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United Nations Conference on the Midterm Comprehensive Review of the Implementation of the Objectives of the International Decade for Action, "Water for Sustainable Development", 2018–2028
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Item 9 of the provisional agenda*
Interactive dialogues

Interactive dialogue 3: Water for climate, resilience and environment – source to sea, biodiversity, climate, resilience and disaster risk reduction

Concept paper prepared by the Secretariat**

Summary

The present concept paper was prepared pursuant to paragraph 9 (d) of General Assembly resolution 75/212, in which the Assembly requested the Secretary-General of the 2023 United Nations Conference on the Midterm Comprehensive Review of the Implementation of the International Decade for Action, "Water for Sustainable Development", 2018–2028 (United Nations 2023 Water Conference) to prepare concept papers on each of the themes of the interactive dialogues, taking into account the relevant water-related processes of the Assembly and other possible contributions. The present paper concerns interactive dialogue 3, entitled "Water for climate, resilience and environment: source to sea, biodiversity, climate, resilience and disaster risk reduction" (Sustainable Development Goals and targets 6.5, 6.6 and 11.5 and Goals 7, 13, 14 and 15). In the paper the challenges, current status, opportunities for progress, transformative solutions and recommendations related to the interlinkages between water, climate, resilience and environment are set out.

* A/CONF.240/2023/1.

** The present concept paper contains contributions from Member States, the United Nations system and a diverse group of stakeholders. See also https://sdgs.un.org/conferences/water2023/documentation; and United Nations, Department of Economic and Social Affairs, "United Nations 2023 Water Conference: Global Online Stakeholder Consultation for the Proposed Themes of the Interactive Dialogues – summary report", October 2022.

I. Introduction

1. The world is not on track to achieve Sustainable Development Goal 6 – water and sanitation for all and related goals and targets by 2030.[1] Water provides social, cultural, environmental, economic and political values. It connects and supports terrestrial, freshwater and marine ecosystems through the hydrological cycle. The coronavirus disease (COVID-19) pandemic highlighted the inextricable linkages between water and the three pillars of sustainable development, as well as the need to build resilience, in particular in communities most at risk. These links are cross-cutting and underpin the achievement of all the Sustainable Development Goals.

2. Water is a critical determinant for achieving internationally agreed goals and targets, including those contained in the 2030 Agenda for Sustainable Development, the Paris Agreement of 2015 and the Sendai Framework for Disaster Risk Reduction 2015–2030.[2] In the Secretary-General's Plan: Water Action Decade 2018–2028, water is recognized as being at the heart of these recent agreements.[3] The role of water is also recognized in the recently adopted 2022 Kunming-Montreal Global Biodiversity Framework, replacing the Aichi Biodiversity Targets.

3. Increasing climate extremes and variability, coupled with unsustainable growth and consumption, are leading to more severe and frequent water-related disasters and risks, worsening environmental degradation, including pollution, increasing water temperatures and ecosystem loss and profoundly affecting economies, societies and the environment.[4] This in turn undermines the natural ability of ecosystems to combat both the causes and impacts of climate change. An increase in global warming is projected to exacerbate risks to ecosystems and humans; 9 out of 10 disasters triggered by natural hazards during the past decade were water-related.[5] Owing to their water-dependent nature, food security, human health, urban and rural settlements, energy production, industrial development, economic development and ecosystems are increasingly vulnerable to the impacts of climate change. At the same time, responses to climate change also impact water resources and hydrological processes.[6]

4. The present thematic concept paper provides a summary of the key issues, challenges and trends related to water for the interlinked topics of climate, resilience and the environment to inform the interactive dialogues that will be held at the United Nations 2023 Water Conference. The paper draws on existing knowledge and preparatory dialogues for the Conference and presents barriers to and opportunities for revitalizing the call to action on Sustainable Development Goal 6 to inspire commitments towards the Water Action Agenda.

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[1] *The Sustainable Development Goals Report 2022* (United Nations publication, 2022).

[2] High-level Panel on Water, "Making every drop count: an agenda for water action – High-level Panel on Water outcome document", 14 March 2018.

[3] United Nations, "United Nations Secretary-General's Plan: Water Action Decade 2018–2028", 2018.

[4] Hans-O. Pörtner and others, "Summary for policymakers", in *Climate Change 2022: Impacts, Adaptation and Vulnerability – Contribution of Working Group II to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change*, Hans-O. Pörtner and others, eds. (Cambridge, United Kingdom of Great Britain and Northern Ireland, Cambridge University Press, 2022).

[5] Figure for the reporting period 2010–2019 was taken from the Sendai Monitor database, available at https://sendaimonitor.undrr.org/.

[6] United Nations, "United Nations Secretary-General's Plan: Water Action Decade 2018–2028", pp. 3–33.

II. Current status and challenges

5. Climate change, unsustainable human activities and poor environmental management affect the availability, quality and quantity of water, impeding the realization of the human right to water and sanitation and a clean and healthy environment, as well as other related human rights.[7] In 2018, 2.3 billion people (almost 30 per cent of the global population) lived in countries under water stress, and 3.6 billion people faced inadequate access to water at least one month per year.[8] As climate impacts do not recognize borders, and 60 per cent of global freshwater supplies are found in transboundary basins shared by 153 countries, this adds an international dimension to climate change adaptation and disaster risk reduction.[9]

6. At the same time, greenhouse gas emissions also originate from water-based processes.[10] For instance, conventional treatment processes rely on a constant energy supply, derived partly from burning fossil fuels. Sewage treatment plants and sludge disposal methods tend to generate methane, a highly potent greenhouse gas. Climate-smart water management could help avoid and reduce emissions of carbon, methane and nitrous oxide emanating from water and wastewater management, as well as mismanaged or drained freshwater systems such as peatlands.

7. Resilience refers to the ability of a system, community or society exposed to hazards to resist, absorb, accommodate, adapt to, transform and recover from the effects of a hazard in a timely and efficient manner, including through the preservation and restoration of its essential basic structures and functions through risk management.[11] However, recent events, such as COVID-19 and devastating floods, such as in Pakistan, show that many countries lack the necessary preparedness, coping capacities and governance systems to deal with the systemic nature of risk.[12] This increases the likelihood of disaster risks,[13] as well as the cascading impacts of disasters.[14]

8. The extent of water-related risk is growing at an unprecedented rate, as are the frequency, intensity and costs of disasters, causing significant losses and damages to

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[7] United Nations Educational, Scientific and Cultural Organization (UNESCO), *The United Nations World Water Development Report 2020: Water and Climate Change* (Paris, 2020).

[8] Food and Agriculture Organization of the United Nations (FAO) and UN-Water, *Progress on Level of Water Stress: Global Status and Acceleration needs for SDG Indicator 6.4.2 – 2021* (Rome, 2021).

