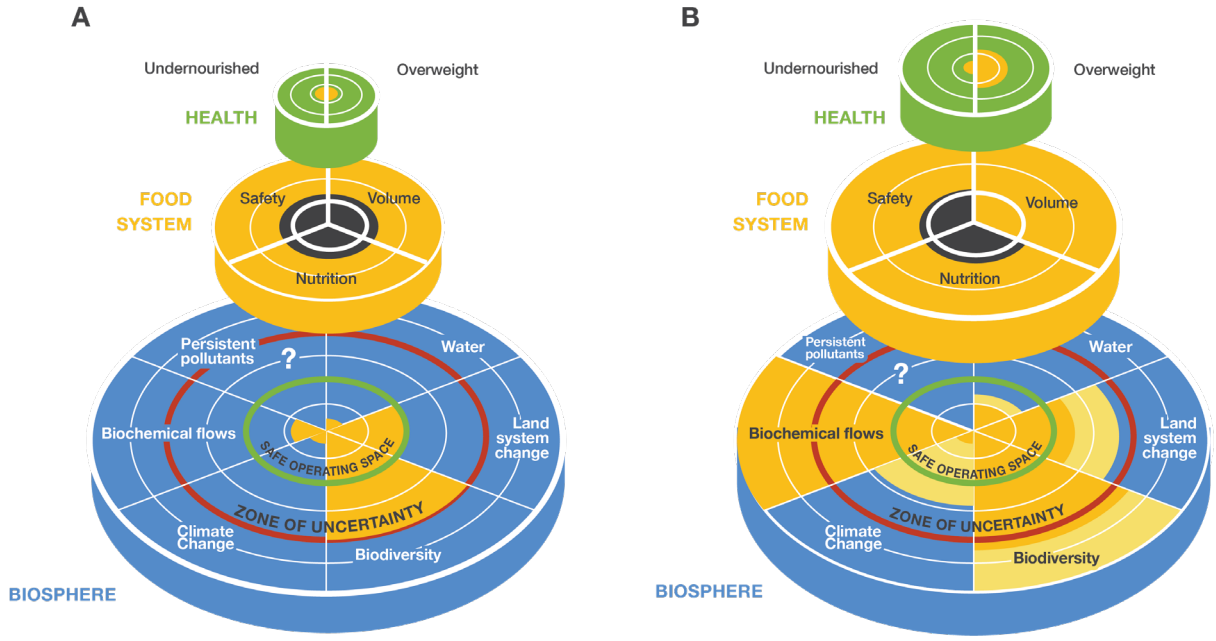

Figure 15 Food system impacts on health and the biosphere: 1961 (left) vs today (right)[128]

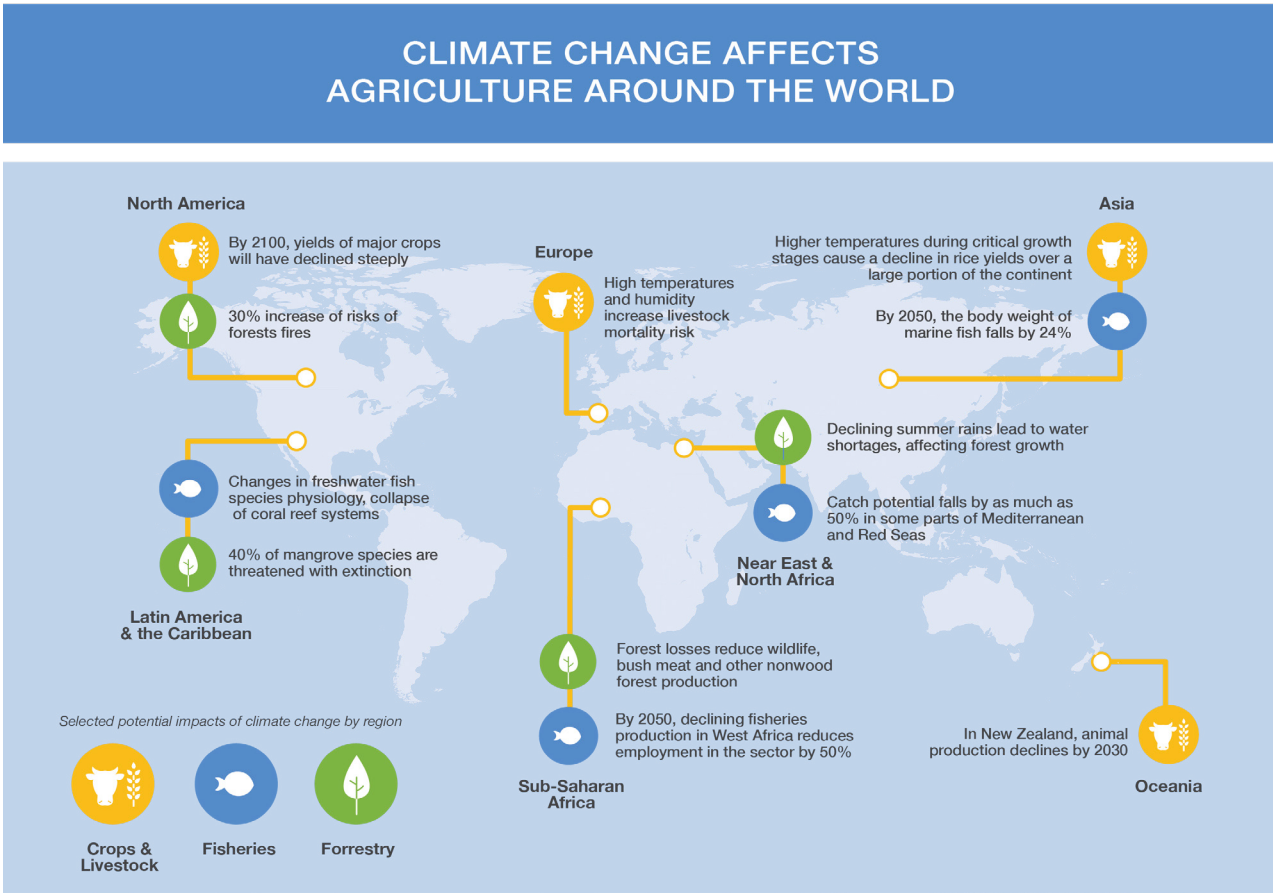

Figure 16 Climate change affects agriculture around the world[129]

As seen in Figure 16, the prospective impacts of climate change on fisheries, forestry, crops, and livestock around the world include effects on production and yield, distribution, seasonality, as well as overall ecosystem dynamics. These trends highlight the importance of food system transformation in adapting to climate change. The CGIAR Research Program has led a collaboration by 100 partners to identify six elements of action and five potential areas to transform the food system under climate change (see Figure 17 below).

It is important to consider the complex dynamics of multi-level and multi-actor contexts, which influence the shaping of national policies. Figure 18 below provides an example from the European Union. Agriculture is linked to climate policymaking and decision-making across multiple levels and mandates, with different types of solutions adopted at different levels to support a systemic and coherent agenda. Much of the necessary action still comes to the national level. FAO has issued several supplementary guidelines on sectoral integration into the NAP process, including both general documents on agriculture[131] and specific documents for fisheries/aquaculture[132] and forestry/agroforestry[133].

These documents build on the best development and implementation experience to date and provide insightful guidance on sector-tailored processes and activities. The key implementation steps identified for agriculture are provided in Table 2 below (see respective documents in aquaculture/fisheries and forestry/agroforestry for other tailored examples).

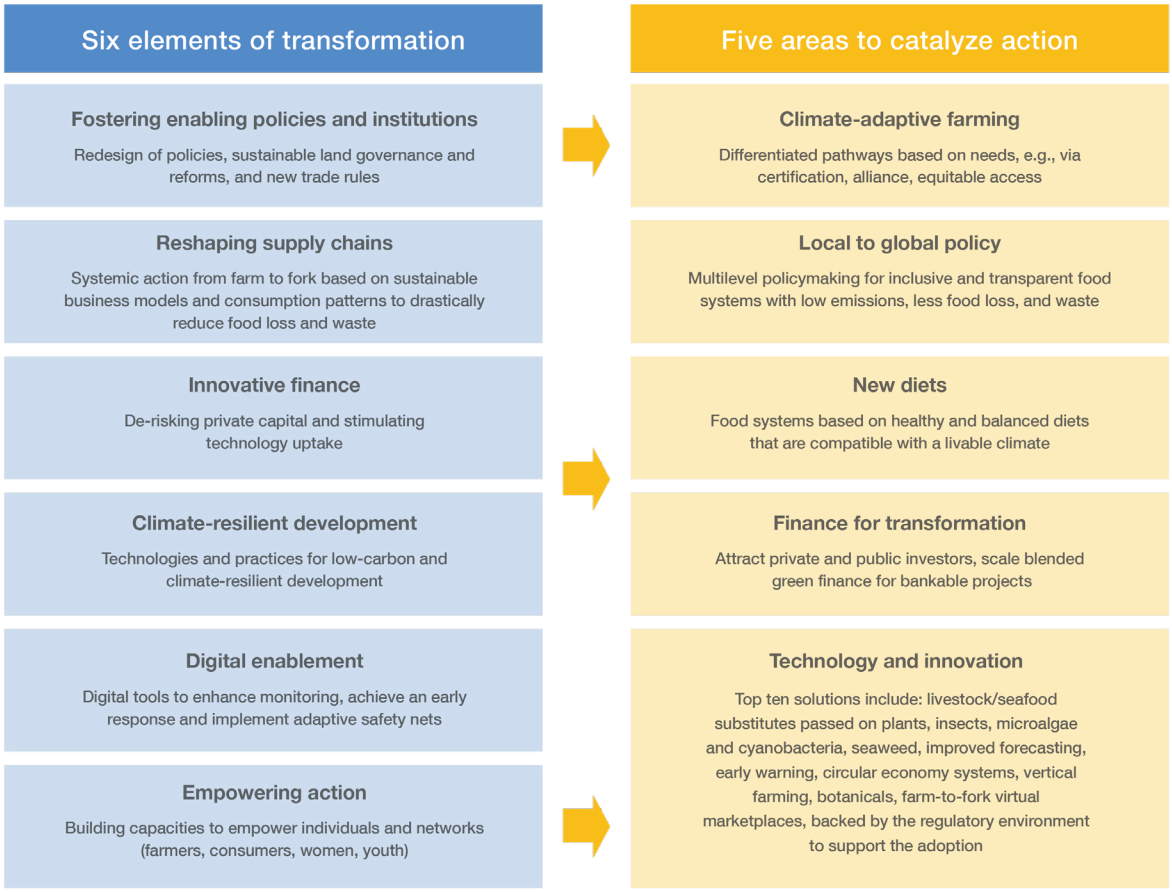

Figure 17 Essential elements and action areas for food system transformation under climate change[130]
Note: arranged and rephrased based on source

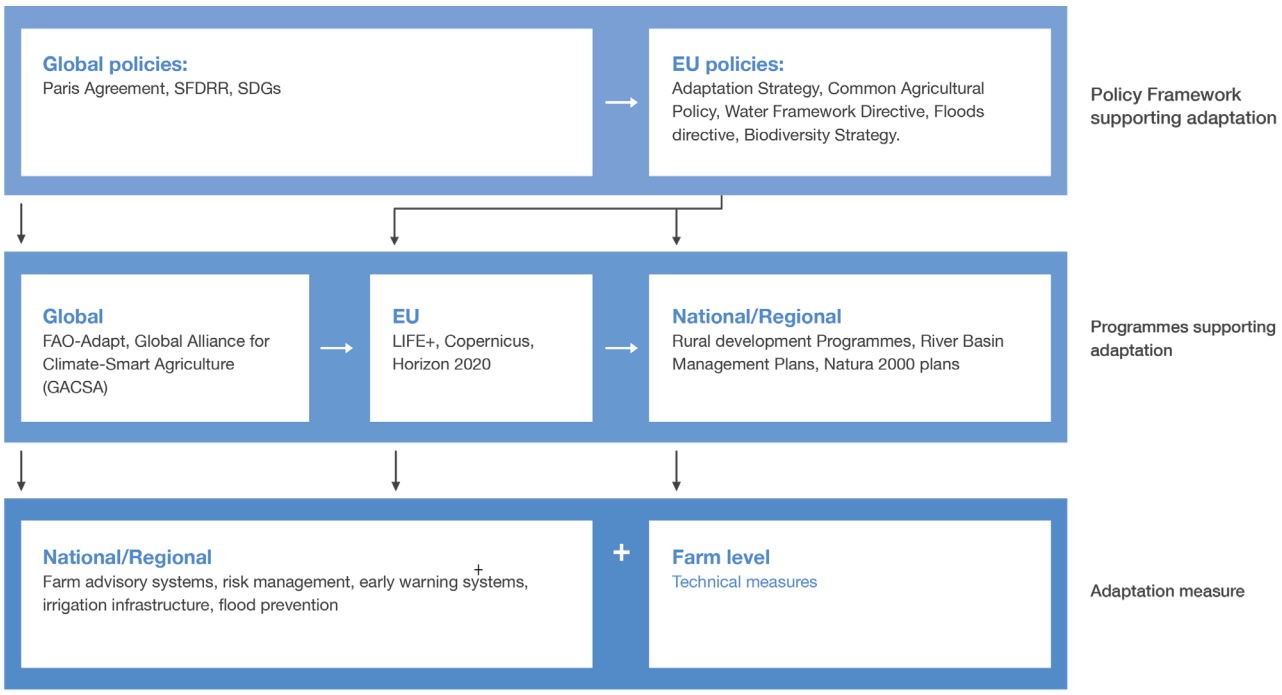

Figure 18 Policies and programmes drive the implementation of measures at different levels

STEP	KEY QUESTIONS
ADDRESSING AGRICULTURE IN NAP	• Are agricultural adaptation priorities adequately included in the NAP? If not, what actions could be taken? • What are the lessons from ongoing programmes? • How could they inform further planning and implementation? • Can new actions be built on the existing ones or is a new approach needed?
PIANNING IMPLEMENTATION	• What are potential approaches for implementing adaptation? • How to integrate adaptation into agriculture planning? • How can we finance this?
DEVELOPING IMPLEMENTATION CAPACITIES	• Is implementation supported by capacity development? • Are all governance levels addressed and engaged? • How does this connect with other sectors?
PROMOTING COORDINATION AND COLLABORATION	• Are all relevant ministries and other stakeholders engaged? • How can regional organizations be reached? • Does this align with Paris Agreement, SDGs, and other relevant frameworks?

Table 2 NAP implementation key steps in the agriculture sector[134]

Building on those general steps and key questions to ask, a tailored policy mix should be developed. Examples of policy measures and actions in the specific case of fisheries (marine and inland) to help fish farmers and processors adapt to climate change are provided in Table 3 below.

Photograph © UNEP

INSTITUTIONS

PUBLIC POLICIES

- Public investments (research, capacity building, communication)
- Incentives to build added value and develop markets through climate-resilient business models.
- Removal of harmful incentives (e.g., for the expansion of fishing capacity)
- Addressing poverty and food insecurity through better fisheries management

LEGAL FRAMEWORKS

- Climate-adaptive legal rules and access rights
- Dispute settlement arrangements
- Regulatory tools (e.g., adaptive control of fishing pressure)

INSTITUTIONAL FRAMEWORKS

- Building dialogue and links among relevant stakeholders
- Improved cooperation for fleet mobility
- Adjust catch considering species distribution

MANAGEMENT AND PLANNING

- Climate-smart management practices, such as EbA or adaptive fisheries
- Co-management, hybrid knowledge, and Integrated coastal zone management (ICZM)
- Water management focused on supporting fishery services
- 'Adjustable' territorial use rights and flexible seasonal rights
- Temporal and spatial planning to permit stock recovery during favorable periods
- Transboundary stock management considering changes in the distribution
- Reduction of stressors (e.g., habitat destruction, pollution) for enhanced resilience

LIVELIHOODS

WITHIN SECTOR

- Fish markets/products diversification, e.g., access to high-value markets
- Supporting sustainable consumer choices
- Incentives to reduce post-harvest losses
- Promotion of eco-labelling and certification
- Flexibility to enable seasonal migration (e.g., following stock migration)
- Fishing patterns diversification considering species exploited, location, and gear
- Promotion of private investment and microfinance for climate-resilient fisheries
- Predicting migration routes and availability of commercial fish stocks

CROSS-SECTORAL

- Livelihood diversification by seasonal switching of farming practices
- Exit strategies for fishers to leave fishing
- Nexus with water, health, and energy implementation

FROM RISK TO RESILIENCE

RISK POOLING AND TRANSFER

- Public and private insurance mechanisms (against fishing hazards, unemployment, death at sea, etc.)
- Personal savings, social protection, and safety nets
- Improve financial security

EARLY WARNING

- The early warning communication and response systems (e.g., food safety, approaching storms)
- Monitoring climate change trends, threats, and opportunities (e.g., of new and more abundant species)
- Extreme weather and flow forecasting

RISK PREVENTION

- Identify risk points
- Safety at sea and vessel stability
- Reinforced barriers to provide a natural first line of protection from storm surges and flooding
- Climate-resilient structures (e.g., protecting harbors and landing sites)

PREPAREDNESS AND RESPONSE

- Building back better and post-disaster recovery
- Rehabilitate ecosystems
- Compensation (e.g., gear replacement schemes)

Table 3 Policy measures to facilitate NAP activities as linked to fisheries[135]

While many of those generic policy measures will make sense for each country, it will be highly important to achieve a policy mix that is representative of, and tailored towards, national needs. Below is an example of how agriculture has been integrated into the NAP process in Uruguay within significant preparatory and capacity building efforts.

In 2000, the Ministry of Livestock, Agriculture and Fisheries of Uruguay created a specialized Climate Change Unit within its Office of Agricultural Programming and Policy to advance technical, policy and monitoring work on agriculture and climate change. In 2016, the Unit was renamed to “Agricultural Sustainability and Climate Change Unit” and became the main focal point for interaction with other authorities and international partners, as described in below.

Uruguay is sensitive to both droughts and floods, while the national economy is highly dependent on food production, which makes the agricultural sector a core priority, as agriculture comprises 70% of the national exports.

The adaptation actions undertaken before the establishment of the plan include[137]:

- Adaptation of cattle production, water resources, feed, and rangeland management
- Soil use and management plans to reduce erosion
- Resettlement of groups vulnerable to floods
- Improvement of the National Protected Areas System
- Restoration and maintenance of coastal ecosystems services
- Development data collection and information systems, climate services, monitoring and early warning systems
- Strengthening of weather, climate, and water services
- Supporting decentralization of the National Emergency System

In 2019, Uruguay published its National Plan for Adaptation to Climate Variability and Change for the Agricultural Sector setting a strategy until 2050 and a detailed action plan until 2025. It was developed over 3 years of consultation. The process was led by the Office of Agricultural Programming and Policy of the Ministry of Livestock, Agriculture, and Fisheries, together with the National System of Response to Climate Change and Vulnerability (SNRCC). The document was developed via a series of stakeholder dialogue sessions involving over 950 private, public, academia, and civil society actors, who defined subsector priorities via ranking exercises. This led to defining four adaptation priorities: (1) sustainable plant and animal production systems, (2) ecosystems and natural resources, (3) livelihoods, and (4) institutional capacities for adaptation[138]. The NAP has been developed with consideration of cost-benefit analysis and a protocol for further estimates of losses and damages is in development.

The plan builds upon the national context and considers the needs of rural women, family farms, and farmer organizations. The plan also puts significant focus on information systems and knowledge exchange and network formation to build adaptive capacity and facilitate learning among actors. Planned activities also cover gender mainstreaming and capacity-building for youth[139].

The insights learned to date include (i) the need for a two-way process (top-down and bottom-up), with the need for regulatory frameworks to guide action and commitment of stakeholders on the ground to implement actual measures; (ii) the importance of knowledge sharing, learning and communication of both lessons and experiences; (iii) the crucial role of researchers and academia in supporting sound policy-making; and (iv) the need to invite farmers and their organizations to participate in the process from the start.

The document was developed within the Integrating Agriculture into National Adaptation Plans (NAP-Ag) Programme run by UNDP and FAO, funded by German BMU[140].

Box 5 NAP development and implementation in the agricultural sector, Uruguay[141]

Going from national to local is particularly important in further action. Climate adaptation is not only about policy, technology, and innovation. Traditional farming practices that build on natural processes help to improve soil fertility, prevent soil erosion and nutrient loss, will play an important role in a technologically enabled and highly automated future. For example, while during drought and floods rainfed crops in Viet Nam experienced up to 40% yield losses, local agroforestry systems allowed farmers to retain a greater share of yields while providing animal feed and diversified sources of income.

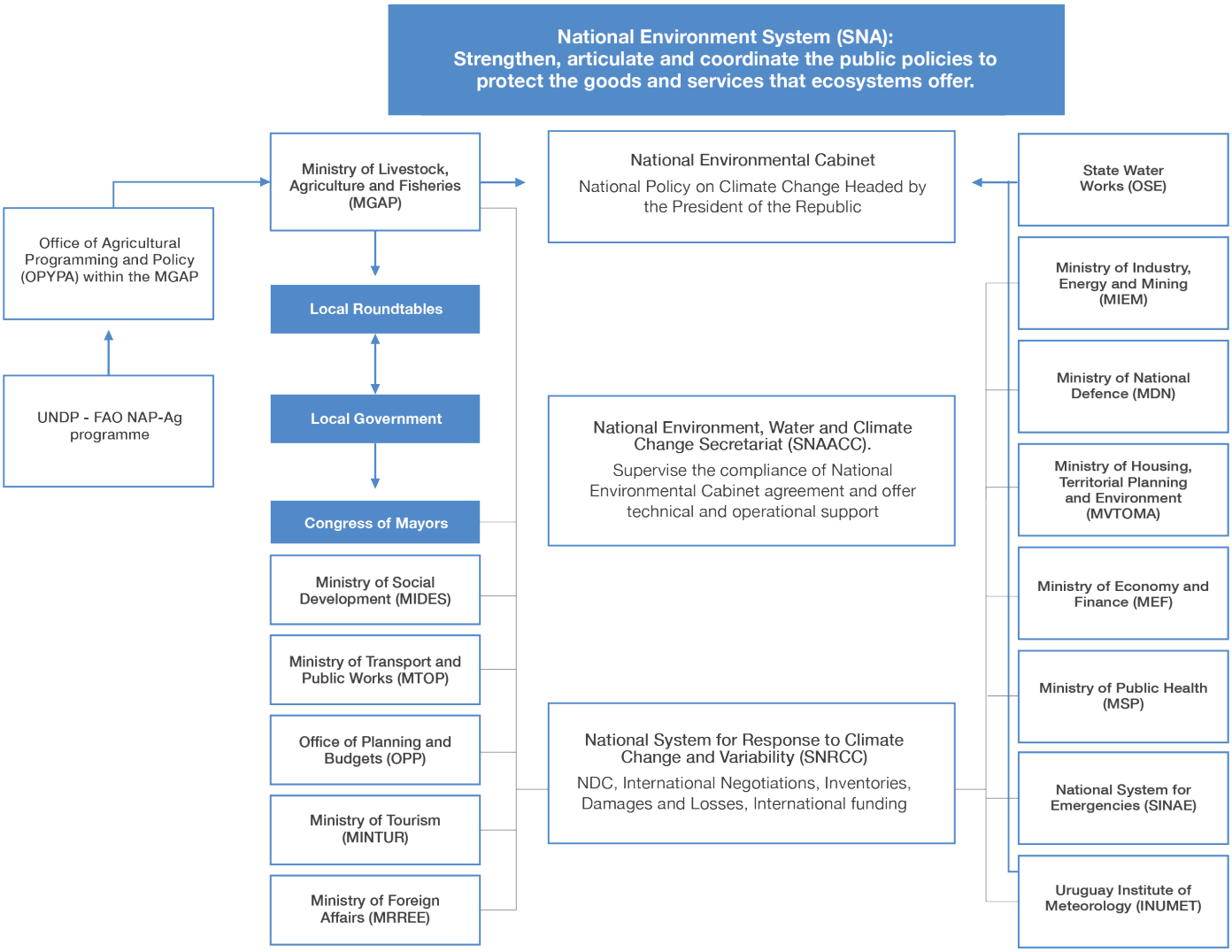

Figure 19 Integration of agriculture within the national climate framework in Uruguay[141]

Tailored policy regimes and institutional arrangements can be highly beneficial in certain contexts. The experience of Tinambac municipality in the Philippines suggests that creating a locally managed marine protected area helped to improve the state of the local ecosystem, increased coral reef resilience, and supported a higher fish biomass and seaweed harvest within the protected area, allowing local communities to generate additional income[142].

8.2. WATER

"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 years143".

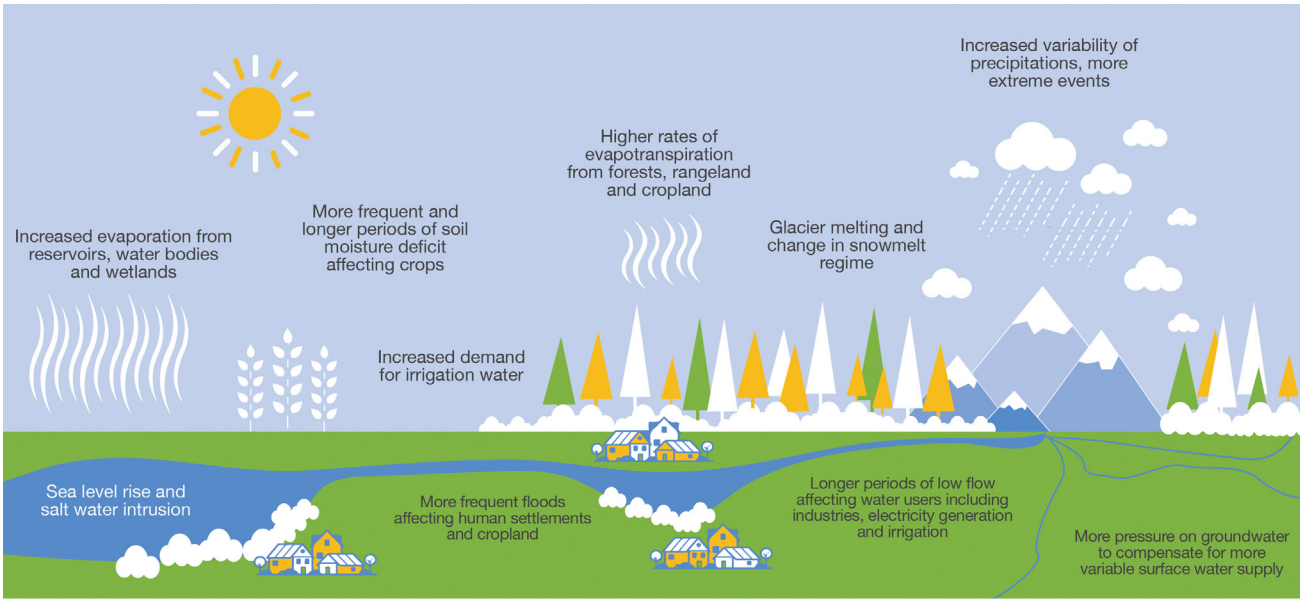

Figure 20 Links between climate change, water cycle, and agriculture[144]

The water cycle is part of a complex ecosystem; economic development and food production both depend on this vital resource (Figure 20). Climate change presents an evident challenge for water stewardship, which in turn has consequences for human wellbeing. Droughts, floods, melting glaciers, sea-level rise, and storms are all manifestations of changes in the water cycle, triggered by climate change (see Figure 21). This may lead to conflicts over the availability of water, climate migration, as well as significant losses and damages. Thus, climate change in the water sector is mostly manifested via either lack of, or over-abundance of, water.

Already today, water insecurity generates an annual cost of US$ 260 billion from water supply shortages and inadequate sanitation, US$ 120 billion from flood damages in urban settlements, and US$ 94 billion per year due to water insecurity within current irrigators. Droughts are particularly destructive, undermining the mental and physical development of children during the first years of their life[145].

