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The Untold Story of Water in Climate Adaptation

Part II: 15 Countries Speak

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How countries actually manage their commitments – and where policies, institutions, management tools, and finance in water resources governance can help



CLIMATE CHANGE

United Nations Framework Convention on Climate Change



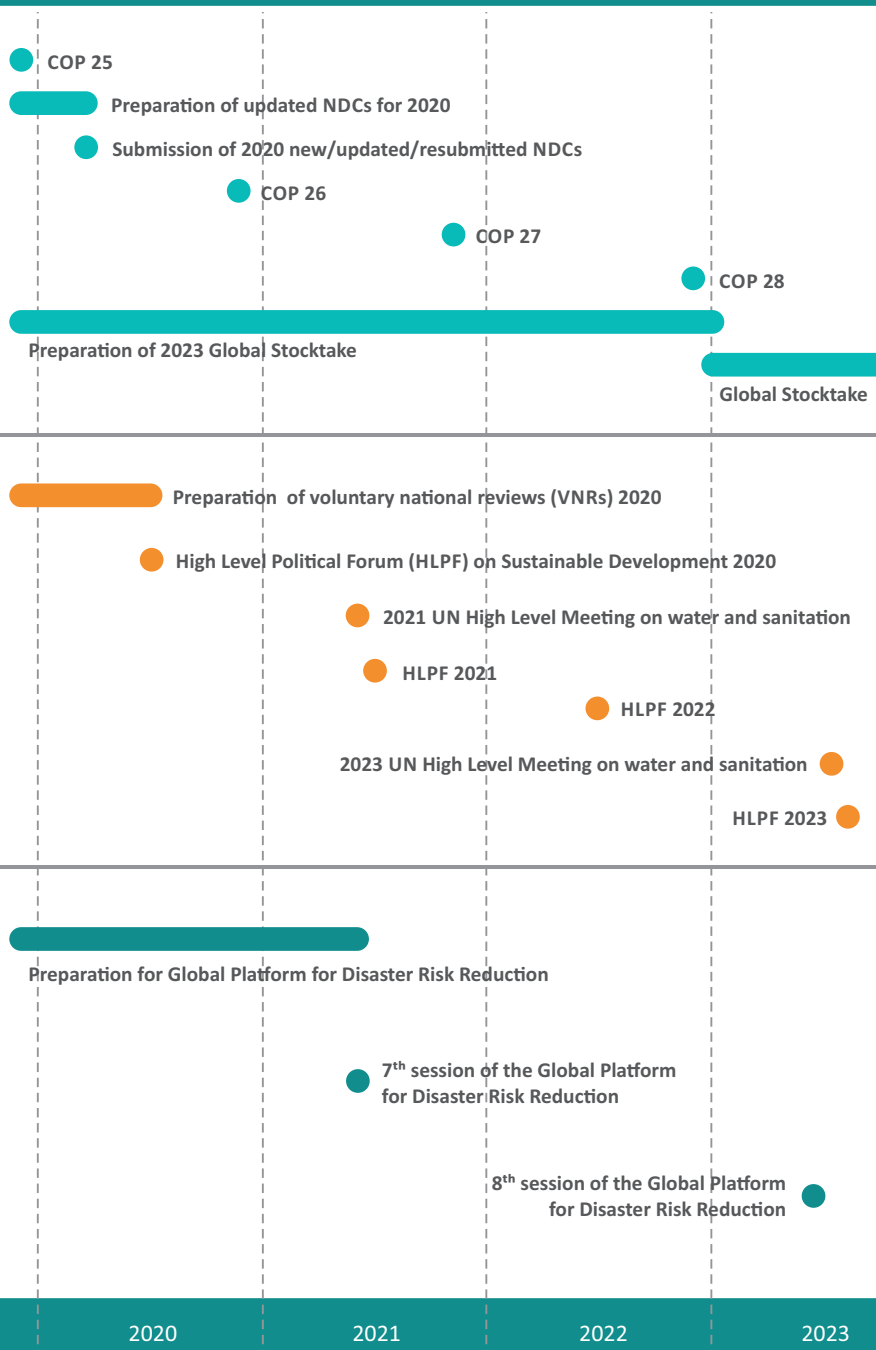
SUSTAINABLE DEVELOPMENT

2030 Agenda for Sustainable Development



DISASTER RISK REDUCTION

Sendai Framework for Disaster Risk Reduction



The Untold Story of Water in Climate Adaptation

Part II: 15 Countries Speak

Synthesis Report

Produced by the Global Water Partnership (GWP), in collaboration with and through analysis by the Overseas Development Institute (ODI)

About the Global Water Partnership

The Global Water Partnership (GWP) vision is for a water secure world. Our mission is to advance governance and management of water resources for sustainable and equitable development.

GWP is a multi-stakeholder action network and intergovernmental organisation dedicated to working with countries towards the equitable, sustainable, and efficient management of water resources. We comprise 3,000+ partner organisations in over 180 countries. Our Network of 65+ Country Water Partnerships and 13 Regional Water Partnerships convenes and brokers coordinated action by government and non-government actors. A long-time advocate for integrated water resources management, we draw on implementation experience at the local level and link it across our Network and to global development agendas.

About the Overseas Development Institute

The Overseas Development Institute (ODI) is an independent, global think tank, working for a sustainable and peaceful world in which every person thrives. We harness the power of evidence and ideas through research and partnership to confront challenges, develop solutions, and create change.

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Foreword

What untold stories? The stories of “getting things done”

How does one “*get it done*”? “*Delivering*” on all these commitments ...?

The myriad of timelines? Focal points? Committees? Coordination mechanisms? Reporting frameworks? Indicators? Financing sources? Contracts? Accountabilities?

The Paris Agreement’s commitments, the Sendai Framework, and the UN’s Agenda 2030 with its Sustainable Development Goals – in and of themselves and taken together, they have created movement among governments who may have otherwise found it difficult to fight bureaucratic inertia, political standstills, or silo-isation. They have also created massive new complexities for legislators and public sector agencies – even among the best and most willing – as they try to navigate their way to ensuring the right actions take place at the right time in the right way.

Translating commitments – and all that comes with them – into laws and policies, holding one’s institutions and governance mechanisms accountable for delivery, mobilising the management tools and the finance needed to turn the policies into changes on the ground – all this is hard enough as it is. Doing so across different sectors and agencies, policy frameworks, and timelines is where policy-making turns into hard work and – occasionally – into what may well be considered minor miracles.

Everyone involved in this work on the ground is looking for “connectors”, for mechanisms to coordinate systematically, to align, to create synergies and win-win solutions.

And yet the solution is right there: In front of our eyes, and it has always been there. Wherever public sector management focuses on how we use, allocate, and manage water – whether it’s too little, too much or too dirty – we see connections created and alignments emerge among Agenda 2030 commitments, Paris commitments, and Sendai commitments.

This analysis tells the story of 15 countries – and how they manage their commitments. We picked the countries because they are different – in their geographies, challenges, political structures, and commitments. In each of the countries, though, water resources management provides a framework for connecting the development agenda with the climate agenda. We did not find easy solutions anywhere – but they do exist, and many can be applied elsewhere.

Read the stories. Be inspired.

The day for excellence among public servants has come. The day for public servants who look at the bigger picture. Who are ready to step back. Ready to not care for the label that comes with an initiative, to neither fight for ‘their’ budget nor ‘their’ power – but for collaborative solutions towards shared commitments. To be mindful of the need for transparency and integrity in decision-making, to be persistent in bringing women into decision-making, to be open to creating space for youth, and to be courageous when what it takes is collaboration across national boundaries.



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Executive Secretary and CEO



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Acronyms

COP	Conference of the Parties
EU	European Union
GCF	Green Climate Fund
G-CREWS	Climate-Resilient Water Sector in Grenada
GHG	Greenhouse gas
GWP	Global Water Partnership
GWP-MED	Global Water Partnership Mediterranean
HLPF	High-Level Political Forum
IWRM	Integrated water resources management
MCC	Millennium Challenge Corporation
NAP	National Adaptation Plan
NDC	Nationally Determined Contribution
NGO	Non-governmental organisation
OSCE	Organization for Security and Co-operation in Europe
SAP	Strategic Action Program
SDG	Sustainable Development Goal
TDA	Transboundary Diagnostic Analysis
UNDP	United Nations Development Programme
UNECE	United Nations Economic Commission for Europe
UNEP	United Nations Environment Programme
UNFCCC	United Nations Framework Convention on Climate Change
VNR	Voluntary National Review
WACDEP	Water, Climate and Development Programme

Executive summary

Worldwide, countries work towards their commitments to address climate change and to pursue the Sustainable Development Goals (SDGs). Many are finding water to be at the heart of both climate change and development. On one hand, destructive impacts of climate change – such as more extreme and frequent floods and droughts – tend to translate through water to economic activities, livelihoods, and ecosystems. On the other, water is fundamental to life: it supports vital ecosystems and is central to productive activities that drive economic growth, thus underpinning sustainable development. And from a very pragmatic perspective: The ‘Water goal’ (SDG 6) – and more specifically the target to govern and manage water resources in integrated formats (SDG target 6.5) – offers countries significant opportunities to advance their broader development and climate agendas effectively, consistently across sectors, and with longer-term viability.

The Untold Story of Water in Climate Adaptation

- Reviews how water resources management currently contributes to climate resilience and sustainable development, assessing the extent to which the climate change and SDG agendas in 15 countries are able to harness water resources management for climate-resilient sustainable development.
- Highlights opportunities for simultaneously addressing climate resilience and sustainable development ambitions, indicating how integrated approaches to water resources management can help manage the interface between climate action and development action, to build climate resilience and advance the SDGs.

The Global Water Partnership (GWP) presented in 2018 an analysis of 80 countries’ Nationally Determined Contributions (NDCs) – revealing that, perhaps unsurprisingly, nine out of every ten countries prioritise action on water for adaptation in their NDCs. Countries recognise that addressing the impacts of climate change means working on water – but are they on the right track? Are they taking the most effective and efficient routes to managing water in ways that build resilience and achieve their development goals? Do they feel they have the required technical and institutional capabilities? Are they successfully managing the multiple overlying dynamics at the interface of water, climate resilience, and sustainable development? In short, are countries taking the *integrated management* approaches needed to bring the climate change agenda and their pursuit of multiple sustainable development goals together, noting that both heavily rely on the availability of water resources and their management? Looking to 2020, how do countries plan to raise their mitigation and adaptation commitments in the second round of NDCs – and what opportunities does water management offer for them to achieve these goals effectively and with long-term viability?

In looking for answers, this analysis – launched in 2019, a year before the finalisation of NDC reviews – looks in more depth at 15 countries (Figure ES1). Examining jointly countries’ water-related climate ambitions and their water-related development goals across the broader SDG spectrum – in the context of countries’ maturity in taking integrated approaches for water management – has generated often surprising and always interesting insights. It offers recommendations for four key stakeholder groups: national policy makers; national non-state actors such as civil society and business; development partners, including bilateral donors, multilateral institutions and the climate funds; and transboundary and regional organisations.

Figure ES1. Countries covered in this analysis

East and South Asia	Europe and Central Asia	Middle East and North Africa	Latin America and the Caribbean	Sub-Saharan Africa
Bangladesh China Indonesia	Kazakhstan North Macedonia Ukraine	Jordan Mauritania Tunisia	Chile Grenada Guatemala	Cameroon Ghana Kenya

Source: Authors

The analysis is based on one core premise – that sustainable development, climate resilience, and water security are interdependent. Water security is essential to address climate change impacts and advance sustainable development. Conversely, climate change and unsustainable development, individually and in combination, threaten water security. The central problem that this analysis addresses is that the linkages between climate resilience, sustainable development, and water security are not being sufficiently recognised, leveraged, and planned for.

To better understand why this is so, the analysis examines each of the 15 country contexts to assess if, why, and how far each country has – or has not – tackled the central problem across four dimensions: the enabling environment of plans and policies; the institutional framework for cross-sector coordination and participation; the instruments for informed decision-making and management; and the flows and architecture for financing. It also examines how transboundary aspects are addressed across each dimension.

The 15 countries selected provide geographical breadth and reflect different levels of maturity in taking integrated approaches to water resources management. The analysis is not a global appraisal, nor is it representative in a statistical sense. Rather, it examines the central problem as faced by each country within its own geographical, historical, and political context to shed light on the rationale behind specific decisions on sustainable development, climate action, and water management. By doing so, it attempts to identify opportunities presented by water resources management to build climate resilience and advance the SDGs, thereby offering each country entry points to overcome the central problem of under-recognition and under-leveraging of climate change, sustainable development, and water security linkages.

The country-specific insights – while not ‘generalisable’ – do offer lessons for other countries faced with similar situations:

1. Enabling environment solutions: Communities working on climate change, sustainable development, disaster risk reduction, and water can collaborate effectively where they identify and articulate the added value of specific water management actions. These actions can be included explicitly in key strategies – starting with the new or updated NDCs to be submitted in 2020.

In the 15 countries studied, opportunities for building resilience and advancing sustainable development by managing water in an integrated manner are often overlooked. Few, if any, of the countries explicitly make the connection in national or sectoral development and climate change strategies, and few demonstrate a deep understanding of how integrated approaches to water resources management can help in planning for uncertain water futures. This is the case even among countries that perceive that their water plans and policies provide a solid foundation for integrated approaches to managing water, as self-assessed under SDG indicator 6.5.1.

The countries' national development plans generally recognise managing climate change risks and improving water resources management as strategic priorities. But they do not always recognise how these priorities can support each other, and sustainable development more widely. The 15 countries' climate-specific strategies, such as NDCs and National Adaptation Plans (NAPs), generally feature actions aimed at enhancing water resources management. In five countries, the NAPs acknowledge the importance of managing water resources for mitigating climate risks across multiple sectors, not just 'water'. However, critical detail is often lacking. Actions that would ensure that water resources management contributes to climate change mitigation are generally overlooked in the countries' climate strategies. Where water features in mitigation actions, for example in relation to hydropower development, the impacts of climate change on water storage and river flows are rarely addressed.

Sectoral strategies, such as those for agriculture or energy, also fail to articulate opportunities to harness water resources management for wider ends. Such sectoral strategies lay a crucial foundation for achieving water-related SDGs, such as 'Zero hunger' (SDG 2) and 'Affordable and clean energy' (SDG 7). While they may recognise the threat of climate change via water, they are not charting a clear course to address them. Agriculture strategies are often limited to developing more reliable water supplies or enhancing water-use efficiency. And energy strategies that prioritise hydropower seldom address the climate change-induced uncertainties around quantity and timing of river flow. Some countries' strategies for managing water resources treat climate change in a surprisingly cursory way. Without more active collaboration among the water, climate change, disaster risk reduction, and development communities at national level, the second round of NDCs in 2020 risks missing significant opportunities for building climate resilience via water.

2. Institutional solutions: Strong political leadership is perhaps the most important 'mechanism' for governments as they strengthen or put in place platforms that coordinate actions across climate, water, and other sustainable development priorities.

In self-assessing their maturity in taking integrated approaches to manage water, countries generally highlight ineffective coordination and collaboration between water and other sectors working towards climate resilience and other SDG objectives. Countries identify this coordination failure as a persistent weakness and this analysis has not found compelling evidence for incentives set anywhere that would foster better collaboration. Other related weaknesses include a lack of basin approach and aquifer management, a lack of public and business consultation and engagement, and a lack of systematic attention to water-related gender considerations.

Where platforms or coordination mechanisms exist, there are differences in the level of senior government representation, and the extent to which stakeholders outside government are included.

The barriers to intersectoral coordination and cooperation are significant. Climate and water decision-makers are often overstretched, with little time to deliver on their core mandates, let alone participate in numerous cross-sectoral platforms. International frameworks, including the Paris Agreement, the 2030 Agenda, and the Sendai Framework, each with its separate process and reporting cycle, can add to that burden for national focal points. And, in the countries considered, socio-political crises can lead to paralysis or cycles of 'firefighting' rather than catalysing cooperation, even where droughts and floods contribute to those crises in the first place.

At the same time, there is evidence that political commitment and resources for cross-cutting agendas can be secured where the leadership sees political value in this. There are also examples that show how including a range of voices and perspectives in cross-sectoral dialogue can deliver better results. Finally, while the NDC process itself begins to contribute to cross-sectoral integration for climate action, linkages to national development planning need much more nurturing.

3. Management instruments: Countries and their development partners can strengthen climate and water data collection; build user-centred systems to process and communicate data for decision-support and early warning; and put in place and strengthen tools and systems to support evidence-based decision-making on water and climate across different sectors.

In assessing their maturity for taking integrated approaches to water resources management, this study of 15 countries uncovered gaps in monitoring practices and revealed a general dearth of decision-relevant data for water management. Climate change increases the need to address these gaps, because it amplifies hydrological variability and introduces new trade-offs between, for example, mitigation and adaptation; flood control, irrigation, and hydropower production; or upstream/downstream maladaptation.

Countries appear to be focusing on instruments that can help address certain aspects of resilience over others. Drought and flood early warning systems feature prominently in climate and sustainable development plans; these early warning systems are vital for enhancing *preparedness* to manage and cope with change and crises, and contribute to several SDG targets, especially disaster risk management (SDG 11.5). But there is little evidence of attention to water management instruments that build resilience in other ways, such as flexible basin-level water sharing arrangements that can enhance *adaptability*, by allowing decision-makers to evaluate trade-offs among different water uses in ways that ensure food security (SDG 2), energy (SDG 7), cities (SDG 11), and ecosystems (SDG 15). Neither is attention paid to the monitoring and management of groundwater, which provides an important supply 'buffer' against changing rainfall patterns.

Underlying these gaps are problems of data collection, processing, and management. Across the 15 countries, observation networks for climate and especially for water are often in a state of disrepair, with missing or damaged monitoring stations, or unreliable systems for transmitting observation data. This resonates with wider evidence of a continued need to improve core infrastructure for meteorological, hydrological, and hydrogeological monitoring.

However, while monitoring infrastructure can produce more comprehensive and reliable data, country experience suggests a bigger challenge is turning data into useable, decision-relevant information. In some of the 15 countries, the number of trained experts in hydro-meteorological offices is declining. Institutional fragmentation is making it harder to source information and get it to the right users. Political priorities can also shape what water-related information gets collected, as well as how it is used, potentially distorting evidence-based decision-making.

Given the inherent role of water in productive sectors such as energy, agriculture, and industry, alongside water's destructive potential via for example flood and drought, the 2020 NDCs would need a strong focus on data monitoring and sharing systems – covering hydro-met, geomorphological, economic, demographic, and institutional information – as well as subsequent decision support systems that utilise acquired data to manage trade-offs and harness potential synergies between climate action and development priorities.

4. Financing for enabling environments, institutions, and management instruments: Those working on climate, water, and other SDGs can engage more with ministries of finance to improve and open up the wider climate finance architecture. That means developing strategies, monitoring systems, and project pipelines for climate finance, in light of the linkages between the water resources management dimensions of climate adaptation and development, with appropriate balancing and sequencing of institutional and infrastructure development.

The countries' baseline self-assessment against SDG indicator 6.5.1 revealed that financing was the weakest dimension of all. Many of the 15 countries face major challenges with the mechanisms for, and sufficiency of, financing for managing water via integrated approaches, which is needed to achieve resilience and development objectives. Climate finance – particularly from the multilateral climate funds – presents new opportunities to address these challenges. However, the growing complexity of the global financing architecture means the different communities (climate change, sustainable development, disaster risk reduction, and water) need to work more closely together, as well as with ministries of finance. If they do not, there is a risk that financing for water resources management will not achieve value for money, especially where co-benefits across different SDGs are missed.

A key task is ensuring that all sources of finance are identified and used efficiently. Multilateral climate funds, especially the Green Climate Fund, are a focus for many of the 15 countries analysed. These funds currently represent a modest, if growing, proportion of climate finance: 0.4 percent of total climate finance, and 3 percent of the total from international bilateral, and multilateral contributors. However, the analysis suggests that there are other options for financing, which may be under-exploited or poorly coordinated. External development finance from bilateral donors and multilateral institutions is important, and in several countries a sizeable share of the commitments deemed to be 'climate-related' is going to water-focused activities (over 10 percent in nine of the countries, and over 30 percent in two countries). Domestic budgets can also play a role, and their importance is changing in many countries as the macroeconomic context shifts. Private financiers, by comparison, appear to play a modest role in financing either climate-resilient water resources management infrastructure or the institutional capacity required to manage water in an integrated way.

Given the diversity of funding and policy options, the nascent efforts in some of the countries to develop systems to track climate finance are particularly important and could be replicated and scaled. Water will need to be sufficiently reflected in such systems, and in related taxonomies of green and climate-related finance, for example through workable definitions of water-related climate resilience projects in different sectors.

In the absence of systematic climate finance tracking at country level, the available evidence only confirms the need for integrated and well-coordinated approaches for financing water, climate change, and other sustainable development objectives. Climate-related external development finance commitments for water already seem likely to be contributing towards other SDG priorities, for example when they are committed to activities involving agricultural water resources (SDG 2), hydropower (SDG 7), or disaster risk management (SDG 11). But, given the lack of integration at the level of strategies and institutions, there is a high risk of duplication and gaps in spending in support of overlapping objectives.

As well as monitoring and coordinating more effectively across different sources of finance, different communities can do more to collaborate on developing financing strategies, as well as specific project proposals and pipelines. Some of the 15 countries are attempting to develop general adaptation financing strategies and their water communities can do more to develop detailed, attractive water-related project proposals, which balance infrastructure with institutional investments for water management. Importantly, these efforts will be more effective and attractive

if they are aligned with and embedded within general climate finance strategies and investment plans. This again requires stronger collaboration across climate, water, and other SDG communities, and with ministries of finance.

Finally, in terms of investment opportunities, particular country examples highlight a few emerging models for climate-resilient water projects involving circular economy approaches and nature-based solutions. These could help unlock finance, for example by helping to put a value on water's contribution to climate resilience, mitigation, and other SDGs, or by tapping new revenue streams that could interest private investors.

5. Transboundary cooperation solutions: National governments and international organisations – particularly transboundary basin organisations – would want to join forces and assertively promote transboundary cooperation approaches, including in the 2020 update of NDCs. Transboundary cooperation is direly needed to reduce shared climatic risks and to maintain water sharing agreements, and both climate and development finance still need to be pushed to prioritise transboundary cooperation solutions to ensure that no maladaptive consequences manifest across borders.

Today's sustainable development and climate strategies of the 15 countries barely recognise the regional and transboundary reach of climate change impacts, and the potential for responding to these holistically through cooperation on water. This narrow approach overlooks the need for a connected response where countries share river basins, lakes, or aquifers and ignores how water can support climate resilience and sustainable development outcomes across subnational, national, and even continental boundaries. The need for transboundary approaches also arises in wider country neighbourhoods that are linked by shared climates, by migration, by regional power pools based on hydropower, or by food trade – all of which could be reshaped by the impacts of climate change on water.

Transboundary water management institutions play a crucial role in enhancing climate change adaptation across borders, and there are strong examples from the countries analysed. However, few of the countries have managed to put such agreements in place for a high proportion of their shared surface and groundwater resources. Where river basin organisations and agreements do not yet exist, there is evidence that climate change can provide a relatively apolitical catalyst for action. This is not to say that climate change initiatives in transboundary basins cannot be politicised – for example when they involve sharing information about 'sovereign' water resources. However, shared climate risks faced by countries can provide a compelling case for evidence-based dialogue among riparians, to find acceptable forms of cooperation – ranging from aligned but separate national initiatives, to national initiatives that consider transboundary benefits, to joint transboundary initiatives and further to fully regional programmes. The country examples also show that certain elements are needed to sustain and build commitment to transboundary cooperation on climate and water issues, such as combining work on policy and governance with implementation projects to provide tangible benefits, and bringing together stakeholders working at different levels (from local to transboundary) for exchange and dialogue.

As at the national level, specific management instruments being developed and applied in transboundary climate and water initiatives involving the 15 countries appear to support resilience by enhancing *preparedness*, for example transboundary-scale early warning and climate information systems. Less common are flexible transboundary water management agreements that allow water sharing to be adjusted if climatic conditions change – causing changes in precipitation patterns and in water demand in different ways across a basin.

Finally, there is the need to secure financing for transboundary water resources management initiatives for sustainable development and climate resilience. There are particular challenges here,

including dispersed legal mandates and responsibility for implementation, and the often-political question of how to distribute upstream or downstream benefits and commitments between multiple countries. It is therefore promising that several transboundary water and climate projects across the countries analysed have received support from the multilateral climate funds. However, there is much more that needs to be done to scale such projects. Project proponents need to undertake early preparation, involving careful diagnosis of the climate change impacts and benefits of a transboundary approach – common as well as differentiated for each participating country – and identifying the broadest possible range of finance sources from across participating countries and international partners to meet identified needs.