[9] *Guidance on Water and Adaptation to Climate Change* (United Nations publication, 2009). See also A/CONF.240/2023/7.

[10] Liu Ye, Jose Porro and Ingmar Nopens, eds., *Quantification and Modelling of Fugitive Greenhouse Gas Emissions from Urban Water Systems*, Scientific and Technical Report Series, No. 26 (London, IWA Publishing, 2022).

[11] See General Assembly resolution 71/276; and A/71/644.

[12] Systemic risk is associated with cascading impacts that spread within and across systems and sectors (e.g., ecosystems, health, infrastructure and the food sector) via the movements of people, goods, capital and information within and across boundaries (e.g., regions, countries and continents). The spread of these impacts can lead to potentially existential consequences and system collapse across a range of time horizons. See International Scient Council, United Nations Office for Disaster Risk Reduction and Knowledge Action Network on Emergent Risks and Extreme Events, "Briefing note: systemic risk", 2022.

[13] Disaster risk is a function of a hazard interacting with the continuously present conditions of exposure, vulnerability and capacity, and addressing these underlying factors is imperative to build resilience. See Ye, Porro and Nopens, eds., *Quantification and Modelling of Fugitive Greenhouse Gas*.

[14] United Nations Office for Disaster Risk Reduction, *Global Assessment Report on Disaster Risk Reduction 2022: Our World at Risk – Transforming Governance for a Resilient Future* (Geneva, 2022).

people, nature, economic assets and infrastructure.[15] Water-related disaster deaths have more than doubled in the past 10 years. Nearly 95 per cent of infrastructure loss and damage reported from 2010 to 2019 were due to water-related disasters.[16] At least 1.4 billion people have been affected by droughts and 1.6 billion by floods from 2000 to 2019.[17]

9. The Intergovernmental Panel on Climate Change (IPCC), in its 2022 report, projects an increase in water-related hazards and threats to water availability and quality, with and exacerbated by increased global warming. This affects agricultural and energy sectors and ecosystem integrity, as well as river basins dependent on snowmelt, glaciers, groundwater availability and surface water storage. IPCC projects that an increase of global warming to 2ºC or 3ºC can cause direct flood damages that are 1.4 to 3.9 times higher than the 1.5ºC global warming scenario without adaptation. Moreover, even though most documented climate change adaptation measures respond to water-related risks and impacts, their effectiveness is hampered by increased global warming.[18]

10. Persons most at risk – including women, Indigenous Peoples, minority groups, youth, migrants and displaced people, persons with disabilities, older persons and people living in poverty – are disproportionately affected by water-related disasters. This is compounded by factors such as age, gender, poverty, disabilities and cultural or ethnic background which increase their vulnerability to shocks and hazards.[19] Climate change, environmental degradation and disasters, caused by natural hazards, are also reshaping contemporary human mobility patterns around the world. In 2021 alone, there were 23.7 million new displacements related to disasters, 22.3 million of which were due to weather-related phenomena such as storms, floods and droughts. These impacts are expected to increase. Recent estimates for six world regions suggest that, unless action is taken, up to 216 million people could move internally within their countries by 2050.[20]

11. Terrestrial and freshwater ecosystems provide invaluable services for climate mitigation, holding more carbon than the atmosphere.[21] They are also invaluable for climate adaptation, acting as a critical buffer against the impacts of climate change and climate-related hazards.[22] Moreover, many climate mitigation measures depend on freshwater resources and impact freshwater resources.[23] Wetlands, for instance, store more than twice as much carbon as the world's forests, but are also disappearing

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[15] Ibid.

[16] See Sendai Monitor database, available at https://sendaimonitor.undrr.org/. See also, Centre for Research on the Epidemiology of Disasters and United Nations Office for Disaster Risk Reduction, "The human cost of weather related disasters: 1995–2015", 2015; and Md. Arfanuzzaman and others, "Water", in *Climate Change 2022*, Hans-O. Pörtner and others, eds.

[17] Greg Browder and others, *An EPIC Response: Innovative Governance for Flood and Drought Risk Management* (Washington, D.C., World Bank, 2021).

[18] United Nations, "United Nations Secretary-General's Plan: Water Action Decade 2018–2028", p. 21.

[19] United Nations, Office of the United Nations High Commissioner for Human Rights (OHCHR), *Frequently Asked Questions on Human Rights and Climate Change*, fact sheet No. 38 (2021).

[20] International Organization for Migration, *People on the Move in a Changing Climate – Linking Policy, Evidence and Action* (Geneva, 2022).

[21] Hans-O. Pörtner and others, "Summary for policymakers".

[22] United Nations, "United Nations Secretary-General's Plan: Water Action Decade 2018–2028".

[23] See Stockholm International Water Institute, *The Essential Drop to Net-Zero: Unpacking Freshwater's Role in Climate Change Mitigation* (forthcoming), available in advance at https://siwi.org/publications/essential-drop-to-net-zero-unpacking-freshwaters-role-in-climate-change-mitigation-report/; and United Nations Environment Programme (UNEP), "Blending water management and climate change adaptation approaches", November 2022.

three times as fast, leading to increased emissions.[24] Holistic, cross-sectoral and inclusive approaches are needed, such as source-to-sea, which is aimed at preventing unintended negative consequences while securing benefits between interconnected ecosystems.[25]

12. Water scarcity and pollution, droughts and floods contribute to reduced ecosystem functions and related ecosystem services and can increase the likelihood of pests and diseases. The predicted increase in frequency, severity and duration of droughts will contribute to long-term degradation, aridification or desertification and disruption of societies and livelihood options.[26] Food and nutrition security are seriously impacted as about 70 per cent of all freshwater withdrawals are used for agriculture globally; the percentage can reach more than 90 per cent in agrarian economies.[27]

13. Up to a third of rivers in developing countries are considered at risk of serious pollution from pathogens, organic matter or salinity.[28] Heavily polluted rivers are an increasingly recognized source of emissions.[29] Freshwater biodiversity and species populations have been lost at a rate of 83 per cent since the 1970s, faster than any other ecosystem being monitored.[30] These changes to freshwater ecosystems have downstream impacts on riparian ecosystems, resulting in biodiversity loss and reductions in food resources and carbon sequestration capacity. Improved water resources management and access to drinking water and sanitation are critical risk reduction, adaptation[31] and mitigation strategies, linking commitments to Sustainable Development Goal 6 and other water-related goals.[32] About 90 per cent of countries already prioritize action on water for adaptation in their nationally determined contributions and nearly all national adaptation plans highlight water and sanitation as a priority sector.[33]

14. Human-induced climate change and environmental degradation are major contributors to the increased frequency and intensity of extreme events. For example, deforested slopes can reduce water retention in catchments, and can induce landslides, silting and flooding, while destruction or reclaiming of wetlands can worsen flooding.[34] As a consequence, nature's ability to help societies adapt to the impacts of climate change, including flood, sea level rise, drought, extreme heat and aridification, is being undermined.[35] Recognizing the direct link between how human activities (e.g., spatial planning, land uses, water uses, etc.) affect the vulnerability,

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[24] See www.global-wetland-outlook.ramsar.org/.