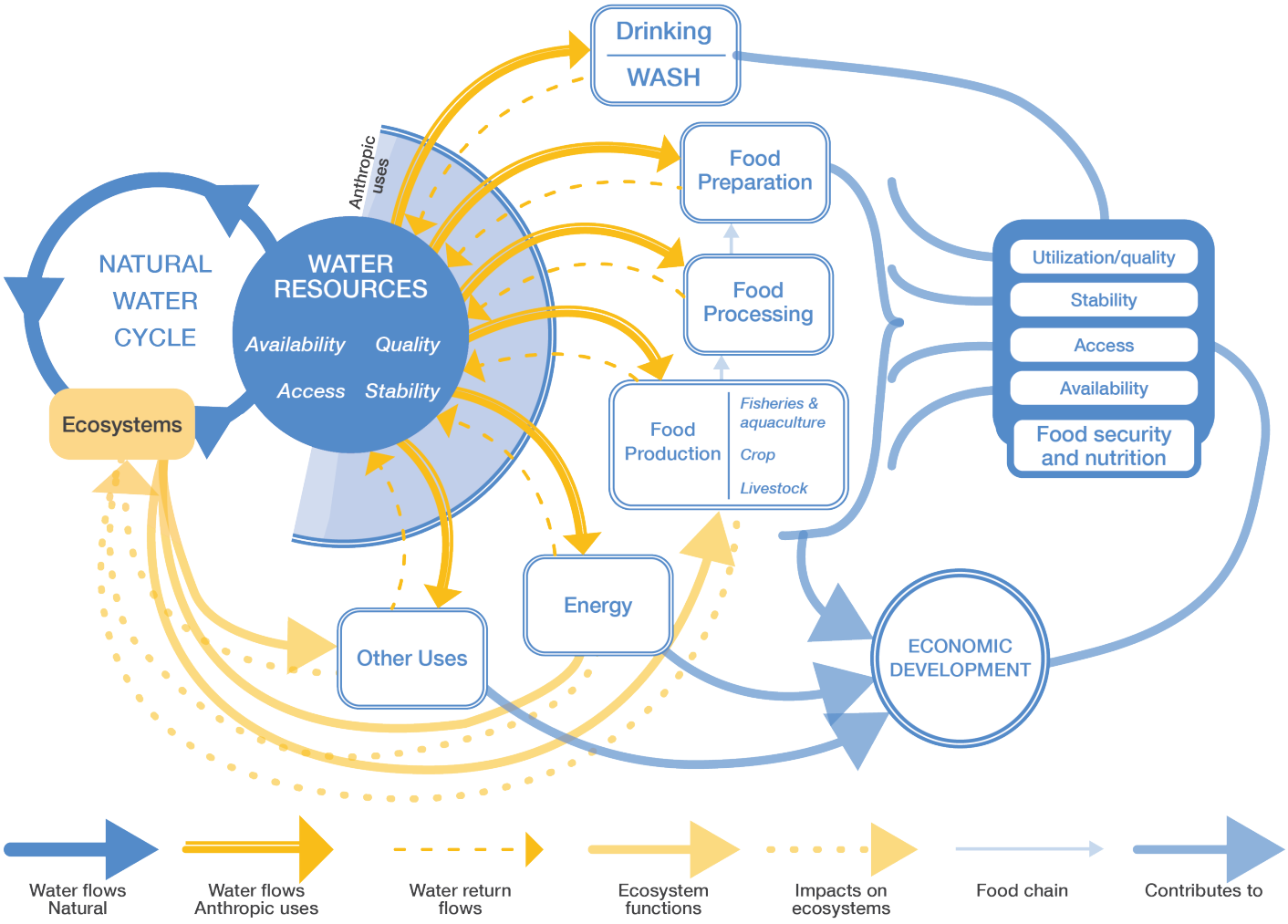

Figure 21 The importance of the water cycle for food security and economic development[146]

Water is essential for drinking, sanitation, food production and processing, transformation, and preparation, while the quality of drinking water has a decisive impact on the human body. It is also vital for the effective functioning of energy systems, industrial production, and transport networks. Water is a prerequisite for any economic process or any human activity. The concept of water security provides a basic framework for understanding the importance of water at different societal levels.

"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[147]".

Box 6 Defining water security

Water stewardship under climate change requires enabling environments, strong institutions, inclusive participation, effective management instruments, and adequate finance. The following key priorities should be considered when integrating water into the NAP process[148]:

- Understand water: make evidence-based decisions and improve data management
- Value water: handle it sustainably, efficiently, and inclusively for equitable pricing and access
- Manage water: at local, national, and transboundary levels in an integrated and just manner.

There are multiple entry points for integrating water into the NAP process with responsibilities distributed among different actors, as demonstrated in Figure 22. Those actors must align their efforts in terms of sequence and ensure effective knowledge sharing on the process and outcomes of their work.

When it comes to on-the-ground implementation, there are multiple approaches, and an effective combination of technical and natural solutions can help achieve effective long-term solutions. It is particularly important to effectively capture and utilize the potential of nature-based solutions as demonstrated by the insights and case highlights presented in Box 7.

It is important to consider that current regulations and standards often prioritize "grey" or hard infrastructure as the key or sole option available, which might require a critical review of some of the following policies[150]:

- Land-use regulation and zoning
- Permitting
- Safety and performance codes and standards
- Procurement policies
- Land rights
- Environmental protection regulations

Supporting ecosystem-based and natural climate solutions requires conducive governance arrangements and supportive policies, and this is particularly relevant in the water sector.

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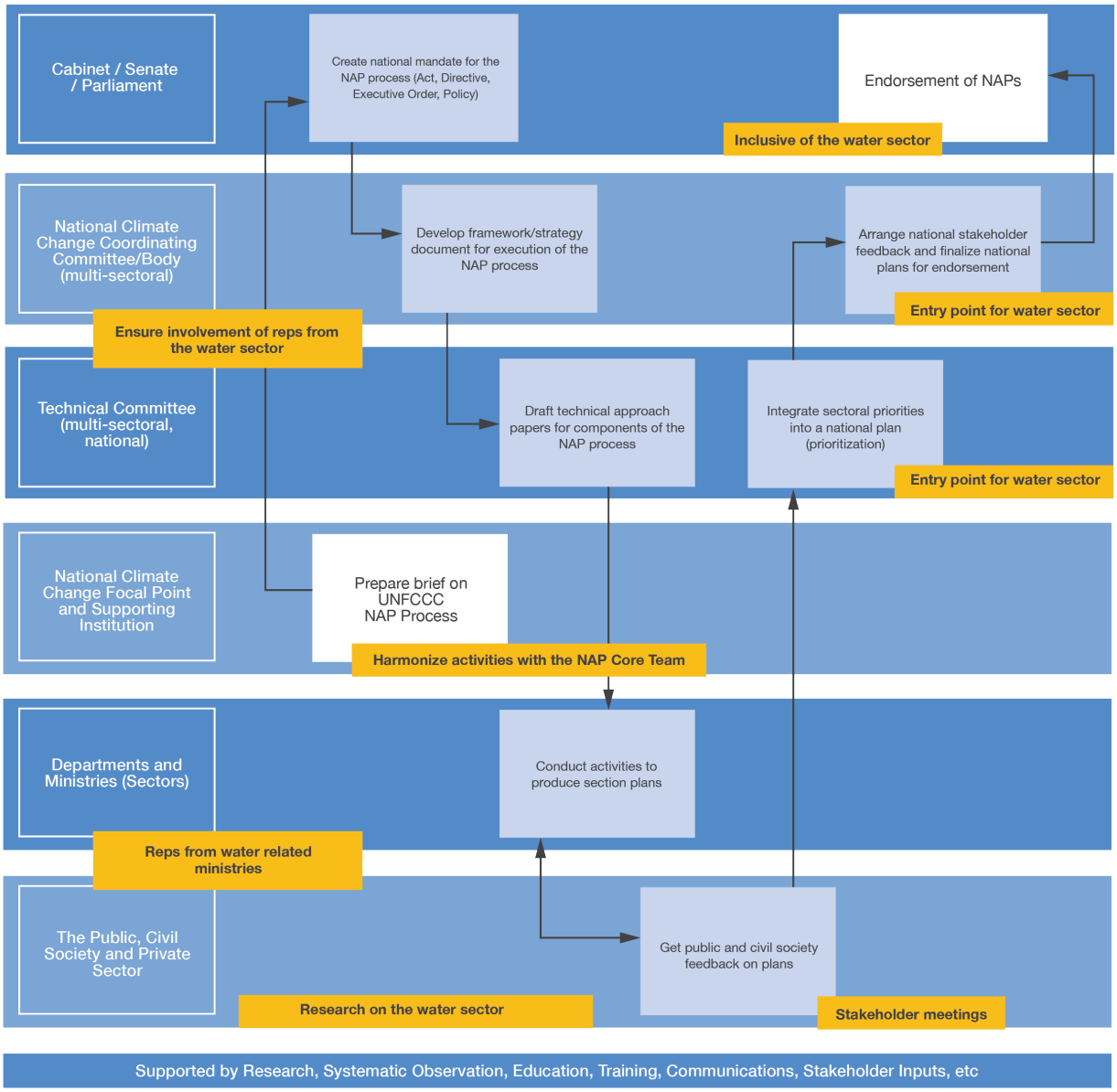

Figure 22 Potential flow of responsibilities and entry points for integrating water into the NAP process[149]

One-third of the world's largest cities get water from forested areas, which secure water flows, absorb rainfall and replenish watersheds. Building on these dynamics, ecosystem-based adaptation can support recharging aquifers, natural water storage, and filtration, as well as wastewater treatment. Smart afforestation can thus help regulate water quality, lower pollution, and reduce sedimentation and improve water use efficiency. Wetlands and riparian buffers can help filter industrial and farmland runoff and sediment, while coastal wetlands can lower saltwater intrusion in coastal aquifers. Ecosystem-based adaptation is particularly effective for reducing exposure to extreme weather events. Mangroves and coral reef restoration provide significant protection from storms, floods, and hurricanes, creating buffers to retain excess water, reduce wave energy and strengthen shorelines. Natural floodplains reduce flood and drought risk while helping to better manage erosion via balancing peak water. For example, Netherlands, Germany, and France are implementing programmes along the Rhine River to ensure that water connects to natural floodplains. Additional benefits of ecosystem-based solutions include carbon sequestration, biodiversity conservation, and provision of fish, fuel, and various forest products.

Box 7 Ecosystem-based adaptation and nature-based solutions

For further information, it is recommended to access the NAP Water Supplement by the Global Water Partnership, which assists countries in capturing relevant opportunities and needs using a cross-sectoral approach while considering other relevant commitments (NDCs) and frameworks (SDGs). It is a key guiding document on integrating water issues into the NAP process within relevant policies, programmes, and plans[151], along with the UNC CC:-learn course Keeping the Taps Running in a Changing Climate, which presents approaches to mainstreaming adaptation in the water resources across multiple sectors.

8.3. INFRASTRUCTURE AND ENERGY

Infrastructure is highly vulnerable to the physical impacts of climate change, yet also plays a critical role in developing resilience to future climate shocks. Under extreme events, damage to infrastructure can be particularly costly. Recent OECD modelling of the potential flood impacts in Paris suggests that infrastructure would bear from 30% to 55% of the direct flood damages, while up to 85% of business losses would be caused by disrupted transportation and energy networks, and not the flood as such[152].

> "Climate-resilient infrastructure is […] planned, designed, built, and operated in a way that anticipates, prepares for, and adapts to changing climate conditions. It can also withstand, respond to, and recover rapidly from disruptions caused by these climate conditions. Ensuring climate resilience is a continual process throughout the life of the asset. Efforts to achieve climate resilience can be mutually reinforcing with efforts to increase resilience to natural hazards"

Box 8 Defining climate-resilient infrastructure[153]

Developing climate-resilient urban infrastructure helps to lower direct losses and indirect costs caused by extreme events. Beyond developing new solutions, existing infrastructure may be retrofitted or managed differently under climate change. New infrastructure, such as sea walls, can be built to safeguard against specific events or processes, using both traditional hard defences as well as natural climate solutions such as wetlands[154].

Climate-resilient infrastructure helps to achieve greater reliability of services, longer asset lives, and safeguard asset returns. Flexible and adaptive approaches to infrastructure are essential for lowering the costs of developing climate resilience in an uncertain future, which should be incorporated into the decision-making processes[155].

A particularly important aspect of linking infrastructure development with the NAP process is de-risking public infrastructure planning (see examples in Box 9).

In Norway, planning guidelines for adaptation encourage the application of nature-based solutions for land-use and general planning. Since 2018, municipalities are obliged to prioritize conservation, restoration, or establishment of nature-based solutions or provide a clear rationale for preferring grey infrastructure.The UK "National Planning Policy Framework" obliges municipalities to use natural drainage systems in residential developments with 10+ homes and other developments. Natural flood management is also strongly promoted by other government agencies. In the United States, the Environmental Protection Agency (EPA) provides guidance for local governments on the full cycle of implementing nature-based solutions for stormwater management. An effective example comes from the Queensland Climate Ready Infrastructure initiative in Australia, which obliges local governments to consider climate change adaptation when applying for infrastructure grants. In Costa Rica, the National Investment Plan for 2015-2018 has required all new infrastructure developments to meet climate resilience criteria. In Mongolia, EbA is implemented by river basin councils to facilitate coordination of localized activities at the basin scale.

Fiji uses vetiver grass to conserve soils and as a solution to climate hazards. It is a resilient species with a deep root system that helps to stabilize slopes and riverbanks, pulls contaminants from water, and can be used for roofing thatch, handicrafts, and livestock feed. Vetiver grass fields already help over 30 communities to address flooding. Fiji's National Adaptation Plan puts a strong emphasis on the potential of nature-based solutions[156].

The Government of Saint Lucia has adopted an Ecosystems Adaptation Strategy and Action Plan (EASAP) 2020–2028 "to define the most effective solutions to the country's biodiversity, ecosystems, and ecosystem management challenges under a changing climate". The plan includes 58 prioritized actions via stakeholder dialogue. Each measure has its temporal scope for implementation: short term (2020–2023), medium-term (2023–2026), or long term (2026–2028), according to its level of urgency[157]. See more in the nature-based solutions section at the NAP Global Network website.

Box 9 Promoting nature-based solutions and EbA for adaptation across scales

Climate change affects energy provision and security, through changes in seasonal and annual heating and cooling demands, or risks to energy production and supply conditions. Such risks include modifications in power plant efficiency rates, issues with cooling water, and damage due to extreme weather events. Less predictable weather may result in consumer-side fluctuations, also putting greater demand on the network.

Diversifying the energy mix and transitioning to renewable energy sources also provide profound opportunities for climate change mitigation and adaptation. Private actors can support building a climate-resilient energy system by investing in staff capacity and skills for climate change, review investment appraisal approaches, and ensure that risk assessments are carried out. To reduce disruptions and damages to services and operations from extreme events and temperature fluctuations, many companies are upgrading current infrastructure and facilities and planning future changes in how they develop.

Public actors can build more climate-resilient energy systems by supporting further knowledge development, establishing specific funds for energy system adaptation, sharing risks and investments through public-private partnerships, and introducing reporting requirements for strategic energy firms. Examples of adaptation measures within energy infrastructure systems are presented in Table 4 above.

Adaptation considerations can be integrated into public tenders and contracts to ensure that climate-resilience is a factor in all new construction and land development projects while ensuring relevant economic, social, and environmental co-benefits.

	IMPACTS	MANAGEMENT MEASURE	STRUCTURAL MEASURE
GENERATION	• Inundation of coastal infrastructures, such as generation plants • Reduced efficiency of solar energy • Insufficient cooling water • Temperature of cooling water before and after use • Reduced output from hydropower generation	• Model climate impacts on existing and planned assets in collaboration with meteorological service • Revise maintenance schedules • Update hydropower operating rules	• Fortify coastal, off-shore and flood-prone infrastructure against flooding • Increase cooling system capacity for solar energy • Locate new facilities outside high-risk zones
TRANSMISSION & DISTRIBUTION	• Flooding of electricity substations • Damage to transmission lines from climate extremes	• Implement a program for pruning and managing trees near transmission and distribution lines • Create disaster mitigation plans • Train emergency response teams for quick repair and restoration actions	• Adjust design criteria for transmission lines, e.g.: • Increase transmission tower height • Bury distribution lines • Use stainless steel material to reduce corrosion from water damage
CONSUMPTION	• Change in energy demand patterns (e.g., increased demand for cooling and reduced demand for energy for heating)	• Undertake load forecasting using climate information • Promote behavioral change to reduce peak use	• Improve building and industrial energy efficiency

Table 4 Examples of adaptation measures for energy infrastructure[158]

Project valuation methodologies commonly disregard climate risks and benefits. High upfront capital costs may depict some of the climate-resilient infrastructure investments inferior to business-as-usual, leading to underinvestment. However, novel evaluation methodologies allow estimating climate risks of non-sustainable infrastructure and the co-benefits of climate-resilient infrastructure, making a clear business case. When it comes to adaptation goals, infrastructure, across its lifecycle, should:

- Be resilient to and help protect against extreme weather events and other natural disasters
- Consider climate change risks in design, maintenance, and operation
- Reduce vulnerability to climate change risks and impacts
- Promote equitable and inclusive access to climate services by low-income and vulnerable groups
- Not facilitate carbon-lock-ins, maladaptation or displacement of climate risks and hazards
- Support creation of jobs for a climate-resilient economy

Different stages at which those considerations can be considered include:

1. Feasibility studies and impact assessments (e.g., use of ESIA, climate-related financial risks)
2. Economic obligations (e.g., technology transfer)
3. Social (e.g., inclusivity, gender-responsive, additional climate services)
4. Environmental (e.g., integration of nature-based solutions, areas devoted to green space),
5. Stabilization clause (excluding it or making it time-bound to not prevent the applicability of forward-looking climate legislation)
6. Review and renegotiation (considering climate change dynamics)
7. Grievance and disputes (community consultation, stakeholder dialogue)
8. Transparency and reporting (disclosure of key documents)
9. Penalties and termination (obligations to prevent climate risks, climate-related grounds for breaches)

It is advisable to consider climate-resilient infrastructure investments within the broader context of sustainability co-benefits. Using contracts as leverage is also much easier than adopting new laws or regulations, as they mostly have a shorter lifecycle and are more flexible in terms of their content and decision-support methodologies.

More examples and lessons are summarized in the Adaptation Case Studies in the Energy Sector by the Climate Scenarios and Services Group “Ouranos” together with the Department of Natural Resources, Canada.

Box 10 Integrating climate-resilience considerations into contracts[159]

More examples and lessons are summarized in the Adaptation Case Studies in the Energy Sector by the Climate Scenarios and Services Group “Ouranos” together with the Department of Natural Resources, Canada.

8.4. HEALTH

"Climate change is the greatest public health challenge of the 21st century. With the right policies and investments today, we have the opportunity to realize our vision of healthy people in healthy places on a healthy planet."[160]

Health is strongly influenced by climate change, with key impacts classified into direct (e.g., physical damage caused by climate change) and those mediated via the environment (air pollution, vector-borne diseases) or society (climate migration, quality of life, undernutrition) and is discussed in more detail in Table 5 below. Health risks posed by climate change are much more complex than they may appear on the surface, including many second-order risks. Extreme events often lead to post-traumatic stress disorders as people lose livelihoods, homes, and jobs.

This puts whole families at risk, as exemplified by the rising rate of localized domestic abuse after Hurricane Katrina. And as people's health worsens, they become less productive which disrupts the general dynamics of the economy. An opposite dynamic gets triggered through integrated action on climate and health, leading to a more vibrant economy, healthier lifestyle choices, lower death rates, a greater sense of wellbeing, and ultimately better societies. For example, see Figure 23 below.

HEALTH IMPACTS	EXAMPLES
Health impacts of extreme weather events	Injury or death
Heat-related illnesses	Heatstroke, heat rash, heat cramps, heat exhaustion
Respiratory illnesses	Infections, obstructive airways disease (such as asthma), and the pulmonary effects of heat and air pollution
Water-borne diseases and other water-related health impacts	Cholera, schistosomiasis, diarrhoeal illnesses, harmful algal blooms, leptospirosis
Zoonoses	Rabies
Vector-borne diseases	Malaria, dengue fever, zika virus, chikungunya, Lyme disease
Malnutrition and food-borne diseases	Underweight, wasting, stunting micronutrient deficiencies, food-borne diseases causing diarrhoeal illness, ciguatera
Noncommunicable diseases	Circulatory diseases (such as cardiovascular disease, cerebrovascular disease, hypertension), endocrine disorders (such as diabetes), cancers
Mental and psychosocial health	Depression, anxiety, post-traumatic stress disorder
Impacts on health care facilities	Destruction of infrastructure, disruption of supply chains, impaired water access and availability, disruption, or discontinuation of health services

Table 5 Key health risks associated with climate change[161]

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Health risks posed by climate change are much more complex than they may appear on the surface, including many second-order risks. Extreme events often lead to post-traumatic stress disorders as people lose livelihoods, homes, and jobs. This puts whole families at risk, as exemplified by the rising rate of localized domestic abuse after Hurricane Katrina.[162] And as people's health worsens, they become less productive which disrupts the general dynamics of the economy. An opposite dynamic gets triggered through integrated action on climate and health, leading to a more vibrant economy, healthier lifestyle choices, lower death rates, a greater sense of wellbeing, and ultimately better societies. For example, see Figure 23 below on how connecting action on air quality, climate, and health helps to address significant challenges faced by members of the C40 cities network while generating a range of positive outcomes[163].

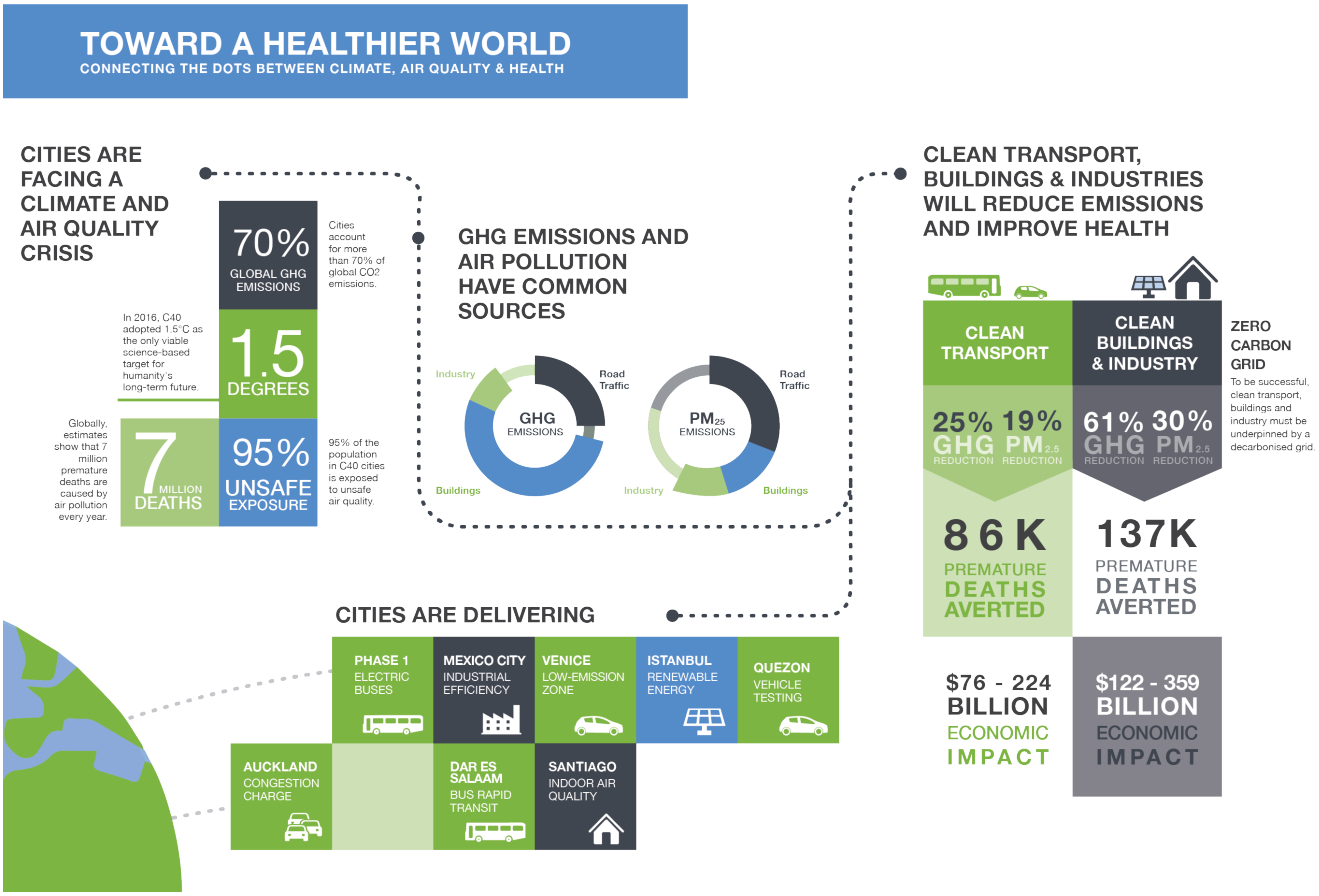

Figure 23 From challenges to solutions through integrated action on climate, air quality, and healthhe NAP process[164]

The World Health Organization (WHO) has created an operational framework for building climate-resilient health systems. It provides ten key components grouped into three categories: foundations, information, and risk management, highlighted in Figure 24 below. The WHO recommends that national adaptation plans cover as many components of the framework as possible, considering the unique features of national health systems.

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Climate-resilient health system: “one that is capable to anticipate, respond to, cope with, recover from and adapt to climate-related shocks and stress”, improving population health amidst climate change. In the upcoming decades, climate change is expected to significantly influence health, with low- and middle-income countries and populations, children, elderly, and people with medical conditions facing the greatest risks. The WHO framework has set a goal of enhancing “the capacity of health systems to protect and improve population health in an unstable and changing climate”[167].

Figure 24 Ten key components for building climate-resilient health-systems[165]

Health National Adaptation Plan (HNAP): a plan by the Ministry of Health and part of the general NAP process.

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Box 11 Key WHO definitions on climate change adaptation[166]

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The WHO framework has set a goal of enhancing "the capacity of health systems to protect and improve population health in an unstable and changing climate"[167].

Building a climate-resilient health system includes multiple tasks, such as ensuring universal access to essential health services under both normal conditions and in times of disruptions, adequate infrastructure and monitoring to manage the spread of climate-related diseases as well as continuous work to reduce inequalities in terms of exposure to health hazards.

NAP implementation in the health sector should consider how the delivery of health services will need to transform under different climate scenarios and how capacities of and load upon health systems will change under those conditions. Health system transformation should be considered across multiple scales, from changes in the daily delivery of services to structural changes in how the health system functions over the long term. The WHO recommends achieving this through a multilevel and adaptive approach, with particular attention to community-level capacity building. While most of the experiences of the HNAP process are still to effectively report on the first lessons of the implementation phase, within each component of the framework, WHO has defined key actions necessary for effective implementation, which can serve as a baseline for thinking about implementation[168]. See for Table 6 more information.

On the ground, implementation may take many forms, while the clearest examples can be provided for action-relevant risks and mechanisms.

	EXAMPLES
Leadership and governance	• Established responsibility and accountability mechanisms • Climate change considered in key health policies and programs • Cross-sectoral partnerships and synergies
Health workforce	• Enough health workers that can deal with climate risks • Health organizations have the necessary resources and processes in place • Key stakeholders are aware of health risks posed by climate change
Vulnerability, capacity, and adaptation assessment	• Understanding of climate-induced health vulnerabilities across groups • Understanding of health system capacities and gaps • Comparative assessment of health adaptation options
Integrated risk monitoring and early warning	• Health-related climate data and epidemiological trends • Emergency preparedness updates
Health and climate research	• Multidisciplinary research agenda supported by training and finance • Research-policy interface Research-policy interface
Climate-resilient and sustainable technologies infrastructure	• Low carbon technology and products considered towards climate risks • Improved health delivery services for climate resilience
Management of environmental determinants of health	• Evidence-based joint monitoring • Continuously revising regulation that protects people from climate risks • Cross-sectoral distribution of roles and responsibilities
Climate-informed health programmes	• Health programming for future climate • Intervention delivery procedures revised to consider climate risks

Table 6 Key components and objectives for HNAP implementation[169]

RISKS & MECHANISMS	INTERVENTION EXAMPLES
HEAT STRESS	• Revise occupational health exposure standards • Redesign facilities for more efficient cooling and heating systems • Raise awareness on the action (clothing, ventilation) • Cooling centres for vulnerable groups
WATER-BORNE AND FOOD-BORNE DISEASES	• Improve monitoring during peak risk • Revise food and water quality standards and procedures
ZOONOTIC AND VECTOR-BORNE DISEASES	• Revise the scope and geographic patterns of disease monitoring • Improve early warning, pest-control, diagnostics, and treatment • Enhance vaccination coverage for humans and animals
ALLERGIC DISEASES AND CARDIOPULMONARY HEALTH	• Forecast exposures, introduce allergens management, and consider demand peaks • Raise air quality standards
NUTRITION	• Conduct nutritional screening and programming for high-risk groups and fragile areas
STORMS AND FLOODS	• Consider health risks in climate-resilient infrastructure planning • Upgrade health infrastructure for future climates
MENTAL HEALTH AND DISABILITY	• Emergency preparedness for considering special needs people that have suffered from disasters or have a mental illness

Table 7 Climate-informed health interventions[170]

More examples of measurable outputs and HNAP process examples can be found in the most recent WHO publication on quality criteria for NAP[171], while multiple in-depth case studies are featured in the report on the European Union country experience[172]. A rich collection of resources on health and climate has also been compiled in the U.S. Call to Action: Policy Action Agenda for Climate, Health, and Equity website[173]. The overlapping nature of the health crisis caused by the COVID-19 pandemic, climate change and rapid loss of biodiversity has been highlighted in several influential reports[174]. The extra pressure on the health system caused by pandemic has increased vulnerabilities to climate change, particularly under extreme events, which can create new pathways for the spread of diseases.

"Previous epidemics such SARS, MERS, H1N1, and now COVID-19, point to growing evidence that the same human activities that contribute to climate change, lead to the emergence of new diseases, and enables their spread."[175]

Meanwhile, lessons can be learned from rapid response to scale up necessary adaptation measures, while creating climate-resilient health systems also means that we will be better prepared for future pandemics.

