POLICY BRIEF

Putting water at the centre of ambitious NDCs

The effective use and governance of water is vital for climate mitigation and adaptation. Accordingly, water-related measures are included in many nationally determined contributions (NDCs) to the Paris Agreement. However, the adoption of more quantitative water targets and greater cross-sectoral integration will not only improve countries' climate mitigation and adaptation activities, but further strengthen water security, identify co-benefits and trade-offs in water use, protect ecosystems, and improve countries' business cases for investment in water.

Authors

David Hebart-Coleman, SIWI

David Mountain, Scriptoria

Water and climate change

The use and governance of water sits at the heart of many environmental and development challenges, including climate change, that are faced by all countries. At the same time, increasingly frequent extreme weather events and long-term hydrological shifts due to climate change are already significantly impacting the water cycle in various ways in many parts of the world – reducing water availability and quality, increasing the risk of water-borne disease, and contributing to environmental pollution and habitat degradation.

Climate mitigation and adaptation measures must therefore focus on water as a priority. Failure to do so will not only be dangerous and costly, but will make it much more difficult, if not impossible, for countries to achieve their climate goals. This will further increase competition for water between sectors and countries, exacerbating the effects of climate change and increasing the risk of migration and conflict.

Nationally determined contributions

Established by the 2015 Paris Agreement, NDCs document how countries intend to reduce greenhouse gas emissions and adapt to the impacts of climate change. All 195 parties of the Paris Agreement are required to produce new or updated NDCs every five years, with the next iteration due in 2025. As the main vehicle for achieving the Paris Agreement's goals, each new or updated NDC is expected to contain more ambitious targets for climate action than its predecessors, as well as clear policies and measures for achieving these targets. This emphasis on continual improvement has made NDCs an increasingly important tool not only for climate goals, but for coordinating climate and development plans and the sectors they encompass.

Recognizing the vital importance of water in climate action and sustainable development – and the growing urgency of climate and water security issues – water

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features increasingly prominently in the majority of NDCs. A 2023 assessment by SIWI found that approximately 85 percent of new or updated NDCs from lower- and middle-income countries (LMICs) include more details and measures about water-related climate vulnerabilities and impacts than previous iterations (UNDP-SIWI Water Governance Facility, 2023). These include measures to support integrated water resource management (IWRM), investment in water capacity development, and water, hygiene and sanitation (WASH) activities. New and updated NDCs also show an increased understanding of the role of ecosystems in addressing water and climate challenges, whether through ecosystem services, nature-based solutions or carbon sinks such as wetlands, peatlands and mangroves.

A lack of measurable targets

However, there remains significant scope to improve water-related measures in the 2025 iteration of NDCs. In particular, there is a widespread lack of measurable, time-bound and quantitative water-related targets. In the first round of NDCs, for example, 106 policies and measures for water-related challenges were accompanied by just 17 water-related targets (Swedenborg et al, 2022). This is coupled with a frequent reliance on vaguely worded targets, with promises to "promote" or "develop" water use but no details. These tendencies are compounded by a lack of baseline data against which progress towards a target can be measured. This is in contrast to other sectors, such as energy, transport and agriculture, for which most NDCs provided quantifiable targets and, for mitigation measures, baseline data. Furthermore, water-related mitigation measures rarely modelled the impacts of measures on either emissions reductions or the environment and hydrology of local areas.

This lack of specificity in water-related targets makes it very difficult to evaluate the contribution of water-related measures to climate adaptation and mitigation or to a country's commitment to broader climate goals and measures, such as the Sustainable Development Goals (SDGs). The resulting uncertainty risks dissuading funders from investing in a country's water-related adaptation and mitigation measures, as it is often unclear what is being proposed, the scale of investment required, how investment impacts will be measured or when results can be expected. This is particularly true for adaptation measures, which tend to be less target-oriented than mitigation measures, lacking as they do mitigation's overarching metric of CO_2-equivalent emissions. As international development becomes increasingly reliant on private investment – which typically demands greater accountability and impact efficiency for its investments compared to public donors – the lack of measurable, time-bound and quantitative water-related targets may therefore prevent LMICs from securing necessary climate funds.

