



Thematic Overview Paper (TOP)

# Regulating water supply and sanitation services

November 2025 | Digbijoy Dey and Marieke Adank

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**Peer review:** Juste Nansi (IRC Africa Hub), Jane Nabunnya (IRC Uganda), Patrick Lester (MWSS RO, Philippines), Jim Gibson (WASH Consultant, South Africa)

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**Design:** Punt Grafisch Ontwerp, Utrecht, The Netherlands

Cite this paper as follows: Dey, D. and Adank, M. 2025. Regulating water supply and sanitation services. Thematic Overview Paper. IRC, The Hague, the Netherlands.

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# Executive summary

## Introduction and Context

Water and sanitation regulation has evolved from basic public health ordinances in medieval cities to sophisticated frameworks governing service quality, pricing, environmental protection, and climate adaptation. The recognition of water and sanitation as human rights (2010) and the adoption of Sustainable Development Goal 6 (2015) have amplified the need for robust regulatory systems that ensure universal access to safe, reliable, and affordable services.

This Thematic Overview Paper examines regulatory functions, models, costs, and future directions across diverse service delivery contexts—from large urban utilities to rural community management and self-supply systems. It synthesises evidence from multiple countries and regulatory traditions to provide practical guidance for water and sanitation professionals.

## Key Regulatory Concepts

**What is Regulation?** Regulation comprises formal legal mechanisms and enforcement processes to ensure stakeholders fulfil their mandates and maintain standards. The regulatory cycle involves: (1) Defining and setting rules and standards for water quality, service performance, tariffs, and environmental protection; (2) Monitoring and information through data collection on compliance; (3) Enforcement using sanctions, penalties, financial incentives, and technological tools.

**What is Regulated?** Core functions include economic regulation (price, service quality, competition, consumer protection), environmental regulation (wastewater treatment, pollution control), public health regulation (water quality, safety), pro-poor regulation (affordability, equitable access), and climate regulation (emissions mitigation, adaptation).

**Who Regulates?** Models include regulation by agency ((semi-)autonomous bodies like Ofwat England and Wales, NWASCO-Zambia); regulation by contract (contractual clauses between entities and providers); ministerial regulation (government ministries); self-regulation (providers monitoring themselves); and third-party regulation (external contractors). No single ‘best practice’ model exists; countries must find the ‘best fit’ for their context.

## Regulatory Requirements Across Service Delivery Models

The 2022 GLAAS survey of 124 countries revealed ‘overseeing quality’ as the most common regulatory function, followed by ‘service coverage and delivery’ and ‘tariff setting.’ However, fewer countries regulate rural services compared with urban, and sanitation regulation lags behind water supply.

**Water services:** Utilities (regulated through dedicated agencies, contracts, or self-regulation); Municipal management (common in Latin America, Europe, Africa, Asia—regulated via contracts, agencies, or government oversight); Community management (thousands of small rural schemes face challenges with low formalisation—only 2,580 of 18,000+ systems registered in Bolivia); Safe water enterprises and private providers (often in regulatory grey zones); Self-supply (primarily self-regulated by households).

**Sanitation services:** Self-supply and containment (regulated through design standards, environmental requirements); Faecal sludge management (licensing providers, setting tariffs, monitoring environmental compliance); Sewered sanitation (comprehensive frameworks in high-income countries—only 13% of Africa has sewered sanitation, yet 63% of African countries have developed related regulations).

### Costs and Financing of Regulation

Regulation costs are related to: Setting of norms and standards and initial set-up of the regulatory framework (one-off, government-funded); Ongoing monitoring (field staff, inspections, equipment, IT systems); Enforcement (legal staff, court processes, compliance actions). The costs of monitoring and enforcement can be covered by utility/consumer levies (e.g. 1-4% on revenues, as done in Kenya, Rwanda, Niger, Mali, Mozambique); Licensing fees (e.g. in Cape Verde, Burundi); Cross-subsidies (e.g. energy sector levies in Ghana, ICT fees in Rwanda); Mixed funding (government grants plus fees, e.g. in Sierra Leone, Angola). Water tariffs are often kept artificially low, limiting contributions and necessitating government tax support.

### Global Monitoring Initiatives

JMP (WHO/UNICEF) sets global norms for service levels, influencing national standards. The MDG-to-SDG transition elevated focus from 'improved' to 'safely managed' services. GLAAS assesses 192 indicators of national WASH systems strength, including regulatory capacity and financing. The new Align to Accelerate initiative (WHO, UNICEF, World Bank) is developing common indicators to measure WASH systems strength, including regulatory capacity. IBNET facilitates voluntary utility benchmarking, promoting transparency and performance competition.

### Future Directions and Recommendations

Emerging trends: (1) Re-municipalisation—cities like Paris, Berlin, Indianapolis returning privatised services to public control; (2) Digitalisation and AI—smart technologies enhancing monitoring and transparency; (3) Climate adaptation—mandating climate-resilient infrastructure; (4) Climate mitigation—regulating greenhouse gas emissions from WASH services.

Key recommendations: Context-specific approaches (no one-size-fits-all); Capacity building (institutional, technical, financial); Phased implementation (align standards with provider maturity); Decentralised regulation (responsive to local conditions); Pro-poor emphasis (bridge policy-practice gap); Global alignment (2025 Call to Action on Strengthening WASH Regulatory Systems—IWA, WHO).

A growing recognition of the importance of regulation in achieving universal WASH access has driven significant advances in regulatory frameworks worldwide. However, substantial gaps remain—particularly in rural areas, for decentralised service delivery models, and in translating pro-poor policies into practice. Effective regulation serves as a bridge between government, service providers, and consumers, ensuring transparency, accountability, and equitable service delivery. As the sector confronts challenges of climate change, urbanisation, and rising service-level expectations, strengthened regulatory systems will be essential for sustainable water and sanitation for all.

The diversity of regulatory models and contexts demonstrates that successful regulation requires adaptation to local realities rather than universal prescriptions. Countries must build on existing strengths, learn from international experience, and progressively strengthen regulatory capacity to meet present and future WASH challenges.

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# 1 Introduction

Water supply and sanitation were for a long time treated largely as common goods, not as regulated services. Historically some city ordinances (e.g. in medieval European and Islamic cities) prohibited waste disposal in streets or rivers, but enforcement was weak (Juuti, P. & Katko, T. 2005; Ostrom, E. 1990). In the nineteenth century, industrialisation and urban crowding led to cholera and typhoid epidemics. This, and the development of the “germ theory” in the second half of the 19th century, led to the introduction of regulation for preventing water-borne diseases. Public health acts - such as the pioneering UK Public Health Act of 1848 - created formal legal duties for municipalities to provide clean water and sanitation (Hamlin, 1998). In the US, the Clean Water Act of 1948 laid the foundation for water regulation.

In the late 20th century, privatisation of water supply services in several countries led to the establishment of dedicated regulatory bodies, such as the Office of Water Services (Ofwat) in England and Wales, to oversee the newly established private water companies. Countries like Portugal (IRAR, later renamed to ESRAR), Chile (SISS), Philippines (MWSS-RO) and Zambia (NWASCO) established their regulatory agencies around the same period. This was driven by a desire of the public sector to regulate prices and performance of private service providers in a natural monopoly.

The recognition of the human rights to water and sanitation in 2010, and the 2015 global commitment to Sustainable Development Goal 6 (SDG 6) for sustainable water and sanitation services for all, calls for a stronger focus on both expanding the coverage of facilities and services, and on ensuring that these services are provided at an appropriate, agreed level. The “Human rights and access to safe drinking water and sanitation” states water and sanitation are essential human rights that must be guaranteed

(United Nations 2010). It demands that water and sanitation be available, affordable, accessible, acceptable, safe, and of high quality, and should be delivered transparently, accountably, and sustainably, without discrimination (Heller, 2017). Sustainable Development Goal 6 focuses on water services available when needed, on premises, and free from contamination, and on sanitation services with safe disposal and treatment of human waste.

Over the last decades, an increasing number of people have obtained access to water and sanitation services, and population and economic growth have gone hand-in-hand with an increase in demand for higher service levels. In line with this, water and sanitation sectors in many countries are going through reform processes, with self-supply (e.g. household latrines) and community-managed services (e.g. community-managed handpumps or piped schemes) being upgraded to more professionally managed services. These changes call for stronger regulatory systems that ensure affordable, yet economically viable, high-quality services, while safeguarding consumer interests, public health, and the environment.

Over the years, regulation in the water and sanitation sector has been shaped by the aim to ensure public health, to control prices and services of private service providers, to ensure access to water and sanitation services for all (in line with the human right to water), at the right service level (in line with SDG 6).

Especially over the last two decades, there has been increasing realisation and recognition in the sector about the importance of regulation. Examples of key publications about regulation in the water and sanitation sector include:

- Groom et al. (2006): “Explanatory Notes on Key Topics in the Regulation of Water and Sanitation Services”. Focus on economic regulation of water and sanitation services. This was the first set of outputs from a programme of work on regulation in the water supply and sanitation sector funded by the Public-Private Infrastructure Advisory Facility (PPIAF), the Bank-Netherlands Water Partnership (BNWP), and the World Bank.
- Trémolet (2015): “Regulation in Rural Areas”. This Triple-S learning note explores the role of regulation in sustainable water service delivery in rural areas and identifies areas for improvement.
- Mumssen et al. (2018): “Regulation of Water Supply and Sanitation in Bank Client Countries: A Fresh Look”. A water global practice discussion paper providing insight into regulatory objectives, forms and functions.
- SIWI, UNICEF, WHO, & IADB (2021): “WASH Regulation (WASHREG) Approach: An Overview” is intended to help WASH professionals and other stakeholders understand the elements of WASH regulation within a broader enabling environment for effective and sustainable WASH service delivery.
- World Bank (2022): The World Bank report “Water Supply and Sanitation Policies, Institutions, and Regulation: Adapting to a Changing World” reflects on the body of Policies, Institutions and Regulation (PIR) knowledge and experiences to refine the concept and advocate for greater action by policy makers, development partners, international financial institutions, and civil society.
- ESAWAS (2022): “The Water Supply and Sanitation Regulatory Landscape Across Africa”. A description and analysis of regulatory functions, mechanisms and models across Africa.

This Thematic Overview Paper provides water and sanitation sector professionals with a conceptual and practical overview of:

1. What functions and models of regulation are relevant across different service delivery approaches?
2. What are the financing mechanisms and costs of regulation of water and sanitation services?
3. What role do global initiatives play?
4. What are the emerging challenges and future directions for regulating water and sanitation services?

Following this introduction, a conceptual overview of regulatory definitions, functions and models is presented in Section 2. Section 3 presents the requirements and reality of regulating different water and sanitation service delivery models. Costs and sources of funding for regulation are presented and discussed in Section 4. The role of global regulatory initiatives is discussed in Section 5. Finally, Section 6 presents the future of regulation of water and sanitation services and the way forward.

## 2 Regulatory concepts

This section presents the theoretical concepts related to regulation. It defines what regulation is, the functions linked to what is regulated, and describes models which set out who regulates.