Photograph © UNEP

8.5. NEXUS

Until recently, planning and policies on issues such as land use, climate, energy, food, waste, and water were comprehended separately by respective authorities. This is starting to change with the realization of essential linkages among them, prompting opportunities for collaboration and aligning activities across entities.

Energy, agriculture, water, health, and climate change feature complex linkages. They can lead to both benefits and trade-offs. Building synergies is a key task of nexus thinking.

Energy is used at every step of the food production chain, while agriculture remains dependent on fossil fuels, which also makes it carbon intensive. Meanwhile, disruptions in food, energy, or water supply are highly probable under climate change and can undermine human health over short or long periods, which in turn can lead to lower economic productivity.

Optimizing the infrastructure for the nexus will mean mixing portfolios of engineered and natural infrastructures. Each component complements the other, with benefits in terms of cost-effectiveness, climate risk reduction, sustainable development, and benefit-sharing. Improvements in any of those areas can also facilitate positive impacts in others. Improved water or energy efficiency can help agriculture to reduce its footprint as well. And more sustainable agriculture will lead to cleaner water and better human health.

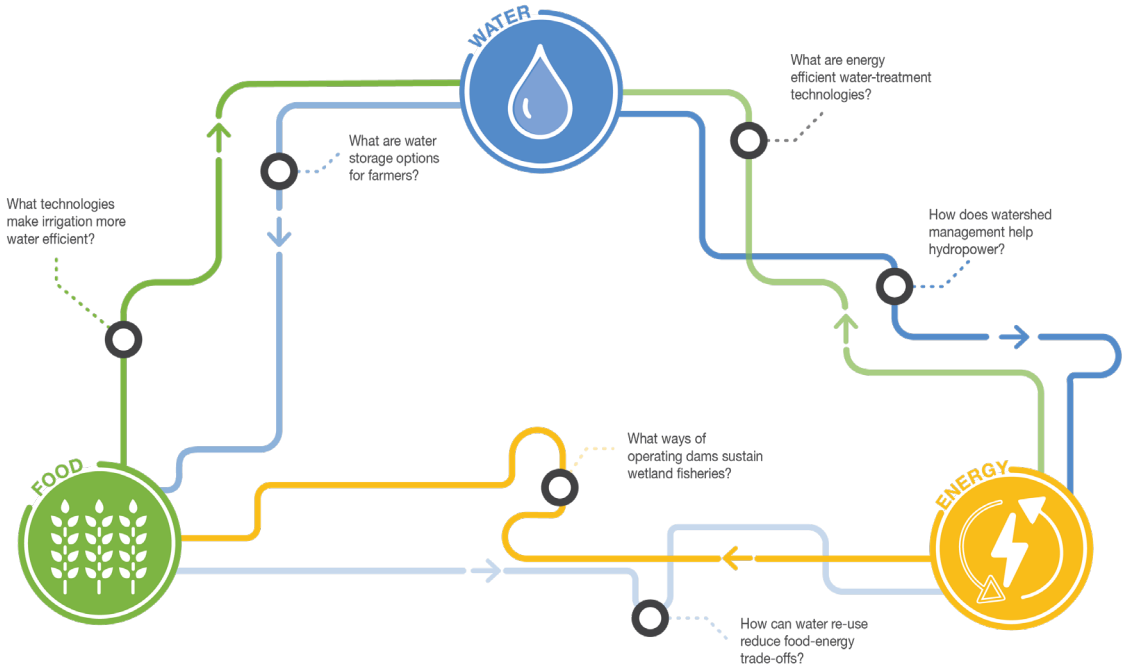

Figure 25 The food, water, and energy nexus[176]

9. CROSS-CUTTING ACTIVITIES: FROM SECTORAL ACTION TO NEXUS THINKING

9.1. INSTITUTIONAL AND STAKEHOLDERS

Importantly, the purpose of nexus thinking is not to engage everyone but rather to seek balanced and meaningful inclusion of different entities into the process, recognizing their specific interests, willingness to engage, and capacity to contribute, as well as essential linkages between the topics in question.

While during NAP formulation governments invest in prioritizing stakeholders and building common baselines, implementation requires even greater effort towards coordination of activities among government actors, using effective communication channels. At the implementation stage, it is particularly important to monitor the dynamics of barriers to the participation of different stakeholders (as well as enabling factors). NAP implementation means continuous engagement and collaboration with a wide range of stakeholders, many of whom are responsible for action on the ground.

The institutional arrangements for NAP development and implementation will differ within and between countries and will be driven by national conditions and circumstances. Countries that have already started a NAP-like process usually appoint a government agency to lead the efforts on climate change adaptation. The appointed agency has the task to coordinate the efforts of other agencies and ministries, and to facilitate assessments, planning, outreach, capacity-building, and the convening of relevant agencies and different stakeholders to identify and rank national priorities for adaptation[177]. Yet the effort doesn't end with a single responsible authority.

Adaptation requires action by different actors at numerous levels within and outside of governments. Coordination of their activities helps to avoid duplication of efforts or gaps. It can begin as a process of establishing relationships, sharing information, and raising awareness (formulation), and then move toward the management of joint decision-making, empowerment, and action (implementation). The coordination can be horizontal (e.g., among ministries), vertical (e.g., among national, global, and subnational actors) or among stakeholders (e.g., between government and businesses). Any such activities should consider the basic stakeholder engagement principles, as outlined in Box 12 below[178].

- Appropriateness: Information communicated among stakeholders should be credible, relevant, and applicable.
- Accessibility: Consider capacities to engage, preferred timing, and anything that may influence accessibility.
- Equity: Respect cultural peculiarities, do not discriminate against users due to remote locations or similar.

Box 12 Basic principles for choosing methods of stakeholder engagement[179]

Stakeholder engagement is critical for ensuring that the relevant strategies are useful for those who will implement them or will be bearing their consequences. NAP implementation requires involving a wide range of actors such as policymakers, subnational entities, the private sector, academia, research institutions, civil

society, local communities, indigenous people, and the general public. Ecosystem-based adaptation serves as a great case for adaptation governance analysis, requiring the interaction of many actors across different spatial scales and holding different mandates. The common actors engaged in ecosystem-based adaptation governance are presented in Figure 26 below.

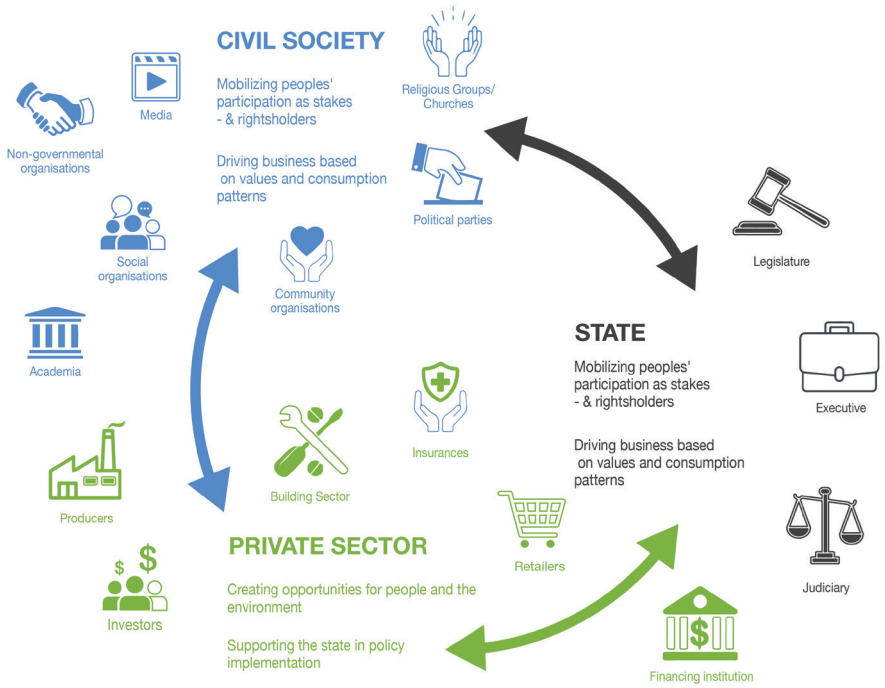

Figure 26 Ecosystem-based adaptation governance: key actors and their mandates[180]

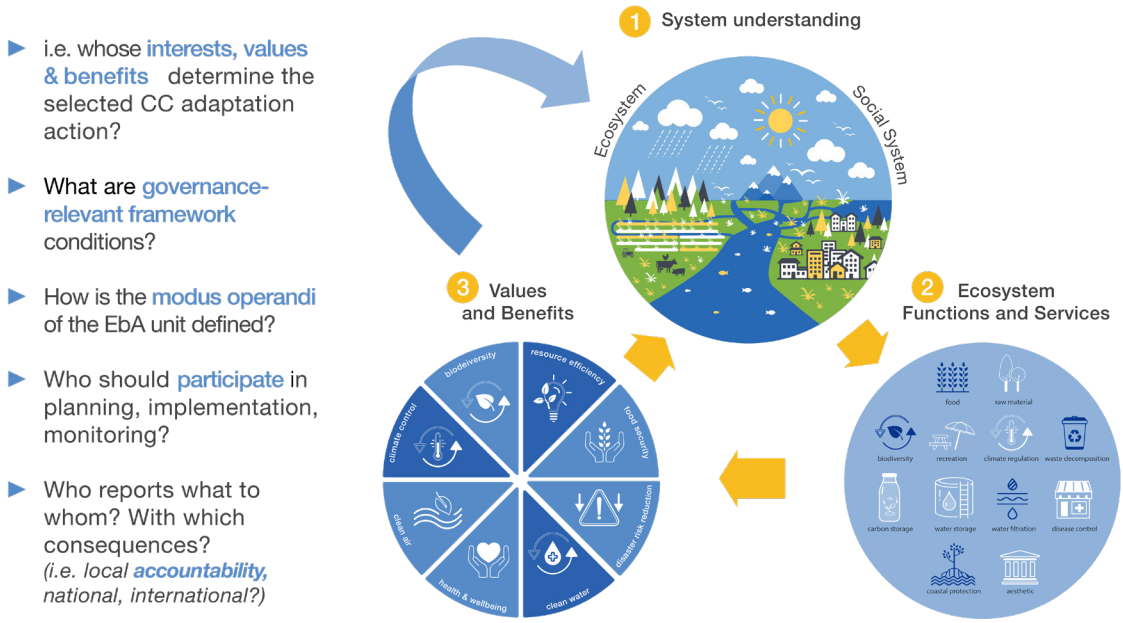

Figure 27 Definition of governance framework based on stakeholder perspectives[181]

The exact formulation of the governance framework will depend on multiple questions, an understanding of the system by stakeholders, different ecosystem functions and services related to the adaptation context, and values and benefits influencing stakeholder perspectives (see Figure 27). The NAP process should engage stakeholders in interactive exercises for adaptation prioritization. This can be demonstrated by the example of nature-based solutions in Figure 28 below.

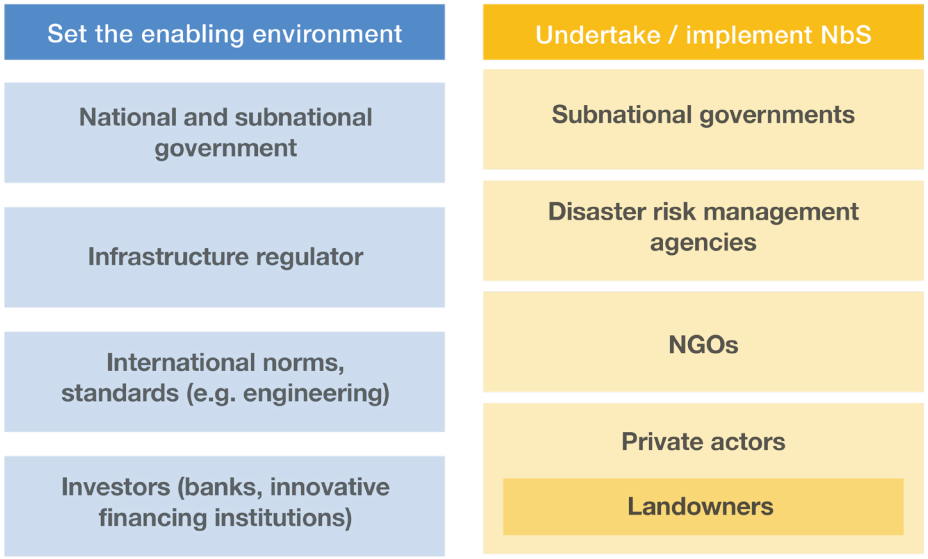

Figure 28 How different actors contribute to the application of nature-based solutions[182]

The NAP process should include diverse target groups at different stages. Most initial events would need to involve people responsible for launching and steering the NAP process, researchers, sectoral, technical, and HR experts, as well as active NGOs[183]. When it comes to implementation, however, local decision-makers, private and civil society actors will come to the centre, as mechanisms and policies need to be manifested via on-the-ground actions aimed at improving adaptive capacity and building climate resilience, as seen in Figure 19.

Involving a wide range of stakeholders in the decision-making process comes with challenges, such as navigating different power relations and delays in policymaking. Stakeholders may have different views on the issue in question and build on their own unique experience of previous practices and engagements.

Figure 29 illustrates how different rightsholders and stakeholders may differently view the assumingly same adaptation context. The "framing" of adaptation, therefore, varies case by case due to the complex nature of adaptation. By incorporating the voices of many stakeholders, particularly the most vulnerable, long-term adaptation can be better tailored and more effective[184]. Participatory and inclusive NAP processes can help stakeholders to achieve their development aims and goals while considering the need to adapt to the changing climate and learn from each other[185].

Throughout the implementation phase of the NAP, the government should continuously engage with all stakeholders while improving coverage with the most up to date information, harnessing motivations for change and facilitating relevant collaborations.

THE DISTINCTION OF RIGHTS HOLDERS AND STAKEHOLDERS
IN EBA PLANNING AND IMPLEMENTATION IS AN IMPORTANT ASPECT OF EQUITY.

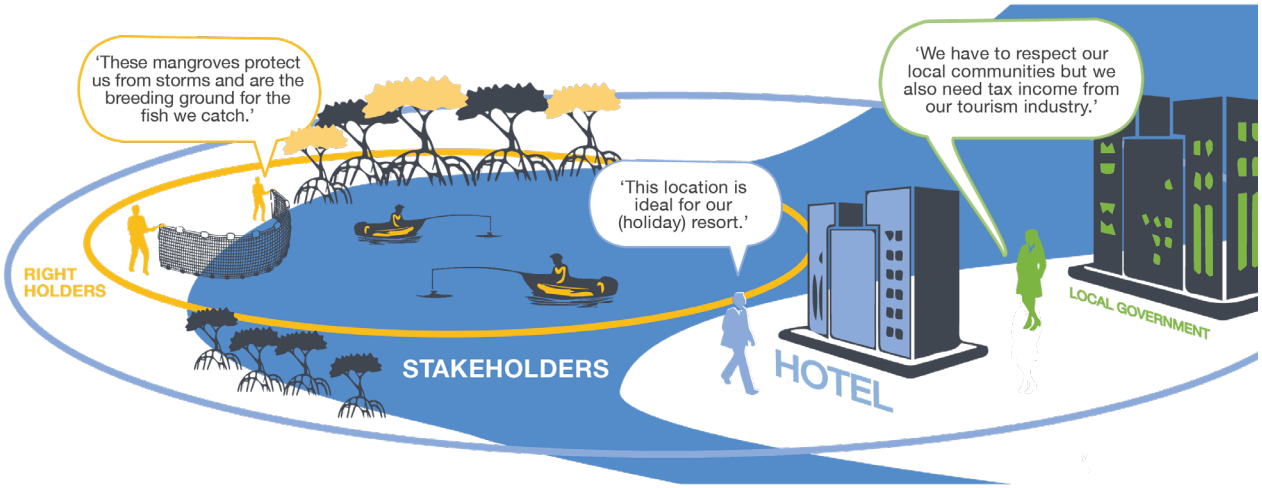

Figure 29 Considering different rightsholder and stakeholder perspectives[186]

Due to the cross-cutting impacts of climate change, 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 MSP approach allows for inclusive, integrated platforms and processes to generate holistic responses to climate and development challenges. MSPs function in a wide variety of different ways, from short-term consultations to long-term collaborations.

Box 13 The power of multi-stakeholder partnerships

9.2. CAPACITY DEVELOPMENT

Capacity development allows individuals and organizations to discover, build, update, sustain and evolve their ability to define and reach their goals.

At the initial stages, it is important to effectively assess institutional capacities for adaptation. A country-driven institutional capacity development to enhance cross-sectoral collaboration and institutional effectiveness is an essential part of effective implementation. It is reasonable to start from a rapid institutional capacity assessment (see Figure 30 below).

To foster a national dialogue, the assessment of the technical and functional capacities for NAP across the three capacity development dimensions (individuals, organizations, and enabling environment) needs to ensure a participatory stakeholder process. The findings are to be jointly validated and to inform the contextualized capacity development strategy and action plan, including how to track results. An important element of effective capacity development is drafting effective terms of reference to hire consultants for general or specific positions.

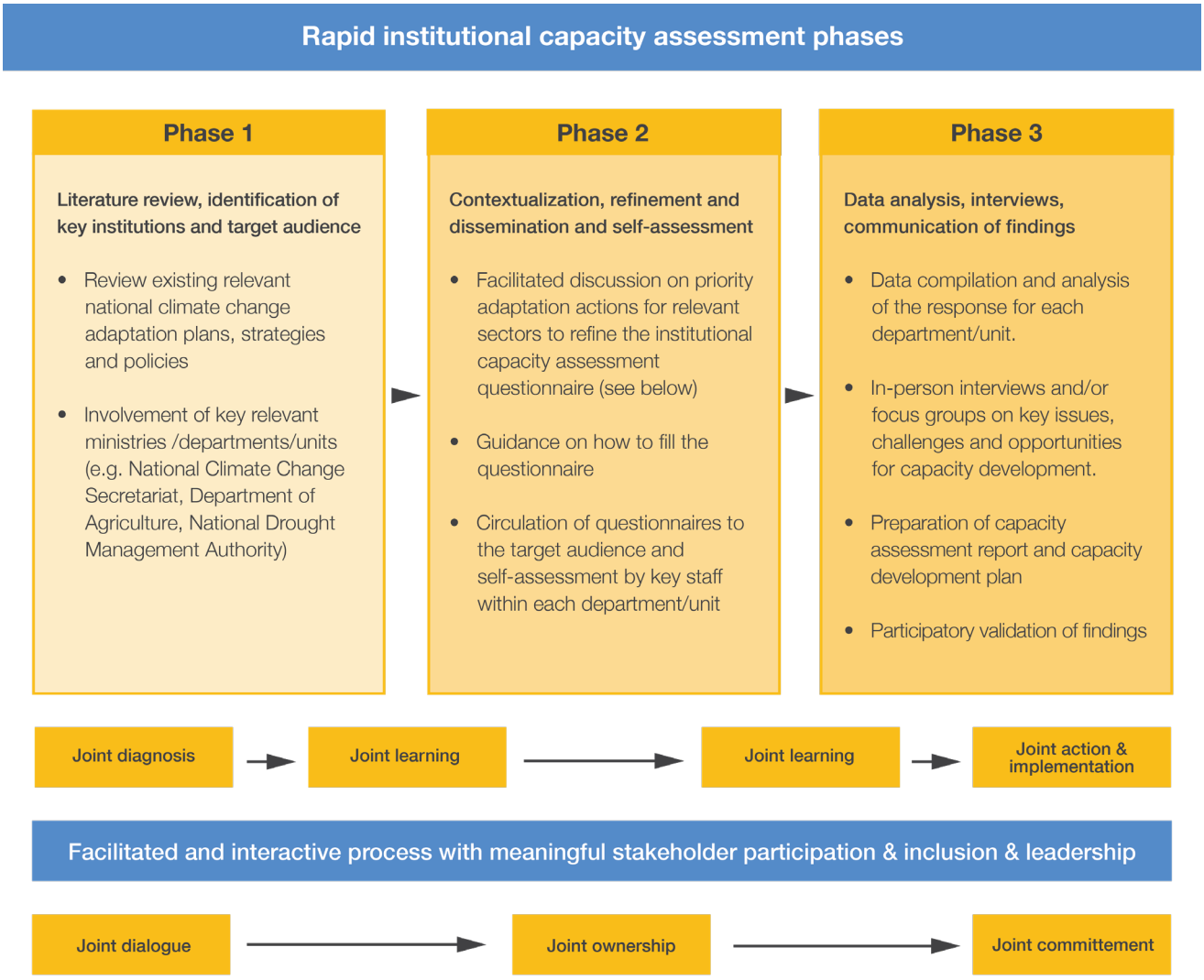

Figure 30 Rapid institutional capacity assessment phases[187]

The quality of the Terms of Reference (ToR) for necessary services ultimately defines the quality of NAP deliverables. When creating a ToR, make sure to include key elements provided below:

- Duration and location
- Background information on the nature of work required
- Purpose and objectives of the assignment
- Scope of work and key activities
- A full list of expected deliverables
- Supervision and reporting
- Required and desirable qualifications and experience
- Documents to be submitted
- Evaluation criteria

Ideally, at the stage of publication, you want to narrow the list of candidates to those that fit your needs and further select candidates based both on the individual capacities and your needs.

Box 14 Developing effective Terms of Reference

While consulting positions may be filled at different stages, coordinating personnel need to continuously reflect on the added value of consultancies, the unique national needs beyond generic framings, how the new scope of work to be assigned fits together with the work already provided, as well as how the individual consultant profile fits the general composition of the NAP core team. It is therefore regarded as imperative that every position includes a strong Terms of Reference (ToR), to outline in specific terms the needs for each person contributing to the project. Effective ToR examples can often be found at organizations such as UNDP, the NAP Global Network, and others. See Box 14 for items to be considered when drafting a ToR. Capacity building takes place under constant interaction of individuals and organizations with dialogue between other organizations. Figure 31 presents a visual illustration of such strong interactions.

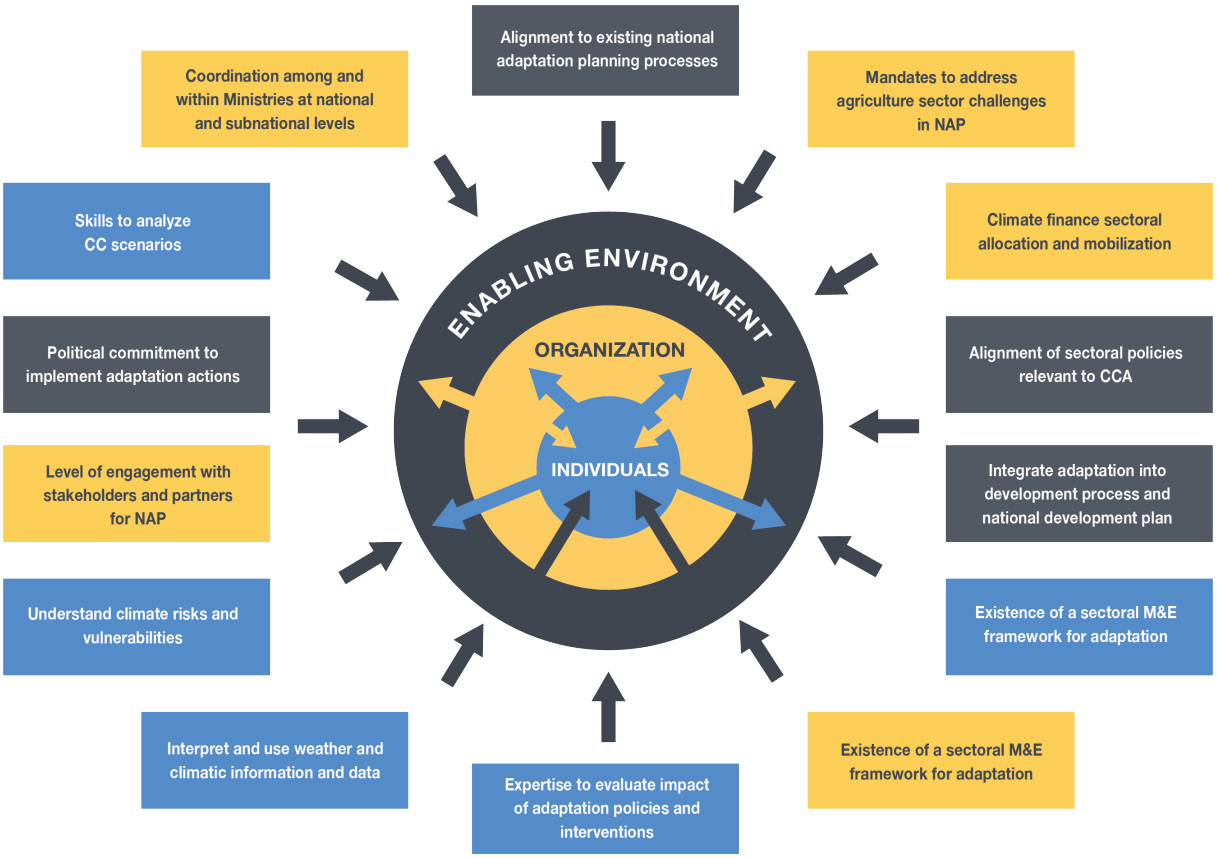

Figure 31 Main elements of the NAP institutional capacity assessment[188]

All in all, effective capacity development includes at least the following attributes[189]:

1.	Improves ownership of the process and outcomes
2.	Allows to build both technical and functional capacities
3.	Synergizes individual (skills, knowledge) and organizational capacities (coordination, mandates)
4.	Utilizes enabling environment (governance, policies)
5.	Integrates understanding of needs, choice of interventions, and monitoring of results

REFERENCES PHASE 2

[99] UNFCCC (2021). NAPs from developing countries. Retrieved from: https://www4.unfccc.int/sites/NAPC/Pages/national-adaptation-plans.aspx

[100] UN (2016). UN CC Learn. Retrieved from: https://unccelearn.org/course/view.php?id=72&page=overview

[101] IPCC (2018). SREX. Retrieved from: https://www.ipcc.ch/site/assets/uploads/2018/03/SREX-Chap6_FINAL-1.pdf

[102] Carlisle, K., & Gruby, R. L. (2019). Polycentric systems of governance: A theoretical model for the commons. Policy Studies Journal, 47(4), 927-952. https://doi.org/10.1111/psj.12212

[103] Arriagada, R., Aldunce, P., Blanco, G., Ibarra, C., Moraga, P., Nahuelhual, L., ... & Stephens, J. (2018). Climate change governance in the Anthropocene: emergence of polycentrism in Chile. Elementa: Science of the Anthropocene, 6. https://doi.org/10.1525/elementa.329

[104] PPC (2014). Adaptation planning and implementation Retrieved from: https://www.ipcc.ch/site/assets/uploads/2018/02/WGIIAR5-Chap15_FINAL.pdf

[105] UNDP (2019). DRC launches National Adaptation Plan project to boost resilience, supported by GCF, UNDP. Retrieved from: https://www.adaptation-undp.org/drc-launches-national-adaptation-plan-project-boost-resilience-supported-gcf-undp

[106] NAP-GSP (2018). National Adaptation Plans in focus: Lessons from the Democratic Republic of the Congo (DRC). Retrieved from: https://www.globalsupportprogramme.org/sites/default/files/resources/naps_in_focus_lessons_from_drc_2.pdf

[107] UNDP (2021). DRC makes strides in adaptation planning and validates a first National Adaptation Plan. Retrieved from: https://www.adaptation-undp.org/drc-makes-strides-adaptation-planning-and-validates-first-national-adaptation-plan

[108] GCF (2019). Readiness Proposal. Retrieved from: https://www.greenclimate.fund/sites/default/files/document/readiness-proposals-democratic-republic-congo-fao-strategic-framework.pdf

[109] ADB (2018). Democratic Republic of Congo: National Climate Change Profile. Retrieved from: https://www.afdb.org/en/documents/drc-national-climate-change-profile

[110] Povitkina, M. (2018). The limits of democracy in tackling climate change. Environmental Politics, 27(3), 411-432. https://doi.org/10.1080/09644016.2018.1444723

[111] Van der Heijden, J. (2019). Studying urban climate governance: Where to begin, what to look for, and how to make a meaningful contribution to scholarship and practice. Earth System Governance, 1, 100005. https://doi.org/10.1016/j.esg.2019.100005

[112] C40 (2020). Climate Action Planning Framework. Retrieved from: https://resourcecentre.c40.org/climate-action-planning-framework-home

[113] UN (2015). Paris Agreement. Retrieved from: https://unfccc.int/sites/default/files/english_paris_agreement.pdf

[114] Heikkinen, M., Ylä-Anttila, T., & Juhola, S. (2019). Incremental, reformistic, or transformational: what kind of change do C40 cities advocate to deal with climate change? Journal of Environmental Policy & Planning, 21(1), 90-103.

[115] Lamb, W. F., Creutzig, F., Callaghan, M. W., & Minx, J. C. (2019). Learning about urban climate solutions from case studies. Nature Climate Change, 9(4), 279-287.