Summary

The analysis points to gaps and missed opportunities in the first round of NDCs, as well as in NAPs, and in broader sustainable development strategies. Weaknesses persist in not recognising or not leveraging inter-relationships between climate adaptation, water resources and linked SDGs. The importance of informed decision-making and planning cannot be overemphasised at the climate–water interface. Built as well as natural water infrastructure are at the heart of managing increasing variability, uncertainty, and extremes in the hydrological cycle that come with climate change, amidst the increasing and competing demands for and pressures on water imposed by development pressures. Decisions made today on water infrastructure will set a course for many years to come and poor decisions can lead to stranded assets and compromise actions that are essential to support climate-resilient sustainable development. Strong institutions and effective instruments for water management will be essential to support climate-resilient sustainable development but are not yet fully functional in the 15 countries considered. National policy makers face a bewildering array of financing options for climate-related water action and deeply ingrained barriers to connecting these with viable investment opportunities. Transboundary actions – which are essential for enhancing adaptation across shared water resources – are still in their infancy in many of the countries assessed. Systematic and ongoing stakeholder engagement – key at the climate–water interface – is happening almost everywhere, but huge gaps exist in gender inclusion. However, opportunities are there to be seized and in almost all of the countries there are examples of success on which to build. Scaling these up and out will only happen if the climate, sustainable development, disaster risk reduction, and water communities work together and do so more systematically than ever before. Specific recommendations for our four key audiences are summarised in Table ES1 below, and can be read in full in Section 6.

Table ES1. Summary of recommendations for the four key stakeholder groups

RECOMMENDATIONS FOR NATIONAL POLICY MAKERS	SPECIFIC STAKEHOLDERS
<ul style="list-style-type: none"> Ensure that the necessary water-related climate measures are included in national climate strategies – starting with the enhanced NDC in 2020; emphasise the need for integrated approaches that combine built and natural water infrastructure solutions supported by adequate institutions and management instruments 	NDC and NAP focal points, designated authorities to the climate funds
<ul style="list-style-type: none"> Identify water-related adaptation needs and turn NDC and NAP ambitions into concrete financing strategies, setting out multisectoral project proposals and pipelines 	NDC and NAP focal points, finance and planning ministries
<ul style="list-style-type: none"> Make a better case for integrated water resources management as an enabler for sustainable development and climate resilience across sectors, emphasising it as a means of securing long-term economic and livelihood gains in the face of mounting pressures from climate and other drivers of change 	Ministries of water
<ul style="list-style-type: none"> Collaborate to strengthen national frameworks for science-based climate information and prediction and plan for how this information will be incorporated into decision-making 	Ministries and wider communities responsible for climate and water
<ul style="list-style-type: none"> Develop fiscal frameworks and tracking mechanisms to improve the coordination and efficiency of climate-related spending, ensuring that water resources management is appropriately incorporated 	Ministries of finance, ministries of water, and other water sector stakeholders
<ul style="list-style-type: none"> Use a wider range of tools to direct more domestic and private investment to water and climate change adaptation, including financial policies and regulations, fiscal policy levers, and information instruments 	Ministries of finance, line ministries
<ul style="list-style-type: none"> Collaborate effectively so that decision-makers and stakeholders understand and tackle systemic barriers to fundable project pipelines in water and water-related sectors, including weak project preparation, low cost recovery, and political interference 	
<ul style="list-style-type: none"> Review the coordination and reporting requirements for the 2030 Agenda for Sustainable Development, the Paris Agreement, and the Sendai Framework for Disaster Risk Reduction, and ensure they are aligned with existing government processes and national development objectives wherever possible 	Ministries and focal points responsible for climate change, water, and other cross-cutting issues
<ul style="list-style-type: none"> Leverage the opportunities offered by water to ensure equitable climate resilience and inclusive sustainable development, through an approach that is gender mainstreamed and gender-transformative (achieving gender equality through required changes in structures, relations, and agency in and among institutions and individuals) 	Ministries and focal points responsible for climate change, water and other line ministries, gender and other cross-cutting issues, programme/project developers, ministries of finance and planning
<ul style="list-style-type: none"> Ensure that transboundary dimensions of water are incorporated into NDC and NAP preparation and implementation – to leverage economies of scale and to avoid unintended maladaptive consequences across borders 	NDC and NAP focal points, programme/project developers
RECOMMENDATIONS FOR NATIONAL NON-STATE ACTORS	SPECIFIC STAKEHOLDERS
<ul style="list-style-type: none"> Act as intermediaries at the interface between climate/water science and the application of integrated water resources management to bridge the divide between the science-driven metrics of climate and the needs of end-users in making informed decisions about how to plan for changing and increasingly uncertain water futures 	Civil society organisations

The Untold Story of Water in Climate Adaptation. Part II: 15 Countries Speak

<ul style="list-style-type: none"> Advocate for greater representation in intersectoral dialogue and coordination in water and climate 	Civil society organisations, businesses, water user organisations
<ul style="list-style-type: none"> Engage more with efforts to track climate finance and build evidence to advocate for more and better finance for water-related climate action across sectors 	Civil society and research organisations in the water sector
<ul style="list-style-type: none"> Explore the business opportunities to support nature-based solutions and circular economy approaches 	Businesses
<ul style="list-style-type: none"> Generate better evidence to show how water management and infrastructure are essential in building economy-wide resilience, with benefits for growth and jobs 	Research organisations
<ul style="list-style-type: none"> Help broker transboundary and regional cooperation on climate change and build and share evidence of the benefits 	Civil society organisations and networks, particularly those that are well integrated into country and regional processes
RECOMMENDATIONS FOR DEVELOPMENT PARTNERS	SPECIFIC STAKEHOLDERS
<ul style="list-style-type: none"> Provide capacity-building support to improve countries' understanding of their existing water resources and how climate change will affect these in combination with other drivers of change 	Development partners
<ul style="list-style-type: none"> Help build in-country capacity to advance a project idea through the different stages of the project cycle, including packaging for blended finance 	
<ul style="list-style-type: none"> Establish a global learning network for driving, funding, and strengthening regional and transboundary cooperation on water for climate adaptation and mitigation in ways that support country SDG targets 	
<ul style="list-style-type: none"> Offer funding and technical support for institutional strengthening on water and climate, in ways that support countries to develop their own fit-for-purpose approaches 	
<ul style="list-style-type: none"> Coordinate more effectively at all levels and develop mechanisms to mediate across the global policy frameworks 	
<ul style="list-style-type: none"> Help bridge knowledge and advocacy gaps 	Development partners, civil society, and research organisations
<ul style="list-style-type: none"> Introduce a more explicit focus on climate change into monitoring assessments of integrated water resources management 	Agencies responsible for monitoring integrated water resources management
RECOMMENDATIONS FOR TRANSBOUNDARY AND REGIONAL ORGANISATIONS	SPECIFIC STAKEHOLDERS
<ul style="list-style-type: none"> Identify and secure funding for transboundary and regional cooperation on water, climate, and disasters, and support implementation of funded initiatives 	Transboundary river basin organisations, regional economic communities
<ul style="list-style-type: none"> Encourage dialogue around climate change between countries that lack operational transboundary basin agreements 	Regional development banks, regional economic communities
<ul style="list-style-type: none"> Help strengthen cooperation between countries and across sectors and stakeholders by providing a platform for networking, and for sharing data, information, and good practices 	Transboundary river basin organisations, regional economic communities, regional development banks

1 Introduction

1.1 Objective

Worldwide, countries are accelerating the implementation of their global commitments to address climate change and pursue the Sustainable Development Goals (SDGs). What can countries do – better, faster, with broader ownership, and for longer-lasting impact – to build real resilience and advance their development priorities? This analysis offers insights into how smartly connecting the ‘Water goal’ (SDG 6), and in particular SDG target 6.5, which describes how to govern and manage water resources (Box 1), with both the broader 2030 Agenda and the climate resilience agenda, can help achieve all three more effectively. **Looking in depth at 15 countries (see Map on next page) across four continents, this analysis:**

- **Reviews how water resources management currently contributes to climate resilience and sustainable development**, assessing the extent to which the climate change and SDG agendas in 15 countries – expressed through their Nationally Determined Contributions (NDCs) and commitments relating to the SDGs – are able to harness water resources management for climate-resilient sustainable development.
- **Highlights opportunities for simultaneously addressing climate resilience and sustainable development ambitions**, indicating how integrated approaches to water resources management can help manage the interface between climate action and development action, to build climate resilience and advance the SDGs.

Box 1. SDG target 6.5

“By 2030, implement integrated water resources management at all levels, including through transboundary cooperation as appropriate.”

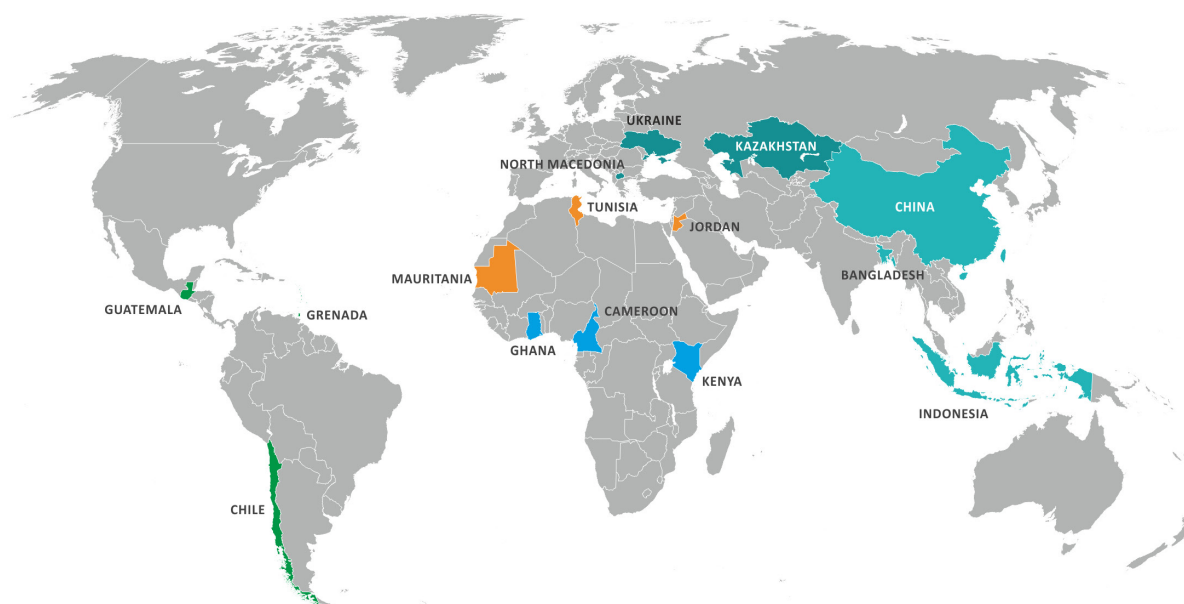
SDG target 6.5 is measured via two indicators:

- Indicator 6.5.1: Degree of integrated water resources management implementation (0-100)
- Indicator 6.5.2: Proportion of transboundary basin area with an operational arrangement for water cooperation.

Source: <https://sustainabledevelopment.un.org/sdg6>

This report offers recommendations for four key stakeholder groups: national policy makers (including focal points for the SDGs and the United Nations Framework Convention on Climate Change (UNFCCC), designated authorities for the climate funds, and ministers of water, environment, planning, and finance); other national stakeholders such as civil society and business; development partners, including bilateral donors, multilateral institutions and the climate funds; and transboundary and regional organisations. The recommendations delineate specific actions that each of the four stakeholder groups should consider taking urgently, to enable countries to better achieve the ambitions around NDCs and the SDGs by working along the water cycle, starting with the next round of NDCs, due in 2020 (Box 2).

Separate country-specific policy briefs present an analysis of whether and how each individual country pursues climate resilience goals and the SDGs in a connected and integrated way, and whether enough attention is being paid to water governance and management mechanisms that would create the required connections. These policy briefs contain recommendations to specific stakeholder groups at the individual country level.

Map. Countries evaluated in this analysis

East and South Asia	Europe and Central Asia	Middle East and North Africa	Latin America and the Caribbean	Sub-Saharan Africa
Bangladesh China Indonesia	Kazakhstan North Macedonia Ukraine	Jordan Mauritania Tunisia	Chile Grenada Guatemala	Cameroon Ghana Kenya

1.2 Rationale and context

Countries recognise that addressing the impacts of climate change means working on water. The UNFCCC's 2016 analysis of 137 country NDCs showed that countries identify water-related hazards such as floods and droughts as their main climate risks, and also identify water and water-related sectors as their priority adaptation actions (UNFCCC, 2016). GWP's 2018 analysis of 80 country NDCs revealed that 9 out of every 10 countries prioritise action on water for adaptation in their NDCs, and the nature of these actions varies widely, including water infrastructure (such as building new water infrastructure, protecting existing infrastructure, or conserving wetlands to harness benefits of natural infrastructure), supporting institutions and governance frameworks (pricing water, establishing and enforcing regulations), and information and decision-support systems (early warning systems for flood and drought).

Water is at the heart of climate change and sustainable development, and as such connects the two. On one hand, many of the destructive impacts of climate change, for example more extreme and frequent floods or droughts, are channelled to economic activities, livelihoods, and ecosystems through water. On the other, water is fundamental to life: it supports vital ecosystems and is central to productive activities driving economic growth, thus underpinning sustainable development. Water management can offer countries significant opportunity to build resilience and advance on their development priorities, but integrated approaches are needed (Box 3).

Box 2. Entry points in global processes for raising ambition on using integrated water resources management in support of climate resilience, sustainable development, and disaster risk reduction outcomes

The United Nations Framework Convention on Climate Change (UNFCCC), the 2030 Agenda for Sustainable Development, and the Sendai Framework for Disaster Risk Reduction 2015–2030 all have their respective global processes and platforms, and monitoring and reporting mechanisms. These provide entry points for dialogue and action to make best use of integrated water resources management (IWRM) in increasing ambition to advance countries' commitments on climate action, sustainable development, and disaster risk reduction (Figure 1).

The first window of opportunity ahead is the submission of new or updated NDCs in 2020. Under the Paris Agreement of the UNFCCC, parties are invited to submit these by Spring 2020, 9 to 12 months ahead of the 26th session of the Conference of the Parties (COP 26) in November 2020.¹ These new or updated NDCs will then need to be implemented.

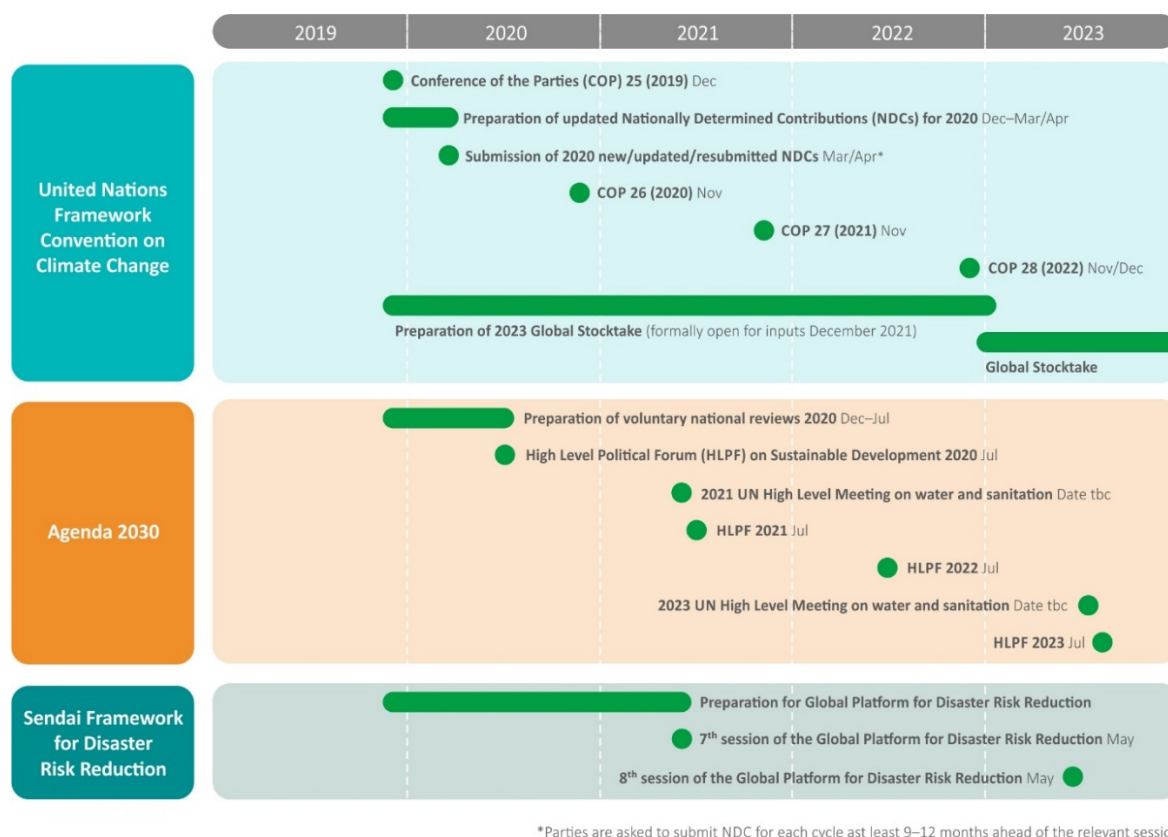
Beyond COP 26, there are other windows of opportunity. For climate, these include subsequent COPs and, in 2023, the Global Stocktake, the five-yearly process established under the Paris Agreement for taking stock of “collective progress toward achieving the purpose of the Agreement and its long-term goals”. This, in turn, is meant to amplify ambition in the next round of NDCs in 2025. The foundations for the 2023 Global Stocktake were laid by the progress made on the guidelines for implementing the Agreement at COP 24 in Katowice, Poland.

For the 2030 Agenda for Sustainable Development, relevant processes include the annual High-Level Political Forum (HLPF), for which countries are encouraged to prepare and present Voluntary National Reviews (VNRs) of progress towards the SDGs. Among the countries considered in the present analysis, North Macedonia, Ukraine, Bangladesh, and Jordan will present their VNRs at HLPF 2020 – several others have presented VNRs at previous HLPFs and others will do so in future years.

Meanwhile, for the Sendai Framework there are biennial sessions of the Global Platform for Disaster Risk Reduction and corresponding Global Assessment Reports on Disaster Risk Reduction – in 2021 and 2023.

Intersecting with this global pathway of preparation, assessments, and events, countries will have their own domestic policy agendas, reflecting their economic planning and political cycles.

Figure 1. Entry points to ensure water flows through and supports the climate, sustainable development, and disaster risk reduction frameworks



*Parties are asked to submit NDC for each cycle at least 9–12 months ahead of the relevant session

Source: Authors, based on review of <https://unfccc.int/>, <https://sustainabledevelopment.un.org/> and <https://www.unisdr.org/>

Development and climate outcomes can be more effectively and efficiently achieved if we allow water, climate change, and SDG activities to reinforce one another. Water is a crucial connector across the 17 SDGs of the 2030 Agenda for Sustainable Development and across the commitments under the Paris Agreement of the UNFCCC, in particular the adaptation commitments. Water also connects these two global policy frameworks with the targets and action priorities of the Sendai Framework for Disaster Risk Reduction 2015–2030.

Each of these three global policy frameworks makes the case for using integrated water resources management approaches to advance climate-resilient sustainable development. The 2030 Agenda explicitly measures the “degree of integrated water resources management implementation” as SDG indicator 6.5.1. In other cases, the recognition is more implicit. The Sendai Framework, for example, recognises the importance of “integrated environmental and natural resource management approaches that incorporate disaster risk reduction”. While the Paris Agreement does not refer specifically to water, it does recognise climate change adaptation can include “building the resilience of socioeconomic and ecological systems, including through... sustainable management of natural resources” (Box 4).

Box 3. Water security, climate resilience, sustainable development: the need for integrated approaches to water management

Building climate resilience through improved water security requires investment in the three Is: better and more accessible *information*, stronger and more adaptable *institutions*, and natural and man-made *infrastructure* to store, transport, and treat water. These needs will manifest at all levels – in projects, communities, nations, river basins, and globally. Balancing and sequencing a mix of ‘soft’ (institutional and capacity) and ‘hard’ (infrastructure) investment responses will be complex, requiring information, consultation, and adaptive management.

Furthermore, tough trade-offs are likely to be unavoidable in balancing equity, environmental, and economic priorities with sustainable development priorities. Finding the right mix of the three Is (information, institutions, and infrastructure) to achieve the desired balance between the three Es (equity, environment, and economics), will be the ‘art of adaptation’ in water management.

Integrated water resources management is an approach for managing these dynamics and a thread that can run through the different levels of engagement. The approach represents global good practice of water management: it recognises the holistic nature of the water cycle and the importance of managing trade-offs within it; it emphasises the importance of effective institutions; and it is inherently adaptive.

Source: GWP, 2009

Nation states are in the drivers’ seats: it is up to them to choose to operationalise the ‘water as a connector’ principle as they align their plans across policy frameworks and their separate accountability mechanisms – including how they ensure that national focal points, working groups, and planning, financing, monitoring, and reporting tools ‘talk to each other’. Ample anecdotal evidence, as well as the case study evidence presented here, indicates that countries struggle with creating these vital connections. This report aims to provide examples of how and where investments and initiatives towards integrated water resources management can strengthen synchronisation between the implementation of the three global policy frameworks, leading to greater overall impact.

Countries are also monitoring their own progress towards “implementing integrated water resources management” along four major ‘dimensions’ (enabling environment, institutions and participation, management instruments, and financing; UNEP, 2018a). This already points to improvements that will directly support all sustainable development goals that rely on or impact upon water, including, importantly, efforts to achieve climate resilience.

This report builds on *The Untold Story of Water and Climate Adaptation* (GWP, 2018), an analysis that connected 80 countries’ water-relevant NDCs with their baseline self-assessments of the degree to which they had implemented integrated water resources management (SDG indicator 6.5.1). It identified numerous opportunities to sharpen and improve on the water-relevant commitments made in the first series of NDCs. For example, among many countries in which integrated water resources management practices were poor to begin with, the focus in NDCs was primarily on building climate-resilient water infrastructure; the NDCs did not indicate that countries were seeing an opportunity to also invest in building institutions and governance mechanisms necessary for managing competing demands on water, as prescribed by SDG indicator 6.5.1. The adaptation-related components of NDCs do draw attention to water-related actions, but little consideration has so far been given to co-benefits or trade-offs relating to climate change mitigation; and while

statements of funding requirements reflect countries' ambition to act, concrete and fundable investment portfolios are not yet available in many cases.

In building on the 2018 analysis, this present report looks at 15 countries' decisions and plans on sustainable development and climate change in more depth. The intention is not to perform statistical analysis or cross-country comparisons, but to provide important insights on a country-by-country basis on why and how priorities and plans are set. The country-level perspective allows a much broader range of issues and processes to be covered besides the NDCs, together with a broader set of SDGs, which include but also go beyond SDG 6.

1.3 Approach

The approach to this current analysis is based, fundamentally, on a conceptual framework and four corresponding, high-level dimensions. These are grounded in a core premise, as well as a central problem – noting that a problem-driven approach to analysis can help to derive policy-relevant findings and inform a locally grounded, adaptive response (Harris, 2013; Andrews et al., 2017).

Core premise: Integrated approaches to managing water for sustainable development, resilience, and disaster risk reduction can generate greater impact than current, fragmented approaches. At the heart of this premise is the understanding that sustainable development, climate resilience, and water security are entirely interdependent: water security is essential to address climate change impacts and advance sustainable development; in turn climate change and unsustainable development, individually and in combination, challenge water security. Fully delivering on climate resilience objectives and sustainable development targets therefore requires an integrated approach, and integrated water resources management can contribute a great deal.

Whether a country is managing its water resources in an integrated way is assessed as part of the ongoing monitoring for SDG indicator 6.5.1. This monitoring uses a questionnaire based on the four 'dimensions' of integrated water resources management (UNEP, 2018a; see Box 5), which is completed by countries and submitted to the United Nations Environment Programme (UNEP). Data drawn from these assessments is available and can be used as a starting point for the analysis of climate change measures and related activities across the SDGs – the four dimensions therefore frame the conceptual framework (the outer circle in Figure 3). Assessing each dimension in turn also allows for a more systematic analysis of underlying barriers and enablers. The headline questions guiding the analysis – which are listed in Box 6 and addressed in the following sections – therefore also follow the four dimensions.

