CHAPTER 3

Governance context of water-related climate mitigation measures

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Chapter 3 Contents

Misty morning at the Upo Wetland near Changnyeong-gun, South Korea. Source: Shutterstock.

Highlights

- Climate change, biodiversity, land, water, and sustainable development are governed by an array of global governance frameworks and national instruments, including:
  - *Climate change:* United Nations Framework Convention on Climate Change (UNFCCC), the Kyoto Protocol, the 2015 Paris Agreement and its associated Nationally Determined Contributions (NDCs), National Adaptation Plans (NAPs), and Long-Term Strategies (LTSs).
  - *Biodiversity and land governance:* The Convention on Biological Diversity (CBD) and its associated National Biodiversity Strategies and Action Plans (NBSAPs) and the United Nations Convention to Combat Desertification (UNCCD) and its associated National Action Programmes.
  - *Water:* The Ramsar Convention, the United Nations Watercourses Convention, Integrated Water Resources Management (IWRM), and the United Nations International Decade for Action: Water for Sustainable Development.
  - *Sustainable development:* The 2030 Agenda for Sustainable Development.
- Various financing mechanisms and instruments are also available to further implementation, including:
  - Global Environment Facility (GEF), Green Climate Fund (GCF), and Clean Development Mechanism (CDM).
  - Market-based mechanisms such as Payment for Ecosystem Services (PES), Water Funds, and water stewardship approaches.
  - Innovative financial mechanisms such as blended finance, guarantees, and bonds (green, blue, sustainability).
- Because interlinked issues such as climate, water, land, and sustainable development are conceptualized, governed, and financed separately, siloed approaches become the norm. By extension, this creates barriers to the achievement of climate mitigation as leverage points are not capitalized on, and risks are not accounted for.
- Integrated approaches are needed to overcome these barriers. To better leverage connections, it is necessary to understand and articulate the synergies among different issues more clearly and create links between different governance structures to facilitate integrated approaches that can capitalize on these synergies. Failing to do so is a missed opportunity for climate change mitigation, which we cannot afford.

3.1 Introduction

To deliver on climate mitigation at the scale and speed needed, water must be mainstreamed into the climate governance process. As chapters 4 to 7 in Part II demonstrate, key climate change mitigation measures depend on, and impact water. Water also holds significant mitigation potential in its own right. However, the mainstreaming of water into climate governance processes such as the NDCs has not occurred to the extent needed. While climate adaptation efforts account to a large degree for water through, for example, NAPs, governance efforts that systematically integrate water considerations into climate mitigation policies, investments, and practice are still missing (Brouwer et al. 2013; Cook et al. 2010; Matthews et al. 2019).

Global environmental governance guides national governance efforts in planning and operationalizing mitigation policy. However, the degree to which different environmental issues have been institutionalized within the broader scope of global environmental governance differs widely. Climate change has emerged as a priority issue over the past decades, and its governance has

become formalized through the introduction of a number of formal treaties that set out obligations for different parties (Coen et al. 2020). In contrast, no coherent global water governance system exists, although there is a small number of formal treaties that cover important aspects of water governance, such as the Water Convention. As a result, water governance at the global level is fragmented, and water as a supra-regional or global issue is typically not given the prominence it needs.

This chapter demonstrates that to date, as the connection between water and climate mitigation is not well understood, the two are often treated as separate issues, and governed by different frameworks and instruments. This set-up, where issues are conceptualized and governed separately, creates siloed approaches. As a result, the identification of risks and utilization of synergies across the different issues are not capitalized on to the extent needed. This is a missed opportunity. As this report illustrates, the success of climate mitigation efforts is linked intrinsically with water (Part II); achieving climate mitigation thus requires the climate and water communities to acknowledge these interconnections and address them through integrated approaches that mainstream water considerations into climate change mitigation policies, investments, and practices (Part III).

To make this case, this chapter reviews global and national frameworks and instruments that exist for different environmental issues, including climate and water. It then explores the synergistic nature of different environmental issues, as well as the critical importance of cross-sectoral collaboration.

3.2 Overview of global environmental governance frameworks and national instruments

This section examines specific 'governance products': the international and national frameworks and instruments that have been developed to steer and address climate, water, and other environmental issues (see Figure 3.1).

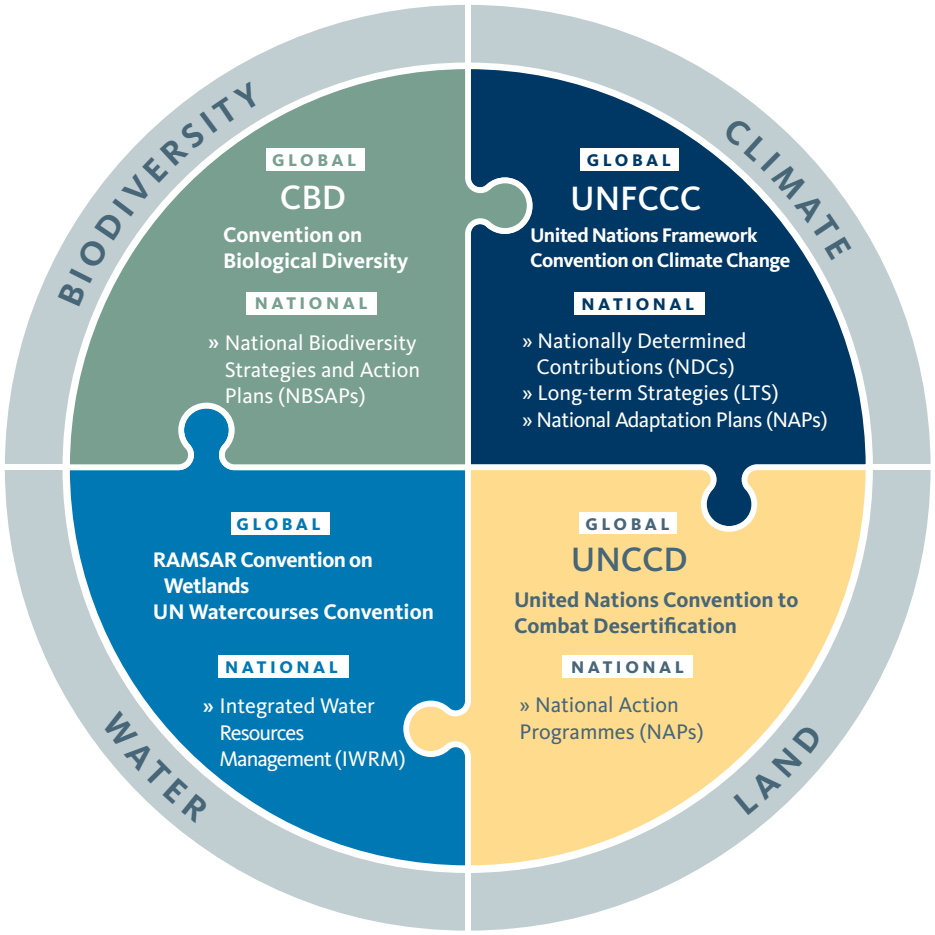

Figure 3.1. Global environmental governance frameworks and national instruments. Source: SIWI.

At the international level, Multilateral Environmental Agreements (MEAs) are becoming increasingly important components of environmental and sustainable development governance as human impacts on the planet intensify. MEAs are formal mechanisms to resolve environmental problems that transcend national boundaries by harmonizing approaches, sharing knowledge and tools, and enhancing access to financial resources (Steiner et al. 2003). Of particular importance are the three conventions emanating from Agenda 21 and established at the United Nations Conference on Environment and Development in 1992 in Rio de Janeiro, thereafter called the Rio Conventions (UN 1992). These include the UNFCCC, CBD, and UNCCD. At the national level, MEAs include instruments setting out how national governments ought to fulfil commitments set out by the MEAs. For example, under the UNFCCC, the Paris Agreement requests each country to outline NDCs, the CBD requests each country to set out NBSAPs, and the UNCCD binds countries to National Action Programmes.[1] As participation of non-state actors in governance is increasing (section 3.3), new types of steering mechanisms beyond the traditional legal binding agreements negotiated by states are also emerging (Biermann and Pattberg 2012). Public-private and private-private norm-implementing mechanisms therefore increasingly complement traditional intergovernmental regimes.