[116] Lamb, W. F., Creutzig, F., Callaghan, M. W., & Minx, J. C. (2019). Learning about urban climate solutions from case studies. Nature Climate Change, 9(4), 279-287.

[117] Mendes Barbosa, L., & Walker, G. (2020). Epistemic injustice, risk mapping and climatic events: analyzing epistemic resistance in the context of favela removal in Rio de Janeiro. Geographica Helvetica, 75(4), 381-391.

[118] Oppla (n.d.) Cloudburst Management Plan, Copenhagen. Retrieved from: https://oppla.eu/casestudy/18017

[119] Call Copenhagen (2021). Climate Adaptation Living Lab. Retrieved from: https://www.callcopenhagen.dk/en/

[120] McNamara, K. E., & Buggy, L. (2017). Community-based climate change adaptation: a review of academic literature. Local Environment, 22(4), 443-460. https://doi.org/10.1080/13549839.2016.1216954

[121] CARE International (2014). Community-Based Adaptation in Practice: A global overview of CARE International's practice of Community-Based Adaptation (CBA) to climate change. Retrieved from: https://insights.careinternational.org.uk/media/k2/attachments/CBA-in-practice-2014-final.pdf

[122] IPPC (2014). Adaptation planning and implementation Retrieved from: https://www.ipcc.ch/site/assets/uploads/2018/02/WGIIAR5-Chap15_FINAL.pdf

[123] WMO (2016). Climate Services for Supporting Climate Change Adaptation - Supplement to the Technical Guidelines for The National Adaptation Plan Process. Retrieved from: https://library.wmo.int/doc_num.php?explnum_id=7936.

[124] WMO (2016). Climate Services for Supporting Climate Change Adaptation - Supplement to the Technical Guidelines for The National Adaptation Plan Process. Retrieved from: https://library.wmo.int/doc_num.php?explnum_id=7936.

[125] Integrating Climate Risks Information into NAPs (WMO-GFCS, 2019). Online course available in English, French and Spanish at https://unccelearn.org/course/view.php?id=60&page=overview.

[126] FAO (2016). Adapting agriculture to climate change. Retrieved from: http://www.fao.org/3/i6398e/i6398e.pdf

[127] Gordon, L. J., Bignet, V., Crona, B., Henriksson, P. J., Van

Holt, T., Jonell, M., ... & Queiroz, C. (2017). Rewiring food systems to enhance human health and biosphere stewardship. Environmental Research Letters, 12(10), 100201. https://doi.org/10.1088/1748-9326/aa81dc

[128] Gordon, L. J., Bignet, V., Crona, B., Henriksson, P. J., Van Holt, T., Jonell, M., ... & Queiroz, C. (2017). Rewiring food systems to enhance human health and biosphere stewardship. Environmental Research Letters, 12(10), 100201. https://doi.org/10.1088/1748-9326/aa81dc

[129] FAO (2016). Adapting agriculture to climate change. Retrieved from: http://www.fao.org/3/i6398e/i6398e.pdf

[130] CCAFS (2021). Transforming Food Systems Under a Changing Climate. Retrieved from: https://www.transformingfoodsystems.com/

[131] Karttunen et al., (2017). Addressing agriculture, forestry, and fisheries in national adaptation plans. Supplementary Guidelines. FAO. Retrieved from: https://www4.unfccc.int/sites/NAPC/Documents%20NAP/Supplements/FAO_Addressing%20Agriculture%2c%20Forestry%20and%20Fisheries%20in%20NAPs.pdf

[132] FAO (2020). Addressing fisheries and aquaculture in National Adaptation Plans (Supplement to the UNFCCC NAP Technical Guidelines). Retrieved from: https://www4.unfccc.int/sites/NAPC/Documents/Supplements/FAO_Fisheries%20and%20aquaculture_ca2215en.pdf

[133] FAO (2020). Addressing forestry and agroforestry in National Adaptation Plans (Supplementary Guidelines). Retrieved from: https://www4.unfccc.int/sites/NAPC/Documents/Supplements/FAO_Forestry%20and%20agroforestry_CB1203EN.pdf

[134] Karttunen et al., (2017). Addressing agriculture, forestry, and fisheries in national adaptation plans. Supplementary Guidelines. FAO. Retrieved from: https://www4.unfccc.int/sites/NAPC/Documents%20NAP/Supplements/FAO_Addressing%20Agriculture%2c%20Forestry%20and%20Fisheries%20in%20NAPs.pdf

[135] FAO (2020). Addressing fisheries and aquaculture in National Adaptation Plans (Supplement to the UNFCCC NAP Technical Guidelines). Retrieved from: https://www4.unfccc.int/sites/NAPC/Documents/Supplements/FAO_Fisheries%20and%20aquaculture_ca2215en.pdf

[136] Nguyen, Q., Hoang, M.H., Öborn, I., & van Noordwijk, M. (2013). Multipurpose agroforestry as a climate change resiliency option for farmers: an example of local adaptation in Vietnam. Climatic change, 117(1), 241-257. https://doi.org/10.1007/s10584-012-0550-1

[137] FAO (2016). Integrating Agriculture in National Adaptation Plans NAP-Ag. Retrieved from: http://www.fao.org/3/c0199e/c0199e.pdf

[138] FAO (2019). Uruguay launches National Adaptation Plan for the agricultural sector. Retrieved from: http://www.fao.org/in-action/naps/news-events/detail/en/c/1235999/

[139] FAO (2016). Integrating Agriculture in National Adaptation Plans NAP-Ag. Retrieved from: http://www.fao.org/3/c0199e/c0199e.pdf

[140] FAO (2019). Uruguay launches National Adaptation Plan for the agricultural sector. Retrieved from: http://www.fao.org/in-action/naps/news-events/detail/en/c/1235999/

[141] FAO (2017). Uruguay Case Study. Integrating Agriculture in National Adaptation Plans (NAP–Ag) Programme. Retrieved from: http://www.fao.org/3/i8237e/i8237e.pdf

[142] Rizvi, A. R., Baig, S., & Verdone, M. (2015). Ecosystems based adaptation: knowledge gaps in making an economic case for investing in nature-based solutions for climate change. Gland, Switzerland: IUCN, 48.

[143] Global Water Partnership (2019). Addressing Water in National Adaptation Plans. Water Supplement to the UNFCCC NAP Technical Guidelines Retrieved from: https://www.gwp.org/globalassets/global/gwp_nap_water_supplement.pdf

[144] FAO (2018). Climate Smart Agriculture Sourcebook. Retrieved from: http://www.fao.org/climate-smart-agriculture-sourcebook/about/en/

[145] Global Water Partnership (2019). Addressing Water in National Adaptation Plans. Water Supplement to the UNFCCC NAP Technical Guidelines Retrieved from: https://www.gwp.org/globalassets/global/gwp_nap_water_supplement.pdf

[146] HPLE (2015). Water for food security and nutrition. Retrieved from: http://www.fao.org/3/av045e/av045e.pdf

[147] Global Water Partnership (2019). Addressing Water in National Adaptation Plans. Water Supplement to the UNFCCC NAP Technical Guidelines Retrieved from: https://www.gwp.org/globalassets/global/gwp_nap_water_supplement.pdf

[148] HLPW (2018). An Agenda for Water Action. Retrieved from: https://sustainabledevelopment.un.org/content/documents/17825HLPW_Outcome.pdf

[149] Global Water Partnership (2019). Addressing Water in National Adaptation Plans. Water Supplement to the UNFCCC NAP Technical Guidelines Retrieved from: https://www.gwp.org/globalassets/global/gwp_nap_water_supplement.pdf

[150] OECD (2020). Nature-based solutions for adapting to water-related climate risks. Policy Perspectives. Retrieved from: https://en.klimatilpasning.dk/media/1753168/nature-based-solutions.pdf

[151]

[152] OECD (2018). Climate-resilient Infrastructure. Policy Perspectives, Environment Policy Paper No. 14. Retrieved from: http://www.oecd.org/environment/cc/policy-perspectives-climate-resilient-infrastructure.pdf

[153] OECD (2018). Climate-resilient Infrastructure. Policy Perspectives, Environment Policy Paper No. 14. Retrieved from: http://www.oecd.org/environment/cc/policy-perspectives-climate-resilient-infrastructure.pdf

[154] OECD (2018). Climate-resilient Infrastructure. Policy Perspectives, Environment Policy Paper No. 14. Retrieved from: http://www.oecd.org/environment/cc/policy-perspectives-climate-resilient-infrastructure.pdf

[155] OECD (2018). Climate-resilient Infrastructure. Policy Perspectives, Environment Policy Paper No. 14. Retrieved from: http://www.oecd.org/environment/cc/policy-perspectives-climate-resilient-infrastructure.pdf

[156] NAP Global Network (2019). Deep roots for resilient communities. A nature-based solution helping Fiji adapt to climate change. Retrieved from: https://napglobalnetwork.org/stories/deep-roots-for-community-resilience-a-nature-based-solution-helping-fiji-adapt-to-climate-change/

[157] NAP Global Network (2020). Saint Lucia's Resilient Ecosystems Adaptation Strategy and Action Plan (REASAP) 2020–2028. Retrieved from: https://napglobalnetwork.org/resource/saint-lucias-reasap-2020-2028/

[158] OECD (2018). Climate-resilient Infrastructure. Policy Perspectives, Environment Policy Paper No. 14. Retrieved from: http://www.oecd.org/environment/cc/policy-perspectives-climate-resilient-infrastructure.pdf

[159] IISD (2017). Contracts for Sustainable Infrastructure: Ensuring the economic, social, and environmental co-benefits of infrastructure investment projects. Retrieved from: https://us.boell.org/sites/default/files/contracts_for_sustainable_infrastructure.pdf

[160] Multiple signatories (2019). U.S. Call to Action: Policy Action Agenda for Climate, Health and Equity. Retrieved from: https://climatehealthaction.org/cta/climate-health-equity-policy/

[161] WHO (2021). Quality Criteria for Health in National Adaptation Plans. Retrieved from: https://reliefweb.int/sites/reliefweb.int/files/resources/9789240018983-eng.pdf

[162] Schumacher, J. A., Coffey, S. F., Norris, F. H., Tracy, M., Clements, K., & Galea, S. (2010). Intimate partner violence and Hurricane Katrina: predictors and associated mental health outcomes. Violence and victims, 25(5), 588-603.

[163] C40 (2019). Toward a healthier world connecting the dots between climate, air quality & health. Retrieved from: https://www.c40knowledgehub.org/s/article/Toward-a-Healthier-World-Connecting-the-dots-between-climate-air-quality-and-health?language=en_US

[164] C40 (2019). Toward a healthier world connecting the dots between climate, air quality & health. Retrieved from: https://www.c40knowledgehub.org/s/article/Toward-a-Healthier-World-Connecting-the-dots-between-climate-air-quality-and-health?language=en_US

[165] WHO (2014). Operational framework for building climate resilient health systems. Retrieved from: https://www4.unfccc.int/sites/NAPC/Documents/Supplements/WHO%20climate%20resillient%20health%20systems%202015.pdf

[166] WHO (2014). Operational framework for building climate resilient health systems. Retrieved from: https://www4.unfccc.int/sites/NAPC/Documents/Supplements/WHO%20climate%20resillient%20health%20systems%202015.pdf

[167] WHO (2014). Operational framework for building climate resilient health systems. Retrieved from: https://www4.unfccc.int/sites/NAPC/Documents/Supplements/WHO%20climate%20resillient%20health%20systems%202015.pdf

[168] WHO (2014). Operational framework for building climate resilient health systems. Retrieved from: https://www4.unfccc.int/sites/NAPC/Documents/Supplements/WHO%20climate%20resillient%20health%20systems%202015.pdf

[169] WHO (2021). Quality Criteria for Health in National Adaptation Plans. Retrieved from: https://reliefweb.int/sites/reliefweb.int/files/resources/9789240018983-eng.pdf

[170] WHO (2021). Quality Criteria for Health in National Adaptation Plans. Retrieved from: https://reliefweb.int/sites/reliefweb.int/files/resources/9789240018983-eng.pdf

[171] WHO (2021). Quality Criteria for Health in National Adaptation Plans. Retrieved from: https://reliefweb.int/sites/reliefweb.int/files/resources/9789240018983-eng.pdf

[172] WHO Regional Office for Europe (2018). Public health and climate change adaptation policies in the European Union. Retrieved from: https://www.euro.who.int/__data/assets/pdf_file/0010/386965/Pagoda-REPORT-final-published-2.pdf

[173] Ibid (2021). Climate & Health Resources. Retrieved from: https://climatehealthaction.org/go/resources/

[174] IPBES (2020). Workshop Report on Biodiversity and Pandemics of the Intergovernmental Platform on Biodiversity and Ecosystem Services DOI:10.5281/zenodo.4147317

[175] UNDP (2020). Coinciding crises: how COVID-19 and climate change are putting pressure on health systems worldwide – and how we can prepare for the future. Retrieved from: https://www.adaptation-undp.org/coinciding-crises-how-covid-19-and-climate-change-are-putting-pressure-health-systems-worldwide-%E2%80%93

[176] IUCN (n.d.). Water-Energy-Food Security Nexus. Retrieved from: https://www.iucn.org/theme/water/resources/infographics

[177] Least Developed Countries Expert Group (2012). National Adaptation Plans. Technical guidelines for the national adaptation plan process. Bonn: UNFCCC secretariat. Bonn, Germany. December 2012. Available at: https://unfccc.int/files/adaptation/cancun_adaptation_framework/application/pdf/naptechguidelines_eng_high__res.pdf

[178] McGray, H. (2009). The national adaptive capacity framework: key institutional functions for a changing climate. World Resources Institute, Washington, DC. Available at: http://pdf.wri.org/working_papers/NAC_framework_2009-12.pdf (accessed 30th January 2021)

[179] Global Water Partnership (2019). Addressing Water in National Adaptation Plans. Water Supplement to the UNFCCC NAP Technical Guidelines Retrieved from: https://www.gwp.org/globalassets/global/gwp_nap_water_supplement.pdf

[180] GIZ (2019). Governance for Ecosystem-based Adaptation: Understanding the diversity of actors & quality of arrangements. Author: Thora Amend. Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH, Bonn. Germany. 64 pp. Retrieved from: https://www.adaptationcommunity.net/wp-content/uploads/2019/09/giz2019-en-eba-governance-study-low-res.pdf

[181] GIZ (2019). Governance for Ecosystem-based Adaptation: Understanding the diversity of actors & quality of arrangements. Author: Thora Amend. Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH, Bonn. Germany. 64 pp. Retrieved from: https://www.adaptationcommunity.net/wp-content/uploads/2019/09/giz2019-en-eba-governance-study-low-res.pdf

[182] OECD (2020). Nature-based solutions for adapting to water-related climate risks. Policy Perspectives. Retrieved from: https://en.klimatilpasning.dk/media/1753168/nature-based-solutions.pdf

[183] United Nations Framework Convention on Climate Change (2019). National Adaptation Plan (Nap) Process Country-Level Training: Capacity Development for Multi-Sectoral Involvement in the Nap Process. Available at: https://www4.unfccc.int/sites/NAPC/Documents/Supplements/NAP-GSP%20nap_country_level_training_factsheet.pdf (accessed 30th January 2021)

[184] United Nations Framework Convention on Climate Change (2019). Adaptation Committee: Various approaches to long-term adaptation planning. Available at: https://unfccc.int/sites/default/files/resource/variousapproaches%20.pdf (accessed 30th January 2021)

[185] Least Developed Countries Expert Group (2012). National Adaptation Plans. Technical guidelines for the national adaptation plan process. Bonn: UNFCCC secretariat. Bonn, Germany. December 2012. Available at: https://unfccc.int/files/adaptation/cancun_adaptation_framework/application/pdf/naptechguidelines_eng_high__res.pdf

[186] GIZ (2019). Governance for Ecosystem-based Adaptation: Understanding the diversity of actors & quality of arrangements. Author: Thora Amend. Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH, Bonn. Germany. 64 pp. Retrieved from: https://www.adaptationcommunity.net/wp-content/uploads/2019/09/giz2019-en-eba-governance-study-low-res.pdf

[187] FAO (2018). Institutional capacity assessment approach for national adaptation planning in the agriculture sectors. Retrieved from: http://www.fao.org/3/I8900EN/i8900en.pdf

[188] FAO (2018). Institutional capacity assessment approach for national adaptation planning in the agriculture sectors. Retrieved from: http://www.fao.org/3/I8900EN/i8900en.pdf

[189] FAO (2018). Institutional capacity assessment approach for national adaptation planning in the agriculture sectors. Retrieved from: http://www.fao.org/3/I8900EN/i8900en.pdf

PHASE 3
MONITOR, EVALUATE, REPORT, & LEARN

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PHASE 3 : MONITOR, EVALUATE, REPORT, & LEARN

10. MONITORING, EVALUATION, & LEARNING

10.1. SEEING THE FOREST FOR THE TREES

Monitoring, evaluation, reporting, and learning regards implemented policies, plans, interventions, and investments, as well achievements behind specific outcomes. It helps to find out whether specific interventions help to decrease vulnerability and improve the preparation and response capacities.

- Monitoring aims to map climate change impacts and adaptation efforts across actors (and sectors or policy fields) via criteria or indicators and showcases changes over time.
- Reporting aims to showcase and present the monitoring results to a broader audience and make the experience gained and lessons learned available to all kinds of stakeholders.
- Evaluation classifies and assesses the efforts, based on monitoring the defined criteria and indicators. It usually takes place regularly. It is an iterative process aimed at synthesizing insights and achieving qualitative improvements over the upcoming cycle based on both achievements and mistakes of the previous one.

Box 15 Defining monitoring, reporting, and evaluation[190]

The process serves multiple purposes such as tracing progress made, assessing what has been accomplished, and communicating the processes and outcomes of adaptation. It provides feedback on adaptation progress and performance, namely whether the adaptation goals, targets and efforts are sufficient and how they contribute to reducing vulnerability to climate change. But the overarching goal is to enable “new information and lessons learned to shape future decisions” within an iterative policy- and agenda-setting cycle. To evaluate adaptation policies, programs, measures, etc., and criteria such as their effectiveness, efficiency, or coherence, it must be clear what they are being evaluated against[191].

Therefore, the process does not start at the end of the adaptation policy cycle but is included in every step: by setting goals and well-defined objectives that are as specific as possible in planning documents and when identifying and assessing options, as well as monitoring over time the baseline conditions and progress. The evaluation itself needs to be a specific and separate effort to focus on getting deeper insights into some elements and to progress from these insights, feeding back into adaptation policy revisions. Only a limited number of countries gained deeper insights through evaluation. Monitoring, evaluation, and reporting have the potential to be a key means of informing more effective adaptation implementation. Over time, there will be greater clarity on what works and what does not, and this will help to avoid maladaptation[192].

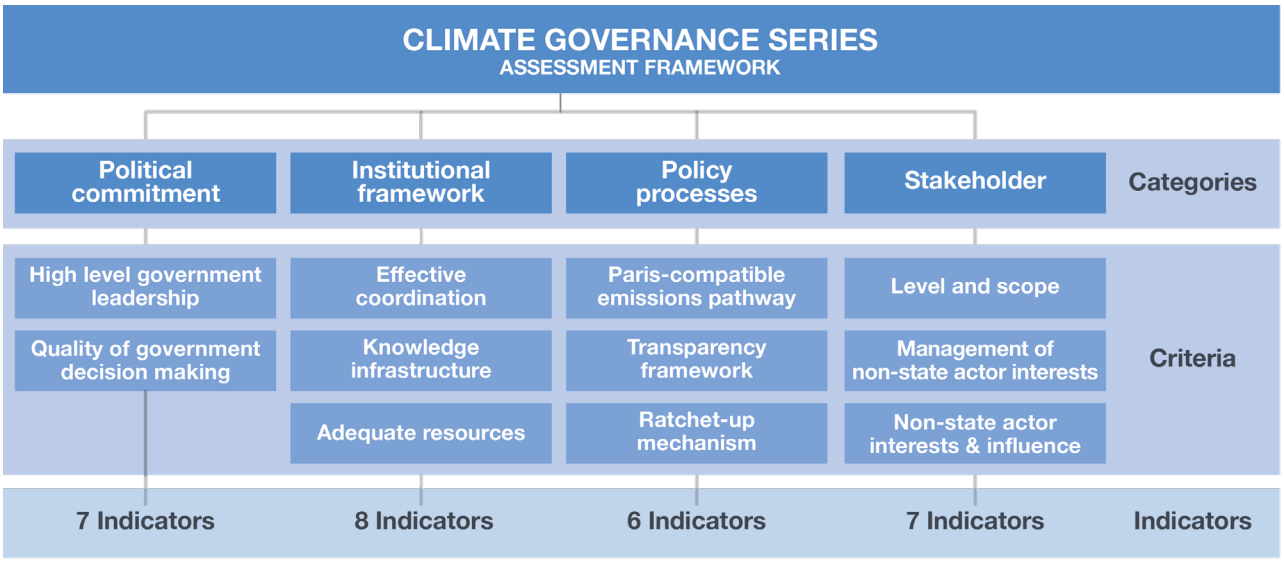

Figure 32 Climate Governance Assessment Framework[193]

Currently, there is still a lack of consensus on proper assessment methodologies of adaptation effectiveness, as many of the assessments have been designed to represent the processes more than evaluate the outcomes and the actual performance[194]. and to date, there are no common units of measurements for assessing the effectiveness of adaptation, with the definition of success being dependent on temporal perspective, the scope of the assessment, and values of decision-makers. The central question, however, is the same: Are we, as a society, becoming more resilient?[195]

While within NAP processes monitoring and evaluation often focuses on the adaptation issues, it is important is having a holistic view of the national climate strategy and framework. An example of such an integrative approach comes from the Climate Governance Assessment Framework developed by the Climate Action Tracker (see Figure 32), which is based on 4 groups of categories, 11 criteria, and 28 indicators that focus on the institutional readiness and factors that can be directly influenced by national governments. The organization provides a transparent methodology and conducts regular assessments, allowing countries to get an understanding of their strong and weak points, v as well as overall performance.

Different levels require different questions to be asked. For example, effective monitoring, reporting, and evaluation framework at the city level developed by C40 CITIES and Ramboll is presented in Figure 33, capturing five facets of planning. Importantly, the framework taps[197] into the learning aspect, which is to be explored further.

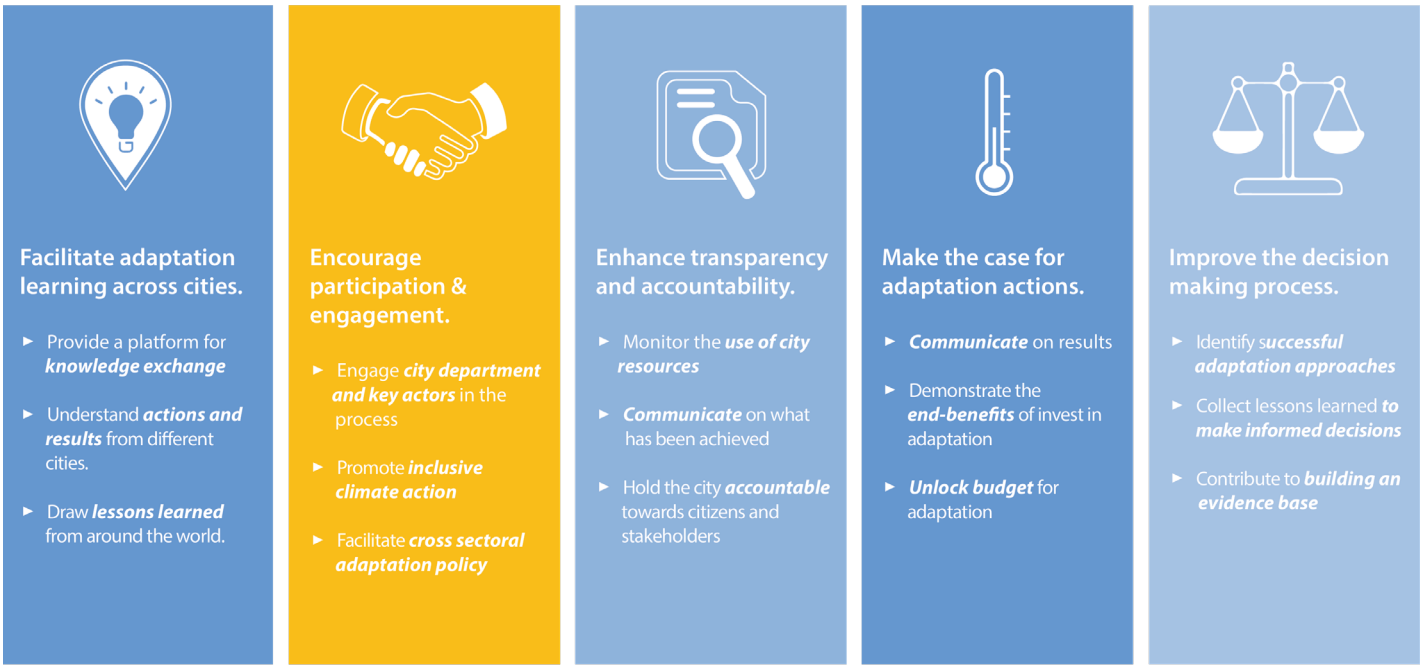

Figure 33 Objectives of monitoring, evaluation, and reporting on urban climate adaptation[196]

Adaptation planning is often based on a limited understanding of changing climate risks. Thus, monitoring, reporting, evaluation, and learning should continuously improve knowledge on climate impacts and vulnerability, present and prospective challenges, opportunities, and remaining knowledge gaps[197]. It is useful to consider learning via a triple-loop lens:

- Single-loop – improving routines, e.g., adapting to irreversible consequences
- Double-loop – questioning assumptions, e.g., reconsidering approaches to assessing vulnerabilities
- Triple-loop – revisiting discourses, e.g., questioning power dynamics and feasibility of present frameworks, looking at what stands behind certain concepts and regimes.

Single loop learning allows for incremental improvements. Double-loop learning helps to step beyond established practices and try something new, while triple loop learning allows to fundamentally reshape present systems and build a qualitatively new ground for adaptation, addressing the core drivers of climate change.

As much as at other phases, learning should consider inclusion and equality issues gender, alignment of with NAP process, NDC updates and progress on SDGs, as well as and strategic linkages between national and local levels.

The Enhanced Transparency Framework (ETF) has been established to build mutual trust and confidence among parties of the Paris Agreement, allow comparability of progress, support mutual accountability, and promote effective implementation of the agreement. Importantly, along with tracking the progress towards

10.2. REPORTING AND TRANSPARENCY

achieving Parties' NDCs, it also considers adaptation actions, financial support, technology development, and transfer, as well as capacity-building efforts[198].

The Katowice Climate Package adopted in 2018 explains modalities, procedures, and guidelines (MPGs) for the ETF. The MPGs describe the information to be reported, reporting format, timing, and processes in the Biennial Transparency Reports (BTR), covering the National Inventory Report (NIR), tracking progress in implementing and achieving NDCs, climate change impacts, and adaptation, and support needed and received. Figure 34 shows how adaptation communication is integrated within the Biennial Transparency report.

Several support initiatives and tools exist to support the process, summarized in Table 8 below. Countries may use these tools and engage with initiatives that best capture their needs per phase and capacities for engagement.