Box 4. How water connects the Paris Agreement, the 2030 Agenda, and the Sendai Framework

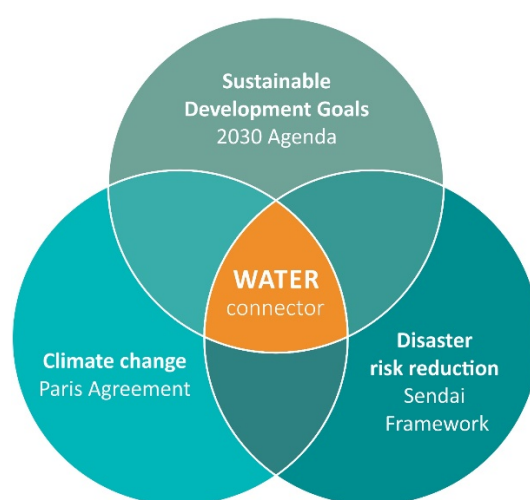
Three frameworks, a common urgency. Each of the global policy frameworks is discrete, with its own targets and mechanisms. Yet in a number of areas, including where water resources are concerned, there is a high degree of overlap (Figure 2), with the potential for duplication of effort or even the risk that actions aligned with one framework may undermine progress in another. Connecting planning and action across the three frameworks is urgently needed: barely 10 years remain until 2030 and the window to limit global warming to 'safe' levels is rapidly closing. In the meantime, climatic changes heighten the frequency, intensity, and unpredictability of floods, storms, droughts, and other hydro-meteorological events, which account for almost 90 percent of major natural disasters in the past decade (UN-Water, 2019) and highlight the need to take a water management lens in reducing the risk of disasters.

Water as a climate and sustainable development connector. Many of the impacts of climate change are 'felt' through water. Water is a fundamental human right, a human as much as an economic necessity, and the lifeblood of vital ecosystems. Water also provides its own spatial dimension to climate and sustainable development outcomes, linking across national (or

subnational) boundaries. Many responses to climate change therefore require taking a river basin- or aquifer-wide perspective (e.g. water-sharing arrangements that can adapt to changing flow regimes). Some need a sub-continental, continental, or even cross-continental approach, for instance early warning systems, sovereign insurance pools for floods and droughts, and schemes to address the knock-on effects on migration and food security.

Integrated water resources management for a holistic and effective response. Integrated water resources management offers practical mechanisms for coordinating across sustainable development trade-offs and for tapping into co-benefits within a changing climate. As well as the approach's orientation to basins (rivers, lakes, and aquifers) – the scale at which many hydrological impacts of climate change will play out – these include an emphasis on effective institutions to manage conflict between water-related activities and interests; engagement with all sectors that use, impact, or are impacted upon by water; and adaptability to changes in the climate and other aspects of our ecological, societal, and economic systems (GWP, 2009).

Figure 2. Role of water as a connector between the Paris Agreement, the 2030 Agenda, and the Sendai Framework



Source: UN-Water 2019

The following more detailed look at three themes illustrates how water acts as a connector across the frameworks.

Agriculture: While agriculture is relevant to several SDGs, SDG 2 ('Zero hunger') has a particular focus on food and farming. Looking first at NDCs under the Paris Agreement, most activities related to SDG 2 that are described in countries current NDCs align with the fourth target: Ensure *sustainable agriculture systems for climate change* (SDG target 2.4), with relevant specific climate actions including climate-smart agriculture and improving livestock resilience (Dzebo et al., 2019). In both cases, good water *management* approaches and systems are crucial, for example productive and rational water allocation and use systems for irrigation, and effective hydro-meteorological monitoring and early warning on drought risk. The Sendai Framework meanwhile underscores the importance of integrating disaster risk assessment into rural development planning and management of areas prone to droughts and flooding, placing at least an implicit emphasis on integrated drought and flood management, which is a crucial part of wider integrated water resources management.²

Energy: SDG 7 ('Affordable and clean energy') has as its first target to "increase substantially the share of renewable energy in the global energy mix". Within the climate framework it is unsurprising that NDCs frequently specify actions that can contribute to this goal given that they

have a strong mitigation focus and set out how countries plan to reduce their national emissions. In terms of renewable energy sources included in NDC actions, hydropower and bioenergy are the most frequently mentioned after solar (Dzebo et al., 2019). Both of these mitigation strategies depend on water – to power turbines and sustain growth of biomass, respectively – and pursuit of either to provide lower-carbon energy may have implications for other uses and users of water, increasing the need for an integrated approach to manage trade-offs across the climate-food-water-energy ‘nexus’. The Sendai Framework does not make a direct link to water-related energy considerations.

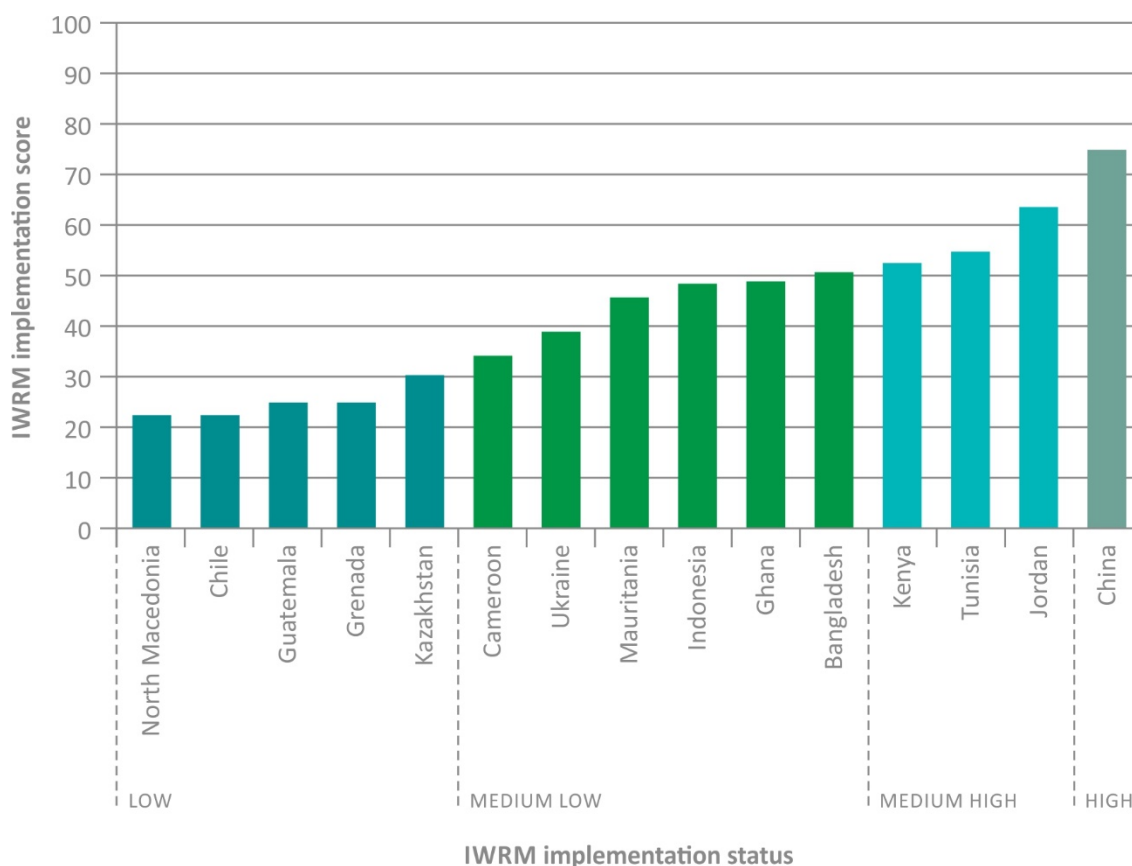
Cities and communities: SDG 11 (‘Sustainable cities and communities’) includes a target for disaster risk reduction that specifically highlights water-related disasters (SDG target 11.5). Integrated approaches to managing water entail a wide range of disaster risk reduction approaches, from informing land use planning with flood data (GWP, 2009) to strengthening multi-hazard early warning systems. On the climate side, many NDCs include climate actions that closely correspond to this SDG, such as the development of early warning systems (Dzebo et al., 2019). The Sendai Framework has a dedicated target that aligns closely, although it is not urban focused and does not mention water-related disasters specifically – namely, to “Substantially increase the availability of and access to multi-hazard early warning systems and disaster risk information and assessments to people by 2030”. The Sendai Framework also stresses the importance of regional early warning mechanisms, implicitly recognising the cross-border nature of natural hazards such as droughts and floods.

Central problem: The linkages between climate resilience, sustainable development, and water security are not being sufficiently recognised or addressed. Weak integration in country approaches to address climate change risks and advance on the SDGs – via water management – forgoes multiple opportunities to build resilience and advance on sustainable development, creates risks of maladaptation³, and threatens to undermine sustainable development gains (inner circle in Figure 4). The recognition that other socioeconomic trends matter hugely for water security is obvious, but tend to be forgotten when adopting a climate lens. Recent research on risk-informed development reaffirms the need to understand interactions between multiple threats rather than tackling them in isolation (Opitz-Stapleton et al., 2019).

Box 5. Getting the basics right: Which countries have a solid foundation for managing water resources under a changing climate?

Assessing their own progress in implementing integrated water resources management approaches can give countries an initial indication of whether their governance and management of water is good enough to help them to work towards achieving the water-related SDGs amid climatic changes and socioeconomic pressures. The baseline implementation scores derived from SDG indicator 6.5.1 assessment (Figure 3),⁴ and from more detailed sub-scores for each composite ‘dimension’ (enabling environment, institutions and participation, management instruments, and financing) provide the starting point for the country-specific analyses in this report.

Two caveats should be noted. Firstly, the baseline SDG indicator 6.5.1 questionnaire looks at policies and plans, institutions, management tools, and financing – but is ‘blind’ towards the incentives or pressures that require them to be in place and functional. For example, climate change is mentioned only in passing.⁵ Secondly, only 6 out of the 15 countries confirmed to have completed the questionnaires as part of a facilitated, multi-stakeholder exercise; answers to the others could have been largely based on public sector ‘expert judgement’.

Figure 3. Implementing integrated water resources management (IWRM) approaches – SDG indicator 6.5.1 baseline scores

Source: UNEP (2018a)

Water is relevant to a vast number of goals across the breadth of the 2030 Agenda; however, to provide focus in each country, the country's top one or two water-related SDGs (besides SDG 6) were selected and included in this analysis (Table 1). Selection was based on country priorities, as expressed in national sustainable development plans and climate strategies, and with reference to the Stockholm Environment Institute and German Development Institute's database on SDG-NDC connections⁶. For all questions, water-related impacts of climate change and responses to these at both the national and the transboundary/regional levels were considered in each of the 15 countries.

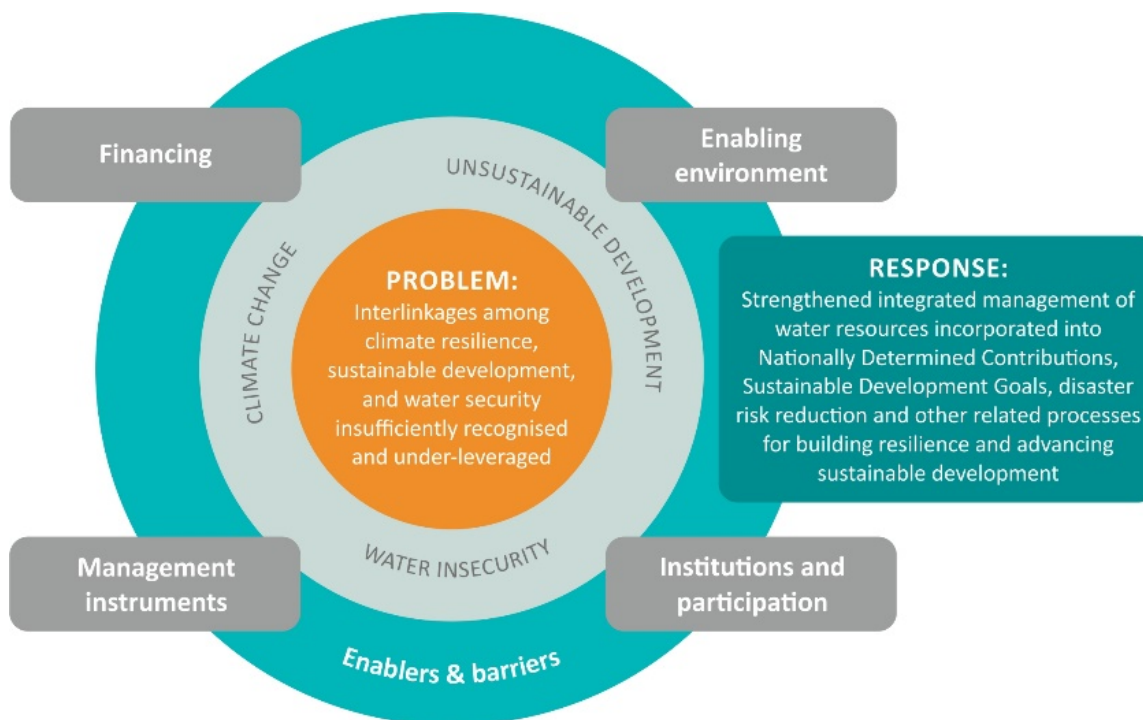
The 15 countries were selected to provide geographical breadth, covering four continents, and to reflect different levels of maturity in taking integrated approaches to water resources management. Other more practical criteria were also applied, including counterpart availability. Data were gathered through in-depth desk-based reviews and key informant interviews, to understand sociopolitical dynamics to deepen the analysis and to sense-check findings. Interviews targeted decision-makers within government departments responsible for climate and/or water where possible; in some cases, interviewees were also part of academia or civil society.

The methodology used has some obvious limitations, including the limited number of cases from which to distil examples and opportunities, and the reliance on remote, desk-based data collection and a limited number of interviewees per country. The methodology deliberately emphasised understanding country-specific decisions as opposed to trying to create comparability among the 15 countries; questions applied in the literature review and key informant interviews were generally

open-ended, with a focus on following country-relevant leads rather than undertaking a check-box exercise to derive the same information in each country context. This approach was critical to understanding each country's experiences in its specific context; the individual country policy briefs show the valuable insights that have emerged, which may in turn be relevant beyond that specific country. We present an overview of relevant findings and interesting insights in this synthesis report.

Box 6. Conceptual framework and the four dimensions guiding this analysis

Figure 4. Conceptual framework



Source: Authors

Enabling environment: What do key policy statements say about the integration of water across climate and sustainable development agendas? In each country, we looked at NDCs and a range of other climate strategies, including National Adaptation Plans (NAPs), national communications, and biennial update reports to the UNFCCC; national sustainable development strategies; water strategies; and strategies for one or two other water-related SDG domains prioritised by the country (Table 1). This provides an initial, high-level view of how significantly water is recognised as a climate and sustainable development connector.

Institutions and participation: Are the responsible institutions able to manage the impacts of climate change on water resources and other water-related SDGs, as defined by the SDG framework, in a coordinated manner and with the involvement of all relevant stakeholders? Here, we reviewed the mechanisms for cooperation and coordination on climate change between institutions responsible for water and other SDG areas; available perspectives on how these mechanisms function; and what has enabled or prevented cooperation and coordination in practice.

Management instruments: Are management decisions for water and other related SDGs being guided by the evidence on the impact of climate change on water? We focused on understanding the extent of climate and water data collection, its conversion into usable

information, and its actual use by different stakeholders (in the climate, water, and other SDG domains), with an emphasis on understanding how evidence is applied in specific management instruments to make decisions – including at transboundary or regional level. Those management instruments ranged from planning and budgeting systems, to systems that allocate water and incentivise its proper use, to early warning systems that reduce the impact of water-related hazards. Again, questions looked at what has enabled and what has prevented evidence-based decision-making in practice.

Financing: Are the countries ready to finance water-related climate action across SDG sectors?

Finally, we examined how climate finance is flowing from different sources to investments in enhanced institutional capacity for water management and water infrastructure development, including in support of the selected SDGs in each country, and the factors enabling or preventing that flow. A range of sources, including multilateral climate funds, bilateral donors, domestic budgets, and private sources, were considered where data were available.

Table 1. Water-related Sustainable Development Goals prioritised by each country and included in this analysis

	2 – Zero hunger	7 – Affordable and clean energy	9 – Industry, innovation, and infrastructure	11 – Sustainable cities and communities	14 – Life below water
Bangladesh (BGD)	x				
Cameroon (CMR)	x		x		
Chile (CHL)		x		x	
China (CHN)				x	
Ghana (GHN)	x	x			
Grenada (GRD)					x
Guatemala (GTM)	x	x			
Indonesia (IDN)				x	
Jordan (JOR)				x	
Kazakhstan (KAZ)	x				
Kenya (KEN)	x			x	
Mauritania (MRT)	x				
Republic of North Macedonia (MKD)	x	x			
Tunisia (TUN)	x				
Ukraine (UKR)	x	x			

Source: Authors

The report comprises five further sections: sections 2–5 present a synthesis of the main findings of this work, responding to the four guiding questions that correspond to the four dimensions of progress on integrated water resources management outlined in SDG indicator 6.5.1. Section 6 offers recommendations to four targeted audiences: national policy makers; other national stakeholders such as civil society and business; donors, including bilateral and multilateral institutions and the climate funds; and transboundary and regional organisations.

2 Enabling environment

Guiding question: What do key policy statements say about the integration of water across climate and sustainable development agendas?

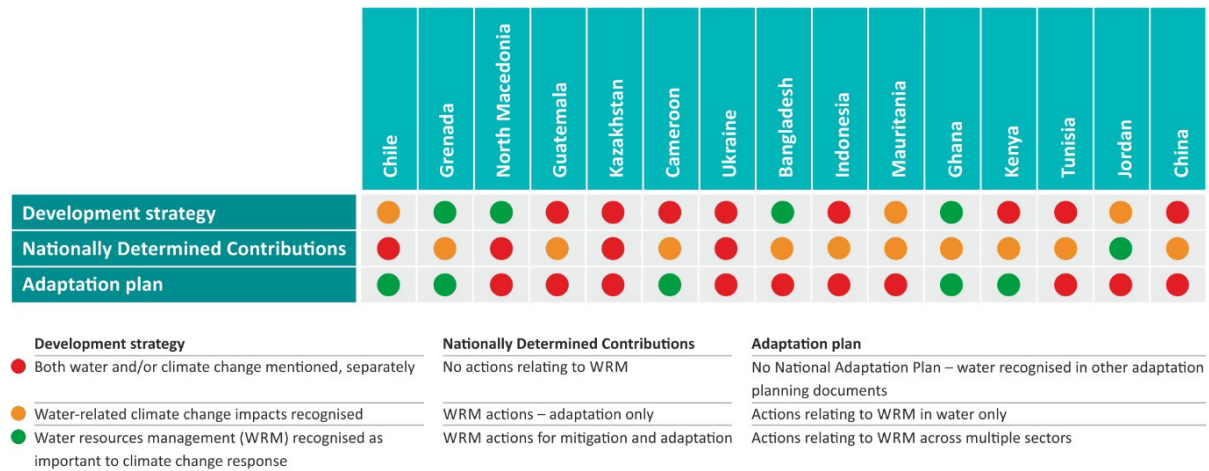
Synopsis: Integrated water resources management can help to address trade-offs and harness synergies across the SDGs, including those relating to climate action (UNEP, 2018a). Yet countries may miss opportunities to set out an ambition and, more importantly, clear pathways to use integrated water resources management purposefully in their national, climate, and sector strategies. Countries may not make an explicit connection between water resources management, climate, and the SDGs in their strategies, nor demonstrate a deep understanding of how integrated water resources management can help in planning for a future increasingly affected by water variability and extremes. Critically, the regional and transboundary impacts of climate change, and the potential for responding to these through cooperation on water, is barely recognised in the strategies of the 15 countries.

Key message: For a stronger *enabling environment*, communities working on climate change, sustainable development, disaster risk reduction, and water can collaborate better to identify and articulate specific water management actions that can support sustainable development and climate resilience. These can then be included explicitly in key strategies – starting with the new or updated NDCs to be submitted by Spring 2020. These actions can be at national or subnational level but should also include efforts to enhance cooperation on water resources management, and/or related areas such as drought and flood management, at the level of transboundary basins or regional country neighbourhoods.

2.1 Countries recognise the importance of water in their strategies for sustainable development and climate change – but often superficially

How water and climate change are framed within national sustainable development plans and climate strategies, such as NDCs and National Adaptation Plans (NAPs), matters insofar as it indicates how senior-level leadership perceives the relevance of water to supporting sustainable development and climate resilience. The relevant strategies examined for each country generally mention water but few do so in a way that explicitly recognises the interdependency of climate resilience, sustainable development, and water security. There are some examples that imply an understanding of how integrated approaches to water resources management can support sustainable development in the face of climate change. For example, both Ghana and Grenada: (i) frame water resources management as crucial to managing climate change impacts in their national sustainable development strategies; (ii) include specific water resources management adaptation actions in their NDCs; and (iii) mention water resources management (or aspects of it) as important for adaptation across multiple sectors in their NAPs (Figure 5).

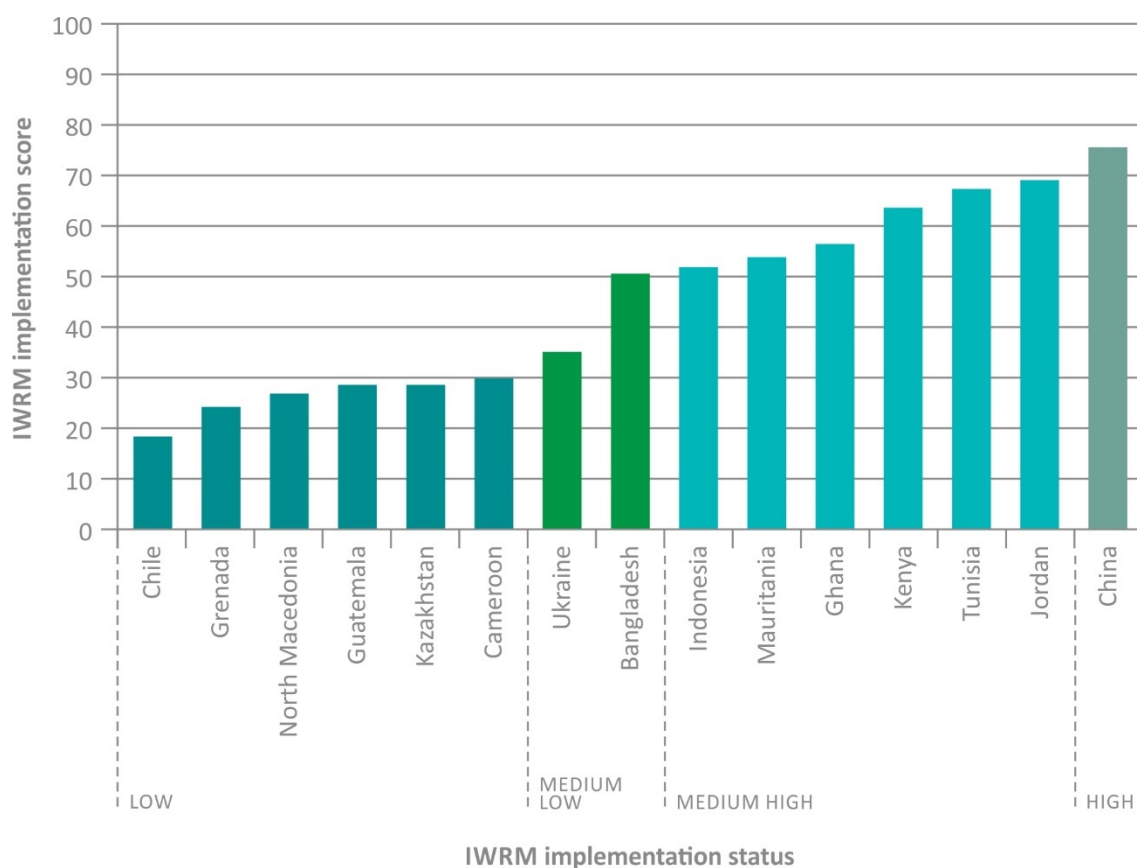
Figure 5. How water's importance for climate adaptation features in national sustainable development strategies, NDCs, and climate change adaptation strategy



Source: Authors' analysis

Countries' self-assessed maturity in implementing integrated approaches to water resources management (SDG indicator 6.5.1) provides an additional lens on this finding. Across all 172 countries that completed the self-assessment in 2017, around half identified they had reached at least a medium-high level of implementation (UNEP, 2018a). In line with this broader trend, 7 of the 15 countries studied rated their progress on this area as medium-high or high (Figure 6). As per the SDG indicator 6.5.1 baseline questionnaire for this dimension, these scores tended to indicate that a country has done things like enacting specific policies for water resources management, and established river basin management commissions, and transboundary management agreements.