[25] Jakob Granit and others, *A Conceptual Framework for Governing and Managing Key Flows in a Source-to-Sea Continuum: A STAP Advisory Document* (Washington, D.C., Global Environment Facility, 2017).

[26] United Nations Office for Disaster Risk Reduction, *GAR Special Report on Drought 2021* (Geneva, 2021).

[27] Andrea Rossi, Riccardo Biancalani and Lucie Chocholata, *Change in Water-Use Efficiency Over Time (SDG Indicator 6.4.1): Analysis and Interpretation of Preliminary Results in Key Regions and Countries*, SDG 6.4 Monitoring Sustainable Use of Water Resources Papers (Rome, FAO, 2019).

[28] UNEP, *A Snapshot of the World's Water Quality: Towards a Global Assessment* (Nairobi, 2016).

[29] Nureen Faiza Anisha and others, "Mitigation measures in freshwater systems", in *The Essential Drop to Net-Zero* (forthcoming), available in advance at https://siwi.org/publications/essential-drop-to-net-zero-unpacking-freshwaters-role-in-climate-change-mitigation-report/.

[30] World Wildlife Fund, *Living Planet Report 2022: Building a Nature-Positive Society* (Gland, Switzerland, 2022).

[31] United Nations, "United Nations Secretary-General's Plan: Water Action Decade 2018–2028".

[32] UNEP, "Blending water management".

[33] Ibid.

[34] See footnote 14.

[35] Ibid.

exposure and coping capacity of systems, societies and communities, is therefore key to improving risk-informed decision-making for water.

15. The twenty-seventh Conference of the Parties of the United Nations Framework Convention on Climate Change (COP27) brought water discussions to the centre of the climate discourse, including through a dedicated Water Day, a Water Pavilion and the new Action for Water Adaptation and Resilience (AWARe) initiative, which proposes and supports mutually agreed policies for cooperative water-related adaptation and its co-benefits, while causing no harm.[36] The Sharm el-Sheikh Implementation Plan acknowledges the critical role of protecting, conserving and restoring water systems and water-related ecosystems, including river basins, aquifers and lakes, in delivering climate adaptation benefits and co-benefits, including for mitigation. It further urges the integration of water into adaptation efforts.[37] Furthermore, it is recognized in the Sharm-El-Sheikh Adaptation Agenda that "to protect people we must protect nature", valuing nature as a solution to building resilience. The Agenda includes commitments on the protection (45 million hectares), sustainable management (2 billion hectares) and restoration (350 million hectares) of lands and inland waters, promoting nature-based solutions and ensuring respect for the rights of Indigenous Peoples and local communities.[38]

16. The recently adopted United Nations Environment Assembly resolutions on nature-based solutions, on addressing plastic pollution, on sustainable lake management and on addressing water quality to protect and restore water-related ecosystems are important decisions that should be fully implemented.[39] In addition, the Kunming-Montreal Global Biodiversity Framework, in particular its targets 8 and 11, provides impetus for concrete target-setting and the implementation of water-related Sustainable Development Goals and other universal global commitments linking climate change, disaster risk reduction, biodiversity and resilience. This builds on the biodiversity principles and safeguards presented in the voluntary guidelines for the design and effective implementation of ecosystem-based approaches to climate change adaptation and disaster risk reduction that were adopted by the Conference of the Parties to the Convention on Biological Diversity.[40]

17. Despite favourable developments at the global level and although the need for coordination across sectors has been recognized as critical to ensure resilient economies and ecosystems, 50 per cent of countries report that they do not have formal national mechanisms for cross-sectoral coordination in relation to water resources management and are mostly undertaking only ad hoc collaboration.[41] Furthermore, comprehensive climate and disaster risk management, reconciling national adaptation goals and disaster risk strategies to build resilience of people,

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[36] Conference of the Parties to the United Nations Framework Convention on Climate Change, "Action for Water Adaptation and Resilience", presentation at the COP27, Sharm El-Sheikh, Egypt, November 2022.

[37] UNFCCC Decision xx/CP.27(2022). Sharm el-Sheikh Implementation Plan. UNFCCC COP27.

[38] Conference of the Parties to the United Nations Framework Convention on Climate Change, "Sharm-El-Sheikh adaptation agenda: the global transformations towards adaptive and resilient development", November 2022.

[39] See the resolutions from the fifth session of the UNEP Assembly in March 2022. Available at www.unep.org/environmentassembly/unea5.

[40] Convention on Biological Diversity, decision 14/5, see Secretariat of the Convention on Biological Diversity, *Voluntary Guidelines for the Design and Effective Implementation of Ecosystem-Based Approaches to Climate Change Adaptation and Disaster Risk Reduction and Supplementary Information*, CBD Technical Series, No. 93 (Montreal, 2019).

[41] UNEP, *Progress on Integrated Water Resources Management: Tracking SDG 6 Series – Global Indicator 6.5.1 Updates and Acceleration Needs* (2021).

economies and natural resources has been slow and piecemeal.[42] More systematic approaches are required to govern and manage water resources in the context of climate change, disaster risk and environmental decline.

18. The Sustainable Development Goals and targets in focus in the present paper – 6.5, 6.6, 7, 11.5, 14 and 15 – have seen only limited progress and fall behind other Goals. The 2022 Sustainable Development Goal report[43] highlights that over 85 per cent of the planet's wetland ecosystems have been lost over the past 300 years and over 733 million people continue to live in countries with high and critical water stress (Goal 6). Global temperatures continue to rise unabated and cause climate extremes and related disasters including water-related ones (Goal 13), while increased plastic pollution and global warming threaten marine life (Goal 14). The report further indicates that the threat of species extinction, deforestation and loss of biodiversity all continue to trigger climate change (Goal 15). Moreover, environmental indicators are often some of the further behind across the 2030 Agenda.[44] A positive trend can be noted for Goal target 11.5, with the number of countries with national disaster risk reduction strategies having nearly doubled in all regions since 2015.[45]

III. Opportunities for progress and transformative solutions through the lens of the Sustainable Development Goal 6 Global Acceleration Framework

19. The Sustainable Development Goal 6 Global Acceleration Framework is aimed at delivering fast results at an increased scale. Opportunities for progress and transformation will be addressed through the lens of the five cross-cutting and interdependent accelerators: financing; data and information; capacity development; innovation; and governance. The accelerators are intended to be action-oriented and inclusive of multiple stakeholders. The transformative solutions presented here are not meant to be exhaustive, but highlight some of the most promising opportunities for overcoming challenges in the area of water for climate, resilience and the environment and building synergies.

