8. The governance of water utilities

Key takeaways

The role of water service providers is to deliver on the core features of SDG6, namely access to safe water, improved sanitation and rainwater drainage. In addition, **water service providers can contribute to the five critical water missions set forth in this report. They must do so in accordance with the Water System Justice approach** defined in Chapter 4.

In the new context for water, characterised by a destabilised hydrological cycle, this requires a shift in perspective: from moving water away from cities through centralised, grey and piped infrastructures to a focus on improved service and environmental quality, resilience, and justice, through efficiency, reuse, catchment protection, and the combination of green and grey infrastructure.

This transition requires policies and institutions that are fit for purpose. **The preference of governing agencies, regulators, and financiers for central, piped infrastructure should give way to promoting a mix of on-site decentralised and centralised systems to enable universal coverage and service access**. Priority should be given to serving those left behind first; phased universal coverage can be considered as a second-best.

For a vast majority of the global population, the role of individual provision, community managed services, and informal markets should be acknowledged and factored in. Water utilities, public-service organisations, or other arrangements should be tasked with gradually supporting the transition towards services in line with health, environmental, and economic regulation.

The transition also requires that, where they exist, **mission-centred water utilities (public or private) be governed to contribute to public value**. Economic regulation can provide the appropriate incentives by defining performance criteria, reviewing development and investment plans, setting adequate tariff levels and structures, and ensuring revenues from water tariffs contribute to improved service provision.

Tariffs should signal the full social costs of water use, with customer-assistance programmes targeted at poor households. Thorough reviews of which costs should be covered by water bills contribute to an economically efficient and socially just contribution of revenues from user tariffs.

Contractual arrangements between organising entities and service providers – be they public or private – should drive operational performance, public value, and justice.

Cities must become water resilient through water-use efficiency, reuse, protection, and expansion of green and grey infrastructure. They must address the growth of untreated wastewater, severe water shortages and flooding, and climate-induced impacts on the urban water cycle. It is imperative to allocate water equitably and reduce urban water consumption through demand assessment, management, and monitoring to ensure that ecosystem health is prioritised along with public health.

Rural areas face different challenges. The cost of connecting users to water supply and sanitation services can be high, and the capacity of service providers to generate revenues can be low, affecting their ability to operate and maintain infrastructures. While centralised water infrastructures bring economies of scale, they require large capital expenditure and their extension to remote communities has often not been financially viable.

This context exacerbates inequities related to: (1) lack of access to water services; (2) concerns about sustainability where water services exist; and (3) issues related to informal settlements.

Challenges and opportunities related to the governance of water utilities

Utilities around the world provide safe water and improved sanitation to city dwellers and rural communities. Anecdotal evidence suggest that they combine:

- Corporatisation as a condition for a clear mandate and objectives; accounting structures autonomous from organising entities (usually local authorities); and ability to access and mobilise financial resources. To be clear, corporatisation is about the strategic and operational autonomy of the service provider, and has nothing to do with the public or private ownership.
- Corporate governance that acknowledges the demand of (served and unserved) populations; and provides accountability mechanisms with appropriate rewards and sanctions.
- Skilled labour across the organisation, from management to financial and technical functions, and customer relationships.
- A robust business model with the capacity for revenues to cover operation and maintenance costs, and part of capital expenditure to maintain existing assets, extend service provision, and adapt to shifting conditions.
- Understanding that long-term investment is necessary, with a focus on outcome-based performance measures.
- Economic regulation operating in the public's interest and sheltered from political interference, which:
    - Sets performance targets and incentives so that private investors see appropriate returns while customers are protected

from monopolistic pricing in the absence of competition.

    - Designs tariffs and procedures for regular adjustments to reflect costs (including inflation), and enable timely maintenance and reinvestment.

    - Reviews development and investment plans.

- Targeted subsidies to ensure affordability for the poor.

- Efficient and equitable demand-management models and just water allocation regimes, which provide users with the water supply they require, and discourage excessive use.