However, while these countries indicate they have a reasonably strong enabling environment for integrated water resources management, they are generally not articulating a strong role for this approach in contributing to their sustainable development and climate strategies' objectives (red or amber circles in Figure 5). Ghana again provides a seemingly positive example: it has strengthened its plans and policies for water resources management with an SDG indicator 6.5.1 baseline score of 56/100 on the enabling environment (medium-high). It also appears to have been able to build on this foundation – as noted, it has incorporated integrated water resources management approaches into its climate and sustainable development strategy in a more meaningful way. Countries that claim a higher level of integrated water resources management implementation but do not explicitly harness this in their sustainable development and climate strategy may be missing untapped opportunities. Grenada, meanwhile, self-scores low for the enabling environment dimension of SDG indicator 6.5.1, but this has not prevented it from prioritising water resources management in its sustainable development and climate strategies. Countries like Grenada are already stepping up implementation of integrated water resources management to ensure it supports their ambitions for climate-resilient sustainable development – both the National Water Policy and 'IWRM Roadmap' are now being revised to address climate change more thoroughly.

Figure 6. SDG indicator 6.5.1 baseline scores for 'Enabling environment'

Source: Data from UNEP (2018a)

2.2 Climate strategies are beginning to see the value of water resources management in resolving climate and development trade-offs but there is little detail on needed institutional measures; water's potential for climate change mitigation is a blind spot

Unsurprisingly, water resources management is a common feature within strategies (NDCs and NAPs) for climate action – 76 of the 80 countries (95 percent) whose NDCs were analysed for the first report in this series (GWP, 2018) include specific actions associated with water resources management in their Paris Agreement commitments. This is also the case for 11 of the 15 countries studied in more depth in this report, and their NAPs and other adaptation strategies give similar prominence to water. Five of the 15 countries' NAPs explicitly acknowledge the importance of water-related actions to manage climate change impacts across multiple sectors (Figure 5). This is positive insofar as it implies that the climate change adaptation community in these countries is beginning to recognise, at least implicitly, the benefits of water for managing cross-sectoral trade-offs and tapping into synergies. Cameroon, for example, includes a dedicated sectoral water resources and sanitation services project in its NAP and in its NDC – with a wide range of institutional and infrastructure measures – but also features water in programmes for agriculture and industry, as well as in a cross-cutting programme on hydro-meteorological data (Republic of Cameroon, 2015a, b).

Opportunities for water-related mitigation are less recognised. Jordan is unique among the countries studied for including water-related actions in its NDC which can contribute clearly to climate change mitigation – focusing on energy efficiency and use of renewable energy sources in its water sector. There are various ways in which water resources management can contribute to climate change mitigation. In addition to the water sector's own carbon footprint, water availability is essential to various potentially lower-emission energy options, such as hydropower and biofuels. Water also

plays a crucial role in carbon pools and sinks such as wetlands. However, these linkages appear not to be being made in the countries' NDCs. Where they are, an integrated water resources management perspective is missing, meaning trade-offs may be missed. A blind spot among several of the countries appears to be an emphasis on hydropower development without explicit consideration of how climate change will affect water availability in rivers and reservoirs (Box 7).

Box 7. The reciprocal relationship between water and climate change mitigation is being overlooked

There is a reciprocal relationship between water and climate change mitigation (UN-Water, 2019). On the one hand, conventional approaches to water management contribute to greenhouse gas (GHG) emissions. On the other, various climate change mitigation strategies aimed at reducing GHG emissions in other sectors, such as energy, depend on water resources, and their viability may be jeopardised by water-related impacts of climate change. On both counts, an integrated approach to water management can help decision-makers to consider trade-offs and spot synergies, including those associated with reducing GHG emissions. However, the water-mitigation relationship is generally being overlooked in the climate and sustainable development strategies of the countries considered.

Looking at reducing emissions from water management, key strategies include:

- *Decarbonising water and wastewater treatment and distribution.* Integrated approaches that aim to reduce water wastage can also reduce the associated energy wastage, and therefore GHG emissions where energy is generated from fossil fuels. Examples include leakage reduction and metering in potable water supply networks, and precision irrigation in agriculture. Renewable energy can also be deployed in water treatment, pumping, and heating – from solar water pumps and heaters, to turbines placed within water distribution systems for energy recovery (UN-Water, 2019). Some of the largest mitigation benefits are likely to be obtained in wastewater systems: globally, wastewater treatment consumes nearly 3 percent of electricity and contributes approximately 1.6 percent of GHG emissions. Estimates suggest that alternative treatment pathways (allowing, for example, for energy to be recovered from gases such as methane) could make wastewater treatment a globally significant contributor of negative emissions (Lu et al., 2018). Of the 15 countries considered, Jordan appears to be the only one that, in its NDC, explicitly identifies actions of this kind among its climate change mitigation measures.
- *Natural solutions for carbon capture and storage.* Wetlands play a crucial role in capturing and storing global CO₂. Peatlands, which comprise peat soils and the wetland habitat on their surface, cover only approximately 3 percent of the globe, but store three times the carbon of the world's forests (UN-Water, 2019). Once drained, for example for agriculture or fuel, peatlands lose the waterlogged conditions required for peat formation and the associated capture and storage of carbon (IUCN, 2017). The soils of mangrove forests, meanwhile, can sequester three to four times as much carbon as terrestrial equivalents (UN-Water, 2019). Several of the countries' NDCs and other climate strategies pick up on the importance of protecting wetlands and mangroves for climate change adaptation. Mauritania's NDC, for example, calls for the rehabilitation and integrated and sustainable management of wetlands "against the effects of climate change" (Islamic Republic of Mauritania, 2015, p.10). However, none of the NDCs reviewed appears to recognise the associated co-benefits for climate change mitigation.
- *Water management for climate-smart agriculture.* Agriculture has been a major factor in peatland loss (IUCN, 2017), but integrated approaches to water management could also help reduce emissions directly within agriculture. In addition to energy efficiency and the decarbonisation of energy for pumping in irrigation as discussed above, rice production systems are a key area for action. Techniques such as alternate wetting and drying could

help to reduce the associated methane emissions (around a sixth of the global total) although more research is needed to understand the potential of such techniques (FAO, 2017). None of the agriculture strategies reviewed appeared to pick up on the importance of integrated water resources management to reduce emissions from the agriculture sector.

Turning to the potential for an integrated approach to water management to support climate change mitigation strategies in other sectors, the most obvious area of concern is energy production. Here, low-carbon but water-dependent forms of energy are mentioned in the countries' strategies, particularly hydropower. However, these do not pick up on the threats associated with climate change, particularly around the timing and volumes of water flows. Small-scale and large-scale hydropower, for instance, features as part of the mitigation measures in North Macedonia's 2015 NDC. Hydropower already accounts for one-third of generation capacity in North Macedonia, and is a focus of planned expansion in lower-carbon energy (Republic of North Macedonia 2018). However, North Macedonia's hydropower is vulnerable to climate change impacts such as reduced precipitation and erosion (USAID, 2018) – yet these vulnerabilities are not explicitly considered in its NDC, nor in Its Strategies for Energy Development (2010–2030) or Utilisation of Renewable Energy Sources (2010–2020) (Republic of North Macedonia, 2010a, b, 2015). The 3rd National Communication to the UNFCCC briefly mentions a need for adaptation measures for hydropower (Republic of North Macedonia, 2014). Such adaptation measures would typically include policies or institutional interventions for managing water-related extremes, or could involve the application of techniques for risk screening at project design stage (Ray and Brown, 2015; Mendoza et al., 2018). North Macedonia has a new Energy Strategy to 2040 under development, which could present an opportunity to address this gap.

Most of the 80 countries covered in the previous study on water in the NDCs (GWP, 2018) prioritised institution building for water management in their NDCs. The NDCs of the 15 countries in this analysis follow this pattern, and their adaptation strategies are similar. However, the detail is usually lacking on what water management institutions for climate-resilient sustainable development would actually look like, with little mention of the kind of management approach and specific instruments needed to handle trade-offs under dynamic hydrological conditions. Grenada's NAP is one of the more promising examples in terms of mainstreaming water resources management for enhanced climate resilience, and a new programme supported by the Green Climate Fund is looking to carry the NAP's intention forward into implementation (Box 8).

Box 8. Grenada's National Adaptation Plan: prioritising the institutional mechanisms for managing water resources under climate change

Grenada's NAP has "Establishment of a climate responsive water governance structure", as one of 12 goals. The related programme of action includes numerous specific institutional measures: updating the National Water Policy (2007) to take account of climate change; developing watershed and water resource master plans; upgrading the national water information system; developing water balances for each major watershed; and developing and revising water tariffs and pollution charges, among others. To be truly climate responsive, plans and management instruments will need to retain flexibility in the face of multiple drivers of change, and be based on local needs and capabilities rather than conforming to externally imposed reform blueprints. For some countries, creating this flexibility has been a challenge when mainstreaming integrated water resources management approaches (GWP, 2016). It is promising then, that Grenada's NAP statements on water resources planning recognise other drivers – including population growth

and urbanisation – besides climate change, and that there is an ambition to continuously revise water balances, calculating them monthly and yearly (Government of Grenada, 2017).

In 2018 Grenada secured a US\$48 million grant from the Green Climate Fund for the G-CREWS project (Climate-Resilient Water Sector in Grenada, 2018–2024). G-CREWS includes parallel investments in water governance and engagement with users to strengthen their adaptive capacity – including establishment of a Water Resources Management Unit as a central body responsible for holistic management of water, as envisaged under the NAP.

2.3 Strategies relating to particular SDGs are also missing the opportunity to harness water resources management – including those for energy, agriculture, cities, and even water

As noted in Box 7, North Macedonia’s strategy for renewable energy features hydropower but does not appear to recognise or address the potential trade-offs involved in investing in power generation that is potentially lower carbon but vulnerable to water-related climate change impacts. This example speaks to the ‘Energy’ SDG (SDG 7), and in particular the target on increasing the share of renewable energy in the global energy mix (target 7.2). More generally, several of the countries’ sectoral strategies relevant to other SDGs make a general acknowledgement of the importance of (integrated) water resources management to support their objectives, but again tend not to convey a detailed understanding of the specific measures and management approaches required.

For example, considering the SDG most closely related to agriculture – ‘Zero hunger’ (SDG 2) – farming and food systems are highly vulnerable to water-related climate change impacts. In the countries in which SDG 2 was selected as a priority SDG for analysis, agriculture strategies generally acknowledged water-related climate change impacts. However, there still appears to be a default presumption that measures to develop more reliable supplies (e.g. ‘irrigate’) or enhance efficiency (e.g. ‘irrigate better’) will be enough to adapt to climate change. Some exceptions exist. For example, in Tunisia, over a decade ago the 2007 National Agriculture and Ecosystems Adaptation Strategy identified the establishment of tradeable water rights as a potential adaptation strategy (Ministère de l’Agriculture et des Ressources Hydrauliques and GTZ, 2007). Nevertheless, this does not appear to have been carried forward and is not visible in more recent climate strategies. Tunisia’s NDC and 2019 National Communication focus on water efficiency, for example drip irrigation, and on conservation agriculture in the agriculture sector. The NDC’s water resources adaptation strategies meanwhile focus on developing non-conventional water resources through water transfers, desalination, and managed aquifer recharge (Republic of Tunisia, 2015, 2019). These will no doubt form part of the solution, but without reform of the underlying architecture for water allocation, the incentives for more efficient use will be insufficient or even inconsequential, and freshwater ecosystems will face a disproportionate risk from droughts. Such reforms are rarely straightforward, and can be challenged by the political economy in a country or sector. In Tunisia, this includes the importance of cereal crops for food security and the resulting water allocation priority and subsidies given to cereal farmers (Mellah, 2018).

Many other sectors and SDGs are of course vulnerable to climate change impacts, and often the response requires action from others besides national government entities. The SDG for ‘Sustainable cities and communities’ (SDG 11) for example, will require action by city and metropolitan regional authorities, perhaps even more so than by national ministries. But city strategies, where reviewed, exhibit similar gaps to the national energy or agriculture strategies. In Chile, for example, the Metropolitan Region of Santiago recognises the threat posed by climate change in its Regional Development Strategy 2012–2021 and describes the need to promote the sustainable and strategic use of water. Around seven million people, mainly in Santiago city, live in the Maipo River basin and depend on the El Yeso reservoir, which climate change projections suggest will dramatically reduce

in volume (Government of Chile, 2016). However, there is a gap in the Regional Development Strategy between general policy statements and the detail needed for delivery and accountability: corresponding indicators in the Strategy are incomplete and lack target values (GIZ, 2017). Chile's Government has, however, committed to learn from its experience with drought. Its lawmakers voted to set up a commission to investigate handling of drought and associated issues of climate change in September 2019. This indicates that parliamentarians can play an important role in creating the enabling environment, providing high-level oversight and accountability as well as political commitment. This example also points to the need for multi-level in-country coordination towards meeting the various national water- and climate-related targets, harnessing city-, province- or state-level contributions.

Turning back to the SDG for 'Clean water and sanitation' (SDG 6), Mauritania's National Strategy for Sustainable Access to Water and Sanitation (SNADEA) 2016, includes an assessment of the climate vulnerability of both ground and surface waters, and its specific programmes for integrated water resources management and water supply and sanitation place strong emphasis on supporting climate change adaptation. It also explicitly maps the contribution of the plan to a number of SDGs.

Despite such positive examples, however, among the countries reviewed, analysis of climate risks and response options are often surprisingly cursory in water strategies – although examples also suggest this might be changing with growing awareness of the scale of the climate change challenge and its urgency. Grenada's IWRM Roadmap, for example, acknowledges that "The impacts of climate change... cannot be underestimated and constitute an additional threat to water security," but lacks detailed consideration of the impact of climate change or of responses to specific threats (Government of Grenada, 2007). On the plus side, these gaps appear to be increasingly recognised in Grenada, with the NAP setting out various measures which would improve the integration of climate change into water sector policy, strategy, and management (Box 8). The IWRM Roadmap, which was never formally adopted by the Government, is also now being revisited to better incorporate climate change. Meanwhile, in Ghana, where Management Boards have been established and integrated water resources management plans developed in a majority of river basins (UNEP, 2018b), attention to climate change is increasing as these plans are revised, for example in the Densu and White Volta Basins.⁷

2.4 Development and climate strategies from the countries generally overlook the water-related climate change impacts that they share with their neighbours, and the potential for cooperative solutions

A further critical gap in the countries' strategies is that the potential for transboundary and regional responses to climate change through water are rarely mentioned. This overlooks the critical international dimension to water's role as a climate and sustainable development connector. Where countries share river basins, lakes or aquifers, the need for regional cooperation is an obvious necessity, complementing local and national-level action to address the threats to sustainable development outcomes posed by climate change. Similarly, such cooperation is needed in wider country neighbourhoods that are linked by shared climates or by the flows of people, energy, and food that will be reshaped by water-related impacts of climate change. In such situations, joining up across countries is the only meaningful way to address or even prevent adverse climate change impacts, such as through transboundary cooperation in drought or flood management. A handful of countries among the 15 seem to have recognised the opportunities and challenges that this presents, at least at high level:

- **Bangladesh's** Seventh Five Year Plan (2016–2020) highlights dependence on upper riparian countries for meaningful and comprehensive water resources development, making an explicit link to current water extremes although not in the context of the impacts of climate

change. However, NDC and other climate change relevant policy documents do not appear to speak to the need for transboundary cooperation on water.

- **Cameroon's** long-term national development strategy, Vision 2035, includes promoting regional projects in Niger and Lake Chad basins as a priority for its Phase II (2020–2027) as part of its efforts to “Intensify the fight against climate change.” The NAP acknowledges transboundary organisations in the Niger and Chad basins but does not frame specific transboundary water management responses to climate change, and the NDC does not appear to mention transboundary water issues at all.
- **Kenya's** Third Medium-Term Plan (2018–2022) as part of the Kenya Vision 2030 mentions negotiations and review and implementation of existing frameworks on transboundary waters, but makes no link to climate change. Cross-border adaptation initiatives are mentioned under the climate change thematic area, and Kenya's NAP includes a medium-term sub-action to enhance collaboration of transboundary water resource management, making it the only country of the 15 where a key climate strategy specifically outlines an action involving transboundary cooperation.
- **Mauritania's** *Stratégie de Croissance Accélérée et de Prospérité Partagée*, 2016–2030 recognises the importance of the Senegal River and Senegal River Basin Development Organization (OMVS) in relation to regional energy integration, fisheries, and waterways, but not in relation to the need to adapt to or mitigate climate change specifically. The NDC and National Adaptation Programme of Action (NAPA) similarly mention the Senegal river but do not explicitly detail actions involving transboundary cooperation.

These examples provide a starting point, but as shown in Table 2, there is a much wider range of proven measures, mechanisms, and formats for transboundary and regional cooperation, that the water community has developed, and which climate change and broader sustainable development initiatives can harness.

Table 2. Complementarity of water-related actions at national and regional/transboundary levels to build resilience

Level of required actions				
			National	Regional
Water management systems	Information systems	Data monitoring and sharing systems	Data collection, verification, quality control; use of shared information for preparedness to flood, drought; Data dissemination and sharing with relevant sectors, local stakeholders, and regional entities; Harmonisation of national practices with regional protocol	Agreement on data collection and sharing protocol; Regional platform/mechanisms available for exchange
		Decision-support information systems and early warning systems	Provision of data for calibration. Use of analytical tools for preparedness and robustness and development projects; National preparedness plans and information dissemination schemes are developed or harmonised; National plans are informed by basin-wide models and jointly developed tools	Joint development of modelling and analytical tools; Forums for dialogue that use tools for development prioritisation and planning; Early warning systems implemented, information disseminated to national or local constituents
	Institutional systems	Flexible policy and legal instruments	National law enforcement, policy implementation; Agreement and execution of management actions	Regional policy implementation; Agreement on climate-informed water/benefit sharing, abstraction limits, storage and release protocols, other regional protocol
		Institutionally and financially sustainable water resource organisations	Sub-basin organisations manage local processes, carry out sub-basin level management functions; National structures coordinate, allocate and develop plans among sectors and ministries; Carry out information and investment functions and communicate with stakeholders for accountability purposes	Agreement on organisation mandate; Capacity building within organisations; Financial sustainability measures in place; Working partnerships with national governments, other regional bodies established
	Infrastructure systems	Basin-scale, resilience-targeted, investment planning	Develop national plans for water management and development; Tailor and prioritise investments to local needs and norms; Coordination of national project prioritisation and planning with regional agreements and processes	Basin-wide dialogue to jointly prioritise interests, evaluate cross-border and cross-sector trade-offs, agreement on regional investment plans that ensure system preparedness, robustness, redundancy and adaptability; Regional resource mobilisation
		Robust infrastructure investment implementation	Prepare and implement national investments in collaboration with regional counterparts to share risk, optimise benefits; Operate national infrastructure sustainably, in coordination with other users; Endeavor to restore and maintain ecosystems services and natural infrastructure; Target preparation studies to ensure robustness, adaptability to a changing climate; Carry out stakeholder consultations to ensure optimisation of benefits, minimisation of impacts	Transboundary coordination in investment planning, implementation and operation; Prepare, operate, restore joint-infrastructure investments; Enable optimal operation of investments in the region

Source: World Bank (2017a)

3 Institutions and participation

Guiding question: Are the responsible institutions able to manage the impacts of climate change on water resources and other water-related SDGs in a coordinated manner and with the involvement of all relevant stakeholders?

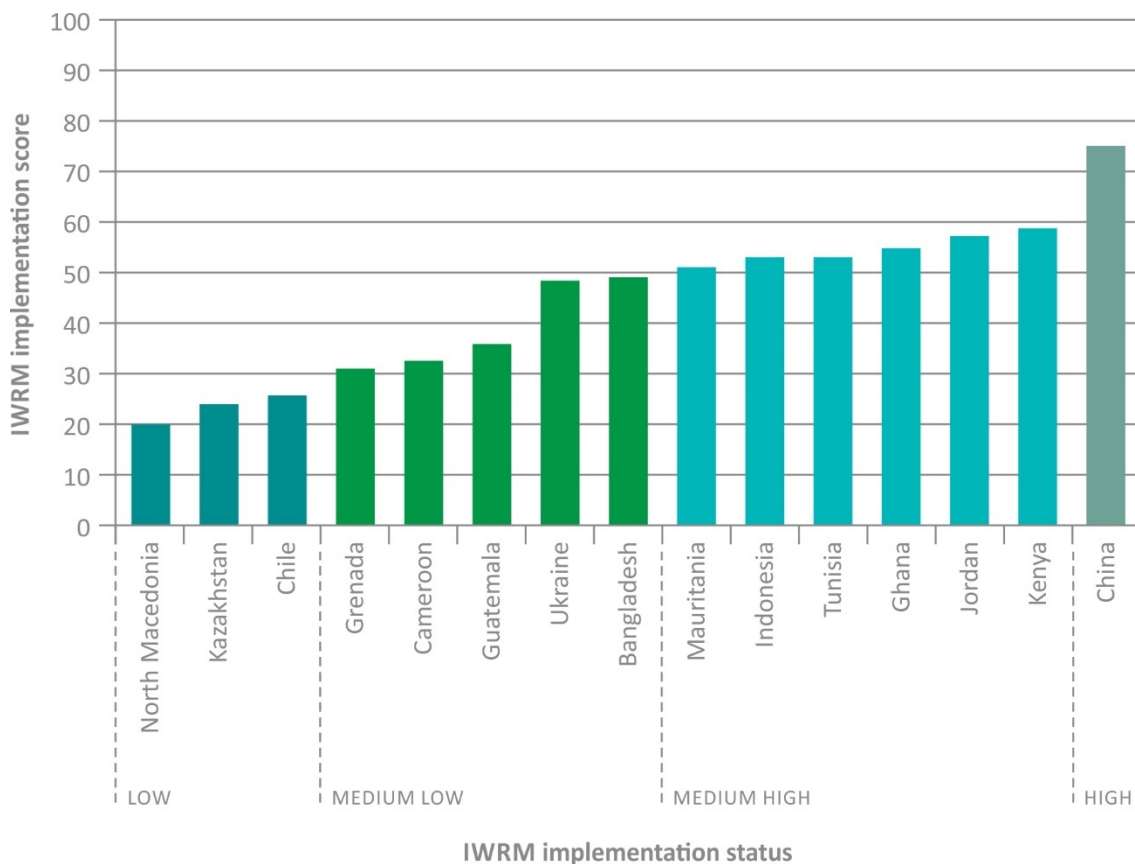
Synopsis: Many of the 15 countries in this analysis already have coordination platforms or other mechanisms for climate change, water, and sustainable development. Diverse approaches suggest that these countries are trying to find an appropriate institutional configuration for their context, which sets the right incentives. However, in many cases they appear not to be working effectively at present. The barriers to intersectoral coordination and cooperation are significant, including competing priorities for officials' time (in some cases made worse by international frameworks with separate focal points and reporting cycles). The ability to coordinate can also be weakened by socio-political crises. At the same time, there are signs that it is possible to secure the political will and resources needed for effective coordination, especially where leaders see political capital in doing so, and that including a wider range of perspectives can support more legitimate and actionable outcomes. At a transboundary level, institutions, including basin organisations and agreements, play a crucial role in enhancing adaptation across borders – including for shared aquifers. Where these are not yet in place, climate change can provide a spark for cooperation.

Key message: For *inclusive, effective institutions* that enable water resources management to support climate-resilient sustainable development, governments could consider strengthening or putting in place platforms that can effectively coordinate actions across climate, water, and other sustainable development priorities. They can also use climate change as an entry point to strengthen cooperation in transboundary basins.

3.1 There are gaps in the institutional frameworks that would enable integrated water resources management to support multiple development outcomes, even before considering climate change

Integrated water resources management approaches – by definition – should support a coordinated and inclusive approach to tackling sustainable development challenges arising with climate change. However, in practice, countries need to find appropriate institutional configurations and set incentives so that individuals and groups cooperate within and across these configurations.

Although the SDG indicator 6.5.1 baseline assessments do not explicitly consider the institutional integration of water resources management with climate change and other SDGs, they do offer some preliminary insights on institutions and participation. Countries' self-assessed scores for the area of 'Institutions and participation' – as for 'Enabling environment' above – suggest there is significant room for improving implementation in this area (Figure 7). While the 15 countries are not statistically representative, the spread of their self-ratings (from low, to medium-low, to medium-high, to high) largely mirrors that in the full sample of 172 countries. Both for the 15 countries and the larger global sample, low scores in this area tend to indicate gaps in institutional mechanisms such as basin and aquifer management organisations, with capacity to function properly; public and business engagement in water management planning and decision-making; and systematic attention to gender aspects (UNEP, 2018a).