In addition to the three Rio Conventions, three global frameworks, all agreed in 2015, are important: the Paris Agreement, the 2030 Agenda for Sustainable Development, and the Sendai Framework for Disaster Risk Reduction (Sendai Framework). To implement these, states set national implementation plans with national targets. The Paris Agreement is discussed further in section 3.1.1. The 2030 Agenda, discussed further in section 3.1.4, serves as an overarching agenda for global development, and includes goals of economic, social, and environmental nature. It thus takes a holistic perspective on sustainable development and makes a strong case that most aspects of society, development, sustainable growth, and the environment are symbiotic and can only be achieved together (UN-Water and UNESCO 2020). The Sendai Framework is a non-binding framework, designed to achieve: "the substantial reduction of disaster risk and losses in lives, livelihoods and health and in the economic, physical, social, cultural and environmental assets of persons, businesses, communities and countries" (UNDRR 2015). Similar to Agenda 2030, this framework is particularly critical when it comes to showcasing the importance of taking a holistic approach. The key objective of the framework is to increase resilience and reduce long-term risk from both sudden and slow-onset hazards, of which climate mitigation and adaptation are key components (Briceño 2015). Moreover, although water is not featured prominently in the framework, it is of vital importance to fulfil the targets as water-related events such as floods and storms account for a significant proportion of all natural disasters. Research shows that floods accounted for 44 per cent of all disaster events recorded between 2000 and 2019. Extreme events have also become more prevalent, with flood-related disasters recorded since 2000 seeing an increase of 134 per cent compared with the two previous decades (WMO 2021).

The main treaty-based international and national frameworks and instruments for climate, land, development, and water are reviewed in further detail below. Reviewing existing frameworks and instruments makes it clear that the conceptual separation of climate, land, development, and water leads to a fragmented system and creates barriers for integrated approaches (section 3.3). Moreover, the fragmented nature of global water governance means that it is challenging to align water with mitigation efforts in a coherent manner. This is a missed opportunity for climate mitigation that we cannot afford.

3.2.1 Governance frameworks for climate change mitigation

The origins of the current climate change governance system can be traced back to the first World Climate Conference organized by the World Meteorological Organization (WMO) in 1979. While the first global conference on the environment was held in Stockholm in 1972, it was not until 1979 that the scientific community came together and jointly expressed the view that climate change poses a serious threat to humanity. In 1988, WMO and the United Nations Environment Programme (UNEP) established the Intergovernmental Panel on Climate Change (IPCC), and in 1990 IPCC published its

1. NDCs, NBSAPs and National Action Programmes are all discussed in more detail in subsequent sections.

first assessment report.[2] Also in 1990, the United Nations General Assembly launched the Intergovernmental Negotiating Committee (INC) to negotiate a framework convention on climate change. At the United Nations Conference on Environment and Development in Rio de Janeiro in 1992, INC6 adopted the UNFCCC (UNFCCC 1992). In 1994, UNFCCC entered into force with the start of the meetings of the Conference of the Parties (COPs), COP1 being held in 1995 in Berlin. While adaptation was included from the outset (Article 4), UNFCCC focused initially on mitigation, i.e., the reduction of greenhouse gas (GHG) emissions by industrialized countries. This initial emphasis on mitigation has continued to permeate many of the different instruments that materialized later, as discussed below.

The history of global climate change governance frameworks: From Kyoto to Paris

The trajectory of the global effort on emission reduction has been defined by the following major landmarks: the adoption of the legally binding Kyoto Protocol in 1997, the negotiation impasse in Copenhagen in 2009, and the Paris Agreement based on voluntary contribution commitments adopted in 2015. The approach to climate change under the Kyoto Protocol – with a primary focus on mitigation – was focused on legally binding emission reduction[3] by industrialized countries. In 2009, expectations were high prior to COP15 in Copenhagen to deliver a new framework in the post-Kyoto world. However, expectations were far from met, with the sitting United Nations climate chief Yvo de Boer questioning whether this perceived global diplomatic debacle would "spell the end of the UNFCCC process" (de Boer quoted in Vidal 2010). A negotiation impasse was experienced in Copenhagen in 2009 due to new emission trends across countries, including emerging markets.[4] However, in hindsight, COP15 was a significant turning point, prompting the shift towards a more polycentric global climate change regime (Bäckstrand and Lövbrand 2019). What can be seen in its aftermath is not one regime but many: a 'regime complex' consisting of overlapping, complementary, and sometimes even conflicting regimes with multiple centres of authority (Keohane and Victor 2016; Widerberg et al. 2016). Subsequent negotiations thus departed from the top-down, legally binding emissions target approach, moving to inviting pledges of voluntary commitments to cut emissions based on contributions defined by each nation individually, which came to be known as NDCs in the following years (Kuyper et al. 2018) Post-COP15, there was also a shift to transparency rather than legal enforcement, and recognition of the need to mobilize finance from public as well as private sources (Coen et al. 2020). The Copenhagen Accords thus contained and set the stage for much of what was to be incorporated in the Paris Agreement.

The Paris Agreement on Climate Change, a legally-binding landmark accord adopted by nearly all sovereign parties (196) at COP21 in 2015, provides a global framework for addressing climate change by: "holding the increase in global average temperature to well below 2°C above pre-industrial levels" and "pursuing efforts to limit it to 1.5°C" (UNFCCC 2015). To achieve this long-term goal, countries need to undergo economic and social transformation to ensure emissions peak as soon as possible and reach net zero emissions in the second half of the century using NDCs as the main vehicle. Relying on five-year cycles of stocktakes of NDCs and increasing commitments/ambitions, the success of the Paris Agreement hinges on the ratcheting of ambitious targets along the way (UNFCCC 2021b, 2021d). The mid-century low-emission development strategies known as LTS, which set the goal of net zero emissions in the second half of the century, are to set the pace for emission reduction. While the Paris Agreement is legally binding once it is ratified by a country, there is no enforcement mechanism. Instead, the intention is to foster compliance through transparency via publicly available NDCs.

2. IPCC prepares comprehensive assessment reports about the state of scientific, technical, and socio-economic knowledge on climate change. These reports represent the 'gold standard' scientific resource on climate change. The reports also outline impacts and future risks, and options for reducing the rate at which climate change is taking place. New assessment reports based on the latest scientific knowledge are released every six or seven years.

3. Quantified Emission Limitation or Reduction Objectives (QELROs)

4. In 2007, China overtook the United States as the highest gross emitter of GHGs. This prompted a shift in focus from historical emissions to emission trajectories of emerging markets, in particular China, but also Brazil, India, Mexico, and South Africa.

National climate change governance instruments: NDCs, LTS and emissions mitigation reporting

At the national level, the Paris Agreement is implemented through countries' voluntary commitments that are nationally determined: the NDCs. NDCs outline countries' efforts to reduce GHG emissions and adapt to climate change.[5] These commitments become legally binding once the NDC has been ratified by the country's legislative body. By providing a comprehensive framework for a country's climate action, NDCs usually build on existing climate action, and on sectoral and development plans and policies. Countries are advised to establish a complementary institutional mechanism comprising various key line ministries, including finance and development, to devise an integrated approach to the country's NDC process. Following guidance by the UNFCCC and other institutions, the selection of priority sectors is likewise often based on pre-existing mitigation[6] or adaptation[7] plans, as well as additional scenario analyses completed for the NDC process. The resulting emission reduction targets are formulated as 'unconditional', meaning a country commits to the implementation through domestic resources, or as 'conditional', where the commitment depends on the availability of international development finance. NDCs also outline the policy ecosystem, ongoing projects, country context, planning and implementation process, financing, and monitoring and reporting processes.