### 2.1 What is regulation?

#### 2.1.1 Defining regulation and regulatory mechanisms

Regulation in the water supply and sanitation sector has been defined slightly differently by different authors (e.g. Selznick, 1985, Trémolet, 2015, Mumssen et al., 2018, Jiménez et al., 2020), but with broadly similar meaning. For this Thematic Overview Paper (TOP), we use the definition of regulation by Jiménez et al. (2020): “formal legal mechanisms, enforcement processes and other rules to ensure that stakeholders fulfil their mandates, and that standards, obligations and performance are maintained, as well as to ensure that the interests of each stakeholder are respected.”

According to this definition, and many others (e.g. Trémolet, 2015, Mumssen et al., 2018), regulation involves:

- Defining and setting the regulation rules and standards.** This involves setting norms and standards related to public health and the environment (e.g. water quality standards) and service performance standards (e.g. standards related to water supply continuity). While environmental and public health standards are often derived from scientific guidelines, service performance standards evolve from historical practice, local norms, institutional capacity, legislation and national-level planning. Defining and setting rules and standards also includes providing approvals for operating water and sanitation related services.
- Monitoring and information:** This involves collecting data and information on compliance with the norms and standards which have been set. Monitoring can be done by a regulator, by the service provider, or by any other entity. The collected data should be available to the regulator, service provider and general public. Monitoring by a regulator or third party can involve regular inspections, audits, and monitoring of water supply or waste management practices.
- Enforcement of the regulatory rules.** This is done based on monitoring data and information. In case of violation of standards, regulators can impose sanctions (e.g. cancelling the licence) or penalty (e.g. financial penalty). Financial tools are also very common such as incentivising service providers to follow standards. In addition, there are technological tools such as banning a certain technology or mandatory use of a certain technology to comply with the standards. In addition to sanctions and penalties, enforcement can involve financial and/or reputational incentives.

As shown in Figure 1, these elements form a cyclical process.



**Figure 1:** Steps of regulating a service (Source: WASHReg Methodology)

The results of the assessment of the information gathered through monitoring, as well as results of enforcement, should inform updates of the regulations and supporting programmes (SIWI, UNICEF, WHO, & IADB, 2021). However, the development and implementation of regulation in real-life situations may not be so organised. Often, local history and customs also play a significant role (World Bank, 2022).

Different entities in different countries have prioritised the use of different regulatory tools for enforcement. The World Health Organization (2024a) identifies a number of enforcement tools commonly used in water and sanitation regulation, including:

- **Financial instrument:**
  - Subsidies and incentives: Encouraging desired behaviours (e.g., investment in renewable energy or sanitation).
  - Performance-based financing: Linking funding or bonuses to achievement of performance targets.
- **Techno instrument:** Using technology as a barrier for violation of standards. It is often used as a tool for environmental regulation enforcement. For instance, compulsory use of sensors that do not allow wastewater to discharge in the environment without complying with the standards.
- **Legal and policy instrument:**
  - Licensing and permits: Conditional approvals to operate, often tied to compliance with standards.
  - Contracts and concessions: Used in public-private partnerships (PPPs) to formalise obligations and service levels.
- **Monitoring and enforcement:**
  - Inspections and audits: Routine or risk-based checks to verify compliance.
  - Reporting requirements: Mandatory submission of operational or financial data by regulated entities.
  - Sanctions and penalties: Fines, suspension, or revocation of licences for non-compliance.

- Public disclosure (“name and shame”): Publishing performance or compliance data to encourage transparency.
- **Informational instrument:** Benchmarking works as a regulatory tool by comparing the performance of service providers—such as utilities, municipalities, or private operators—with one another or with established standards. It helps regulators assess, motivate, and enforce improvements in service delivery, efficiency, and accountability.

### 2.1.2 Regulation as a systems building block

Over the last decade, there has been increasing recognition of the need to consider water and sanitation from a systems perspective, with water and sanitation systems comprising the actors and factors involved in water and sanitation service provision (Agenda for Change 2023). Various authors (e.g. Jiménez et al., 2020, Tremolet, 2015, Huston & Moriarty, 2018) have conceptualised systems in terms of their building blocks. In most of these conceptualisations, regulation was considered as one of the essential systems building blocks.

The regulation building block generally covers formal regulatory mechanisms and enforcement processes, as well as other mechanisms to hold decision makers, service providers and users to account and ensures that the interests of each group of actors are respected (Trémole, 2015).

Regulation contributes to the five accelerators which can support countries in achieving national targets for SDG 6: 1) financing; 2) data and information; 3) capacity development; 4) innovation; and 5) governance (SIWI, UNICEF, WHO, & IADB, 2021). These accelerators are closely related to the finance, monitoring, institutions, infrastructure, and policy and legislation building blocks.

Regulation relates to the other building blocks in the following ways:

- **Policy and legislation building block.**
  - Good policy and legislation are effective only if they are applied and enforced through regulatory systems<sup>1</sup> (Huston and Moriarty, 2018).
- **Institutions building block.**
  - **Clearly defined roles and responsibilities** need to be in place for regulation. This includes clear differentiation between service authorities and service providers and clear definition of regulatory roles and responsibilities (Huston and Moriarty, 2018). These bodies ensure that water and sanitation services are effectively planned, implemented, and monitored (OECD, 2025).
  - **Capacity building:** Regulations may mandate that local governments and water and sanitation service providers build their technical and institutional capacity, ensuring that staff are trained and equipped to handle sanitation management efficiently (OECD, 2025).
  - **Coordination and stakeholder engagement:** Regulations foster coordination between different actors involved in sanitation services, such as local governments, utilities, private contractors, and civil society organisations (OECD, 2025).
- **Monitoring building block.**
  - **Monitoring and reporting** are an essential part of regulation, as monitoring data serve as its basis (Huston and Moriarty, 2018). Regulators can require utilities and service providers (public, private, or community-based) to submit regular data on 1) water quality in relation to set standards; 2) service coverage and continuity; 3) tariffs, costs, and revenue; 4) customer complaints and service interruptions. In England and Wales, for example, Ofwat requires utilities to publish annual “performance commitments”.
- **Standardising indicators and methodologies:** Regulators can define uniform performance indicators, so data are consistent and comparable across providers. Examples of common metrics include non-revenue water, service coverage, compliance with water and wastewater quality standards, response time to breakdowns. This avoids fragmented, incompatible data and helps benchmarking.
- **Creating centralised information systems:** Regulators can build national databases or dashboards that compile data from all providers. This improves transparency and helps policymakers, planners, researchers, and citizens. An example is Peru’s water regulator (SUNASS) which operates a centralised performance information system for utilities (Langen, 2022).
- **Finance building block.**
  - **Setting tariffs:** Establishing and enforcing tariffs that are both equitable and sufficient to recover investments is essential for attracting new finance into the sector and assuring sustainability of current investments (Huston and Moriarty, 2018).
  - **Subsidies and incentives:** Regulatory frameworks may include incentives for adopting safe and sustainable water and sanitation technologies.
  - **Financing regulation:** Regulation is an ongoing expenditure and must be budgeted for (Huston and Moriarty, 2018).
- **Infrastructure development and management building block.**
  - **Adoption of new technologies:** Regulations can encourage the adoption of innovative and more efficient technologies, for example for water purification, leak detection, or metering, improving the sustainability and cost-effectiveness of service delivery, or for decentralised waste treatment, sustainable toilet designs, or wastewater reuse systems to improve the efficiency and sustainability of sanitation services (UN-Water, 2015).

1. Policies are .... Laws are broad legal rules established by legislative bodies. Regulations are specific rules or directives developed by governmental agencies to implement and enforce laws.

- **Incentives for investments:** Regulatory frameworks may create incentives (e.g., tax breaks, subsidies) for utilities or private companies to invest in modern infrastructure and technologies that improve water service quality and reduce waste (UN-Water, 2015).
- Regulatory responsibilities vary across the life-cycle stages of infrastructure (e.g., construction versus capital maintenance) and by type (e.g., rural handpump versus urban piped supply) (Huston and Moriarty, 2018).

As services mature, the need for regulation becomes increasingly evident. **A well-functioning regulatory system is a central feature of good sector governance.**

## 2.2 What is regulated? Regulatory functions

There is a relatively high degree of consistency in the conceptualisation of regulatory functions. Figure 2 presents an overview of the main regulatory functions mentioned in literature (SIWI, UNICEF, WHO, & IADB, 2021, Trémolet, 2015, Mumssen et al., 2018). A relatively new addition to the regulatory functions is its role in stimulating climate change mitigation and adaptation. Both of these will be discussed in more detail below.

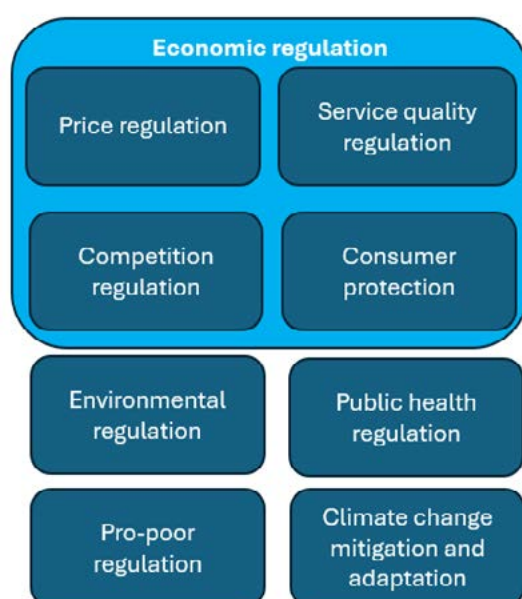


Figure 2: Regulatory functions

### 2.2.1 Price regulation

Price regulation involves setting overall tariff levels and structures to ensure the delivery of services at affordable costs, while assuring long-term financial viability of the service providers (SIWI, UNICEF, WHO, & IADB, 2021). Price regulation can involve regulation of the price of goods, for example materials or items such as filters or latrine slabs, or the price charged for services, including water supply tariffs, costs of latrine construction, or maintenance service fees.

### 2.2.2 Service quality regulation

Service quality regulation involves defining, monitoring and enforcing levels of service based on product characteristics such as technical requirements or customer responsiveness (SIWI, UNICEF, WHO, & IADB, 2021).

- **Setting and regulating performance standards:** Regulatory bodies set performance standards for delivery of services, including response times for service disruptions, the continuity of supply, and leak management (UN-Water, 2015).
- **Setting and regulating construction standards:** Regulatory frameworks define the minimum construction standards for infrastructure. This can include standards ensuring that the infrastructure is both appropriate and suitable for the population it serves (World Health Organization, 2018).
- **Regulating infrastructure maintenance:** Regulations may require utilities to maintain, upgrade, and replace ageing infrastructure to ensure reliable, continuous service delivery (UN-Water, 2015).
- **Regulating quality of service:** Regulations set expectations for customer services, including handling of complaints, installing dispute resolution mechanisms, and maintaining clear and transparent billing practices (UN-Water, 2015).
- **Licensing and certification:** Regulators issue licences for service providers, both public and private, to ensure that only competent, qualified operators are allowed to deliver services (SIWI, UNICEF, WHO, & IADB, 2021). Licensing can also involve site approval for the construction and extension of infrastructure.