Figure 7. SDG indicator 6.5.1 baseline scores for ‘Institutions and participation’

Source: Data from UNEP (2018a)

3.2 Structures to integrate and coordinate work on sustainable development, climate change, and water have been initiated in some of the countries; a bigger challenge may be finding the right level and extent of representation to make these function effectively

The SDG indicator 6.5.1 self-assessment questions for the area of institutions and participation generally do not ask specifically about integration between water, climate, and the SDGs. However, one question does ask about coordination between national government authorities representing different sectors, and provides ‘climate’, as well as ‘energy’, ‘agriculture’ and ‘environment’, as examples of such sectors (question 2.1b; UNEP, 2018a). The responses, captured in Table 3, reveal examples where countries have at least attempted to put in place an intersectoral coordination body for water, as well as some that acknowledge that they have yet to do so. A further consideration is who is included and excluded in coordination processes, consultation, and joint planning. In the case of Ghana, where the governing body of the Water Resources Commission provides the mechanism for cross-sector consultation and coordination on water, there is evidence of inclusion of a broader range of stakeholders, beyond government ministries, departments, and agencies – including water users, water-related regulatory institutions, data management institutions, civil society, women’s groups, and traditional authorities. Among the 15 countries, Ghana also self-assessed its progress against this question highest, scoring itself 80/100, implying that there is formal consultation on water between sectors, with the objective of collective decision-making.

Of course, there can be a gap between having instituted a coordination mechanism on paper, and how far it actually functions to support integration. Kazakhstan and Cameroon indicate in their questionnaire response that while they have instituted an inter-ministerial mechanism, it has not functioned effectively. From the country case study this also appears to be the case in Mauritania,

where the Ministry of Hydraulics and Sanitation has limited resources and time to engage on issues beyond its top priority of extending drinking water supply.⁸

Table 3 also captures the institutional mechanisms for coordination and cooperation on climate change and sustainable development, derived from a search of recent documents. As with water, there are several examples of intra-governmental coordination mechanisms. The variety of institutional configurations suggests countries are attempting to find the right approach to ensure representation of different interests and a balance of technical expertise with decision-making authority. In some cases, such as the climate change coordination platform for Kazakhstan, Jordan, Guatemala, and (in principle) Kenya, representation of the prime minister, president or a minister implies high-level leadership and decision-making is a priority. In Guatemala and Jordan, as well as in Ghana and Mauritania, membership of the relevant bodies also goes beyond government, for example to academia, civil society, and the private sector, which in principle suggests that consensus-building and integration of diverse perspectives are valued. The same applies to several of the countries' platforms for coordinating across the SDGs. Chile, meanwhile, appears to offer a further prototype, prioritising engagement on technical policy details. There is unlikely to be any single, perfect institutional form to support integration on climate, water, and other SDG issues: what is more important is that the configuration serves its intended *function*.

While the analysis looked at these issues in brief, it should be noted that further country-level work is needed to understand the extent to which all the various platforms are facilitating joint working between water and climate stakeholders, as well as with other sectors working on different water-related SDGs. As the next section considers, insights from the countries do reveal certain enablers and barriers that shape the incentives for cooperation and coordination – many of which are country specific, though some broad commonalities exist.

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Table 3. Intersectoral coordination mechanisms for water and climate change

Country	Water	Climate change	Sustainable development
North Macedonia	Coordination is under The National Water Council (6.5.1 question score 20: Communication)	National Climate Change Committee (NCCC) comprising government, academia, private sector, and civil society	The National Council for Sustainable Development of North Macedonia
Kazakhstan	Inter-ministerial council on water issues but does not function in practice (6.5.1 question score 20: Communication); 8 inter-sectoral river basin councils – created according to the national legislation – regularly meet with all stakeholders, including energy, agriculture, private sector and NGOs; Inter-sectoral council on water under Ministry of ecology, geology and natural resources (since 2019)	Council on Transition to Green Economy headed by the Prime Minister – meets regularly.	Coordination Board with permanent inter-agency working groups in five areas (People, Planet, Prosperity, Peace and Partnership, grouping SDGs). Includes government agencies, civil society, international organisations, the private sector, as well as independent experts.
Chile	No coordinating entity, only sectoral information-sharing practices (6.5.1 question score 20: Communication)	Inter-ministerial Climate Change Technical Team (ETICC) coordinated by the Climate Change Division of the Ministry of Environment	National Council for the implementation of the 2030 Agenda, chaired by the Minister of Foreign Affairs, comprising various ministries
Grenada	No entity/platform for coordination; some public and stakeholder consultations for policy and draft legislation development (6.5.1 question score 40: Consultation)	National Climate Change Committee composed of 13 members of different public authorities and ministries and chaired by permanent secretary	Not identified
Cameroon	Inter-ministerial National Water Committee (Comité national de l'eau). Has met once since its creation (6.5.1 question score 30: Communication/consultation)	Board of the National Observatory on Climate Change (ONACC)	Platform for dialogue led jointly by the Minister of Economy, Planning, and Spatial Planning and the Resident Coordinator of the UN System, with participation of representatives of public administrations, the private sector, civil society, parliamentarians, and development partners
Guatemala	No entity/platform for coordination. Some consultations among government actors, through technical tables (6.5.1 question score 60: Participation)	National Climate Change Council (CNCC). Advisory body with public and private participation, formally chaired by the President	Secretariat of Planning and Programming of the Presidency
Ukraine	Procedures to agree drafts of national, sectoral, regional programs, strategies for economic development involving public hearings and participation of stakeholders. Specific intersectoral commissions e.g. on agreed regimes of work of the Dnipro and Dniester reservoirs (6.5.1 question score 70: Participation/representation)	Inter-agency commission on climate change, made up of various relevant ministries and the Ukrainian non-governmental organisation (NGO) network	High-Level Inter-ministerial Working Group, with a working subgroup for each goal
Bangladesh	National Water Resources Council (6.5.1 question score 50: Consultation/participation)	Bangladesh Climate Change Trust (formerly Climate Change Unit) within the Ministry of Environment, Forest, and Climate Change coordinates Climate Change Cells within relevant ministries	Inter-ministerial SDG monitoring and implementation committee comprised of Secretaries from 21 ministries. A high-level Principal Coordinator (SDG Affairs) also created at the Prime Minister's Office to head the committee. The General Economics Division (GED) of the Planning Commission serves as secretariat
Mauritania	National Water Council (6.5.1 question score 60: Participation)	Coordinating Unit for the National Programme on Climate Change (CCPNCC) composed of sector focal points, civil society, and private sector	Inter-ministerial committee chaired by the Prime Minister, comprising various public bodies

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Country	Water	Climate change	Sustainable development
Indonesia	Basin Water Resources Management Council (TKPSDA) shares information and experiences and often takes part in the planning process (6.5.1 question score 70: Participation/representation)	Directorate General of Climate Change in the Ministry of Environment and Forestry coordinates climate change policies and international positions; National Development Planning Agency (BAPPENAS) mainstreams climate change into national planning	Inter-ministerial committee chaired by the Prime Minister, comprising various public bodies, SDG National Coordination Team supported by the SDG National Secretariat at the Ministry of National Development Planning/BAPPENAS
Tunisia	Ministry of Water provides inter-ministerial coordination in the area of water through the National Water Council and Higher Water Council, chaired by the Prime Minister (6.5.1 question score 70: Participation/representation)	Management Unit by Objectives within the Ministry of Environment for the monitoring and coordination of activities related to the implementation of the “Paris Agreement” and the UNFCCC as well as effective engagement of all stakeholders (public, private, CSOs, academia, etc.)	National Technical Committee composed of sectoral SDG focal points, representatives of national organisations, civil society, the private sector, and academics
Ghana	The governing organ of Water Resources Commission. Includes major water users, water-related regulatory institutions, data management institutions, civil society, women’s groups, and traditional authorities. Meets at least quarterly (6.5.1 question score 80: Representation)	National Climate Change Committee including ministries, departments, agencies, donors, parliament, civil society organisations, research institutions, and the private sector.	High-Level Ministerial Committee (HLMC), an SDGs Implementation Coordination Committee (ICC), a Technical Committee and a CSOs Platform on SDGs
Jordan	No detailed answer provided (6.5.1 question score 70: Participation/representation)	National Committee on Climate Change (NCCC), including 10 line ministries, 3 public institutions, 4 research and academic organisations, and 4 NGOs. Headed by the Minister of Environment or delegated	To ensure the implementation of the 2030 Agenda builds upon existing institutional frameworks, these have been further refined to allow for better harmonisation, including The Higher Steering Committee, The National Higher Committee for Sustainable Development, The Coordination Committee, and Working Groups
Kenya	Regular coordination between national Government institutions and the national and county Government in place. Frameworks for coordinated approach to shared functions between Government sectors (e.g. flood, pollution control, catchment protection, dam construction) (6.5.1 question score 70: Participation/representation)	National Climate Change Council, chaired by the President – yet to meet	Inter-Agency Technical Committee including public bodies and representatives from civil society organisations and the private sector, among others, has been set up. For decentralised coordination, SDGs Liaison Office also established within secretariat of the Council of Governors (COG) of Kenya’s counties
China	Cross-sector and cross-agency coordination mechanisms for water issues such as water disaster relief, water resources protection and pollution control, etc. Decision-making power normally assigned to the leading agency or the higher-level body (6.5.1 question score 70: Participation/representation)	National Leading Group on Climate Change, Energy Conservation, and Emissions Reduction comprising ministries, departments, and agencies	A domestic coordination mechanism for the implementation, comprising 43 government departments, has been established

Source: For water: SDG indicator 6.5.1 questionnaires available via UNEP-DHI (2019). For climate change and sustainable development: country-specific documentary sources.

3.3 Barriers to coordination and collaboration on climate, sustainable development, and water in the countries mostly arise from domestic political disruption or crises, as well as the competing demands of the different global policy frameworks themselves

Institutional configurations for water, climate change, and sustainable development do not operate in a vacuum. They are subject to numerous constraints and enablers, reflecting a much wider, and often highly dynamic, political economy. Several dynamics create pressures on officials' time or distract from the business of actually coordinating.

The domestic political environment can work against coordination and cooperation, both horizontally across sectors, and vertically from national to local levels. Kenya has developed an impressive multi-level climate governance framework, given legal standing with the 2016 Climate Change Act, which requires counties to designate a County Executive Committee member to coordinate climate change affairs, with oversight of the county-level legislature, the County Assembly. However, in the wider context of devolution, implementation has been challenging. Devolution has reshaped the power dynamics within government at different levels, causing stakeholders to jockey for authority and resources. And mandates – not always fully clear on paper – have been transferred to local and county-level entities without commensurate development of capacity or provision of resources to fulfil them. The latter is particularly a concern for water resources, over which counties do not have full jurisdiction, and many of which are distributed across county boundaries (Bellali et al., 2018).

Ongoing political and socioeconomic crises can easily distract policy makers and their agencies and institutions from an integrated effort to address slower-onset threats such as climate change, or from a focus on longer-term goals such as the SDGs. Paradoxically, when slow-burn climate and water trends do tip into crises it can prevent the very coordination needed to address the underlying causalities. We have found little evidence for the oft-quoted lore that “it takes a crisis” to galvanise the institutional coordination and cooperation needed tackle underlying problems (such as weak water resources governance and management). Instead, we have seen how crises can lead to paralysis, or a cycle of firefighting. For example, in both Tunisia and Cameroon the water-related impacts of climate change already contribute to recurrent crises. Tunisia's Government notes that recurrent droughts are exacerbating social tensions between different regions, with a particularly heavy impact on poor and vulnerable people in rural areas, especially women (Republic of Tunisia, 2019). In Cameroon, the Far North region has suffered from the Boko Haram conflict since 2012, especially in areas close to Lake Chad and the Nigerian border. Drivers include abject poverty, inadequate public services, and a limited land and water resource base, with climate change expected to reduce water availability further (World Bank, 2019a). Yet, as indicated in Table 3, Tunisia does not have a designated national coordination mechanism for climate change, and coordination on climate change in Cameroon has been described as inadequate in recent research (Republic of Tunisia, 2019; Ngum et al., 2019).

Moreover, challenges are not just linked to domestic disruption or crisis. International agendas – including the Paris Agreement, SDGs, and Sendai Framework – may themselves do little to ease the burden on country governments and individual officials' time. Each requires governments to establish dedicated institutional mechanisms, such as national focal points and reporting cycles, increasing a risk of gaps between the mechanisms and duplication across the mechanisms. The intent to endorse all relevant international mechanisms is laudable, yet the desire to give each agenda due political attention and resourcing can be severely limited by human, institutional, and financial capacity. In North Macedonia, for example, the Ministry of Environment and Physical Planning is designated to lead on climate change but has been able to allocate only one member of staff, a State Councillor, to work directly on climate change – rather than a department as may have been needed. A National Committee on Climate Change was established, extending in principle across all government portfolios; however, representation of key ministries has been problematic as most do not have designated officials responsible for climate change (UNECE, 2019a).

3.4 Examples from the countries suggest that an incremental approach to building political commitment, and inclusion of different stakeholders, can enable and enhance institutional integration on water, climate, and SDG issues

Domestic political economy dynamics can also create windows of opportunity that support more integrated approaches. Political leadership matters enormously, and it may be easier for leaders to exert leadership where political capital is associated with being active on environmental and social issues. While international frameworks and agendas can, as noted, increase fragmentation at country level, there are also examples where they have helped lend visibility and political salience to sustainable development and climate issues. In North Macedonia, for example, the international visibility associated with the 2030 Agenda has encouraged domestic efforts. As one of the countries expecting to submit a Voluntary National Review in 2019 (see Box 2), North Macedonia intends to update its Rapid Gap Assessment, mapping national policy documents against the SDGs with accompanying recommendations, to establish a working group for each SDG, and to strengthen the National Council for Sustainable Development.

In Bangladesh, meanwhile, making progress towards the Millennium Development Goals (MDGs) and success in achieving lower middle-income country status have reportedly inspired the Government's leadership to get firmly behind the SDG agenda, viewing it as well-aligned with its own recent commitment to become a developed country by 2041. Of course, prioritisation from the top needs to lead to prioritisation across government and eventually wider society. Two shifts in Bangladesh suggest that the SDGs are becoming owned and driven by the Government, at least. Firstly, the 2030 Agenda is institutionalised within powerful government entities: work on the SDGs is led by an SDGs Implementation and Monitoring Committee within the Prime Minister's Office, with reporting supported by the General Economics Division of the country's Planning Commission. Secondly, there has been a concerted effort to internalise the 2030 Agenda within Bangladesh's own institutional setup – including integrating the SDGs in its seventh Five-year Plan (2016–2020) and the mapping of ministry responsibilities and data gaps against the goals and targets (UNESCAP, 2018).

While senior leadership within government remains crucial, the examples considered here also reveal the importance of including a broad range of interests and voices. It might be expected that opening up the policy discourse beyond government on complex issues such as integrated water resources management, climate change, and the SDG agenda more broadly would further complicate things. However, experience in Tunisia's agricultural sector (linking to SDG 2) demonstrates that doing so can lend greater credibility and relevance to resulting responses (Box 9). In Guatemala, a compensation scheme for financing water management actions and a draft Law for a Watershed Management Authority have been developed for the Xaya-Pixcaya sub-basins, which provide around a third of Guatemala City's water supply (linking to SDG 11). Success factors reportedly include a bottom-up participatory approach and the integration of different stakeholder interests, as well as availability of sufficient and appropriate technical water and climate data to understand climate risks.

However, as is the case for institutional coordination in general, meaningful participation, which moves from informing people to consulting them and ultimately engaging them as empowered partners, requires dedicated resourcing and supportive legislation. On the need for dedicated resourcing, North Macedonia has taken a proactive approach since 2013 to integrating gender considerations into its climate change response, undertaking studies to understand gender-related vulnerability, identify entry points relevant to mitigation and adaptation (with water particularly highlighted in the latter), and adopt a methodology and indicators for monitoring and evaluating gender-responsive budgeting. A draft Gender and Climate Change Action Plan has been prepared, engaging 124 people over 30 institutions (Obradovik Grncarovska et al., 2018). A similar process to incorporate a gender perspective in climate policy is getting underway in Indonesia at both national level and in cities including Makassar (GGGI, 2019; Rosalina et al. 2017; Eschke, 2017). On the need

for supportive legislation, in Guatemala structures to facilitate public participation and localised forms of governance for natural resource management are being initiated, including community-based water committees, and micro-watershed councils. However, the latter do not yet have legal standing and it falls to municipalities to undertake the necessary institutional reconfiguration (GCF, 2018).

Box 9. Participation secures successful cross-sectoral planning in Tunisia

In Tunisia's mountainous and forested north, the Douimis River flows down to Lake Ichkeul, a Ramsar-classified wetland that has become ecologically fragile due to advanced erosion aggravated by infrequent but sudden downpours. At least 46 percent of agricultural land in the area is severely eroded, and farmers report that increasing temperatures, decreasing rainfall, and wildfires linked to climate change are creating conditions of hardship.

In 2010, the Global Water Partnership Mediterranean (GWP-MED) brought together a cross-section of stakeholders – scientists, farmers, local communities, and national and regional government representatives – through the Water, Climate and Development Programme (WACDEP). The initiative aligned behind the Tunisian Government's recognition of the region as especially vulnerable and as a priority intervention area for water and soil conservation projects.

GWP-MED worked closely with national and regional government entities: the Tunisian General Department for Planning and Conservation of Agricultural Lands and the Department for Agriculture Development of Bizerte, respectively. To ensure the initiative was informed by evidence from climate change models and rural development research, the National Meteorological Institute and the National Research Institute for Rural Water Engineering and Forestry were engaged. The voices of farmers and community members were brought to meetings and workshops through facilitation groups. Beyond enlisting a broad mix of participants, effort was also made to ensure they could be active, informed participants, for example by explaining climate science in language and visuals – such as vulnerability and risk maps – that could be understood by all. The underlying issues of availability and quality of water were approached, where necessary, through more immediate socioeconomic concerns such as land tenure, education, culture, and transport.

The participants were invited to generate practical solutions for inclusion in plans and strategies, in thematic planning groups, and consider how suggested measures could be budgeted for. Several recommendations generated in the initiative were integrated into Tunisia's Five-Year Development Plan 2016–2020. The process made clear that a combination of lived experience, scientific evidence, and understanding of management needs is the basis for a strong and locally relevant response to climate change.

Source: GWP (2019)

3.5 Transboundary institutions, including basin organisations and agreements, can play a crucial role in enhancing adaptation across borders; where they do not yet exist, climate change may incentivise their establishment

At the transboundary level, transboundary basin organisations are key institutions. These provide an intermediary allowing ministries, research organisations, financial bodies, and potentially others such as civil society and business from one country to engage and cooperate with those of others that share the river, lake, or aquifer. Extending the concept of 'institutions' beyond organisations, operational agreements for water-related cooperation are also vital. These are 'institutions' in the wider sense in that, for transboundary neighbours, they set out the 'rules of the game' (North, 1991), for example around water sharing or operation of water infrastructure. This becomes

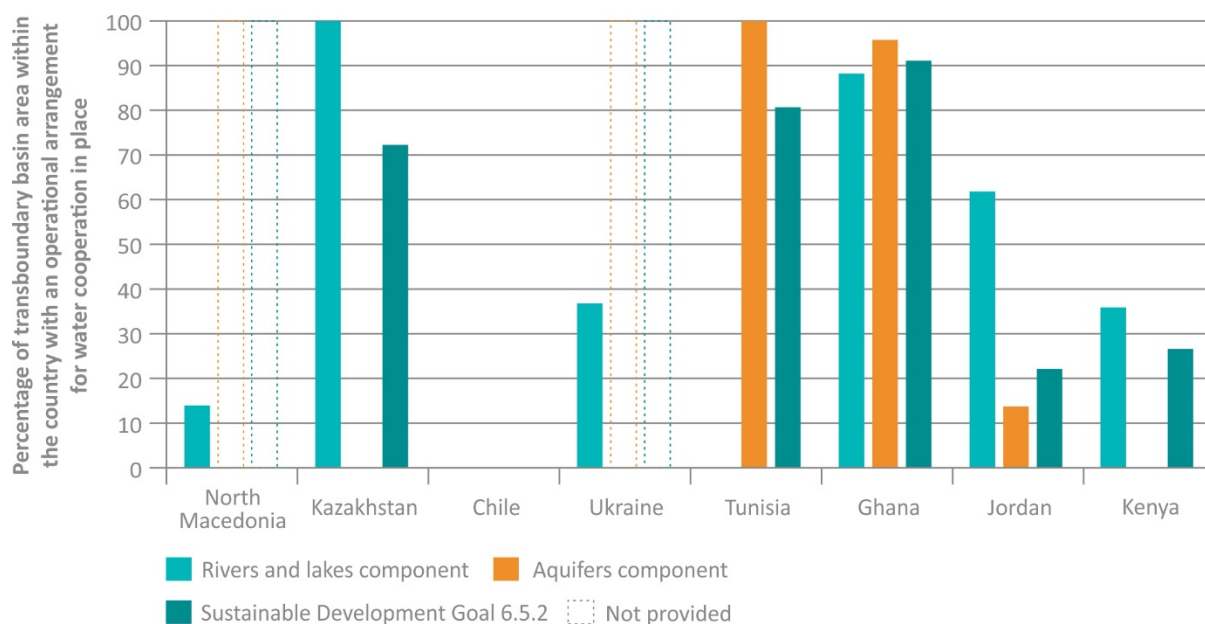
particularly important in shared basins characterised as ‘high risk’ in terms of their exposure to climate hazards. Evidence suggests that political tensions are more likely to arise in basins facing high levels of variability or rapid rates of change and with limited institutional capacity to absorb such change, exemplified by a lack of treaties or the absence of river basin organisations or their operation (De Stefano et al., 2010).

The question then becomes how to get such institutions in place where they are not already there, especially in basins that are highly vulnerable to climate change. SDG indicator 6.5.2 tracks the proportion of the basin area (river, lake, or aquifer) within a country with such ‘operational arrangements’ in place. Among the eight countries considered in this analysis that responded to the SDG 6.5.2 baseline assessment, there are still significant areas of transboundary basins where agreements need to be initiated or operationalised (Figure 8). Chile, for example, has no transboundary basin areas covered by operational agreements (UN-Water et al., 2018).⁹ Water-related climate impacts on shared rivers were also not recognised in the sustainable development, climate, or sectoral policies reviewed in Chile. Bangladesh meanwhile, (not shown in Figure 8) is a party to the Ganges Water Sharing Treaty, 1996, with India, which aims to ensure the dry season flow in the Ganges River; there are other arrangements between Bangladesh and India on water-related disaster risk reduction, including sharing flood-related data of transboundary rivers, within the Statute of the Indo-Bangladesh Joint Rivers Commission (1972). However, Bangladesh shares 56 other transboundary rivers besides the Ganges, for which there are no operational agreements.

It should be noted that operational arrangements for transboundary aquifers are just as important as those for rivers and lakes – perhaps more so as climate change will in many cases increase reliance on groundwater as a more secure source than surface water. Globally, such agreements are rare (UN-Water et al., 2018). Among the 15 countries, Tunisia stands out, in that 100 percent of its transboundary aquifers – including the vital North-Western Sahara Aquifer System – are covered by cooperation agreements (Figure 8). However, it has no operational agreements for transboundary surface waters, while the opposite is true for Kazakhstan.

In principle, climate change could provide an entry point or catalyst for cooperation, for two reasons. Firstly, because it amplifies shared risks, across shared resources. Secondly, because the timeframes involved encourage a long-term perspective in which the costs of non-cooperation, for example restricted downstream flows, are surpassed by the benefits of cooperation (World Bank, 2017b). In the ideal case, climate change provides a relatively apolitical issue around which to initiate technical cooperation, allowing progressive strengthening of institutions such as basin organisations and agreements. There are examples of this happening among the 15 countries, including in the Dniester River basin. The Dniester River makes up one of the largest basins in Ukraine and the largest in its neighbour Moldova, supplying water to a significant population and supporting a wide range of industries including food, forestry, and hydropower production. In 2015, high-level government representatives from Moldova and Ukraine jointly signed a Strategic Framework for Adaptation to Climate Change, which was developed by expert representatives in consultation with environment, water, and sectoral authorities from both countries, supported by the United Nations Economic Commission for Europe (UNECE) and the Organization for Security and Co-operation in Europe (OSCE). The Strategic Framework identifies areas of joint actions at the basin level that require transboundary cooperation. These activities helped to stimulate transboundary water cooperation more broadly, by facilitating the entry into force of the transboundary Dniester Treaty in 2017 and establishment of the Dniester Commission in 2018 – as well as increasing the adaptive capacity in the basin through the Strategic Framework. Equally, if agreements or joint bodies are in place, before climate issues are under discussion, the process for developing implementable strategies to address adaptation and climate-related trade-offs still needs careful consideration. Again, valuable lessons on how this can be done are available from the countries – for example from the Chu-Talas basin shared by Kazakhstan (Box 10).