The first round of NDCs saw water included in mitigation as part of emissions reduction through renewable energy in the energy sector (hydropower, hydrogen, solar water heaters in buildings), as well as in agriculture (solar water pumping and distribution), land use (wetlands, peatlands), and the waste sector (wastewater treatment and reuse) (see Box 3.1).

Box 3.1. Uganda's first NDC: Building resilient communities, wetland ecosystems, and associated catchments

Wetlands play a particularly important role in Uganda where they serve as natural water reservoirs and help to sustain traditional rain-fed agricultural productivity. In the dry season, the 4 million people living in these areas can still access water to grow crops to feed their families or use the wetland fringes as pasture for animals. The wetlands also act as breeding grounds for large-scale fisheries.

Uganda's wetlands are increasingly seen as an important defence against the onset of climate change. They regulate flooding and remove pollutants from storm surface runoff before the water enters lakes and other water bodies. In addition, they play a critical role in continuously recharging groundwater sources. Uganda has lost around 30 per cent of its wetlands in the last 15 years due to degradation and encroachment, which in turn has exacerbated a series of ecological problems. These include increased flooding as the wetlands lose their water catchment capacity, reduced productivity of farmers living around the wetland fringes, and the silting up of water bodies. This ultimately poses a threat to national water supplies. The conservation of healthy wetlands also has the potential to counter rising GHG emissions. While there are no precise figures for the carbon sequestration of Uganda's wetlands, studies have shown that they can store and release GHGs.

5. The Paris Agreement is also the first place where adaptation efforts were integrated to equal the status of mitigation. While a balanced allocation between mitigation and adaptation had already been included in the 2009 Copenhagen Accord, referring to what later became the GCF, the Paris Agreement formalized this approach further. The increasing attention and support for adaptation, and growing emphasis on adaptation by the G-77, culminated in the Paris Agreement, Article 2, which elevated adaptation to be on par with mitigation. A call for action on adaptation emerged in 2001 due to new climate impact evidence from the second and (especially) third IPCC reports, which culminated in the landmark Marrakech Accord, adopted by COP7 in 2001, recognizing for the first time the intrinsic relationship between development and climate change issues (Helgeson and Ellis 2015). With further evidence of climate vulnerabilities, the Bali Action Plan at COP13 in 2007 established adaptation as one of the four pillars under the UNFCCC. At COP16 in 2010, Parties highlighted adaptation with the same level of priority as mitigation and adopted the Cancun Adaptation Framework and established NAPs for least-developed countries (LDCs) to develop medium- and long-term adaptation planning. COP has since invited non-LDCs to undertake NAPs, and many have launched 'NAP equivalent' processes that follow the spirit of the UNFCCC NAP guidance, if not all of its specific steps. It is likely that COP26 in Glasgow and COP27 in Egypt may also advance the establishment of a Global Goal on Adaptation (via the Glasgow Sharm el Sheik Work Programme).
6. Pre-identified mitigation actions based on Nationally Appropriate Mitigation Actions, UNFCCC reporting through National Communications, low emission development strategies, Reducing Emissions from Deforestation and forest Degradation in developing countries (REDD+) strategies, CDM projects and others.
7. Based on NAPs, National Adaptation Programmes of Action, National Communications, National Planning documents, and disaster risk reduction plans.

Box 3.1. Cont.

Uganda was among the few countries to incorporate wetlands into their first NDCs, and one of the very few that did so for both mitigation and adaptation actions.

Uganda's first NDC regarding wetlands:

	NDC climate measures
Mitigation	Development of enabling environment for wetland management, including: • Creation of national information database through re-inventory and assessment of all wetlands. • Design and implementation of 11 RAMSAR site wetland research, eco-tourism and education centres. • Design and implementation of 111 District wetland action plans, with carbon sink potential. • Design and implementation of 15 RAMSAR sites and framework wetland management plans. • Demarcation and gazettement of 20 critical and vital wetland systems and their maintenance countrywide as carbon sinks. • Wetlands law enforcement and governance. • Strengthening wetland management institutions responsible for wetlands management and conservation. • Overall, increase wetland coverage to 12% by 2030, from approximately 10.9% in 2014, through demarcation, gazettement, and restoration of degraded wetlands.
Adaptation	Water sector: • Managing water resource systems, including wetlands, particularly in cities, in such a way that floods are prevented, and existing resources conserved (through the establishment of an IWRM system).

One project example contributing to Uganda's NDC is the Building Resilient Communities, Wetland Ecosystems and Associated Catchments in Uganda project. Financed by GCF and supported by the United Nations Development Programme, Uganda is currently implementing a wetlands project which restores an estimated 760 square kilometres of degraded wetlands and associated catchments, while improving the lives of at least 500,000 people directly, and more than 4 million indirectly, across 20 districts in the eastern and south-western areas of Uganda. The regions have experienced the highest levels of wetland degradation and climate change impacts. The project is employing a three-pronged approach, including restoration of wetlands and associated catchments, improved agricultural practices and alternative livelihood options in the wetland catchment areas, and strengthening farmers' access to climate and early warning information. While focused on climate change, this project is also introducing measures to support gender empowerment, specifically preventing gender-based violence motivated by the impact of droughts.

Overall, based on the first NDC, the Government of Uganda has bigger plans: it aims to increase the current 8 per cent coverage of wetlands across the country to 12 per cent. With nearly 70 per cent of Uganda's population relying on agriculture, measures to enhance people's resilience to climate change are vital. For its revised NDC, Uganda has indicated that it is adding an assessment of the mitigation potential of wetland conservation. However, in the interim submission presented in October 2021, this was not yet included.

REF: SIWI/GIZ NDC study (forthcoming).

Based on an initial review of new or enhanced NDCs in the most recent round by UNFCCC, 21 per cent of the countries chose to include wetlands and 22 per cent included wastewater in their mitigation strategies (UNFCCC 2021e). The new or revised NDCs also show another uptick in renewable power, including hydropower and the production of hydrogen (UNFCCC 2021c) (Box 3.2).

Box 3.2. Water and mitigation in the latest NDCs

In the last two years (2020–2021), countries around the world have been preparing updates to their first NDC or preparing their second, enhanced NDC as part of international climate change processes. The purpose of an NDC is to outline a party's commitments or contributions regarding climate change under the Paris Agreement, mainly in terms of mitigating GHG emissions but also adaptation measures as part of Adaptation Communications if desired by the party. Notably, many parties chose to include substantive adaptation policies, measures, and targets within their enhanced NDCs.

As of 4 January 2022, a total of 157 new or enhanced NDCs had been received by the UNFCCC, including 114 from non-Annex 1 parties and 43 from Annex 1 parties.[8] NDCs from Annex 1 countries focus on mitigation commitments, whereas most non-Annex 1 countries contain a mixture of mitigation and adaptation commitments.

In terms of mitigation, most parties included modelling and estimates of mitigation activities in the broad categories of Energy, Agriculture, Forestry and Other Land Use (AFOLU), Industrial Process and Products Use, and Waste. All these categories either include water-related components or are reliant on water sources to be effective, but few enhanced NDCs from non-Annex 1 countries outlined specific water-related mitigation measures or recognized specific dependencies or impacts on water resources.