- **Setting and regulating emergency protocols:** Regulations may require utilities to have contingency plans in place for emergencies, such as natural disasters, that could affect services (UN-Water, 2015).

### 2.2.3 Competition regulation

Competition regulation involves monitoring competition for the market (in case of a monopoly) and ensuring competition in the market where applicable (in case of small-scale providers) (SIWI, UNICEF, WHO, & IADB, 2021).

- **Competition management:** Competition management aims to balance efficiency, affordability, and quality while ensuring sustainable and equitable access to services.
- **Licensing:** Regulations often require service providers (whether public or private) to obtain licences or certifications before they can operate. As mentioned above, this is intended to ensure involvement of qualified and competent service providers. In addition, licensing can play a role in competition regulation, e.g. by assigning certain areas to certain service providers.

### 2.2.4 Consumer protection

Consumer protection involves resolving customer complaints in the second instance (after they have been dealt with by a service operator) (SIWI, UNICEF, WHO, & IADB, 2021).

- **Consumer rights:** Regulations define the rights of consumers to receive safe, adequate, and equitable sanitation services. This includes ensuring that services meet quality standards and that users are informed about how the system operates and the costs involved (SIWI, UNICEF, WHO, & IADB, 2021) (World Bank, 2017).
- **Protection against exploitation:** Regulations can safeguard consumers from unfair pricing practices, such as unreasonably high tariffs or billing errors (UN-Water, 2015). Competitive and inclusive tariff setting, discussed above, is often considered the first step in consumer protection.

- **Transparency and accountability:** Regulation ensures that service providers operate transparently by requiring them to publish performance reports, financial statements, and information on the quality and reliability of services. This ensures that service providers are held accountable for their actions and builds consumer trust (UN-Water, 2015).
- **Complaint resolution:** Regulatory frameworks typically include mechanisms for consumers to report issues related to sanitation services, such as sewage overflows or unsanitary conditions. Regulators may require service providers to address these complaints within a specific time frame (SIWI, UNICEF, WHO, & IADB, 2021) (World Bank, 2017).

### 2.2.5 Environmental regulation

Environmental regulation involves establishing, monitoring and enforcing rules on how, who and how much water may be extracted, with the aim of protecting resources for current and future generations (SIWI, UNICEF, WHO, & IADB, 2021).

- **Wastewater treatment standards:** Regulations define acceptable methods for the treatment of wastewater before its discharge into the environment. These standards aim to reduce environmental pollution, protect water quality, and ensure that treated wastewater meets safety levels for reuse or disposal (UN-Water, 2015).
- **Resource recovery:** Some regulations encourage or mandate the recycling or reuse of wastewater, sludge, and other waste materials. This supports the circular economy by turning waste into valuable resources, such as fertilisers or biogas (UN-Water, 2015).
- **Environmental protection:** Regulations can impose restrictions on the dumping of untreated waste into the environment and enforce penalties for violations. This ensures that sanitation services contribute to environmental sustainability rather than harming ecosystems (UN-Water, 2015). These can include Land Use Regulations.

### 2.2.6 Public health regulation

Public health regulation involves setting, monitoring and enforcing standards to protect the public from health risks.

- **Setting and regulating water quality standards:** For water supply, this involves setting and regulating water quality standards to ensure that drinking water is safe for consumption and for protecting public health. These standards typically cover microbiological, chemical, and physical parameters (e.g., free from pathogens and toxic substances such as lead or arsenic) (UNICEF & WHO, 2017). For sanitation, it involves setting and regulating sanitation standards to ensure that wastewater is safely managed, preventing contamination of water sources, soil, and food. This includes the safe collection, treatment, and disposal of human waste to prevent the spread of diseases such as cholera, typhoid, and dysentery (WHO, 2018).
- **Health and safety regulations:** Worker safety is a regulatory priority for both sewered and non-sewered sanitation. In the EU, Directive 89/391/EEC provides a general framework for worker safety. In the US, OSHA standards (29 CFR 1910.146) regulate confined spaces such as sewers. In non-sewered sanitation, workers' health and safety are typically governed by national regulation, as the types of non-sewered sanitation can vary significantly from country to country. Some countries, like India, have banned manual scavenging (direct human entry into sewers/septic tanks without protective equipment) under the Prohibition of Employment as Manual Scavengers and their Rehabilitation Act, 2013.

### 2.2.7 Pro-poor regulation

OECD (2025) and World Bank (2017) highlight universal service obligations and affordability requirements as part of regulatory functions. In the literature, this is sometimes referred to as "pro-poor regulation" or "equity regulation". In many countries, pro-poor aspects are embedded in other regulatory areas mentioned above. However, some countries go further and establish explicit regulations that directly target pro-poor objectives. Pro-poor regulation can explicitly address the following areas:

- **Tariff and affordability rules**, e.g., lifeline tariffs, cross-subsidies, or targeted subsidies so that low-income households can afford services.
- **Service expansion obligations** requiring utilities to extend coverage to underserved settlements (informal urban areas, remote rural communities).
- **Standards for equitable access** mandating that all consumers receive a minimum service level (continuity, quality, accessibility).
- **Consumer protection mechanisms** providing voice and grievance channels to vulnerable or marginalised groups.
- **Disaggregated data** (urban/rural, gender, income level) are required by regulators to track who is being served and who is left behind.

Many of these pro-poor regulatory functions overlap or interact with other regulatory functions, such as tariff setting, performance regulation and customer protection, but with a special emphasis on the poor.

### 2.2.8 Regulation for mitigation and adaptation to climate change

Climate-related water scarcity, water quality deterioration, infrastructure vulnerability and public health risks are pushing water and sanitation regulators to integrate climate resilience into their mandate (WHO, 2017).

Water and sanitation services are affected by climate change, including changes in water resource quantities and qualities and climate-related risks to water and sanitation assets. On the other hand, water and sanitation services are a source of greenhouse gas emission. Regulators are playing a role in climate change mitigation as well as adaptation (UNESCO & UN-Water, 2020).

- **Climate change mitigation:** Regulations can encourage water and sanitation services to be designed and operated in a way that minimises greenhouse gas emissions. Recent studies (Leeds, 2025) have estimated the enormous amounts of emissions caused by sanitation services. This is a relatively new area, but regulators are already considering it an emerging issue for future regulation.
- **Climate change adaptation:** Regulations can establish guidelines for utilities to plan for climate change impacts, such as fluctuating water availability, droughts, or floods, ensuring that drinking water systems remain resilient in the face of these challenges (UNESCO & UN-Water, 2020).
- **Disaster risk management:** Water regulations may require utilities to prepare for climate-induced risks, such as extreme weather events, by implementing disaster management plans and climate-resilient infrastructure (UNESCO & UN-Water, 2020).

## 2.3 Who regulates? Overview of regulatory models

Different regulatory models can be identified. Based on Trémolet & Binder (2010), ESAWAS (2022), and SIWI, UNICEF, WHO, & IADB (2021), we identify the following models:

- **Regulation by agency.** This involves a regulatory body (semi-) autonomous from the government and has discretionary powers to regulate water and sanitation services or aspects of those services (ESAWAS, 2022). ‘Regulation by agency’ models are based on the English-speaking common law tradition. Under such models, an agency established by law is responsible for regulating the service in a more autonomous manner. The ‘independent regulatory agency’ model has often been promoted as a way of overcoming potential conflicts of interest and limit political interference. In some countries, such as in the UK, Colombia, Mozambique, Honduras or Zambia, a national regulatory body has been established. This entity is commonly known as ‘national regulator’. Some countries have modified existing agencies to take on that responsibility (ESAWAS, 2022).
- **Regulation by contract** involves a public entity other than a (semi-) autonomous regulatory agency agreeing with a service provider on contractual clauses that determine how key aspects of water and sanitation service provision are defined and controlled, such as tariffs and service standards (ESAWAS, 2022). This regulatory model originates in the Francophone civil law tradition. It refers to a situation where most of the rules, particularly on tariffs and service quality, are set out in advance in a contract (Trémolet & Binder, 2010). Regulation by contract can be effective if the contracting authority is capable of enforcement. Contracts and compliance obligations can be customised to align with the providers’ capacities, and as long as enforcement is deemed feasible. The potential loss of a contract—or the opportunity for its extension or expansion—serves as a strong incentive for compliance.

- **Ministerial regulation or regulation by government:** In some countries (especially where there is a history of regulating the water and sanitation sector), the public sector owns the assets and takes care of the management. This can be considered as regulation by government. A ministry or body under a ministry typically performs regulatory responsibilities and does not use contracts as a core regulatory tool (ESAWAS, 2022). The Netherlands and Germany are considered to follow this model (SIWI, UNICEF, WHO, & IADB, 2021).
- **Self-regulation:** A service provider (typically a public utility or unit of local government) is legally mandated to perform key regulatory activities upon itself (i.e., setting tariffs and performance standards, performance reporting) (ESAWAS, 2022). Service providers themselves set norms and standards and monitor compliance accordingly.
- **Regulation by third party:** There are few cases where external contractors are used to perform certain duties such as tariff review, benchmarking or dispute resolution (SIWI, UNICEF, WHO, & IADB, 2021).

It is not uncommon for different regulatory functions in a country to be assigned under different regulatory models. For example, in the francophone tradition of economic regulation through contract, conflict management is done by independent agencies, such as Public Courts.

Trémolet & Binder (2010) noted that: ‘as these models are, in their initial form, rarely applicable in developing countries, we have witnessed the emergence of a whole host of hybrid models, which can combine several aspects of these main models or invent others in an attempt to provide more appropriate solutions for the context of developing countries’.

There is no single ‘best-practice’, or one-size-fits-all approach/design or model for water and sanitation service regulation. Countries must instead find the ‘best-fit’ according to their particular context (ESAWAS, 2022).

## 2.4 Summing up

Table 1 presents an overview of how regulation is done (regulatory mechanisms), what is regulated (regulatory functions) and who regulates (regulatory models).

**Table 1:** Overview of regulatory mechanisms, functions and models

| Regulatory mechanisms                                                                                                                                                                                                                 | Regulatory functions                                                                                                                                                                                                                                                                                                                                                       | Regulatory models                                                                                                                                                             |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <ul style="list-style-type: none"> <li>• Defining and setting the regulation rules and standards</li> <li>• Monitoring</li> <li>• Enforcement (through sanctions and penalties, and financial and reputational incentives)</li> </ul> | <ul style="list-style-type: none"> <li>• Economic regulation:               <ul style="list-style-type: none"> <li>• Price regulation</li> <li>• Service quality regulation</li> <li>• Competition regulation</li> <li>• Consumer protection</li> </ul> </li> <li>• Environmental regulation</li> <li>• Public health regulation</li> <li>• Pro-poor regulation</li> </ul> | <ul style="list-style-type: none"> <li>• By Agency</li> <li>• By contract</li> <li>• By government / ministry</li> <li>• Self-regulation</li> <li>• By third party</li> </ul> |

### 3 Regulatory requirements and realities

The 2022 UN-Water Global Analysis and Assessment of Sanitation and Drinking-water (GLAAS) survey of 124 countries included questions about regulatory functions. An overview of the results is presented in Figure 3. Overall, it shows that the regulatory function which most countries had in place was “overseeing quality”, followed by overseeing “service coverage and delivery”, closely followed by “setting tariffs”. It shows that fewer countries have rural regulatory functions than urban ones, and fewer have sanitation regulatory functions than water ones.

