IWRM TOOL - C

Management Instruments

Management Instruments is one of the four pillars of IWRM. Management instruments are tools and techniques that support decision-makers and water users in making rational and informed decisions to advance IWRM based on the local context and the socio-hydrological issues at stake. The Tools in this section cover a range of management instruments such as assessment methodologies, economic instruments, decision support systems, techniques for enhancing efficiency in water management, and mechanisms for the promotion of social change and dialogue.

Defining Management Instruments

Management instruments refer to a variety of techniques and mechanisms that enable decision-makers to take rational and informed decisions (UNEP, 2021). These include the technical, social, and economic tools which can be deployed to assess and overcome specific water management problems, e.g., enhancing water use efficiency, combatting water pollution, and changing unsustainable water use practices. Traditionally, most management instruments were centred on "hard" techno-engineering and infrastructure-based solutions. These included, for instance, the construction of dams, wastewater and recycling treatment systems, and the expansion of water distribution networks to meet increasing supply and demand needs (Tools C3).

However, as water sector professionals began to fully understand the full extent of the cross-cutting nature of water, acknowledgement and the growing importance of "soft" infrastructure was increasingly recognised. For example, economic instruments (Tools C4), which provide incentives for efficient water services, leading to sustainable consumption and protection of water resources, are now popular management instruments in the water sector. Similarly, the importance of data, monitoring and information management systems has been recognised as a bedrock foundation for achieving IWRM.

Additionally, to cultivate, and increase the adoption of sustainable practices and to sustain positive changes in the water sector, understanding water users' behaviours became increasingly important. Promoting social change (Tools C5) has become a key element for management instruments. Through this social lens, we understand and improve the behaviours of stakeholders by using targeted communication. This assists in cultivating the desired behaviour, increasing the value of water (Tool C5.04), and incentivising enterprises to become water stewards (Tool C5.05).

Data and Information Management and Use

When managing water resources and regulating human activities, water sector professionals need accurate, comprehensible, and timely information. Monitoring systems such as gauging systems, remote sensing, and satellite imaging can help gather data, for instance, linked to availability, withdraws, hydro extremes, per capita consumption, rainfall, etc. To be comprehensive, water monitoring systems need to consider both surface and groundwater. It is reported that approximately 40% of countries have developed and implemented information gathering systems for water availability (Fig. 1).
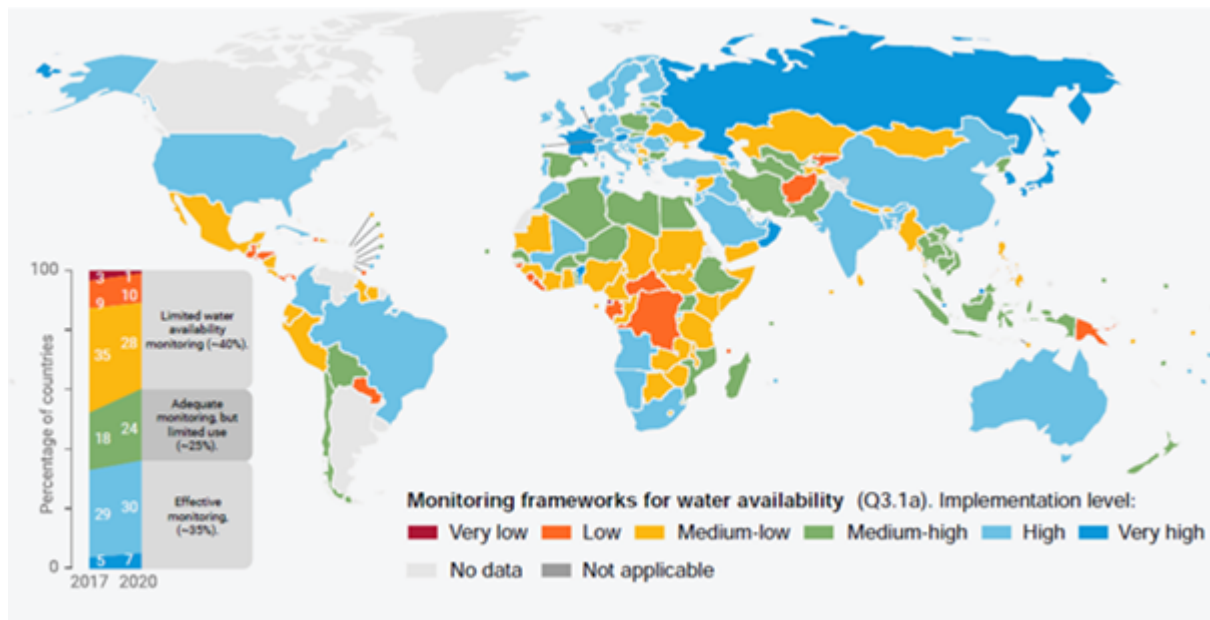