As a general observation, water-related activities featured far more prominently within enhanced NDCs compared with the first iterations (made between 2015 and 2019). Water-related policies and measures continue to be found far more frequently within adaptation sections of these NDCs. Nevertheless, measures around wastewater, climate smart agriculture, waste management, and wetlands are examples of water-related activities found within mitigation sections, and these received increased prominence compared with the first round.

REF: SIWI/GIZ NDC study (forthcoming).

8. Annex I Parties include the industrialized countries that were members of the Organisation for Economic Co-operation and Development in 1992, plus countries with economies in transition (the EIT Parties), including the Russian Federation, the Baltic States, and several Central and Eastern European States. Non-Annex I Parties are mostly developing countries. Certain groups of developing countries are recognized by the Convention as being especially vulnerable to the adverse impacts of climate change, including countries with low-lying coastal areas and those prone to desertification and drought. Others (such as countries that rely heavily on income from fossil fuel production and commerce) feel more vulnerable to the potential economic impacts of climate change response measures. The Convention emphasizes activities that promise to answer the special needs and concerns of these vulnerable countries, such as investment, insurance, and technology transfer.

Recognizing that many adaptation actions also result in emission reductions (Article 4, paragraph 7), the Conference of the Parties, the supreme body of the UNFCCC Convention's (CMA)[9] Annex to the Paris Agreement guides parties to provide information on mitigation co-benefits from adaptation and economic diversification (UNFCCC 2021a).[10] For example, restoring wetlands not only helps wetland ecosystems adapt to climate change, but also keeps wetlands from becoming major emission sources themselves. Indeed, guidance on NDC design, enhancement, and implementation acknowledges the potential for synergies (but less for conflicts) for mitigation and adaptation goals (GWP 2019; Huq et al. 2018; Smith et al. 2019). Building on the CMA guidance for mitigation co-benefits, the guide on NDC enhancement states that "if adaptation actions are expected to lead to GHG emissions reductions, it is important to take such effects into account in the mitigation planning and target setting to avoid underestimation of the mitigation potential and to make that fact explicit to avoid 'accidental double-counting'" (WRI and UNDP 2019a: 530; Box 3.3).

However, on a practical level, few countries chose to quantify and include such mitigation co-benefits in their emission targets. Assessing the specific mitigation potential of adaptation actions and including them in mitigation targets can constitute a commitment. Making such commitments depends on the country's priorities and financial situation. For example, for a highly vulnerable sector such as agriculture which is intimately linked to food security, livelihoods, and national economy, adaptation will have to be prioritized, and the country will be less able to commit to a specific emission reduction target, even when such benefits accrue. In this situation, countries may prefer to propose vulnerable sectors under the adaptation component only and refer to potential mitigation benefits without quantifying them. When countries can commit to a mitigation target or action, the target can be offered as an unconditional or conditional target, with the latter being subject to international financial support (which still gives countries room to focus on the adaptation goal).

In support of the global climate neutrality goal for the second half of the 21st century, the Paris Agreement (Article 4, paragraph 19) invites countries to submit long-term low GHG emission development strategies, now commonly referred to as LTS. These plans provide a visionary roadmap for achieving net zero emissions by mid-century through economic and social transformations, with a perspective of at least 30 years. While this call was addressed particularly to developed countries, all countries benefit from developing a long-term plan to avoid maladaptation, as well as 'mal-mitigation', which includes water-related risks resulting from poor mitigation planning. In addition, proposed climate actions and economic diversification are best viewed from a long-term climate and development perspective to avoid costly, carbon-intensive lock-ins. For vulnerable developing countries, LTS could be a particularly useful tool to identify climate action pathways that do not put water security at risk when planning adaptation as well as mitigation measures.

Overall, the UNFCCC has experienced various important developments: a) a shift from targeting industrial country emissions in a legally binding manner under the Kyoto Protocol to mandating voluntary contributions from all countries under the Paris Agreement using NDCs; b) moving from the top-down Kyoto architecture to a more bottom-up approach with national plans under Paris; c) broadening out from a primary mitigation focus under Kyoto to a triple goal comprising mitigation, adaptation, and finance under the Paris Agreement; and d) acknowledgement of the need for long-term resilience and net zero ambitions for the second half of the 21st century (Kuyper et al. 2018; UNFCCC 2021b, 2021d).

9. What is the CMA? "The Conference of the Parties, the supreme body of the Convention, shall serve as the meeting of the Parties to the Paris Agreement. All States that are Parties to the Paris Agreement are represented at the Conference of the Parties serving as the meeting of the Parties to the Paris Agreement (CMA), while States that are not Parties participate as observers. The CMA oversees the implementation of the Paris Agreement and takes decisions to promote its effective implementation" (UNFCCC 2021a).
10. CMA 1/10 "Recognizes that each Party with a nationally determined contribution under Article 4 of the Paris Agreement that consists of mitigation co-benefits resulting from its adaptation action and/or economic diversification plans consistent with Article 4, paragraph 7, of the Paris Agreement shall provide the information referred to in Annex I as applicable to its nationally determined contribution and as it relates to such mitigation co-benefits." "Recognizes that each Party with a nationally determined contribution under Article 4 of the Paris Agreement that consists of mitigation co-benefits resulting from its adaptation action and/or economic diversification plans consistent with Article 4, paragraph 7, of the Paris Agreement shall follow the guidance contained in Annex II as it relates to such mitigation co-benefits. CMA 1/16 Annex I: "Mitigation co-benefits resulting from Parties' adaptation actions and/or economic diversification plans, including description of specific projects, measures and initiatives of Parties' adaptation actions and/or economic diversification plans."

Box 3.3. The treatment of water-related GHG emissions in the IPCC guidelines for emission reporting

The NDCs complement the preceding reporting tools for climate change such as National Communications and associated Biannual Update Reports, documents submitted periodically to UNFCCC.[11] The National Communications reporting is informed by a set of guidelines developed by IPCC, an inter-governmental body of the United Nations mandated to provide objective scientific information on climate change. The guidelines focus on the highest emitting sectors: energy; industrial processes; solvent and other product use; agriculture, land-use change and forestry; waste; and others. The water sector is not one of them.

The 1996 Revised IPCC Guidelines (IPCC 1996) included the following water-related components:

- Wetlands and rice cultivation – irrigated versus rainfed (under Agriculture, land use and land-use change).
- Water heating and cooling, as well as emissions from water pumping and distribution may have been included indirectly through energy in residential and commercial buildings, and industrial activities.
- Wastewater – both industrial and residential (under Waste).

Under the Paris Agreement, countries are making the transition from National Communications to the **Enhanced Transparency Framework (ETF)**, which encourages them to submit biennial transparency reports (BTRs) and national inventory reports by 2024 (Annex 1 countries by 2022). Originating from the Katowice climate package (COP24), ETF adopted a detailed set of modalities, procedures, and guidelines (MPGs). The final biennial reports for developed countries are due no later than 31 December 2022 (decision 6/CP.25). Parties under the Paris Agreement are required to submit their first report (BTR1) and national inventory report, if submitted as a stand-alone report, in accordance with the MPGs, at the latest by 31 December 2024 (UNFCCC 2022).

Wastewater, according to the IPCC Guidelines, can be a source of methane when treated or disposed of anaerobically or when dissolved methane enters aerated treatment systems. It can also be a source of nitrous oxide emissions. The 2006 IPCC Guidelines for National Greenhouse Gas Inventories (IPCC 2006) improved calculations for wastewater in various aspects, including clarifications and new additions. For instance, the methane emission factors for wastewater discharged to aquatic environments were updated and a new emission factor for discharge to reservoirs, lakes, and estuaries was introduced. The calculation of methane emissions from effluent discharged to aquatic systems has been updated to include the discharge of treated effluent and to reflect the removal of organics that occurs during treatment. As for carbon dioxide (CO_2) emissions, only non-biogenic (fossil) CO_2 emissions from wastewater treatment and discharge are considered, but not biogenic, organic matter stemming from human excreta or food waste.