This model can be found in high-income and low-income countries, often in urban areas where costs of connecting dwellers to a central infrastructure are lower than in rural areas. Where in place, it has delivered massive benefits in terms of access, health and reduction in child mortality, and protection of water resources.

However, it is far from ubiquitous and faces several challenges. Moreover, despite significant efforts and recent progress, one-quarter of the global population does not have access to safely managed drinking water, and half the population does not have access to improved sanitation. Access is lagging the United Nations (UN) Sustainable Development Goal (SDG) 6 ambition in some world regions (especially sub-Saharan Africa), and rural communities are most affected.

Where people have access, there are concerns about the sustainability of the service. In most high- and low-income countries, renewal of infrastructures is slower than the life-expectancy of assets (OECD, 2020). The investment backlog affects the operational efficiency of service provision, and delaying investment can jeopardise the financing model of services. In another context, lack of maintenance leads to 40% of boreholes in Africa being broken.

Informal settlements face distinct issues. Lack of land tenure can be an obstacle to public investment in infrastructure and networks; access to piped water is also often tied to users' tenure. An important message is that we cannot solve one aspect of people's lives (water supply) while neglecting others (dignified housing). Dignity should guide and prioritise action towards securing access to water supply and sanitation services to all.

This situation triggers justice issues. In the absence of service provision, communities have access to water through private vendors (typically, water trucks) operating in fragmented and usually unregulated markets at the interface of local authorities and utilities. One question is whether their role should be acknowledged and encouraged, and if so, what the financing model should be: vendors qualify as private sector but are not attractive to the private-sector branch of development finance institutions.

Ultimately, most utilities need to evolve. Whittington et al. (forthcoming) characterise three phases in the development of urban water supply and sanitation services.

Cities typically move along a water development path from low- to high-quality service provision, with movement between phases facilitated by shifts in political, technical, and financial "disequilibria":[56]

- In **Phase 1**, water supply coverage increases but quality of service and efficiency of consumption and production stagnates, trapped by insufficient government transfers and low tariffs.
- In **Phase 2**, economic growth facilitates increased revenues, allowing for investments in service quality and increasing access to improved sanitation. Production efficiency improves, but consumption efficiency remains low due to weak price signals and poorly targeted subsidies, and environmental quality often degrades.
- In **Phase 3** – which remains aspirational for many cities – governments and citizens demand improved environmental and service quality. Investments are made to improve the resilience of supply, and subsidies are more carefully targeted toward the poor.

The challenges to achieving Phase 3 of urban water policy include revisions of tariff structures (e.g., existing increasing block tariffs) to improve financial sustainability, increased use of information to improve consumption efficiency, and asset management and investment planning that weigh the benefits and costs of new capital investments in the context of climate change.[57]

While enhancing the efficiency of utilities has multiple benefits, it alone does not provide sustainable access to all and transition to Phase 3. Water access by marginalised users is an important question related to water justice in cities. Increasing urbanisation, especially in cities of low-income countries, will exacerbate urban water equity and access concerns (Amankwaa et al., 2022). Further, while extension of networks to unserved communities can yield economies of scale, decentralised systems have value when organised as a public service. Regulating off-grid water distribution is a crucial part of governing urban water infrastructure.

New ways to provide water supply and sanitation services are required. They combine:

- Mission-centred water utilities (Chapter 5).
- A Water System Justice approach that emphasises (but is not limited to) serving those left behind first.
- New infrastructure design and organisation.
- Financing models that question which costs should be covered by the water bill, and which combine clear price signals with targeted social measures.
- A model to manage the transition.

Ragavan et al. (2024) argue that a shift to a graduated model of provisioning can be facilitated by regulation that does not disrupt ongoing business models or push service providers to subvert regulation. Light-handed regulation that reduces financial disincentives, prevents rent-seeking, while addressing oligopoly and informational asymmetry and promoting safe services could be a viable alternative. The Differentiated Schemes strategy in Colombia provides an example.

