

# Water resources, climate change impacts and adaptation planning processes: overview, good practices and lessons learned

## BACKGROUND

This synopsis provides a brief overview of the impacts of climate change on water resources and highlights the good practices and lessons learned in adaptation planning processes addressing water resources at all levels. The synopsis is drawn from the findings of the following documents prepared under the Nairobi work programme (NWP):

Documents	Information source
“Good practices and lessons learned in adaptation planning processes addressing ecosystems, human settlements, water resources and health, and in processes and structures for linking national and local adaptation planning: a synthesis of case studies” ( <a href="#">FCCC/SBSTA/2015/4</a> ; 2015)	170 case studies contributed by Parties and NWP partner organizations.
“Synthesis report on methods and tools for, and good practices and lessons learned relating to, adaptation planning processes addressing ecosystems, human settlements, water resources and health, and good practices and lessons learned related to processes and structures for linking national and local adaptation planning” ( <a href="#">FCCC/SBSTA/2014/4</a> ; 2014)	Submissions from two Parties and 18 NWP partner organizations.
“Report on the technical workshop on water and climate change impacts and adaptation strategies” ( <a href="#">FCCC/SBSTA/2012/4</a> ; 2012)	The workshop was attended by 52 representatives of Parties and relevant international, intergovernmental and non-governmental organizations.
“Water and climate change impacts and adaptation strategies” ( <a href="#">FCCC/TP/2011/5</a> ; 2011)	Literature review.

### Overview of the impacts of climate change on water resources

- Climate change increases water vulnerability by reducing the availability and accessibility of water resources, leading to adverse impacts on:
  - \* Ecosystems and biodiversity;
  - \* Agriculture and food security;
  - \* Land use and forestry;
  - \* Water supply and sanitation;
  - \* Health;
  - \* Urban settlements and infrastructure.
- Impacts on regional water availability and accessibility lead to regional water crises, resulting in economic destabilization and conflict, which affects poor and vulnerable people the most.

## KEY FINDINGS

The table below presents emerging good practices and lessons learned on the various aspects of adaptation planning for water resources, as well as key recommendations to scale up adaptation planning and action for water resources.

Building an 'actionable' knowledge base	
<b>How to build an 'actionable' knowledge base?</b>	<ul style="list-style-type: none"> <li>• Establish an inclusive, interdisciplinary and systematic assessment of climate impacts and future climate risks to water resources that:               <ul style="list-style-type: none"> <li>* Combines traditional and contemporary scientific sources, by engaging community-based knowledge holders, as well as scientists;</li> <li>* Involves all members of a community (including men, women and indigenous people);</li> </ul> </li> <li>• Connect science and practice over the long term through sustained communication and partnerships with members of affected communities and/or with local institutions;</li> <li>• Functional observations and monitoring systems are essential, not only to inform scientific assessments, but also to provide a consistent and reliable source of information:               <ul style="list-style-type: none"> <li>* A cyclic adaptive approach is helpful to deal with uncertainty, using updated assessments and targeted amendments to existing measures based on new information;</li> <li>* Both climate change risk reduction and economic performance need to be incorporated into monitoring and evaluation frameworks to determine the progress of adaptation interventions and the investment required.</li> </ul> </li> </ul>
<b>Which co-benefits can be expected?</b>	<ul style="list-style-type: none"> <li>• Bottom-up approaches to vulnerability assessment (which reflect inherent system limits and serve as an effective means of framing uncertainties about future climate projections) and top-down methodologies (which rely heavily on climate models to frame vulnerability) are harmonized.</li> </ul>
Implementing an inclusive planning process	
<b>Key principles</b>	<ul style="list-style-type: none"> <li>• Inclusive and iterative processes for planning and appraising adaptation options, including the assessment of priorities and trade-offs, are key to designing successful, context-specific, cost-effective adaptation interventions and avoiding potential maladaptation.</li> </ul>
<b>How to ensure inclusiveness?</b>	<ul style="list-style-type: none"> <li>• An iterative process of mutual learning, participatory techniques and a bottom-up approach ensures that stakeholders play an active role in determining appropriate strategies for the management of water resources;</li> <li>• The design of an integrated and inclusive consultative process with local communities will help to incorporate indigenous technologies and traditional know-how into building water management plans, policy and strategies;</li> <li>• Livelihood diversification solutions can inspire local commitments and actions to resilience.</li> </ul>
<b>How to make decisions under uncertainties?</b>	<ul style="list-style-type: none"> <li>• Flexible decision pathways use economic analytical methodologies to estimate the costs of maintaining multiple options and evaluate trade-offs between waiting for more reliable information before implementation, versus acting in the short term with less information;</li> <li>• A full assessment of possible interventions, including their effects on the economy and on environmental quality, is recommended so that adaptation options are socioeconomically viable;</li> <li>• It is useful to integrate both engineering (hard infrastructure) and ecological (dynamic social–ecological systems) perspectives and approaches to resilience;</li> <li>• Water management and infrastructure decisions should not externalize the environmental and social impacts during the decision-making process.</li> </ul>