Financing

20. **Leverage available funding streams and opportunities.** Global estimates for financing needs for water-related investments to achieve Sustainable Development Goal 6 range from $6.7 trillion by 2030 to $22.6 trillion by 2050.[46] Investments are needed not only to build new infrastructure but also to maintain, operate and increase the resilience of existing facilities to better ensure the sustainable management of water resources. For the interconnected challenges of climate, resilience and the environment, addressing the financing challenge is not merely a matter of obtaining more funding to invest in water infrastructure, it is also a matter of quantifying the multiple benefits and making the best use of available and incoming financial streams and opportunities, such as for climate change adaptation and mitigation funding, as well as nature-based and hybrid solutions. Identification, mapping and alignment of

[42] United Nations Office for Disaster Risk Reduction, *Promoting Synergy and Alignment between Climate Change Adaptation and Disaster Risk Reduction in the Context of National Adaptation Plans – A Supplement to the UNFCCC NAP Technical Guidelines* (Geneva, 2021).

[43] See asterisk footnote.

[44] UNEP, *Measuring Progress: Environment and the SDGs* (Nairobi, 2021).

[45] United Nations Office for Disaster Risk Reduction, *Status Report on Target E Implementation* (Geneva, 2020).

[46] Organisation for Economic Co-operation and Development (OECD), *Financing a Water Secure Future*, OECD Studies on Water (Paris, 2022).

existing water-related initiatives, programmes and projects, and planning new integrated projects synergistically could facilitate allocation of scarce resources and time and cost-effective implementation.

21. **Take advantage of blended and innovative finance by highlighting water as a lever for climate and sustainability**. As at 2018, nearly 93 per cent of climate financing went towards mitigation measures, but less than 1 per cent of that amount went to water projects. At the same time, climate adaptation financing is set to increase from 7 to 50 per cent of the total.[47] Mitigation finance made up 58 per cent of public and 86 per cent of private climate finance as at 2020.[48] There are important opportunities, as many water management interventions (e.g. wastewater management, climate-smart agriculture, nature-based solutions, including hybrid infrastructure, etc.) contribute to both mitigation and adaptation and could qualify for mitigation funding by highlighting co-benefits. Water-related initiatives must therefore seize the opportunity to demonstrate their contribution to both sustainability and climate objectives (mitigation, adaptation, resilience) to mobilize related funding. The benefits of initiatives in the water sector can further be bolstered by the sharing of risks and revenues across public and private financiers (philanthropy, government and the private sector). Such blended financing can help attract other, long-term, sources of finance and encourage greater uptake of water and climate-smart solutions by "softening" the transition towards integrated solutions. Lastly, supported by reforms in multilateral development banks, approaches such as special drawing rights, green and blue bonds and debt-for-nature swaps, inter alia, could be further streamlined and promoted with consideration of unique country circumstances.

22. **Unlock national finance for resilience and deliver at the local level**. Governments and regulators must consider resilience in their planning and operational activities, and allocate available finance to those most in need and who contribute most to water conservation.[49] For instance, Indigenous Peoples preserve 80 per cent of the world's remaining biodiversity but little of the funding allocated to them actually reaches them.[50] Part of the targeting of finance for resilience includes the shifting of investment time-horizons, budgetary approaches and planning processes from short-term, fragmented approaches to holistic and integrated strategies[51] by, for example, assessing investments using a source-to-sea and/or systemic risk lens that encompasses ecosystems and all sectors, and by downscaling and tailoring financing mechanisms and impact investments to reach persons most at risk.[52] Where source-to-sea approaches extend beyond national jurisdictions and touch on multiple countries, that perspective must also encourage transboundary cooperation.[53] Tools exist to overcome common finance barriers in transboundary approaches.[54]

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[47] Climate Policy Initiative, "Updated view on the global landscape of climate finance 2019", 2020, table A.2.

[48] Ibid.

[49] Ibid.

[50] Eugenia Recio and Dina Hestad, "Indigenous peoples: defending an environment for all", IISD Earth Negotiations Bulletin Policy Brief, No. 36 (2022); Rainforest Foundation Norway, "Falling short: donor funding for indigenous peoples and local communities to secure tenure rights and manage forests in tropical countries (2011–2020)", 2021.

[51] Jessica Ertel and others, eds., *Nature for Water: A Series of Utility Spotlights* (London, IWA, Publishing, 2019).

[52] Guy Hutton, "SDG6 global financing needs and capacities to ensure access to water and sanitation for all", in *Financing Investment in Water Security: Recent Developments and Perspectives*, Xavier Leflaive, Kathleen Dominique and Guy J. Alears, eds. (Amsterdam, Elsevier, 2022).

[53] See the case study by UNEP on transboundary cooperation entitled, "Mainstreaming flood and drought management in the lower Mekong River Basin", 2022.

[54] *Funding and Financing of Transboundary Water Cooperation and Basin Development* (United Nations, publication 2021).

23. **Strengthen policies and regulatory frameworks for investments**. Water-related investments are more likely to materialize where robust water policies, regulations and institutional arrangements have been put in place, as well as a policy framework for investment, which dictates the availability and allocation of (domestic and foreign) private finance. The lack of such arrangements in a vast majority of countries limits the scalability and replicability of successful pilot projects.[55] Policy and regulatory frameworks are also required, to ensure that investments in water infrastructure properly factor in disaster risks and incorporate resilience-building measures, such as those put forward by the Principles for Resilient Infrastructure.[56] In addition, incentives and regulation would enable investments to be redirected towards climate-smart and nature-positive investments. Target 18 of the Kunming-Montreal Global Biodiversity Framework is an example of the necessary political commitment. It calls for the elimination, phase-out or reform of incentives, including harmful subsidies, freeing up at least $500 billion per year.[57]

24. **Risk analysis and risk transfer**. Financial markets fail to properly value water-related investments and to incorporate the systemic nature of water risks, including by the avoidance of future liabilities and by redirecting financial flows that increase exposure and vulnerability to water risks. In a 2019 report, the Network for Greening the Financial System suggests that many financial institutions underestimate their exposure to water risks.[58] Disclosure of firm-level data on exposure and vulnerability to water risks[59] is a significant development in this regard. Risk transfer is another important area for consideration. Innovative insurance schemes are incentivizing a range of actors to invest in becoming "climate (and water) smart",[60] as well as in increased resilience.