Figure 8. Proportion of the transboundary basin area (river, lake, or aquifer) within a country with an operational arrangement for water cooperation in place (SDG indicator 6.5.2)



Source: UN-Water et al. (2018)

Box 10. Ingredients for successful cooperation on climate change in the Chu-Talas basin

The Chu and the Talas Rivers are the major sources of water in agriculture and support the livelihoods of more than three million people in Kazakhstan and Kyrgyzstan. The Chu-Talas basin is highly vulnerable to climate change, with overall growth of aridity and declining availability of water resources both likely to occur. Initial climate change adaptation activities started in the basin in 2010 with modelling of climate change impacts and a vulnerability assessment, supported by the United Nations Development Programme (UNDP), UNECE, and OSCE. This was elaborated into a set of climate change adaptation measures, covering a broad range of issues from water quality to monitoring and education, that were assessed for cost-effectiveness, and further integrated into a Transboundary Diagnostic Analysis (TDA) and Strategic Action Program (SAP). The SAP, when approved, will become the main document for transboundary management in the basin, facilitating cooperation, planning, funding, and implementation. Lessons from the process include:

- Joint bodies play a crucial role for climate change adaptation in transboundary basins. The Joint Bilateral Chu-Talas Water Commission established by Kazakhstan and Kyrgyzstan allowed discussion of problems in a bilateral context, and finding solutions.
- Transboundary adaptation strategies can support national adaptation and sectoral strategies and NDCs, and vice-versa. For example, sectoral climate change adaptation plans for disaster risk reduction, forestry, biodiversity, agriculture, and water resources in Kyrgyzstan were developed in coordination with, and were complemented by, the transboundary adaptation activities in the Chu-Talas basin.
- Strategic documents can be backed by demonstrated implementation of adaptation measures. Re-forestation, public awareness, and sustainable irrigation on the ground in Kyrgyzstan complemented the integration of climate change into the TDA and SAP.
- Involving local stakeholders in discussion of adaptation measures aids communication with decision-makers at national and transboundary levels, given that implementation of the adaptation measures often takes place at a local level.

Source: UNECE (2019b)

As in the case of national-level institutional cooperation and coordination, it is also important to recognise barriers and enablers that arise at the transboundary and regional levels, which may prevent agreements from being made in the first place, as well as their effective operation. As an example, political economy dynamics around state sovereignty have disrupted a collaboration on data sharing – which might have been expected to be relatively apolitical – in the Niger River basin, shared by Cameroon (Box 11).

Box 11. National/regional tensions around data sharing for climate resilience in the Niger basin

The Niger River basin has experienced significant climate variability, with major droughts from 1970 to 2000. Rainfall has recovered to within 5 percent of pre-1970 levels in the Lower Niger, including the Benue River which rises in Cameroon and Chad, but is still well below pre-1970 levels in the upper basin, which acts as a major water source for the Niger River. Climate change is expected to add to and exacerbate the historical pattern of climate variability (GEF, 2014)

The Niger Basin Authority (NBA) has provided a framework for cooperation among riparian countries including Cameroon as well as Benin, Burkina Faso, Chad, Ivory Coast, Guinea, Mali, Niger, and Nigeria. Initiatives to improve water information systems include the NBA Observatory, under which a data exchange protocol binds countries to share data on hydrology as well as socioeconomic and environmental issues. Services provided by the observatory that are relevant to building climate resilience include summarising and analysing planned abstractions; issuing forecasts of flows; and providing socioeconomic and hydrology data to inform water management dialogue, evaluation of trade-offs, and preparation of investment plans at basin level (World Bank, 2017a).

However, member states can be reluctant to share flow and abstraction data where it contravenes their national interests, and recruitment of staff to the NBA is often shaped by the need to maintain member-state goodwill, through equal representation, rather than competitive selection (World Bank, 2017b). Such lessons will need to be considered in the new, US\$205 million project, the *Programme for Integrated Development and Adaptation to Climate Change in the Niger Basin, 2019–2024* (AfDB, 2018).

4 Management instruments

Guiding question: Are management decisions for water and other related SDGs being guided by the evidence on climate change and water?

Synopsis: Across the 15 countries there are significant challenges for collecting climate- and water-related data and, more importantly, turning it into information that is actually used to support decision-making for sustainable development. These challenges include degraded or missing data collection networks (especially for groundwater), gaps in human resource capacity for hydro-meteorology, institutional fragmentation of responsibilities for monitoring of climate, surface water, and groundwater, and a lack of useable instruments or tools to support climate- and water-informed decision-making and regulation, on the basis of sound evidence. Certain types of management instrument, such as early warning systems, seem to be a focus of attention in many of the countries considered, and may enhance resilience, for example by aiding in disaster preparedness. But there are worrying gaps in other areas, such as adaptable basin management plans, and allocation and regulatory systems that can support sustainable use of water resources for different sustainable development activities, under dynamic conditions. Importantly, there are promising, albeit rare, examples of such instruments at transboundary level.

Key message: For *management instruments* that can support and guide decisions according to the evidence on climate change and water, countries and their development partners could consider: strengthening climate and water data collection; building user-centred systems to process and communicate data as useful information; and putting in place and strengthening the tools and systems that will support evidence-based decision-making on water and climate across different sectors. This includes expanding the use of management instruments that can reduce shared risks and maintain fair shares of water in a changing climate, within transboundary basins.

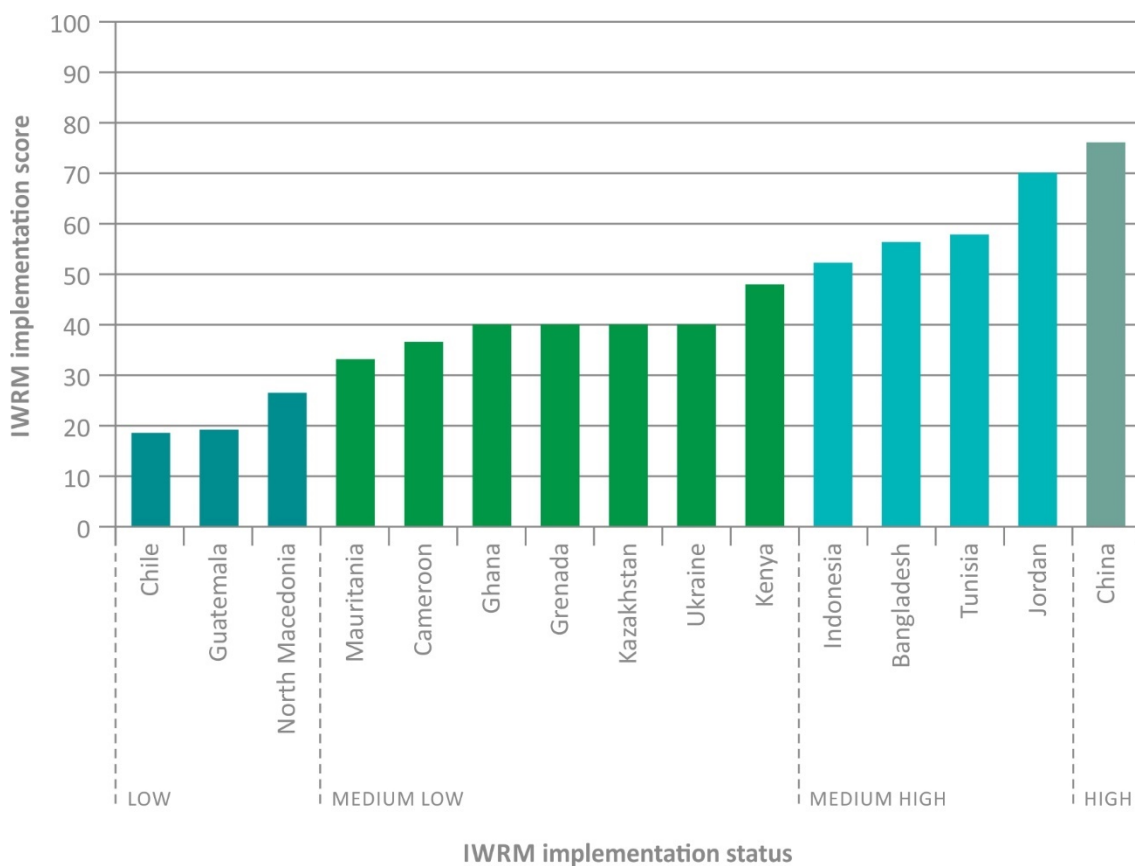
4.1 The instruments and tools for managing water resources are missing or inadequate in many of the countries studied, and do not fully reflect the climate-related risks being faced

When seeking to manage water resources in an integrated way “tools and activities that enable decision-makers and users to make rational and informed choices between alternative actions” are needed (UNEP, 2018a, p.8). In a context of climate change, rational and informed choice depends on a continued flow of sound data about current situations that also helps to build trends and future projections. Data need to be turned into information in a way that allows decision-makers to improve the quality of their decisions despite growing uncertainty, geographical and temporal variabilities, and gaps in evidence. The countries participating in the SDG indicator 6.5.1 baseline assessments also provided information about the area of management instruments and tools, including: monitoring of water use and availability; data and information sharing (subnational and transboundary); and tools and processes for management of disasters, pollution, ecosystems, river basins, and aquifers.

These instruments are an important foundation in achieving many SDG-related targets, and will need to help decision-makers deal with increasing variability of water resources, scarcity, quality problems, and extremes – from early warning systems for disaster risk management (SDG 11.5) to ensuring flexible and sustainable allocation of water for agriculture (SDG 2), energy (SDG 7), cities (SDG 11), and ecosystems (SDG 15). Across all countries, as well as the 15 countries in this study, more than half report that they have no instruments for sustainably managing water use, pollution, water-dependent ecosystems, or disaster risk, or they report that instruments are in place but are limited to short-term projects or restricted geographical areas (UNEP, 2018a). The SDG indicator

6.5.1 baseline questions on management instruments do not make an explicit connection to climate change or related challenges such as decision-making under uncertainty. But the connection is clear – and any climate-related policy, target, or commitment should be taking the dearth of existing instruments for managing water resources into account.

Figure 9. SDG indicator 6.5.1 baseline scores for ‘Management instruments’



Source: Data from UNEP (2018a)

Figure 9 shows the generally low SDG indicator 6.5.1 average baseline scores for management instruments for the 15 countries. It might be expected that countries would prioritise instruments and tools that reflect their specific risks and sustainable development priorities. However, this appears to be the case only partially, at best. For example, Bangladesh, which faces heavy losses each year from water-related disasters, scores itself high on management instruments for disaster risk reduction (80), implying that management instruments to reduce impacts of water-related disasters are long term, effective, and have good coverage. However, just as Bangladesh has been threatened by water-related disasters, it also has long-running and slower-onset challenges relating to groundwater, including contamination from arsenic, and rising demand for groundwater for drinking and irrigation (USAID, 2018). Hydrogeological information, and its use to protect groundwater resources, is increasingly important, even more so with significant climate change impacts on groundwater from drought, more intense rainfall, and salinisation in coastal areas, as well as a potential further increase in demand for the resource, given surface water is likely to be affected more quickly by climatic changes. Bangladesh’s use of aquifer-level management instruments, however, is limited to data on the groundwater table collected by the Bangladesh Water Development Board, as well as by agencies responsible for agriculture and water supply, sanitation and hygiene, typically around short-term and ad-hoc projects (score: 20). The Water Act 2013 reportedly allows for fixing of safe yields and restrictions on abstractions – the instruments

that would actually allow the data to influence management and decision-making – but the provisions await implementation (UNEP, 2018c).

4.2 Water management instruments that are prioritised and in use in the countries can help build preparedness to climate change, but may not adequately build other characteristics of resilience

Instruments and tools for managing water need to have certain characteristics if they are to contribute to climate resilience. For example, they can aid ‘preparedness’, such as flood protection plans and early warning systems; ‘adaptability’, such as water allocation arrangements that can be adjusted in times of drought; or ‘robustness’, such as design and operating rules for infrastructure that deal with uncertainty about future extremes (IPCC, 2014a; World Bank, 2017a). However, when reviewed in this light, there are few examples of water management instruments in the 15 countries that seem adequate to allow managing for resilience. On the positive side, the development of early warning systems, which support preparedness, has featured in several of the countries. In some cases, it has been a catalyst for strengthening hydro-meteorological monitoring, including in Ghana, Grenada, Kenya, and Bangladesh. In several cases, alerts via SMS, email, and other channels are being effectively delivered to vulnerable groups such as farmers and residents of low-income settlements. Early warning systems are cost-effective, saving lives and assets worth, on average, at least 10 times their cost (GCA, 2019). Such systems also contribute directly to many SDG targets, notably to “reduce deaths, people affected and losses from disasters” (SDG 11.5) but also many others including “build the resilience of the poor and those in vulnerable situations” (SDG 1.5), “ensure sustainable food production systems and implement resilient agricultural practices” (SDG 2.4), and “strengthen resilience and adaptive capacity to climate related hazards” (SDG 13.1).

Also commonly reported are efforts to incorporate water-related climate information into periodic plans and strategies. Cameroon’s NAP and Indonesia’s National Development Plan are examples, as are Ghana’s National IWRM Plan and some of its revised River Basin Management Plans. In general, however, these plans are static and completed as periodic, one-off exercises, often with donor support. Even those that set the framework for ongoing management of water – such as basin management plans or irrigation water-permitting systems – do not incorporate climate change in a way that demonstrates characteristics such as ‘adaptability’. A possible exception is China, where climate and hydrological projections are reportedly used for planning and management decisions by the Ministry of Water Resources and River Basin Committees, aided by probabilistic scenarios.¹⁰ In other cases there is at least growing recognition that water management instruments will need to be revised under climate change – as in the case of Chile’s market-based water management, where, despite nominal flexibility, factors including deregulation, erosion of trust, and an absence of territorial planning and integrated management of water resources have undermined the ability to handle recurrent and increasingly severe droughts (Guzmán, 2019; Urquiza and Billi, 2018).

Water management instruments that could support other characteristics of resilience, such as tools to systematically build ‘robustness’ into infrastructure design and operation, were not identified in the countries studied. Such tools are available and indeed have been pioneered by the water community. One example is the ‘decision tree’ approach, which can be applied to projects or basins to help users progressively consider vulnerabilities from the bottom up, moving through screening, analysis, stress testing, and potentially active risk management, according to whether particular climate sensitivities are identified at each stage (Ray and Brown, 2015). This has been used, albeit with donor support, in low-income countries such as Nepal at both the level of a hydropower investment project and for screening a portfolio of hydropower projects in a river basin (Bonzanigo et al., 2015). A further example is the Climate Risk Informed Decision Analysis (CRIDA) approach, which builds on the decision tree but embeds aspects of that approach within a conventional planning cycle, and incorporates specific methodologies to enhance flexibility of plans and to compare robustness of options (Mendoza et al., 2018). If tools are available but not being used, it

may suggest that enhancing uptake, for example by adapting tools to low-resource contexts and enhancing capacity to know when and how to apply them, is a more significant priority than innovating new ones.

4.3 Inadequacies in water and climate data and evidence-based decision-support exist against a backdrop of gaps in technical infrastructure and human resource capacity

A first, obvious, gap is in monitoring infrastructure, especially hydrological networks. This translates into limited data to support downscaling of global and regional climate models to decision-relevant scales for water management (e.g. basins and sub-basins), particularly in areas of rugged topography (Mendoza, 2018). In Ghana, the National Meteorological Observation Network managed by the Ghana Meteorological Agency covers 95 percent of the country with automatic weather stations, and has been boosted by a radar monitoring station (Republic of Ghana, 2015). But the hydrological monitoring network is in a state of disrepair (UNEP, 2018b). In North Macedonia, an estimated 40 percent of river gauging stations were non-operational in 2014, a situation which is reportedly little changed.¹¹ This compounds other deficiencies in the monitoring infrastructure of the National Hydro-Meteorological Service (HMS), including out-of-date and missing physical equipment and IT, as well as a lack of expert capacity for data processing and implementation of predictive models (Republic of North Macedonia, 2014).

There is also a need for suitably qualified human resource capacity to interpret whatever data are available, and especially to turn it into decision-relevant information that non-specialists can understand. In China, despite national and basin water resources management organisations utilising climate change projections and scenarios, many sector agencies are still ill-equipped to do so, and scientists are reportedly unsure how to communicate information in a policy-relevant way (Nadin et al., 2015). Staffing in the national meteorological or hydro-meteorological services is reportedly decreasing in many of the countries, including Ghana, Kenya, and Guatemala, although it is increasing in some others, such as Bangladesh and Indonesia (WMO, 2019). The Global Framework for Climate Services (GFCS), an initiative of the World Meteorological Organization, has been an important source of support to countries to develop science-based climate information and prediction and incorporate it into planning. The GFCS has helped 19 countries to develop endorsed national action plans for establishing National Frameworks for Climate Services, including in Cameroon where it worked with the Directorate of National Meteorology (Republic of Cameroon, 2016).¹²

4.4 Where water and climate information does exist, barriers to evidence-based decision making in the countries include politicised decision-making and fragmentation among responsible organisations

Underlying and interacting with the above-mentioned gaps in human resources and monitoring infrastructure are various political economy challenges. Resources for monitoring and communicating information can follow economic and political priorities. In Cameroon, sophisticated monitoring and predictive models are available for one river, the Sanaga. This is reportedly linked to energy security concerns: the Sanaga is vital for hydropower.¹³ Perceived economic and security priorities can also determine where hydro-meteorological services are housed: the Bangladesh Meteorological Department is part of the Ministry of Defence; the *Direction de la Météorologie Nationale* in Cameroon sits in the Ministry of Transport; and Kazhydromet is in Kazakhstan's Ministry of Energy. This positioning might in principle lend political visibility to the service, but can create difficulties for sharing water, climate, and weather information and translating it between sectors with different specific needs – from an air traffic control centre to a power producer operating a dam – and duplication of effort, with different entities responsible for monitoring overlapping aspects of water resources.

There are further barriers to the actual use of evidence, even if generated, to inform decisions and actions. In Ghana, despite various projects attempting to strengthen early warning systems, the challenge is for responsible agencies – such as those for agriculture, health, and disaster risk reduction – to undertake preparedness and response actions in a coordinated way.¹⁴ A political drive to complete important initiatives at the sector level may also prevent adequate consideration of evidence on water-related climate change. For example, there is reportedly limited use of climate projection information or engagement by the relevant water authorities in one of Ghana's flagship agriculture programmes, which involves building hundreds of small dams to support irrigation. While this initiative can contribute to the politically important areas of rural poverty reduction and food security by supporting year-round farming (also aligning with SDGs 1 and 2, therefore), it depends on sound appraisal of water availability and trends, including in relation to climate change.¹⁵

Additionally, there may be a tendency for countries and their development partners to focus on data collection, and potentially information processing – which can be addressed with better monitoring networks and training – rather than the messy and politicised business of the end-use of information by different decision-makers. This is a trend that has been observed in other areas of water management – such as information systems for water, sanitation and hygiene (Pasanen and Mason, 2019). In Mauritania, climate and water strategic documents outline various measures to enhance climate and water information and put it to specific use, from the general (a climate information system) to the specific (hydrogeological syntheses, extension of routine remote monitoring to all groundwater catchments, and strengthening of a multi-hazard early warning system). However, neither the climate nor water documents appear to provide detail on how climate change information will be incorporated into existing and future management instruments in water and water-dependent sectors such as agriculture and livestock (for example in basin and watershed management plans, irrigation management arrangements, or livestock resilience programmes) (Islamic Republic of Mauritania, 2015, 2016, 2019).

4.5 There are examples of information-sharing initiatives and management instruments at regional or transboundary scale, but their uptake and application does not seem to reflect cross-border water and climate risks

The physical impacts of climate change – from floods that spill across river basins to droughts that affect multiple countries – will ignore national and other administrative boundaries. Transboundary and regional information sharing on water is vital, therefore, as are instruments to utilise that information and help countries, in cooperation with each other, to make evidence-based planning and management decisions.

To aid in 'preparedness' on major transboundary river systems, several of the countries in Africa are participating in transboundary projects to enhance early warning and climate information, with the support of the multilateral climate funds: Cameroon in the Niger River basin, Ghana in the Volta River basin, and Kenya in the Lake Victoria basin.¹⁶ Grenada, meanwhile, as a small island developing state, has no transboundary basins but is dependent on regional organisations to help source and interpret information on water- and climate-related disasters, which are increasing in magnitude and frequency across the Caribbean. The Caribbean Disaster Emergency Management Agency is helping Grenada to revise its National Disaster Plan, and the CARIBSAVE partnership has helped to fill gaps on climate risk assessment for Grenada. Nonetheless, a recent assessment suggests that Grenada can engage more deeply with these and other regional bodies such as the Caribbean Institute for Meteorology and Hydrology, which provides outlook forecasts for decision-makers in governments across the Caribbean (IMF, 2019).

Flexible transboundary water management agreements that can support 'adaptability' are rare but do exist, for example the Lake Chad Water Charter, which has been signed by the six member countries including Cameroon. This includes a specific Article (13) setting out multiple criteria to be

used when determining States Parties' usage, of which several look at climate variability and change. The multiple criteria are to be applied flexibly, in principle allowing adjustment of water and benefit sharing if climate and other conditions change (World Bank, 2017a).

5 Financing

Guiding question: Are the countries ready to finance water-related climate action across SDG sectors?

Synopsis: The countries' baseline self-assessment of their maturity in developing integrated approaches to water resources management reveals major challenges with both the sufficiency of, and mechanisms for, financing. Climate finance, and particularly the multilateral climate funds, present new opportunities to address both challenges and are a focus for many of the national stakeholders consulted, but as yet provide only a small percentage of total climate finance. Wider climate-related external development finance for water from bilateral and multilateral sources is playing an important role in the countries, including in support of other SDG priorities. However, the lack of integration between water and these areas already observed – for example at the level of strategies and institutions – leaves the risk of duplication and gaps in spending in support of overlapping objectives, reducing value for money. Domestic budgets can also play a role, and their likely importance is changing in many countries, reflecting the need to place financing options in the wider macroeconomic context. Private financiers, by comparison, appear currently to play a modest role in financing climate-resilient water resources management infrastructure in the countries, although there are some examples of emerging models, including some involving circular economy approaches and nature-based solutions, which may help attract private investors. Difficulties persist in preparing detailed, attractive project proposals and pipelines that balance infrastructure with institutional investments for water management. There are steps the water community can take 'in house' to better attract climate finance, through better project preparation. However, examples already underway suggest that communities working on water, climate, and other SDGs, as well as ministries of finance, can do more to work collaboratively to develop general adaptation financing strategies; improve the tracking of climate finance; and enhance the macroeconomic environment for climate-related investment through financial and fiscal policy.