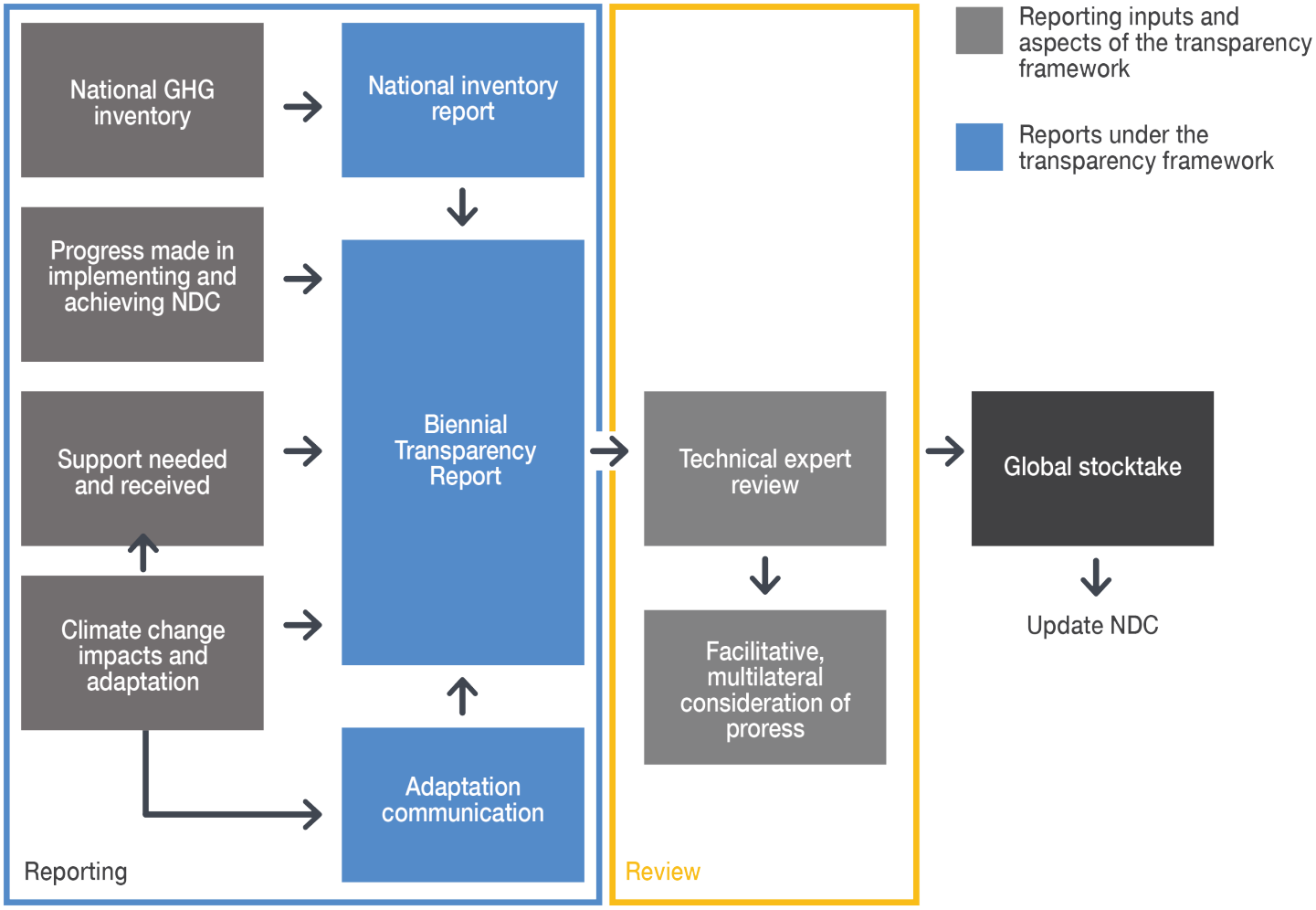

Figure 34 Enhanced Transparency Framework of the Paris Agreement[199]

INITIATIVE	AIM
Capacity-Building Initiative for Transparency (CBIT)	CBIT was established in 2015 as part of the Paris Agreement with the overall aim to help strengthen the institutional and technical capacities of non-Annex I countries, upon request, in meeting the enhanced transparency requirements of Article 13, both pre-2020 and post-2020. Specifically, CBIT aims to strengthen national institutions for transparency-related activities in line with national priorities; provide relevant tools, training, and assistance for meeting the provisions stipulated in Article 13 of the Agreement and help improve transparency over time.
Initiative for Climate Action Transparency (ICAT)	ICAT aims to strengthen MRV systems in a country-driven manner, particularly concerning reporting on NDC implementation to foster greater transparency, effectiveness, ambition, and trust. ICAT provides a methodological toolbox for impact assessment, capacity building, and knowledge sharing to more than 30 developing countries, and covers both mitigation and adaptation
Caribbean Cooperative MRV Hub (CCMRVH)	The Caribbean Cooperative MRV Hub ("MRV Hub") is a new regional institution designed to support Member Countries in their efforts to improve MRV systems, build Paris Agreement reporting capabilities, and enhance their domestic evidence-based policymaking.
UNEP/UNDP NAP Global Support Programme (NAP-GSP)	The GSP provides support to non-Annex I Parties to prepare NCs and BURs that are submitted to the UNFCCC. Further, the GSP works with key counterparts to provide technical guidance and assistance for the development of the NCs and BURs, as well as in the identification of priority areas of support for the implementation of NDCs.
Partnership on Transparency in the Paris Agreement (PATPA)	PATPA promotes practical exchange and political dialogue between countries for enhanced transparency. By bringing together climate experts from a variety of countries, the Partnership aims to strengthen transparency, communication, networking, and trust between countries; build capacity and foster a mutual learning process within regions and among practitioners around the globe and identify and disseminate best practices and lessons learned.
GEF Enabling Activities	The GEF provides resources to non-Annex I countries to prepare NCs and BURs to comply with Convention obligations in line with COP guidance, including transparency.
Global Green Growth Institute (GGGI) MRV Program	GGGI's MRV program aims to support countries in establishing robust MRV systems in line with national development strategies.
Consultative Group of Experts (CGE)	The CGE aims to assist developing country Parties to fulfil their reporting requirements under the convention, and the implementation of the ETF of the PA

Table 8 Aim of international support initiatives for MRV and transparency[200]

Several countries have established systems of NAP monitoring and evaluation to date. Most of the currently implemented systems sufficiently cover tracking of established documents and measures, targeting of vulnerable groups, and effectiveness of inclusion. Sector-specific systems are not yet widespread and can be found in few countries, including Thailand, Uganda, and Viet Nam, while a few countries are at different stages of introducing similar systems. In some cases, like Saint Lucia, the system represents how sectoral and cross-sectoral activities contribute to the overall NAP goals and objectives. Advanced frameworks are also increasingly explored by authorities, such as Kenya's monitoring and evaluation system that works via a National Performance and Benefits Measurement Framework. Most countries that have submitted NAP documents expect to update them once every five years.

Box 16 Reporting, monitoring, and review in NAPs: progress to date[201]

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11. CONNECTING THE DOTS

11.1. NAP GLOBAL PROGRESS: HOW WELL ARE WE DOING?

Countries diverge significantly in how they satisfy the criteria for adequate and effective adaptation planning, as seen in Figure 35 prepared by UNEP[202]. Whenever a certain criterion is not satisfied, it can be classified as a challenge to be addressed and we can see that a large share of countries still struggles on most issues related to the NAP process.

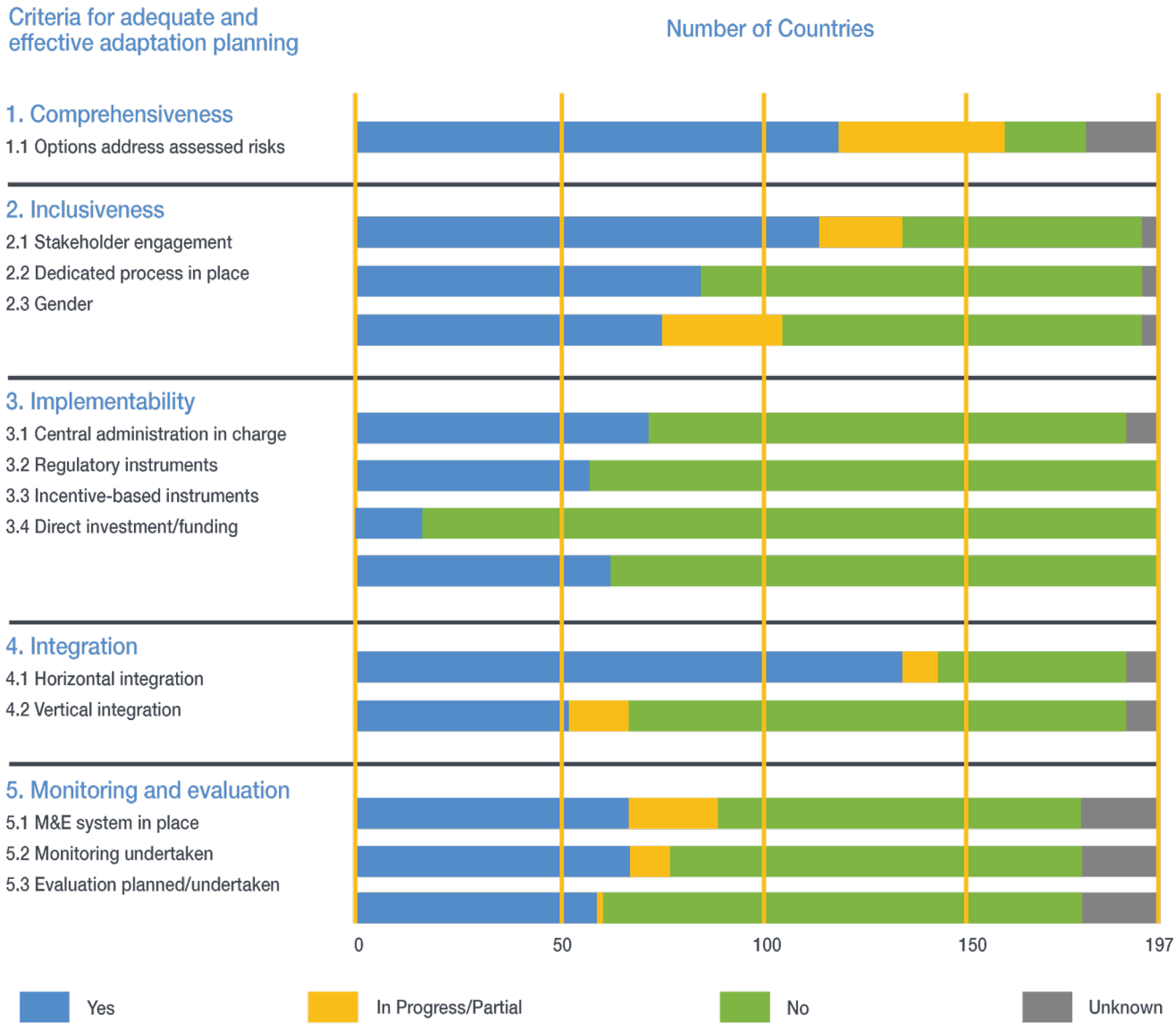

Figure 35 Criteria for adequate and effective adaptation planning[203]

ETF reporting component	Gaps in transparency capacity (average)	Gaps in transparency capacity (average)		Priority for CB	
		LDCs	SIDS	LDCs	SIDS
GHG Inventory	Institutional arrangements	70	70	38	5
	Methodologies	53	52		
	Data collection and management and procedures	40	42		
NDC progress and achievement	Institutional arrangements	67	70	32	19
	Methodologies	42	34		
	Data collection and management and procedures	28	31		
Climate change impacts and adaptation	Institutional arrangements	53	38	2	9
	Methodologies	56	51		
	Data collection and management and procedures	42	34		
Support needed and received	Institutional arrangements	46	59	3	0
	Procedure for reporting support needed	28	39		
	Procedures for reporting support needed	28	29		

Figure 36 Matrix of prioritized gaps and needs by LDCs and SIDS[204]

11.2. WHAT HAVE WE LEARNED UNTIL NOW?

Summarizing the gaps and needs in capacity-building efforts to LDCs and SIDS to implement the ETF, there are low capacities on data collection and management, procedures for reporting on NDC progress and achievement, and procedures for reporting support needed.

SIDS also have limited reporting capacities on climate change impacts and adaptation, especially in terms of institutional arrangements, and data collection and management, and procedures. Additionally, there appears to be a large gap for SIDS on methodologies for NDC progress and achievement. In terms of priorities, LDCs seem to prioritize capacity building for GHG inventory improvements, followed by NDC progress and achievement, while SIDS seems to priorities building capacities in NDC progress and achievement, followed by climate change impacts and adaptation.

Figure 36 illustrates gaps in transparency capacity (score 1–100) for different CB needs areas for LDCs and SIDS, respectively. Areas with the biggest gaps are marked in green; medium capacity in yellow; and higher capacity is marked in red. The priorities for CB enhancement for LDCs and SIDS are based on the number of outputs related to each CB needs area countries have requested support to CBIT. The higher the number, the more countries have requested support related to the respective area. The CB needs areas with the highest support requested are marked in green.

The UNFCCC systematically assesses and classifies gaps and needs related to NAP processes, and necessary support activities to overcome them[205], which provides and important opportunity for those who are just starting with the NAP process to learn from the success and failures of others.

Another source would be regular reports on the lessons learned by the NAP Global Network. Its most recent report based on 5 years of engaging with the NAP processes, highlights the key lessons to date (Table 9).

Photograph © UNDP

I. BUILDING RELATIONSHIPS TAKES TIME BUT IT'S WORTH THE EFFORT	Strong and lasting relationships are essential for an effective understanding of needs and charting optimal pathways for capacity development and collaboration. However, very often the time and resources required to build those relationships are not sufficiently built into budgets, while types of engagements between consultants and authorities (e.g., short-term missions) do not facilitate the process. Relationships should be approached with patience, through multiple formal and informal channels, and with readiness to balance different actor needs.
II. COLLABORATION IS CAPACITY BUILDING	Both consultants and local participants can learn a lot from the NAPZ process, and this understanding should facilitate exploration of opportunities and sharing of experiences. This allows consultants to gain a deep understanding of every national context they engage with, being able to further channel this experience.
III. APPROACHES BECOME TOPICS	Capacity building for NAP has often been revealed to be a tool of itself, helping to advance the NAP process through the tools used to learn about it.
IV. VALUE CHAINS ACCELERATE ACTION	Combining different types of assistance and capacity building rather than focusing on one type generates reinforcing effects, thus it is important to always consider how the provision of diverse support may play out together
V. PROCESS IS THE KEY	Investing in the process is essential to generate lasting results, as the opposite to the fast development of high-level documents that lack ownership and engagement.

Table 9 Matrix of prioritized gaps and needs by LDCs and SIDS[206]

Photograph © UNDP

11.3. AN AGENDA FOR FURTHER ACTION

Many of the challenges outlined can be gradually addressed thanks to the iterative nature of the NAP process, which allows countries to move forward on their adaptation priorities, while also adjusting systems and decision-making based on previous experiences and new developments. The Global Center on Adaptation suggests the following agenda for integrating climate adaptation into mainstream economic planning, built upon three pillars[207]:

STRENGTHENING UNDERSTANDING	STRENGTHENING PLANNING	STRENGTHENING FINANCE
Measuring progress better	Prioritizing adaptation in post-COVID recovery	Mobilizing private and public sector to make bold commitments
Better, open-access data collection	Revising policies and subsidies that increase climate vulnerability	Applying new instruments: climate resilience bonds, climate resilience debt swaps, etc.
Understanding what works	Embedding climate science into government plans	Climate-proofing the global financial system
Understanding at small geographical scales	Building stronger governance and technical institutions	Integrating climate considerations into financial decisions
	Scaling up NAPs and building adaptation into NDCs	Tracking climate finance to make sure it reaches those who need it

Table 10 Agenda for action on adaptation

The urgency of climate change makes each of the challenges and tasks above more acute, while the rapid development of methodologies, technologies, and requirements makes it hard to keep up with trends. Therefore, specific systems to track the most recent development are also essential to be established. In this context, it is useful to continually assess and reflect on gaps in knowledge, capacities, and skills, as filling them can also automatically mean overcoming some of the challenges you face[208].

Building a long-term political culture and dialogue among stakeholders is one of the key ways to ensure this

process evolves. In this context, harnessing the art of long-term thinking beyond political cycles is an essential skill for every policy- and decision-maker. It is important to remember that "process is everything" and every workshop, event, meeting, and publication adds up to the overall success[209].

With multiple organizations supporting NAP processes, many of those challenges can be gradually solved, and much can be learned from others who may have faced the same issues as you in the past. Engaging with partners like the NAP Global Network or projects such as the National Adaptation Plan Global Support Programme (NAP-GSP) can help avoid common pitfalls and significantly improve your adaptation planning experience and outcomes.

The COVID-19 pandemic has undermined much of the progress in building climate resilience, leaving the world more vulnerable than it was just one year ago. Yet it also brought valuable lessons, facilitated digitalization, and showed that rapid emission cuts are possible. Despite all the challenges, we need to accumulate resources and accelerate action, with renewed knowledge of recovering from shocks[210].

Photograph © UNEP

12. CONCLUSION OF PHASE 2 NAP IMPLEMENTATION AND MONITORING

In this chapter, we had closer look at what it takes to ensure effective NAP implementation across scales and sectors, via top-down and bottom-up approaches, and engagement with a wide range of stakeholders. While rigorous plans and dedicated lists of measures may create an impression that everything is under control, climate change as such does not allow us to take this for granted.

The uncertainty, unpredictability, and volatility of its manifestations require continuous attention to its dynamics, learning from both failures and achievements. The perfect adaptation outcome is non-existent, yet the best we can hope for is aligning and streamlining the NAP process, so it serves its purpose, goals, and objectives. Continuous learning, reflection, critical and systems thinking will be as essential as effective monitoring systems and dedicated policies. Meanwhile, any of the listed actives will not be possible without the financial resources to kick-start and keep them going, which we shall discover in the next chapter on "NAP Financing".

FINANCING THE NAP PROCESS

13. CLIMATE FINANCE & ADAPTATION AND WHY IT MATTERS

13.1. KEY CONCEPTS AND IDEAS

The Paris Agreement suggests the need for countries to align their financial flows to support climate action, particularly stating in Article 9 that "[d]eveloped country Parties shall provide financial resources to assist developing country Parties concerning both mitigation and adaptation in continuation of their existing obligations under the Convention"[211]. In seeking increased impact of climate finance investments, the Paris Agreement in Article 7, paragraph 7 (c) calls for "strengthening scientific knowledge on climate, including research, systematic observation of the climate system and early warning systems, in a manner that informs climate services and supports decision-making". This will allow Parties to pursue adaptation actions based on and guided by the best available science. Financing is necessary throughout the entire NAP process.

With the rise of dedicated institutions and a growing number of devoted actors, the last two decades have seen the rapid expansion of climate finance to address climate-related development challenges and achieve international climate goals, objectives, and targets. In this module, we will explore a wide range of concepts and funding opportunities that exist in this space. It is important to begin with a few key concepts that we will refer to throughout this module.

CONCEPT	DEFINITION
CLIMATE FINANCE	Local, national, or transnational financing from public, private, and alternative sources seeking to support climate change mitigation and adaptation212.
ADAPTATION FINANCE	Climate finance, targeted specifically at adaptation needs, often framed within the NAP process, as well as broader measures with adaptation benefits or reduction of exposures.
ADAPTATION BENEFITS	"The avoided damage costs or the accrued benefits following the adoption and implementation of adaptation measures"213.
ADAPTATION COSTS	"Represent the costs of planning, preparing for, facilitating, and implementing adaptation measures".214
LOSS AND DAMAGE	"Losses and damage may occur where adaptation limits are reached – because actions are unaffordable, not physically or technically possible, socially difficult or simply not sufficient to prevent some harm to humans, the environment and assets – and where adaptation has not been optimally implemented.". 215

Table 11 Climate finance core concepts

13.2. AN AGENDA FOR FURTHER ACTION

As we can see, there are separate definitions for climate finance and adaptation finance and this distinction is significant considering inequalities in distribution, as well as different criteria for defining successful finance in every case. It is not always easy to distinguish between adaptation benefits and avoided costs, but we should bear in mind that the benefits of adaptation span beyond preventing damage and are often synergetic, generating positive externalities or co-benefits beyond a single quantifiable criterion. Also, a clear demarcation of which projects to consider as mitigation and which as adaptation is not always possible, and we will have to carefully navigate the space of overlapping benefits, mandates, and agendas.

The falling prices and growing efficiency of clean and renewable technologies are making low-carbon solutions increasingly competitive, while the need to transition towards a climate-resilient path in every sector makes climate finance a key driver and an essential element for any timely and effective transition. Increased understanding of multiple benefits and advantages of climate solutions, particularly the ones that are robust, adaptive, and no-regrets, paired with a growing political will has captured the interest of multiple stakeholders and has created momentum for scaling up projects implemented to date. It is increasingly clear that while public actors play a crucial role in catalyzing adaptation finance, it will not be possible to reach necessary climate financing amounts without the dedicated engagement of the private sector.

Global investment in adaptation has grown from US$ 22 billion in 2015–16 to US$ 30 billion in 2017–18. However, the adaptation finance gap is not closing as costs may rise faster than the inflow of funds. Annual adaptation costs in developing countries are currently estimated to be around US$ 70 billion, potentially reaching US$ 140–300 billion in 2030 and US$ 280–500 billion in 2050. [217] Despite promising opportunities, at the current pace, we can expect a growing inequality in finance distribution and growing gaps between the required and available finance, entrenching present vulnerabilities to climate change. To get adaptation finance right, we need to increase it 5- to 10-fold.[218] Another important aspect is the financing within gap sectors. For example, the Asian Development Bank has estimated the need for US$ 26 trillion investment in infrastructure development in Asia-Pacific between 2016–2030 (US$ 1.7 trillion per year), which is more than twice the present infrastructure investments in the region. [219]

Developed countries' contributions to adaptation funds remain low compared to mitigation, leaving adaptation underfunded. Since 2003, approximately 24% of the financing approved by climate finance initiatives that the Climate Funds Update (CFU) monitors support adaptation, and this share is gradually decreasing in relative terms. [220] It is also useful to visualize the regional and sectoral distribution of climate finance, as presented in Figure 37.

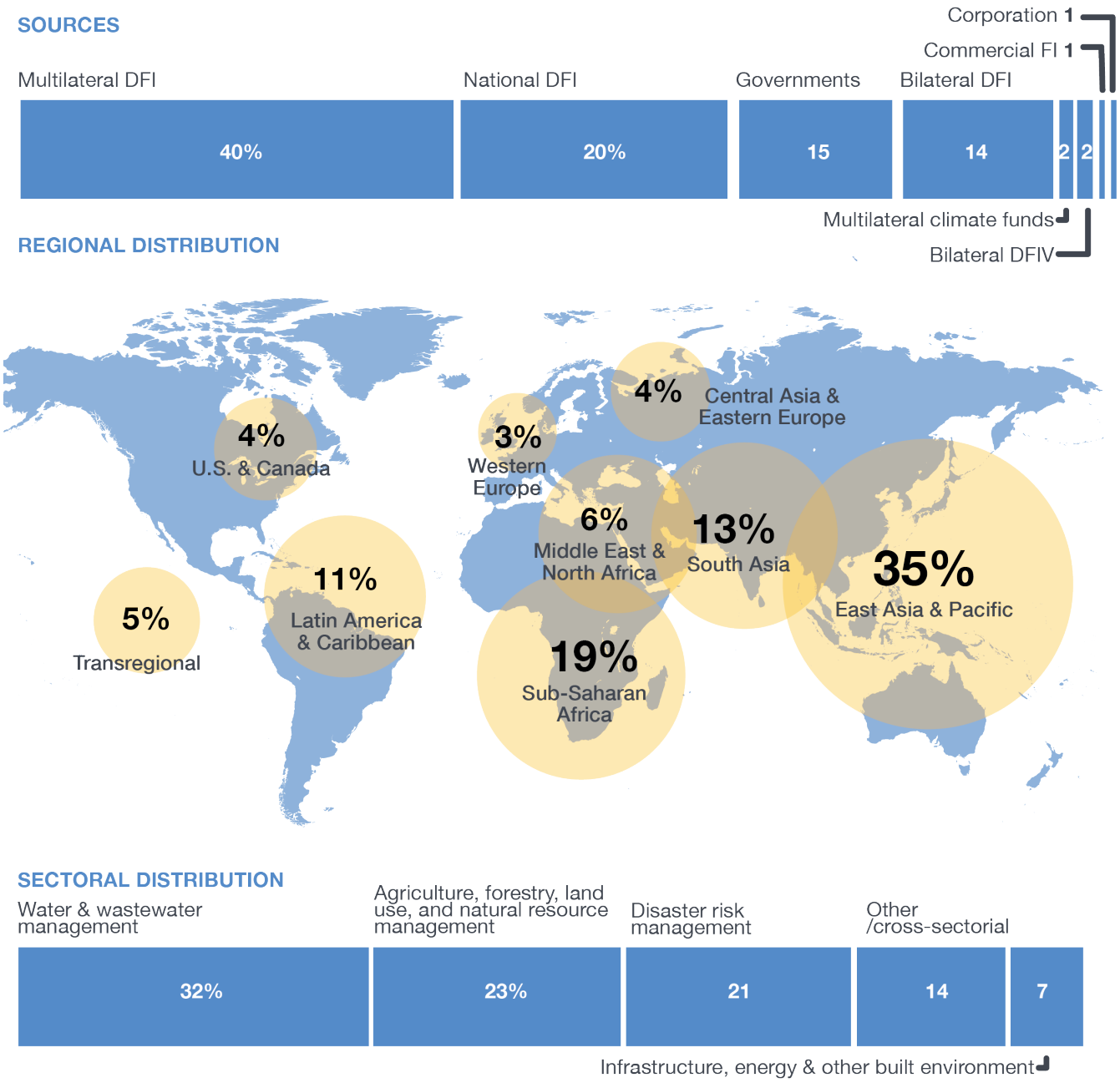

Figure 37 Adaptation finance by source, region, and sector [221]

14. EMBEDDING ADAPTATION FINANCE

Governments need substantial financial resources throughout the entire NAP process. The exact amount varies from country to country depending on factors such as the exposure to climate change hazards and risks, available capacities, and progress on adaptation to date, among others.[222] Climate science provides the basis for identifying and selecting investments necessary for adapting to climate change, ensuring

that the proposed investments will generate climate adaptation benefits for vulnerable populations, communities, and sectors (WMO-GCF, forthcoming). Climate datasets, observations, and analyses, provide a comprehensive understanding of what is happening locally in terms of climate trends, variability, and change, informing appropriate response actions and more sound finance estimates and decisions. Thus, climate science allows decision-makers to right-size, plan, and design investments and solutions that account for local circumstances and needs. This leads to a smoother, more effective, and financially viable implementation of the selected actions (WMO-GCF, forthcoming).

The NAP Global Network guidelines outline a three-step process for systematically embedding adaptation finance into national climate finance, budgeting, and planning processes. This includes (1) identification of needs, costs, and gaps; (2) identification and prioritization of sources and options based on national needs and priority actions; and (3) defining steps and actions that can improve the likelihood of securing finance from identified sources that would feed into an operational policy or framework document.

Figure 38 below provides a graphical representation of these strategies. We will further explore each of these steps (or building blocks) in more detail. National adaptation finance should be designed to meet the needs of the NAP process across different temporal horizons and mandates. Early planning is essential, which regards to the development (process maintenance and coordination) and implementation (carrying out prioritized activities) phases.

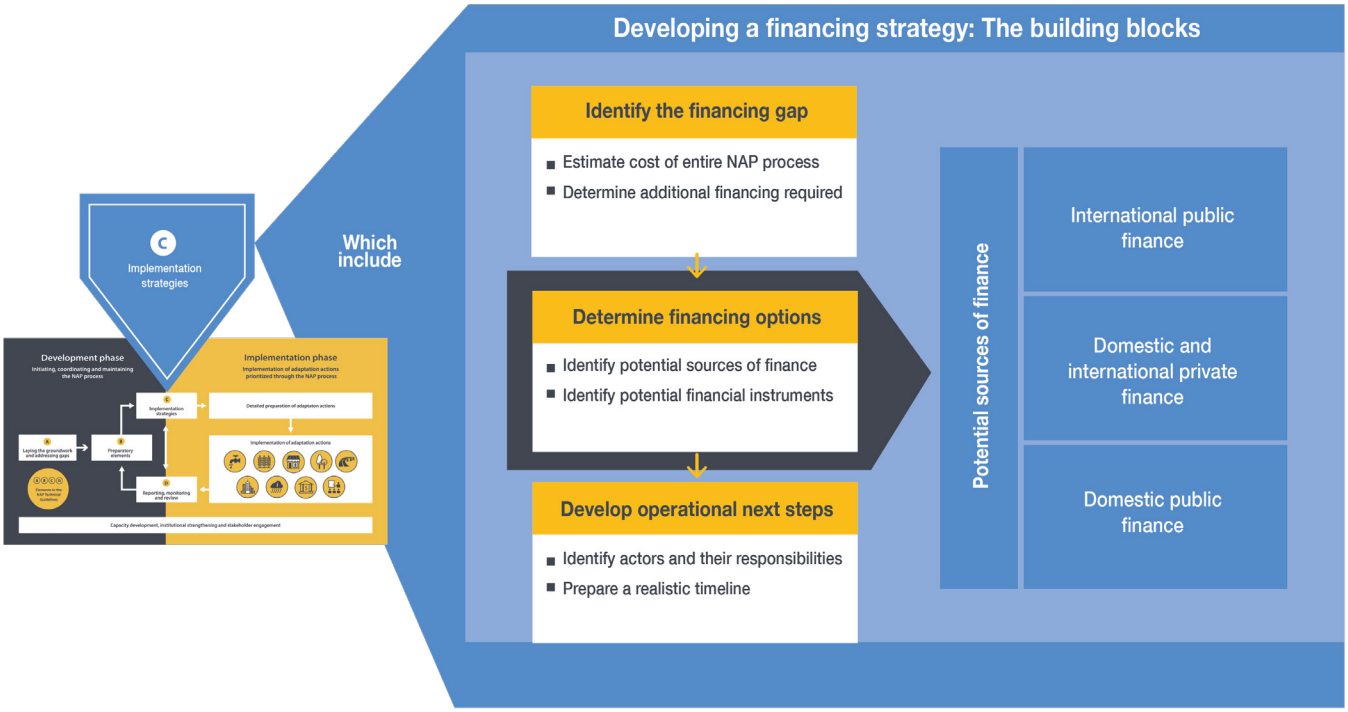

Figure 38 Main building blocks of a NAP financing strategy and its link to the NAP process[223]

14.1. IDENTIFY NEEDS AND GAPS

It is beneficial to establish grounds for effective tracking of adaptation finance flows, which allows a better understanding of the sources, users, and uses of adaptation finance, builds transparency, improves understanding of the available mechanisms, strengthens the capacity to raise resources in the future, and builds an effective foundation for adaptation finance budgeting[224].

