



# 9. Harnessing data as a foundation for action



## Key takeaways

**Data is critical for transforming how we govern water at every scale** from local to global and across sectors, to achieve the 3Es: efficiency, equity and environmental sustainability. However, **the data landscape today has many gaps and is highly fragmented**, particularly regarding green water.

We should work towards a global water data infrastructure to enable science-based decision making, recognising and building on data at every level of the hydrological cycle including local and Indigenous knowledge, and empowering all stakeholders including citizens to shape decisions on water. To achieve this, we must strengthen data collection from the local level up, and aim for interoperability of data reporting by promoting harmonisation with recognised measurement and reporting frameworks.

**We should generate momentum for corporate water footprint data disclosure** through actions by coalitions involving the

private sector and civil society organisations. We should expedite work on regulatory standards to mandate water disclosure. Such requirements should aim to provide transparency on the double materiality of water risks posed by companies' operations – including both their own vulnerabilities to water stresses and disruptions, and the impact of their operations on water resources and land-use changes. **We also recommend that water disclosure be integrated** in carbon transition plans and be an integral part of sustainability-related disclosures.

**Crucially, we must develop pathways to value both blue and green water as natural capital.** Though still in its early stages, this initiative is an important enabler for responsible stewardship of freshwater ecosystems, enabling governments and all stakeholders to evaluate the costs and benefits associated with land conversions, conservation, and restoration projects.



Data underpins transformations in how we value and govern water necessary for the missions outlined in Chapter 5 to succeed. However, large gaps exist and, alarmingly, water data collection and quality have been decreasing in recent years. The data landscape is highly fragmented, reflecting a lack of institutional capacity and citizen engagement, insufficient funding, siloed management approaches, and a reluctance to share data publicly (Figure 9.1). Gaps exist at most hydrological and administrative scales, reflected in data repositories compiled under the United Nations (UN) Sustainable Development Goal (SDG) indicators, as well as other policy frameworks and conventions. This holds true for both blue and green water, with especially green water data largely overlooked.



FIGURE 9.1: Why is water data missing?

# Why is water data missing?

## Challenges

- Technical
- Financial
- Legal
- Political



## Unlocking the potential of data

To unlock water action, we must embark on a systematic effort to collect data that is comprehensive, of high quality, timely, interoperable, and publicly accessible (Figure 9.2).

Governments need data covering the full hydrological cycle for sustainable water governance. This includes river basin,<sup>66</sup> inter-basin, and inter-sectoral water management, understanding land use change and forest-

water interactions, and ensuring water-use efficiency, water quality and sustainable use of groundwater. Water data also support comprehensive tracking and evaluation of investments in water and implementation of policies at different geographical scales. At the local level, behavioural, preference and socioeconomic data can complement water data to inform justice assessments and guide context-specific policy. For example, field research in Tajikistan helped visualise that providing training directly to women increased participation in community-managed water-user associations (Balasubramanya, 2019).

### Box 9.1 – Water Accounts: State of Play and Ways Forward

*The System of Environmental-Economic Accounting (SEEA) provides a comprehensive and systematic framework to understand the interactions between the economy and the environment. The SEEA-Water framework focusses exclusively on water resources and details the ways in which the economy uses water, including physical flows and stocks, and economic parameters (UN, 2012). It is noteworthy that the framework does not consider green water.*

*Water accounts provide policymakers with key information to support integrated water resources management (IWRM). They also contribute to a suite of indicators commonly used for monitoring and reporting of green growth and sustainable development. Due to these reasons, water accounts were selected as one of the five priority accounts (in 2016) for establishing global databases by the UN Committee of Experts on Environmental-Economic Accounting (UNCEEA).*

*The OECD has been tasked to lead the development work on water accounts. However, given countries' limited adoption of water accounts, new avenues need to be explored to facilitate their compilation at national level. Recommended areas of work include:*

- *Stocktake countries that compile water accounts, their methods, and the key policy applications.*
- *Review the availability of global datasets (including from Earth observation, model-based research datasets, and corporate data) and analyse their suitability for gap-filling in official water statistics and water accounts, considering both blue and green water.*
- *Develop recommendations for international efforts to enhance the quality and availability of water statistics and accounts globally, such as by exploring the bridges between water statistics, water accounts, and the place of water in ecosystem accounts.*
- *Develop use cases on how improved official water accounts and statistics can support countries' national and international objectives and strengthen countries' capacity to manage water resources sustainably.*
- *Build a harmonised global database on official or nationally validated water accounts and statistics.*
- *Rally support and engagement from a range of stakeholders towards further enhancement of water data, statistics, and accounts globally.*

*Work along these lines is a clear case for the benefit of international cooperation.*

<sup>66</sup> The European Union (EU) Water Framework Directive (WFD) (Directive 2000/60/EC) is an example of how data facilitates river basin management.