25. **Value and invest in nature**. The adoption of global standards for ecosystem accounting through the System of Environmental-Economic Accounting-Ecosystem Accounting, which allows for the valuation of ecosystems and their diverse benefits, and other valuation efforts, has the potential to better inform planners and policymakers of the true value of ecosystems when faced with competing and complex development decisions (i.e., the choice between grey infrastructure, nature-based solutions and/or hybrid solutions), and can facilitate carbon and biodiversity offset schemes for finance.[61]

Data and information

26. **Enhance spatial and temporal monitoring and water data and information management for quantity and quality**. More comprehensive, connected and harmonized water resources data and information at the local, regional and global scales should support decision-making related to climate change and other environmental and societal changes. The *State of the Global Water Resources 2021*

[55] Climate Policy Initiative, "Updated view on the global landscape of climate finance 2019".
[56] United Nations Office for Disaster Risk Reduction, "Principles for resilient infrastructure", 2022.
[57] See UNEP, document CBD/COP/15/L.25.
[58] United Nations and UNEP, "GBO-5 inland water highlights", 2021; CDP Worldwide, "The time to green finance: CDP financial services disclosure report 2020", 2020; and CDP Worldwide, "2021 climate change data set", CDP database, available at www.cdp.net/en/climate.
[59] See also, Financial Stability Board, *Recommendations by the Task Force on the Climate-Related Financial Disclosures* (2017); www.ngfs.net/en; and Alice Martini, "Socially responsible investing: from the ethical origins to the sustainable development framework of the European Union", *Environment, Development and Sustainability*, vol. 23 (2021).
[60] Renee Cho, "How climate change impacts economy", Columbia Climate School, 20 June 2019; and Len Abrams and others, *Unlocking the Potential of Enhanced Rainfed Agriculture* (Stockholm International Water Institute, 2018).
[61] United Nations and others, *System of Environmental-Economic Accounting: Ecosystem Accounting* (2021).

report highlights the lack of accessibility and availability of verified hydrological data.[62] National hydrological and meteorological services urgently need improved capabilities to provide hydrological status assessments and outlooks as a basis for improved water management, which requires the sharing of hydrological and related data, ideally following the World Meteorological (WMO) unified data policy. Global monitoring efforts on Sustainable Development Goal 6 targets offer opportunities for addressing data and information challenges. However, more systematic capacity-building and institutional strengthening is required to increase risk understanding on water-related issues and improve the frequency, consistency, comparability, accessibility and uses of relevant data from a range of sources.

27. **Strengthen risk knowledge and understanding**. Countries have highlighted inadequate risk knowledge as a key bottleneck for strengthening early warning systems.[63] The risk data ecosystem needs to be strengthened through better risk analyses and tracking of losses and damages to be able to manage water-related disasters. Data on water-related losses and damages will be critical to informing the funding arrangements as agreed at COP27. Data-sharing, both within and among countries, needs to be promoted. Monitoring of implementation and efforts to build resilience should be enhanced through the reporting mechanisms of the Sustainable Development Goals, the Sendai Framework and related initiatives. Measuring what we value, risk-informing decisions and tracking progress in resilience building are critical to sustainable development.

28. **Global science-based assessment on water**. Political processes should be informed by science and evidence. Experiences from IPCC and the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services demonstrate the strength of data, science and collaboration among scientists in increasing knowledge and understanding on climate change and biodiversity and calling attention to pressing global challenges. More recently, they have also started exchanging knowledge, building synergies between climate change and biodiversity by taking a topical approach, considering for instance nature-based solutions and resilience and/or risk.[64] Building on the experiences of these well-established assessment reports, a global science-based assessment on water would provide state-of-the-art science and analysis to address interdependent water challenges and support coordinated land, coastal and freshwater management in national climate change and disaster risk reduction planning to maximize system-wide benefits.

29. **Heightened focus on groundwater and cryosphere data and information**. Data and information on groundwater are particularly lacking as they are difficult to generate, but groundwater is a vitally important source, providing approximately half of the world's total drinking water and support ecosystems.[65] Investments in data on groundwater dynamic, volume and identification of recharge areas at the national level are critical. Data and information on the cryosphere (glaciers, snow cover, ice cap and permafrost) are also desperately needed, as it provides the largest natural storage of freshwater at the global scale.[66] Data and information that cross the

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[62] World Meteorological Organization (WMO), *State of the Global Water Resources 2021* (Geneva, 2022).

[63] United Nations Office for Disaster Risk Reduction and WMO, "Global status of multi-hazard early warning systems: Target G", 2022.

[64] Hans-O. Pörtner and others, "IPBES-IPCC co-sponsored workshop report on biodiversity and climate change", 2021.

[65] Mark Smith and others, *Spring: Managing Groundwater Sustainability* (Gland, Switzerland, International Union for Conservation of Nature, 2016).

[66] Regine Hock and others, "High mountain areas", in *The Ocean and Cryosphere in a Changing Climate: Special Report of the Intergovernmental Panel on Climate Change* (New York, Cambridge University Press, 2022).

traditional land, freshwater, coastal and marine boundaries will further build understanding of source-to-sea linkages and how they respond to changes in parts of the source-to-sea system across sectors.

30. **Early warning systems**. To minimize climate-induced losses and damages, anticipating predictable shocks and stresses and acting ahead of time is crucial. Growing evidence shows that early warning and anticipatory action approaches are more effective in saving lives and livelihoods than post-facto response. Currently, data and information in the water sector are fragmented and often not quality assured, has large gaps and are partially inaccessible, especially for populations highly exposed to water-related hazards. Hydrological data are not made publicly available in approximately 67 per cent of the 101 countries that provided data. Of countries that provided data, end-to-end[67] flood forecasting and warning systems are absent or inadequate in 34 per cent, and end-to-end drought forecasting and warning systems are lacking or inadequate in 54 per cent.[68] In addition, the effects of water-related hazardous events (e.g., droughts, floods, saltwater intrusion, landslides, pollution, algal blooms, chemical spills, etc.) need to be monitored and be included in multi-hazard early warning systems. Multi-hazard early warning systems provide an integrated system that should draw on data and information from the water sector to increase climate resilience. However, only 95 countries reported that they have multi-hazard early warning systems in place, amounting to less than half of the countries globally. Multi-hazard early warning systems may fail owing to gaps in the warning chain or because the recipients of the warning are not prepared to react adequately. Coverage is particularly low in small island developing States, the least developed countries and in Africa.[69] Multi-hazard early warning systems need to be designed and established in an integrated manner and include information on ecosystems and water resource conditions, in addition to data on socioeconomic factors contributing to vulnerability. Early warning systems should be supported by multi-hazard disaster risk governance and the integration of risk reduction measures across sectors.

31. **The power of Earth observation**. Accelerating digital transformation, through remote sensing and satellite imagery data, holds great potential for transforming how data and information are generated and accessed and used for monitoring and reporting on water bodies.[70] Earth observation increasingly enables innovative water and decision information systems across scales. This will offer more opportunities for neutral, reliable and transparent data and information-gathering and sharing, essential for ensuring sustainable water management and to close data and information gaps. Field observation, however, will remain essential to "ground-truth" Earth observation data.