Figure 1. Development and Implementation of Monitoring Frameworks for Water Availability (Source: UNEP, 2021).

This data is in turn processed through different kinds of water related assessments which helps us look at a given problem form different angles. These assessments are carried out to identify the pros and cons of certain interventions and determine the best course of action for a specified waterbody or situation. Such assessments can allow us to understand risks (Tool C1.01) and vulnerabilities (Tool C1.02), provide a physical environmental understanding (Tool C1.05) and offer insights into the stakeholders present and relevant socio-economic considerations (Tool C1.04), etc..

In addition to assessments, there are decision support systems (Tools C2) which can help us to understand; (i) the data gathered and processed through assessments, (ii) monitor, evaluate, and model, and (iii) create convening spaces for water data discussions. The use of Geographic Information Systems (GIS) (Tool C2.01) is a common example of a decision support system which bolsters decision-maker's ability to make informed choices. These systems capture, store, visualise, and evaluate spatial-temporal data of water-related ecosystems. Applications have occurred in areas such as water resources mapping and management, rainfall-runoff prediction and flood forecasting, and waterbody and flood mapping (Wang and Xie, 2018).

Some of the common success factors that have been highlighted for data and information management and use include the following (UNEP, 2021):

- **Online Information Systems** (B4.01): develop or enhance an online national

information system (or similar) for the coordinated management of water resources, which compiles information from different entities, or points to the location of such information.

- **Funding** (Tools D): secure funding for establishing and operating monitoring networks, making use of modern technology and approaches where appropriate; oblige data holders to share their data if their collection has been funded with government resources.
- **Legal Frameworks** (Tools A2): when developing legal and operational arrangements for cross-sectoral coordination, include provisions for data- and information-sharing.
- **Data-Sharing Protocols**: harmonise and standardize data collection and sharing methods and develop management and exchange protocols to allow subnational data to be interpreted and collated at the national level.
- **Broad Data Sources**: encourage the private sector, international partners, NGOs and academic institutions to share water data that may be of national interest and create enabling environments that allow those data to be standardised, overcoming legal, cultural, and technical bottlenecks.