Firms can use data about the impact and dependency of business activities on water resources to mitigate water and climate risks in supply chains and operations. They can also steer investment and consumer preferences towards sustainable and just practices, including water conservation. Recent regulatory developments such as the European Union (EU) Corporate Sustainability Reporting Directive (CSRD), underscore the importance of robust corporate water-related data.

Comprehensive water data is crucial for citizens' informed participation in water governance and management. Access to water data enables communities to understand local water resources, quality issues, and risks, fostering engagement in water-related decision-making and development of locally relevant solutions. By democratising access to water data and providing tools for its interpretation, citizens – including youth and Indigenous Peoples – are empowered to play a role in water conservation, pollution monitoring, and sustainable water-use practices. Granular data, covering informal and formal water services, is critical for visualising local inequalities in access to water and sanitation, and allowing stakeholders to design more just allocation and water services (Balakrishnan & Anand, 2015). Democratising water data will require local capacity for data collection and analysis, including intercultural approaches (Mehltretter, et al., 2023), by providing funding, technical support, and training to local institutions and communities.

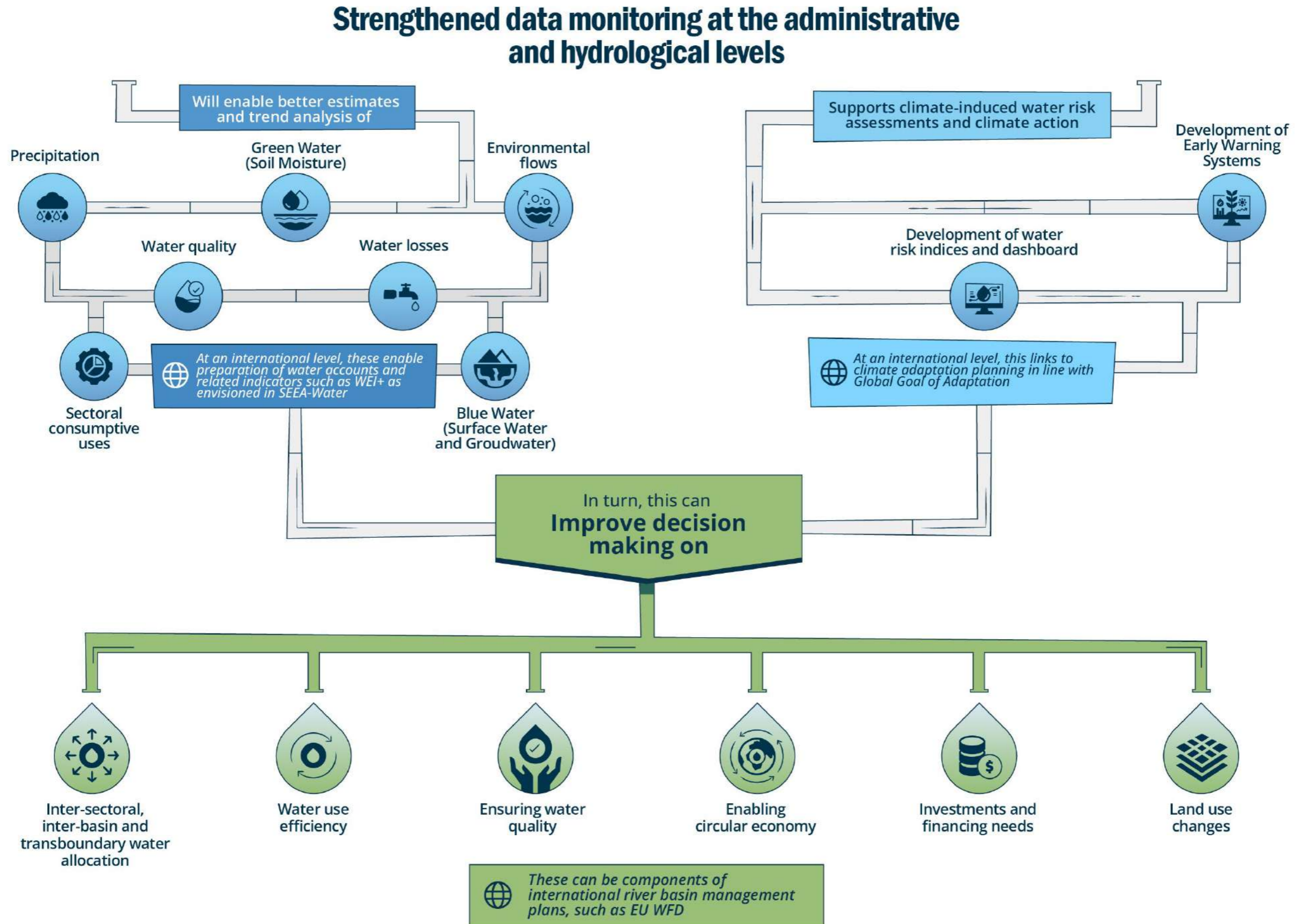
As also indicated in Chapter 7, a long-term goal must be to enable water to be valued as part of natural capital. Recognising and evaluating the services freshwater ecosystems provide for well-being, economic growth, and sustainability encourages investment in their protection. By the evaluation of costs and benefits associated with land conversions, conservation, and restoration projects, it also helps governments and stakeholders make decisions about land use (Annex 9.1, Box 2). The valuation of water-related ecosystem services can expand the use of debt-for-water swaps, allowing countries to reduce their sovereign debt burdens. The data would help structure swap agreements based on measurable water conservation outcomes, ensuring that investments lead to tangible environmental and economic benefits.