Notably, the status of the operator should not be overstated. The share of private operation of water services remains limited (below 10% globally) and trends are ambivalent. While private operation of water services gains traction in countries such as Brazil and China, re-municipalisation is trending in several OECD countries. Second, and most importantly, there are examples on how public and private models of operation work well. A major review by the World Bank suggests that the status of the operator might not be the factor that drives the performance of service provision.[58]

56 The text here quotes Whittington et al. (forthcoming)

57 The transition to Phase 3 demands addressing core challenges beyond the scope of this chapter, such as land-market distortions, limited institutional capacity, fiscal space, and serious upstream and downstream water conflicts.

58 See https://elibrary.worldbank.org/doi/abs/10.1596/978-0-8213-7956-1. In the same vein, discussions building on IIPP research considered that commercialisation, involving the operation of public utilities on a profit-oriented basis through levies and fees, may or may not work, but must be coupled with fit-for-purpose institutional tools.

Towards mission-centred water utilities

This section explores several solutions to address the issues outlined above. It is inspired by a mission-centred approach to economics and policy, and a framework to characterise water-related justice.

Mission-centred water utilities

Water service providers have their own mandate in relation to SDG 6: affordable universal supply of clean water, sanitation, and treatment of wastewater, addressing stormwater drainage. This remains paramount. In the context of this report, it is noteworthy that water utilities are key institutions to deliver on the five critical water missions discussed in Chapter 5:

1. **Launching a new revolution in food systems.** Water utilities play a role in the development of (peri-)urban agriculture through water allocation regimes and the capacity to offer reclaimed water, where appropriate.

2. **Conserving and restoring natural habitats.** Water utilities can limit pressure on water resources through efficiency gains and water-demand management. They can minimise pollution by complying with environmental standards for wastewater and rainwater collection and treatment. Utilities around the world invest in catchment protection to minimise treatment costs. This creates co-benefits in terms of biodiversity and land use. It can also contribute to other missions. Decisive drivers here are the acknowledgement of the value of ecosystems, and contracts with farmers.

3. **Establishing a circular water economy.** Significant opportunities emerge in relation to using reclaimed water for non-potable purposes, and recovering energy and valuable substances from wastewater streams. Instruments such as feed-in tariffs for energy generated in wastewater treatment plants are key to shaping such markets.

4. **Enabling a clean-energy world and an artificial intelligence (AI)-rich era** to be achieved with much lower water-intensity. Utilities can contribute to a low-carbon transition through energy efficiency and the capacity to recover heat and energy from wastewater streams. Lower water intensity can be achieved by making use of diverse sources of water (including rainwater and reclaimed water), and supplying water that is fit for purpose.

5. **Ensuring that no child die from unsafe water by 2030.** This requires thorough operation and maintenance of existing assets, and delivery of services that comply with health standards. It also requires the capacity to consider options beyond the prevailing model of piped, central infrastructure, combining innovative infrastructure, operation, and finance. Particular attention will be paid to slum dwellers and most-fragile populations.

These missions illustrate the new complexity that water utilities face if they want to deliver on their mandate, adjust to the new context, and contribute to stabilising the hydrological cycle.

Water System Justice at the heart of mission-centred water utilities

The framework for Water System Justice provides a consistent and comprehensive approach. Table 8.1 shows how features can be reflected in the governance of water utilities.

The overarching message is that utilities should focus on serving those left behind first. This requires innovative design, operation, and financing of service provision, possibly combining centralised and decentralised services, with formal and informal service providers, at multiple geographical scales. Shaping the water utility sector to deliver this ambition requires institutional capacities to embed public value in service provision, and to inform symbiotic partnerships across a range of actors.

