

Regulation of Water Supply and Sanitation in Bank Client Countries

A Fresh Look

Discussion Paper of the Water Supply and Sanitation Global
Solutions Group, Water Global Practice, World Bank

NOVEMBER 2018

Yogita Mumssen, Gustavo Saltiel, Bill Kingdom,
Norhan Sadik, and Rui Marques

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Please cite the work as follows: Mumssen, Yogita, Gustavo Saltiel, Bill Kingdom, Norhan Sadik, and Rui Marques. 2018. "Regulation of Water Supply and Sanitation in Bank Client Countries: A Fresh Look." World Bank, Washington, DC.

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Cover design: Jean Franz, Franz & Company, Inc.

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Acknowledgments

This discussion paper is a product of the World Bank Water Global Practice’s Global Study on Policy, Institutions, and Regulatory Incentives for Water Supply and Sanitation Service Delivery, and forms part of the Water Supply and Sanitation Global Solutions Group (WSS GSG) agenda. This work was financed by the World Bank’s Global Water Security and Sanitation Partnership and the Swiss State Secretariat for Economic Affairs (SECO).

This discussion paper was prepared by a team led by Yogita Mumssen and Gustavo Saltiel. Authors of the

discussion paper were Yogita Mumssen, Gustavo Saltiel, Bill Kingdom, Norhan Sadik, and Rui Marques. This work was carried out under the general direction and guidance of Maria Angelica Sotomayor and Bill Kingdom. The team is also grateful for the comments and suggestions from Alexander Bakalian, Chloe Oliver Viola, Daniel Camos Daurella, Katharina Gassner, and Oscar Pintos. The team would like to acknowledge the valuable inputs and support provided by Pascal Saura, Berenice Flores, Clémentine Marie Stip, Ilan Adler, and Pinki Chaudhuri.

Abbreviations

AIAS	Administration for Water Supply and Sanitation Infrastructure (<i>Administracao De Infra-Estruturas de Agua E Saneamento</i> ; Mozambique)
AMCOW	African Ministers Council on Water
ARCE	Regulatory Agency of Delegated Public Services of the State of Ceará (<i>Agência Reguladora de Serviços Públicos Delegados do Estado do Ceará</i> , Brazil)
ARESEP	Regulatory Authority of Public Services (Autoridad Reguladora de los Servicios Públicos, Costa Rica)
AySA	Argentina Water and Sanitation Utility (<i>Agua y Saneamientos Argentinos</i> , Argentina)
ARR	annual revenue requirement
BSWSC	Bauchi State Water Supply Company (Nigeria)
CA	concession agreements
CAPEX	capital expenses
CBO	community-based organization
CCG	customer challenge group
CLTS	community-led total sanitation
CRA	Water Regulatory Council (<i>Conselho de Regulação de Águas</i> ; Mozambique)
CRA	National Water Regulatory Commission (<i>Comisión de Regulación de Agua Potable y Saneamiento Básico</i> , Colombia)
CU	commercialized utility
DCM	decision of the council of ministers
DMF	delegated management framework
DPWA	Department of Public Works and Highways
DTF	devolutionary trust fund
ENRESP	Public Services Regulatory Authority (<i>Ente Regulador de Servicios Publicas</i> ; Salta, Argentina)
EPI	economic policy instrument
ERSAR	Water and Waste Services Regulation Authority (<i>Entidade Reguladora dos Servicos de Aguas e Residuos</i> ; Portugal)
ESC	Essential Services Commission (Australia)
EU	European Union

EWRA	Egypt Water Regulatory Authority
EWURA	Energy and Water Utilities Regulatory Authority (Tanzania)
FCS	fragile and conflict affected states
FINDETER	Financial Development Territorial SA (<i>Financiera del Desarrollo Territorial SA</i> ; Colombia)
GP	global practice
IBNET	international benchmarking network
IBT	increasing block tariffs
IDT	institutional diagnostic tool
IEG	independent evaluation group
IRAR	Institute for Regulation of Water and Waste (Instituto Regulador de Águas e Resíduos; Portugal)
IPART	Independent Pricing and Regulatory Tribunal (Australia)
JVA	Jordan Valley Authority
KPI	key performance indicator
LG	local government
LGU	local government unit
LICs	low-income countries
LMICs	low- and middle-income countries (authors combine LIC, LMIC and MIC)
LWUA	Local Water Utilities Administration (Philippines)
MDG	millennium development goal
MWSS	Metropolitan Waterworks and Sewerage Services (Philippines)
NGO	non-governmental organization
NPG	new public governance
NRC	National Regulatory Council (Australia)
NRW	non-revenue water
NPM	new public management
NSW	New South Wales
NWASCO	National Water Supply and Sanitation Council (Zambia)
NWP	national water policy

NWRB	National Water Regulatory Board (Philippines)
O&M	operation and maintenance
OBA	output-based aid
ODA	official development assistance
ODI	outcome delivery incentive
OECD	Organisation for Economic Co-operation and Development
Owat	Water Services Regulation Authority (England and Wales)
ONEA	National Water and Sanitation Utility (Office National de L'Eau et de L'Assainissement; Burkina Faso)
OPDM	Public Decentralised Municipal Agency (<i>Organismo Público Descentralizado Municipal</i> ; Mexico)
OPEX	operating expenses
PBC	performance-based contracting
PBF	performance-based financing
PBGS	performance-based grant system
PC	performance commitment
PDAM	local government-owned WSS utility (Perusahaan Daerah Air Minum; Indonesia)
PENSAAR	Strategic Plan for Water Supply and Sanitation Sector (<i>Plano Estratégico para o Setor de Abastecimento de Água e Saneamento de Águas Residuais</i> , Portugal)
PIR	policies, institutions and regulation
PLANSAB	National Basic Water and Sanitation Plan (<i>Plano Nacional de Saneamento Básico</i> , Brazil)
PPP	public-private partnership
PPWSA	Phnom Penh Water Supply Authority (Cambodia)
PSP	private sector participation
PUC	public utility commission
PURC	Public Utilities Research Center
PWA	Palestinian Water Authority
PWRF	Philippines Water Revolving Fund
RBF	results-based financing
RIA	regulatory impact analysis

RoA	return on assets
RPI	retail price index
SABESP	The State Water Utility of Sao Paolo (<i>Companhia de Saneamento Básico do Estado de São Paulo</i> , Brazil)
SDE	Senegalese Water (<i>Senegalaise des Eaux</i> , Senegal)
SDG	sustainable development goal
SECO	Swiss State Secretariat for Economic Affairs
SIM	service incentive mechanism
SISS	Superintendence of Sanitary Services (<i>Superintendencia de Servicios Sanitarios</i> , Chile)
SLG	service level agreement
SNIS	National Information System for WSS (<i>Sistema Nacional de Informacoes Sobre Saneamento</i> , Brazil)
SOE	state-owned enterprise
SONES	National Water Company of Senegal (<i>Société Nationale des Eaux du Sénégal</i>)
SSPD	Superintendence of Public Services (<i>Superintendencia de Servicios Publicos Domiciliarios</i> , Colombia)
SUNASS	National Water and Sanitation Sector Regulator (<i>Superintendencia Nacional de Servicios de Saneamiento</i> , Peru)
SWC	Sydney Water Company
SWSC	Swaziland Water Services Corporation
TPA	traditional public administration
TRASS	Administrative Court for Complaints Resolution; Peru
TTL	task team leader
UNICEF	United Nations Children's Fund
URSEA	Energy and Water Utilities Regulator (<i>Unidad Reguladora de Servicios de Energía y Agua</i> , Uruguay)
USO	universal service obligations
WACC	weighted average cost of capital
WASH	water supply, sanitation, and hygiene
WASREB	Water Sector Regulatory Board (Kenya)
WDR	World Development Report
WICS	Water Industry Commission for Scotland

WRA	Water Regulatory Authority (Albania)
WRM	water resource management
WSRC	Water Sector Regulatory Council (Palestine)
WSSRC	Water Supply and Sanitation Regulatory Commission (Bangladesh)
WSS	water supply and sanitation
WSS GSG	Water Supply and Sanitation Global Solutions Group
WWGs	water watch groups
ZINWA	Zimbabwe National Water Authority

Executive Summary

Objectives of this Discussion Paper

This discussion paper is a supplement to the 2018 World Bank global study *Aligning Institutions and Incentives for Sustainable Water Supply and Sanitation (WSS) Services*, recently published by the World Bank's Water Global Practice. The Global Study promotes holistic approaches in shaping WSS sector policies, institutions and regulation by considering the wider political economy and governance framework to incentivize sustainable actions.

In particular, this paper examines how lower- and middle-income countries (LMICs)¹ can successfully establish or improve regulation of the WSS sector by taking into account political, legal, and institutional realities. Rather than importing “best practice” models from OECD (or broadly, upper-income) countries, experience has emphasized the importance of developing “best fit” regulatory frameworks that are aligned with the policy and institutional frameworks of a LMIC's WSS sector. This ensures that new regulations are embedded within the country's broader political economy and governance frameworks.

This paper does not seek to offer definitive conclusions, rather it provides suggestions on the way forward, along with a phased approach to regulatory reform. Importantly, it sheds light on the issues that warrant further investigation to determine the future of WSS regulation in LMICs.

Background

Regulation is a policy intervention that aims to promote sector goals in the public interest - balancing

the competing interests of the various stakeholders. Economic regulation refers to the “setting, monitoring, enforcement and change in the allowed tariffs and service standards for utilities” (Groom et al., 2006).

The United Kingdom and Australia both established independent regulators in the 1980s and 1990s as part of a package of reforms built around privatization or commercialization. Regulation of private utilities has existed for many decades in the United States, while contract regulation has historically predominated in France and Spain. These international reforms of WSS services often inspired similar models of regulation in LMICs.

Yet, the context for regulation in LMICs was much different from where the models originated—in terms of access, quality of service, data availability, human capacity, governance and institutional context, to name a few. Regulatory initiatives in OECD countries were also built on foundations such as trusted institutions, well-defined property rights, and a formal system of contract and corporate law, creating predictability and stability for investors. In LMICs legal and administrative institutions are less developed, with weaker enforcement, transparency, and accountability, and local history, customs, and traditions that can play a significant role in determining reform outcomes.

WSS Regulation in Low- and Middle-Income Countries

For regulations to be effective, their goals, form, and function must align with the country's established

institutional framework, and consider the realities of its political economy. Otherwise, governments may merely create the illusion of reform. This is often described as “isomorphic mimicry,” referring to when governments suggest reform but do not necessarily implement it, for example by only making changes in the external form of policies and/or organization rather than their actual functions.