Capacity development

32. Capacity development is a cross-cutting theme across all Sustainable Development Goal 6 accelerators. Without the institutional and human capacity to address the complex and interdependent challenges of climate change, disaster risk

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[67] End-to-end connects disaster risk knowledge, observations, monitoring and forecasting systems, warning dissemination mechanisms, and preparedness and response capability. See Hans-O. Pörtner and others, "IPBES-IPCC co-sponsored workshop report on biodiversity and climate change"; and WMO, *Early Warnings for All: The UN Global Early Warning Initiative for the Implementation of Climate Adaptation – Executive Action Plan 2023–2027* (2022).

[68] WMO, *2021 State of Climate Services: Water* (Geneva, 2021).

[69] See Hans-O. Pörtner and others, "IPBES-IPCC co-sponsored workshop report on biodiversity and climate change"; and WMO, *Early Warnings for All*.

[70] Jeff Tollefson, "Billion-dollar NASA satellite launches to track Earth's water", Nature, 14 December 2022.

reduction and environmental degradation and their impacts on water, it will be difficult to achieve the Goals or other relevant international goals and targets.[71]

33. **Transformational alliances, methods and approaches**. Institutional and human capacity development that is inclusive and enables innovation, including the use of artificial intelligence, virtual reality and digital learning, and new forms of collaboration is needed to provide the space for complex and synergistic problem solving to adequately address climate, resilience and environmental challenges related to water. Youth, women, Indigenous Peoples and other persons most at risk have an important role to play and offer knowledge, expertise and insights that are invaluable for addressing water-related systemic risks, including human-induced climate change and biodiversity loss.

34. **Citizen science and involvement**. Co-creation, citizen and open science are already proving to be effective tools to address climate and resilience challenges, including on water. Scientific tools and other social applications should be developed to encourage citizen participation to improve water management, such as integrating modern science with ancestral, Indigenous Peoples' and local knowledge[72] about water and climate conditions, as well as data and information related to risk knowledge. Innovative capacity development programmes that involve diverse actors at all levels, take into consideration different sources of knowledge and data and adopt transdisciplinary approaches can better address interdependent, complex and interconnected water challenges. The World Water Quality Alliance and Adopt-a-River initiatives are examples of engaging citizen scientists and spurring citizen action.

35. **Green jobs and a skilled workforce of water professionals**. Sustainable water management offers and maintains job opportunities to sustain livelihoods. Without investments in the capacity to manage water resources sustainably, many of these jobs may be lost, with devastating consequences for entire regions and communities.[73] At the same time, water professionals need to develop skills that enable them to address the complexity of interdependent challenges, while translating science-based solutions to locally defined actions through training of local stakeholders. Young water professionals, in particular, need support to pursue water-related careers and navigate the interdependent challenges of climate change, disaster risk reduction and biodiversity loss through a water- and risk-lens.[74] Relatedly, integrated approaches, including nature-based solutions for water, offer considerable opportunities for job creation that require a new combination of skills and professions with high potential to attract youth, while complementing existing livelihoods in rural areas.

Innovation

36. **Create the enabling conditions for innovation**. Investments in solutions and technologies that can help to better manage water resources and facilitate both adaptation to and mitigation against climate change originate under conditions that stimulate innovation, supported by enabling policies and regulations.[75] An enabling policy and regulatory environment that facilitates technology transfer, rewards and

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[71] Mizan R. Khan and others, *The Paris Framework for Climate Change Capacity Building* (London, Routledge, 2018).

[72] WMO, *Early Warnings for All*; and UNESCO, Intergovernmental Hydrological Programme, *IHP-IX Strategic Plan of the Intergovernmental Hydrological Programme: Science for a Water Secure World in a Changing Environment* (Paris, 2022).

[73] World Wildlife Fund and International Labour Organization, "Nature Hires: how nature-based solutions can power a green jobs recovery", October 2020.

[74] See https://valuingwaterinitiative.org/journeys/youth/.

[75] Soumitra Dutta and others, eds., *Global Innovation Index 2022: What is the Future of Innovation-Driven Growth?*, 15th ed. (Geneva, World Intellectual Property Organization (WIPO), 2021).

creates a market for innovation further supports the channelling of investments towards integrated solutions that tackle climate change adaptation and mitigation and help overcome systemic risks, while providing environmental, social and economic benefits. Legal and policy frameworks should be backed by public support and consultation. They can help elevate the role of water resources in climate mitigation and for disaster risk reduction, as well as promote innovative and alternative solutions, such as nature-based or hybrid solutions and circular economy.

37. **Adapt innovations to local contexts**. The deployment of innovative practices and technologies can be complex and dependent on local conditions. This includes increasing visibility, knowledge-sharing between countries and uptake by making the business case for local water management solutions that respond to particular contexts, as well as historical, cultural, local, traditional and Indigenous Peoples' knowledge. The communities affected by climate change need to feel ownership of their own water management such that they are able to design workable and sustainable solutions that incorporate their experiences and knowledge in building resilience. For example, in relation to adaptation technologies, if not properly assessed within the particular context, deployment of technologies may lead to maladaptation, with potential detrimental effects on other population groups or activities.

38. **Leverage existing promising solutions and innovations**. Numerous and diverse options that provide multiple benefits are already available.[76] Among them are zero-energy wastewater treatment and other energy-saving techniques that equate to greenhouse gas emission reductions, as well as nature-based solutions for climate change and disaster risk reduction.[77] Many of these options are also "no-regret" solutions, which enable progress towards sustainable development in the water sector in conditions of uncertainty of the local impacts from climate change.[78]

39. **Leverage information and communications technologies (ICTs)**. ICTs, such as mobile telephone apps, offer a vast potential for monitoring environmental conditions and water-related disasters, such as floods and droughts, providing data and information for early warnings and alerts and, in the immediate aftermath of disasters, ensuring timely communication and access to information. The growing number of services and users enables broad-based, targeted and inclusive delivery of alerts to populations at risk. The use of increasingly accessible technology for collecting, monitoring and sharing water-related data can also leverage the participation of millions of people to collect and share data and information that help identify risks or expose illegal activities (i.e., dumping of pollution, excess water extraction, etc.).[79] Such techniques are also educational and improve awareness of problem areas, teaching people how to recognize risks and monitor and report them.

Governance

40. **Convergence of intergovernmental processes and agendas**. To achieve convergence between global processes, decisions and commitments, countries should build upon and link the water, resilience and environmental initiatives at conferences of the parties for climate change, biodiversity, wetlands and desertification and at relevant global decision-making bodies, such as the General Assembly and the United

[76] WIPO, "Innovative technology in the Water, Sanitation and Hygiene (WASH) sector", 2020.
[77] United Nations Office for Disaster Risk Reduction, *Words into Action: Nature-Based Solutions for Disaster Risk Reduction* (Geneva, 2021); and Secretariat of the Convention on Biological Diversity, *Voluntary Guidelines for the Design and Effective Implementation*.
[78] WIPO, *Green Technology Book 2022: Solutions for Climate Change Adaptation* (Geneva, 2022).
[79] Catchment Based Approach, Citizen Science Monitoring App, available at https://catchmentbasedapproach.org/learn/citizen-science-mobile-apps/.