TABLE 8.1: Water system justice applied to water service provision

Justice	Service provision should:	Link to 2030 Agenda
Recognition	Serve the poor first. Recognition justice emphasises the needs of the poor, marginalised, disabled, and homeless, ensuring affordability and accessibility.	"leaving no one behind"; "the furthest behind first".
Epistemic	Use other knowledges. Epistemic justice acknowledges diverse social norms and water, sanitation and hygiene needs.[59]	"intercultural understanding", "recognise all cultures"
Interspecies	Protect water ecosystems. Interspecies justice mandates sustainable water abstraction, compliant wastewater discharge, and ecosystem-based management to maintain ecological integrity.	Improve water quality: reduce pollution and treat waste water; increase recycling and safe reuse; protect/restore water ecosystems
Intergenerational	Anticipate future demands. Intergenerational justice addresses past and present water depletion impacts.	Protect the planet from degradation to support present and future needs
Intragenerational	Use targeted subsidies to ensure affordability, accounting for intersectional in equality. This ensures equitable rights, with the wealthy subsidising water services for the poor and sharing water between users to meet basic needs.	Provide accessible, available, and good-quality water on-premises; adequate, equitable sanitation and hygiene for all; commit to Human Rights for water and sanitation.
Procedural	Ensure accountability through access to information, decision-making, civic space, and courts.	Support and strengthen participation of local communities in improving water, sanitation, and hygiene services.
Substantive	Meet minimal needs within water boundaries. This covers both Just Minimum. Access to water, sanitation, and hygiene services, and Just Allocation.	Access to all.

Source: Schwartz K. et al. (preprint), *Water Utilities: Putting the Furthest Behind First Gupta et al. (2024).*

59 For instance, across sub-Saharan Africa, careful consideration of cultural preferences when designing water supply, sanitation and hygiene technologies, and the significance of integrating women into leadership positions within community water-management and sanitation programs were crucial to enhance sustainability and effectiveness (Tsekleves et al., 2022).

Policy shifts to move the needle on water utilities

This section outlines options to accelerate transition towards Phase 3 utilities that deliver on the five critical water missions described above.

Promote diverse modalities to serve the poorest populations and communities

Central, piped infrastructure has distinct advantages. It triggers economies of scale in densely populated environments. The resulting governance framework typically includes economic regulation, control of service provision, and accountability mechanisms designed to respond to the monopolistic characteristics of network infrastructure. It embodies a well-established business and financing model, where the public sector is usually charged with covering capital expenditure, while users are expected to cover operating expenditure. It has delivered robust services in both high-income and low-income environments, in line with Phases 1 and 2 of the development pathway presented above.

The model also faces limitations:

- It cannot provide access to billions of people globally, especially in rural/peri-urban/remote communities and informal settlements.
- It triggers high up-front costs, which require specific financing models.
- It faces challenges in transitioning towards Phase 3 of the development pathway and adjusting to shifts in demographics or climate.

In such contexts, urban and national policies and programmes should consider diverse arrangements (i.e., centralised and decentralised, networked and non-networked, formal and informal) and promote an appropriate combination at scale, adjusted to the urban context (Box 8.1).

Box 8.1: Acknowledging the comparative advantage of informal service providers

Informal service providers are increasingly recognised as critical to enabling universal access to water, sanitation, and hygiene services, especially in informal settlements. Evidence from several regions and countries suggests that informal service provision represents a sizeable share of the global market.

Around 25-70% of urban population the world over could be relying on informal providers (Arias-Granada et al., 2018; Asian Development Bank, 2024; D. Garrick et al., 2018). Besides the lack of formal services, inadequacy in the form of their poor quality or reliability drives demand towards off-grid alternatives. In certain cases, the inability of public utilities to keep pace with rapid growth and expansion in urban areas, along with large capital investment needed in networked infrastructure, has led informal service providers to be co-opted to meet requirements (D. Garrick et al., 2018; USAID Urban Wash, 2023).

While unit costs can be higher, decentralised systems can increase access and systemic resilience. Also, capital costs can be much lower, which matters in low-income countries where borrowing costs can be exorbitant and debt problems are pervasive. These solutions ought to be mainstreamed where appropriate. Decentralised systems can:

- Be scaled up and down to reflect population dynamics.
- Adapt to uncertainties about water availability triggered by climate change.
- Accommodate alternative financing mechanisms, including small-scale or even micro- finance.