There are different service delivery models for the provision of urban and rural water and sanitation services, with different degrees of scale, professionalisation, and private sector involvement. These service delivery models can have different regulatory requirements and realities. In countries with multiple service delivery models, different regulatory arrangements are likely to be in place.

ESAWAS (2022) found a diversity of regulatory frameworks for water and sanitation service delivery in Africa, with most countries having mixed approaches comprising multiple regulatory models.

The World Bank (2022) also argues that the domain of regulation should be explored within specific country contexts. According to them, legal and administrative institutions in low- and middle-income countries (LMICs) are generally less developed, with weaker enforcement, transparency, and accountability. They argue that in these contexts, the presence of local history, customs, and traditions can play a significant role in determining reform outcomes. Based on this context, the objectives of regulation in LMICs may be different.

The next section presents an overview of the different water and sanitation service delivery models and their regulatory requirements and realities.

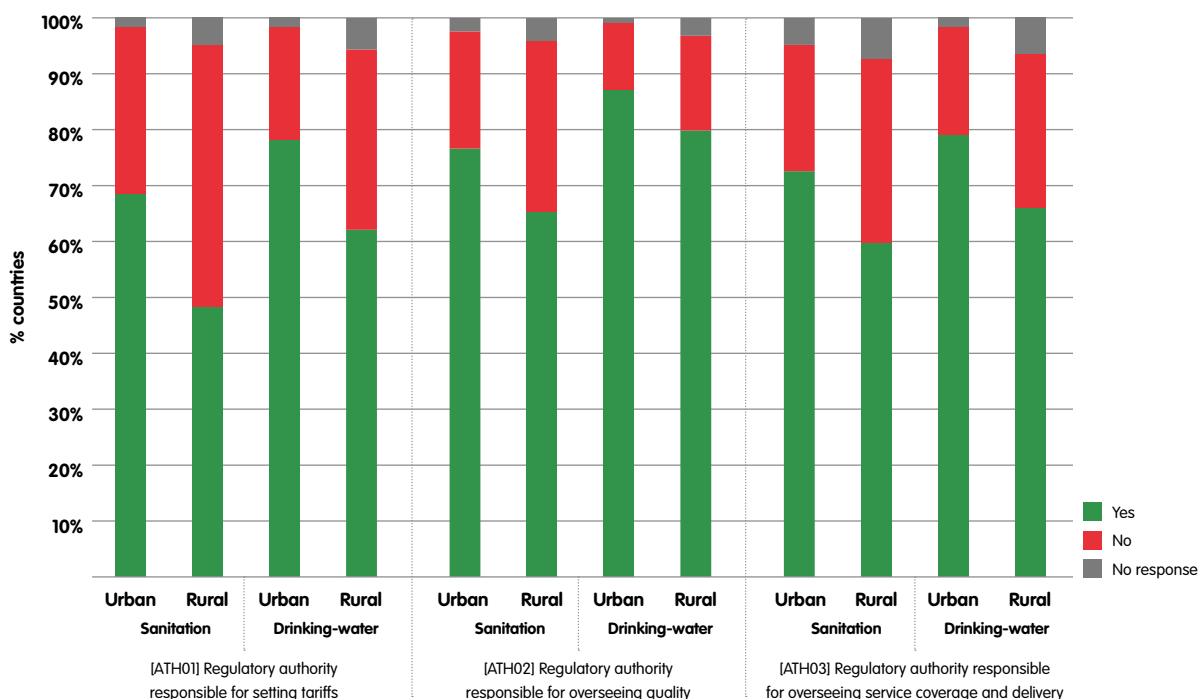


Figure 3: Regulatory functions in 124 countries

### 3.1 Regulating water service

Building on the work of Adank et al. (2021) and ESAWAS (2022), Table 2 presents an overview of the main water service delivery models.

Most literature and sector documents focus on regulation of utilities. This section discusses the regulatory requirements and realities of all main service delivery models mentioned above.

#### 3.1.1 Regulating utilities

Water utilities are defined by Adank et al. (2021) as legally established corporate entities, responsible for the direct provision of ('retail') water services to clients. They manage revenues and expenditure autonomous from local government and involve professional paid operational staff, as well as professional paid executive management referred to as 'corporate oversight' by Pilgrim et al., 2007. Utility management is the common model for urban water supply, but it is also increasingly becoming a significant model for rural water supply. Utilities can cover urban (and rural) areas nation- or region-wide, or can cover a specific administrative area, e.g. a specific town or municipality (Adank et al., 2021).

**Regulatory functions:** Essential regulatory functions for regulating utilities include price regulation, setting and regulating performance standards, setting and regulating water quality standards, consumer

protection, pro-poor regulation, and climate change-related regulation.

**Regulatory models:** Setting and regulation of water quality standards is commonly the responsibility of government, e.g. the Ghana Standards Board in Ghana. Consumer rights groups, consumer fora and ombudsmen can also play a role in consumer protection.

Price and performance regulation of national or regional public utilities involves monitoring and enforcement of services provided by a single or small number of providers. This is the responsibility of a central **agency** in Great Britain, for example, and in many countries in Africa. Regulatory agencies can be focused on water supply (and sanitation) only, like Ofwat in England and Wales, the National Water Supply and Sanitation Council (NWASCO) in Zambia, regulating 11 urban Commercial Utilities, and the Water Regulatory Authority (AURA) in Mozambique, regulating the national urban utility FIPAG. Regulatory agencies can also regulate multiple utility sectors. In Ghana, for example, the Public Utilities Regulatory Commission (PURC) regulates both the Ghana Water Company Limited (GWCL) and the Electricity Company of Ghana Limited. The Rwanda Utilities Regulatory Authority (RURA) regulates the national utility WASAC, but also the ICT, transportation, electricity, and nuclear and radiation sectors.

**Table 2:** Water service delivery models

| Service delivery models | Water service providers                                                                                                                                                                                                                                                                    |
|-------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Utility management      | <ul style="list-style-type: none"> <li>National or regional public utilities</li> <li>Single-area public utilities</li> </ul>                                                                                                                                                              |
| Municipal management    | <ul style="list-style-type: none"> <li>Municipal departments</li> <li>Municipal management with delegated private operator</li> </ul>                                                                                                                                                      |
| Community management    | <ul style="list-style-type: none"> <li>Community committee</li> <li>Community committee and maintenance service provider</li> <li>Community committee with delegated private operator</li> </ul>                                                                                           |
| Safe water enterprises  | <ul style="list-style-type: none"> <li>Safe water enterprises</li> </ul>                                                                                                                                                                                                                   |
| Private supply          | <ul style="list-style-type: none"> <li>Intermediate private supply: Including tanker operators sourcing water from utility-managed source and water vendors.</li> <li>Independent private supply: Including tanker services with own source and bottle and sachet manufacturers</li> </ul> |
| Self-supply             | <ul style="list-style-type: none"> <li>Households</li> </ul>                                                                                                                                                                                                                               |

In several Francophone (including Burkina Faso, CAR and Senegal) and a few anglophone (Eswatini, Uganda) African countries, national or regional utilities are regulated through **contracts** (ESAWAS, 2022). In Burkina Faso, the contract between the national utility (Office National de l'Eau et de l'Assainissement, ONEA) and the government specifies ONEA's targets for technical performance, including investment commitments to expand access. As part of the performance contract, ONEA has implemented a

programme to expand services to informal settlements and peri-urban areas (Mumssen et al., 2018).

From 1997 to 2012, performance regulation of the regional water utilities in the Netherlands was mainly carried out through **self-regulation**. Since 2012, performance, water quality and tariff regulation have been the responsibility of an inspectorate under a **Ministry**, as set out in Box 1.

### Box 1: Water service regulation in the Netherlands

In the Netherlands, water services are provided by regional utilities. While there were around 200 municipal and private utilities in the 1960s, these have since been consolidated into 10 publicly owned utilities that serve the country today. The 2011 Drinking Water Act (and the previous 1957 Piped Water Act) forms the basis for a set of laws and regulations that govern water supply in the Netherlands. Norms and standards are set in the Drinking Water Resolution and Drinking Water Regulations and are based on the European Drinking Water Directive. Water quality, performance and tariffs are currently regulated by the Human Environment and Transport Inspectorate (Inspectie Leefomgeving en Transport, ILT), which is the supervisory authority of the Ministry of Infrastructure and Water Management.

**Performance regulation:** In 1997, utilities started voluntary performance self-regulation through benchmarking, with publication of the first benchmarking report in 1999. This was organised by the Association of Utilities, VEWIN, as a response to the privatisation discussion driven by the Ministry of Economic Affairs. It demonstrated the high performance of public utilities, which informed the decision by the Dutch parliament in 2003 to protect water as a public good, rather than implementing the proposed privatisation of the water supply sector (De Witte et al., 2007). Benchmarking has led to improved decision making, leading to efficiency gains of 23% between 1997 and 2006, according to De Witte et al. (2007). This was facilitated by making data publicly accessible. The utility owners, municipalities represented by elected municipal councils, were sensitive to public debate and therefore pressured utilities with low efficiency to improve. In 2012, utility performance benchmarking became mandatory under the Drinking Water Act (Drinkwater wet) and ILT was assigned by the Ministry of Infrastructure and Water Management to conduct benchmarking. ILT now carries out benchmarking every three years, covering: 1) water quality, 2) customer service, 3) environmental aspects, 4) cost efficiency and research and development. Based on the benchmarking results, utilities develop improvement plans and set targets for the next benchmarking round.

**Water quality regulation:** The National Institute of Public Health and the Environment (RIVM) analyses water quality data from utilities, which are reported annually by ILT to the parliament and the senate.

**Tariff regulation:** At the start of each year, utilities propose new tariffs. These are presented to the utility's shareholders - municipalities and / or provinces - for approval. ILT ensures the set tariffs are cost-reflective, transparent and non-discriminatory, and in accordance with the Drinking Water Act. It is advised by the Consumer and Market Authority, which reviews the tariffs annually. The Minister of Infrastructure and Water Management reports the outcome to parliament each year.



**Decentralised public utilities** serving a service area covering a single administrative unit can be found in different countries, including in Europe (e.g. utilities serving a city, a town or multiple towns in Portugal), Africa (e.g. utilities serving cities and towns in Ethiopia and Kenya) and Asia (e.g. utilities serving big cities like Phnom Penh and Jakarta).