Nations Environment Assembly. Furthermore, the ongoing midterm review of the Sendai Framework provides opportunities for synergies and alignment.

41. **Strengthen integrated water resources management and promote governance at scale**. Holistic, cross-sectoral perspectives, such as integrated water resources management, should be mainstreamed into development, climate, disaster, environmental and economic planning strategies or policy frameworks at all levels. Integrated water resources management in combination with source-to-sea management, transboundary governance, integrated coastal zone management, sustainable land and seascape management, spatial planning and other related management approaches produces long-term viable solutions that ensure multi-stakeholder participation and address multiple threats and development challenges simultaneously, including through increased coordination and governance at scale across institutions, sectors and public uses. Considering the connectivity of upstream and downstream activities and their impacts on ecosystem processes and actors helps with decisive action to reduce disaster risks, loss and damage, and achieve benefits across the 2030 Agenda, including for building climate resilience, mitigating greenhouse gases and protecting biodiversity. The linkages and importance of integrated water resources management to climate adaptation planning are becoming more evident and practical. In particular, adaptation initiatives can be fast-tracked and made more cost-efficient by taking advantage of established and trusted integrated water resources management frameworks, building on multisectoral planning and implementation approaches developed over decades through the integrated water resources management approach to address and reduce risks in a systemic way.[80] However, the average country rate of implementation of integrated water resources management – to support climate adaptation and mitigation, build resilience and manage ecosystems – needs to double to approach the 2030 target for Sustainable Development Goal target 6.5.[81] This should be accompanied by commensurate investment, especially in small island developing States and the least developed countries as recommended in the WMO 2021 State of Climate Services report.[82]

42. **Comprehensive risk management and integrated policymaking**. Mainstreaming water into nationally determined contributions and national adaptation plans, which are at the heart of the Paris Agreement and the achievement of its long-term goals, not only ensures that the role of water for climate change and resilience building is recognized, but also enhances coordination across sectors and policy domains. Comprehensive risk management[83] is one approach to achieving convergence between national adaptation plans and national and local disaster risk reduction strategies. Comprehensive risk management makes it possible to systematically address climate change through risk assessments with a focus on water-related hazards (floods, droughts, etc.). Moreover, it encourages and facilitates cooperation between authorities.

43. **Promote nature-based solutions**. Ecosystem health and nature-based solutions are important connectors between national adaptation goals, resilience building and human well-being. Nature-based solutions[84] for climate change mitigation and adaptation, as well as disaster risk reduction, have received endorsement in major global political negotiations (including in the context of the Rio conventions, the Convention on Wetlands of International Importance especially as Waterfowl Habitat,

[80] UNEP, "Blending water management".
[81] See UNEP, *Progress on Integrated Water Resources Management*.
[82] Hans-O. Pörtner and others, "IPBES-IPCC co-sponsored workshop report on biodiversity and climate change"; and WMO, *Early Warnings for All*.
[83] United Nations Office for Disaster Risk Reduction, *Technical Guidance on Comprehensive Risk Assessment and Planning in the Context of Climate Change* (Geneva, 2022).
[84] UNEP, document UNEP/EA.5/Res.5.

as amended by the Paris Protocol of 1982 (Ramsar Convention),the United Nations Environment Assembly, to name but a few) owing to their cost-effective nature and multiple benefits for the environment, biodiversity, societies, livelihoods and economies. They help regulate water flows and groundwater tables, improve water filtration and thus water quality, store carbon and serve as natural defence systems.[85] For instance, the 2021 Dasgupta Review highlights the disaster risk reduction benefits derived from wetlands during Hurricane Sandy in 2012. It is estimated that more than $625 million in flood damages could be avoided.[86] To take advantage of the full potential of nature-based solutions, policies, safeguards and procurement processes are needed to support the integration of nature-based solutions into water resource supply and management, climate mitigation and adaptation planning and disaster risk management.

44. **The role of local communities and Indigenous Peoples**. Of particular importance to strengthening environmental governance is the inclusion and empowerment of local communities and Indigenous Peoples in decision-making and benefit-sharing with regard to water and its related ecosystems.[87] These principles are at the heart of funds, projects and other efforts to advance nature-based solutions. These protect and restore ecosystems and their services for benefits for societies, economies and the environment, including climate.[88]

IV. Recommendations

45. Urgent actions in the short term and transitions of systems over the longer term are required to mitigate and adapt to climate change, reduce disaster risks, prevent ecosystem degradation and loss and build lasting resilience for societies, economies and the environment. Holistic water governance and management approaches that take into consideration the linkages between ecosystems from source to sea, ensure convergence between international processes, and foster cross-sectoral collaborations are necessary to:

- Manage changes in hydrology related to precipitation, evaporation, glacial melt, groundwater depletion, permafrost, etc.
- Address multiple compounding and cascading risks resulting from water-related hazards and interacting climatic and non-climatic risks that transcend sectors and geographies.
- Innovate to tackle emerging risks and vulnerabilities to climate hazards.
- Halt irreversible losses in terrestrial, freshwater, coastal and marine ecosystems.

The following three recommendations are proposed to accelerate the achievement of water goals and enable better water outcomes to contribute to climate, resilience and environment objectives:

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[85] United Nations Office for Disaster Risk Reduction, *Words into Action*; and Secretariat of the Convention on Biological Diversity, *Voluntary Guidelines for the Design and Effective Implementation*.

[86] Partha Dasgupta, *The Economics of Biodiversity: The Dasgupta Review*. (London, H.M. Treasury, 2021).

[87] FAO and Fund for the Development of the Indigenous Peoples of Latin America and the Caribbean, "Forest governance by indigenous and tribal peoples: an opportunity for climate action in Latin America and the Caribbean", Policy Brief, 2021.

[88] See www.unep.org/explore-topics/climate-action/what-we-do/climate-adaptation/ecosystem-based-adaptation.

Recommendation 1: "Inter-COP" process to connect, integrate and fully implement water-related decisions made at global assemblies, conventions and frameworks dedicated to climate, resilience and the environment

46. Moving from agreement to implementation will be key to delivering on the ambitious water-related commitments made in recent years at the General Assembly, the United Nations Environment Assembly, the United Nations Framework Convention on Climate Change, the Convention on Biological Diversity, the United Nations Convention to Combat Desertification and the Sendai Framework for Disaster Risk Reduction 2015–2030 and other related intergovernmental processes.