Perhaps the biggest challenge to successfully importing regulation models from OECD countries to LMICs derives from significant differences in ownership and legal structures. WSS providers in LMICs are dominated by state-owned enterprises (SOEs) or are run by municipal governments, whereas private operators or ring-fenced corporatized SOEs dominate OECD countries. The incentive mechanism is quite different between public and private operators:

- **Private utilities.** The ability of a private operator to finance itself and provide fair returns to shareholders is of critical importance. This provides private utilities with clear incentives to improve efficiency, deliver on improvements demanded by customers, and expand networks to new customers.
- **SOEs and municipal-run utility services.** Financial sustainability is balanced with stated or unstated social and political objectives and weak accountability. Incentives are less clear and often lead to low levels of service quality, coverage, efficiency, and financial sustainability.

Regulatory Objectives

A government’s broader policy objectives determines what role regulation will play in achieving them, so gaining clarity on sector objectives is a critical first step. Policy objectives in OECD countries may be quite different from those in LMICs. In the former case, where universal coverage for the WSS

sector already exists, the policy objective may relate more to efficient service delivery, environmental goals, and accessing commercial finance. In LMICs, the government’s objectives may be similar but prioritized in a different order, or else be completely unrelated.

For example, some common regulatory objectives for the WSS sector in LMICs include:

- Increasing access, especially to peri-urban and rural areas, and to poor and vulnerable groups;
- Improving quality of service delivery;
- Improving efficiency of service providers; and
- Securing access to capital markets for sector financing.

Regulatory Forms

Over the past few decades, LMICs have predominantly imported or designed new WSS regulations in the form of a dedicated sector regulatory agency, often with aspirations of independence. But the most effective regulatory forms in these countries have been varied, and depend on a multitude of factors, including the country’s legal system, sector policies, governance structure, the extent of decentralization, and whether national SOEs already exist.

Moreover, LMICs often confront distinct challenges in terms of limited administrative capacity and budgetary resources. Factors such as poorly trained staff; insufficient information; lack of financial resources; inadequate civil service rules; and unrealistic time constraints can all impact the capacity of regulators to effectively implement their mandated responsibilities. In the absence of institutionalized coordination mechanisms, there is an increased risk of duplicating roles, and sometimes a lack of clarity regarding institutional mandates and policies (see table 1.1).

TABLE 1.1. Range of WSS Regulatory Frameworks in Low- and Middle-Income Countries

Regulatory Frameworks	Description
Sector Specific National or State Regulator	WSS regulator mandated to oversee private and public service providers. Roles and responsibilities may include issuing licenses, setting and monitoring performance standards, setting tariffs, ensuring consumer protection, performing audits, evaluating business plans, building capacity, and reporting regularly to government authorities. Sector-specific regulators operate across a vast number of countries including Colombia, Egypt, Mozambique, and Peru . In large federal countries where WSS services and regulation are at the state level, the national regulatory model outlined above can be replicated at the state level.
Multi-Sector Regulator	Multisector regulation provides scale economies, consistent regulatory processes, and knowledge exchange between different sectors. Although the multisector regulator might avoid regulatory capture by a specific sector; certain sectors may not receive sufficient attention. Ghana has an established multisector regulator responsible for oversight of energy and water sectors. Tanzania, Angola and Cape Verde have similar regulators, with varying degrees of success. In Brazil , 14 states have established multisector public services regulators which include, besides the water sector, also the transportation and energy sectors.
Self-Regulation at the Municipal Level	This takes many forms but essentially the public entity providing the service (municipal department, agency, corporation) is overseen by the municipal, council, or a designated governing board. In some cases, a municipally owned ring-fenced corporation is responsible for service delivery, and oversight is carried out by the board of directors. The board represents the municipality and has the power to approve tariffs. Managerial authority is delegated to the CEO of the utility, and oversight is undertaken by a municipal governing board. Cambodia offers an example of self-regulation whereby policy making, service delivery, and regulatory functions are implemented by the PPWSA.
Government Department	Traditional form of WSS regulation through the same ministry (or Secretary of State) that develops policy and operates water systems.
Regulation by Contract	Performance contracts between the government and a private entity responsible for O&M of the WSS facilities. Monitoring entity performs functions similar to that of a regulator, although with significantly less professional support staff and discretion. Burkina Faso implements a performance contract arrangement between the service supplier and the government. The contract specifies performance targets such as expansion of services to informal areas.

Regulatory Functions

Regulators can use numerous tools to incentivize WSS service providers to achieve sector objectives. The effectiveness of these tools, however, primarily depends on the degree to which they are aligned with and responsive to the sector’s policy and institutional framework. Key regulatory functions and their associated tools and approaches found in LMICs include improving financial sustainability; improving service provider performance; increasing accountability, transparency, and consumer voice; and pro-poor regulation.

Improving Financial Sustainability

If a service provider is financially weak then it cannot properly operate and maintain its assets, nor

mobilize finance for improving coverage or quality of service. Regulators can help improve this situation in several ways:

- a. **Build a solid analytical foundation.** This entails placing an initial focus on quality regulation until the required financial data and capacity levels are met by utilities. In **Colombia**, the government focused initially on acquiring unit costs and standardizing the accounting norms used by utilities. This enabled it to introduce efficiencies to fully reflect operational costs first and then increasingly investments.
- b. **Financial modeling** underpins effective tariff setting. **Burkina Faso** successfully implemented a financial model agreement with a private utility company that is stipulated in a performance-based management contract.

- c. **Assess creditworthiness.** In **Kenya**, the regulator prepared 43 shadow credit ratings to inform investors of the risk of investing in Kenyan WSS utilities. This played a key role in facilitating increased access to commercial finance for utilities.
- d. **Attract private sector investment.** Securing private sector investment is unlikely without improved financial sustainability through regulation. **Colombia's** tariff reforms were to a large degree effective in stimulating private sector participation.

Improving Service Provider Performance

Monitoring the performance of WSS service delivery by utilities can help improve performance when linked to some form of reward or penalty, even if it is simply shining the light on good or poor performers, known as sunshine regulation. LMICs use a multitude of performance management tools with varying degrees of success, including:

- a. **Benchmarking.** This creates the potential for incentives to improve performance through associated rewards and penalties. A prerequisite for benchmarking is the establishment of a reliable data collection system. In **Peru**, weighted performance indicators are calculated to a single performance score. In **Chile**, performance results are reflected in procedure for setting tariffs.
- b. **Licensing.** This allows regulators to monitor agreed upon service standards. In **Albania**, the Water Regulatory Authority is responsible for ensuring service providers meet stipulated service standards.
- c. **Performance- and results-based contracts.** Key performance indicators (KPIs) can be used in public-public or public-private contracts to improve performance. In **Burkina Faso**, the government implemented three-year contract plans with twenty to thirty KPIs for technical, financial, and commercial performance. Performance contracts are most effective when they include simple agreements, clear responsibilities, realistic targets, reporting

requirements, and monitoring and auditing arrangements. Risks remain in relation to contract enforcement, risk management, and risk sharing.

- d. **Corporatization.** This enables the introduction of performance-based remuneration for staff and managers and facilitates results-based approaches. **Uganda** provides an interesting example of using a corporate charter with clear KPI targets and incentives for public utilities.
- e. **Client and service provider contracts.** Such contracts allow for clearer performance improvement targets to be set. For example, in **Brazil** all state companies have contracts with municipalities, which are the owners of the assets. In **Argentina**, the state-run utility Agua y Saneamientos (AySA) and most other utility companies have contracts with provinces that are the owners of the WSS facilities.

Increasing Accountability, Transparency, and Consumer Voice

Regulators play an instrumental role in establishing consumer protection and engagement practices that support improved accountability and transparency in service provision. A variety of successful mechanisms are used across LMICs, ranging from Water Watch Groups (WWGs) comprised of local volunteers in **Zambia** to public hearing and consultation processes that are used widely across Latin America.

Pro-Poor Regulation

Instruments that can incentivize expanded access include:

- a. **Universal service standards.** This involves setting clear access targets with enforceable penalties should targets be unmet.
- b. **Provision of output-based aid (OBA):** Regulation (by contract, agency, or other) could allow for performance-based instruments such as OBA to subsidize, for example, the costs of installing water connections for the poor, a practice used

in many countries including **Colombia, Kenya, Morocco, the Philippines, and Uganda**. This supports incentive policies while insuring—through appropriate financial modeling—the sustainability of the interventions.

- c. **Differentiated service standards and alternative service providers.** For example, in 2003, **Zambia** established the Devolutionary Trust Fund (DTF) to improve WSS coverage in peri-urban and low-income areas, administered by a regulatory agency called the National Water Supply and Sanitation Council (NWASCO). The DTF targets low-cost, high-impact projects such as water kiosks, water meters, and improvements on pipelines and sewerage pipes.
- d. **Social tariffs.** In cases where low-income households already have access to services, regulators might implement social tariff schemes to secure affordability of services for the poor. One common example is the “life line scheme,” implemented with varying success. Regulators could also provide targeted subsidies through direct transfers.

Strengthening Regulation: The Way Forward

Any regulatory model must be fit for purpose and custom designed for a specific country’s institutional context and political economy. This requires regulators and service providers to learn, adapt, and improve over time.

Developing the appropriate regulatory framework will require the following broader institutional reform considerations:

- a. **Identify key reform drivers.** These are the main motivating factors and objectives for reform and improvements of the WSS sector. They stem from endogenous factors (politicians and/or government officials) or exogenous factors (donors and development agencies).
- b. **Understand the existing institutional environment of the sector.** This requires identifying the sector’s key actors, leaders, national policies and strategies,

institutional and administrative capacities, and its legal and regulatory frameworks.

- c. **Understand the political economy of the country and sector.** This requires identifying how the public sector has developed over time, including cultural influences and attitudes toward WSS services.
- d. **Design interventions that are fit for purpose.** This ensures that interventions are not overly complex for the given context and capacities.
- e. **Provide sufficient capacity support.** This ensures that reform objectives are realized. Capacity building should be informed by realities on the ground.
- f. **Ensure there is sufficient financial capacity.** Doing so will sustain results and guarantee the human resources required to implement the desired interventions.

Though literature on WSS sector regulation in LMICs holds off on providing a template for reform, it often recommends a set of principles for effective regulation that are commonly followed by better-performing regulatory frameworks:

- **Regulatory Autonomy.** A degree of insulation from political influence is needed to ensure that regulation is enforced. However, there are also successful experiences where political entities who are bound by a strong legal framework have successfully implemented regulation.
- **Cost-effectiveness.** The cost of regulation should not exceed its benefits or become burdensome for the regulatory agency or for the service providers being regulated (Shugart, 2009).
- **Predictability.** Regulatory mandates, rules, and operational standards should be adequately clarified and reliably enforced without arbitrary and frequent changes.
- **Accountability.** Building confidence in the regulatory framework requires stakeholder engagement to achieve consensus among sector actors and to deliver necessary improvements.