## Recommended pathways for action

First, we should work towards a Global Water Data Infrastructure that empowers stakeholders with access to blue and green water data for science-based decision-making through an integrated data platform, recognising and building on data at every level of the hydrological cycle including other knowledge systems (such as local, religious, rural, traditional, and Indigenous knowledge). To ensure epistemic justice, the infrastructure can provide a platform for co-developing a process to identify how to aptly integrate different knowledge systems alongside behavioural, cultural, and ecological data. Governments should curate and manage this digital public infrastructure to support the efficient, equitable, and environmentally sustainable governance of the hydrological cycle in the public interest (Eaves et al., 2024). The infrastructure should facilitate the aggregation, harmonisation and utilisation of existing hydrological data (Annex 9.1, Box 2) and the development and verification of new data and generation capabilities. To improve data interoperability, and enabling comparative analysis and benchmarking, promoting harmonisation with internationally recognised measurement and reporting frameworks such as SEEA-Water constitutes a key objective of the infrastructure. It is important to note that incentives and disincentives play a role in data quality and might cause misreporting.

Data collection would primarily occur at sub-national and national levels, led by governments and local stakeholders in the interest of nations and communities. It is essential that this data can be aggregated at every hydrological scale and be interoperable by aligning with internationally recognised concepts and methods. It is recommended to establish a country-level foundational water data package, which would serve as a guideline for data contributions and reporting on SDG 6 and beyond. Notwithstanding, nations and communities should have some level of data sovereignty, and reporting needs to be sensitive to existing circumstances, priorities and capabilities.

FIGURE 9.2: Strengthened data monitoring at the administrative and hydrological levels





### Box 9.2 - The Global Water Data Portal

*The Global Water Data Portal is a key component of the Water and Climate Coalition (WCC) that supports the implementation of the UN Decade of Action through the UN-Water SDG 6 Global Accelerator Framework (GAF). The Portal aims to provide unified access to relevant water data sources and aggregate relevant water data to support the fulfilment of the SDGs and improve policy development, national and regional adaptation actions, and efficiency in water monitoring and management. It will link existing water information systems like the Food and Agriculture Organisation's (FAO) AQUASTAT and WaPOR, and World Meteorological Organisation's (WMO) Global Hydrological Status and Outlook System (HydroSOS), providing geospatially referenced information that enhances data visualisation and decision-making capabilities.*

Second, we must strengthen capacities and financial support to collect data and aim for interoperability of data-reporting within water basins and globally. As atmospheric moisture-tracking and global hydrological models rely on harmonised datasets of climate variables, improving these models' underlying data is critical. New technologies, such as low-cost satellite monitoring, are enablers that could capture parameters beyond blue water, including soil moisture and the state of the hydrological cycle. For instance, the Trishna mission will advance the measurement of evapotranspiration as of 2027.<sup>67</sup>

Multilateral organisations and stakeholder coalitions should urgently collaborate with national and local authorities to build data collection and harmonisation capabilities and systems, including operation of new technologies. Expanding the capacity of real-time monitoring is also essential. As explained in Chapter 5, real-time monitoring of groundwater levels can inform abstraction rates, supporting sustainable use of groundwater. Incentivising local governments and communities to mobilise data in decision-making processes is also important to ensure that data is translated into effective policies. Citizen engagement in monitoring and data gathering can complement public and private efforts while supporting data democratisation and justice. Community-based monitoring offers opportunities for more efficient, affordable, and scalable approaches. The Institute of Public and Environmental Affairs (IPE)'s Blue Map app

is one example: with 3.8 million users, the app leverages citizen science to monitor and report on environmental data in China, enhancing transparency and accountability.