47. To achieve convergence, Member States must build upon, implement and link water-related climate, resilience and environmental initiatives at conferences of the parties and intergovernmental processes for sustainable development, climate change, disaster risk reduction, biodiversity, the environment and desertification. An "inter-COP" process joining related parallel processes would support the implementation of interconnected water-related goals at the national level and facilitate a more synergistic and focused discourse on how to achieve convergence for integrated policies and actions on water, climate change, disaster risk reduction, biodiversity conservation and resilience building. An "inter-COP" process would enable actions towards policy alignment in political negotiations and promote multilateral cooperation on the implementation of global frameworks.

48. Member States and stakeholders should also utilize ongoing processes to ensure convergence. The ongoing midterm review of the Sendai Framework provides an opportunity for ensuring alignment between the deliberations at the United Nations 2023 Water Conference and the political declaration guiding the implementation of the second half of the Sendai Framework. Moreover, Member States should capitalize on upcoming United Nations Environment Assemblies, the global stocktakes of the Paris Agreement and the Sustainable Development Goals to reinforce multilateral cooperation and the call to action for cross-sectoral, integrated approaches at scale implemented in partnership through a whole-of-government and whole-of-society approach. UN-Water can be called upon to encourage collaboration among its Members and Partners on common initiatives, and maximize inter-agency work to support this process.

49. Integrated water resources management approaches should be fully implemented. Integrated water resources management mechanisms and tools should be strengthened to link to and operationalize other processes related to disaster risk reduction, sustainable development and climate change, with a particular focus on adaptation. Furthermore, they should enable nature-based solutions initiatives through participatory approaches to include vulnerable, Indigenous Peoples and local communities, United Nations country teams, basin management authorities and decision-making ministries, including those for finance and national planning or budgeting. Integrated water resources management needs to be backed by legislation and governance structures to make freshwater protection more durable,[89] while simultaneously achieving other sustainability objectives. Integrated water resources management should also be linked to other related processes such as climate change adaptation planning, source-to-sea planning, integrated coastal zone management and landscape planning to better operationalize and mutually strengthen each approach in a meaningful and tangible way for actors on the ground in terms of food and energy

[89] Jonathan Higgins and others, "Durable freshwater protection: a framework for establishing and maintaining long-term protection for freshwater ecosystems and the values they sustain", *Sustainability*, vol. 13, No. 4 (February 2021).

security, economic opportunities, health, access to financial resources and partnership building across sectors and related stakeholders.

Recommendation 2: Global water information system for improved water management, climate resilience, early warning and risk-informed decision-making

50. A global water information system will significantly change the way in which we prepare for the impacts of climate change, manage water resources sustainably and build resilience. With the impacts of climate change being felt mainly through water and to an accelerating extent, we need to better understand the current status and future conditions of water resources in relation to climate change and other environmental and societal changes. Decision makers need to have reliable information to ensure that water is available, of sufficient quality and quantity and adequately allocated across sectors. Data and information on water, as well as risk knowledge, are also needed, to ensure equitable access to water resources, as well as to protect people and economies from related disasters and pollution. A global water information system is needed to provide information on the status and outlook, and to support multi-hazard early warnings.[90]

51. The Early Warnings for All initiative needs this global system to enhance knowledge on risks, impacts, consequences and available response options (multi-hazard and "end-to-end approach"), as well as increase capacities to anticipate and manage disaster risks across scale.[91] Early warning for all has to be a key priority, in particular for floods, droughts and other water-related hazards, alongside the deployment of nature-based solutions in disaster risk reduction strategies.

52. Water information systems need to be based on open, inclusive and interlinked information to better manage the resources and reduce disaster risks. More comprehensive, connected and harmonized water-related data at the local, regional and global scales will improve our understanding on how much and in what quality water is and will be available in a given time and location. The data and information should be made accessible to all through a transparent system of data-sharing based on a unified policy.[92]

Recommendation 3: Environmental economic accounting to unlock investments for water-related climate and environmental resilience building

53. The application of the System of Environmental-Economic Accounting-Ecosystem Accounting linked to national accounting will help make the case for investments in sustainable and resilient water infrastructure, nature-based solutions and/or hybrid options to address water-related climate and disaster risks. Furthermore, the System can help to set clear and measurable targets for freshwater ecosystems, taking wider ecosystem functions into considerations.

54. Valuing and accounting for ecosystems paves the way for understanding and investing in them as nature-based solutions, demonstrating co-benefits for both climate mitigation and adaptation, as well as additional benefits, such as job creation, recreation and tourism, better human health outcomes, the protection of cultural values, etc. Many water management interventions (e.g., wastewater management, climate smart agriculture, forestry and other ecosystem restoration or protection measures) have mitigation potential and could qualify for mitigation funding. Highlighting the benefits and co-benefits of water and water ecosystem management

[90] WMO, *Early Warnings for All*.
[91] Ibid.
[92] WMO, "WMO unified data policy", April 2022.

would allow for more targeted climate finance and raise awareness of the role of water for both climate mitigation and adaptation as well as resilience building, for example through wetland preservation, restoration and construction.

55. Similarly, expedient action on nature-related financial risk disclosure in corporate reporting is a necessary and significant opportunity to the reduction of negative impacts on freshwater ecosystems. Action should build on the Task Force on Climate-related Financial Disclosures,[93] the Taskforce on Nature-related Financial Disclosures, the International Sustainability Standards Board and other initiatives, as well as implement target 15 of the Kunming-Montreal Global Biodiversity Framework to increase companies' contribution towards resilience building.

V. Guiding questions

56. The following questions guide the interactive dialogue:

- How do we ensure that water is a lever for transformative and sustainable development in the face of climate change, increased systemic risk and biodiversity loss? What are practical examples of linking water, climate, resilience and environment?
- What opportunities can we capitalize on to strengthen convergence between intergovernmental processes for water, climate change, disaster risk reduction, biodiversity, the environment and desertification? Why has progress been so slow and what kind of processes (e.g. an "inter-COP" process) are needed to increase synergies between the various related frameworks at the global and national level?
- What are the barriers to providing data and information for improved water management, climate resilience, early warning systems and risk-informed decision-making? What is needed for water-related data and information to be available and understood by all? How can we ensure that data and information on floods, droughts and other water-related hazards are fully integrated in multi-hazard early warning systems and in disaster risk reduction strategies and policies?
- How will ecosystems and nature be better valued and their protection incentivized? What kind of guidance could be developed to adjust tools for economic analysis (cost-benefit analysis, economic impact analysis, due diligence, modelling) so that they reflect the multiple values of water, uncertainties about future water availability and demand, and exposure and vulnerability to water risks?
- How can we fully integrate integrated water resources management approaches and utilize them to advance related outcomes, including climate adaptation and nature-based solutions? What practical examples demonstrate integrated governance at scale?

[93] Financial Stability Board, *Task Force on Climate-Related Financial Disclosures: 2021 Status Report* (Basel, 2021).