- **Transparency.** Allowing for performance data to be made public supports the building of institutional trust within the system and improved stakeholder engagement.
- **Fairness.** Regulatory rules and decisions balance the interests of key stakeholders, ensuring the sustainability of water services (Shugart, 2009).

At the same time, regardless of what regulatory model a LMIC chooses to apply to its WSS sector, there are two fundamental requirements that must be met if a regulatory regime has any chance of successfully responding to existing and changing realities on the ground:

- **Data.** Quality data is a foundational requirement for any regulatory model, whether it seeks to attract and oversee public-private partnerships (PPP) or to improve the performance of public sector entities. From the start, regulation should focus on data collection, validation, analysis, and dissemination.
- **Human Capacity.** Regulatory functions must be tailored to existing human capacity. Regulatory designs should accommodate weak initial capacity and respond to its improvement over time.

For LMICs, the role of regulation will and should evolve over time. Thus, establishing a successful regulatory regime is best accomplished by taking a phased, or step-by-step approach. For example:

- **For countries without a WSS regulator and/or that are considering one,** a simplified regulatory impact analysis can clarify the objectives, costs, and benefits of regulation and reveal opportunities for incentivizing utility performance. In turn, clarification of regulatory objectives and functions enable the development of legal and other frameworks that support regulation in the sector, aligning it with the existing political economy and sector policies.
- **Building data capacity is an essential first step for regulation.** Whether the chosen form of regulation is through an independent regulatory entity,

contract, decentralized department, or utility, data is key. During the incipient stages of regulation, before a more formalized regulatory arrangement is developed, creating a ring-fenced unit within a ministry or department might be the best or only option. Resources and data capacity building should be provided so that the tasked unit can establish a system to monitor and evaluate service providers and service delivery, and can be the initial foundations for a more substantive regulatory arrangement.

- **As institutions continue to build their capacity,** regulators should focus on improving utility performance through monitoring, benchmarking, and appropriate performance incentives.
- **As institutional capacity and utility performance improve,** regulators can take on additional responsibilities such as accounting for their regulatory base; gradually installing protocols for covering capital expenditures once all operating costs are covered by tariffs; and introducing the development of rigorous business planning, information management, and customer engagement practices.
- **After utilities begin to achieve performance objectives and service standards set out by regulators,** norms and methods to monitor creditworthiness can be established to raise capital through available markets.
- **Finally, regulators can work with multiple stakeholders and may often provide important input into policy discussions.** This includes interfacing with ministries— including the Ministry of Finance in case the transfer of funding and subsidies is needed—as well as with development partners. However, most regulatory objectives and functions imply that regulators must engage with all sector stakeholders at arm’s length, including utilities, consumers, and the government. Through the implementation of citizen engagement mechanisms and the oversight of utility performance, regulators are well positioned to contribute evidence-based recommendations to policy makers. Accordingly, regulators may

sometimes play a role in resolving policy-related issues; at the very least they can provide expert advice and data, without compromising their regulatory decision-making process.

For further guidance, the World Bank's global study, *Aligning Institutions and Incentives for Sustainable WSS Services*, offers analysis and practical insights on the dynamics of reform and underpinnings of how the political economy influences WSS sector policies, institutions, and regulation and, in turn, how they can deliver sustainable outcomes. The study provides actionable guidance that would benefit the design process of reforms.

In addition, practitioners interested in exploring and understanding the current policy, institutional, and regulatory situation in a specific client country may start by employing the Institutional Diagnostic Tool (IDT), developed by the World Bank's Water, Poverty, and Economics Global Solutions Group. IDT may serve as a first step toward understanding the WSS sector of a specific country, including its greater institutional and political context. Other tools and guidelines to consider can be found in the Body of Knowledge on Infrastructure Regulation, an online database of research and best practices for infrastructure policy (Mumssen, Saltiel, and Kingdom 2018).² For example, it offers a self-assessment tool designed to assist

decision makers develop appropriate strategies to reinstate regulatory systems or to improve the effectiveness of regulation.³

This discussion paper is intended to explore the salient issues for regulating the WSS sector in LMICs, learning from the experience of the past two decades. As such it should be seen as complementary to the many documents on the more detailed technical aspects of regulation. The paper also alludes to areas of future work, including deep dive reviews that explore regulation in specific countries or on specific topics. These provide additional lessons and ideas for sector officials who intend to operationalize the next generation of regulatory reforms in their country, and who seek the best fit for their respective context. The topics highlighted include working with informal service providers, regulation and sanitation (non-network services), SOEs and PPPs.

Notes

1. For ease of review, the authors use "LMIC" to refer to all non-OECD countries (or broadly speaking, non-upper-income countries). LMIC in this case captures lower, lower-middle, and middle-income countries to represent the Bank's client countries, unless otherwise stated.
2. The Body of Knowledge on Infrastructure Regulation can be accessed here: <http://regulationbodyofknowledge.org>
3. The self-assessment tool can be accessed here: <http://regulationbodyofknowledge.org/self-assessment-tool/#/home>

Chapter 1: Introduction

Achieving universal access and sustainability in water supply and sanitation (WSS). The Millennium Development Goals (MDGs) resulted in impressive gains in overall access to potable water and to a lesser extent to sanitation facilities globally. An important question arises from this achievement: how can these achievements be sustained and scaled-up? Building on the achievements delivered under the MDGs, the Sustainable Development Goals (SDGs) agenda addresses key challenges of WSS service delivery, going beyond improved access to place a major new emphasis on sustainability. Thus, the transition from the MDGs to SDGs calls for renewed approaches for development of water sector policies, institutional strengthening, and regulation that can deliver universal and sustainable WSS service delivery outcomes through increased efficiency and improved sector financial performance. Key stakeholders, namely service providers, need to be incentivized to deliver improved services over the long term. This involves, among other things, (a) supporting service providers in their efforts to be technically and economically efficient, and (b) strengthening the institutional framework within which the service provider operates accounting for broader political economy factors and aligning incentives for sustainable service delivery. This discussion paper focuses mainly on the latter issue, while separate work undertaken by the World Bank's Water Global Practice (GP) focuses on utility turnaround (World Bank, forthcoming).

Background. There has been increasing attention given to the issues of institutions and the broader enabling environment when it comes to sustainable service delivery in the infrastructure sectors: the World Development Report (WDR) 2017 specifically focuses on this issue. The 2018 World Bank global study *Aligning Institutions and Incentives for Sustainable Water Supply and Sanitation (WSS)*

Services, recently published by the World Bank's Water Global Practice (Mumssen, Saltiel, and Kingdom 2018), responds to this mandate by promoting holistic approaches in shaping WSS sector policies, institutions and regulation by considering the wider political economy and governance framework to incentivize sustainable actions. This discussion paper is a supplement to the global study and provides a deeper dive into one of the important instruments for aligning institutions and incentives: regulation.

Good regulatory practices can determine the prospects for policy success or failure. Studies show strong correlations between regulatory quality and economic growth, better governance quality and higher incomes per capita. (World Bank 2015)

Regulation is defined in this paper, as in the aforementioned global study, as “the sustained and focused control exercised typically by a public agency over activities that are valued by a community” (Selznick 1985, p. 383) and involves the setting of rules and ensuring that those rules are enforced. *Economic regulation* usually refers to the “setting, monitoring, enforcement and change in the allowed tariffs and service standards for utilities” (Groom, Halpern, and Ehrhardt 2006, p. 1). In the context of low- and middle-income countries (LMICs), this definition has often been broadened to encompass social or development goals of access and equity. In this vein, although there is extensive discussion on aspects of economic regulation in the report, this deep dive attempts a broader application, given that regulation in LMICs can have wider objectives and implications. For one, if an effective regulator exists, it can be at the forefront of sector technical knowledge and may result in playing a broader role than anticipated. Further, regulation in LMICs can take many forms, such as through independent agencies, contracts, or self-regulation including by municipalities or the community. Rather than

importing “best practice” models from upper-income countries, experience has emphasized the importance of developing “best fit” regulatory frameworks that are aligned with the policy and institutional frameworks of a LMIC’s WSS sector. The report concludes that, although there are commonly understood criteria that are usually necessary for effective regulation, the final shape and form of regulation in any context will be different: there is not one ladder that is being climbed, nor one ideal regulatory and institutional design at the top of the ladder.

The **objective of this paper** is to provide an overview of the aspects of regulation listed below in order to clarify the relevant background and contextual factors to support practitioners as they consider their own regulatory reform options. This paper does not seek to offer definitive conclusions, rather it provides suggestions on the way forward, along with a phased approach to regulatory reform. Importantly, it sheds light on the issues that warrant further investigation to determine the future of WSS regulation in LMICs.

- **WHY** is regulation important for the water sector, i.e., what are the **objectives**?
- **WHAT types of WSS regulatory structures and arrangements** are being used in LMICs?

- **HOW** are WSS regulators performing their mandated functions, e.g., the **instruments and methods** they are using; coordination with other sector institutions; the experience they have had so far; and how these functions can impact sustainability improvements?
- **WHERE** does the WSS community go from here, including understanding the necessary preconditions to develop appropriate interventions for effective regulation?

To answer these questions, the report begins with a brief overview in chapter 2 on the rationale for regulation and elaborates on some of the traditional regulatory models implemented in OECD (i.e. upper-income) countries and limitations for their applicability in LMICs. Chapter 3 provides a review of key literature on regulation of WSS services, including the objectives of regulation, the different regulatory forms and structures, and the varying tools available to regulators to fulfill the desired objectives. Chapter 4 describes the regulatory arrangements and tools implemented in practice in LMICs. Chapter 5 concludes the report, analyzing the options for effective regulation in LMICs going forward.

Chapter 2: An Overview of Traditional WSS Regulatory Models and Applicability for Low- and Middle-Income Countries

The United Kingdom and Australia established independent authorities for economic regulation in the 1980s and 1990s given the wide-scale privatizations or restructurings that were taking place, while France and Spain have regulated their private utilities through contractual arrangements. In this time, many OECD (i.e. upper-income) countries also strengthened some form of “self-regulation” when services are provided by public entities and municipalities themselves, for example in the United States, Germany, and the Netherlands. Subsequently, in the 1990s and 2000s, there was a wave of “importation” of these models in LMICs, most notably those models used to regulate private sector providers: it was estimated that close to 200 new infrastructure regulators (i.e., not just for WSS) were created in the period of 1996–2006 (Brown, Stern, and Tennenbaum 2006). By 2008, over 130 WSS regulators had been established (Marques 2010). Yet, the context in LMICs was and is quite different than their rich world counterparts where the models were originally developed, for example in terms of access levels, quality of service, data availability, human capacity, and governance. This chapter explores the objectives of regulation more generally and reflects on the applicability of the traditional models and their evolution in the LMIC context. Although the discussion is specific to the WSS sector, some parallels can be drawn between WSS and other infrastructure sectors (including the power and transport sectors) that offer useful insights and lessons regarding regulation, and vice versa.