There are several tools to assist in this finance tracking process. The Climate Public Expenditures and Institutional Review (CPEIR) by UNDP is a well-established tool designed for systematic qualitative and quantitative assessment of national public expenditures that are related to climate change. CPEIR exercises have proven helpful for country decision-makers to understand where and how adaptation finance is used, identify programmes that incorporate adaptation objectives and co-benefits, and obtain robust data and evidence for spending decisions. Following CPEIR exercises, governments can adjust their fiscal policies and reprioritize or reallocate scarce public resources towards more climate-resilient trajectories, while increasing transparency of the financial flows.[225] The CPEIR analytical framework is presented below (Figure 39).

The process includes six steps, starting from stakeholder and concept initiation and moving through necessary arrangements, terms of reference, analyses, validation, finalization, and application of the gained insights. Take a look at the CPEIR guidebook from 2015 that builds on previous lessons of its application and case studies on climate financing frameworks and CPEIRs in different countries for the application of the tool.

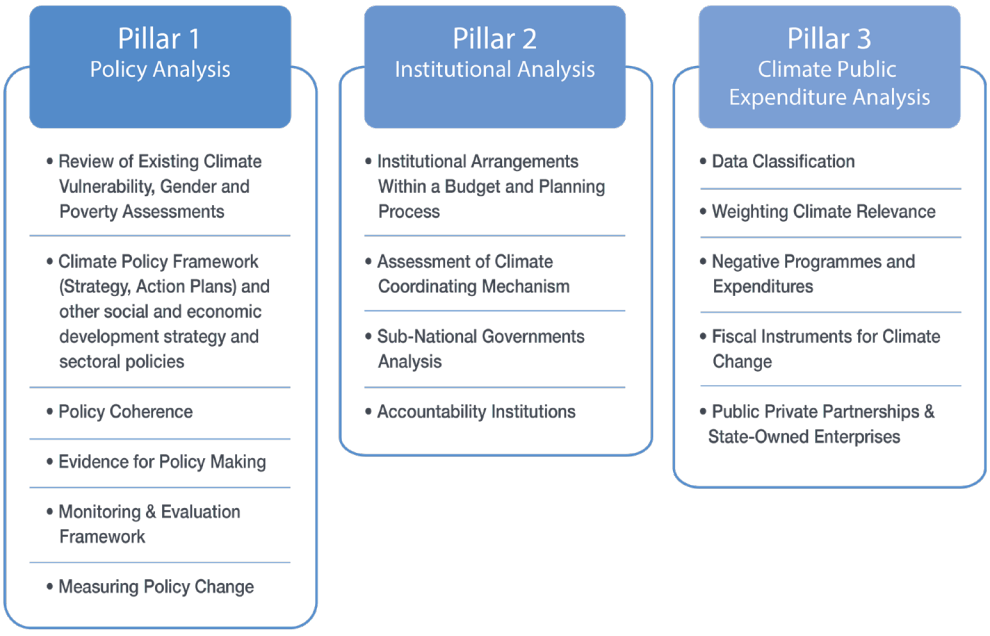

Figure 39 CPEIR analytical framework[226]

An example of tracking climate-related finance within the national policy context comes from Viet Nam, as presented in Figure 40 below. This analysis shows how it is possible to classify policy actions and track devoted resources and enabling activities, as well as considering sectoral programmes. Insights gained through such an assessment can help develop scenarios of future needs and expenditures.

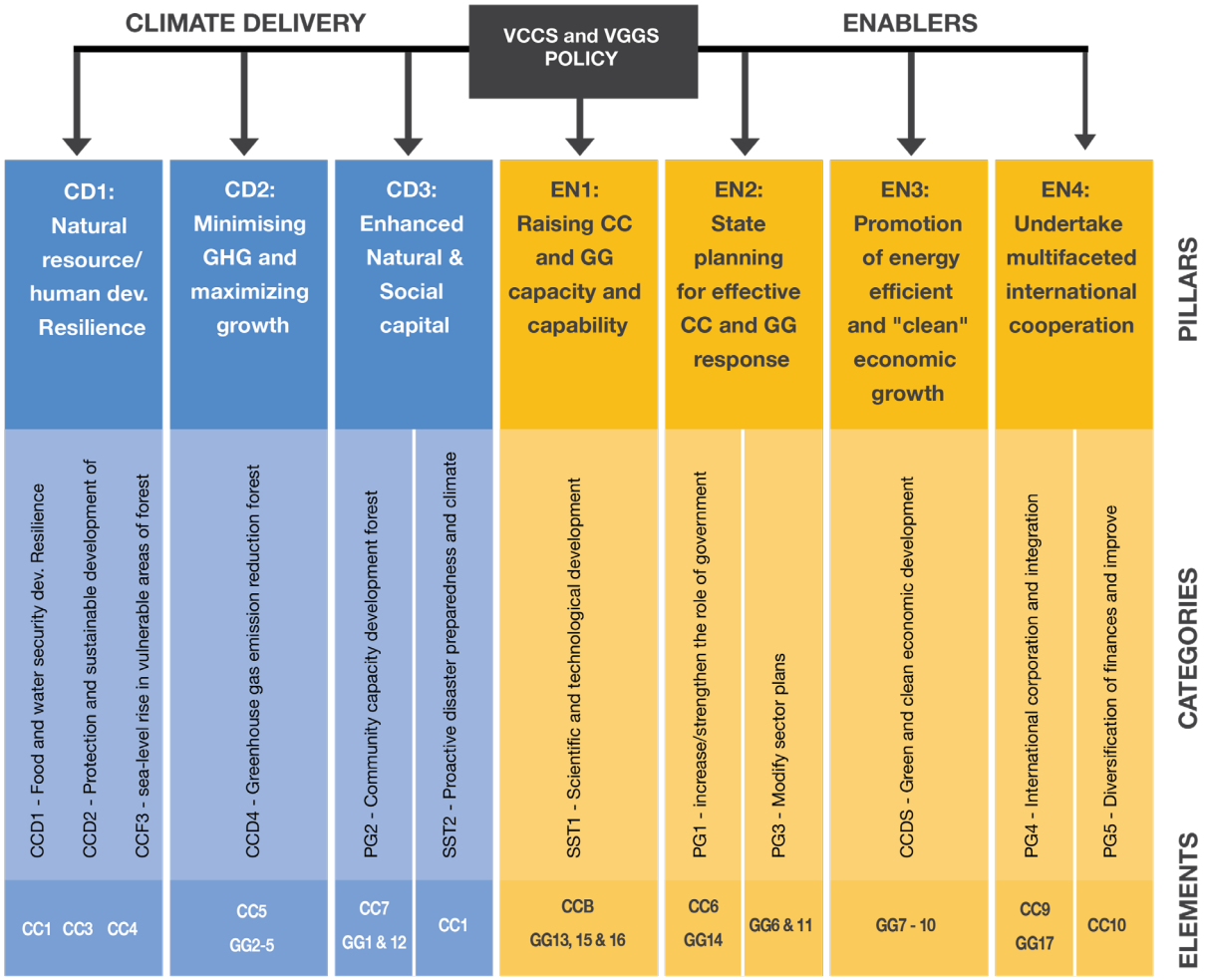

Figure 40 National objectives of Viet Nam for its CPEIR analysis[227]

Additional required finance is defined by first estimating the total expected cost of the NAP process under applicable scenarios, followed by assessing coverage of those needs through national and subnational domestic public budgets, as well as ongoing programmes. This will help determine a potential NAP process finance gap.

Throughout the NAP process, it is recommended to consider both operating and investment costs. The first relates to continuous expenses required to support the process, including staff, equipment, collaboration arrangements, facilities, as well as general administration and oversight. The latter regards actual investment into adaptation, which may include technology, infrastructure, equipment, education, research, and development, as well as any other activity defined within the prioritization process.

While the development costs will be covered mostly by public resources distributed among different ministries, authorities, and agencies, as well as local authorities and communities engaged early on into the process, implementation costs are borne by a wide range of actors that are contributing to the implementation in a variety of ways.

An example of addressing this need comes from Kenya, where a Training Handbook on Climate Finance Budget Coding, Tracking and Reporting, published in 2019, has been developed as part of the Government's strategy to strengthen its climate finance capacity, improve resource coordination, better track expenditures and improve transparency.

The handbook was developed by a Multi-Stakeholder Technical Working Group coordinated by the National Treasury and the Ministry of Environment and Forestry and involving a wide range of actors. It clearly outlines the roles and mandates of different actors with regards to adaptation finance, where the National Treasury develops a strategy, issues regulations, defines procedures, identifies sources of climate finance, monitors their use, and works with the Cabinet Secretary responsible for climate change affairs to develop incentives to promote climate change initiatives.

The handbook provides all actors with a clear understanding of the framework, adaptation options, and opportunities for engagement. Another great example of climate change finance alignment comes from Nepal (see Box 17 below).

Thus, it is important to assess and build the administrative capacities within the NAP core team to be able to develop the necessary instruments to facilitate effective stakeholder involvement in adaptation planning.

The Climate Change Financing Framework (CCFF) in Nepal blends top-down guidelines under a whole-of-government approach, attached to a high-level strategic resource envelope, with bottom-up approaches for prioritizing allocations through the budget cycles at various levels of governments, starting at the federal level to the provinces and local governments. It links policy decisions to budget allocations and expenditure tracking in a structured way. The government built its activities on a clear roadmap that considers climate change mainstreaming into planning and budgeting. The process considers important factors such as the roles played by different stakeholders and necessary reforms.

Box 17 Climate Change Financing Framework (CCFF) in Nepal[229]

14.2. EXPLORE FINANCE OPTIONS: SEEK DIVERSITY

Every country needs to determine how to best combine different sources of finance to meet their needs considering their capacities and contexts. The range of climate adaptation finance options available will depend on the development status, present bilateral and multilateral agreements as well as the presence of adaptation programmes or initiatives nationally and regionally. Effective combination of finance options requires understanding their similarities and differences. Most finance providers will have specific criteria and priorities for engagement, expect a straightforward methodology to track adaptation success, require demonstrating co-benefits and long-term self-sustainability, as well as expecting at least partial co-financing to ensure ownership. On the other hand, the type of instruments that can be used and how they are applied differ vastly depending on associated return expectations, transaction costs, risk levels, and other factors. The types of finance providers will depend on the scale, the amount of capital, and the associated actors. For example, Small and Medium Enterprises (SMEs) might not need as much support in the effective assessment of their climate risks and opportunities as opposed to large infrastructure projects (see Figure 41).

The importance of effective stakeholder engagement becomes apparent again, with the need to engage key actors that are responsible

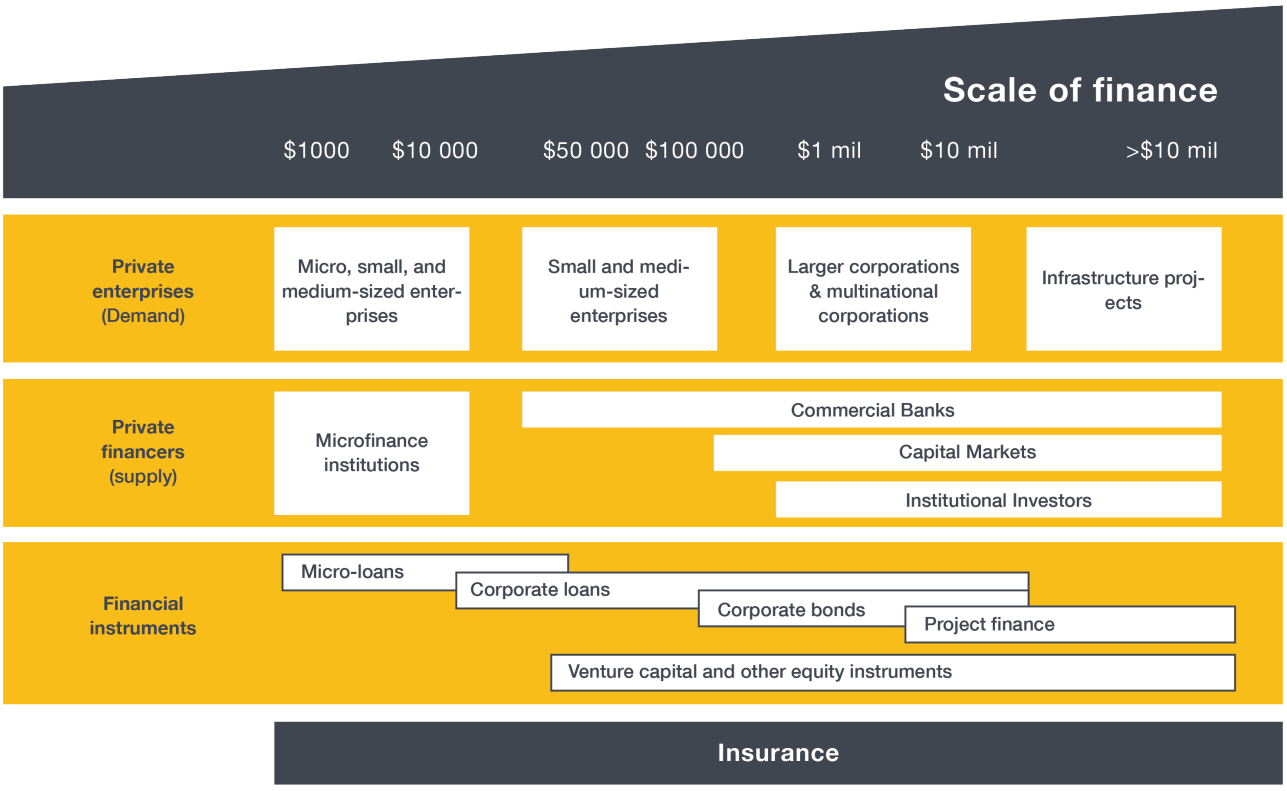

Figure 41 Interdependence between private sector actors, influence, and scales of finance[230]

for managing financial flows, such as ministries of finance or ministries of development.

Representatives of sectoral ministries should also be welcome at the table, particularly as there might be significant differences in sectoral vulnerabilities and needs.

Sectoral experts, for instance, provide information on impacts of climate variability, change and extremes, exposure, vulnerabilities, and risks and opportunities in the climate sensitive sectors prioritized; and contribute to obtaining the data and elaborating the science needed to analyze and assess impacts – including documenting data, information, or knowledge gaps that impede the assessment of climate impacts.

These experts usually support identifying, prioritizing, and selecting climate actions in the NAP process. Early engagement with the national focal points of bilateral providers and prospective private sector actors can also provide a better understanding of actor priorities, help build trust, and yield beneficial long-term commitments, particularly in terms of securing finance for building capacities, strengthening institutions, and developing relevant frameworks.

The diversity of finance sources should be balanced by feasibility, considering the related rise in transaction costs and necessary arrangements to support the process and maintain relationships with the finance providers and ensure due diligence.

MDBs and IDFC established in 2015 Common Principles for mainstreaming climate action, which include the need to commit to climate strategies, manage climate risks, promote climate smart objectives, improve climate performance and account for climate action. The have also established Common Principles for Climate Change Adaptation Finance Tracking, presented in Box 18 below.

- Adaptation finance tracking relates to tracking the finance for activities that address current and expected effects of climate change, where such effects are material for the context of those activities.
- It may relate to activities consisting of stand-alone projects, multiple projects under larger programs, or project components, sub-components, or elements, including those financed through financial intermediaries.
- Adaptation finance tracking process consists of the following key steps:
    - Setting out the context of risks, vulnerabilities and impacts related to climate variability and climate change.
    - Stating the intent to address the identified risks, vulnerabilities and impacts in project documentation.
    - Demonstrating a direct link between the identified risks, vulnerabilities and impacts, and the financed activities.
- The process requires adaptation activities to be disaggregated from non-adaptation activities as far as reasonably possible. If disaggregation is not possible using project specific data, a more qualitative or experience-based assessment can be used to identify the proportion of the project that covers climate change adaptation activities. In consistence with the principle of conservativeness, climate finance is underreported rather than over-reported in this case"

Box 18 Common Principles for Climate Change Adaptation Finance Tracking[231]

14.3. DEVELOP STRATEGY AND BUDGET

A comprehensive government led approach that engages all relevant stakeholders toward the mobilization, management, and targeting of climate change finance will benefit not only the implementation of NDCs/NAPs but also facilitate identification of available financial means. One approach to facilitate this is through the establishment of a Climate Change Finance Framework (CCFF). In short, the CCFF[232] is a comprehensive and strategic approach through which governments can review financing gaps and outline key governance, planning, sourcing, and budget system reforms that better link climate finance with the delivery of priority actions.[233]

NAP finance strategies may be formalized into an operational document featuring a general framework, a realistic timeline, key steps, and actors engaged at every stage. It should clearly outline respective responsibilities and coordination arrangements, set milestones and targets, as well as provide sensitivity and risk analyses to incorporate factors such as political volatility and prospective outcomes. Outcomes may vary using different policy instruments such as taxes, levies, or fees. Current experience suggests that establishing coherent adaptation finance strategies or broader climate finance frameworks can be a crucial factor behind overall progress on the adaptation process.

These are some of the questions to ask when developing the strategy (adapted from the Performance Based Climate Resilience Grants):[234]

- What are the political, fiscal, and adaptation governance landscapes?
- What are the planning, budgeting, and sector coordination arrangements?
- Who are the key actors (i.e., the national designated authorities and national implementing entities)?
- How are adaptation finance capacities distributed geographically, across sectors, and social groups?
- Are there national and/or local assessments on existing and projected climate change impacts and related costs?
- Is there a national-level climate change policy or adaptation strategy?
- Is there a national coordinating mechanism for climate change and adaptation finance in particular?
- Which development partners support adaptation and how is it organized?
- What are the costs of typical climate adaptation investments depending on the scale?
- Who oversees the flow of funds, coordination of performance assessments, and MERL?
- What provisions exist for reporting, accountability, and audits?
- Are there annual performance assessments? Are they credible, robust, and have quality assurance?
- Is there strong ownership and commitment from the ministries responsible for climate change adaptation?
- Are there particular toolkits and guidelines on national adaptation finance or related aspects?
- What are strategic national interests that could serve as entry points for adaptation finance?
- What are the main flaws in the budgeting and planning systems and how can they be overcome?
- What are the main risks related to adaptation finance and how can they be managed?

Based on analyses and engagements at various stages, it is possible to determine feasible entry points into the national planning and budgeting cycle to consider adaptation finance needs along with the other national priorities. For this, the NAP support team should make sure to cover at least the following aspects[235]:

√	Engage key actors and institutions that participate in the budget allocation
√	Have clearly defined priorities and robust cost and benefit estimates
√	Develop sector-specific guidance whenever feasible
√	Consider the need for improving the current finance system to meet NAP priorities
√	Consider temporal alignment of timeless for core documents
√	Communicate both broad significance and specific considerations depending on the actor perspective

Table 12 Example of Climate-Relevant Expenditures criteria in Kenya[238]

While the applicable approach to NAP finance differs from country to country, it is possible to distinguish two common entry points within the planning and budgeting cycle[236]:

- Zre Frameworks (MTEF) are commonly embedded in the national development priorities, providing caps for resource allocation in particular areas for the next 3-5 years.
- Annual budgeting processes based on yearly development or sectoral plans defining allocation for operational spending, programmes, and activities.

Such embedding and integration can facilitate conditions for ensuring stable financing for the implementation of adaptation actions. While the first case would facilitate more long-term action, in the second, more flexibility can be achieved depending on the emerging needs and available resources. As an example, the national budgeting process in Kenya is presented in Box 19 below.

The handbook also provides significant assistance for future proposal development outlining priority sectors, core adaptation activities, and enabling environments that have been created in the country to facilitate improved adaptation opportunities and outcomes. It also outlines potential entry points for mainstreaming climate finance into the budgeting process and guidelines on nationally aligned costing of adaptation activities via the framework of Climate-Relevant Expenditures (CRE). Table 12 provides an example of Climate-Relevant Expenditures criteria from Kenya.

1	Addresses one or all the climate change risk mitigation or climate-proofing categories
2	Allocates above 25% of funding to one or all the climate risk mitigation or climate-proofing categories
3	Demonstrates that incremental or additional financing has been used for 1) above; and
4	Shows that the outcome/output increased resilience, reduced emissions, or increased awareness

Policy, planning, and budgeting integrated for optimal national and county development outcomes, linked to the Constitution of Kenya, Kenya Vision 2030, and its Medium-Term Plans (MTPs). County budgets are further linked to the County Integrated Development Plans (CIDPs), as well as specific sector, legal and institutional frameworks. Meanwhile, climate change budgeting is aligned to the Climate Change Act, 2016, the National Climate Change Action Plan (NCCAP), the Nationally Determined Contributions, the National Policy on Climate Finance, the National Climate Change Framework Policy, the Green Economy Strategy and Investment Plan (GESIP), County Integrated Development Plans, MTPs, and other relevant policy documents. The national handbook suggests that climate adaptation finance should be clearly defined in the MTEF budget proposals before the allocation of expenditures and their validation.

Expenditures should consider available and agreed on budget resources, while allocations and expenditures should not undermine gender equality and other cross-cutting social issues. Integrating climate finance in Kenya's budgeting process is expected to help maximize the budgetary allocation of public sector resources to climate issues, allow tracking public sector expenditures related to climate issues and their effectiveness against policies and plans; and strengthen monitoring and reporting.

Importantly, the handbook also presents challenges and ways they are addressed to be considered by policy- and decision-makers. The identified challenges include inconsistencies in official financial reports, resolved through alignment via Integrated Financial Management System (IFMIS), consideration of plans developed off-system without clear links to budgets, the lack of accounting of climate finance provided by development partners to non-state actors due to the absence of the relevant mechanism and institutional capacity gaps within the MCDAs to mainstream climate change into budgeting.

Box 19 Integration of adaptation finance within the national budgeting in Kenya[237]

The Government of Togo has set to align its NAP process with the national development and budgeting, which was analyzed to define key entry points and initial steps for alignment with inputs from ministries. Analysis revealed that adaptation considerations have been already partially integrated into national and sectoral priorities, while more coordinated integration into the budgeting process was established, followed by capacity-building for MTBF committee members. The process took place under the Technical Committee for Coordination of the Integration Process of Climate Change in Planning and Budgeting, co-chaired by the Ministry of Development Planning, the Ministry of Economy and Finance, and the Ministry of Environment and Forest Resources. The activities were implemented within GIZ's Climate Policy Support Programme and a bilateral Study and Expert Fund by the German Federal Ministry for Economic Cooperation and Development. Togo issued its NAP in 2017, featuring identified measures, their costs, and key finance options.

Box 20 Aligning the NAP process to Togo's national budget-planning process[239]

Additionally, entry points for local adaptation finance as mediated by the government can also be considered, as presented in the example of Performance-based Climate Resilience Grants (PBCRG).

The next chapter (Sources of adaptation finance) will dive deeper into possible sources of funding and related instruments.

Figure 42 Country entry points for PBCRG[240]

15. SOURCES OF ADAPTATION FINANCE

The current adaptation finance architecture includes private and public finance, both international and domestic, as well as resources from development finance institutions and increasingly from insurance and risk pooling mechanisms[241]. Countries can access diverse financial sources to support their NAP processes and need to determine how to best combine domestic and international, public, and private sources. Figure 43 provides an overview of the complexity of the international adaptation finance architecture.

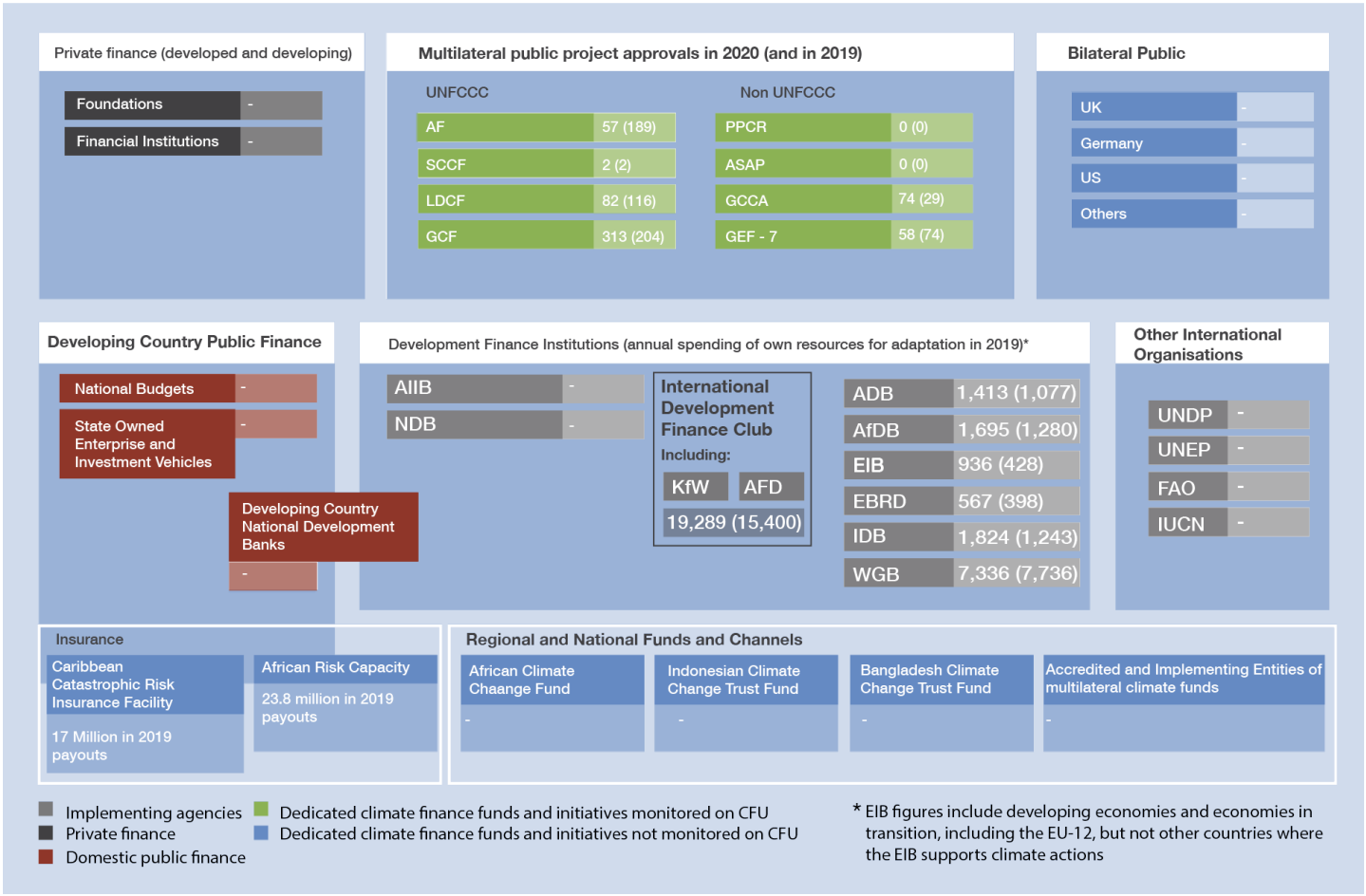

Figure 43 Adaptation finance architecture diagram (US$ millions)[242]

Those sources are not equally available for different phases, as Figure 44 suggests. The development phase usually requires significantly fewer resources and features a narrower range of available resources, which are mainly limited to domestic and international public finance. The implementation phase is particularly resource-intensive while also offering a wide scope of opportunities for finance. In most cases, countries will use a combination of sources, defined within a comprehensive adaptation finance framework and strategy[244]. We will further explore key steps in building an actionable climate finance strategy, proceeding with an outline of activities and elements necessary to establish an effective national adaptation finance framework.

A brief overview of core prospective sources is provided in Table 13 and detailed in further chapters. It should be noted that there are both unique and common financial instruments used within those sources. For example, project-based finance, grants, and loans can come from different providers, while certain institutions may specialize only in particular types of instruments.