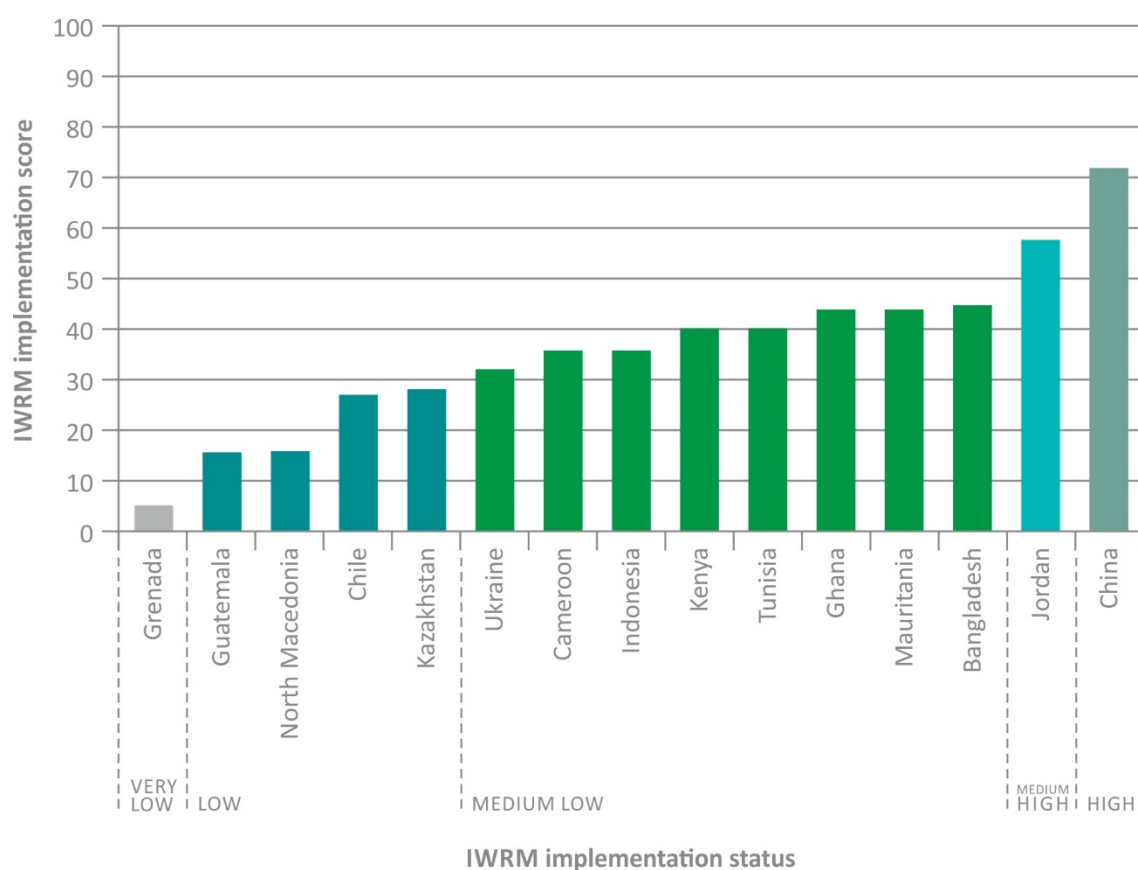
Key message: For *financing* to support water-related climate action across SDG sectors, those working on climate, water, and other SDGs can engage more with ministries of finance, in support of efforts to improve the wider climate finance architecture, including the development of adaptation financing strategies and climate finance monitoring systems. As part of this wider effort the water community in particular can contribute stronger project proposals and pipelines that balance and sequence institutional and infrastructure development, and which maximise the synergies for sustainable development and climate resilience. In many cases it will also be necessary to apply a transboundary lens when developing funding proposals that seek to enhance climate resilience and sustainable development through water.

5.1 Mechanisms for financing water resources management need to be strengthened across the countries if they are to make a full contribution to development goals in the face of climate change

Countries' 2017 self-assessments of their progress on *financing* integrated water resources management provide a starting point to examine how far financing for water can support action on climate change or the SDGs. The generally low average scores (below 50) in the SDG indicator 6.5.1 baseline for the area of financing reflect insufficient allocation and/or disbursement of national budgets, limited revenue raising from water users and low allocations to transboundary cooperation (Figure 10).¹⁷ These low scores for the 15 countries reflect a trend among the 172 countries that responded to the baseline assessment – with the global average implementation of the financing area being 8 to 12 points lower than the other three areas (UNEP, 2018a). What emerges is a clear

sense of the inadequacy of both the mechanisms for, and sufficiency of, financing for integrated approaches to water resources management, as well as the infrastructure required to manage water. However, this self-assessment was, once again, undertaken without specific consideration of climate change – which is likely to amplify risks and therefore costs, but also open new opportunities for financing from both public and private sources. The rest of this section considers how far water is featuring in wider climate finance flows and what can be done to ensure water resources management investments can be financed more effectively.

Figure 10. SDG indicator 6.5.1 baseline scores for 'Financing'



Source: Data from UNEP (2018a)

5.2 The dedicated climate funds are recognised as an increasingly important source of finance for water resources management in support of climate-resilient sustainable development, but many of the countries do not appear to be looking at a wider range of financing sources and policy options

Climate finance refers to “the financial resources paid to cover the costs of transitioning to a low-carbon global economy and to adapt to, or build resilience against, current and future climate change impacts” (Falconer and Stadelman, 2014, p.1). As such, it includes a huge and potentially bewildering array of flows. Analysis of country documents and interviews with national-level stakeholders suggests that the full array of options is not well understood or exploited.

In many of the countries considered in this analysis, the opportunity to access large volumes of climate finance from the multilateral climate funds was an acknowledged focus for the government representatives interviewed. Globally, however, the dedicated climate funds have, to date, represented a small share of total climate finance from external development finance providers: just US\$2 billion in 2015–2016, compared to US\$16 billion from bilateral donors and US\$46 billion from

multilateral financing institutions (Oliver et al., 2018). The multilateral climate funds will, it is hoped, continue to grow in importance, but general external development finance flows that are ‘climate-related’ often play an important role in helping countries to adapt to and mitigate climate change, including by financing water resources management and water infrastructure. In the 15 countries considered, over US\$8 billion was committed by bilateral and multilateral sources in the period 2012–2017 for ‘climate-related’ activities that directly involved water resources management or infrastructure. Over 15 percent of this had a ‘principal’ focus, and 41 percent a ‘significant’ focus, on climate change adaptation (40 percent had ‘climate components’ relating to adaptation while the remainder was not targeted at adaptation or not screened) (OECD, 2019a).¹⁸ This contrasts with commitments of US\$0.1 billion from the multilateral climate funds to projects with a water focus approved for the 15 countries since 2003.¹⁹

Private finance can also contribute, especially in middle-income and high-income countries. However, globally, the contribution of private investors to climate-related spending on water resources is likely to be very small – in particular where water resources management is concerned. At country level, the volume of private financing for water resources management could not be identified either in literature searches or by interviewees in any of the 15 countries. At the global level, it is estimated that in 2015–2016 54 percent of total climate finance (US\$463 billion per year) originated from private actors. But the vast majority of this was invested in mitigation – the replacement of high-carbon with low-carbon activities and energy efficiency. The global estimates do identify some mitigation-related investment in waste and wastewater projects. However, these received only 0.2 percent of the total financing going towards mitigation, much less than their contribution to the total anthropogenic GHG emissions (around 3 percent in 2010) (IPCC, 2014b). Flows of climate finance to water and wastewater management did make up half of the estimated US\$22 billion per year for adaptation in the 2015–2016 period, but this is only 5 percent of total climate finance, and the vast majority of climate finance for adaptation is public finance (Oliver et al., 2018).

There are increasing efforts to use development finance and philanthropic funds to directly leverage private money through blended finance (OECD, 2019b). It must be acknowledged that private climate finance for water resources management and water infrastructure is likely to remain limited, unless unpredictability in the governance, policy, and legal frameworks, as well as the transaction-intensive ways of ‘doing business’ in the water sector, are resolved. These complicate and limit the opportunities to build trusted revenue streams – and therefore reduce the incentives for private investment. However, some promising models for attracting private finance for water investments with climate co-benefits were identified in the countries, including in wastewater management, discussed below in Section 5.6.

Overall, there appears to be scope for governments in the countries considered to expand their focus beyond the dedicated climate funds and to examine a broader range of sources of finance for water resources management in support of climate and sustainable development objectives. In doing so, governments have a wider set of public policy tools besides their own budgets and those of development partners, which can be used to shape incentives for others, including private investors and households. This is necessary if the wider financial system is to contribute to the Paris Agreement’s objective of “making finance flows consistent with a pathway towards low greenhouse gas emissions and climate-resilient development” (Article 2.1c) and if the much larger volumes of finance that currently go towards maladaptive and high-carbon investment are to be redirected (Whitley et al., 2018). To do so, sectoral ministries in charge of water, climate, and other SDGs will have to engage more closely with ministries of finance – see Box 12.

Box 12. How governments can use a broader public policy toolkit to further align development finance flows with the Paris Agreement and SDGs

Public finance can stimulate innovation, mainstream new technologies, overcome market failures, and address barriers to private investment entering markets; it can also be directly invested in climate action.

In addition to public finance – available from either domestic tax revenues, from international finance institutions and/or from bilateral donors – governments have at their disposal a suite of tools that will influence investment by both public and private entities. These tools include financial policies and regulations, fiscal policy levers, and information instruments (Whitley et al., 2018). Together these tools can influence the way that private actors – from households to corporations – invest in and use water resources.

- *Financial policy and regulation*, acting through force of law, refers to all financial market rules insofar as they involve the role of central banks and other financial regulatory authorities. Financial policy and regulation can shift investments from one type of project to another by moving investors' rationale from being driven by short-term yields to focusing on longer-term sustainable solutions.²⁰ One example is mandating stress testing – a form of supervisory review that evaluates the resilience of the financial system to adverse shocks and can identify which financial institutions are exposed to highly climate-vulnerable assets. Others include increasing standards of due diligence for financial institutions in their accounting for climate risks and requiring investors to include long-term environmental sustainability dimensions in their financial disclosures, allowing investors to fully understand the risks a specific organisation or banking institution may be exposed to, in turn informing capital allocation. The effect of these interventions on the case for water resources management are likely to be indirect but could be powerful – helping to shift public and private investment into areas that, through better water governance and management, reduce the climate vulnerability of assets and investment portfolios as well as, ultimately, the wider financial system.
- *Fiscal policy* levers act through influencing price signals and include taxes, levies, price support and controls, public procurement, and budget support. Much attention is being paid to phasing out fossil fuel subsidies in order to transition to low-emission, climate-resilient pathways, and there is also significant potential for using fiscal policy to shift private investment decisions and consumer behaviour towards increasing climate change resilience, such as tax exemptions for water investments, as well as tariffs and fees for water use (Canales Trujillo et al., 2015). The deployment of water tariff and pricing systems is, however, challenging, both politically and technically. There is likely to be a role for public climate finance, including international provision of climate finance, to support efforts to reform tariffs and fees. Another instrument would be considering the availability and quality of water as part of public procurement across all sectors. Public authorities are major consumers, particularly in construction, food and catering, vehicles, and transport. 'Water-sensitive' public procurements can reduce water consumption and waste production and through these choices can encourage green market development (OECD, 2015).
- *Information instruments* act by raising awareness about climate risks and opportunities for sustainable development. They include a wide array of initiatives from scenario analysis, certification and labelling, transparency initiatives, and corporate strategies. Examples in water include outreach and campaigns around, for example, efficiency of water use and water footprint analyses.

Finance ministries are centrally engaged in the deployment of these tools. They often set budget priorities and pricing policies, and they are engaged in establishing financial market rules. These

tools support the removal of barriers to mobilising finance such as real and perceived risks (e.g. politicisation of tariffs; import duties on equipment), insufficient returns on investment, and capacity and information gaps (GGBP, 2014). To secure financial stability as physical climate-related risks increase (TCFD, 2017) finance ministries will increasingly want to deploy these tools to avoid the risks of future assets locking in climate risks, or becoming stranded (referring to the premature devaluing of assets as a result of climate change and its impacts and implications; Rautner et al. 2016). Water stakeholders will want to engage with ministries of finance and with other sectors to help them to understand how to take full advantage of the tools to support water-related climate resilience.

A final consideration with regard to the overall financing landscape facing any country is that it is dynamic, depending on a country's macroeconomic situation as well as the availability of different kinds of international support. Countries should consider how their opportunities for climate finance might change with economic growth and shifting geopolitics. For example, North Macedonia's candidacy for European Union (EU) membership means that EU pre-accession aid is a major source of finance for green investment, but these financial flows also come with many prescriptions as the country tries to align with EU frameworks and directives. Bangladesh's economic performance helped it to reach lower middle-income country status in 2015 and the country is also on track to graduate from Least-Developed Country status by 2024. Chile ceased to be eligible for official development assistance in 2017, having achieved high-income country status for three consecutive years. Both Bangladesh and Chile may increasingly need to rely on their own domestic resources although for both countries access to the Green Climate Fund (GCF) remains open.

Grenada, meanwhile, is undergoing a structural adjustment programme, to deal with macroeconomic challenges including high debt. All of the climate-related external development finance committed to Grenada for water-focused activities from 2012–2017 was in the form of loans, which may reflect the country's status as an upper middle-income country. A recently completed Climate Change Policy Assessment (CCPA) for Grenada, jointly supported by the International Monetary Fund (IMF) and the World Bank, suggests that the Government of Grenada needs to improve its fiscal position and further reduce debt levels and financing needs by making additional reforms to its Fiscal Responsibility Law. This could, in turn, provide more space for climate-related investment, for example in resilient infrastructure (IMF, 2019).

5.3 Some countries are moving to track climate finance internally as a step to sourcing and allocating finance efficiently to water and other purposes, while maximising co-benefits for climate and other SDGs

A fundamental barrier to countries being able to consider and access the full range of financing sources for climate-related water resources management investments is a lack of consistent tracking systems for both domestic and international public climate finance, as well as for private contributions. Currently, there are a number of different approaches for classifying water projects in international finance flows, but the categorisation often varies depending on what the focus is and how far water management extends into related domains such as ecosystems, coastal protection, or agriculture. This underscores that the co-benefits for other SDG areas are implicitly recognised, but does not help to accurately map or direct finance to different needs. In the GCF, classification of water security falls within the results area "Increased resilience and health and well-being, and food and water security". The Pilot Program on Climate Resilience (one of the World Bank-hosted Climate Investment Funds) seems to closely link water to agriculture including sustainable water and land management practices. When links to mitigation are included, the categorisation is more complex and these projects are generally labelled as 'cross-cutting' (Hedger, 2018). Efforts to develop 'taxonomies' of green or climate-related investments are underway, which could provide a

consistent definition of what actually counts as, for example, a climate-resilient water resources management activity or infrastructure project. The European Commission is developing such a taxonomy for EU countries and other non-EU countries have expressed interest in using it (Whitley et al., 2018).

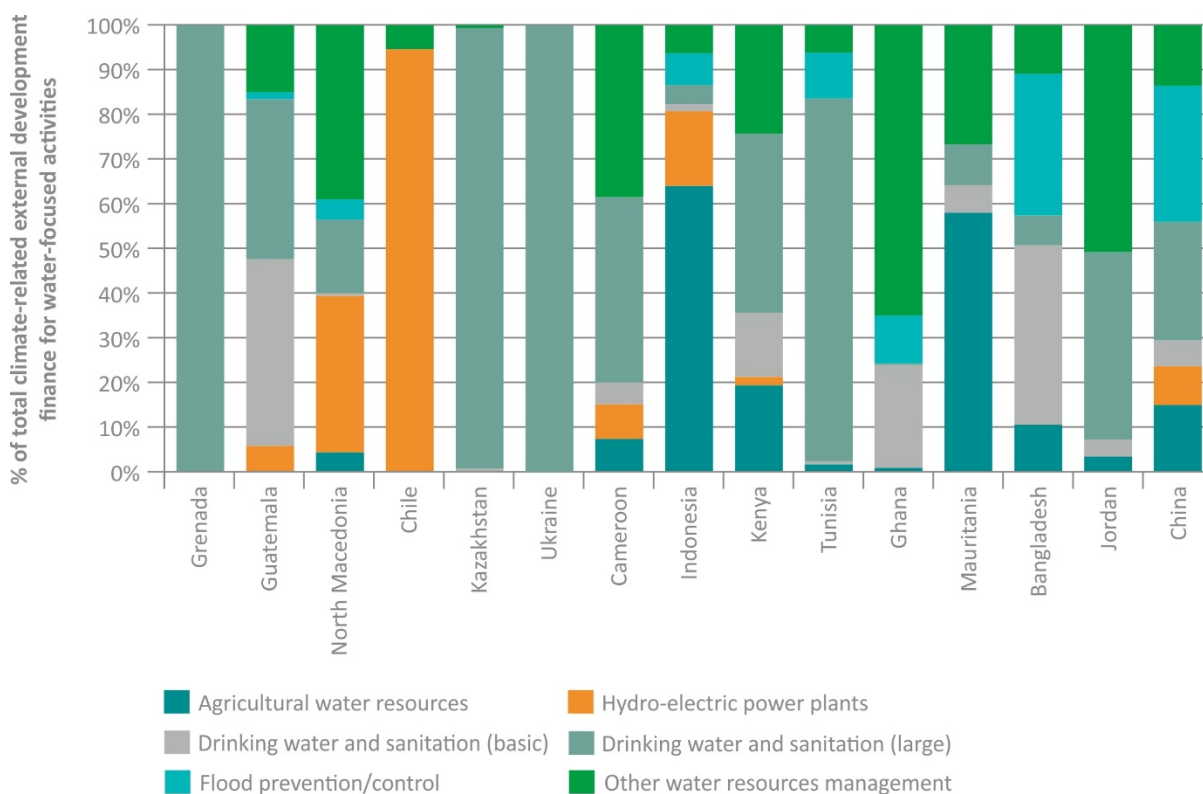
There are limited current examples from the 15 countries of efforts to improve tracking at the national level, but those that exist do provide some inspiration for others. Bangladesh was one of the frontrunners, applying the Climate Public Expenditures and Institutional Review (CPEIR) tool in 2012 and subsequently developing, in 2014, a Climate Fiscal Framework to ensure costs and prioritisation of climate actions are reflected in the existing national budgetary framework, and to require routine tracking of climate-related expenditures. Kenya's National Assembly adopted a National Policy on Climate Finance in 2018 to guide and promote climate finance flows and track these through budget coding (Jura, 2018).

5.4 Climate-related external development finance for water already supports a range of SDGs in the countries, underscoring a need for integrated approaches to ensure cost-effective spending

'Climate-related' external development finance plays a major role in funding water investments in the countries considered and appears to be supporting other SDGs besides the 'Water goal' (SDG 6) (Figure 11). For example, in Chile, over 90 percent of the climate-related external development finance committed for water-related activities from 2012–2017 was for hydropower (potentially supporting the 'Energy goal', SDG 7). Over the same period in both Indonesia and Mauritania, around 60 percent of climate-related external development finance went to agricultural water resources management, and therefore likely supports the goal on food and agriculture (SDG 2). The share going to flood prevention and control – higher in Bangladesh and China, which both face significant flood risk – is also likely to contribute to the target on disaster risk reduction (SDG 11.5). While the majority of climate-related development finance in several of the countries went to activities that align closely with the 'Water goal' – i.e. those labelled "other water resources management activities" and "drinking water and sanitation" in Figure 11 – these are likely to have co-benefits for other SDGs. For example, in Grenada, Kazakhstan, Ukraine, and Tunisia a large proportion of the climate-related commitments for water activities went to large drinking water and sanitation systems, which links to the goal on cities and communities (SDG 11) as well as the water, sanitation and hygiene, and wastewater treatment targets within the 'Water goal' (SDG targets 6.1, 6.2, and 6.3).

The attribution of climate-related development finance commitments for water to certain SDGs is approximate, but it does suggest that the countries considered are, in general, likely to already be using external climate finance for water to support a range of SDG objectives. However, this only underscores the need for better integration across water, climate change, and other SDGs when planning and managing climate finance. Given the gaps observed in the previous sections, there is room to improve integration on these issues at the levels of the enabling environment, institutions and participation, and management instruments. By helping to ensure trade-offs are managed and synergies are spotted early, better integration in all of these areas will ensure climate-related spending on water is more cost-effective. For example, despite the high share of Chile's external climate-related commitments going to hydropower in recent years, Chile faces increasing threats to hydropower generation from changing flows in river basins associated with projected declines in rainfall and glacier melt. Importantly, Chile's National Action Plan on Climate Change recognises these impacts, and the resulting need to promote other renewable energy sources besides hydropower (Government of Chile, 2017).

Figure 11. Share of climate-related development finance commitments for water-focused activities, 2012–2017, going to different areas²¹



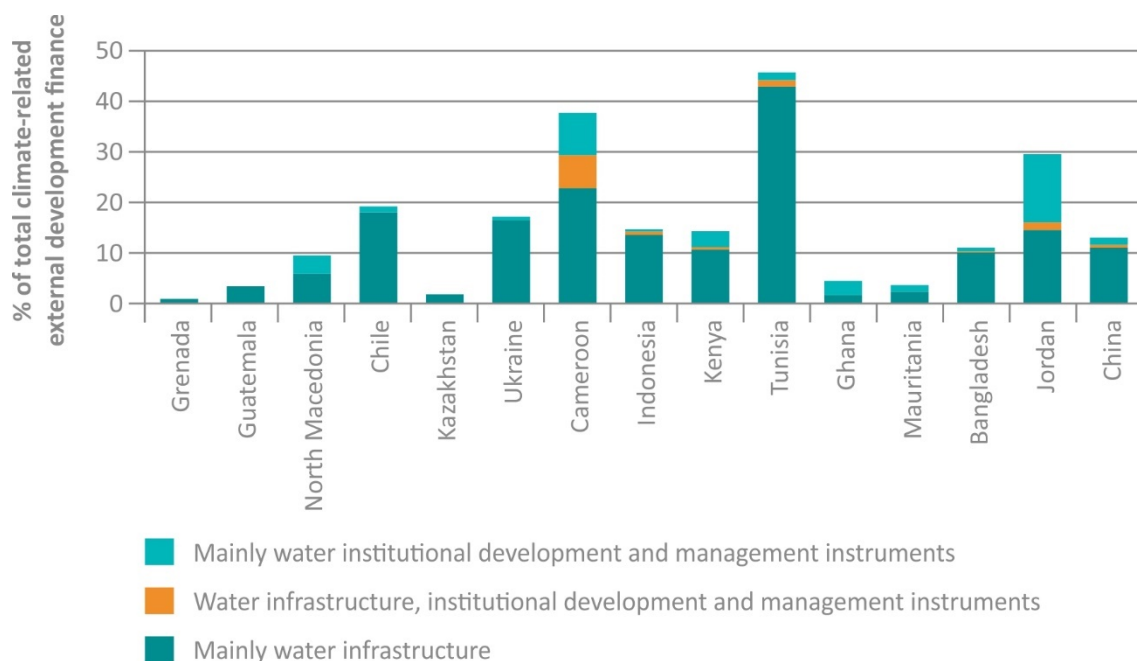
Source: OECD (2019a)

5.5 Countries' efforts to develop adaptation financing strategies present an opportunity to coordinate and integrate their ongoing efforts on project preparation for water resources management within in a wider framework

For those in the water community looking across the financing landscape, the need to direct the different pools and flows of money – be they public or private, international, or domestic – to water infrastructure via project finance, often absorbs all attention. This leaves little time to focus on mobilising resources to build, improve, or sustain institutional solutions for water resources management.

However, many of the countries considered do appear to receive a share of climate-related external development finance commitments for water for activities that relate to institutional development or management instruments in water (Figure 12). Commitments to activities that mainly relate to water infrastructure for water management generally dominate, but this is expected, given that it is often costly, and external development finance is more likely to be used for capital costs than recurrent expenditure such as staff salaries. That countries are seemingly allocating external development finance to institutions and management instruments also fits with a pattern observed in the previous instalment in this series, which reviewed 80 NDCs for water-related components, and found that close to half sought to invest in both water-related infrastructure and some sort of institutional measures for adaptation (GWP, 2018); the same is true for the majority of the 15 countries considered here. However, as the previous study also observed, it is how institutional and infrastructure investments are combined and sequenced that matters. Among the 15 countries, at least, specific institutional complements to different infrastructure measures (e.g. irrigation water permitting alongside irrigation infrastructure), and awareness of their appropriate sequencing, is less often in evidence in NDCs or other climate strategies.

Figure 12. Proportion of 2012–2017 climate-related development finance committed to institutional development and management instruments and/or infrastructure for water management²²



Source: OECD (2019a)

NDCs, and even NAPs, are generally high level and can only go so far in specifying projects in the detail needed to be readily fundable, and in organising them into a ‘pipeline’ of opportunities that can be regularly updated. The lack of such fundable projects and project pipelines is an acknowledged challenge for water resources investments (GWP, 2018; Hedger, 2018; Caldecott, 2018), echoed in the country interviews. Water stakeholders consulted for this research often attributed the gap to capacity issues on the side of the recipients, who need to invest more time and resources in developing projects, and stringent and limiting access requirements on the side of the funders, such as the multilateral climate funds.

There are initiatives seeking to support improvements in the project pipeline for water resources management, in support of climate-resilient sustainable development. Some of these place a strong emphasis on tackling the underlying institutional and capacity challenges for integrated water resources management, as well as gaps in infrastructure. For example, UNEP, as the custodian agency for SDG indicator 6.5.1, has teamed up with GWP and UNDP Cap-Net to develop and offer a *SDG 6 IWRM Support Programme*, initially working with four countries (Ghana, Guatemala, Kazakhstan, and Viet Nam). This programme pilots the use of the SDG indicator 6.5.1 self-assessment process as a starting point to ‘workshop’ a multi-stakeholder dialogue, and identify priorities and actions towards improving performance in implementing integrated water resources management approaches. In the four countries “IWRM (6.5.1) Action and Investment Plans” were developed. These singled out key areas in the countries’ performance against the SDG indicator 6.5.1 that were seen to present specific investment opportunities, including addressing climate-related risks. Going forward, the *SDG 6 IWRM Support Programme* will continue to work with central governments to mainstream integrated water resources management in the articulated response to multiple sustainable development challenges.