Definition and rationale for infrastructure regulation. Regulation for the purposes of this report is defined as “the sustained and focused control usually exercised by a public agency over activities that are valued by a community” (Selznick 1985, p. 383) and involves setting rules and ensuring that those rules are enforced.

Economic regulation specifically refers to the “setting, monitoring, enforcement and change in the allowed tariffs and service standards for utilities” (Groom, Halpern, and Ehrhardt 2006, p. 1). In the context of LMICs, this definition has sometimes been broadened to encompass social or development goals of access and equity. In this vein, although there is extensive discussion on aspects of economic regulation in the report, this deep dive attempts a broader application. Regulation is necessary because WSS service providers, especially in urban and peri-urban areas and increasingly even in rural contexts, are natural monopolies, with no competition in the market. As a result, there is little pressure on service providers to maintain service quality, operate efficiently to keep prices down, and serve marginal and less profitable areas. *Natural monopolies* can be described as cases when the competitive running of wires and pipes above or below the ground in duplicate, triplicate, or more would be so obviously inefficient and costly that we “naturally” permit monopolistic supply of such goods with decreasing average costs. In such cases, the lack of market competition cannot prevent monopolistic markup pricing and, thus, regulation becomes necessary (Reagan 1987). In addition to the WSS sector, the power, telecommunications, and railway sectors are all in whole or in part examples of natural monopolies.

Due to the extremely high social and public good value of their outputs, coupled with their natural monopoly characteristics, infrastructure sectors including WSS have long been regulated by governments to protect the public interest. The formal regulation of WSS services became a topic of international interest in the late 1980s when the rising cost of infrastructure required to

serve expanding populations and to protect the environment led policy makers to seek private investment. In the United States, **"rate of return regulation"** had been implemented well before then. Today, rate of return regulation is widely implemented and is used in countries including Canada, Japan, and several European countries.

In the United States, although most utilities are municipally owned, privately owned utilities also serve many communities. Most privately-owned utilities are regulated by state public utility commissions (PUC), which oversee rates and returns, and also enforce measures to achieve financial sustainability and sometimes service-quality standards (Beecher 2016). Under this regulatory regime, the system accounts for operating costs and allows firms to fully recover these costs in addition to a set rate of return on capital invested that is in line with what would have been earned in a competitive market. However, some drawbacks of rate of return regulation that are often cited include: (i) weak incentives to improve efficiency (productivity), as the rate of return is not revised often, and (ii) over-investment from utilities gold-plating and inflating their costs to increase prices and attain additional profits. Regulators are unlikely to have perfect knowledge of cost information, although new assets are required to be "used and useful" if they are to be included in the rate base.

By contrast, state economic regulation is not applicable to most publicly owned systems in the United States. In fact, only a small number of states regulate public systems. Water pricing and financing of public utilities are approved through local government. However, in some states, such as Wisconsin, regulatory oversight is extended to municipal utilities whereby municipal governing boards self-regulate water systems (Beecher 2016).

An alternative regulatory model is performance-based regulation such as **"price cap regulation,"** first introduced in England and Wales, and which is currently

being used in several countries, including some LMICs such as Colombia or Brazil. The British government established a separate independent economic regulator of WSS services at the time of privatization reforms, known as the Water Services Regulation Authority, or Ofwat, which sets a price cap that companies may charge. The primary motive of introducing price cap regulation was to provide incentives to improve productive efficiency. This form of regulation sets a cap or specifies formulas that determine the price that a utility can charge. This forces the monopolist to set a price below the profit maximizing price, thus limiting abusive pricing methods. The cap is set according to a number of economic factors such as expected capital and operational efficiency and price inflation. In the United Kingdom, the conceptual RPI-X formula is widely implemented in which *RPI* (retail price index) is the rate of inflation and *X* is a set figure of the expected efficiency gains the regulator believes would exist in competitive market conditions. If the utility exceeds efficiency assumptions incorporated into the calculation of the price cap, it is able to retain the additional profits as a reward until the next tariff review. In addition to price caps, revenue caps can also be imposed on revenues. For example, the Scottish WSS regulator, The Water Industry Commission for Scotland (WICS), implements revenue cap regulation to set the prices of Scottish Water, the national SOE for WSS.

Some critiques of the price cap system include the extensive data required as well as the incentives for investment (that wane) at the end of a given cycle. Further, in the case of the UK, there has been criticism on whether Ofwat and the price cap mechanism have kept private sector profits actually in check while encouraging sufficient efficiencies, or whether regulation has been too lenient (e.g., allowing too high a weighted average cost of capital) (Ford and Plimmer 2018). An additional feature of the Ofwat regulatory model is the use of **"yardstick competition"** whereby the performance of a private utility operating in one

area is compared with the performance of others, setting benchmarks and expectations, as part of the tariff setting process. This structure has incentivized the privatized utilities to improve service quality, operational efficiency, and capital efficiency over time (Mumssen and Triche 2017).

The French regulatory model provides an alternative whereby services are **regulated by contract** between the local government and the entity responsible for service delivery. Service delivery responsibilities are often delegated to private companies through management contracts, affermage or lease contracts, or concessions that are subject to European Union (EU) regulations and French law. France implements civil law and accordingly much of the regulatory details are embedded in national laws and regulations; therefore, contracts are not as detailed. Contrastingly, in countries that implement common law, contracts must include a greater amount of detail in order to serve as a basis for effective regulation by contract. Contracts may specify the tariff levels, tariff structure, formulas for periodic adjustment of tariffs, and performance targets and service quality that are monitored and enforced by local government. The main enforcement mechanisms of regulation by contract are termination

and nonrenewal (Mumssen and Triche 2017), along with the clauses that allow for the renegotiation and restoring the economic and financial equilibrium of the contract. **Table 2.1** summarizes the regulatory models described herein.

Independent economic regulation proved to play a determining role within the broader reform package implemented in 1994 to revolutionize Australia’s urban WSS sector. States or territories established independent regulators to depoliticize price setting mechanisms and enforce organizational incentive structures critical to improve sustainable WSS services. Contrary to the experiences of the United Kingdom and United States, regulation in Australia was introduced to oversee corporatized public utilities as opposed to private businesses. **Box 2.1** showcases the regulatory model implemented in New South Wales: the first state to establish independent economic regulation, preceding the national reforms. Although performance-based mechanisms are now used to regulate state-owned enterprises (SOEs), it is important to note that originally, rate of return regulation was used, until it was felt stronger performance incentives were appropriate to further incentivize efficiency gains (Salisbury, Head, and Groom 2017).

TABLE 2.1. Traditional Regulatory Models in Selected OECD Countries

Elements of regulatory model	United States	United Kingdom	France
Regulator	Multisector, state-level PUC regulates majority of privately owned utilities. Total number of commission-regulated water utilities is approximately 7,700. This includes about 3,300 private utilities and 1,800 municipal utilities. The majority of public utilities implement self-regulation.	Non-ministerial government department: Ofwat	No national and regional regulators

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TABLE 2.1. continued

Elements of regulatory model	United States	United Kingdom	France
Utility ownership	Only investor-owned utilities (serving approximately 23% of the total population) are regulated. Majority of the remaining government-owned utilities do not fall under a formal economic regulator.	18 regional privatized utilities	Public authority is the owner and regulation by contract is widely implemented between local government and a private company or concessionaire. Enactment of the Sapin Law led to imposition of a maximum duration for concession contracts. This influenced the decline in the number of concessions and increased use of affermage contracts. As of 2016, 60% of the French population received services from private operators.
Financing policy	Services funded entirely by customers and private investors for investor owned utilities.	Services funded entirely by customers through tariffs and private investors.	Local government is responsible for investments either directly or through contract.
Tariff setting	Rate of return regulation: Generally, tariffs reflect full costs of service delivery and ensure long-term financial viability of utilities. Estimations of WACC are critical to the process of rate-making.	Price cap regulation: Maximum prices are set by Ofwat based on estimates of efficient total expenditure, and risk and return assumptions. Costs of financing are calculated to estimate the returns required by investors ("building block approach"). Estimation of the WACC is key to determining returns. Interestingly, Ofwat is the first U.K. regulator to adopt a negative real risk-free rate to estimate capital costs for the 2019 price review (PR19).	Full cost recovery of operations and investments.
Licensing	Yes	Yes	No
Performance setting and monitoring	PUCs ensure safe, adequate, and reasonable services and evaluate utility performance.	Ofwat measures KPIs across four areas: customer experience; service reliability and availability; environmental impact; and financial. Companies must submit annual performance reports. Incentivizing efficiency savings: utilities keep difference between Ofwat's price limit and actual costs. Ofwat sets efficiency targets on the basis of expenditures, giving companies more responsibility to manage costs and risks. Benchmarking to compare relative efficiency of utilities. The PR19 methodology requires companies to agree on PCs and ODI with their customers. Ofwat has stipulated that companies must require financial ODIs by default.	Services are subject to EU water quality regulations and French laws regarding procurement, technical standards, and water abstraction and effluents. The EU and national entities enforce these rules.

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TABLE 2.1. continued

Elements of regulatory model	United States	United Kingdom	France
Competition	Control market entry and exit; approval of mergers and acquisitions.	Water Act of 2014 extends retail competition to all non-household customers, and provides for possible future competition in wholesale markets. The regulatory regime uses "yardstick" (comparative) competition when assessing utility performance.	Competition exists for the market when PPPs are periodically tendered/retendered. Market competition increased after introduction of the Sapin Law as a result of decreased contract durations.
Consumer protection	PUCs are responsible for responding to consumer complaints and provide utility-related information to consumers. Rate setting process for private utilities is quasi-judicial and is participatory in that it allows for consumers and other stakeholders to weigh in during the proceedings.	As part of the 2014 price review, water companies were required to establish independent CCGs to review quality and effectiveness of consumer engagement and how companies reflected this in business plans. CCGs comprise customers and their representatives, local authorities, businesses, and environmental groups. CCGs provide independent reports to Ofwat regarding consumer engagement performance. Additionally, the SIM compares company performance in customer satisfaction. Companies receive rewards/penalties accordingly.	Water mediator was established in 2009 by the Association of French Mayors, the Assembly of Communities in France, and water companies with the primary responsibility of improving services offered to consumers and mediating disputes. The Audit Office (Cour des Comptes) has also an important role of watchdog.