### **Case study 1 - Alliance for Global Water Adaptation Decision Support System (DSS)**

DSS has been designed as a tool to integrate emerging and existing insights about climate adaptation and water resources management into an evidence-based system to inform water management decision-making processes. The goal is to minimize the high uncertainties around future projections for water impacts from climate change and to build new sets of guidelines for long-term sustainable water resources management. DSS is a series of guidance documents in development, which focuses on four major components: (1) implementing ‘bottom-up’ approaches to vulnerability assessment that reflect inherent system limits and serve as an effective means of framing uncertainties about future climate projections; (2) creating explicitly flexible decision pathways that use economic analytical methodologies to estimate the costs of maintaining multiple options and evaluate trade-offs between waiting for more reliable information before implementation, versus acting in the short term with less information; (3) integrating approaches to resilience from both engineering and ecological perspectives; and (4) developing governance systems that reallocate, learn from and anticipate shifting needs and conditions.

#### **Developing adaptation plans for water resources at all governance levels**

##### ***What does it take?***

- Develop interministerial coordination and cooperation to provide a useful institutional foundation at the national level;
- Address the cross-sectoral dimension of water infrastructure development, including the fact that:
  - \* Water adaptation requires good spatial planning in both urban and rural areas, including good land-use planning and wise infrastructure investments;
  - \* Integrated water planning is important over the short and long term and should be carried out across sectors;
- Provide financial and technical resources to enable subnational and local institutions to plan, implement and sustain adaptation-related projects.

##### ***Which co-benefits can be expected?***

- The effective alignment of national and local institutions, policies and plans helps to respond to climate-induced hazards;
- Effective governance and integrated planning that take into account climate risk, water-use efficiency, infrastructure development and socioeconomic conditions contributes to enhancing water and food security and to improving disaster management.

#### **Developing adaptation plans for transboundary water resources**

##### ***Key principles***

- When planning adaptation across boundaries, riparian countries should focus on preventing transboundary impacts, sharing benefits and risks in an equitable and reasonable manner and cooperating on the basis of equality and reciprocity.

##### ***What does it take?***

- A sound legal and institutional framework for transboundary cooperation and a governance system that can learn and anticipate shifting needs and conditions;
- A shared scientific knowledge base for joint decision-making, including joint scenarios, modeling and vulnerability assessments;
- A clear political mandate and financial commitment, enabling administrations, experts and stakeholders to work collaboratively;
- A coordination mechanism/institution to agree on priorities for adaptation among different riparian countries, through the engagement of regional centres and networks and the private sector.

## **Case study 2 - Water and climate change adaptation in the Danube River basin.**

The World Wildlife Fund (WWF) supported the establishment of the Danube River Protection Convention in 1994 and the European Union water framework directive in 2000. WWF helped to secure an agreement from the Heads of State of Bulgaria, Republic of Moldova, Romania and Ukraine to establish the **Lower Danube Green Corridor**, a wetlands protection and restoration initiative encompassing 11,574 km<sup>2</sup> of natural areas along approximately 1,000 km of the Danube River. The four Governments agreed to preserve a total of 9,350 km<sup>2</sup> of natural areas, as well as to restore 2,230 km<sup>2</sup> of former floodplain. The Green Corridor is intended to attenuate floods, restore biodiversity, improve water quality and enhance local livelihoods.