Instruments for Efficient Water Use and Pollution Control

Management instruments can also be used to enhance water use inefficiency. Such instruments to enhance water use efficiency includes; Water Pricing (Tool C4.01) Recycling and Reuse mechanisms (Tool C3.03), and Water Markets (C4.02). Nature-based Solutions (NbS) (Tool C3.04) are also becoming an increasing popular alternative to hard infrastructure as a way of enhancing water efficiency. For instance, the use of wetlands and mangroves is reported to enhance groundwater recharge and discharge, sediment stabilisation, water quality, and flood flow alteration (WWAP/UN-Wwater, 2018). At present, approximately 45% of the countries have reported to have developed and implemented management instruments towards enhancing water use efficiency.
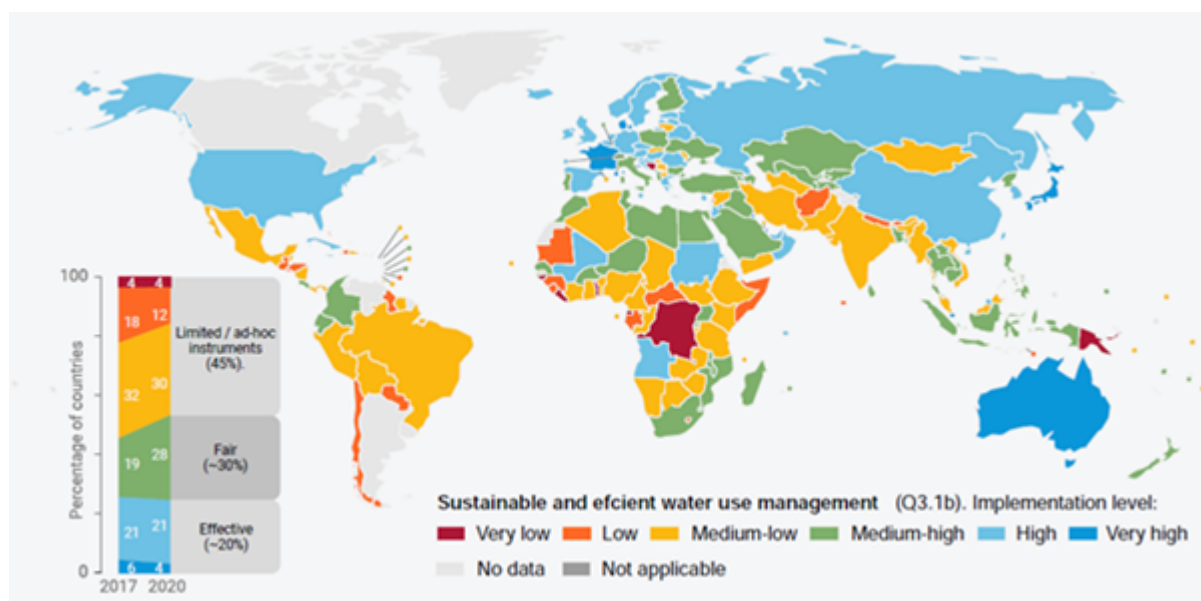

Figure 2. Development and Implementation of Management Instruments for Water Efficiency (Source: UNEP, 2021).

Likewise, management instruments can help water professionals tackle issues related to water pollution. One common approach is to create a "carrot and stick" system of

incentives that combines regulatory and economic instruments ([Tools C4](#)) for reducing pollution. For instance, Pollution Charges ([Tool C4.04](#)) creates an economic incentive which motivates users reduce the amount of pollution they produce. There are also several types of tradable water pollution markets ([Tool C4.03](#)) by which polluting industries can exchange with each other pollution permits. In addition to these Tools, several management instruments used to enhance water efficiency can also be employed for the purpose of reducing pollution, e.g., Nature-based Solutions (NbS) ([Tool C3.04](#)), Recycling and Reuse mechanisms ([Tool C3.03](#)), Payment for Ecosystem Services ([Tools C4.06](#)). Approximately, 50% of countries have developed and implemented these kinds of mechanism for reducing water pollution and protecting the ecosystems (Fig 3.).
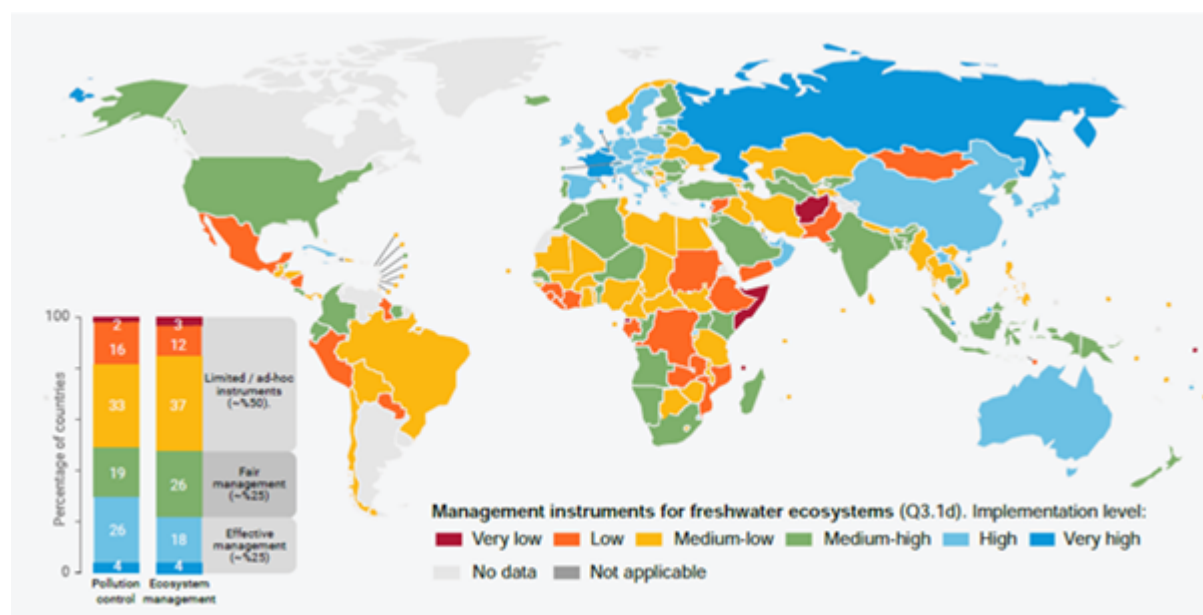