Another important addition to the IPCC Guidelines was the 2013 Supplement to the 2006 IPCC Guidelines for National Greenhouse Gas Inventories: Wetlands (IPCC 2014). Wetlands play a critical role in the global carbon cycle, storing significant amounts of CO_2 and methane. Wetlands are also the largest natural source of methane (30 per cent) and could release substantially more under future warming scenarios. At the same time, their potential to sequester carbon has largely remained untapped (Anisha et al. 2020; Zhang et al. 2017). The Wetlands Supplement provides updated data, clarifications, and filling of information gaps. It covers inland organic soils and wetlands on mineral soils, coastal wetlands including mangrove forests, tidal marshes, and seagrass meadows, as well as constructed wetlands for wastewater treatment (IPCC 2014).[12]

Thereafter, the 2019 Refinement to the 2006 IPCC Guidelines for National GHG Inventories made further clarifications, e.g., regarding flooded lands. Overall, the 2019 revision of the IPCC Guidelines saw a tweaking of

11. National Communications describe the national circumstances, national GHG emissions profile, and possible mitigation and adaptation options, and identify needs. The NDC takes the National Communication, which outlines what can be done, a step further, by laying out what a country commits to do.
12. The 2006 IPCC Guidelines on wetlands covered only peatlands drained and managed for peat extraction and conversion to flooded lands and offered limited guidance for drained organic soils.

Box 3.3. Cont.

the main categories and refinements in the sub-components of reporting with minor adjustments of relevance for water management. This resulted in wetlands being included under Agriculture, forestry and other land use (IPCC 2006, 2019a, 2019b).[13,14]

Whereas the guidelines acknowledge that nitrous oxide emissions can stem from wastewater treatment plants or from "receiving aquatic environments following the disposal of untreated or treated wastewater effluent", its guidance focuses on the former: "how to estimate the nitrous oxide produced during wastewater treatment and sludge treatment that *occurs within the wastewater treatment system, and disposal of the wastewater* (IPCC 2019a; 2019d). The reason for the inclusion of the wastewater treatment system, according to the IPCC, is that "more recent research and field surveys had revealed that emissions in sewer networks and from nitrification or nitrification-denitrification processes at WWTPs [wastewater treatment plants], previously judged to be a minor source, may in fact result in more substantial emissions" (IPCC 2019a; 2019d). Therefore, wastewater treatment and discharge for domestic and industrial sectors[15,16] should be reported, as are emissions from untreated wastewater if discharged into a pooled entity. It is noteworthy, however, to point out that the **emissions released from water bodies polluted by untreated wastewater are likely to be underestimated and under-reported** (see Chapters 4 and 5).

Aside from the refinements relating to Nature-based Solutions (NbS) and wastewater treatment, current IPCC guidelines do not take into account the risk and synergy dimensions that water provides (HLPW 2018; WWC 2017), possibly affecting environmental integrity. Guidance on the design of Intended Nationally Determined Contributions (INDCs), Enhanced NDCs and NDC implementation draws attention to potential sectoral synergies (but does not caution the risk of adverse interactions) (Ricardo-AEP and CDKN 2015; UNDP et al. 2020; WRI and UNDP 2015; 2019a; 2019b). The set of sectoral checklists with water interactions to consider for NDC enhancement was developed to help identify water-related issues to consider and address further within climate plans and policies, taking a deeper look at the potential risks and opportunities for water in the NDC process (WGF 2020).

13. Subcategories: Wetlands converted to forest land, Wetlands converted to cropland, Wetlands converted to grassland, Wetlands converted to settlements, Wetlands converted to other land, Wetlands remaining wetlands, Peatlands remaining peatlands, Flooded land remaining flooded land, Land converted to wetlands, Land converted for peat extraction, Land converted to flooded land, Land converted to other wetlands.

14. Flooded lands are defined in the 2006 IPCC Guidelines for National GHG Inventories (Wetlands) as water bodies where human activities have caused changes in the amount of surface area covered by water, typically through water-level regulation.

15. Methane and nitrous oxide.

16. The 2019 Refinement includes new guidance on how to estimate nitrous oxide emissions from domestic and industrial wastewater and presents updated guidance to estimate emissions from centralized wastewater treatment plants. The nitrous oxide emission factors for wastewater discharged to aquatic environments have also been updated and the calculation of emissions from effluent discharged to aquatic systems has been updated to reflect the removal of nitrogen that occurs during treatment.

3.2.2 Governance frameworks for biodiversity and land

Biodiversity and land-related issues have, like climate, received significant attention in global governance. Examining their governance, two MEAs are of particular importance: the Convention on Biological Diversity (CBD), and the Convention to Combat Desertification (UNCCD).

Global biodiversity and land governance frameworks: CBD, UNCCD and the United Nations Decade on Ecosystem Restoration

The CBD has three main objectives: a) the conservation of biological diversity; b) the sustainable use of the components of biological diversity; and c) the fair and equitable sharing of the benefits arising from the utilization of genetic resources.

Examining the UNCCD, its main purpose is to combat desertification and land degradation in countries

experiencing serious drought and/or desertification. Further objectives include the improvement of land productivity and the rehabilitation, conservation, and sustainable management of land and water resources. Both CBD national biodiversity strategies and action plans (NBSAPs) and UNCCD National Action Programmes can contribute to mitigation of climate change through sustainable management of water resources in ecosystems and agroecosystems that result in the reduction of emissions.

There are clear synergies between achieving land degradation neutrality (LDN) through implementation of sustainable land management, as recommended by UNCCD (Cowie et al. 2018), and implementation of water mitigation measures on productive land. For example, forest landscape restoration (FLR) has emerged as a way to attract synergies in the implementation of the Rio Conventions and develop solutions to challenging environmental and socio-economic issues. The Global Partnership on Forest and Landscape Restoration defines FLR as "an active process that brings people together to identify, negotiate and implement practices that restore an agreed optimal balance of the ecological, social and economic benefits of forests and trees within a broader pattern of land use" (GPFLR 2013). It is believed that FLR can contribute significantly to achieving the CBD Aichi targets, as well as the upcoming 2030 global biodiversity framework targets of reversing desertification and land degradation, mitigating climate change, and enhancing adaptation. The ambitious goals include reaching LDN (Sustainable Development Goal [SDG] 15.3) by 2030, restoring 150 million hectares of land by 2020 within the framework of the Bonn Challenge, and restoring 350 million hectares by 2030 under the New York Declaration on Forests, which is relevant to several of the targets of SDG 15. Should these goals be reached, such activities could significantly mitigate emissions. However, barriers to implementation remain, such as land tenure rights, capacity constraints, harmful subsidies, and financial barriers (FAO and UNCCD 2015). It is also worth noting that the role of water and a functioning hydrology for landscape restoration has so far received very limited attention in the FLR discourse (Tengberg et al. 2018; 2021).

Beyond the CBD and the UNCCD, it is also critical to promote The United Nations Decade on Ecosystem Restoration (2021-2030) as a collective framework to manage land in the coming decade. Launched in June 2021, it aims to prevent, halt, and reverse ecosystem degradation to mitigate climate change emissions, enhance livelihoods, and maintain biodiversity while contributing to the achievement of global ecosystem goals. As per the strategy, the Decade strives to spark a global movement involving actions from governments, civil society, and the public and private sectors, as well as communities and individuals, making it an inclusive global initiative. It will achieve this by focusing on eight ecosystem types: farmlands; forests; freshwater; grasslands, shrublands and savannahs; mountains; oceans and coasts; peatlands; and urban areas (UNEP and FAO n.d.). Critically, the Decade recognizes the significance of freshwater ecosystems and peatlands as key aquatic ecosystems.