However, the problem of weak or missing projects and project pipelines is not isolated to water – it is a challenge for financing low-carbon and resilient infrastructure generally. Barriers common to the water sector in fact affect all sectors, including the capacity of domestic institutions to structure and

negotiate projects; limited ability to undertake rigorous project preparation (including pre-feasibility and feasibility studies); economic factors including costs and returns; and limitations of policy, regulation, and governance (Nassiry and Nakhouda, 2016). Given the common challenges and the need to use finance effectively, it is crucial for the different communities – climate, water, and those working on other water- and climate-relevant SDGs from cities to agriculture, to work together on the overarching investment strategies that can give ‘teeth’ to the measures described in NDCs or NAPs.

Water-related measures in the NDCs and NAPs of the countries are often more a wish-list than a reflection of endorsed, planned, and designed investment opportunities – but the solution is unlikely to be provided by enhancing the water project pipeline in isolation. Going forward, as countries reformulate their NDCs (especially those doing so for Spring 2020) and seek to operationalise them through related strategies and action plans, it will be important that these avoid fragmentation into individual and sectoral projects that may be funded from different sources. An overall vision or strategy to coordinate and channel finance to climate-resilient investments across and between different sectors is crucial. In this regard, Cameroon stands out for having developed a costed National Investment Plan for Climate Change Adaptation, setting out needs, resources, and gaps in national and external finance, in support of its NAP (Republic of Cameroon, 2015c). The document, the development of which was supported by GWP, prioritises four costed programmes. However, the initiative has stalled due to a lack of funding to operationalise the strategy in greater detail – in turn preventing a coordinated and cost-effective approach to financing the NAP programmes. Other countries are working on their own adaptation financing plans. In North Macedonia, the first readiness support programme to the GCF led to an analysis of climate financing, which is being further developed in preparation of a national law and strategy for climate change. Mauritania is also preparing a financing strategy as part of its NAP, with GCF support. Meanwhile Bangladesh is revising its Climate Change Strategy and Action Plan – taking the opportunity to address weaknesses in its original, 2009 iteration, including a lack of prioritisation.²³ External support is increasingly available. For example, the GCF has geared up on readiness as well as further project preparation support, including for the water sector.

5.6 Emerging models for investment can help set a value on water’s contribution to climate resilience, mitigation, and other development goals, and help to tap new revenue streams

The difficulty of valuing the benefits of water resources management projects has also been a challenge in shaping funding applications to climate finance institutions and a barrier to accessing such funding. This is an even bigger barrier to private investment in resilience. The previous research in this series raised the question of whether monetary value can be placed on the (often social and environmental) return from water-related investments, including through mitigation co-benefits (GWP, 2018). The 15 countries’ strategies or documents regarding climate change do not, from our review, engage in depth with the challenges of separating out and valuing economic benefits of water investments. However, there are glimpses of promise in two approaches – nature-based solutions, and circular economy approaches. These appear in some of the 15 countries, and could potentially help the water community to tackle the challenge of valuation as well as other barriers to investment, including delivering mitigation co-benefits and securing or diversifying revenue models to attract private investors.

Nature-based solutions are recognised, albeit at a high level, in several of the NDCs and other strategies assessed in the 15 countries. These include plans or measures that will involve land, forest, and ecosystem management, as well as hard infrastructure for water, from plans to scale up water harvesting in the NDCs of Grenada and Jordan, to watershed and wetland conservation measures indicated in the NDCs of Chile, Tunisia, and China. Focusing on nature-based solutions can open up new revenue streams and modes of payment between public, private, and civil society actors (Box 13), offering different mechanisms to attract private finance. They can provide mitigation

co-benefits, as is amply documented, for example, for the cases of investing in mangroves and wetlands that can act as carbon sinks as well as offering flood protection. Such approaches also encourage a concerted effort to measure and account for the full contribution of water and other natural capital to wealth and wellbeing, which will be needed if these initiatives are to be scaled up (Browder et al., 2019).

Box 13. Financing nature-based solutions for more, cleaner water in Chile and Kenya

The Nature Conservancy has established Chile's first water fund, together with the Metropolitan Region of Santiago, local water utility Aguas Andinas, international businesses, and other NGOs. The water fund model is based on broad partnerships to facilitate investment in natural infrastructure. The Maipo River basin, which sweeps from the Andes to the Pacific, provides 80 percent of the capital Santiago's freshwater needs, as well as supporting industry and agriculture contributing almost half of Chile's GDP. Development and climate change put severe stress on the basin, with a 40 percent drop in water balance projected by 2070, and a reduction of glacier area. However, currently less than 5 percent of the Maipo area is under official protection.

Through the water fund model, parties, usually downstream, contribute financially towards natural solutions that in turn can cut their costs as well as reducing their water-related risks. In the Maipo basin the Nature Conservancy and partners plan to use wetlands, river-side vegetation, and forests to improve the quality and quantity of the water reaching Santiago (TNC, 2019).

In another example from Kenya, the Upper Tana-Nairobi Water Fund, supported by business and industries in Nairobi dependent on the Tana River, has reduced water delivery interruptions caused by sediment spikes by 30 percent since 2013 (NCE, 2018).

Circular economy approaches to addressing water challenges have not been included in the NDCs of many countries, so far. China briefly mentions sludge-to-energy initiatives in its Third National Communication and Jordan mentions wastewater re-use as an adaptation measure in its NDC. Jordan is a global leader in using wastewater reuse to tackle water scarcity constraints, particularly in agriculture (thus supporting SDG 2). However, it has also been able to recover energy, providing climate mitigation co-benefits by using biogas as an alternative to fossil fuels (supporting the energy goal, SDG 7). Crucially, the cost savings and additional revenue opportunities have helped to attract private finance (Box 14).

Box 14. Extracting every drop of value from wastewater in Jordan

Jordan's As-Samra Wastewater Treatment Plant was initially designed in 2003 to treat wastewater for 2.3 million inhabitants of Amman and supply treated wastewater for irrigation to the surrounding region. Upgrading the plant became necessary, due to rapid population growth and an influx of refugees. This was completed in 2015, utilising US\$223 million in blended finance sourced from the Government of Jordan (9 percent), Millennium Challenge Corporation (MCC; 42 percent) and private debt and equity financing (49 percent). As well as providing international funding that addressed a 'viability gap' for private investors, MCC also acted as transaction advisors in preparing the project (World Bank, 2016) underscoring the value of project preparation support from international or regional organisations.

Current water scarcity and population growth, rather than climate change, provided the original motive (World Bank, 2016). However, in 2018 the European Bank of Reconstruction and Development (EBRD) and the EU agreed to support a further expansion in capacity, aiming for multiple co-benefits: increasing local communities' resilience, energy recovery from treated sludge, and improved water flows (thus contributing to energy security and climate change

mitigation), as well as addressing additional needs created by the Syrian refugee crisis (EBRD, 2018). This points to the potential for climate change to act as an additional motivator for private finance in cases where there are clear financial savings – either through water reuse and efficiency (where water is priced effectively) – and new value opportunities, for example energy recovery.

5.7 Financing transboundary cooperation on climate change and water raises particular challenges and opportunities that need to be considered from the earliest stages of project development

The 15 countries analysed for this study are generally involved in some kind of recent transboundary or regional water project with a strong climate change dimension, which offers opportunities for strengthening water resources management in the context of shared climate risks. Examples that have secured financing from the multilateral climate funds and which show a welcome focus on cooperation to strengthen institutions and mechanisms for water resources management and early warning across river basins and lakes include:

- **Programme for Integrated Development and Adaptation to Climate Change in the Niger Basin** (2019–2024, US\$205 million) involving Cameroon, Benin, Burkina Faso, Chad, Côte d’Ivoire, Guinea, Mali, Niger, and Nigeria, which aims to increase water security and climate resilience in the basin, including through catalysing multi-state cooperation to balance conflicting water uses, considering climate variability and change.
- **Integrating Flood and Drought Management and Early Warning for Climate Change Adaptation in the Volta Basin** (2018–2022, US\$8 million) involving Ghana, Benin, Burkina Faso, Côte d’Ivoire, Mali, and Togo, which aims to assist the six Volta Basin countries in implementing coordinated and joint measures to improve existing flood and drought management plans and to enhance early warning systems at local, national, and regional levels.
- **Adapting to Climate Change in Lake Victoria Basin** (2018–2021, US\$5 million) involving Kenya, Tanzania, Uganda, Burundi, and Rwanda, which supports institutions to integrate climate resilience into transboundary water catchment management, among other activities.
- **Senegal River Basin Climate Change Resilience Development Project** (2013–2021, US\$85 million), involving Mauritania, Guinea, Mali, and Senegal, which aims to strengthen transboundary water resources management in the Senegal River Basin through institutional strengthening, knowledge generation and dissemination, and piloting of programmes on climate change adaptation and integrated water management across all four countries.

However, given that these initiatives are generally new and untested, it is important to consider lessons from the wider literature. This suggests that, when it comes to financing transboundary basin projects, these can present particular risks and complexities that must be considered at the earliest stages of project preparation – and when implementing the projects themselves. Some risks arise from the dispersed legal mandate and responsibility for implementation, the involvement of multiple countries, and the question of how to distribute upstream or downstream benefits and commitments. The transboundary context can also offer opportunities, however, including the potential to leverage greater resources and distribute risks across more parties – both of which are easier to realise where transboundary basin organisations are already in place.

A further complexity is that climate change financing mechanisms and their associated procedures and project cycles are often better suited to national projects, and even officially established basin organisations may not be able to access funding directly. For example, the GCF is accessible only to approved National Designated Authorities. For the GCF to finance a transboundary project requires

regional and national organisations to cooperate right from the concept stage. Given these issues, and building on previous research (World Bank, 2019b), to access climate finance for transboundary basin projects, individual countries and basin-level organisations could consider:

- Identifying the core climate change challenge, including the vulnerabilities common to, and differentiated between countries, and reasons for these;
- Ensuring the design and scope are climate-specific, responding to specific climate change impacts and demonstrating the additional benefits of a transboundary approach;
- Understanding the financing landscape, including public and private sources, across all involved countries, and establishing relationships with financing partners, matching needs to funding sources at the early planning stages.

6 Key messages and suggested way forward

Across the countries considered, the analysis has identified major deficiencies in the first round of NDCs, as well as in NAPs and in broader sustainable development strategies. Most commonly these fail to recognise or leverage crucial inter-relationships between water resources on the one hand and other sustainable development goals on the other, including climate action. Strong institutions and effective management instruments for integrated water resources management will be essential to support climate-resilient sustainable development but are largely inadequate in the 15 countries considered in this analysis. National policy makers face a bewildering array of financing options for climate-related water action, but deeply ingrained barriers to connecting these with viable investment opportunities. In all of the countries, however, there are bright spots and islands of success on which to build. Scaling these up and out will only happen if the different communities – climate, sustainable development, disaster risk reduction, and water – work together, and do so more frequently and effectively than ever before.

All parties to the UNFCCC are invited to submit new or updated NDCs at the end of 2020, offering a near-term window of opportunity for improvements. The years of refinement and ratcheting-up of ambition to 2030 and beyond also offer opportunities, with the key medium-term window provided by the 2023 Global Stocktake. Parallel processes for the 2030 Agenda and the Sendai Framework for Disaster Risk Reduction, including the annual High-Level Political Forum, voluntary national reviews, and the Global Platform for Disaster Risk Reduction, also open the space to review progress and increase ambition.

This report has offered key messages in relation to each of the areas investigated. In turn, these messages give rise to more specific recommendations for four audiences: national policy makers, including focal points for the SDGs and the UNFCCC, designated authorities for the climate funds, and ministers of water, environment, planning, and finance; other national stakeholders such as civil society and business; development partners, including bilateral donors, multilateral institutions, and the climate funds; and transboundary and regional organisations. These complement and build on the growing action on climate change adaptation and water, including the Global Commission on Adaptation's 2019 report, *Adapt Now: A Global Call for Leadership on Climate Resilience* (GCA, 2019).

6.1 National policy makers

- NDC and NAP focal points, as well as designated authorities to the climate funds, can work with the support of the water community to ensure that appropriate water-related climate measures are included in national climate strategies – starting with the NDC update for Spring 2020.
- NDC and NAP focal points and others (e.g. finance and planning ministries), with the support of the water community, can identify what their water adaptation needs are and turn their NDC and NAP ambitions into concrete financing strategies. These can set out multisectoral project proposals and pipelines – the water community in particular can feed in strong project pipelines to support this effort, and can use integrated water resources management as an entry point. Those undertaking these efforts can seek support from the many readiness and capacity-building initiatives available.
- Ministries of water can make a better case for integrated water resources management as an enabler for sustainable development and climate resilience across sectors. Integrated water resources management is not just a water project, or an approach to adaptation within the water 'sector' – it is a means of securing long-term economic and livelihood gains in the face of mounting pressures from climate and other drivers of change. But that case should be carefully tailored to local circumstances and capabilities, with a focus on the fundamentals of

what an integrated water resources management approach entails in different environmental, social, economic, and political circumstances.

- Ministries and the wider communities responsible for climate and water can collaborate to strengthen national frameworks for science-based climate information and prediction. From the start, it is important to plan for how this information will be incorporated into decision-making. Support can be sought from existing initiatives such as the Global Framework for Climate Services.
- Ministries of finance can lead on the development of fiscal frameworks and tracking mechanisms to improve the coordination and efficiency of climate-related spending. Ministries of water and other water sector stakeholders can work with them to ensure water resources management is appropriately incorporated.
- Ministries of finance, together with other ministries, can use a wider range of tools to direct more household and private investment to water and climate change adaptation, including financial policies and regulations, fiscal policy levers, and information instruments. They can also collaborate more to understand and tackle systemic barriers to fundable project pipelines in water and water-related sectors, including weak project preparation, low cost recovery, and political interference
- Ministries and focal points responsible for climate change, water, and other cross-cutting issues can review the coordination and reporting requirements for the 2030 Agenda for Sustainable Development, Paris Agreement, and Sendai Framework for Disaster Risk Reduction, and ensure they are aligned with existing government processes and national development objectives wherever possible. This can include efforts to develop more efficient approaches to cross-sectoral coordination across different cross-cutting issues, such as water and climate, or the climate-water-food-energy nexus – involving non-state actors in a participatory manner wherever possible.

6.2 National non-state actors

- Civil society organisations can play an important brokerage role as intermediaries working at the interface between climate/water science and its application in integrated water resources management. In particular, there is a growing need to bridge the divide between the science-driven metrics of climate, and the needs of end users in making informed decisions about how to plan for uncertain water futures. The gap – in metrics, institutions, and understanding – could be bridged by trusted ‘third party’ groups and individuals.
- Civil society organisations, business, and water user organisations can advocate for greater representation in intersectoral dialogue and coordination in water and climate. This could support more appropriate responses. These, in turn, are more likely to attract international funding, as well as promote transparency and accountability. It can also help to ensure non-state actors’ own contributions – financial and non-financial – are aligned with government and development partner efforts.
- Civil society and research organisations in the water sector can engage more with efforts to track climate finance and build evidence to advocate for more and better finance for water-related climate action across sectors.
- Businesses can explore opportunities to support nature-based solutions and circular economy approaches that can reduce operating costs while also improving the resilience of their business models to water-related impacts of climate change.
- Research organisations can generate better evidence to show how water management and infrastructure are essential in building economy-wide resilience, with benefits for growth and jobs. Such evidence can, in turn, help shape public investment priorities.
- Civil society organisations and networks, particularly those that are well integrated into both country and regional processes, can help to broker transboundary and regional cooperation on climate change where there is stalemate. They can also build and share evidence of the

benefits – both in the near term (e.g. annual climate, disaster risk reduction, and SDG meetings) and the medium term (e.g. the Global Stocktake).

6.3 Development partners

- Development partners can support capacity-building to improve countries' understanding of their existing water resources and how climate change will impact these in combination with other drivers of change. They can also help countries in project development phases to design climate-resilient infrastructure projects that appeal to funders, but which are backed with an appropriate emphasis on strengthening institutions and management instruments, and make the case for parallel support for water resources management.
- Development partners can establish a global learning network on how to fund, drive, and scale regional and transboundary cooperation on water. This could bring together the experience of multilateral development banks, bilateral donors, the climate funds, and regional economic commissions – building on the work of organisations such as the World Bank and UNECE.
- Development partners can offer funding and technical support for institutional strengthening on water and climate, in ways that support countries to develop their own fit-for-purpose approaches, based on an understanding of wider social and political pressures facing decision-makers in each country.
- Development partners can coordinate more effectively at all levels and develop mechanisms to mediate across the global policy frameworks – the 2030 Agenda, the Paris Agreement, and the Sendai Framework, as well as others such as the humanitarian Grand Bargain. A key concern is reducing transaction costs for country engagement in multiple initiatives.
- Development partners can work with civil society and research organisations to bridge knowledge and advocacy gaps. Examples of areas for attention include improving valuation techniques to capture the full economic and financial benefits of water-related climate change adaptation measures; and developing a strong case for including integrated water resources management for climate-resilient sustainable development as a focal cross-cutting issue within the 2023 Global Stocktake under the Paris Agreement.
- Agencies responsible for monitoring integrated water resources management can introduce a more explicit focus on climate change into assessments; for example, future rounds of monitoring for SDG indicators 6.5.1 and 6.5.2. This could encourage countries to think through how their efforts on integrated water resources management support climate action.

6.4 Transboundary and regional organisations

- Transboundary river basin organisations and regional economic communities can work with their members to identify and secure funding for transboundary and regional cooperation on water, climate, and disasters, and support implementation of funded initiatives.
- Regional development banks and regional economic communities can encourage dialogue around climate change between countries that lack operational transboundary basin agreements, using existing frameworks including the Water Convention, the Watercourses Convention, and the Draft Articles on the Law of Transboundary Aquifers.
- Transboundary river basin organisations, regional economic communities, and regional development banks can help strengthen cooperation between countries and across sectors and stakeholders. They can provide a platform for networking, and for sharing of data, information, and good practices.

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Endnotes

¹ NDCs should be submitted to UNFCCC 9–12 months before the Conference of the Parties serving as the meeting of the Parties to the Paris Agreement (CMA; Hackmann, 2016)

² Paragraph 30(g) (UNISDR, 2015)

³ “... Actions that may lead to increased risk of adverse climate-related outcomes, increased vulnerability to climate change, or diminished welfare, now or in the future” (IPCC, 2014a)

⁴ The SDG indicator 6.5.1 baseline status is derived from countries’ self-assessment of their progress in implementing integrated water resources management, using a questionnaire with 33 questions divided across four sections (enabling environment, institutional frameworks, management instruments, and financing). Guidance was provided to allow respondents to score the country’s progress against each question. The questions scores were averaged within and across sections to derive an overall implementation score, which was then grouped into one of six implementation status categories: very low (score of 0-10), low (11-30), medium low (31-50), medium high (51-70), high (71-90), and very high (91-100)

⁵ One question (of 33) – question 2.1b – assesses “Coordination between national government authorities representing different sectors on water resources, policy, planning, and management”. The guidance notes identify climate as well as energy, agriculture, and environment as examples of ‘sectors’. A further question – question 3.1e – asks about “Management instruments to reduce impacts of water-related disasters from the national level”

⁶ <https://klimalog.die-gdi.de/ndc-sdg/>

⁷ Key informant interview

⁸ Key informant interview

⁹ Chile shares transboundary river basins with Argentina, Bolivia, and Peru: Argentina-Chile – Aysen, Aviles, Baker and Carmen Silva Chico, Palena, Comau, Pascua, Cullen, Puelo, Rio Grande, San Martin, Gallegos/Chico, Seno Union/Serrano, Valdivia, Lake Fagnano, Yelcho; Bolivia-Chile – Cancoso/Lauca; Bolivia-Chile-Peru – Lake Titicaca-Poopo System; and Argentina-Bolivia-Chile – Zapaleri

¹⁰ Key informant interview

¹¹ Key informant interview

¹² Official website of the Global Framework for Climate Services: <https://gfcs.wmo.int/national-action-plans>

¹³ Key informant interview

¹⁴ Key informant interview

¹⁵ Key informant interview

¹⁶ Programme for Integrated Development and Adaptation to Climate Change in the Niger Basin, <https://www.greenclimate.fund/projects/fp092>; Integrating Flood and Drought Management and Early Warning for Climate Change Adaptation in the Volta Basin, <https://www.adaptation-fund.org/project/integrating-flood-drought-management-early-warning-climate-change-adaptation-volta-basin-benin-burkina-faso-cote-divoire-ghana-mali-togo/>; and Adapting to Climate Change in Lake Victoria Basin, <https://www.adaptation-fund.org/project/adapting-climate-change-lake-victoria-basin-burundi-kenya-rwanda-tanzania-uganda/>

¹⁷ Respondents to the questionnaire are encouraged to consider co-funding from loans or grants, but given that much of this is likely to be off-budget it is not always clear how far countries are assessing their ability to finance from domestic sources, vs. international

¹⁸ OECD DAC External Development Finance Statistics. Accessed 14 October 2019. Available at: <http://www.oecd.org/dac/financing-sustainable-development/development-finance-topics/climate-change.htm>. Based on the authors’ analysis of total bilateral and multilateral climate-related external development finance commitments for five years (2012–2017) sourced from individual files for “Climate-related development finance at the activity level”, for 2012–2013, 2014–2015, and 2016–2017. These files compile activities tagged as ‘climate-related’ by contributors using the Rio markers. Activities assumed to focus on water comprise: agricultural water resources (sector: agriculture); hydroelectric power plants (sector: energy generation, distribution, and efficiency); flood prevention/control (sector: general environment protection); basic drinking water supply; basic sanitation; basic drinking water supply and basic sanitation; water supply – large systems; sanitation – large systems; water supply and sanitation – large systems; river basins’ development; education and training in water supply and sanitation; water resources conservation;

and water sector policy and administrative management (sector: water supply and sanitation). NB This may not capture all bilateral and multilateral climate-related finance for water-related activities. For example, commitments relating to early warning systems and inland water transport are often amalgamated within other activities unrelated to water. Data are for country-specific activities; regional activities where no specific country is named are excluded. Guarantees are excluded from the DAC statistical system

¹⁹ Data collated by Climate Funds Update (<https://climatefundsupdate.org/>), updated February 2019. This collates project-level data from the multilateral climate funds and categorises projects, among other parameters, according to their main sectoral focus, using the OECD DAC sector classification. The total of US\$0.1 billion (US\$125 million) was derived by applying the same sector classification as those applied for climate-related external development finance. However, any comparison with total climate-related external development finance is approximate, due to slight discrepancies in the classifications used. Regional, multi-country and global projects are excluded

²⁰ Financial policies and regulations can be outside of the domain of individual countries. These can include regional central banking institutions, but also regulations such as Basel III and Solvency II put in place after the financial crises that can influence investment flows in emerging markets (see e.g. CISL and UNEP FI, 2014)

²¹ See endnote 18 for how external development assistance commitments are classed as 'climate-related'. For the purpose of this chart, 'water-related' activities were selected and in some cases grouped, as follows: agricultural water resources (sector: agriculture); hydroelectric power plants (sector: energy generation, distribution, and efficiency); drinking water and sanitation – basic, grouping the following: basic drinking water supply, basic sanitation, basic drinking water supply and basic sanitation (sector: water supply and sanitation); drinking water and sanitation – large, grouping the following: water supply – large systems, sanitation – large systems, water supply and sanitation – large systems (sector: water supply and sanitation); flood prevention/control (sector: general environment protection); other water resources management, grouping river basins' development, education and training in water supply and sanitation; water resources conservation; and water sector policy and administrative management (sector: water supply and sanitation). Data source: OECD (2019a)

²² Based on a crude categorisation of certain activities that are, according to the definitions used by the OECD Development Assistance Committee, more likely to involve predominantly 'hard' infrastructure investments or 'soft' institutional and management investments. For the purpose of this chart, the 'Mainly water infrastructure' category includes agricultural water resources (sector: agriculture); hydroelectric power plants (sector: energy generation, distribution, and efficiency); flood prevention/control (sector: general environment protection); basic drinking water supply; basic sanitation; basic drinking water supply and basic sanitation; water supply – large systems; sanitation – large systems; water supply and sanitation – large systems (sector: water supply and sanitation). The 'Water infrastructure, institutional development, and management instruments' category includes river basins' development (sector: water supply and sanitation). The 'Mainly water institutional development and management instruments' includes education and training in water supply and sanitation; water resources conservation; and water sector policy and administrative management (sector: water supply and sanitation). Data source: OECD (2019a)

²³ Key informant interview



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