Regulating such utilities involves monitoring and enforcement of many service providers, often with differences in size, capacity and level of professionalisation. Different norms and standards may be set for different categories of utilities. In Ethiopia, for example, the second Growth and Transformation Plan (GTP-2) set different norms and standards for different utility categories with different populations. However, mechanisms for monitoring and enforcement of these norms and standards have been under development for years. In the absence of a central regulatory agency and performance contracts between utilities and local governments, regulatory tasks are mainly carried out by local and regional government. They play an active role in tariff regulation (Adank, forthcoming).

In Portugal, the Water and Waste Services Regulation Authority (ERSAR) is responsible for regulating the performance of the 478 utilities that provide water and sanitation services. Benchmarking of utilities has been an important tool used by ERSAR to regulate performance, with data collected and published annually. Tariff regulation is the responsibility of local government (municipalities), though ERSAR is responsible for tariff regulation of multi-municipal systems. The Competition Authority (AdC) is responsible for competition regulation.

In Kenya, the Water Services Regulatory Board (WASREB) regulates 93 formalised water service providers. Consistent emphasis by WASREB on data submission has increased compliance, with the proportion of service providers submitting the required data rising from only 25% in 2005/06 to 98% by 2019/20 (ESAWAS, 2022).

**Challenges and opportunities:** Regulatory frameworks and mechanisms are often focused on utilities (ESAWAS, 2022). A relatively small number of national and regional utilities can be regulated with limited resources and manpower. Utilities are generally (relatively) professional with data systems in place, providing opportunities for (cost-)effective regulation. Nevertheless, as noted by the World Bank (2022), even long-established regulators with substantial resources, such as Ofwat and the Italian Regulatory Authority for Energy, Networks and Environment, acknowledge that data collection and monitoring can be problematic.

A setting with a larger number of utilities, each serving a single administrative area, presents a good opportunity for benchmarking and performance competition. Associations of decentralised utilities (e.g. Water & Sanitation Providers Association (WASPA) in Kenya and the Federation of Water and Sanitation Utilities in Ethiopia) mainly play a role in capacity building and advocacy aimed at government, but they could also play a role in facilitating benchmarking. In Ethiopia, for example, VEI has supported the Federation to pilot (voluntary) benchmarking, with awards for the best performing utilities fostering performance competition.

### 3.1.2 Regulating municipal management

Under municipal management, a municipal department either directly manages water service provision, or delegates management to a private operator. Municipal management is a common service delivery model found in several Latin American countries, including Honduras, Bolivia and Colombia. It is also common in several European countries such as France and Germany, several African countries, including Mozambique and South Africa, and several Asian countries, including India, Indonesia and the Philippines.

**Regulatory functions:** As with utilities, essential regulatory functions for regulating municipal management include price regulation, setting and regulating performance standards, setting and regulating water quality standards, and consumer protection and pro-poor regulation.



**Regulatory models:** Regulation of municipal water supply can take place through **contracts**, as is the case in France, for example. This is a common model for municipal management with delegated service provision (OECD, 2015). In order to ensure consumer protection in France, a water mediator was established in 2009 by the Association of French Mayors, the Assembly of Communities in France, and the federation of private operators. Its primary responsibility is to improve services offered to consumers and mediate disputes. Furthermore, the Audit Office (Cour des Comptes) has also an important role as a watchdog.

In the above-mentioned Latin American countries with municipal management, performance and tariff regulation of municipal water supply is the responsibility of dedicated **agencies**: ERSAPS (Ente Regulador de los Servicios de Agua Potable y Saneamiento) in Honduras, AAPS (Autoridad de Fiscalización y Control Social de Agua Potable y Saneamiento Básico) in Bolivia, INAA (Instituto Nicaragüense de Acueductos y Alcantarillados) in Nicaragua, and CRA (Comisión de Regulación de Agua) in Colombia.

In the above-mentioned African countries, municipal management is mainly regulated by **government**. See Box 2 for an example of how the governmental Department of Water and Sanitation regulates municipal water supply in South Africa.

In Germany, municipalities are responsible for water supply services, but they can delegate this to private or public companies. Since 2005, municipal utilities engage in voluntary benchmarking conducted by the German Association of Energy and Water Industries (OECD, 2014). Price and performance **self-regulation** is combined with a strong legal framework setting out norms and standards, along with public accountability frameworks to ensure customer protection.

### 3.1.3 Regulating community management

Community management of relatively small piped schemes or point sources, such as handpumps or on-the-spot springs, is the responsibility of a voluntary community committee, with or without delegated operation and/or maintenance. Community-management is a common water service delivery model in the rural Global South, including in many African countries, in several Latin American countries,

## Box 2: Municipal water supply regulation in South Africa

In South Africa, the Department of Water and Sanitation (DWS) is the water sector regulator under both the National Water Act and the Water Services Act. In 2008, it introduced the Blue Drop Certification Programme as an incentive-based regulation programme for improving municipal water services. Although the programme was stopped in 2014, it was reintroduced by the Minister of Water and Sanitation in 2021.

It involves an assessment of all 958 water supply systems (WSS) in each of the 144 water services authority (WSA) areas in the country. For each WSS, assessments are carried out on the asset conditions, maintenance practices, operational practices, treatment practices, monitoring and control practices, and skills and qualifications of staff.

Results are reported to keep the public and stakeholders informed and updated with credible data and information about the state of water services in the country. Well performing service providers are recognised and asset holders are provided with advice and guidance on how to improve their water services.

Source: DWS, 2023

like Bolivia, Honduras, and Nicaragua, and in several Asian countries, including Nepal, India, Bangladesh, Indonesia, and the Philippines. It means service provision by a large number of small service providers, often with limited capacity and data and information systems.

**Regulatory functions:** Regulating community management focuses on price and performance regulation. Furthermore, registration and licensing of the large number of service providers is key. Where handpump maintenance service providers are part of community-management models, price and performance regulation, as well as licensing of such service providers, are essential.

**Regulatory models:** In Latin America, community-managed water supply in rural areas is commonly regulated through agencies, like the above-mentioned AAPS in Bolivia, ERSAPS in Honduras, and INAA in Nicaragua, which also regulate municipal service providers serving towns and cities. In some African countries, community-managed water service provision is also regulated by an agency that oversees other service delivery models, such as AURA in Mozambique.

Community management in Africa is more commonly regulated through government arrangements (ESAWAS, 2022). This is often decentralised to local government. In South Africa, for example, municipalities have been designated as Water Services Authorities (WSAs), responsible for regulating service providers, including community-managed systems. They authorise and license these entities as Water Services Providers (WSPs), monitor their compliance with service standards and water quality, and provide technical support and capacity building.

**Challenges and opportunities:** Best practices for regulating community-managed water supply are rare. A key challenge, regardless of the regulatory model, is that many of the thousands of community-managed service providers remain informal and unregistered. In Bolivia, for example, there are over 18,000 communities with water supply systems,

many of which are managed by Comités de Agua Potable y Saneamiento (CAPyS). AAPS issues licences to formalise service providers. However, only some 2,580 community-managed entities have been formally registered by AAPS so far (AAPS, 2025).

The number of community-based service providers is also a key challenge, especially for central regulatory agencies. AURA, for example, struggles with regulating the large number of rural community-managed facilities. Lack of staff, resources and finance to regulate these have resulted in only two of the 1425 rural schemes being regulated (Aura, 2024).

Decentralising regulation to local government, as has been the case in South Africa, could limit the number of service providers to be regulated by a single entity. However, technical and financial capacity is often a limiting factor.

Solid independent frameworks and mechanisms for regulating price and performance of delegated management and maintenance, and licensing of such service providers, are rare. Social enterprises engaged in handpump maintenance support often apply self-regulation when it comes to performance regulation.

### 3.1.4 Regulating safe water enterprises

Safe water enterprises, often acting as social enterprises, develop and manage assets (commonly micro-grid kiosks). This model has emerged over the last two decades as innovative service delivery models, focused on providing high quality services (Bhatnagar et al., 2017). Asset development is undertaken and financed by external parties, with revenues from water sales covering operation and minor maintenance costs.

**Regulatory functions:** Solid frameworks for price, performance and competition regulation of safe water enterprises are key to ensure consumer protection.

**Regulatory models:** Safe water enterprises commonly engage in self-regulation, with elaborate sets of KPIs for ensuring effective and efficient service provision. Often, safe water enterprises try to engage

local government in approving tariffs, but in general, models for regulating safe water enterprises are underdeveloped, with governments not feeling responsible for regulating these service providers.

**Challenges and opportunities:** Safe water enterprises often have elaborate data and information systems in place for informing effective and efficient operation and maintenance. These data present a good opportunity for monitoring and regulating such service providers. However, safe water enterprises typically operate in an uncertain regulatory context where they are not recognised as part of the broader water provision ecosystem. Lack of competition regulation means they face threats from centralised networks extending into their service areas at subsidised prices, low-cost local competitors that may not be selling safe water, and ‘free’ water from local sources (Bhatnagar et al., 2017).

### 3.1.5 Regulating private service providers

Private providers include independent providers who develop and manage their own water source and provide water services by making it available through bottles or sachets, or through point sources or small reticulated schemes (e.g. Ghana’s “limited mechanised schemes”). Intermediate private providers, such as water tankers and vendors, source water from other service providers and re-sell it.

**Regulatory functions:** Independent and intermediate private service providers often operate in the informal arena and are therefore difficult to regulate. In addition to water quality and price regulation, licensing of these service providers is key.

**Regulatory models:** Regulation of tanker trucks complementing piped water supply in urban areas is carried out in different ways. In some contexts, this is part of the mandate of the regulatory agency (e.g. PURC in Ghana), while in others it is part of the mandate of local government (e.g. Delhi Jal Board in India, and municipalities in South Africa). Urban utilities can also play a role, such as the Nairobi City Water & Sewerage Company licensing tankers and mandating chlorination.

**Challenges and opportunities:** Centrally set water quality norms and standards can apply to private service providers. However, monitoring and enforcing these standards is a major challenge. Formalising informal private service providers is an important first step towards regulating them, but the large number of such providers is a big challenge. Small scale private service providers operate with slim profit margins, which limits their ability to adhere to elaborate regulatory requirements. Baker (2009) therefore suggests regulation of such service providers should be light, without major additional costs for these service providers. Groups of small piped water providers and entrepreneurs have formed associations/coalitions (e.g., SWAPAK in Kenya) and are being incorporated into regulatory frameworks so they can register, access finance, and coordinate with county utilities. This has helped them standardise practices and expand service areas more formally.

### 3.1.6 Self-supply

Under this service delivery model, households themselves are responsible for the development and management of their own water supply. Governments, NGOs and the private sector may play a role in stimulating and facilitating this and in supplying goods, services and materials.

**Regulatory functions:** Ensuring adequate water quality is the main driver for the introduction of regulation of self-supply (Sutton and Butterworth, 2021). Regulation should also involve price regulation on items related to developing and maintaining self-supply options, such as pumps and filters. Furthermore, it should include the setting and regulation of construction standards.

**Regulatory model:** Self-regulation by individual households is the main regulatory model for self-supply, with households responsible for monitoring and reporting health issues and to undertake remedial actions, largely at their own cost. The role of government has mainly been focused on supporting households with self-supply with advice, information, and guidelines, creating awareness of health risks and measures to reduce them (Sutton and Butterworth, 2021).