Note: CCG = customer challenge group; EU = European Union; KPI = key performance indicator; ODI = outcome delivery incentive; PC = performance commitment; PPP = public-private partnership; PUC = public utility commission; SIM = service incentive mechanism; WACC = weighted average cost of capital.

BOX 2.1. Approach to Water Sector Regulation in New South Wales

The Independent Pricing and Regulatory Tribunal (IPART) was established in New South Wales under its own act: the IPART Act of 1992. IPART's focus was on the regulation of prices of government businesses, which contrasts with the regulatory environment overseas at that time. The New South Wales government did not link independent price setting to privatization. Rather, it sought to remove the abuse of monopoly power and provide incentives for price reform and efficiency. Note that in the Australian states and territories, by its National Competition Policy all the monopolies industries must be regulated by independent regulatory authorities.

The IPART Act sets out a number of objectives that the tribunal must consider in determining prices. IPART's role in the economic regulation of water is largely constrained to the regulation of prices. While IPART monitors license compliance and advises on license conditions, it does not set drinking water standards, environmental standards, social tariffs, or handle consumer complaints.

Consistent with efficient pricing principles, IPART uses a two-part tariff (fixed and usage charges) to charge for water. IPART sets maximum prices consistent with the determined annual revenue requirement based on the long-run marginal cost of supply for each of the metropolitan water agencies it regulates. Once the regulated revenues are determined, prices are set in accordance with the designated approach so that, for the forecast

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BOX 2.1. continued

customer numbers and volumes of water and wastewater, expected revenues equal the annual revenue requirement (ARR).^a In addition to usage charges, all properties pay a quarterly service charge, which is levied to recover the agency's remaining revenue requirement.

Periodic charges reflect the average cost of supply and are uniform throughout each agency's area of operation. This is known as postage stamp pricing. The use of postage stamp pricing for periodic water services results in prices that do not signal the diversity in costs of providing these services to different locations. Over time, water prices have become more cost reflective to provide better signals to consumers and a better basis for funding services. Consumption charging is now the rule for urban water. Cross-subsidies between different types of users have largely been eliminated, and the prices of water and related services now better reflect the costs of those services.

Source: Salisbury, Head, and Groom 2017.

a. Annual revenue requirement (ARR) = operating expenses (OPEX) + depreciation + return on assets (ROA)

WSS reforms implemented in LMICs have in the past often been influenced by public sector reform trends in upper-income countries. During the 1960s and 1970s public policy regarding infrastructure sectors largely focused on building up technical capacity. This transitioned in the 1990s to articulating “best practices” amid the Washington consensus embrace of open markets. There was a tendency to believe that regulatory models such as the Ofwat model or the French model of regulation by contract could be transported to other contexts. Some countries even coined the term “hybrid regulation models” whereby they established a general regulatory framework at the same time as specific concession contracts for some utilities creating, in some cases, overlaps and contradicting rules.¹ Thus, many LMICs set up sector regulators—in collaboration with donors—and there was an initial reliance on cost plus methods followed by a rush to institute price or revenue cap mechanisms as the trend toward incentive based regulation had swept the OECD water markets where the objective was to improve capital and operational efficiency and to improve service quality, having already achieved universal access.

However, many water utilities in LMICs did not have the capacity to respond to the complexity of such regulatory incentive mechanisms. For example, application of the Ofwat model failed due to constraints including limited institutional capacity, lack of scale, poor baseline data, and a history of inability or unwillingness of customers to pay the full cost of WSS services. Moreover, incentive-based mechanisms assumed a level of cost information that was not available in LMICs. Despite this, it should be noted that the U.K. regulatory model contributed to highlighting the relevance of regulation as an instrument to promote sustainable WSS services and to mitigate the shortcomings of contracts when they exist.

For regulation to be effective in LMICs, any imported model must be adapted to the local institutional and political context, otherwise governments may merely create the illusion of reform rather than implementing change de facto. This is often described as *isomorphic mimicry*, referring to when governments suggest reform but do not necessarily implement it, for example, by changing what policies or organizations look like rather than their actual functions. Regulatory models grew organically in

OECD countries and represented a social contracting process—such as the utility consensus of the United States—that involved a bargaining process (through legislation, lobbying, etc.) allowing for all affected parties to weigh in directly or indirectly. Furthermore, regulation was introduced given required preconditions for successful implementation including solid institutional capacity; institutional trust; availability of quality data; and effective law or incentive enforcement, among other necessary policy and institutional factors. Formal institutions, such as well-defined property rights and a formal system of contract and corporate law, created predictability and stability for investors (Barron 2005). Consequentially, the extent of private sector participation (PSP) and public-private partnerships (PPPs), shareholder pressure, public access to performance data, and the enforcement of regulatory mechanisms, including penalties, all strengthen responsiveness to regulatory pressures when compared to those that might exist in public sector utilities.

By contrast, in LMICs the motivation was often restructuring of the sector with a view to future PPPs and implementing regulatory functions with the purpose of regulating the private operator. Regulatory models were transported without adequately articulating the institutional and political economy preconditions necessary for effective regulation within the given country context. In LMICs, legal and administrative institutions are less developed, with weak enforcement, transparency, and accountability, and where local history, customs, and traditions can play a significant role in determining reform outcomes. Heavy contrasts can be drawn between the legal and political systems of upper-income countries and LMICs. Whereas upper-income countries benefit from principles that support social

and political pluralism, LMICs often do not; thus, in many cases routes of accountability between the state and its citizens are weak (Barron 2005). Only if citizens are empowered to voice their concerns would there be any pressure for improved performance.

Due to distinguishing policy and institutional factors, regulatory models in LMICs tend to be geared toward achieving different objectives than their wealthier counterparts.

Whereas upper-income countries are focused on enhancing productive efficiency of service providers and ensuring that efficiency gains are attained as a means of sustaining affordability and quality of service (see **Table 2.1**), the needs and objectives of WSS in most LMICs are quite different. In the WSS sector in LMICs, SOEs, municipally or community run services are the norm; the needs and objectives of the sector are more focused on access and equity; the starting point is more challenging, with substandard or inappropriate physical infrastructure and limited focus on operations and maintenance (O&M); technical capacity of key stakeholders to undertake effective regulation is relatively weak; financial needs are high yet resources are extremely limited; customer and citizen voice is sometimes muted; and the political economy including the institutional context is problematic. Effective regulation in a LMIC context should be structured in form and content to meet these realities, and expectations and achievements must be tempered to fit this reality.

Note

1. An example of this situation is the concession of WSS services in Buenos Aires in which conflicting requirements between the regulatory framework and the concession contract generated a series of controversies between the government and the concessionaire that contributed to undermining the reputation of the reforms.

Chapter 3: Regulation in Low- and Middle-Income Countries: View from Key Literature

The literature on WSS regulation in LMICs has grown rapidly in the past few decades. It spans roughly four categories. First, there is a body of literature on what is regulation in LMICs, i.e., the objectives. Second, there is a relatively small amount of work describing how WSS regulation is organized in LMICs.¹ Third—and this is where the bulk of the work is so far—there is a range of assessments of regulatory functions, such as tariff setting, standardization of quality of services, consumer engagement, and so forth. Finally, the literature touches on the different political economy and institutional factors that impact effectiveness of regulatory frameworks and underscores the importance of designing regulatory frameworks within broader institutional contexts. The second and third categories contain both positive (“what is”) assessments as well as normative (“what should be”) recommendations for WSS regulation. Although the purpose of this chapter is to provide an overview of literature specific to the WSS sector, many of the regulatory themes discussed here reveal themselves in other infrastructure sectors, albeit in ways unique to the defining features of the sector in question. Perhaps most important is the discussion on the design of “best fit” regulatory interventions, which is a common challenge that features across all sectors. It is noted that the knowledge base is limited, and there exists no quantitative assessment of WSS regulators and regulatory arrangements by country with sufficient detail on regulatory outcomes and effectiveness.²

Developing economies are often described as “economies with missing markets.” In the contractual world of regulation, missing markets translate in to incomplete contracts. Contracts are incomplete because of players’ bounded rationality, as in any economy—but also because of institutional weaknesses. (Laffont 2005, p. 245)

3.1 Regulatory Objectives

While regulation in upper-income countries focuses mostly (but not exclusively) on the incentives and value for money provided by regulation of WSS service providers, regulation in LMICs has a broader set of objectives, which include social and related objectives. While efficiency and cost minimization are in the main line of sight of regulators in upper-income countries, access and equity are at the forefront, in the context of tremendous need, while operating in more constrained financial, technical, human capacity, and political economy environments. **But it is important to note here that regulation will only help define the mechanisms to incentivize service providers, users, and other key stakeholders in the sector; it is the role of sector policy to determine what the objectives are and shape what type of regulation will ultimately be needed.**

Yet, despite obvious differences between upper-income countries and LMIC WSS sector contexts, some high-level objectives are fairly consistent with regards to the desirable features for effective infrastructure regulation:

- **Cost-effectiveness:** the cost of regulation should not exceed its benefits or be burdensome on the regulatory agency or on the service providers regulated (Shugart and Alexander 2009).
- **Transparency:** allowing for regulatory decisions to be made public supports the building of institutional trust within the system, enhanced stakeholder engagement and accountability (Mumssen and Triche 2017). Berg (2013a) also underscores the importance of transparency. His extensive review of regulation of SOEs finds that well-performing institutions make information available and that access to benchmarking information creates foundations

for improved governance, performance evaluation, and the creation of effective incentives. According to a survey conducted by the Organization for Economic Cooperation and Development (OECD) in 2015, by promoting transparency, regulators are also expected to share regulatory expertise with the public sector, thus highlighting policy coherence and coordination, continuity, predictability, and credibility of decision making (OECD 2015).

- **Predictability:** rules and operational standards are adequately clarified and are reliably enforced without arbitrary and frequent changes made to them without prior consultation among relevant stakeholders (Mumssen and Triche 2017). Related to predictability, some degree of consistency is also important, yet while noting that different contexts and situations require some flexibility. Balancing consistency and flexibility may be a challenge for effective regulation.
- **Fairness:** regulatory rules and decisions balance the interests of the consumers, the service providers, and remaining stakeholders, ensuring the sustainability of the water services (Shugart and Alexander 2009).
- **Independence, or “decisional autonomy”:** some degree of insulation of regulator decisions from political influence motivated by short-term gains or other special interests helps to ensure that regulation is enforced in favor of achieving priorities articulated in sector policies. Independence of regulators depends on the country context. It is also important to note that there are successful experiences of regulation implemented by political entities that are well bound by a strong legal framework (Berg 2013a).
- **Designing regulatory incentives aligned with the political economy:** the political economy has a significant impact on the success or otherwise of regulatory reform efforts. There are no one-size-fits-all solutions, and to produce positive and sustainable service delivery outcomes, regulatory incentives must be tailored to local circumstances and must consider

political economy realities (Mumssen, Saltiel, and Kingdom 2018).