Box 8.2: Decentralised on-site water reuse systems

San Francisco (California), United States, is leading the trend in "extreme decentralisation" of water reuse: making it mandatory for all new buildings with footprints larger than 100,000 square feet to include on-site water reuse systems. For example, the headquarters of the San Francisco Public Utilities Commission flushes its toilets with wastewater treated in engineered wetlands built into sidewalks around the building. This process reduces the building's imported potable water supply by 40%.

In Bengaluru, India, some apartment complexes treat their wastewater and use it for laundry and washing. One complex supplies treated potable water to industry, both reusing water and earning revenue.

A study in South Africa indicated that, for population densities below 112 persons/hectare, simplified sewerage was more expensive than onsite sanitation options, which could be due to higher costs associated with pumping-station maintenance and monthly household surcharge. However, for densities above 198 persons/hectare, sewerage became cheaper than onsite sanitation options at the same costs (Manga et al., 2020).

In the Char communities of Bangladesh, with fluctuating heavy rainfall patterns and a history of migration, constructing temporary, low-cost structures that can be easily rebuilt has been common, as opposed to costly permanent structures that might be abandoned or damaged (Mills et al., 2020).

Decentralised systems also face limitations, such as lack of technical and financing capacities, and more challenging monitoring of performance and compliance with existing regulations. Modalities to monitor and enforce compliance with environmental and economic regulation need to adjust to such contexts. This can be done via utilities or a public service organisation (Box 8.3).

While allowing for small-scale operational units, aggregation of small service providers can improve operational performance and sustain technical and financial capabilities.[60] It can also provide opportunities to comply with environmental requirements in a cost-effective way. Several aggregation options can be considered, from shared functions to merging.

Box 8.3: Decentralised public sanitation services in France

A SPANC (service public d'assainissement non collectif) is a public service company with responsibilities related to equipment, maintenance, and functioning of non-connected wastewater treatment systems. These sanitation facilities collect, transport, treat, and dispose of all domestic wastewater (except rainwater) from buildings not connected to a public network. SPANC shows how the development of a non-fixed network provides an effective alternative to wastewater network provision in sparsely populated areas, while offering environmental protection (Chapter 5).

Transitioning can require letting different standards co-exist for a set transition period. While this might not be in line with the just water system approach, such strategies can be practical ways to transition towards better service for all, as illustrated by Colombia's Differentiated Schemes strategy (Chapter 5).

Embed public value in the governance and review of water utilities

Public value as a concept for water utilities should come with metrics to report and measure success. Typically, this calls for utilities to maximise social welfare, i.e., social-cost/-benefit analysis should guide utility investment and policy decisions. Framing questions can help operationalise the notion:

60 For practical considerations on the pros and the modalities of agglomeration, see OECD (2022).

- Who are utilities willing to serve?
- Who oversees servicing the poorest parts of the population: a water utility (through a dedicated pro-poor unit), local authorities, or someone else?
- What are the success factors in relation to Water System Justice?

Answers are likely to be country-specific, but some generic framing might be relevant. Options to make publicly or privately operated water utilities mission-centred and urge them to maximise public value include:

- Hold service providers and organising authorities accountable for performance, combining social, environmental, and economic criteria.
- Promote corporate governance arrangements that keep citizens informed and involved, and hold decisionmakers accountable for service delivery.
- Corporatise service provision as a condition to keep political interference at bay. Independent of the status of the operator, corporatisation has advantages in defining, driving (through rewards and sanctions), and monitoring performance. It is a condition for financial integrity and transparency. Corporatisation can apply to decentralised systems, as illustrated by SPANC in France.
- Consider employment and professional training as an opportunity to turn staff into custodians of public value. Skill partnerships can be relevant.