Growing realisation that self-supply can present water quality challenges has led to increased efforts to provide advice and monitor water quality in most high-income countries. In the UK, for example, Regulation 10 requires that a private water supply that serves more than one household should be registered with the local authority and five-yearly risk assessments undertaken at the expense of the well owner (£500 each time) (Sutton and Butterworth, 2021). However, single households are exempt, as is the case in more than half of the European countries (Rickert et al., 2016). Where arrangements are in place for monitoring water quality related to self-supply, responsibility usually lies with the health sector within local government, while the water supply or environment sector provides the regulatory framework and enforcement (Sutton and Butterworth, 2021).

**Challenges and opportunities:** The large number of households practising self-supply, often located in remote locations, is a challenge for monitoring and enforcement of water quality and possible environmental effects, requiring considerable logistics and resources. Furthermore, enforcement of water quality and environmental standards by households relying on self-supply places high demands on the existence of legislative systems.

### 3.1.7 Regulating different service delivery models

In many countries, water services are provided through different service delivery models. The various regulatory functions of a specific service delivery model may fall under one or more different regulatory models and frameworks. Regulatory frameworks are strongest for utility managed water supply.

Regulatory models and mechanisms related to service quality, price, and consumer protection differ per service delivery model.

Where multiple service delivery models are present and serving the same area, there is a need for competition regulation and licensing. However, examples of good practices are limited.

Drinking water quality standards are often set centrally based on WHO standards for multiple or all service delivery models. Mechanisms for monitoring and enforcing water quality do tend to differ across service delivery models. Setting price, performance and competition norms and standards, and monitoring and enforcing these, often fall under the same regulatory model. These regulatory models and mechanisms can apply to a single specific, or to multiple service delivery models (e.g. regulatory agencies in Latin American countries regulating both municipal and community management models).

Most water and sanitation regulators are not yet doing enough to implement truly pro-poor regulation, even though many have adopted it as a policy principle. For instance, regulators in countries such as Zambia (NWASCO), Kenya (WASREB), and Uganda (NWSC-regulated) have introduced pro-poor guidelines and tariff structures, but enforcement is often weak. Subsidies or cross-financing mechanisms rarely reach informal settlements or unconnected households.

Regulation of climate change mitigation and adaptation is not widespread (yet) in the water supply sector, but is under development. In England and Wales, the central regulatory agency Ofwat introduced mandatory standardised reporting requirements for operational greenhouse gas emissions by water utilities in 2022. At the 2024 Price Review (PR24), Ofwat proposed to set a common reduction target for operational emissions, incentivised through a performance commitment with financial rewards and penalties.

Regulatory change is often a gradual process, which progressively includes environmental and climate change adaptation considerations. An example of such a process in Colombia is presented in Box 3.

### Box 3: Gradual regulatory change towards inclusion of environmental considerations in Colombia

The tariff methodologies of the Water and Sanitation Regulatory Commission (CRA) of Colombia evolved organically over 28 years, shifting from promoting cost recovery to promoting efficiency and regulating externalities, including investment planning that incorporates environmental considerations. This process has not been linear, but has consisted of a number of regulatory cycles, each building on the previous one. The third cycle reinforced environmental protection by adding the costs related to the protection of basins and water sources, regionalisation, and green growth (incorporating differential schemes and environmental investments) to the methodology. Reforms have been successful, allowing continuous improvement of services during the past decades. However, rapid population growth and increasing risks related to climate change will continue to challenge their effectiveness (World Bank, 2022).

## 3.2 Regulating sanitation services

Regulatory models and practices can differ per service provider along the sanitation chain, these are presented in Table 3.

In sewer-based sanitation, containment is absent. Transporting wastewater through sewers requires significant investment and oversight.

### 3.2.1 Regulating self-supply for onsite sanitation and containment of FSM-based sanitation

Self-supplied sanitation services involve a household implementing, operating and maintaining a sanitation facility with onsite treatment (covering the entire sanitation chain) or the containment part of FSM-based sanitation. These models are very common in remote locations, but also in municipal areas, in the Global South.

**Required regulatory functions:** Regulation of self-supply includes design and construction standards for latrine pits and septic tanks. Since sanitation has impact on the environment, environmental standards such as pit depth, distance from water source and hygienic containment and disposal of excreta also apply. Ideally, prices related to sanitation products and services should also be regulated. In practice, regulators struggle to do so due to the decentralised nature of the self-supply market. Private latrine constructors and contractors compete in designing, manufacturing, and installing various toilet and containment systems, which may require competition oversight. In addition, consumer protection is needed to ensure households have access to information to make informed choices among sanitation facility constructors.

**Table 3:** Sanitation service provision models

| Service delivery models  | Containment             | Emptying                                                                                                                                                                     | Transport | Treatment                                                                                                     | Reuse / disposal |
|--------------------------|-------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|---------------------------------------------------------------------------------------------------------------|------------------|
| Sewered sanitation       | Household               | Sewered sanitation <ul style="list-style-type: none"><li>• Utility-managed</li><li>• Municipal-managed</li><li>• Community-managed</li></ul>                                 |           |                                                                                                               |                  |
|                          | Public latrine operator |                                                                                                                                                                              |           |                                                                                                               |                  |
| Faecal sludge management | Household               | FSM service provider (e.g. vacuum truck operators) <ul style="list-style-type: none"><li>• Utility managed</li><li>• Municipal managed</li><li>• Privately managed</li></ul> |           | Treatment plant <ul style="list-style-type: none"><li>• Utility managed</li><li>• Municipal managed</li></ul> |                  |
|                          | Public latrine operator |                                                                                                                                                                              |           |                                                                                                               |                  |
| Self-supply              | Household               |                                                                                                                                                                              |           |                                                                                                               |                  |

**Required regulatory model:** In most cases, self-supplied sanitation is regulated by local government, especially municipal authorities. In Bangladesh, the 2009 municipal act, National Building Code and 2016 DOE standards jointly set the regulatory framework for self-supplied sanitation. In India, municipal authorities have developed Standard Operational Procedures based on Central Public Health & Environmental Engineering Organisation (CPHEEO) guidelines for latrine design.

**Challenges and opportunities:** Rural and remote locations are a challenge for monitoring and enforcement of possible environmental impacts, requiring considerable logistics and resources. Particularly, enforcing standards for excreta containment and disposal by households using self-supplied models is often challenging in rural, especially remote, areas.

### 3.2.2 Regulating faecal sludge management

Faecal sludge management (FSM) is common in urban, peri-urban areas and towns, and in relatively densely populated rural areas in the Global South. Multiple actors, who often operate informally, are involved in faecal sludge management. These actors perform different functions within the sanitation service chain, from containment to emptying/collection, transport, treatment and disposal (or reuse) (Dey et al., 2016). While containment is commonly the responsibility of households themselves (through self-supply), the other parts of the sanitation chain can be managed by utilities, municipalities, private sector or community-based organisations. Regulation needs to cover all these actors across the different steps of the sanitation service chain. As containment by households was discussed above, this section focuses on regulation of the rest of the sanitation chain.

**Regulatory functions:** Regulatory functions include price regulation of sludge collection and transport services. They also include licensing, and health-related standards and regulations for safe emptying and transportation. Furthermore, they include permits and guidelines for site selection (e.g. selection of different technologies for different locations or

hydro-geological zones), construction, operation and maintenance of treatment and disposal facilities, related to health and environmental regulation. Vacuum truck operators, manual pit emptiers, and other service providers compete in waste collection and transport. Some companies compete in converting sludge into useful by-products like fertilisers or biogas. Especially in the case of privately managed faecal sludge management, there is a risk of competition between service providers, which needs to be regulated. Regulators can use franchise models (for defined service areas) and market-based systems. There is also a need for consumer protection, ensuring customers have access to information to make informed choices among providers of faecal sludge collection and transport services (ESAWAS 2024).

**Regulatory models:** Municipalities commonly set tariffs or taxes related to faecal sludge collection and transport.

Municipality-managed faecal sludge management services are commonly **self-regulated** by the municipality, following national regulations and guidelines. Community-managed FSM services are commonly regulated by national or municipal **government**.

Licensing of service providers is commonly regulated by **government** (municipal authorities or their line department in the ministry). Where a dedicated regulatory agency is present (e.g. NWASCO in Zambia or WASHRED in Kenya), the licensing can also be regulated by the **agency**.

**Challenges and opportunities:** Environmental regulations apply for municipal, community-managed and privately managed services. However, due to the profit-making objective of the private sector, private entrepreneurs tend to violate environmental regulations more frequently. Therefore, regulatory agencies place greater emphasis on monitoring environmental compliance of private service providers. While municipal authorities struggle to monitor and regulate the decentralised private service providers because of

limited capacity, there are cases where private operators have formed coalitions or associations and adopted standard operating procedures and performance metrics required under regulation.

### 3.2.3 Regulating sewerage sanitation

Sewerage sanitation is common in most high-income countries. In middle-income countries, sewerage services are mainly restricted to cities because this requires significant capital investment, while in low-income countries they are mostly absent. Sewerage services are commonly provided by utilities or (local) government.

**Regulatory functions:** Regulation of sewerage sanitation services includes setting connection fees and monthly or annual service charges to ensure providers apply fair and equitable tariffs. Furthermore, it can include performance and environmental regulation to ensure safe disposal or treatment of waste and prevent stormwater, greywater and groundwater contamination.

**Regulatory models:** Regulation of sewerage sanitation can comprise different regulatory models for various regulatory functions, as shown in the example of the Netherlands presented in Box 4. Especially when the private sector is involved in operation and maintenance of sewerage systems, performance regulation can include performance-based contracting. The National Sanitation Agency of Senegal (Office National de l'Assainissement du Sénégal; ONAS), for example, uses affermage (or leasing) contracts to engage private operators for the operation and maintenance of sewer systems and faecal sludge treatment plants (FSTPs). However, in this case tariffs are set by ministerial order (ESAWAS, 2022).

**Challenges and opportunities:** Although sewerage sanitation serves only some 13% of Africa's population, 63% of African countries have developed regulations or standards, and guidelines on sewerage sanitation, and 43% of countries are applying these at scale (ESAWAS, 2022).

#### Box 4: Regulating sewerage sanitation in the Netherlands

The Netherlands has a multi-level regulatory model for sewerage sanitation services, combining regulation by central and local (municipal) government, regulation by agencies (water boards), and contractual arrangements with private operators. This is governed by Acts such as the Environmental Management Act which sets the national framework for waste management and environmental protection; the Water Act governs water management, including wastewater treatment and sanitation; the Public Health Act ensures public health through hygiene and sanitation standards.

### 3.2.4 Regulating different service delivery models

Different countries have different models and frameworks in place for regulating sanitation services. Some countries have a single regulatory body, but in many countries the responsibility is shared among two or more actors. In countries where sanitation services have evolved over time, the regulation functions can be fragmented across different authorities.