- **Consultation and inclusion:** to build confidence in the regulatory framework and ensure its effectiveness, regulators should regularly consult with stakeholders (Mumssen and Triche 2017). Stakeholder participation can support the exchange of ideas necessary to identify win-win solutions and achieve consensus among sector actors (Berg 2013a).

The literature finds that operational divergences between different ownership structures (i.e., public and private utilities) necessitate different regulatory initiatives in order to achieve the said objectives. USAID³ (2012) highlights the key factor that differentiates private utilities from publicly owned utilities:

When a regulator regulates a privately-owned utility, [the] main concern of the shareholders is their return on equity, their free cash flow and their dividends. Under rate of return regulation ..., the regulator has a benchmark ... [return on equity] that they will build into the revenue requirement and tariff order. Under incentive-based regulation, ... the regulator also sets a framework for allowed equity return. In either case, the shareholders are very interested in their equity returns. (USAID 2012)

With respect to privately owned utilities, importance is given to the role of capital markets in incentivizing performance improvements. Shareholders appoint a board responsible for oversight, and the board has authority to provide financial incentives through bonuses for improved performance; determine salaries; and to appoint and fire management. Investors are crucial to the profitability and sustainability of private utilities and monitor managerial decisions as well as the regulatory climate. They care for earning an adequate return on investment. Thus, utilities are incentivized to improve efficiency of operations through cost containment, delivering demanded quality improvements and network expansions (Berg 2013b). The most recent proposals by Ofwat for its price

reviews demonstrate the increased emphasis placed on return on equity as a lever to incentivize improved performance. Specifically, Ofwat is revisiting its estimated weighted average cost of capital (WACC) for the utilities: there has been criticism that Ofwat in the past has allowed too high a WACC given the prevailing market rates, therefore placing insufficient pressure on the companies for significant performance improvements (Ford and Plimmer 2018).

Typically, private utilities are regulated to control the monopoly nature of the enterprise. But most WSS service providers in [LMICs] are government owned. Many ask “why regulate what you own?” Governments can regulate utilities that are ministries or departments through governance mechanisms such as a board or more arm’s-length through an independent regulator/body who set and monitor tariffs and service standards. Though the overall global experience has been varied and not fully recorded and analyzed, it is reasonable to say that on balance the arm’s-length regulation of public service providers yields better sector performance than left to the devices of the line ministry to achieve solely through the fiat of ownership. (Berg 2013a)

For SOEs, especially if not corporatized, return on equity, dividends, and bonuses are not a priority nor are they feasible in many cases. Financial sustainability is balanced with stated social and unstated political objectives (Berg 2013a; Eisendrath 2012). Berg (2013a) argues that utility management should develop realistic business plans and implement actions with transparency in order to measure targets and benchmark performance. In addition, incentive mechanisms must be tailored to SOEs. As Berg explains, a study implemented on electricity distribution firms in Ukraine finds that private and public utilities respond very differently to the same incentives. Where cost-plus regulation was adopted, private utilities inflated their costs of service but also significantly reduced losses compared to SOEs, which were more concerned with the political costs of reducing losses than increasing

profits (Berg 2013a). These challenges are even greater when services are provided (and often regulated by) municipalities themselves.

PPPs allow governments to provide public services using the resources and expertise of the private sector but come with a different set of considerations for regulation. Typically, PPPs entail enforcement of a long-term contract between a private entity and the government for the provision of WSS services. The private entity is responsible for asset management and service delivery and can be compensated directly through tariffs, or other payments, based on performance.⁴ A World Bank study on PPPs for urban water utilities (Marin 2009) notes that out of the 65 LMICs that implemented PPPs since the 90s, at least 41 still had private water operators functioning by the end of 2007, and 84 percent of awarded contracts were still active (Marin 2009). However, 24 countries had reverted to public management of service provision and several contracts were terminated. Failures in contractual arrangements can be attributed to some of the following institutional weaknesses: government’s fiscal inefficiency or the ability to collect revenue when there are direct subsidies in place; accountability of key actors for meeting their obligations (related to information flow or management between actors leading to underperformance); credibility or political will of the government to enforce contractual commitments; and technical and legal capacity of state actors to supervise performance and actions of service providers (Estache and Wren-Lewis 2010). One study notes that between 1990 and 2010, over 90 percent of water PPP contracts were renegotiated, mostly to hedge against the institutional risks that were discovered after the contract was entered into (Camos and Estache 2017).

The objectives and nature of infrastructure regulation are not only shaped by the institutional and ownership arrangements but also by the significant financial, technical, and political economy constraints common to LMIC contexts. Berg (2013b) elaborates on the implications of LMIC and upper-income country settings on

the challenges for regulating WSS services. He explains that in the case of regulating private companies in upper-income countries, the main challenge is availability of reliable cost information with which to set performance, efficiency, and tariff targets, among others. However, the challenge of regulating public WSS service providers in LMICs is much greater. As often, the roles of the sector players are not clarified in governing laws and rules, or they are overlapping in some cases. Even if roles are clear, restricted autonomy reduces incentives for compliance by service providers (Berg 2013a). Add to that, modest regulatory capacity in many countries has resulted in an overall limited expression of the regulatory potential. Similarly, the OECD (2016b) identifies a number of water-related governance gaps that place additional constraints on effective regulation in LMICs:

- **Policy gap:** overlapping, unclear allocation of roles and responsibilities.
- **Administrative gap:** mismatch between hydrological and administrative boundaries, with implications for long-term sustainability of service providers.
- **Information gap:** asymmetries of information between central and subnational governments, and between service providers and governments, and consumers. The most significant information gap is in terms of costs, which results from a failure to implement cost accounting measures (Camos and Estache 2017).
- **Capacity gap:** lack of technical capacity, staff, time, knowledge, and infrastructure.
- **Funding gap:** unpredictable or insufficient revenues to effectively implement water services policies, and to invest and operate infrastructure.
- **Objective gap:** competition, and lack of coordination, between different ministries.
- **Accountability gap:** lack of awareness about water service policy, plus low involvement of water users' organizations, in which lack of data and participation limit ability of affected groups to raise concerns in public forums.

Finally, within the context of integrated water resources management, the literature notes that objectives specific to WSS regulation can also support broader water-related objectives associated with water resources management (WRM) as outlined in **Box 3.1**.

3.2 Regulatory Forms

The literature agrees that regulatory forms and governance structures are crucial determinants of performance (Berg 2013a). Different approaches of implementing regulatory interventions are described throughout various studies and reports. The most commonly discussed regulatory approaches are: (a) regulation by agency, in which different governance structures of agencies exist; and (b) regulation by contract.

Regulation by Agency

Regulation by agency is an approach in which a regulatory body is given discretionary powers by government to control tariffs and service standards, subject to the existing laws and the regulatory body's mandate.

"Independence" is often one objective sought through regulation by agency, although it is by no means a guarantee of independence. A sample of 123 LMICs finds that around 45 percent have adopted this regulatory approach in the water sector (Bertomeu-Sanchez et al. 2017), while 28 percent of 100 LMICs sampled in 2015 had an independent regulatory agency in the power sector (Foster et al. 2017).

However, although a regulator may be "independent" de jure, in many LMICs, independence may not translate de facto into the ability to make many critical decisions, for example, with regard to tariff levels. Political interference can induce suboptimal performance due to features that commonly characterize governments, which include policy inconsistencies; information asymmetries; politicization of decisions; unclear priorities; and a lack of participatory approaches and transparency in decision making.

BOX 3.1. Link between WSS Regulation and WRM

WRM aims to secure the sustainability and quality of water resources and manage water shortages. Thus, the linkages between WSS regulation and WRM are clear. Effective WSS regulation incentivizes efficient water consumption and therefore protects water resources. Tariffs and other funding sources that reflect the true costs of collecting, treating, and disposing of wastewater make it possible for service providers to meet effluent standards and safeguard water quality.

Whereas WSS regulation is often concerned with safeguarding public interests against monopolistic behavior, WRM is mostly concerned with externalities: indirect costs imposed on users by overuse of resources or environmental damage. Correcting for externalities requires the use of different regulatory tools, and this makes WRM regulation distinct from WSS regulation. In addition, WRM applies to all users of water resources, including agriculture, industry, navigation, hydroelectricity, and recreation—in addition to WSS. Developing a deeper understanding of the linkages between WSS regulation and WRM is an important area for further work, particularly for water scarce regions where countries are caught between improving access and service delivery at affordable levels and rapidly dwindling water resources that are becoming ever more costly to access.

Source: Mumssen and Triche 2017.

One of the particular benefits of independent regulators as described in the literature is minimizing political interferences that can prioritize equity objectives at the cost of efficiency and performance objectives. Yet, as Berg (2013a) and Mumssen, Saltiel, and Kingdom (2018) caution, this does not negate the fact that the broader institutional and political economy factors that constitute the enabling environment within which regulators operate are part and parcel to the success of implementing regulatory incentives.

Regulation by Contract

Regulation by contract is the approach whereby a public entity and a service provider agree on contractual clauses that determine how tariffs and service standards are controlled. Under regulation by contract, an oversight institution may be responsible for monitoring performance and making regulatory decisions. The role of these entities can encompass, among others, addressing conflict management conveniently; protecting and handling the complaints of customers and users; protecting the public interest in the unavoidable renegotiations; defending fair play and the contract in

the long run; and allowing for better, simpler, and more transparent contracts (Marques, forthcoming). However, the mandate of these institutions should be governed by the contract and should be altered only by agreement of both parties. Further, a country need not be limited to choosing either the French (contract) or the Anglo-American (agency) model of regulation, hybrid regulatory arrangements have also been used (Brown, Stern, and Tenenbaum 2006).

Self-Regulation

An additional regulatory regime, which is unfortunately not discussed as often in the literature and is possibly one of the most prevalent forms in LMICs, is “self-regulation.” In some cases, this may mean the publicly owned utility—which could be the same as the municipality (or the community)—that provides WSS services and performs all regulatory activities, including setting tariffs and performance standards and carrying out performance monitoring. This form of regulatory regime also exists in upper-income countries, but often, in the absence of a regulator, there is usually a level of reporting and customer awareness

that places pressure on the utility to perform. In the United States, the utility is held accountable to a third party such as the board of directors, the financial markets, or a city council. In France, which has a degree of self-regulation when services are municipally run, sunshine regulation has recently been introduced whereby a national agency has been tasked to collect performance data for monitoring and evaluation purposes, placing a de facto “check” on service performance (Salveti 2014). Another case of self-regulation is in the Netherlands in which Vewin, the association of water utilities that defines rules and standards for all Dutch water utilities, is responsible for the excellent level of performance of the water sector; a system of naming and shaming and competition across the utilities often ensues to help improve performance. Unfortunately, in LMICs, self-regulation often means minimal or no regulation, if anything, because of limited resources and capacity. There are some examples, such as in the Philippines and local government utility service providers. Examples of self-regulation in LMICs are provided in further detail in chapter 4.