Moreover, the impetus on ecosystem-based restoration approaches allows for the links between forests and water to be taken into account. Notably, UNEP and FAO (2021) notes the importance of water-forest links in the Decade's launch report, and stresses that these are taken into account in restoration efforts. With an estimated USD 1 trillion needed for ecosystem restoration to address global environmental challenges, the Decade aims to mobilize these resources through multiple pathways (UNEP and FAO 2020a). The Finance Task Force of the Decade is chaired by the World Bank, and is focused on directing subsidies towards ecosystem restoration, countering economic interests leading to ecosystem degradation, and incentivizing investments in ecosystem restoration (UNEP and FAO 2020b).

National biodiversity and land governance instruments: NBSAPs and National Action Plans

At national level, the NBSAPs are instruments for implementing the objectives of the CBD (CBD 1992: Article 6). The CBD requires countries to ensure that NBSAPs mainstream biodiversity "into the planning and activities of all those sectors whose activities can have an impact (positive and negative) on biodiversity" (CBD 2012). In 2010 the CBD adopted a strategic plan with 20 targets known as the Aichi biodiversity targets that were included in revised and updated NBSAPs (CBD 2010). The NBSAPs have become instruments for achieving several ecosystem-related targets under SDG 15: Life on land, especially for wetlands (15.1), forests (15.2), and mountains (15.4). However, there has been limited progress in achieving the Aichi targets, which highlights the importance of good governance in achieving conservation targets (Buchanan et al. 2020). The Aichi targets expired in 2020, and a new global

biodiversity framework is currently being negotiated to guide actions worldwide through to 2030, to preserve and protect nature and its essential services to people. While not yet finalized, the first draft of the framework gives a good indication of the direction it will take. The draft framework makes a strong case for alignment with the SDGs and emphasizes improving or maintaining the connectivity and integrity of natural systems. With regards to the 2030 action targets in the draft framework, two proposed targets are of particular importance in this context. These are proposed Target 2: Ensure that at least 20 per cent degraded freshwater, marine and terrestrial ecosystems are under restoration, ensuring connectivity among them and focusing on priority ecosystems; and proposed Target 8: Minimize the impact of climate change on biodiversity, contribute to mitigation and adaptation through ecosystem-based approaches, contributing at least 10 gigatons of CO_2 equivalent (GtCO2e) per year to global mitigation efforts, and ensure that all mitigation and adaptation efforts avoid negative impacts on biodiversity. As it stands, Target 2 sets a percentage target for restoration and includes terrestrial and freshwater ecosystems, while Targets 2 and 8 both make reference to whole ecosystems and ecosystem-based approaches, which, in theory, should include forest-water linkages, for example. Other targets refer to conservation through various measures, and emphasize effective, equitable, and sustainable management of resources. Furthermore, the targets include socio-economic aspects that are often overlooked when addressing the impacts of natural resources management.

For the UNCCD, National Action Programmes are the key instruments for implementing the Convention. More recently, the UNCCD adopted LDN targets as the guiding principle for implementing the Convention. LDN was also adopted as target 15.3 of SDG 15. The three LDN and SDG 15.3.1 sub-indicators cover trends in land cover, land productivity, and soil organic carbon stocks for monitoring changes in land-based natural capital and to determine the proportion of land that is degraded over the total land area (UNCCD-AGTE 2013).

3.2.3 Governance frameworks for water

Unlike climate, biodiversity, and land, water has not been governed in the same globally coordinated manner and there is no 'Rio Convention' or other overarching global framework for water. This has implications for both policy coordination as well as access to financing, especially in the context of climate change mitigation.

Restoration of the Alviso wetlands at the Don Edwards wildlife refuge, California. Source: Shutterstock.

Global water governance: Ramsar Convention, the United Nations Watercourses Convention, and the International Decade for Action

While no overarching framework exists for water, there are global water frameworks of significance, focusing specifically on blue water (see Chapter 2). The Convention on Wetlands of International Importance, especially for waterfowl habitats, otherwise known as the Ramsar Convention on Wetlands, is one of the earliest examples of an environmental MEA and relates specifically to water. Established in 1971, it provides a framework for conservation and sustainable use of wetlands (Steiner et al. 2003). Challenges in preserving, restoring, and protecting wetlands for increased biodiversity, hydrological functioning, and climate change mitigation are global. Wetlands, such as peatlands, are major carbon sinks and it has been pointed out that management objectives for wetlands could become more closely linked to UNFCCC emission targets and the Paris Agreement (AGWA 2020), also see Box 3.1. However, the Ramsar Convention is not one of the Rio Conventions and there is limited coordination and financing of mitigation actions in wetlands linked to the climate regime (Tengberg et al. 2018).

For transboundary water management, the United Nations Convention on the Law of the Non-navigational Uses of International Watercourses, also known as the United Nations Watercourses Convention, is of special importance. Designed as a framework convention, it entered into force in 2014 after a very long and complex process that lasted over 44 years. Its aim is to ensure utilization, development, conservation, management, and protection of international watercourses, and to promote their optimal and sustainable utilization for present and future generations. The convention embraces the principle of equitable and reasonable utilization and lays down certain factors that should be taken into account, including natural factors, such as hydrology, climate and ecology, as well as the conservation, protection, development, and economy of the water resources of the watercourse (Salman 2015). The convention could thus have a bearing on the design and implementation of climate change mitigation measures that require water, but as a framework convention it leaves the details in the specific watercourse agreements to be worked out by the riparian states.

Another example of a global framework in the water context is the 2018–2028 International Decade for Action on Water for Sustainable Development, declared by the United Nations General Assembly. The Water Action Decade commenced on World Water Day, 22 March 2018, and will end on World Water Day, 22 March 2028. The objective of the Decade is to accelerate efforts to meet water-related challenges, as well as to highlight the role of water in achieving the wider sustainable development agenda, including social, economic, and environmental objectives. Specifically the Decade highlights the need for cooperation and partnerships across all levels and sectors to achieve internationally agreed water-related goals and targets. Progress will be assessed at the 2023 Conference for the Midterm Comprehensive Review of Implementation of the United Nations Decade, taking place at United Nations Headquarters in March 2023, co-hosted by Tajikistan and the Netherlands.

National water governance instruments: IWRM

As these two MEAs demonstrate, water has been negotiated at the global level for a long time. In discussions leading up to the United Nations Conference on Environment and Development in Rio in 1992, water was included, and the need for holistic management of freshwater was recognized. As a principle, it was formally recognized in Chapter 18 in Agenda 21. However, while the Rio Conference saw the governance of climate and land formally institutionalized through UNFCCC, CBD, and UNCCD, global water governance has not been institutionalized in the same manner. In the absence of a global water framework, the Dublin principles, established at the Dublin Conference on Water and Development in January 1992,[17] serve as a guide for global water dialogues, and laid the foundation for the concept of integrated water resources management (IWRM). The Johannesburg Conference on Environment and Sustainable Development in 2002 adopted the Johannesburg Plan of Implementation of international commitments on sustainable development, including elaboration and implementation of national IWRM plans. However, many countries have, for a range of reasons, developed or included national IWRM planning without moving to the stage of implementation. While IWRM plans do not explicitly address climate mitigation or land management, most examples to

17. The Dublin Principles state that: (i) water is a vulnerable, finite resource; (ii) water management and development should include stakeholders; (iii) water is an economic good; and (iv) women play a central role in management and conservation of water.

date include components related to conservation of ecosystems and biodiversity, considered important for the hydrological functioning of watersheds and river basins. Strengthening these implicit components also provides an entry point for linking IWRM to climate change mitigation. IWRM as envisioned in Agenda 21 (Chapter 18) is now translated into the 2030 Agenda as target 6.5: By 2030, implement integrated water resources management at all levels, including through transboundary cooperation as appropriate.