The focus of sanitation service regulation varies from country to country. In some countries, regulation of sanitation service provision primarily targets larger, more formalised service providers in large cities. In other countries, it also encompasses smaller, decentralised and often less formalised service providers, such as private vacuum tanker operators and manual pit-emptiers, serving rural growth centres and small towns.



### Box 5: Regulating sewerage sanitation in Singapore

All buildings in Singapore are connected to a comprehensive sewerage system, ensuring 100% wastewater collection and treatment. Singapore is famous for having recycled water that meets drinking water standards. The Public Utilities Board (PUB) is responsible for wastewater management, which includes sewerage infrastructure. Wastewater is sent to Water Reclamation Plants (WRPs) for treatment before being discharged or recycled into NEWater. In addition, Singapore has the Deep Tunnel Sewerage System (DTSS), a long-term project to modernise Singapore's wastewater management and reduce land requirements for treatment plants (PUB, 2025).

The predominant regulatory model for sewerage sanitation regulation in Singapore is **Regulation by Agency**. The National Environment Agency (NEA) and the Public Utilities Board (PUB) are the key agencies managing sanitation services.

**Regulating service quality:** NEA's hygiene regulations cover building owners' responsibility. Owners of malls, food courts, and offices follow the regulation for regular cleaning and maintenance. The Environmental Public Health (Public Cleansing) Regulations mandate regular cleaning and maintenance of toilets. The Code of Practice on Environmental Health (COPEH) provides design guidelines for toilet infrastructure and maintenance standards. For continuous upgrading of the sanitation service, the Restroom Association of Singapore (RAS), with support from (NEA), has launched the Happy Toilet Programme in 2003. This star-grading initiative for public toilets focuses on five main areas: design, cleanliness, effectiveness, maintenance and user satisfaction. This allows users to leave the toilet happy, as the programme will ensure that they have the best experience, with all their needs met. The cornerstone of the Happy Toilet Programme is a grading system, which is based on minimum and progressive standards starting at three stars, progressing to four, five, and a maximum of six stars. The six-star rating, introduced on 1 January 2015, represents the highest level of accreditation (Restroom Association of Singapore, 2015).

**Regulating prices:** The Public Utilities Act and the Sewerage and Drainage Act grant PUB the authority to set and revise tariffs based on operating costs. PUB reviews tariffs periodically to ensure sustainability. There is a provision to publicly announce tariff adjustments with sufficient notice. The government may offer rebates to offset costs for lower-income households (PUB, 2025).

In many countries, sanitation service regulations are included in local government, public health, and environmental management acts. In these instances, regulatory mandates are usually not explicitly defined and mainly focused on sewerage management.

In their assessment of sanitation regulation in 54 African countries, ESAWAS (REF) found that most of them have some degree of ministerial regulation. However, ministerial regulation is not always the predominant model. Of the 54 countries, 20 are regulated by agency, 15 by contracts, and 18 have ministerial regulation as the predominant model (ESAWAS, 2022).

In EU countries, regulation of sanitation services is fragmented. Services in large cities are often regulated by an agency or contract, while in small cities they are regulated by ministries or municipalities (EurEau, 2023).

There is no solid analysis of regulatory models in Asian and Latin American countries. However, a country-by-country analysis indicates that most of these countries use ministerial regulation as the predominant model.



### Box 6: Regulating sanitation service delivery in Nepal

Nepal has made significant strides in improving sanitation coverage over the past few decades. Access to improved sanitation facilities increased from 6% in 1990 to 99% in 2024, largely due to concerted national efforts and the implementation of the National Sanitation and Hygiene Master Plan in 2011.

**Sanitation service providers:** Under the Ministry of Water Supply, the Department of Water Supply and Sewerage Management (DWSSM) implements sanitation projects, including sewerage and wastewater treatment, across the country (DWSSM, 2025). Kathmandu Upatyaka Khanepani Limited (KUKL) acts as a water supply and sewerage utility for the capital city, Kathmandu. About 5% of the total population are covered by a sewer network. The rest of the country is served by Local Government Institutes. Municipalities and rural municipalities are directly responsible for sanitation infrastructure and public toilets in their respective areas. These municipalities provide sanitation services with support from NGOs, community-led initiatives and private sector actors. In rural areas, households access sanitation services through self-supply.

**Regulation:** Overall, ministerial regulation is the predominant model in the country, with regulation by contract also present in city areas. The Water Supply Management Act 2006 and the Local Government Operation Act 2017 are the key regulations for sanitation in the country. These two Acts have made Local Municipalities primarily responsible for sanitation service provision.

However, the different steps regarding sanitation services were not elaborated in those two Acts. As a result, services have remained mostly self-supplied and unregulated, with people relying on on-site sanitation systems and limited formal/informal pit emptying services. With the introduction of FSM services, urban municipalities have started adopting responsibilities to manage and partially regulate the services. Sanitation services have remained unregulated in rural municipalities (SWA, 2025).

At present, Nepal is on the verge of developing structured regulation for its sanitation services. The Government of Nepal commissioned the Water and Sanitation Act in 2022. It has recently developed the Water and Sanitation Regulation (2024) to implement the Act. At present, preparation is ongoing to develop a Service Regulation Division within the Department of Water Supply and Sewerage Management. This division will be authorised to license water and sanitation utilities, enhancing regulatory oversight.

Additionally, the newly created Water and Sanitation Service Tariff Commission has been given the responsibility of overseeing the economic regulation of water and sanitation services, ensuring fair and transparent tariff-setting practices. There are also Domestic Wastewater Effluent Standards (2023) which provide guidance for treatment system design and compliance monitoring (ENPHO, 2025).

With these regulatory advancements, Nepal expects to improve the inclusivity of sanitation services.

## 4 What does regulation cost and who pays?

As presented in section 2, regulation has three major components: 1) defining and setting the regulation rules and standards, 2) monitoring, and 3) enforcement. This section presents the main cost types related to each of these three components and the main sources of funding for these costs, based on EPA (2025), Ritchie et al., (2024) and section 5.1 of OECD (2014). This is followed by a more in-depth overview of the costs of regulation (section 4.2) and funding mechanisms (section 4.3).

### 4.1 Costs and sources of funding

**Setting rules, norms and standards:** This is mostly a one-off event, though it does require updating/modernisation at periodic intervals. Typical expenditures for these processes include staff salaries for regulators, policy units and legal experts. These processes may also require research, policy analysis, and stakeholder consultation, which may incur additional costs. The initial funding for establishing rules, norms and standards is typically provided by the government or its development partners (Kjaer & Vetterlein, 2018). See Box 7.

**Monitoring & informing (ongoing oversight):** Typical expenditures related to monitoring include field staff and inspector salaries, travel/logistics for site visits, monitoring equipment and labs (e.g., for water/air quality, telecom signals, financial audits). In addition,

operating and maintaining IT systems/databases for reporting and public dashboards may also be part of monitoring expenditures.

The regulatory body, often funded by a mix of government budgets, licence/permit fees, and industry levies, is the main source of funding for these costs. As the regulated entities, service providers may be required to self-monitor and report at their own cost. Consumers indirectly pay for this if monitoring costs are built into tariffs or service charges.

**Enforcement:** Typical expenditures for enforcement include the costs of legal staff, court expenses and arbitration processes. Costs for compliance measures (where offenders are sometimes forced to pay compensation or retrofit equipment) are also part of enforcement. In certain cases, communication/outreach for penalty announcements is included in the cost of enforcement.

Enforcement costs are mostly covered by the regulator or government through taxes or tariffs. Service providers or customers who violate the rules, norms and standards may be required to pay fines or bear corrective costs directly. In some sectors (e.g., environment, water, telecom), a portion of the fines may be redirected to fund regulatory activities.

#### Box 7: Establishing regulatory agencies/departments in Zambia and Bangladesh

The National Water Supply and Sanitation Council (NWASCO), established with government funding regulates water supply and sanitation services in Zambia. It is mandated to develop and enforce sector standards and guidelines and is empowered to develop and apply a range of regulatory mechanisms, including reputational and financial incentives and sanctions (NWASCO, 2025).

In Bangladesh, the Local Government Division is establishing a regulatory mechanism for supporting water and sanitation service delivery with financial support from the Asian Development Bank (Water Integrity Network and AguaConsult, 2024).

**Table 4:** Source of fund for regulatory work

|                   | Regulatory body setup                                         | Monitoring                                                                                                  | Enforcement                                                                            |
|-------------------|---------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------|
| Source of funding | Mostly government/<br>regulator; partly licence<br>applicants | Mixed — regulator (budget +<br>fees), regulated entities (self-<br>monitoring), and indirectly<br>consumers | Regulator/government<br>upfront, violators ultimately<br>pay (fines, compliance costs) |

The above showed that a considerable part of the costs of monitoring and enforcement are expected to be covered by fees and fines. However, water tariffs are often kept artificially low, so service providers cannot contribute much to regulation funding. Therefore, governments often use taxes to cover (part of) the regulatory costs for water and sanitation. Ofwat, the water regulator for England and Wales, for example, is funded by licence fees from water companies, but is also subsidised by the Department for Environment, Food and Rural Affairs (DEFRA) to cover activities of broader public interest (such as resilience planning and affordability measures). This cross-subsidy recognises that not all regulatory functions can be charged to utilities without raising tariffs (Ofwat, 2025).

## 4.2 Regulatory costs in reality

It is hard to obtain clear figures on costs of water and sanitation service regulation. Different costs are covered by different and often multiple sources. The WHO TrackFin method for WASH accounts has a specific service category called “S3 – Support services,” which includes “regulation of water and sanitation supply activities and service providers.” So, when countries publish WASH accounts using TrackFin,

spending on regulation is captured, but it is included in the broader S3, category along with other functions such as policymaking, planning and administration.

The WASH accounts database of WHO has data on 14 countries. Although these include other costs of support services, it gives us an indication of proportionate costs of regulation. Among them, ten countries provide periodic data (the remaining four countries have reported data for one year only). Among the ten countries, seven show a periodic increase in costs for support activities, these countries are Burkina Faso, Chad, Ghana, Kenya, Madagascar, Mali and Senegal. Whereas the other three show a decrease in costs over time, these three countries are Niger, Nigeria and Sierra Leone. For Kenya, the costs for S3 items in 2020 was USD 123 million. For Ghana, it was USD 91 million (World Health Organization, 2020).