Reporting has a role to play, like corporate social responsibility for financial institutions. New metrics are required to quantify access and justice. There would be benefits in characterising the role of independent economic regulation to define, promote, and realise public value in practice.

Contracts, partnerships, and regulation

Contracts and partnerships

Contracts organise the relationships between the organising entity (usually a local or regional government) and the service provider (be it public or private; again, this discussion is agnostic as regards the status of the service provider). Where they exist, contractual arrangements do not likely reflect a multidimensional perspective on performance, nor provide adequate incentives. There is room to design and enforce contractual arrangements that drive operational performance, public value, and justice.

Conditionalities are effective in steering the operation of water utilities towards public value by setting balanced incentives and risk-sharing. Governments can embed conditionalities in contracts to (Mazzucato & Rodrik, 2023; Mazzucato & Zaqout, 2024):

- **Prioritise those most in need**, such as slum dwellers, the most fragile populations, and women and girls (considering prevailing gender inequality in access).
- **Improve water conservation and the efficiency of water use**, urging water utilities to curb water-demand management through fixing pipes, and chasing non-revenue water. To mitigate impacts on revenues, additional sources of income disconnected from the water bill could be explored to cover the fixed cost of service operation.
- **Reinvest revenues in productive activities**, such as R&D and innovation around water, to promote cost-effective and low-carbon modes of operation, or digitalisation (e.g., digital twins) to support performance improvement.
- **Reinvest some revenues into catchment conservation programmes.**

Partnerships supported by conditionalities can be defined to ensure that water utilities are governed to deliver in line with the expectations of national or local authorities. Performance-based contracts for water services illustrate that kind of

arrangement.[61] Economic regulators have a role in setting performance standards, monitoring and reporting on achievements, and providing incentives and sanctions.

Fair and effective partnerships require that the public sector have capacities. More work is required to characterise such capacities and develop the appropriate curricula and training opportunities.

Regulation[62]

In principle, three sets of regulations apply to water utilities. First, health regulations set standards for potable water and service quality. Second, environmental regulations are designed to safeguard water resources (quality and quality) and enable reuse. The primary focus is on water abstraction and discharges. Ragavan et al. (2024) documents the interface between the urban water cycle and the water cycle at large. It emphasises the benefits of rainwater harvesting and groundwater recharge. These can only materialise if the protection of surface and groundwater is properly regulated. Third, technical regulations are designed to ensure efficiency in water use; they can also promote energy efficiency and lower carbon footprints.

From an economic and social perspective, national regulatory authorities supervise the provision of essential services by monopoly suppliers. They aim to enhance the cost-efficiency of utilities, foster investment, and protect customers from poor-quality services and unjustified tariff increases. Economic regulators review tariffs to identify the amount of revenue that adequately covers the cost incurred by a regulated entity while incentivising efficiency in service development, investment, and operation. Best practices stimulate efficiency and discourage overinvestment.[63]

Contract design can improve cost-efficiency in service delivery. Critically, a service provider knows more than its regulator about their own cost structure and level of efficiency. This informational asymmetry translates into a bargaining advantage that can lead to inadequate services, inflated costs, or the ad hoc renegotiation of contracts. These inefficiencies translate into higher rents or returns for the service provider. With appropriate attention to contract design, many of these problems can be mitigated. Capping the price of the service can be a good option, and requires minimal access to cost data. In other contexts, a more appropriate contract would limit the allowable rate of return by defining a maximum markup over audited costs ("cost-plus"), complemented with international cost benchmarking. Offering a menu of choices can be a good option: in expressing a preference, firms reveal information about their cost structures and comparative advantages, which allows for better-informed regulation.

However, prevailing models of economic regulation for water service provision have not always ensured delivery of service for public value. Anecdotal evidence suggests that revenues are not adequately pumped back into the maintenance of water and sanitation treatment systems, leading to lack of investment, infrastructure decay, and degraded service quality. Lessons can be learned from recent successes and failures about the ambition and modalities of economic regulation for water services.