Sectoral silos persist

Another important issue with NDCs is a lack of coordination between sectors, with most NDCs simply assuming that the necessary quantity and quality of water will be available to carry out their various sectoral climate mitigation and adaptation measures across all sectors (Swedenborg et al, 2022), despite recognizing risks that climate

change poses to water security. This assumption does not sufficiently consider the numerous and far-reaching links between water use and availability across all water-dependent sectors.

For example, energy generation – with the exception of wind and solar – is water intensive, accounting for ten percent of worldwide freshwater withdrawals. This includes not only the vast reserves of water required for hydropower, but the water needed to cool thermoelectric plants. An NDC measure to reduce carbon emissions by burning more biomass, therefore, will increase the energy sector's water consumption, potentially depriving other sectors of sufficient water to meet their own needs. Ironically, this may include agriculture – the very sector required to boost biomass production. Conversely, plans to increase agricultural production through irrigation may divert water away from reservoirs, reducing energy generation via hydropower and increasing a country's reliance on fossil fuels. Many more examples of competing water uses could be given across a wide range of sectors – forestry, fisheries, WASH, urban planning – each illustrating how uncoordinated water use in one can have cascading and ultimately self-defeating impacts on the water security and climate commitments of all sectors.

Such cross-sectoral impacts of water use for climate mitigation and adaptation are generally not discussed in current NDCs. The 2023 SIWI study found, for instance, that only 16 percent of assessed NDCs contain adequate detail about water and energy interactions (UNDP-SIWI Water Governance Facility, 2023). This is particularly true for mitigation measures, which – despite often requiring reliable access to water – are rarely considered in terms of availability of water resources or their possible impact on local hydrological conditions. As a result, the NDC measures risk increasing inter-sectoral competition for limited water resources. This, in turn, will reduce water-use efficiency, constrain mitigation and adaptation measures, and prevent countries from achieving their NDC goals and Paris Agreement commitments.

Set measurable, time-bound and quantitative targets

As parties to the Paris Agreement create new and updated NDCs for 2025, both of these issues represent a major opportunity to improve water-related measures and targets. First, countries need to provide more, and more quantitative, targets. Where possible, these should be accompanied by baseline data. Targets and data should make it clear for each measure what is being proposed, what quantifies successful implementation, how successful implementation will be measured, how much investment is needed to achieve it and whether the required commitment is conditional or unconditional. Mitigation measures should also be accompanied by modelling to show how they will contribute to emissions reductions and how mitigation activities may impact local ecosystems and hydrology.

The NDC for Bolivia, for example, includes the following quantitative, time-bound target: "1.3 million hectares under efficient irrigation will have been reached by 2023." It also accompanies this target with information on baseline conditions and the conditionality of the target (Government of Bolivia, 2022). Quantitative measures like

these can not only fulfil a country's obligation to increase the ambition of its NDC with every iteration, but also make it easier for investors to evaluate the effectiveness of measures, possibly improving the business case for investment.

Improve cross-sectoral coordination

The second major opportunity to improve water-related measures – particularly adaptation measures – is to better acknowledge the links between water use and availability across sectors, especially for mitigation measures, accompanied by cross-sectoral integration of water measures. This will identify possible trade-offs and areas of potential conflict over shared water resources. More positively, it may also uncover co-benefits of water-related measures. The revised NDC for Nigeria, for example, notes how the restoration of degraded watersheds and wetlands will not only protect water resources, but also conserve ecosystems and enhance carbon sequestration (Government of Nigeria, 2021).

Greater cross-sectoral integration can be achieved in part by adopting planning strategies that support collaboration across sectors, such as basin planning or watershed planning, as well as a stronger emphasis on integrative water governance strategies and tools, such as IWRM, water–energy–food nexus approaches and source-to-sea governance. It is important that NDCs explicitly state how these strategies and tools will be used to implement measures, rather than simply including them as standalone measures. Similarly, individual measures should explicitly link trade-offs and co-benefits between sectors. NDCs should include detailed information on these measures, including how they will coordinate with actions in other sectors, whether their implantation is reliant on other measures, and the risks that this will affect the implementation of other measures.