Municipal Regulation

Municipal “regulation,” or oversight, when there is some degree of ring-fencing between local WSS service provision and the municipality, is an alternative model of regulation by agency and offers a different set of benefits in terms of improved sector coordination and planning activities of utilities. Because local government is responsible for zoning, density of development, and rights of way, which all affect utility costs, Berg (2013a) explains that it may be more appropriate to allow for municipal governments to regulate utilities. Municipal regulation may also allow for jurisdictional consistency, whereby that which bears legal responsibility for service provision (i.e., the municipal government) is also in charge of regulating it and enforcing compliance with the rules. There are a variety of ways this regulation, or oversight, is often undertaken. In certain cases, such as in Brazil and Ecuador, there are municipal regulatory agencies in

which separate bodies exist that have regulatory functions. In other cases, the WSS utility is separated from the municipality (e.g., a corporatized or nonmunicipal water company), and there may be a contract or statutes between the municipal company and the municipalities in which the duties and rights are established. The municipality supervises and checks the contract and the performance of the company and can approve the tariffs, the budget, and accounts report. And there may be cases where there is no real arm’s-length separation between the municipality and the service provider, which can be even more problematic in terms of even basic oversight.

Regardless of the exact structure of municipal regulation (or oversight), as noted by Berg (2013a), there are common challenges with local regulatory frameworks that include the lack of expertise to address information asymmetries between the regulatory agency and the service providers, and the level of transparency required to adequately promote citizen engagement initiatives. This challenge is particularly exacerbated when it comes to carrying out performance comparisons because national data collection is required, yet the fragmented nature of municipal regulation means that it is often not available (see French example mentioned previously). Further, in the absence of complete transparency and accountability mechanisms, inter-governmental regulatory mechanisms may prove to be counterintuitive in the context of utility operations (Berg 2013a). Groom, Halpern, and Ehrhardt (2006) further elaborate on the problematic implications of these political factors on service delivery, which could be exacerbated at the municipal level:

- **Selective representation** of customer needs in which poorer, rural areas are marginalized
- **Promotion of short-term political objectives** (e.g., below-cost recovery tariffs)
- **Capture of WSS service providers** for personal and political gains whereby service provider managers act in the interest of powerful stakeholders other than their customers

TABLE 3.1. Range of WSS Regulatory Frameworks in Low- and Middle-Income Countries

Regulatory frameworks	Description
Sector-specific national or state regulator	<p>WSS regulator mandated to oversee private and public service providers. Roles and responsibilities may include issuing licenses, setting and monitoring performance standards, setting tariffs, consumer protection, performing audits and evaluating business plans, capacity building, and regular reporting to government authorities. Sector-specific regulators operate across a vast number of countries, including Colombia, Egypt, Mozambique, and Peru.</p> <p>In large federal countries where WSS services and regulation are at the state level, the national regulatory model outlined above can be replicated at the state level.</p>
Multisector regulator	<p>Multisector regulation provides scale economies, consistent regulatory processes, and knowledge exchange between different sectors. Although the multisector regulator might avoid regulatory capture by a specific sector; certain sectors may not receive sufficient attention. Ghana has an established multisector regulator responsible for oversight of energy and water sectors. Tanzania, Angola and Cape Verde have similar regulators, with varying degrees of success. In Brazil, 14 states have established multisector public services regulators which include, besides the water sector, also the transportation and energy sectors.</p>
Self-regulation at the municipal level	<p>This takes many forms but essentially the public entity providing the service (municipal department, agency, corporation) is overseen by the municipal, council, or a designated governing board. In some cases, a municipally owned ring-fenced corporation is responsible for service delivery, and oversight is carried out by the board of directors. The board represents the municipality and has the power to approve tariffs. Managerial authority is delegated to the CEO of the utility, and oversight is undertaken by a municipal governing board. Cambodia offers an example of self-regulation whereby policy making, service delivery, and regulatory functions are implemented by the PPWSA.</p>
Department of government	<p>Traditional form of WSS regulation through the same ministry (or Secretary of State) that develops policy and operates water systems.</p>
Regulation by contract	<p>Performance contracts between the government and a private entity responsible for O&M of the WSS facilities. Monitoring entity performs functions similar to that of a regulator, although with significantly less professional support staff and discretion. Burkina Faso implements a performance contract arrangement between the service provider and the government. The contract specifies performance targets such as expansion of services to informal areas.</p>

Note: EWURA = Energy and Water Utilities Regulatory Authority; O&M = operations and maintenance; PPWSA = Phnom Penh Water Supply Authority; WSS = water supply and sanitation.

Table 3.1 provides a summary of the range of WSS regulatory arrangements discussed in the literature (Berg 2013a). It is understood that this list is not exhaustive, and that there may be some hybrid models that capture more than one element in the table.

Berg (2013a) cites several predominant elements of importance regarding the different regulatory framework options. These include how information is made available; how incentives are implemented effectively; and performance evaluation. The literature also identifies a number of factors to aid evaluation of a regulatory agency including (a) how the regulatory authority or responsibilities are mandated or

described; (b) type of governing body and whether it is separate from political and business interests; (c) level of autonomy of regulatory agency; (d) enforcement powers of the regulatory agency (e.g., authority to collect data, enforcement of standard accounting procedures for utilities, enforcement of fines and sanctions); (e) appointment and compensation process of staff; (f) level of financial autonomy; and (g) decision-making processes (Mustafa 2002).

The literature supports the implementation of evidence-based approaches in regulatory decisions to deliver successful outcomes that would contribute to the sustainability of services. One particular method

by which regulatory performance can be assessed is through regulatory impact analysis (RIA). The OECD defines *RIA* as the “systematic approach to critically assessing the impact of proposed and existing regulations.” A wide range of methods and tools to implement RIA and measure regulatory impact of newly introduced regulatory interventions are available (OECD 2005; Rodrigo 2005). The OECD and Public Utility Research Center (PURC) provide valuable sources to guide implementation of RIA as well as best practices from LMICs.

In addition, regulators may look to improve their performance by seeking external audits and using international standards for guidance. An example of external audits is the ISO 9001 audit for quality management systems, which assesses a range of governance elements of management systems, including but not limited to human capacity, customer communication (including complaint handling mechanisms and feedback), internal audit process, process evaluation, resources, and organizational knowledge. Upon successful completion of the assessment, the regulator could attain the ISO 9001 certification as an internationally recognized standard of quality management. Currently, there is little literature and experience available in the use of external audits to improve performance of regulators in LMICs.

Regulatory forms should be aligned with available or realistically attainable human resources capacity in the country. Berg (2013a) discusses a number of important human resources policies and requirements that should be made available to regulators to deliver results. For instance, recruitment and staff training could be part of regular managerial responsibilities. In addition, compensation policy needs to be flexible enough to recruit able staff and retain the expertise developed. Also, attention needs to be given to encourage professionalization and promote sustainability including nomination procedures and measures to avoid political appointments. Capacity building is crucial for the long-term sustainability of the agency. The funding of the

regulator is a key determinant of resources available for recruitment, capacity building, and staff retention. Depending on the law, regulators could obtain funds from a surcharge on utility bills; however, the central government may have the authority to allocate money from the public budget. Cases in which the regulator relies on public funding could compromise the regulators independent authority (Berg 2013a).

3.3 Regulatory Functions

The OECD report on *The Governance of Water Regulators* (2015) surveys 34 different entities responsible for regulation of WSS services and has developed a comprehensive typology of regulatory functions that comprise 19 different functions, the majority of which are also applicable in other infrastructure sectors. These are broadly categorized as the following:

- **Tariff setting**, an important task of the WSS regulator whether in a private or public operator setting
- **Monitoring service and performance standards**, an important objective that impacts both service delivery as well as long-term sustainability
- **Enhancing governance of the sector**, including transparency and accountability of key stakeholders (in particular the service provider) and promoting customer voice, which are additional important functions for any regulatory framework
- **Increasing access and equity** through pro-poor regulation
- **The fit of regulation within the broader enabling environment**, including legal and institutional framework

In addition, regulation can entail WRM, environmental matters and related drinking water quality standards (see **Box 3.2**). We do not discuss these areas in detail but do point to their importance and interrelatedness. And as explained previously in terms of regulatory form, the relevant functions and content will ultimately be completely dependent on the available or realistically attainable capacity.

Improving Financial Sustainability

If adequately equipped, regulators could play a major role in availing the financial resources necessary to achieve the policy goals set by the sector as well as verifying that those goals have been achieved effectively. Tariff setting (including tariff structures and levels) could be a potentially powerful tool in successfully achieving various policies and objectives. Regulators may be authorized to apply a particular methodology to set tariffs, or they may be given discretion in determining them. Ideally, tariff levels are determined based on the revenues required to achieve financial sustainability assuming some level of operational efficiency, investment program, and financing arrangements. The tariff structure refers to the design of the rates to allow for cost recovery of prudently incurred costs, incentivize efficient water consumption, and promote equity. Different approaches to rate setting and designing tariff structures are used to achieve financial sustainability while also promoting a multitude of sector policies, including demand management, universal access, and pro-poor approaches. To the extent possible, the following discussion separates the discussion between rate setting, which focuses on overall cost recovery and financial sustainability, from tariff structures (e.g. increasing blocks, lifelines), which can have redistributive or other policy implications, with the latter discussed in more detail in the subsection discussing pro-poor and non-network services regulation.

Incentive regulation uses rewards and penalties to motivate behavior that improves service provider performance and ultimately sustainable management of services. Mechanisms include price setting regimes with built-in incentives; efficiency reviews that evaluate controllable costs; benchmarking performance; and the setting of performance targets. Additionally, command and control regulation can be used, whereby the regulator incentivizes service providers to implement specific actions through monitoring compliance with the set performance goals and ensuring they

have been achieved using the specified procedures (Berg 2013b). Forms of regulatory regimes, such as rate of return and price cap, all aim to create financial incentives by providing opportunities for service providers to cover costs. Additionally, yardstick regulation offers incentives to cut costs by rewarding good performance and penalizing poor performance. Relative success or failure is dependent on, among other things, actual information asymmetries between the service providers and regulator (Mumssen, Saltiel, and Kingdom 2018).