Figure 3. Development and Implementation of Management Instruments for Water and Ecosystems Protection (Source: UNEP, 2021).

Management Instruments for Social Change and Dialogue

Sustained change in the behaviour of water stakeholders is needed to ensure effective water management toward a water-secure future. Targeted communication is required to understand how stakeholders think, and feel, and what motivates them to practice or not practice a certain type of behaviour (SNV, 2016). For example, Behaviour Change Communication ([Tool C5.02](#)) campaigns utilise strategic communication to encourage the adoption of healthier and more sustainable practices at both the individual and community levels. Often, we see the use of this strategy to understand the barriers to WASH services and to improve hygiene practices and increase the appreciation of water supply services ([Tool B5.06](#)). Youth engagement and empowerment strategies ([Tool C5.01](#)) can also be utilised to mobilise social change in water resources management (GWP, 2015).

Management instruments also cover Tools for dialogue and conflict resolution ([Tool C6](#)). In fact, water management involves several stakeholders who often do not share the same perspective on how the resources should be shared. Thus, water management also requires strategies to deal with conflict among stakeholders. Dialogue instruments are used to avoid, deescalate, and resolve conflicts related to water resources management. For example, Water Diplomacy ([Tool C6.04](#)), Negotiation ([Tool C6.01](#)), and Facilitation and

Mediation (Tool C6.02) are also part of the array of tools which can bring different actors to the table and have a constructive approach towards conflict resolution.

Section Overview

The Tools in this section is organised into the following groupings of management instruments:

- **Assessment Instruments** (Tools C1): describes the importance of collecting and processing scientifically grounded data to inform water policy decisions. It highlights the need and benefits of assessments, typology, stepwise approach for its implementation, and the criteria for understanding the impact of an assessment.
- **Decision Support Systems** (Tools C2): gives an insight into Decision Support Systems (DSS) as a mechanism to integrate different types of information in promoting a more holistic system. An introduction to DSS, general components, modelling, data analysis, and information for decision making is provided.
- **Efficiency in Water Management** (Tools C3): explains the need for efficiency in water management as a pathway to increase the productivity of available water by reducing its misuse and wastage. It defines water efficiency and use of an IWRM approach towards achieving such efficiency.
- **Economic Instruments** (Tools C4): connects the use of economic incentives as an avenue to changing the behaviours of water users. Distinction between market-based instruments vs. command-and-control mechanisms, the economics of water scarcity and pollution are described.
- **Promoting Social Change** (Tools C5): highlights the social lens, emphasising the need for social change to aid in sustained sustainable water resources management. It provides a contextual overview of social change, driving factors, barriers and the building blocks for social change in the water sector.
- **Dialogue** (Tools C6): focuses on the concept of dialogue as a form of respectful two-way communication which allows the expression of ideas. The specificities of dialogue, its contribution to IWRM, principles and strategies, and typology are provided.

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Thematic Tagging
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