Typically, while national regulatory authorities cover several aspects of a firm's policy (cost efficiency, investments, quality of services, customer care), other aspects, such as corporate financing policy, remain neglected. The example of England and Wales suggests that leaving out corporate finance led to a higher risk of ineffective financial structure, oriented toward short-term profit maximisation and dividend payouts. Experience shows the strong preference of water utilities for debt maximisation, achieving a debt-to-equity ratio beyond the notional value established by the economic regulator.

Where water utilities' balance sheets have debt, national regulatory authorities could intervene to reduce risks from over-indebtedness that reduces the availability of finance for investment,

61 See synthesis by the International Water Association; https://iwa-network.org/groups/performance-based-for-improving-utility-efficiency/

62 This section is based on a personal communication from the President of the Association of European Regulators in the drinking water and wastewater sector (WAREG).

63 For a detailed analysis of the tariff methodologies adopted by European national regulatory authorities, see the Association of European Regulators in the drinking water and wastewater sector (WAREG) report: https://www.wareg.org/documents/water-tariffs-frameworks-in-europe/.

damaging the quality of services. A range of actions could avoid such situations, including corporate governance or regulatory levers. Considering their mandate, water utilities should have governance and capital structures that impede corporate management from adopting strategies that result in ineffective performance. More work is required to characterise such developments in regulation and governance.

Tariffs for water supply and sanitation services

Trying to achieve several policy objectives using tariffs has proven ineffective: it has often undermined operational performance and deterred investment, with socially unjust consequences. Tariffs are best conceived in conjunction with targeted social support outside of water bills.

Each of the three phases of urban water development characterised above face challenges when it comes to pricing and associated subsidies:

1. In Phase 1, subsidies to connection and operation can be poorly targeted: cheap tariffs do not benefit the poorest households, who are not connected.

2. In Phase 2, a pressing issue is how to set tariffs to raise revenues and ensure that poor households can still afford water, while enhancing the operational efficiency of the service provider. Increasing block tariffs have been the answer in many cities in the Global South, but they often fail to deliver and can be socially regressive.

3. In Phase 3, regulators signal the full social costs of water use; customer assistance programmes target subsidies to poor households who need them. Singapore's U-Save subsidy programme illustrates one way this can be done without compromising the incentives customers face to use water wisely (Box 8.5).

Box 8.5: Leveraging tariffs and subsidies for public value

Subsidising connections in Africa

In Nyeri, Kenya; Kampala, Uganda; and Dakar, Senegal, subsidised connection charges enabled coverage to more than double within a decade. In cities such as Maputo, Mozambique; and Mzuzu, Malawi, informal supply modes such as standpipes and water kiosks are also subsidised (Beard & Mitlin, 2021).

Block tariff structures coupled with targeted subsidies in Singapore

Singapore uses a block tariff system for households, coupled with targeted subsidies for lower- and middle-income households. The large first tariff block includes a water conservation tax and enables the long-term cost of producing and distributing water to be recovered. While 96% of households fall into this first block, a significant proportion of them receive a targeted and progressive rebate to ensure affordability. The U-Save subsidy programme delivers quarterly rebates to poor and middle-class households who live in public housing, to help them pay utility bills (water, gas, and electricity). The size of the rebate depends on the size of the housing unit; households who live in lower-value housing units receive larger rebates.

First, costs can be minimised when economic regulation provides incentives for operational performance and for economic efficiency of development and investment plans. In practice, reliable, safe, and sustained service delivery benefits from investment decisions that factor in realistic assessments of lifecycle and long-term service costs, along with the professionalisation of service delivery (Garrick et al., 2020). An important caveat is that information on (true) costs is private and unknowable to the regulator. In the absence of competition, it is challenging for regulators to find the appropriate level of pressure (see above).

Cost can also be minimised through alternative infrastructure design or agglomeration of small service providers. The cost of capital matters as well in a capital-intensive industry such as water supply and sanitation. Patient and local capital has a role to play; paying back high-interest loans in foreign

currency is prohibitive.