Water quality is one area that will particularly benefit from more integrative NDCs. Highly polluted water not only impacts WASH and biodiversity, but has been shown to emit significant levels of greenhouse gases. Water pollution should therefore be considered in terms of climate mitigation and adaptation. Despite this, only 32 percent of NDCs from LMICs address water quality (Hebart-Coleman, 2023). Of those, most raise the issue only in relation to wastewater problems, and very few include measures to reduce water pollution. This is a missed opportunity: commitments to improve water quality may yield significant co-benefits for countries towards their WASH, environmental and climate goals.

National targets, international impacts

The principle of integration can, and should, be extended to countries sharing transboundary basins. Just as mitigation and adaptation measures in one sector are likely to affect water availability for other sectors, so will water-related actions in one country likely impact the quantity and quality of water in countries that share water resources. For example, concerns have been raised that uncoordinated and excessive extraction of the Tuli Karoo transboundary aquifer, shared by Botswana, South Africa and Zimbabwe, may lead to future conflict (Gomo and Vermeulen, 2017). Despite

many examples such as this, NDCs currently pay little attention to the needs of neighbouring countries and do not include transboundary measures. Where political sensitivities do not prevent greater international cooperation, there should be more investment in exchanges between countries and the sharing of commitments. Countries should allow more time to prepare NDCs in order to accommodate these exchanges.

International integration can be further strengthened by meaningfully acknowledging water's central role in a wide range of global environmental and sustainable development frameworks, such as the SDGs, the Ramsar Convention on Wetlands and the Sendai Framework for Disaster Risk Reduction. For instance, NDCs should explore how their water measures and targets might productively interact with ongoing SDG-related activities and exploit any possible co-benefits of these interactions – something which very few NDCs currently do. Countries should also establish long-term strategies to direct commitments made in their NDCs and coordinate their relation to other national and international frameworks.

Case study: Data and cross-sectoral collaboration inform Panama's NDC process

SIWI's 2023 review of the inclusion of water in NDCs identified several countries whose NDCs contained more ambitious and detailed water-related measures and targets than most countries. Panama was one of those countries.

Increasing water challenges

Panama has abundant water resources, with almost 500 rivers, dozens of lakes and both Atlantic and Pacific coasts. Hydropower accounts for two-thirds of its energy production, and the Panama Canal remains at the heart of the national economy. Accordingly, the Government of Panama is keenly aware of water's essential role in the country's continued social and economic development.

Yet despite its importance, the country's traditional abundance of water resources meant that water was not a focus of Panama's first NDC, submitted in 2016, which instead prioritized climate mitigation through the energy and forestry sectors. However, the increasing impacts of the climate crisis in Panama in recent years – including droughts, floods and more frequent and intense storms – have led policymakers to reassess this stance. The country's increasing water challenges are exemplified by the 2023–2024 drought, which forced authorities to impose water-saving measures for the Panama Canal and reduce the number of ships which could pass through it. Panama's small size compounds such challenges, with impacts in one part of the country often affecting other regions.

Cross-sectoral collaboration

Changing conditions and attitudes influenced Panama's updated NDC, submitted in 2020 (Government of Panama, 2020). The updated NDC was significantly broadened to include ten priority sectors – reflecting both Panama's vulnerability to climate change and its relatively low greenhouse gas emissions.

The water-related measures in Panama's updated NDC are notable for several reasons. First, they recognize the cross-sectoral impacts of climate change and were informed by water–energy–food nexus thinking. This was achieved thanks to the Ministry of Environment's cross-sectoral approach to NDC development, whereby key sectoral actors were consulted on their understanding of their respective sectors, their future goals for the sector and the support they need to achieve this. By highlighting the practical limitations facing each sector, these consultations also ensured that the NDC's water-related measures remained ambitious, but were not so ambitious as to be unachievable.