### **Scaling up adaptation planning and action for water resources**

#### **What does it take?**

- Develop capacity-building as an initial and inherent component of the adaptation planning process, including in order to:
  - \* Ensure the success of innovative technological interventions at the community level;
  - \* Strengthen local capacity to sustain livelihoods;
- Ensure continuous intersectoral communication and coordination;
- Enhance international cooperation to facilitate access to financial and technical resources, as well as capacity-building for developing countries. International cooperation should aim, in particular, at:
  - \* Establishing national data information systems;
  - \* Finding the most appropriate international funding mechanism to enable developing countries to comply with established procedures for data collection and management;
  - \* Strengthening technical and institutional capacities in providing high-quality climate services through North–South, South–South and triangular cooperation;
- Develop demonstration projects;
- Consider innovative local-level financing and revenue options to secure long-term and sustainable investments and trigger cost-effective solutions.

## **POSSIBLE NEXT STEPS FOR ENHANCED KNOWLEDGE SUPPORT**

### **Making knowledge more relevant and accessible**

- Building networks and collaborative partnerships that effectively connect knowledge holders:
  - \* Creating a learning environment in the form of a ‘living lab’, where stakeholders and scientists have the opportunity to explore adaptation measures through dialogue, experimentation and fieldwork;
  - \* Focusing on recent events and stakeholder knowledge, and moving beyond discussions on uncertainty in order to help shift the discussion from research-based towards action-oriented adaptation solutions;
- Establishing synergies between different networks, as well as between international conventions and mechanisms (e.g. the UNFCCC, the United Nations Economic Commission for Europe, the Global Climate Observing System and the Global Framework for Climate Services ), research and scientific institutions (e.g. the United States Geological Survey), universities, the private sector, bilateral cooperation and river basin commissions, with respect to sharing data and relevant information;

- Exchanging good practices from multiple levels, in particular those that have the potential to be scaled up and that are science- and evidence-based, and on transboundary and regional cooperation in adaptation;
- Establishing a water and adaptation helpdesk to facilitate information-sharing at multiple levels;
- Compiling and synthesizing information on economic analyses, demonstrating the economic impacts of climate change and adaptation actions (i.e. the costs and benefits of adaptation options and the costs of non-action);
- Disseminating information to diverse groups of stakeholders, including policymakers, using various types of communication tools.

### **Addressing critical knowledge gaps**

- Developing localized science in order to draw attention to the local impacts of climate change and facilitate decision-making at the regional, national and subnational levels. This might include efforts to develop scenarios downscaled to the level of managing water resources, and methods to develop narrative climate scenarios based on key climate vulnerabilities;
- Improving the available analytical tools to capture how human interactions with hydrology produce positive or negative outcomes for the economies and ecosystems upon which human communities depend;
- Developing research on extreme events and long- and longer-term climate change and their transboundary dimensions to raise awareness on the need for transboundary cooperation in adaptation;
- Assessing water-relevant adaptation policies and aspects concerning sustainable water management, addressing long-term impacts to ensure coherence and prioritizing adaptation actions at the national level;
- Investing in the appropriate coverage of monitoring systems at different scales;
- Establishing mechanisms for filling in data gaps in data-scarce areas with advanced tools where needed;
- Enhancing the establishment of data information systems through data platforms, clearing houses and meta-databases on observational data.

For further information, the [Adaptation knowledge portal](#) provides access to:

- Documents [FCCC/SBSTA/2015/4](#), [FCCC/SBSTA/2014/4](#), [FCCC/SBSTA/2012/4](#) and [FCCC/TP/2011/5](#);
- Detailed [case studies](#) on adaptation planning processes addressing water resources;
- Further information on [tools and methods](#) for adaptation planning processes addressing water resources;
- [Additional knowledge resources](#).