Second, one needs to specify which costs should be covered by the water bill. International experience suggests there is room to implement the polluter pays principle more systematically. For instance, in the context of revising the Urban Wastewater Treatment Directive, the European Commission is setting up an extended producers' responsibility mechanism so that pharmaceutical and cosmetic industries cover the costs of additional treatment required to control pollution from the substances they market. Such a mechanism can inspire regulators in other parts of the world, including in the Global South, where a significant part of the costs incurred by water users results from harmful practices upstream.

Third, tariffs for water supply and sanitation services are best designed to signal the full social, environmental, and financial costs of service provision, including the scarcity of freshwater. They would apply to all water users. Poor households would be compensated through targeted social support outside of the water bill. Such a principle conveys the right message to water users in a simple and transparent way. And it makes the most effective use of public funding.

Tariffs can be combined with policy instruments such as abstraction charges or nudging to signal the opportunity cost of using water, especially when the resource is scarce. Demand-side approaches to improving and sustaining water, sanitation, and hygiene outcomes need innovative and targeted behaviour-change communication and strategies (Chirgwin et al., 2021).

Finally, it should be acknowledged that not all parts of the water value chain are equally able to attract finance or generate revenue. It might be difficult to generate revenue to provide access to unserved areas, be they poor neighbourhoods, remote communities, or informal settlements. Some cross-subsidisation along the water continuum and the multiple duties of water utilities can be justified when sanitation is not affordable. National and local governments should be encouraged to consider which subsidy is most appropriate to cover the cost of service-provision where no revenue can be generated. The answer will be specific to each jurisdiction.

When in place, tariffs for water supply and sanitation services should be adjusted to reflect costs and enable timely maintenance and reinvestment. Lack of adjustments can explain why utilities find themselves trapped in Phase 2 (or even regressing from Phase 3). Economic regulation is key to ensure that tariff adjustments are justified and do not undermine incentives for operational efficiency.

The question remains about how much revenue collected through tariffs should and could finance massive investments required to keep up with local and global ambitions and adapt water services to the new context characterised in this report, such as to deliver climate-resilient infrastructure, replacing today's aging assets. How should tariffs consider this long-term perspective, which raises issues of intergenerational justice? To what extent should current customers pay to benefit future customers?.[64]

Additional revenue streams

In addition to tariffs, diverse financing mechanisms can be explored to generate the cashflows required to finance water supply and sanitation services. Three options are recommended:

- **Extended producer-responsibility mechanisms**, as described previously, can serve to comply with the polluter pays principle. Where appropriate, they generate revenues that can be earmarked to finance treatment of water before it is supplied to users. Their justification and design require robust investigations of the source and costs of pollution.

- **Capturing the value of private benefits triggered by public investment** in infrastructure makes economic sense and is socially just. Land-value capture can generate fiscal space for (national or local) governments[65] and contribute to financing water-related investments, where

64 For recent behavioural experiments to reveal preferences of consumers, see page 70 of https://www.oecd.org/gov/regulatory-policy/scotland-s-approach-to-regulating-water-charges-fcc8c6df-en.htm.

65 See an exploration of land-value capture to finance flood protection in Indonesia: OECD (2023). Similar reasoning can apply to water supply and sanitation.

investments in water supply and sanitation generate private benefits for landowners and property developers.

- **Wastewater treatment can generate valuable materials** and contribute to a circular economy. With only 39-76% of the total energy used in anaerobic digestion processes reclaimed, there is scope to tap into the energy generation of domestic wastewater, which can be up to ten times the energy required for its treatment (Barroso Soares, 2017). Technologies are available to collect heat, methane, or substances that have economic value. Adequate regulation (e.g., feed-in tariffs for energy supply) can incentivise recovery, generating revenues for utilities that are independent from the volume of water sold or treated. The financial relevance of such schemes depends on the market price of recovered materials, which can vary, affecting the business case for such developments.