3.2.4 Governance frameworks for sustainable development: The 2030 Agenda

The 2030 Agenda for Sustainable Development - materialized through the 17 Sustainable Development Goals (SDGs) - is an ambitious global framework, setting out a trajectory for global development as a whole. Its ambition is noteworthy, not only due to the breadth of issues covered, but also because of its recognition that the issues are all interlinked, with most aspects of society, development, sustainable growth, and the environment being symbiotic (Figure 3.2). The holistic nature of the SDG framework implies that individual goals cannot be treated in isolation; a large number of potential interactions across the 17 goals and associated 169 targets have to be considered by policy-makers (Costanza et al. 2016). Interconnections between different goals can be both positive (synergies) as well as negative (trade-offs). However, positive correlations among SDGs generally outweigh negative trade-offs, especially for SDGs 1 (No poverty), 3 (Good health and wellbeing), 4 (Quality education), 10 (Reduced inequalities), 12 (Responsible consumption and production), and 13 (Climate Action) (Pradhan et al. 2017).

Prior to the SDGs materializing in 2015, 'mainstreaming' was adopted internationally as a key approach to integrate the environmental issues raised in MEAs into national plans and strategies, as well as in sectoral plans and policies (Nunan et al. 2012). Particularly significant was the Poverty Reduction Strategy Paper (PRSP) initiative launched by the Bretton-Woods Institutions in 1999. The message of PRSP was further reinforced through the establishment of the Millennium Development Goals (MDGs) in 2000. For many years, the MDGs were considered to be the main entry point for mainstreaming MEA objectives at the national level, particularly in low-income countries. However, evidence

Figure 3.2. The SDG 'wedding cake'. Source: Azote Images for Stockholm Resilience Centre, Stockholm University (n.d.)

points to the PRSP alone often not being the most effective force for change. In practice, PRSP objectives could be overruled by upstream processes on key policy issues such as fiscal regimes or foreign investment policy, or downstream decisions on specific investments (Bass et al. 2010). For example, even if a PRSP recommended a particular action to mitigate climate change that requires water, it could be ignored in the face of wider water demands. A more holistic understanding was required.

The holistic and multidimensional approach taken by the SDGs provided a new space to address climate mitigation in a coordinated manner, and utilize the synergies that were often not realized through 'mainstreaming'. Looking specifically at the SDGs relevant to achieving synergies between water management and climate change mitigation, these are primarily SDGs 6 (Clean water and sanitation), 7 (Affordable and clean energy), 13 (Climate action), and 15 (Life on land). A closer look at SDG 15 serves to demonstrate why it is necessary to approach the SDGs with a holistic mindset. Achieving SDG 15 is, according to some studies, associated with a high degree of trade-offs with other SDGs (Pradhan et al. 2017). Nevertheless, the IPCC Report on Climate Change and Land (IPCC 2019c) identified SDGs 2, 3, 7, 11, and 12 as directly relevant to achieving target 15.3 on LDN, while SDGs 1, 6, and 13 are considered to be cross cutting. This shows that synergies across SDGs that are related to mitigation are not only possible, but that target 15.3 on LDN can be closely linked to water-related mitigation measures in terrestrial ecosystems, such as forests, grasslands, and wetlands, as well as agricultural lands. Moreover, this also reconfirms the importance of looking at climate and water as well as other environmental issues in an integrated manner.

3.3 Global financing mechanisms and instruments

To realize the objectives set out in the above discussed frameworks, the question of financing has always been of central importance. As it stands today, the financing system is fragmented, with different funding channels, rules, and procedures creating barriers to accessing funding (Bertilsson and Thörn 2020). Moreover, looking across the board at the global landscape for climate finance, it is noteworthy that water and wastewater management is one of the largest recipient sectors for adaptation finance (37 per cent), but still only receives a very small fraction of mitigation finance. In total, water and wastewater management received USD 17 billion of USD 46 billion of adaptation finance in 2019/20, but only USD 1 billion of USD 571 billion of mitigation finance (CPI 2021).

The Global Environment Facility (GEF) was established in 1992 to be the financial mechanism of the Rio Conventions. GEF was thus set up to fund the incremental costs of addressing global environmental problems related to climate change, biodiversity loss, and land degradation. In addition, it has evolved to fund costs related to international waters and persistent organic pollutants. During the past two funding cycles it has also increasingly supported integrated programmes across two or more environmental issues and sectors to foster synergies and address additional drivers of environmental change (Tengberg and Valencia 2018). The next GEF cycle will seek to promote a green, blue, and resilient recovery, and create pathways to an equitable, nature-positive, and carbon-neutral world (GEF 2021). GEF also administers funds established under UNFCCC, including the Least Developed Countries Trust Fund and the Special Climate Change Trust Fund, and acts as interim secretariat for the Adaptation Fund. However, GEF has been subjected to criticism from donors for lacking capacity to scale up project financing, and from recipient countries for problems with access modalities (Bruun 2017).

In response to the criticism, the Green Climate Fund (GCF) was established by the Parties of the UNFCCC at COP16 in Cancun in 2010 as the new primary climate finance mechanism. GCF funds both climate change mitigation and adaptation, as well as cross-cutting interventions. It is guided by an objective to promote a paradigm shift towards low-emission and climate-resilient development pathways (GCF 2020). As such, it focuses on how to facilitate more fundamental system change, as incremental adjustment (e.g. promoted by GEF), is considered insufficient to manage climate change. GCF is therefore increasingly providing guidance to countries on these complex concepts and processes. This has, however, created tension between top-down governance and country ownership (Bertilsson and Thörn 2020).

In addition to GEF and GCF, the 1997 Kyoto protocol set up the Clean Development Mechanism (CDM). Under the Kyoto Protocol, industrialized countries

Starting 2023, the Affric Highlands rewilding project, Scotland, will return 500,000 acres of land to natural processes. Source: Shutterstock.

committed to individual and legally binding targets for GHG emissions. Article 12 defines a CDM whereby high-income countries (Annex 1 countries) earn certified emission reductions through projects implemented in low-income countries. A CDM project activity might involve, for example, a rural electrification project using solar panels or the installation of more energy-efficient boilers. However, several issues, including high transaction costs, have surrounded CDMs, which has resulted in a weak project pipeline (Cowie et al. 2007; FAO and UNCCD 2015). However, since CDMs are not an instrument under the Paris Agreement, the mechanism is currently phased out, which means that selling credits from CDM projects in the market beyond 2021 is unlikely. Instead, a new central mechanism will take its place under Article 6.4 of the Paris Agreement once its rules and regulations have been adopted. Some projects, such as Land-Use Change and Forestry (LULUCF) can also access funding through Reducing Emissions from Deforestation and forest Degradation in developing countries (REDD+) (see Chapter 6).

Increasingly, market-based mechanisms and private sector actors are being recognized as having a critical role to play. Market-based mechanisms such as Payment for Ecosystem Services (PES) have long been utilized to safeguard wider ecosystem services, including watershed health (Costanza 2020). More recently, Water Funds have been introduced as a vehicle to mobilize investments for water security through solutions grounded on nature-based infrastructure and sustainable management of watersheds. Companies that are deeply embedded in the natural environment through their supply chains, and that rely on these systems to supply water of suitable quantity and quality to produce their goods and services, also have an important role to play (Rudebeck 2019). Increasingly, companies are adopting water stewardship approaches and striving to invest in projects beyond their own operations to mitigate risk and safeguard access to water resources. Increasingly, efforts are being strengthened to mobilize capital directly from the financial services sector. For example, while overseas development assistance is still considered to have a critical role to play, it is often leveraged strategically to mobilize commercial capital through guarantees or blended finance approaches for example, which incentivize commercial capital to flow into bankable segments of projects. Green bonds, blue bonds, and sustainability bonds are other examples of innovative financing mechanisms that have gained substantial traction. Bonds are fixed-income financial instruments, where the proceeds will be used exclusively to finance or re-finance environmental or social projects. While no single source of financing will be enough, collaboration across sectors is the key to mobilize funding more widely. Moreover, while no vehicle can provide a silver bullet, they all have a role to play.