Establishing cross-sectoral NDC development initially proved a challenge, as many actors in other sectors did not appreciate the importance of creating an ambitious NDC, or why they should be involved in the process. To address this, the Ministry of Environment produced communications about the urgency of the climate crisis and impressed upon sectoral actors that cooperation in the NDC process had become an important step to receiving national and international support for their sector. If sectoral priorities are not included in Panama's NDC, it is much harder for the country to justify their importance to potential donors and partners, or to specify the type of support required – whether capacity building, technology transfers or financial support.

Data challenges

Another challenge in developing Panama's NDC – one shared by many other countries – has been providing quantifiable targets to track progress on its water-related measures, particularly for adaptation measures. This is partly due to a lack of accessible in-country data on climate change and water. Before 2018, climate modelling exercises were carried out by external consultants who did not share their data with in-country experts.

To help address this issue, the Government of Panama, with the support of international partners, is now improving the capacity of in-country technicians to fill data gaps and run national and watershed-level climate-change scenarios. The country is also using its national monitoring and evaluation system to aggregate existing data currently held by different institutions throughout the country. This aggregated data will then be used to assess how adaptation efforts are progressing in Panama and to identify remaining data gaps.

Panama's second NDC, due to be submitted in 2024, will build on its predecessor's achievements with more water-related measures and targets. Watershed management has been chosen as a particularly urgent priority for the second NDC, owing to the

country's social and economic dependence on its watersheds. As the Government of Panama looks ahead to subsequent NDCs, the principles identified in its updated first NDC – measures grounded in the best available science and data, and developed using cross-sectoral collaboration – will continue to inform its water-wise climate planning.

Recommendations

Set measurable, time-bound and quantitative targets accompanied by baseline data

Each water-related measure should have a target that makes it clear what is being proposed, how implementation will be measured, what quantifies successful implementation, how much investment is needed to achieve it and whether the required commitment is conditional or unconditional.

Integrate water measures across sectors

Acknowledge the links between water use and availability across sectors and identify possible trade-offs, co-benefits and potential conflicts over shared water resources. Use planning strategies that support collaboration across sectors, such as basin planning or watershed planning, as well as a stronger emphasis on integrative water governance strategies and tools, such as IWRM, water–energy–food nexus approaches and source-to-sea governance. Cross-sectoral integration is especially important for mitigation measures, which often depend on a reliable supply of water.

Include more water-related mitigation measures

Water and water-related activities are rarely regarded as mitigation priorities, despite the essential role they play in climate action. However, water-related mitigation measures are very rarely included in NDCs. Countries need to recognize water-related mitigation measures as priorities and include more in their NDCs.

Strengthen international cooperation and integration

Invest in international exchanges and share commitments with countries using transboundary basins. Allow for more time to prepare NDCs to incorporate the results of these international exchanges into water-related measures and targets.

Connect NDCs to global environmental and sustainable development frameworks, such as the SDGs and the Ramsar Convention

Investigate and state how water-related measures and targets might productively interact with ongoing SDG-related activities and exploit any possible co-benefits of these interactions. Establish long-term strategies to direct commitments made in NDCs and coordinate their relation to other national and international frameworks.

Consider water pollution in terms of climate mitigation and adaptation

Invest in research to better understand the links between water quality, freshwater ecosystems and climate change. Include measures and targets to reduce water pollution and improve water quality.

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About this policy brief

This policy brief is based on the 2023 report Water in the Nationally Determined Contributions: Increasing Ambition for the Future, authored by David Hebart-Coleman.

Acknowledgements

Thanks to Mabel Zúñiga, Ministry of Environment, Panama, for her insights into Panama's NDC process.

About SIWI

SIWI is a leading water institute, focused on water governance and capacity building in order to reach a just, prosperous and sustainable water wise world. It is well-known for its research, knowledge generation, and applied science, which helps to develop policy recommendations and supports the implementation of programmes. In addition, SIWI uses its trusted convening power to facilitate multi-stakeholder dialogues, most evident in its annual event, World Water Week.

Stockholm International Water Institute
Kabyssgatan 4D • 120 30 Stockholm • Sweden
Visiting Address: Hammarbybacken 31
Tel. +46 8 121 360 00 • www.siwi.org

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