## 4.3 Funding of regulation in reality

In reality, the income and expenditure of the water and sanitation regulators vary from country to country. It also varies depending on the type of regulator (i.e. agency or ministry). For instance, Ofwat’s revenue comes from licence fees of water companies, while fines go directly to the **UK** Treasury’s Consolidated

**Table 5:** Estimated income analysis of Ofwat, WASREB and NWASCO for the year 2023-2024

| Organisation              | Estimated Income (2023–2024) | Source of Income                                                  | Destination of Fines/Surcharges                                               |
|---------------------------|------------------------------|-------------------------------------------------------------------|-------------------------------------------------------------------------------|
| Ofwat (England and Wales) | ~80 million USD              | Licence fees from water companies                                 | Licence fees fund Ofwat; fines go directly to UK Treasury’s Consolidated Fund |
| WASREB (Kenya)            | ~10 million USD              | 4% regulatory levy on monthly turnover of water service providers | Levy directly funds WASREB operations                                         |
| NWASCO (Zambia)           | ~2.5 million USD             | 2% surcharge on water tariffs (levy on utilities’ turnover)       | Levy directly funds NWASCO operations                                         |

Fund. In contrast, WASREB in **Kenya** applies a regulatory levy of 4% on the monthly turnover of water service providers. NWASCO in **Zambia** applies a 2% surcharge on water tariffs, usually interpreted as a levy on utilities' turnover rather than tariff amounts. To understand the revenue flow of these three regulatory authorities, their annual reports were analysed by the authors. Based on the annual reports, an estimate was made on their revenues for the year 2023-2024, which is presented in Table 5.

While these numbers do not necessarily reflect the expenditure of these regulatory authorities, they give us an understanding of the expenditures. ESAWAS (2022) summarised the financing mechanisms used by water and sanitation regulators in 20 African countries. The financing mechanisms used to fund these regulators are:

#### **Fees/Levies on Utilities/Consumers:**

- Kenya (WASREB): 4% levy on consumer tariffs paid to licensed providers.
- Lesotho: Funding mainly through licences and a levy on customers (82% from levies, 18% licences).
- Mali: 1% levy on all water and electricity bills.
- Mozambique: 3% levy on gross annual revenue of providers (60% retained, 40% goes to Ministry of Finance).
- Niger: 2.5% levy on annual revenue of service providers.
- Rwanda (RURA): 0.3% levy on service provider turnover, plus licence fees and fines. (Funding of regulation of water and sanitation services is, however, also cross-subsidised by revenues from licence fees from other sectors, including the ICT sector.)
- Sierra Leone (EWRC): 1% levy on supplier revenue, supplemented by grants/donor funds and some government financing.

#### **Licensing and Service Fees:**

- Cape Verde: Funded through contributions from entities and licensing/service fees.
- Burundi: Partially funded through fees from operations.
- Mauritania: In theory, funded through tax levies and operator fees, but in practice relying on fees from other regulated sectors (for example, telecom).

#### **Energy Sector Cross-subsidy:**

- Ghana (PURC): Funded by a regulatory levy on electricity/gas transmission (0.12–0.08 pesewas per unit). 67% for PURC activities, 33% for pro-poor water programmes.

#### **Mixed (Fees and Central Government):**

- Sierra Leone: Mix of levy (1%), grants/donors, and government support.
- Angola: Annual regulatory fee charged to utilities, recalculated each year.

ESAWAS (2022) observed that the most financially autonomous regulators rely on levies on utility revenues, customer tariffs, or licence/service fees. In practice, however, many regulators still depend partly on government or donor support, especially in fragile economies. These regulators struggle to enforce regulation effectively, leading to noncompliance.

## 5 The role of global monitoring initiatives in regulation

Global water and sanitation monitoring initiatives such as JMP (Joint Monitoring Programme of WHO/ UNICEF), GLAAS (Global Analysis and Assessment of Sanitation and Drinking-Water) and IBNET (International Benchmarking Network for Water and Sanitation Utilities) each play a role in regulation of water and sanitation services. These three initiatives each focus on a different part of the WASH results chain. JMP focuses on service levels, the ultimate outcome of service level provision. IBNET focuses on water (and sanitation) service provider performance related to a specific service delivery model: the utility model. GLAAS focuses on the strength of national systems responsible for ensuring water and sanitation service provision.

### 5.1 Joint Monitoring Programme (JMP) of WHO/UNICEF

JMP focuses on tracking progress toward global water, sanitation, and hygiene (WASH) goals as set by the United Nations, such as the Millennium Development Goals (2000-2015) and the Sustainable Development Goals (2015-2030). It compiles data which it uses to produce national estimates on access to water and sanitation services, based on a set of service level indicators. As such, JMP plays a role in setting global norms and standards, and monitoring progress on these. It does not play a direct role in enforcement of the norms and standards.

**By defining indicators to measure progress on global goals, JMP influences the setting of national service-level standards.** The shift from MDGs to SDGs meant moving from monitoring access to improved water and sanitation services, to monitoring access to higher-level services: basic and safely managed. This is likely to have played a role in national governments adjusting their coverage / access indicators to go

beyond tracking access to improved services. In general, an increasing number of countries align their WASH service norms and standards to those of JMP.

**JMP may play an indirect role in strengthening national regulatory systems.** In addition to data on the proportion of the population with access to improved water facilities, which was the focus under the MDGs, under the SDGs, JMP also compiles data on 1) proportion of people with water services on premises, 2) whether water services are available when needed, and 3) whether water services are free from contamination. In order to provide data on these variables, countries need to have systems in place for assessing reliability and continuity of water services (service quality), and quality of the water supplied (water quality).

Also, JMP data can highlight gaps in access to water and sanitation services, which in turn encourage governments to strengthen regulations to ensure equity and quality. JMP encourages the use of regulations in achieving the global goals, especially when monitoring aspects such as water quality, infrastructure reliability, and service continuity.

**Although JMP is not directly involved in enforcement, its publicly available data can inform government and development partner decisions on resource allocation.**

### 5.2 Global Analysis and Assessment of Sanitation and Drinking-Water (GLAAS)

GLAAS focuses on the capacity of countries to implement sustainable water, sanitation, and hygiene programmes. It assesses the strength of national policies, financing, governance structures, and regulatory frameworks and systems. It does so by

assessing the situation in countries on a total of 192 indicators. These include indicators related to national regulatory frameworks, the capacity of governments to implement regulations, and whether the regulatory bodies are functioning effectively to ensure water safety and sanitation improvements. GLAAS also assesses whether sufficient resources are allocated for effective regulation, including training and staffing of regulatory bodies. Many of the indicators differentiate between rural and urban water, and rural and urban sanitation.

GLAAS does not set norms and standards related to minimum acceptable levels on the different indicators. It also does not play a role in enforcement. National stakeholders can compare their country's performance over time or with other countries.

At present, efforts are ongoing to develop a common monitoring and review framework for a broader sector-wide shift towards a WASH systems strengthening approach. Led by WHO, UNICEF and the World Bank, the Align to Accelerate initiative is working on 1) a globally agreed set of core indicators to monitor the strength of WASH systems and 2) a common monitoring and review framework to guide countries in defining a relevant set of national indicators to monitor the strength of WASH systems. These include indicators related to regulation (World Health Organization, 2024b).

### 5.3 International Benchmarking Network (IBNET)

IBNET focuses on the performance of utilities. It provides an opportunity for utilities to (voluntarily) submit performance and tariff data and compare their performance over time or with other utilities. Utility performance is assessed on performance indicators. IBNET does not set norms and standards, but focuses on making utility performance data transparent and accessible.

### 5.4 Others

In addition to the initiatives discussed above, there are other efforts where regulation and regulatory activities are being monitored. Different organisations have included regulation (and accountability) as core components of their water and sanitation systems strengthening work. Organisations such as IRC, Sanitation and Water for All (SWA) and WaterAid have included regulation as one of the building blocks of a WASH system and monitor it in their work. Also, Agenda for Change, Water For People, SIWI, the UN-Water's SDG 6 Global Acceleration Framework, OECD and USAID's Sustainable WASH Systems Program consider regulation as a cross-cutting element to monitor in their programmes.

## 6 The future of regulation of water and sanitation services and the way forward

This section presents the conclusions, an analysis of the future of regulation in the water and sanitation sector, and recommendations for the way forward. These are based on sector literature reviewed in this Thematic Overview Paper, and on the insights of the authors.

**There is growing recognition of the importance of water and sanitation service regulation and the role it can play in systems strengthening and change.** Regulation has an important role to play in achieving universal access to water and sanitation, enforcing laws and policies that require service providers to reach underserved areas, balancing access with affordability (UNESCO & UN-Water, 2020). Furthermore, they have a role to play in stimulating sector transformation with increased focus on provision of higher service levels, professionalisation, efficiency and sustainability. Water and sanitation regulators can play a central role in building trust, integrity, and responsiveness in the sector. They can act as a bridge between government, service providers, and consumers — ensuring that decisions, performance, and resources are transparent and accountable. This section highlights some of the key issues for the way forward.

**There is no one-size-fits-all solution to regulation. Regulatory systems strengthening and change need to be part of or fit well into sectoral systems strengthening and change.** Regulation and standards should be implemented in phases and aligned with the level of maturity of service providers (World Bank, 2022) and the overall sector. Regulatory tools, functions, resources and capacities must fit the water and sanitation landscape. Decentralised regulation that responds to local conditions can play a key role.

**To fulfil the present and future needs, regulators require institutional, technical, and financial capacity.** The availability of these capacities varies from context to context and often need to be further developed. Capacity building of regulators needs to be mainstreamed, so they can fulfil their evolving roles effectively.

**There is a growing global trend towards re-municipalisation, where previously privatised public services are being brought back under public control.** Paris is a well-known example: after decades of private water management, the city reclaimed its water services in 2010, creating Eau de Paris, which has been praised for reducing costs and increasing transparency (EPSU, 2025). Indianapolis regained control of its water and wastewater services from private operators in 2011 after concerns over rising costs and declining service quality (Warner, 2011). Cities such as Berlin, Buenos Aires, and other municipalities in the USA, have followed similar paths in sectors like water, energy, and public transport. In general, this shift is often driven by dissatisfaction with private operators' high prices, lack of transparency, and profit-driven service reductions. This trend may increase regulatory involvement in the future, with regulators expected to take on a stronger guiding and oversight role for service providers.

**Digitalisation and the use of AI present opportunities for strengthening regulation, helping regulators to track performance and enabling citizens to hold service providers accountable for provided services.** Water utilities are gradually increasing the production and use of data for decision making (IWA & Xylem 2019). The increased digitalisation and uptake of smart technologies is expected to support transparency and accountability, and drive more effective and efficient management of water services through performance management and benchmarking.

**Climate mitigation and adaptation:** The uncertainties caused by climate change require regulatory measures to support climate change mitigation and adaptation. Climate-related regulation can, for example, involve setting limits for monitoring and enforcing carbon emissions from water and sanitation service providers, as well as regulating the construction of climate-resilient infrastructure, ensuring services can withstand climate shocks, and mandating emergency response measures in case of crises (UNFCCC, 2025).

**Global initiatives and alignment:** In June 2025, a Call to Action on Strengthening Water and Sanitation Regulatory Systems was launched by IWA, WHO and their partners, encapsulating a vision for creating enabling environments for regulation, improving institutional capacity and aligning efforts with the global Sustainable Development Goal (SDG) 6 targets (IWA and WHO, 2025). Furthermore, the Align to Accelerate initiative, led by the World Health Organization, UNICEF and the World Bank, intends to develop a common monitoring and review framework comprised of an agreed set of core indicators that operate together as “vital signs” to measure and track the strength of WASH systems at national level. These will include indicators related to regulatory strength intended to help governments identify and address regulatory gaps.



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