Critically, there is untapped potential to access international climate finance for water-related mitigation

measures. Currently, large sums are being committed at the international level to mitigate and adapt to climate change, but only a small fraction of these funds are being directed to water-related mitigation measures. There is an opportunity to tap into these funding sources and redirect funds for investments in water-related projects if such mitigation measures are integrated into the NDCs and other national and sectoral instruments. Most financing committed today, however, is mobilized at the national level; there is still a substantial need to mobilize additional financing for local projects, particularly in low-income countries.

3.4 Achieving climate mitigation through integrated and cross-sectoral approaches

Reviewing existing frameworks and instruments for climate; biodiversity; and land, water, and sustainable development makes it clear that the conceptual separation between the different issues creates a fragmented governance system. This fragmentation in turn creates barriers to identification and funding of more holistic governance approaches where leverage points are utilized to achieve win-win outcomes across the different issues. Moreover, because of the fragmentation of global water governance, there are also inherent fragmentations in water messaging, expertise, and funding, which means that water as an issue is typically not strongly advocated with 'one voice' in the same way as climate, or biodiversity and land, where efforts can assemble under one joint convention. In effect, coherent water messaging is often not featured in a prominent manner. This is of particular significance within climate discussions. While the role of water is acknowledged strongly for climate adaptation, the role of water for climate mitigation is not yet acknowledged to the extent needed to achieve mitigation targets. As demonstrated in Part II, this is a missed opportunity for climate mitigation because to meet climate mitigation targets, water must be mainstreamed into this process.

To better leverage the synergies that exist between climate mitigation and water, as well as between climate; biodiversity; and land, water, and sustainable development more broadly, it is necessary to understand and articulate the leverage points more clearly. For example, there is potential for strong synergies between the three Rio Conventions in LULUCF that can generate significant carbon benefits above and below ground, while also contributing to conservation and sustainable use of biodiversity, and reduction of land degradation and desertification (Cowie et al. 2007; IPCC 2019c). Sustainable management of water resources for forestry and agriculture at the landscape scale can further enhance these synergies, while also contributing to water and food security for local communities (Tengberg et al. 2021). Parts II and III of this report unpack and assess these leverage points in more detail, and demonstrate the value added to climate mitigation potential by holistic management through integrated approaches.

To facilitate integrated approaches and contribute to delivering climate mitigation, it is also critical to strengthen governance (Azizi et al. 2019; Tengberg et al. 2021). This can be achieved, at least in part, through a shift towards a polycentric governance system. Such a system, where different actors operate across a multitude of different scales and centres of power, is necessary because to perform well under conditions of rapid climate change, governance systems themselves must be integrated (coordinated across levels and sectors to enhance synergies and reduce trade-offs) and adaptive (able to respond to new knowledge gained during policy implementation) (Pahl-Wostl 2015). Polycentricity is thus an essential characteristic of integrated and adaptive governance and management systems (Ostrom 2010). Moreover, it has been argued that polycentric systems combine the distribution of power and authority with effective and efficient coordination, and balance bottom-up and top-down governance (Pahl-Wostl 2015).

Inherent to a polycentric system is a distributed centre of power, where different stakeholders dispersed across space and scales contribute to governance efforts. The inclusion of non-public actors in governance, which is a defining feature of the shift from govern*ment* to govern*ance* as a system of govern*ing*, not only contributes to polycentricity, but also creates innovative opportunities for cross-sectoral collaboration. Civil society actors and epistemic communities like non-governmental organizations (NGOs) and advocacy networks play an increasingly important role in policy-making in terms of agenda-setting, knowledge dissemination, and policy implementation (Haas 1992; 2008; Rasche and Gilbert 2012). Similarly, the private sector, including companies and the financial

services sector, now contributes extensively to shape environmental policies and deliver on their objectives (Biermann and Pattberg 2008). While companies have a long tradition of engaging with issues beyond core business activities (Fyke et al. 2016; Schwartz and Carroll 2008), efforts to mobilize the financial services sector and enable it to align financial flows with environmental objectives is a fairly new endeavour.

Explaining the growing inclusion of non-state actors, researchers point towards what is typically characterized as the 'governance gap': a growing aperture between the scale at which issues arise (global) and the space in which issues are managed (the nation-state) (Castells 2008). Faced with this gap, it is argued that the public sector suffers from a 'governance deficit': a decline in state capacity – or at least perceived capacity – to deal with complex environmental issues (Delmas and Young 2009; Falkner 2003;Hajer and Versteeg 2005). Part of this is perceived to be an 'implementation deficit': because of the mismatch between complex global environmental issues and availability of national resources, individual governments typically suffer a deficit of material capacity to address the issue at hand. Moreover, because of the disjunction between the need for globally coordinated approaches in supra-territorial spaces and national territorial self-determination, some also point to a 'participation deficit', where negotiated solutions are perceived to lack the appropriate level of stakeholder participation, and by extension democratic legitimacy (Scholte 2002). These gaps create ample opportunities to mobilize – and legitimize – the support and involvement of actors beyond conventional public departments. For instance, the arguments based on the implementation deficit are often drawn upon to rationalize the inclusion of actors from the business sector (Beisheim 2012; Brühl and Hofferberth 2013), and those pointing towards the participation deficit often turn to NGOs as the type of actor with the potential to close this gap, by 'giving voice' to those who would otherwise not be heard (Bernauer and Gampfer 2013; Dany 2012; Teegen et al. 2004). While collaboration across sectors is not without tensions, it is absolutely critical to address complex environmental challenges, such as climate mitigation.

With new types of actors involved, it naturally follows that new types of governance instruments are required. In addition to traditional treaty-based regimes, a range of other mechanisms have therefore emerged, including voluntary and market-based mechanisms. Critics suggest that the replacement of regulatory approaches with market-based and voluntary mechanisms could lead to outcomes that are not aligned with the public good (Brühl and Hofferberth 2013; Mert 2012). However, while there are instances where such critique is valid, it is vital to recognize that it is imperative that these actors become increasingly involved, and new types of mechanisms are required to incentivize involvement.

Interestingly, as the field of actors involved in national governance efforts becomes increasingly complex, it is also a natural consequence that governance becomes more polycentric. These different actors operate across a multitude of different scales and centres of power, from local NGOs to large multinational corporations or financial institutions spanning the Earth, where even national governance is operationalized across multiple levels.

3.5 Conclusions and future outlook

To deliver on climate mitigation at the scale and speed needed, water must be mainstreamed into the climate governance process. However, as this chapter demonstrates, water and climate mitigation are treated as separate issues, governed by different frameworks and instruments. The fragmented nature of global water governance also means that it is challenging to align water with mitigation efforts in a coherent manner. This is a missed opportunity for climate mitigation we cannot afford. At the broader level, this set-up, where interlinked issues such as climate, water, biodiversity, land, and sustainable development issues are conceptualized, governed, and financed separately, creates siloed approaches. By extension, it creates barriers to achieving climate mitigation as leverage points are not capitalized on, and risks are not accounted for. Integrated approaches are needed to overcome these barriers. To better leverage synergies, it is necessary to understand and articulate the potential win-wins more clearly (see Chapter 8) and strengthen governance structures to facilitate approaches that can capitalize on these synergies (Chapter 9).

The following chapters in Part II provide an overview of the mitigation potential of different sectors as they relate to water, collectively attesting that climate and water are linked inextricably, and that climate mitigation cannot succeed without accounting for water.

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