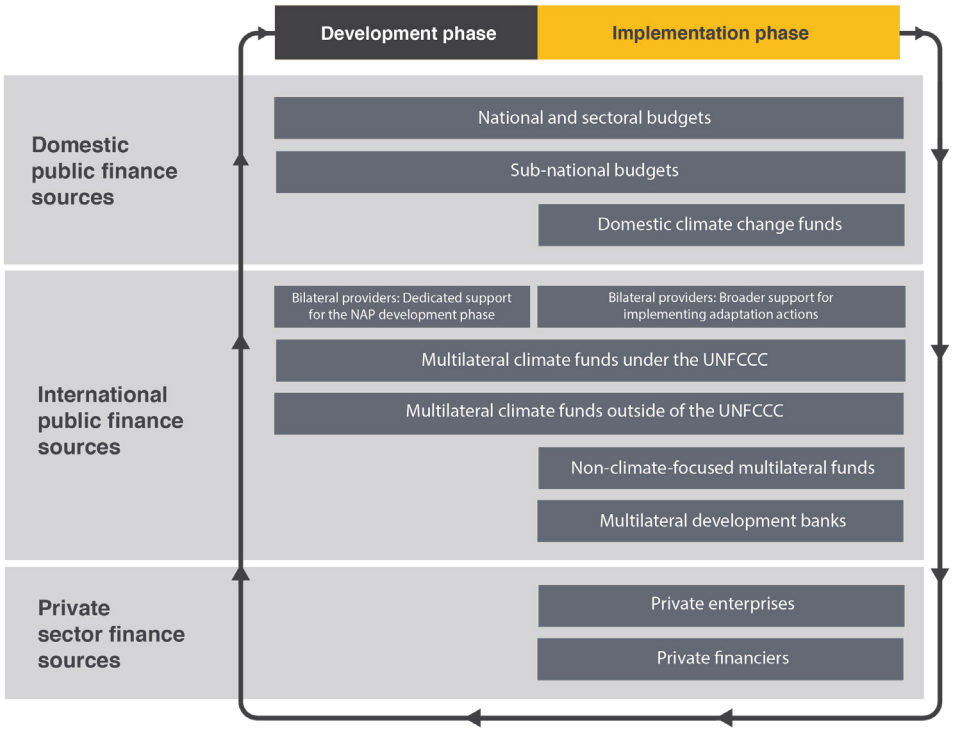

Figure 44 Potential sources of finance for the NAP process for development and implementation[243]

SOURCE	ACTORS, MECHANISMS, & INSTRUMENTS	OPPORTUNITIES
GOVERNMENT	Domestic public finance by government actors and agencies via annual budgets, 3-5-year plans, and domestic climate funds. Includes diverse government actors, relies mainly on fiscal instruments and revenue redistribution.	Core activities of both development and implementation phases to improve ownership, build the NAP process around national systems, cover essential adaptation priorities, and leverage broader engagement.
BILATERAL	Country-to-country public funding delivered via sectoral support, development assistance tailored programs or projects, and export credits. Instruments include grants, loans, guarantees, insurance, and equity.	Relevant for development and implementation phases of the NAP process, particularly helpful in driving innovation and enabling actions, creating necessary frameworks and systems, such as improving transparency.
MULTILATERAL	Mostly public funds driven by governments and delivered via tailored institutions and mechanisms such as climate and sectoral funds. Instruments include grants, loans, insurance, guarantees, and equity.	Financing implementation phase, with specific fund targeted at implementing prioritized actions. Multilateral development banks (MDBs) may feature higher concession levels compared to commercial banks.
PRIVATE	Non-state commercial actors including enterprises, private foundations, commercial banks, insurance providers, and investment funds. Instruments include loans, microfinance, credit lines, private bonds, subordinated debt, venture capital, guarantees, insurance, grants, and remittances.	Financing the implementation phase of the NAP process, i.e., adaptation actions by governments or non-state actors. Investment in new business opportunities that support adaptation and reduce climate risk. Investments to protect existing business practices from climate impacts.

Table 13 Core sources, actors, and opportunities for the financing NAP process[245]

15.1. INTERNATIONAL PUBLIC FINANCE

The two most common sources of international public adaptation finance are bilateral and multilateral providers. Bilateral donors focus on grant-based technical assistance as part of broader support packages, as well as bilateral development banks focused on specific projects. There are two key channels they use, as outlined in Table 14:

INSTRUMENT	DESCRIPTION
GOVERNMENT-TO-GOVERNMENT COMMITMENTS	Build on country priorities and collaborative arrangements and financed via either bilateral assistance overall portfolio (e.g., improving data management) or integrated into specific programs in climate-sensitive sectors such as agriculture or water (e.g., climate modelling). Targeted budget support, basket financing, or sector-wide approaches beyond the financing of individual projects may also be part of the package.
TARGETED CLIMATE FUNDS	Finance specific adaptation projects Common examples are Germany's International Climate Initiative, the Nordic Development Fund, the United Kingdom's International Climate Fund, and the European Union's Global Climate Change Alliance (GCCA+) programme. Such funds publish regular calls with specific focus areas and often under well-developed internal frameworks, to which recipients must comply.

Table 14 Common instruments within bilateral adaptation finance[246]

NAP processes provide a strategic opportunity to communicate a country's adaptation needs coherently and to integrate adaptation priorities into frameworks for development assistance, alongside other development priorities. In this way, bilateral finance may provide simpler and quicker access modalities than some multilateral mechanisms. As well, the broad range of support modalities from bilateral providers means that these funds can be used to finance the whole range of costs associated with the NAP process.

These costs include direct support to governments for operational costs as the process is being initiated; institutional strengthening, stakeholder engagement, and capacity development for different actors involved in the process; infrastructure, equipment, and improved systems for generation and communication of climate information; and strengthening of monitoring and evaluation systems. Bilateral providers place a strong emphasis on capacity development and technical assistance for adaptation, creating opportunities to finance These costs include direct support to governments for operational costs as the process is being initiated; institutional strengthening, stakeholder engagement, and capacity development for different actors involved in the process; infrastructure, equipment, and improved systems for generation and communication of climate information; and strengthening of monitoring and evaluation systems. Bilateral providers place a strong emphasis on capacity development and technical assistance for adaptation, creating opportunities to finance the building of in-country capacity that may not be offered by other sources such as the private sector or domestic finance.

Furthermore, when provided in the form of grants, this funding represents a low-risk source of finance for investing in innovative approaches to adaptation that could also leverage other sources, including private finance. The extent to which bilateral finance may be a potentially important source of finance for the NAP process will vary from country to country, depending in part on existing relationships with providers. In LDCs, where ODA plays a significant role in financing development activities in general, there may be greater potential to gain bilateral support for the NAP process. Opportunities for bilateral funding for the NAP process will also be determined by the degree of emphasis on adaptation within each provider's funding strategies, both generally and in the country in question. For bilateral assistance to be an effective source of finance for the NAP process, donor coordination is critical to avoid duplication of efforts, in line with internationally agreed principles and mechanisms for development aid effectiveness. Some common bilateral provider and dedicated programs are provided below.

Ministries coordinating bilateral processes are key actors ensuring consistency and stability of such finance and should ensure how bilateral adaptation support aligns with other sources. The engagement of bilateral providers into the process can be helpful at different stages, particularly when it comes to capacity building and transparency.

Multilateral providers comprise a heterogeneous group of funds both under and outside of the UNFCCC. The largest sources of approved funding for adaptation projects are currently the Green Climate Fund (GCF), the Pilot Program for Climate Resilience (PPCR) by the World Bank Climate Investment Funds, the Least Developed Countries Fund (LDCF) of the Global Environmental Facility (GEF), and the Adaptation Fund (AF), outlined in Error! Reference source not found. below.[247]

thEFund (LDCF) of the Global Environmental Facility (GEF), and the Adaptation Fund (AF), outlined in Error! Reference source not found. below.[247]

Fund	Pledged	Deposited	Approved	Projects approved
Green Climate Fund (GCF-IRM, GCF-1)	20,320.3	10,179.0	1,620.0	63
Least Developed Countries Fund (LDCF)	1,686.4	1,583.8	1,265.7	283
Pilot Program for Climate Resilience (PPCR)	1,144.8	1,144.8	987.2	67
Adaptation Fund (AF)	1,039.2	978.3	777.3	238
Global Climate Change Alliance (GCCA)	1,332.90	1,332.9	380.9	40
Adaptation for Smallholder Agriculture Programme (ASAP)	406.5	331.8	293.1	42
Special Climate Change Fund (SCCF)	379.6	372.9	284.0	72

Figure 45 Multilateral funds supporting adaptation (2003-2019, US$ millions)[248]

Different funds have different capacities, mandates, and scopes of involvement with the NAP process. The GCF can facilitate the NAP development within its Readiness and Preparatory Support Programme, targeted at *"strengthening institutional capacities, governance mechanisms, and planning and programming frameworks to identify and implement a transformational long-term climate action agenda for developing countries*[249]*".* It can also finance specific adaptation measures.

Being *"capital agnostic"*, the GCF provides a *"full range of financing instruments including loans, equity, guarantees, and grants to de-risk investments and crowd in public and private investment to achieve transformative results.*

The Fund strives to balance its funding equally between mitigation and adaptation and to maximize development co-benefits to increase the resilience of the most vulnerable people, communities and nations". It's six investment criteria include (1) impact potential, (2) paradigm shift potential, (3) sustainable development potential, (4) needs of the recipient, (5), country ownership and (6) efficiency and effectiveness.[250]

GCF is also particularly focused on building new alliances and supporting public-private partnerships.

GCF recently called for an "*(…) increased generation and use of climate information in decision-making"* to increase the impact of GCF's investments.[251] Climate science helps to prevent maladaptation as an unsuccessful planned action or a series of actions and strategies 'leading to unpredictable change', including rebounding and shifting vulnerability or eroding sustainable development [252] (IPCC, 2018) and improving national, sub-national and sectoral planning and decision-making. Climate actions can be more transformative when the science demonstrates the need for investment and can show where impacts will be greatest (WMO-GCF, *forthcoming*).

Considering that the GCF is the largest source of adaptation finance to date, it makes sense to look at its project cycle and the requirements that need to be met when submitting project proposals. Overall, the GCF project approval process includes 10 stages, from project origination to closure (see Figure 46).

Its cycle begins with the preparation of necessary programmes at a country level and direct work with the designated Accredited Entities via Nationally Designated Authorities and focal points. The project is further developed and submitted by accredited entities, followed by a review and assessment by the GCF Secretariat, and the final review and approval by the GCF Board. After this, the project is implemented, evaluated, and closed. The GCF project cycle is overseen by the Secretariat and GCF independent units, with learning considered a central aspect of the process.

Before submission of the full funding proposal, National Designated Authorities and Accredited Entities may submit concept notes to the GCF to present a summary of the proposed project or to receive feedback from the Secretariat on whether it is aligned with the GCF's objectives, policies, and investment criteria, to improve the project development process as well as from the Independent Technical Advisory Panel. A short outline of concept notes requirements for the Simplified Approval Process is provided in Box 21 below.

Figure 46 GCF project/program activity cycle[253]

Studying and applying GCF criteria and processes can prove useful for many other applications. The other most common funds include the Least Developed Countries Fund and the Special Climate Change Fund. They both support NAP processes for a defined group of countries, while the Adaptation Fund finances specific projects and programmes within the implementation phase. Multilateral funds outside of the UNFCCC can be another key source for implementation phase finance. Examples include the Pilot Program for Climate Resilience and the Adaptation for Smallholder Agriculture Programme.

A. Project/Programme Summary

The section intends to obtain essential information about the proposed project or programme

A.1. Project or Programme
A.2. Public or Private sector
A.3. Is the concept note submitted in response to a Request for Proposals (RFP)
A.4. The result areas for the project/programme
A.5. Impact potential
A.6. Financing information
A.7. Implementation period:
A.8. Is funding from the Project Preparation Facility needed?
A.9. Is the Environmental and Social Safeguards Category C or I-3
A.10. Rationale for the ESS categorization
A.11. Has the CN been shared with the NDA?
A.12. Confidentiality
A.13. Executing Entity information
A.14. Project/Programme rationale, objectives, and approach of programme/project

B. Project/Programme Information

The section intends to collect information to assess the economic and technical viability.

B.1. Context and baseline
B.2. Project/programme description (including objectives)
B.3. Expected performance against the GCF investment criteria
B.4. Stakeholder consultation and engagement

C. Indicative Financing/Cost Information

C.1. Financing by components
C.2. Justification of GCF funding request
C.3. Exit Strategy and Sustainability

D. Annexes

Optional supporting documents may include ESS screening check list, map indicating the location of the project/programme, or evaluation report of previous project (as applicable).

Box 21 GCF Concept Note Outline[254]

Development Finance Institutions / Multilateral Development Banks (MDBs) such as the Asian Infrastructure Investment Bank (AIIB), the New Development Bank (NDB), the International Development Finance Club (IDFC), the Asian Development Bank (ADB), the African Development Bank (AfDB), the European Investment Bank (EIB), the European Bank for Reconstruction and Development (EBRD), the Inter-American Development Bank (IDB), or the World Bank Group (WBG), among others, can support the implementation of adaptation measures, particularly those that are within the sector or scope of MDB priorities.

MDBs often finance specific adaptation or development projects with adaptation co-benefits. They can also help attract extra resources from the public and private sectors. National authorities need to have a clear understanding of the agendas and expectations of different multilateral actors to achieve an optimal mix of different sources.

15.2. DOMESTIC PUBLIC FINANCE

Domestic public finance may serve as a key source for NAP development, coordination, and maintenance, as well as the implementation of key prioritized actions which are essential (such as adaptation of critical infrastructure) and that should ideally not depend too much on other actors. Identifying and systematically embedding those costs into national planning and budgeting is necessary for securing stable, even if not the largest, sources of finance to remain operational during the medium- and long-term.

- Domestic finance can play a key role in securing the monetary means within the following areas:
- Ongoing operational costs (human resources, equipment, and communication)
- Cost of integrating adaptation into planning and budgeting (personnel time and expert inputs)
- Crosscutting enabling measures (monitoring, evaluation, reporting, and learning system)
- Core adaptation actions by ministries or subnational authorities (green-blue infrastructure)
- Building capacities and mechanisms for the inclusion of other actors (public-private partnership (PPP) framework development)

Mobilizing domestic resources has multiple benefits, starting from a high degree of ownership and integration within current planning and budgeting frameworks, to the capacity for independently defining priorities without relying on external agenda. It can also prove crucial for the maintenance of the NAP process under unstable conditions and can allow to more flexibly channel resources where they are most needed in certain moments, while facilitating domestic learning and strengthening of institutions.

A similar prioritization can be helpful at subnational levels, and domestic planning should consider allocating to subnational levels a core priority under greater limitations for access to international public sources. Such longer-term commitments at the national level can also be a signal for private actors to also start investing in adaptation. There are a few key sources of domestic public finance, such as domestic government revenues (current and new) and domestic budgets, amongst others, elaborated in Table 15.

New and redistributed revenues can be targeted at both general adaptation priorities and capacity building, as well as at specific activities such as reducing exposure to most significant climate risks, redistributing risks, discouraging maladaptive pathways, as well as generating new revenue streams. The use of those instruments for adaptation is at its inception, with most of the available experience stemming from mitigation finance, and thus it is important to consider feasibility in each case, considering the necessary time and resources, as well as risks associated with poor implementation under a lack of institutional capacity.

The distributed nature of domestic public budgets governed by multiple entities requires an understanding of key actors and their effective dialogue to ensure coordination and avoid overlap. In this context it is important to also consider the role of national development banks, such as the Fiji Development Bank or NABARD in India, as well as national climate change trust funds, such as the Indonesia Climate Change Trust Fund (ICCTF).

ACTIVITY	DESCRIPTION
GOVERNMENT – NEW REVENUES	
TAXES, LEVIES, AND FEES	Government taxes, levies, and fees on goods or services can provide new revenues or reframe incentive structures, for example via gasoline and carbon taxes, levies in national emission trading schemes (ETSs).
BONDS	Governments can issue bonds at a fixed or variable rate of interest for investors to purchase. India and Nigeria have been successful in climate-tailored Diaspora Bonds.
DEBT CONVERSION	Governments may negotiate with creditors to have a portion of their debt cancelled as debt-for-nature / debt-for-development and debt-for-climate swaps, which may help countries with high debt and vulnerability to climate change.
REVENUE REDISTRIBUTION	
SUBSIDIES	Use available budgets to subsidize the cost of climate services or uptake of climate-resilient technologies and practices, such as subsidies encouraging the use of drought-resistant seeds. Conditional tax breaks may encourage companies to invest in adaptation.
SUBSIDY REFORM	Governments can reduce existing subsidies, such as fossil fuel subsidies to facilitate the reallocation of funding to climate adaptation measures and reduce risk-generating activities
DOMESTIC CLIMATE FUNDS	Established at the national and/or sub-national levels, they can fuel implementation and help channel, plan, distribute and monitor adaptation finance, as well as help provide direct access to international finance opportunities.

Table 15 Domestic adaptation finance sources[255]

New and redistributed revenues can be targeted at both general adaptation priorities and capacity building, as well as at specific activities such as reducing exposure to most significant climate risks, redistributing risks, discouraging maladaptive pathways, as well as generating new revenue streams. The use of those instruments for adaptation is at its inception, with most of the available experience stemming from mitigation finance, and thus it is important to consider feasibility in each case, considering the necessary time and resources, as well as risks associated with poor implementation under a lack of institutional capacity. The distributed nature of domestic public budgets governed by multiple entities requires an understanding of key actors and their effective dialogue to ensure coordination and avoid overlap. In this context it is important to also consider the role of national development banks, such as the Fiji Development Bank or NABARD in India, as well as national climate change trust funds, such as the Indonesia Climate Change Trust Fund (ICCTF).

While being supported by a multitude of international public finance providers, securing domestic funding might not be the most obvious step, but it is necessary for building commitment, accountability, and trust from external sources. It will also allow streamlining of adaptation efforts within already established systems and processes while lowering the risk of non-alignment between national priorities and external agenda. Sectoral budgeting may also prove significant, particularly if specific climate-sensitive sectors are crucial for the national economy.

While climate finance is often limited, it is essential to back and kickstart priority projects that are not of significant interest to private investors at their inception. Thus, it is particularly important to ensure the effective use of the limited resources. Under insufficient private sector involvement and lack of predictability regarding international public funding, domestic public finance must still play a major role in adaptation, as predicted losses and damages may be too significant. In Bangladesh, for example, the shares of domestic resources to finance climate change adaptation are three times as high as foreign resources, asV outline in Box 22. This showcases how domestic funding should play a significant role while at the same time international and private sector resources can multiply the benefits of national adaptation efforts.

Bangladesh is currently still classified as LDC, meaning that it is part of a group of countries identified as economically vulnerable, especially to the adverse effects of climate change. As Bangladesh was aware of its own severe vulnerability, it was one of the first LDCs to finalize its NAPA to respond to climate change in November 2005, which was updated in 2009. The NAPA was financially supported by the UNFCCC's LDC Fund and adhered to the guidelines of the international community and the UNFCCC's LDC Expert Group. The NAPA consists of four pillars: food security, energy security, water security, and livelihood security. However, Bangladesh's policy makers considered the NAPA to be inadequate in the aftermath of its completion because it did not properly respond to the magnitude of the climate change problem the country faces. [256]

It is against this background that the government of Bangladesh initiated a more comprehensive planning process, making use of its own financial and intellectual resources.

The Bangladesh Climate Change Strategy and Action Plan (BCCSAP) was established and presented to the Cabinet of Bangladesh in 2009. The BCCSAP's vision is the eradication of poverty and the achievement of economic and social wellbeing through a pro-poor climate change strategy. This climate change strategy gives priority to adaptation, disaster risk reduction and further addresses low carbon development, mitigation, technology transfer, and provision of funding.[257] As action was perceived to be urgent, it was initiated with national funds instead of with the financial support from the international community. However, the accruing costs excelled the domestic financial resources, wherefore the government of Bangladesh received assistance and donations from the international community.

Consequently, the Parliament enacted the Climate Change Trust Act and established the Climate Change Trust Fund (CCTF) as well as the Bangladesh Climate Change Resilience Fund to adequately respond to climate change. From 2009 to 2013, the government had allocated US$ 350 million, which were taken from its own resources. Within the framework of the CCTF, different government agencies have implemented 207 projects amounting to a financial outlay of US$ 238.9 million. The government further affirmed 63 projects of various NGOs and the private sector, having a financial outlay of US$ 3.13 million.

Both domestic and foreign resources to finance climate change adaptation contribute to the overall climate budget and flow into the latter via three different streams – the Bangladesh CCTF, the Government of Bangladesh Annual Development Plan, and non-governmental Delivery Mechanisms.

Box 22 Strong domestic climate adaptation finance efforts as a priority in Bangladesh

15.3. PRIVATE SECTOR FINANCE SOURCES

INITIATIVE	DESCRIPTION
Task Force on Climate-related Financial Disclosures (TCFD)	Established by the Financial Stability Board, TCFD aims to improve and facilitate reporting of climate-relevant financial information. The scheme is gradually transitioning from a voluntary scheme into obligatory compliance
UN Environment Finance Initiative (UNEP-FI)	The initiative serves as a thought leadership organization and a bridging links between banks, insurers, and investors, aiming to build a sustainable finance sector.
Climate Disclosure Project (CDP)	A global corporate environmental disclosures system, rating and database on climate, water, and forests, to which companies are often requested to data by investors and other stakeholders.
Green Banks Network	The network facilitates clean energy finance leadership and sharing of best practices.
Central Banks and Supervisors Network for Greening the Financial System (NGFS)	The group brings together Central Banks and Supervisors that want to improve climate risk management in the financial sector and share best practices. It also publishes insightful analyses, such as on what will change for banks in a world transformed by climate change.[258]
Institutional Investor Group on Climate Change (IIGCC)	The collaboration-driven group based in Europe has more than 275 investor members and 35 million EUR in assets. It works in the policy and corporate contexts, as well as promotes climate-aligned investor practices.
Sustainable Insurance Forum (SIF)	The group unites 30 leading insurance providers with 92% of market share and over 5 trillion US$ of insurance premiums with the aim of integrating sustainability into the operations of insurance companies and related regulations.
Climate Bonds Initiative (CBI)	“An international, investor-focused not-for-profit working solely on mobilizing the US$ 100 trillion bond market for climate change solutions.”
International Network of Financial Centres for Sustainability (FC4S)	“A collective of international financial centres working together to achieve the Sustainable Development Goals and the Paris Agreement” with 33 members, having 80% of global equity market and US$ 74.6 trillion equity market capitalization.

Table 16 Key climate finance and investment initiatives targeting the private sector

Engaging private sector actors requires understanding of their motivations, concerns, and scope of options relevant to each actor. Table 17 provides a summary.

ISSUE	DESCRIPTION
WHAT	Approaching the private sector requires considering the goal, scale, lifetime, and volume of the capital required. Some private actors may engage with adaptation only to achieve scale, after pilot projects backed by public sources prove successful, while venture capital and private equity may be interested in investing in early-stage developments of proven concepts.
WHO	Private actors differ in terms of their capacities and risk profiles which influence their ability to attract adaptation finance. MSMEs may attain microloans at high-interest rates/guarantee requests, while microenterprises might not have such opportunities at all. Currently, we can see the proliferation of large private investments into adaptation paired with lending institutions collaborating with international programmes to support adaptation for MSMEs.
WHY	For most representatives of the private sector, engagement with adaptation will build on a mix of reputational advantage, present and prospective compliance requirements, meeting stakeholder expectations, risk governance regarding future uncertainties, and competitive positioning related to new business opportunities, such as embedding climate-resilience considerations in their products and services to attract customers or access new markets.

Table 17 Engaging private sector actors: scope, options, and reasons

The largest share of private sector adaptation finance comes from dedicated project developers and corporations, while there is also rising participation of microfinance institutions, commercial banks, capital markets, private equity, infrastructure funds, and institutional investors, as well as households. Examples of common and emerging private finance mechanisms are provided in Table 18.

MECHANISM	DESCRIPTION
GREEN CLIMATE BONDS (GCB)	Help to finance projects aligned with specific environmental / climate /water goals. Beneficiaries of green bonds include both developed countries and LDCs, such as Rwanda, Uganda, and Zambia.[259]
IMPACT INVESTING FUNDS	Support projects that generate positive social/environmental impacts and return on investment, often in sustainable agriculture, microfinance, housing, health care, and renewable energy.
DEVELOPMENT GUARANTEE	Backing sustainable development finance via the public sector to protect banks and investors from risks of not being paid to help them enter new markets, e.g., provide low-cost credit to MSMEs for adaptation needs.

Table 18 Examples of emerging private finance mechanisms

Recent years have witnessed the rise of risk facilities and insurance mechanisms to remedy against prospective losses and damages from climate change, including both abrupt events (cyclones) and long-term processes such as sea-level rise. Such instruments aim at shifting financial risks associated with disasters from governments to a shared financial entity. This, for example, can be used through bridging private and public funds to issue catastrophe bonds to participating countries, while resilience bonds can also provide similar safety nets with payments to finance proactive adaptation measures according to NAP priorities. With the support of the Global Facility for Disaster Reduction and Recovery (GFDRR), multiple countries are currently exploring the potential of catastrophe bonds to ensure recovery from prospective disasters, while providing high returns if no disasters occur.[260]

The UNEP Finance Initiative analysis of private sector adaptation finance highlights that is still often financed using traditional business investment instruments and principles.[261] This allows companies to easily streamline adaptation into strategic business management; however, it raises the questions of adequacy of common analytical tools and approaches used by business to make decisions, under the deep uncertainty of climate change.

Decision-makers need to understand the evolving drivers behind both demand of, and supply for, private adaptation finance, including market failures, lack of long-term perspective, common thinking and planning patterns not adjusted to the multifaceted risks and challenges manifested by climate change. There is a tendency towards the use of utilitarian, technological and monetary approaches in framing climate risks, as well as prospective losses and damages, which may result in superfluous and maladaptive engagement with adaptation challenges and opportunities. Financing flood protection by enterprises, should not make the conditions worse for the people who work for them, as has happened in many cases around the globe. Another example would be greater exploitation of local groundwater sources, seeming like a viable solution to water scarcity, however smart and viable adaptation investments would rather focus on long-term solutions that prioritize water harvesting and reuse, instead of depleting local capacities. Every decision may have its implications that are not obvious at first glance, and thus outcomes and risks of adaptation finance and investments should be considered across different temporal horizons, spatial scales, and groups of stakeholders.

Many challenges in this context remain as a relatively small share of businesses understand adaptation benefits and risks of inaction. Thus, generating awareness, creating a supportive environment, and sending the right signals are essential steps for private sector engagement.

Photograph © U.S. Mission Geneva / Eric Bridiers

16. TRANSFORMATIVE CLIMATE FINANCE

COVID-19 has been a clear game-changer when it comes to adaptation finance, creating an abrupt adaptation funding challenge for developing countries with resources channeled towards emergency healthcare and economic relief. The World Bank has developed a set of key recommendations to guide transformative climate finance – a summary of the recommendations is provided in Table 19.

RECOMMENDATION	EXPLANATION
Plan for the long term	Avoid short-term projects that may undermine long-term objectives or are inconsistent with them. Consider interim steps necessary to achieve the desired transformation.
Nurture policy-financing and enabling environments	Target finance to activities that help to overcome the barrier to transformation and not simply support the status quo. Consider capacities and stakeholders necessary to drive this change.
Use a wide palette of instruments	More instruments mean different stakeholders can find the best ways to get their projects funded under optimal conditions and a higher likelihood of effective implementation.
Enhance leverage on a wider, systemic basis	Support projects that can leverage funds from other sources and benefit the economy and adaptation beyond the project scope.
Invest in climate intelligence products	Climate intelligence such as GIS, early warning systems, modelling, and scenario-building software, and risk assessment tools can make or break the NAP process. It is crucial to invest in up-to-date software and technologies that support the NAP process and building skills to use them effectively.
Facilitate just transition	Business-as-usual style climate action poses a risk of significant externalities, pollution displacement, and unemployment. Economic benefits generated by climate action should be used to balance the impact on different groups, particularly ensuring employment and reskilling of those who lose jobs in carbon-intensive industries.
Differentiate by income and vulnerabilities	Poorest countries suffer most from climate change while being least responsible for it. Vulnerabilities also differ across scales and among groups.

Table 19 Recommendations for achieving transformative climate finance[262]

16.1. THE MORE THE BETTER?

Currently, 95% of international public finance is awarded to development projects which do not fully prioritize climate objectives, even though climate proofing of projects is increasingly commonplace. This requires a fundamental shift in how we conceive the purpose of climate finance and the way it is used.

An important aspect of adaptation finance is its distribution amongst different types of solutions. While historically, technical solutions with a focus on mitigation have been a clear priority, recent years have seen a rise of interest in nature-based solutions (NbS) which provide both mitigation and adaptation benefits. For example, they have been used to create green jobs to recover from financial crises by the United States and South Korea, aiming at both facilitating employment and supporting ecosystem restoration. Investing in NbS is considered a particularly important strategy for developing countries, as these are often low-cost and no-regret options, which generate lasting, certain, and diverse benefits for nature and people alike. According to a recent report, 7 to 40 jobs can be created per US$ 1 million invested in nature-based projects, which can be particularly important as countries develop their green recovery agenda.[263]

On the other hand, financing for infrastructure projects needs to be carefully assessed as it may lead to lock-in for carbon-intensive paths (e.g., gas heating), which may have a high financial barrier to unlocking low-carbon and climate-resilient alternatives.[264]

16.2. THE MORE THE BETTER?

According to the World Bank, the total amount of climate finance that can be allocated by MDBs for decarbonization and resilience projects would be enough to meet only 4% of the needs to achieve deep transformation of the economy. This requires development institutions and other climate finance stakeholders to strategically invest in solutions that do not simply improve resilience or adaptive capacity. It will require to systematically remove barriers towards low-carbon and climate-resilient development and enabling an opportunity for a greater contribution from the private sector and governments.

Current narratives of “building back/forward better” need to leverage towards systemic interventions that change the policy context and business ecosystem rather than only discrete clean infrastructure projects.[265] One promising way for significantly raising the effectiveness of adaption finance is combining minimum conditions, performance measures, and a menu of eligible investments, as this has been adopted within the performance-based climate grants (PBCRG) framework applied to performance-based adaptation finance at the local level. These conditions and performance measures are outlined in Table 20.