Third, we should generate momentum for market-based disclosure of corporate water footprints through actions by coalitions involving the private sector and civil society organisations (Annex 9.1 Box 1). This can build on tools such as the World Wide Fund for Nature (WWF) Water Risk Filter.<sup>68</sup> CDP – a not-for-profit that runs a global disclosure system for investors, companies, cities, states, and regions to manage their environmental impacts – is also active in this, having collected water security data from nearly 4,000 companies globally since 2009, with the aim to expand collection of relevant water-related data from 90% of the world's highest-impact companies by 2025. The Treaty on Transnational Corporations and Human Rights being negotiated under the UN Human Rights Council could accelerate this effort.

Fourth, we should work towards regulatory standards on water disclosure that are consistent and aligned with international best practices, including Target 15 of the new Global Biodiversity Framework. These standards should inform data collection regimes enabling disclosure of double materiality of water risks posed by companies' operations – including both their own dependencies and supply chain risks, and impact of their operations on water resources and on the hydrological cycle,

<sup>67</sup> The Thermal infraRed Imaging Satellite for High-resolution Natural resource Assessment mission is a partnership between the French and Indian Space Research Agencies to observe the temperature of the Earth's surface. This provides information to determine the water stress of plants and their evapotranspiration. <https://cnes.fr/projets/trishna>

<sup>68</sup> The WWF Water Risk Filter allows companies to assess three types of water-related business risk: physical, regulatory, and reputational. Companies can explore maps of water-related risks, now and by 2030-50. As a screening and prioritisation tool, the Filter helps identify water risk hotspots across multiple sites, and focus on what and where it matters to mitigate water risk to enhance business resilience. WWF, 2023).

including through land-use change. It should also recognise the interconnection between the conservation of blue and green water, and net reduction in carbon emissions. The International Sustainability Standards Board (ISSB) is advancing global sustainability-related financial disclosure standards for capital markets, building on the Task Force on Climate-related Financial Disclosures (TCFD) recommendations. It is expanding its work beyond carbon to biodiversity disclosure (see also Chapter 7). We recommend that water disclosure be integrated in carbon transition plans and be an integral part of sustainability-related disclosures.

Fifth, we must value water as natural capital. This effort is in its early stages, with much work ahead. It is an important enabler for responsible stewardship of freshwater ecosystems, and decision-making on land-use changes. Efforts begin at watershed-level with natural capital assessments to demonstrate a clear link between investments to preserve or restore a watershed and downstream benefits for users (Annex Box 2). Valuing these ecosystem benefits forms a basis for agreements between local communities, governing authorities, and the private sector on the use of a watershed. Work on frameworks and tools to document and incorporate natural capital in decision-making is ongoing under coalitions such as the Alliance for Water Stewardship,<sup>69</sup> the Capitals Coalition,<sup>70</sup> and the collaborative initiative between the UN Environment Programme World Conservation Monitoring Centre (UNEP-WCMC) and other stakeholders on a Toolkit for Ecosystem Service Site-Based Assessment (TESSA)<sup>71</sup> (UNEP-WCMC, 2022). We can build on open-source tools such as InVEST, which combines data gleaned from thousands of researchers working with techniques like satellite imaging, soil surveys, climate modelling, and human development mapping, to quantify and place a value on natural resources. Also, the concept of a Gross Ecosystem Product (GEP), approved by the UN Statistical Committee in 2021, has been adopted in China to measure the aggregate monetary value of ecosystem related goods and services in specific regions (see Annex 9.1 Box 2).

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Sixth, attention has to be paid to ensuring equity, in areas such as the creation of data that might otherwise remain unrecognized, and in ownership and access to data. The marginalised should not be disadvantaged by the absence of (access to) data about the challenges they face.

69 The AWS Standard 2.0. Alliance for Water Stewardship (2020).

70 Natural Capital Protocol (2016)

71 The value of freshwater ecosystems and the benefits from their restoration ([link](#)). UNEP-WCMC (2022).