CONCEPT	EXPLANATION
MINIMUM CONDITIONS	"Basic requirements with which local governments have to comply to access the grants. These conditions are formulated to ensure that a minimum absorptive capacity is in place to handle the funds. The entire set of minimum conditions needs to be met before local authorities can access their grants. In general, minimum conditions are concerned with good governance and public financial management. They act as on or off triggers and basic safeguards".
PERFORMANCE MEASURES	"The set of indicators against which local governments are assessed on an annual basis. They are more qualitative and variable measures than the minimum conditions and cover core functional areas – e.g., quality of the planning and integration of climate change adaptation and the execution of adaptation measures, governance, and accountability – in some detail. Local authorities' overall performance against these measures is used to adjust the level of funds made available to local governments, subject to compliance with the minimum conditions"

Table 20 Minimum condition and performance measures according to the PBCRG framework[266]

The minimum conditions and performance measures should essentially cover good governance and public financial management (planning, budgeting, procurement, transparency, accountability, and reporting on physical and financial execution), climate aspects (climate scientific information on hazards and impacts), risk and vulnerability assessments; mainstreaming of adaptation in local planning, budgeting, procurement/ contracting and execution; and technical compliance for climate-proofing) and the interface between the two (participation of vulnerable groups, gender equality, transparency, and environmental and social safeguards).

The role of the divestment movement should also be considered. As of 2020, over 1,200 institutional investors with more than US$ 14 trillion of assets have committed to divestment from at least some of their fossil fuel holdings. Divestments provide possibility for financial flows to better prioritize climate adaptation objectives and facilitates mobilization of the financial markets towards low-carbon and climate-resilient (re)investments. Such mobilization should, however, not come at the expense of the just transition and should consider the interconnections across supply chains, with every large-scale divestment having profound impacts.[267]

Leveraging adaptation finance also requires effective consideration of risks. Common adaptation finance risks include regulatory, monetary, fiscal, political, lack of transparency and public disclosure, policy capture, conflict of interest, creative accounting and reporting, mismanagement and misappropriation of funds, lack of participation, project, technological and acceptance risks.[268] Minimum conditions facilitate the creation of a robust transfer system for climate

finance and gradually improve the accountability of local governments allowing to reduce the risks, while performance measures allow for greater inclusion of vulnerable groups, particularly in decision-making and monitoring; as well as securing the quality and relevance of the adaptation actions. Finally, dedicated measures addressing finance risks allow to prevent possible losses and inefficiencies and achieve a streamlined and robust process.

16.3. MAKING CLIMATE FINANCE WORK FOR ALL

The provision of adaptation finance is complicated by the unequal distribution of climate impacts and vulnerabilities with the poorest countries often affected worst, especially Small Island Developing States (SIDS) and Least Developed Countries (LDCs).[269]

These countries also have different institutional capacities to respond to climate change and to ensure that financing is utilized effectively and equitably, including with attention to gender, and vulnerable and marginalized groups.

The criterion of "vulnerability to the adverse effects of climate change" is seen as increasingly insufficient for considering which countries require adaptation support. For example, higher-income developing countries such as Chile have managed to mobilize both private and domestic public adaptation finance much better than lower-middle-income countries such as Guatemala.

Less than 10% of dedicated climate finance reaches the local level, leaving those who need it most and the ones who directly experience impacts of climate change with a minor share of resources and limited opportunities to influence decisions in this regard. [270]

To make climate finance more inclusive, both providers and beneficiaries need to be fluent in using a wide range of financial instruments that allow for an effective disbursement beyond project-based loans and grants. These include policy-based finance, results-based finance, equity finance, and guarantees, all of which have shown promising results to date.

Certain arrangements can be also made at the local level to ensure effective use of funds. Current evidence suggests that having communities involved in project monitoring or even as implementers (community contracting) of core activities can generate new employment opportunities, improve the sense of ownership, and lead to a greater understanding of adaptation objectives and outcomes. In those cases, it is important to ensure that all community representatives have equal and fair opportunities to engage in the project and benefit from its outcomes.

Box 23 provides examples of facilitating greater

inclusion in adaptation finance at the local level. Whenever any large-scale adaptation project is implemented, it is important to consider how it intervenes into the dynamics of the local economy, e.g., whether it doesn't endanger any substantial local arrangements, as well as whether it will not create dependence and lead to unemployment upon project completion (if people leave their regular occupations to work for the project).

Sufficient allocation, timely provision, and effective distribution are challenges to be solved over the upcoming years while demanding from actors to make sense of an increasingly complex climate finance architecture.

When it comes to the interplay of mitigation and adaptation, the challenge of substantiating adaptation measures and monitoring adaptation outcomes are making adaptation finance lag in both theoretical elaborations, planning, and practical implementation. Still, dedicated adaptation funds and initiatives, and a new understanding of essential links between mitigation and adaptation make and increasingly clear case for greater investment in adaptation in the following decade.

- Forming monitoring committees with the inclusion of representatives of local communities (Bhutan, Cambodia, Tuvalu)
- No less than 30% of women within the District Consultative Committee (Mozambique)
- Encouraging women to participate in meetings and raise issues that require (Bangladesh)
- Improving access to services and general conditions for women are considered in the five-year plan and providing evidence of participation (Bangladesh)
- Gender-responsive and participatory multi-criteria analysis (Benin)
- Demonstrating involvement of and information to citizens in climate
- Providing evidence that climate change projects have addressed vulnerable groups such as women, children, and the elderly (Mozambique)
- Citizen report cards to assess public satisfaction and views on performance (Bhutan)
- District women's union and a female village representative participate in the District Development Support Team and technical input into the district investment planning process (Lao PDR)

Box 23 Examples of facilitating greater inclusion in adaptation finance at a local level [271]

CONCLUSION FINANCING THE NAP PROCESS

This chapter took a closer look at why adaptation finance is central to an effective and successful NAP process. It explored the current adaptation finance landscape and architecture and investigated factors behind the effective integration of adaptation finance within national systems and priorities. Key takeaways from this chapter include:

- Adaptation finance covers both the prevention of prospective risks and damages and the harnessing of significant co-benefits related to many adaptation finance initiatives.

- Current adaptation finance is highly heterogenous and non-uniform. It represents various actors' priorities and complex power dynamics manifested through a range of providers.

- While public finance sources traditionally stand behind high risks and crucial adaptation investments, the private sector can stand behind significant interventions and help scale up necessary technologies and solutions.

- Effective adaptation finance requires an in-depth and nuanced understanding of the context, benefits, drawbacks, opportunities, and risks associated with different finance sources and mechanisms, being able to strategically combine them, considering unique needs and opportunities associated with each NAP phase.

- It is impossible to treat adaptation finance outside of the mainstream public planning and budgeting, and integration with the NAP process forms the cornerstone of effective adaptation.

- A truly transformative, innovative, and visionary approach is required to shape the future of adaptation finance, moving beyond present agendas and towards a renewed understanding of effective climate action, that is inclusive, long-term, and aligned with climate-proof development pathways. Established and novel mechanisms will need to be utilized in their full capacity to ensure closing the adaptation gap

REFERENCES PHASE 3

[190] NAP Global Network (2020). Monitoring, evaluation, and learning. Retrieved from: https://napglobalnetwork.org/themes/monitoring-evaluation/

[191] EEA (2020). Monitoring and evaluation of national adaptation policies throughout the policy cycle. Retrieved from: https://www.eea.europa.eu/publications/national-adaptation-policies

[192] EEA (2020). Monitoring and evaluation of national adaptation policies throughout the policy cycle. Retrieved from: https://www.eea.europa.eu/publications/national-adaptation-policies

[193] Climate Action Tracker (2020). Climate Governance series Methodology. Retrieved from: https://climateactiontracker.org/documents/839/2020-12_CAT_ClimateGovernance_Methodology_Note.pdf

[194]UNEP (2021). Adaptation Gap Report 2020. Available at: https://reliefweb.int/report/world/adaptation-gap-report-2020

[195] EEA (2020). Monitoring and evaluation of national adaptation policies throughout the policy cycle. Retrieved from: https://www.eea.europa.eu/publications/national-adaptation-policies

[196] C40 CITIES / RAMBOLL (2019). Measuring progress in urban climate change adaptation. Monitoring - Evaluating - Reporting Framework. Retrieved from: https://ramboll.com/-/media/178c6570dafe4fce8d564ccbb1e95830.pdf

[197] https://www.eea.europa.eu/publications/national-adaptation-policies

[198] Nordic Council of Ministers (2020). Nordic Capacity-Building Support to LDCs and SIDS for the Implementation of the Transparency Framework of the Paris Agreement. Retrieved from: https://pub.norden.org/temanord2020-519/#31673

[199] Nordic Council of Ministers (2020). Nordic Capacity-Building Support to LDCs and SIDS for the Implementation of the

[200] Nordic Council of Ministers (2020). Nordic Capacity-Building Support to LDCs and SIDS for the Implementation of the Transparency Framework of the Paris Agreement. Retrieved from: https://pub.norden.org/temanord2020-519/#31673

[201] UNFCC (2019). Progress in the process to formulate and implement national adaptation plans. Retrieved from: https://unfccc.int/sites/default/files/resource/sbi2019_INF.15.pdf

[202] UNEP (2021). Adaptation Gap Report 2020. Available at: https://reliefweb.int/report/world/adaptation-gap-report-2020

[203] UNEP (2021). Adaptation Gap Report 2020. Available at: https://reliefweb.int/report/world/adaptation-gap-report-2020

[204] Nordic Council of Ministers (2020). Nordic Capacity-Building Support to LDCs and SIDS for the Implementation of the Transparency Framework of the Paris Agreement. Retrieved from: https://pub.norden.org/temanord2020-519/#31673

[205] UNFCCC (n.d.). Gaps and needs related to the NAPs. Available at: https://unfccc.int/topics/adaptationa-and-resilience/workstreams/national-adaptation-plans-naps/gaps-and-needs-related-to-the-naps

[206]NAP Global Network (2021). Resilience in Action. Five years of supporting National Adaptation Plan (NAP) processes. Retrieved from: https://napglobalnetwork.org/wp-content/uploads/2021/01/napgn-en-2021-resilience-in-action

[206]Saghir et al. (2020). State and Trends in Adaptation Report 2020. Available at: https://gca.org/reports/state-and-trends-in-adaptation-report-2020/

[207] Mackay et al., (2015). Skills Assessment for National Adaptation Planning. UNITAR. Available at: https://www.uncclearn.org/wp-content/uploads/library/nap16062015.pdf

[208] NAP Global Network (2021). Resilience in Action. Five years of supporting National Adaptation Plan (NAP) processes. Available at: https://napglobalnetwork.org/wp-content/uploads/2021/01/napgn-en-2021-resilience-in-action.pdf

[209] Saghir et al. (2020). State and Trends in Adaptation Report 2020. Available at: https://gca.org/reports/state-and-trends-in-adaptation-report-2020/

[210] UNFCCC (2015). Paris Agreement. Available from: https://unfccc.int/sites/default/files/english_paris_agreement.pdf

[211] Please note that an internationally acknowledged definition of “climate finance” has not yet been established. There is some consensus that it comprises financial support for both mitigation and adaptation activities, including capacity-building and Research & Development (R&D), as well as broader efforts to enable the transition towards low- carbon and climate resilient development.

[212] Climate finance includes international and domestic flows as well as public, private and public-private flows. The provided definition is taken from: UNFCCC (n.d.) Introduction to Climate Finance. Available at: https://unfccc.int/topics/climate-finance/the-big-picture/introduction-to-climate-finance

[213] IPCC (2007). AR4 Climate Change 2007: The Physical Science Basis. Available at: https://www.ipcc.ch/report/ar4/wg1/

[214] IPCC (2007). AR4 Climate Change 2007: The Physical Science Basis. Available at: https://www.ipcc.ch/report/ar4/wg1/

[215] London School of Economics and Political Science (2021). What is Climate Change ‘Loss and Damage’?. Available at: https://www.lse.ac.uk/granthaminstitute/explainers/what-is-climate-change-loss-and-damage/ (accessed March 2021)

[216] GAC (2019). Adapt now: a global call for leadership on climate resilience. Available at: https://gca.org/reports/adapt-

now-a-global-call-for-leadership-on-climate-resilience

[217] Watson, C. & Schalatek, L. (2020). Climate Finance Thematic Briefing: Adaptation Finance. Climate Finance Update. Available at: https://www.odi.org/sites/odi.org.uk/files/resource-documents/12073.pdf

[218] Saghir et al. (2020). State and Trends in Adaptation Report 2020. Available at: https://gca.org/reports/state-and-trends-in-adaptation-report-2020/

[219] ADB (2017). Meeting Asia's Infrastructure Needs. Retrieved from: https://www.adb.org/publications/asia-infrastructure-needs

[220] Watson, C. & Schalatek, L. (2020). Climate Finance Thematic Briefing: Adaptation Finance. Climate Finance Update. Available at: https://www.odi.org/sites/odi.org.uk/files/resource-documents/12073.pdf

[221] Richmond et al. (2021). Adaptation Finance in the Context of Covid-19. The Role of Development Finance in Promoting a Resilient Recovery. Global Center on Adaptation. Available at: https://gca.org/wp-content/uploads/2021/01/GCA-Adaption-in-Finance-Report.pdf

[222] NAP Global Network (2017). Financing National Adaptation Plan (NAP) Processes: Contributing to the achievement of nationally determined contribution (NDC) adaptation goals. Available at: https://www4.unfccc.int/sites/NAPC/Documents/Supplements/napgn-en-2017-financing-nap-processes.pdf

[223] NAP Global Network (2017). Financing National Adaptation Plan (NAP) Processes: Contributing to the achievement of nationally determined contribution (NDC) adaptation goals. International Institute for Sustainable Development. Retrieved from: http://www.napglobalnetwork.org/wp-content/uploads/2017/08/napgn-en-2017-financing-nap-processes.pdf

[224] Tirpak, D., Brown, L.H., & Ballesteros, A. (2014). Monitoring climate finance in developing countries: Challenges and next steps: Reporting on a series of three workshops. Retrieved from http://www.wri.org/publication/ monitoring-climate-finance-developing-countries-challenges-and-next-steps

[225] UNDP (2015). Budgeting for Climate Change: How governments have used national budgets to articulate a response to climate change. Retrieved from: https://www.greengrowthknowledge.org/research/budgeting-climate-change-how-governments-have-used-national-budgets-articulate-response

[226] UNDP (2015). A methodological guidebook climate public expenditure and institutional review (CPEIR). Retrieved from: https://www.climatefinance-developmenteffectiveness.org/sites/default/files/publication/attach/CPEIR%20Methodological%20Guidebook%20_Final%20for%20website.pdf

[227] UNDP (2015). A methodological guidebook climate public expenditure and institutional review (CPEIR). Retrieved from: https://www.climatefinance-developmenteffectiveness.org/sites/default/files/publication/attach/CPEIR%20Methodological%20Guidebook%20_Final%20for%20website.pdf

[228] Republic of Kenya (2019). Kenya's Training Handbook on Climate Finance: Budget Coding, Tracking and Reporting. Retrieved from: https://www.ndcs.undp.org/content/ndc-support-programme/en/home/impact-and-learning/library/kenya_s-training-handbook-on-climate-finance--budget-coding--tra.html

[229] Government of Nepal (2017). Climate Change Financing Framework. Retrieved from: https://mof.gov.np/uploads/document/file/CCFF_FINAL_Web_20180222050438.pdf

[230] NAP Global Network (2017). Financing National Adaptation Plan (NAP) Processes: Contributing to the achievement of nationally determined contribution (NDC) adaptation goals. Available at: https://www4.unfccc.int/sites/NAPC/Documents/≈

[231] EIB (2015) Common Principles for Adaptation Finance Tracking. Retrieved from: https://www.eib.org/attachments/documents/mdb_idfc_adaptation_common_principles_en.pdf

[232] Governance of Climate Change Finance to Enhance Gender Equality in Asia Pacific. URL: https://www.climatefinance-developmenteffectiveness.org/topic/climate-change-financing-frameworks-ccff (accessed March 2021)

[233] UNDP (2017). Hard Choices Integrated Approaches. Available at: https://www.asia-pacific.undp.org/content/rbap/en/home/library/democratic_governance/hard-choices-integrated-approaches.html

[234] UNCDF (2018). Financing local adaptation to climate change. Experiences with performance-based climate grants. Retrieved from: https://www4.unfccc.int/sites/NAPC/Documents/Supplements/Financing_local_adaptation_to_climate_change_UNCDF.pdf

[235] NAP Global Network (2017). Financing National Adaptation Plan (NAP) Processes: Contributing to the achievement of nationally determined contribution (NDC) adaptation goals. International Institute for Sustainable Development. Retrieved from: http://www.napglobalnetwork.org/wp-content/uploads/2017/08/napgn-en-2017-financing-nap-processes.pdf

[236] GIZ (2014). NAP align: Recommendations for aligning national adaptation plan processes with development and budget planning (Supplementary material to the NAP technical guidelines). Retrieved from http://www4.unfccc.int/nap/Documents/Supplements/GIZ%20NAPAlign%2025.11.14.pdf

[237] Republic of Kenya (2019). Kenya's Training Handbook on Climate Finance: Budget Coding, Tracking and Reporting. Retrieved from: https://www.ndcs.undp.org/content/ndc-support-programme/en/home/impact-and-learning/library/kenya_s-training-handbook-on-climate-finance--budget-coding--tra.html

[238] Republic of Kenya (2019). Kenya's Training Handbook on Climate Finance: Budget Coding, Tracking and Reporting. Retrieved from: https://www.ndcs.undp.org/content/ndc-support-programme/en/home/impact-and-learning/library/kenya_s-training-handbook-on-climate-finance--budget-coding--tra.html

[239] NAP Global Network (2017). Togo National Adaptation Approach. Retrieved from: https://napglobalnetwork.org/wp-content/uploads/2017/11/togo-cop23-nap-global-network-poster.pdf

[240] UNCDF (2018). Financing local adaptation to climate change.

Experiences with performance-based climate grants. Retrieved from: https://www4.unfccc.int/sites/NAPC/Documents/Supplements/Financing_local_adaptation_to_climate_change_UNCDF.pdf

[241] Watson, C. & Schalatek, L. (2020). Climate Finance Thematic Briefing: Adaptation Finance. Climate Finance Update. Available at: https://www.odi.org/sites/odi.org.uk/files/resource-documents/12073.pdf

[242] Watson, C. & Schalatek, L. (2020). Climate Finance Thematic Briefing: Adaptation Finance. Climate Finance Update. Available at: https://www.odi.org/sites/odi.org.uk/files/resource-documents/12073.pdf

[243] NAP Global Network (2017). Financing National Adaptation Plan (NAP) Processes: Contributing to the achievement of nationally determined contribution (NDC) adaptation goals. International Institute for Sustainable Development. Retrieved from: http://www.napglobalnetwork.org/wp-content/uploads/2017/08/napgn-en-2017-financing-nap-processes.pdf

[244] NAP Global Network (2017). Financing National Adaptation Plan (NAP) Processes: Contributing to the achievement of nationally determined contribution (NDC) adaptation goals. Available at: https://www4.unfccc.int/sites/NAPC/Documents/Supplements/napgn-en-2017-financing-nap-processes.pdf

[245] NAP Global Network (2017). Financing National Adaptation Plan (NAP) Processes: Contributing to the achievement of nationally determined contribution (NDC) adaptation goals. International Institute for Sustainable Development. Retrieved from: http://www.napglobalnetwork.org/wp-content/uploads/2017/08/napgn-en-2017-financing-nap-processes.pdf

[246] NAP Global Network (2017). Financing National Adaptation Plan (NAP) Processes: Contributing to the achievement of nationally determined contribution (NDC) adaptation goals. Available at: https://www4.unfccc.int/sites/NAPC/Documents/Supplements/napgn-en-2017-financing-nap-processes.pdf

[247] Watson, C. & Schalatek, L. (2020). Climate Finance Thematic Briefing: Adaptation Finance. Climate Finance Update. Available at: https://www.odi.org/sites/odi.org.uk/files/resource-documents/12073.pdf

[248] Watson, C. & Schalatek, L. (2020). Climate Finance Thematic Briefing: Adaptation Finance. Climate Finance Update. Retrieved from: https://www.odi.org/sites/odi.org.uk/files/resource-documents/12073.pdf

[249] GCF (2020). Readiness and Preparatory Support guidebook: A practical guide on how to prepare readiness proposals for the Green Climate Fund. Retrieved from: https://www.greenclimate.fund/document/readiness-and-preparatory-support-guidebook

[250] GCF (2019). Investment criteria indicators. Retrieved from: https://www.greenclimate.fund/document/investment-criteria-indicators

[251] GCF Board decision B.07/04 (b) (iii)

[252] IPCC (2018). Special Report: Global Warming of 1.5 ºC. Available at: https://www.ipcc.ch/sr15/

[253] GCF (2020). GCF Programming Manual. Retrieved from: https://www.greenclimate.fund/sites/default/files/document/gcf-programming-manual_0.pdf

[254] GCF (2020). Simplified Approval Process Concept Note. Retrieved from: https://www.greenclimate.fund/document/simplified-approval-process-concept-note

[255] NAP Global Network (2017). Financing National Adaptation Plan (NAP) Processes: Contributing to the achievement of nationally determined contribution (NDC) adaptation goals. Available at: https://www4.unfccc.int/sites/NAPC/Documents/Supplements/napgn-en-2017-financing-nap-processes.pdf

[256] LDC paper series (n.d.). The Bangladesh National Climate Funds. Retrieved from https://ldcclimate.files.wordpress.com/2012/05/bangladeshnationalfund.pdf

[257] Umme Rehana (2014). Climate Finance in Bangladesh.

[258] NGFS (2020). Adapting central bank operations to a hotter world. Reviewing some options. Retrieved from: https://www.ngfs.net/sites/default/files/medias/documents/ngfs_monetary_policy_operations_final.pdf

[259] Hurley, G., & Voituriez, T. (2016). Financing the SDGs in the least developed countries (LDCs): Diversifying the financing toolbox and managing vulnerability. Retrieved from http://www.undp.org/content/undp/en/home/ librarypage/poverty-reduction/afd-undp-financing-sustainable-development-and-managing-vulnerab.htmlac

[260] GFDRR (2020). GFDRR Annual Report 2020. Bringing resilience to scale. Retrieved from: https://www.gfdrr.org/en/publication/gfdrr-annual-report-2020

[261] UNEP FI (2016). Demystifying Adaptation Finance for the Private Sector. Retrieved from: https://www.unepfi.org/publications/climate-change-publications/demystifying-adaptation-finance-for-private-sector/

[262] World Bank (2020). Transformative Climate Finance: A New Approach for Climate Finance to Achieve Low-Carbon Resilient Development in Developing Countries. Retrieved from: https://openknowledge.worldbank.org/handle/10986/33917

[263] Richmond et al. (2021). Adaptation Finance in the Context of Covid-19. The Role of Development Finance in Promoting a Resilient Recovery. Global Center on Adaptation. Available at: https://gca.org/wp-content/uploads/2021/01/GCA-Adaption-in-Finance-Report.pdf

[264] Erickson, P., Kartha, S., Lazarus, M., & Tempest, K. (2015). Assessing carbon lock-in. Environmental Research Letters, 10(8), 084023.

[265] World Bank (2020). Transformative Climate Finance: A New Approach for Climate Finance to Achieve Low-Carbon Resilient Development in Developing Countries. Retrieved from: https://openknowledge.worldbank.org/handle/10986/33917

[266] UNCDF (2018). Financing local adaptation to climate change. Experiences with performance-based climate grants. Retrieved from: https://www4.unfccc.int/sites/NAPC/Documents/Supplements/Financing_local_adaptation_to_climate_change_UNCDF.pdf

[267] Mormann, F. (2020). Why the divestment movement is

missing the mark. Nature Climate Change, 10(12), 1067-1068.

[268] Republic of Kenya (2019). Kenya's Training Handbook on Climate Finance: Budget Coding, Tracking and Reporting. Retrieved from: https://www.ndcs.undp.org/content/ndc-support-programme/en/home/impact-and-learning/library/kenya_s-training-handbook-on-climate-finance--budget-coding--tra.html

[269] IPCC (2018). Global Warming of 1.5 °: an IPCC special report on the impacts of global warming of 1.5 °C above pre-industrial levels and related global greenhouse gas emission pathways, in the context of strengthening the global response to the threat of climate change, sustainable development, and efforts to eradicate poverty. Geneva, Switzerland: Intergovernmental Panel on Climate Change. Available at: https://www.ipcc.ch/report/sr15/

[270] IIED (2017). Delivering real change: getting international climate finance to the local level. Retrieved from: https://pubs.iied.org/10178IIED

[271] UNCDF (2018). Financing local adaptation to climate change. Experiences with performance-based climate grants. Retrieved from: https://www4.unfccc.int/sites/NAPC/Documents/Supplements/Financing_local_adaptation_to_climate_change_UNCDF.pdf

ANNEXES A: SUPPLEMENTARY MATERIALS TO THE NAP TECHNICAL GUIDELINES

ORGANIZATION(S) AND YEAR	TITLE OF SUPPLEMENTARY MATERIAL
International Federation of Red Cross and Red Crescent Societies (IFRC), 2013	How to Engage with National Adaptation Plans: Guidance for National Red Cross and Red Crescent Societies
Convention on Biological Diversity (CBD), 2014	Promoting synergies in addressing biodiversity and climate change adaptation issues: linking national adaptation plans and national biodiversity strategies and action plans
Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH, 2014	Aligning National Adaptation Plan (NAP) Processes to Development and Budget Planning
Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH, 2014	The Stocktaking for National Adaptation Planning (SNAP) Tool
Global Programme of Research on Climate Change Vulnerability, Impacts and Adaptation (PROVIA), 2014	Supporting NAP Development with the PROVIA Guidance: A User Companion
Southern Voices on Climate Change (SV), 2014	Civil-Society Guide to the LEG/NAP Technical Guidelines
World Health Organization (WHO), 2014	Guidance to protect health from climate change through health adaptation planning
Conservation International (CI), 2015	Tool for integration of ecosystems into climate change adaptation planning processes, DRAFT
Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH, 2015	Guidebook on Developing National Adaptation Monitoring and Evaluation Systems
Food and Agriculture Organization of the United Nations (FAO), 2015	Guidelines to Support the Integration of Genetic Diversity into Climate Change Adaptation Planning and NAPs
Indigenous Peoples of Africa Coordinating Committee (IPACC), 2015	Guidelines towards integrating African Indigenous and Traditional Knowledge in National Adaptation Plans, Platforms and Policies (hard copy only)
National Adaptation Plan Global Support Programme (NAP-GSP), 2015	National adaptation plan process country-level training- Capacity development for multi-sectoral involvement in the NAP process

Southern Voices on Climate Change (SV), 2015	Joint Principles for Adaptation; National Adaptation Policy Assessment Tool
World Health Organization (WHO), 2015	Operation framework for building climate resilient health systems
World Meteorological Organization (WMO), 2015	Climate Services for Supporting Climate Change Adaptation: Supplement to the Technical Guidelines for the National Adaptation Plan Process
Indigenous Peoples of Africa Coordinating Committee (IPACC), 2016	An Introduction to integrating African Indigenous & Traditional Knowledge in National Adaptation Plans, Programmes of Action, Platforms and Policies
International Telecommunication Union (ITU), 2016	Information and Communication Technologies for Climate Change Adaptation in Cities
NAP Global Network, 2016	Vertical Integration in national adaptation plan processes
International Institute for Environment and Development (IIED), 2017	National adaptation plans: understanding mandates and sharing experiences
Food and Agriculture Organization of the United Nations (FAO), 2017	Addressing Agriculture, Forestry and Fisheries in National Adaptation Plans
NAP Global Network, 2017	Financing National Adaptation Plan (NAP) Process: Contributing to the achievement of nationally determined contribution (NDC) adaptation goals
CGIAR Research Program on Climate Change, Agriculture and Food Security (CCAFS), 2017	10 best bet innovations for adaptation in agriculture: A supplement to the UFCCC NAP Technical Guidelines
United Nations Human Settlements Programme (UN-Habitat), 2018	Addressing Urban and Human Settlements Issues in National Adaptation Plans
United Nations Capital Development Fund (UNCDF), 2019	Financing Local Adaptation to Climate Change
Global Water Partnership (GWP), 2019	Addressing Water in National Adaptation Plans: Water Supplement to the UNFCCC NAP Technical Guidelines
NAP Global Network and UNFCCC, 2019	Toolkit for Gender-Responsive Process to Formulate and Implement National Adaptation Plans (English, French)
Food and Agriculture Organization of the United Nations (FAO), 2020	Addressing fisheries and aquaculture in National Adaptation Plans (Supplement to the UNFCCC NAP Technical Guidelines)
Food and Agriculture Organization of the United Nations (FAO), 2020	Addressing forestry and agroforestry in National Adaptation Plans (Supplementary Guidelines)
World Health Organization (WHO), 2021	Quality criteria for Health National Adaptation Plans