WSS regulators in LMICs have typically used the cost-plus (also known as rate of return) method, but some of them switched to price cap or incentive-based methods in the 1990s, only to revert back to simpler cost-plus approaches to setting WSS tariffs (Camos and Estache 2017; UNCTAD 2010). Some hybrid methods have also been tried in which some costs (uncontrollable) are automatically passed through while others are subject to review because the utility is expected to control such costs (Camos and Estache 2017). Broadly put, the higher the risk or perception of institutional risk, the more attractive a cost-plus regime appears (Estache and Wren-Lewis 2008). Tariff methodology is also determined by the gaps in the cost information that is available to regulators who must have both the data and the ability to use regulatory accounting practices (including valuing the regulatory asset base) needed to compute tariffs and rates of return needed under various scenarios (basic operations, investments, social concerns, among others). Thus, some practitioners argue for a phased approach. The simplest solution is to allow authorities to buy time to put all the regulatory tools in place (e.g., accounting system, asset valuation, cost of capital assessment, and efficiency measurement methodologies and matching databases). These are needed to compute a fair average price or subsidy, which can be done with a reasonably modest amount of basic cost accounting data. The approach also reduces the risk of possible artificial cost inflation to justify higher prices

and profit sharing between authorities and operators (Camos and Estache 2017). The key is for regulators to keep an eye on credit worthiness and the ability of utilities to access commercial finance in some form or in some degree. It is clear that meeting the SDG target of universal access will be achieved only if utilities can gradually begin to supplement current financing (through transfers, tariffs and taxes) with some level of commercial borrowing and decrease reliance on public resources over time (Goksu et al. 2017).

The literature discusses a number of common challenges related to achieving financial sustainability and the regulatory tools available to address them. Weak institutions marked by low credibility, capacity, and inefficiency, compounded by lack of data on costs, are at the forefront of getting to cost recovery. Other challenges by and large revolve around the problem of underinvestment and inefficient investment in the WSS sector. The literature provides a number of possible explanations for this: (a) public sector fiscal constraints, (b) underpricing of WSS services, including through low asset valuation, and (c) multiple institutional mandates and lack of coordination among institutions responsible for sector investments. Consequentially, this also results in low levels of private sector investment given low credibility and high risk resulting from lack of predictability and consistency.

A. Public sector fiscal constraints: Regulatory decisions have internalized the fact that the WSS sector has typically financed its investments from public debt as opposed to tariff revenues. This has resulted in accumulation of unsustainable levels of government debt to finance investments. Moreover, underpricing reduces the sector's ability to finance investments and operations. In addition, the method by which investment projects are packaged to attract private investors sometimes leads to private operators selecting only the best investment opportunities. Thus, high-cost, low-revenue activities (such as network expansion) are left for the public sector,

adding to the financial burden and increasing levels of debt. This implies a key role for regulators in preventing underpricing of services, which in turn would attract private sector investments and appropriate financing arrangements.

B. Underpricing of WSS services: In many LMICs, tariffs are politically sensitive, and tariff setting based on a proper valuation of the utility's asset base would entail tariff increases among users, which is often politically inconvenient. Thus, a key challenge for tariff setting for public sector utilities is inclusion of the asset base and capital investments. Often, the cost of replacing old assets and cost of providing a return on the investment tied up in the assets (return on capital) are not calculated and therefore not included in the tariffs. Hence, regulators could undertake a thorough valuation of the regulatory asset base and develop scenario-based investment plans (depending on coverage targets) to demonstrate what it will take to provide universal coverage. Consumer ability and willingness to pay are additional factors that considerably influence underpricing of services. Utilities often cannot charge full cost recovery tariffs unless subsidy mechanisms are established, nor can they charge full costs if service quality is poor.

C. Multiple institutional mandates and lack of coordination among institutions responsible for investment: Vertical and horizontal coordination mechanisms between different intergovernmental levels and organizations within the sector must be administered to remedy coordination challenges that hinder potential to attract sector investments. Issues of vertical coordination are becoming more important as "multilevel governance" becomes a common challenge for governments. Even in a centralized institutional context, subnational levels of government exercise some level of autonomy, which requires a desirable level of coherence among decision makers across the different levels of government. Portugal, for example, set out a Strategic Plan for Water Supply

and Sanitation Sector (PENSAAR), which allows all those involved in the WSS sector to have a clear idea about the government's objectives and priorities, and for greater coordination among the various institutions (Mumssen, Saltiel, and Kingdom 2018). Note that the policy (plan) is not a responsibility of the regulator. The regulator supervises and approves the WSS investment plans, taking into account the national objectives for the WSS sector.

Regulatory challenges in resolving inefficient investment levels are of a political nature. Tremolet and Halpern (2006) discuss the political sensitivities of the regulators' task to deliver fair access but also fair rates of return to service providers and to minimize subsidy payment burdens on taxpayers. In the absence of a strong regulator, service providers have the incentive to maximize returns at the expense of service quality and coverage levels. An empirical study shows that the private operator of the Malian water utility delivered investment levels that were well below the contractual commitments, which is expected as long as the provider can get away with it. Moreover, despite achieving cost savings, very little of the savings were passed on to consumers. Eventually the services were re-nationalized. Similar experiences are documented across a number of Latin American countries, including Argentina and Bolivia (Camos and Estache 2017).

Nonetheless, regulation can be strengthened to help address the monumental challenge of financial sustainability. An important start is to improve the capacity of regulators and enhance data availability to shine the light on performance for service providers, the regulator, and potential investors. This could entail financial modeling instruments to monitor the financial sustainability of operations through quantitative indicators and targets that can be monitored. For example, credit enhancement indexes that help prepare service providers for commercial finance by highlighting where they need to improve performance to attract investment. However, the literature on efficiency implies that regulators have not been as effective as they should be in

creating incentives for operators to share cost data. Under conditions in which service obligations and low tariffs are enforced, service providers are incentivized to adjust production within the limits of the regulatory boundaries. Carvalho, Marques, and Berg (2012) find over 250 studies that explore efficiency drivers of WSS service provision that have underscored a number of insights on the impact of regulation on prices, cost, and quality of service: (a) lasting cost inefficiencies exist despite regulatory reforms; (b) service provider performance may be better assessed on a case by case basis to account for wide-ranging variables including market size, ability, and willingness to pay; (c) some cost drivers are predictable; and (d) overall institutional governance matters to the impact of regulation.

Improving Service Provider Performance

Setting performance standards, for example, using KPIs, is a way that regulators can analyze, evaluate, and possibly incentivize service providers' performance. Submission of annual audited financial reports is considered standard practice, and they should be made available to customers and other stakeholders. The performance report would have to meet the informational requirements of a transparent set of evaluation criteria and standards designed to ensure the sustainability of operational and capital costs and technical and service quality. Setting performance standards for services can include setting standards for service continuity and water pressure; meter installation or service repair schedules; or addressing consumer complaints. Performance reports could also cover social information such as coverage, access for the poor, water resources sustainability, and environmental impacts of inadequate mechanisms for sanitation. However, set performance standards will have implications for the cost of services as improved quality and reliability necessitates increased resources.

Moreover, benchmarking could be a part of tariff reviews and choosing an appropriate tariff methodology (Berg 2013a). Berg (2013a) elaborates on some KPIs

that are an essential feature for benchmarking performance and establishing realistic targets, these fall under the following broad categories:

- **Service quality:** measurements of service quality include continuity, safety, and average times to undertake repair works. Service providers face trade-offs between improving service quality and expanding networks. This creates issues because citizen satisfaction is determined by perceptions of service quality, access, and tariffs.
- **Efficiency:** indicators of operational efficiency include the number of employees per 1,000 connections and the level of non-revenue water (NRW).
- **Financial:** measurements of financial performance include bill collection rates, cost recovery levels, and available funds for capital investments.
- **Customer Service:** indicators include the number of customer complaints received, addressed, and resolved; the duration of time between receipt and resolution of complaint; and customer satisfaction of services.

Benchmarking performance across different service providers is done to a certain extent in LMICs (see examples in next chapter). However, the literature points out some common challenges regulators face in implementation and enforcement of benchmarking:

- **Weak performance incentives for public service providers.** Regulators can benchmark performance of service providers in meeting specified standards; however, the greater issue is what incentives and disincentives are available to the regulator in cases in which performance standards are not met. For example, bonus pools from public funds can also be allocated to service providers based on their relative performance, thus providing incentives to improve service quality and contain costs. An alternative would be to use the performance criteria in allocating investment funds, which would incentivize better performance (Berg 2013a).

- **Lack of capacity to collect and analyze data.** In many countries, this is the result of a wrong skill mix or level among the staff of the agencies and the ministries. It can also often be due to a lack of financial resources to outsource or acquire technical assistance or put in place an information collection system that could be used to measure performance, forecast needs, and assess the real financing and technological options at the city, regional, or national level. One outcome of this is that the regulators are less likely to be able to observe costs and distinguish between the extent to which high costs are linked to the service provider's technological constraints, inefficiencies of information, or efforts to make the most of the technology available (Berg 2013b; Camos and Estache 2017).

In addition to annual performance reports, other instruments that facilitate informative interactions between sector stakeholders include audited statements that the service provider has complied with all its relevant statutory, license, and regulatory obligations. Regulators often have the responsibility to issue and monitor operational licenses to service providers, another tool available to incentivize improved performance. Licenses specify standards by which the service providers must be operated. In the case required standards are unmet, regulators have authority to revoke licenses; however, this authority is often not practiced as it will likely adversely impact consumers. Other financial penalties can be implemented; however, this will lead to reductions in spending on maintenance. In the case of a concession, the regulator oversees the contract, ensuring that both parties (usually the state and a private entity or PPP) adhere to the contract.

Increasing Accountability, Transparency and Consumer Voice

Enabling enforcement of accountability and transparency measures ultimately requires adequate amounts and quality of data and information, as well as

involving citizen voice into the regulatory process. Brown, Stern, and Tenenbaum (2006) have developed a list of 10 governance principles that apply to the broader institutional framework, including the regulator. The list emphasizes the importance of accountability and transparency, among other principles. Transparency is essential to effectively benchmark performance and emulate competition in open markets. Data and information regarding performance, business plans, and internal incentives should be collected and publicly disclosed through a number of avenues, including public hearings, the Internet, and newspapers. Stakeholder views can be heard through regulatory public hearings and workshops. Information on trends and relative performance allows for effective design and implementation of policy and mobilization of public opinion (Berg 2013a).

Additionally, through the regulatory tools that allow for collection and publication of performance data, regulators play a key role in increasing accountability of service providers to government and citizenry. Consistent availability of reliable and up-to-date information on performance indicators serves to inform and guide policy makers, implementers, and service providers and holds them accountable for outcomes of their decisions. An additional mechanism by which utility managers are held accountable is through technical evaluations of business plans (Berg 2013a). Further, service providers can be required to display relevant performance information on websites, in pamphlets (with bills) to customers, etc.

However, in many LMICs, reporting is weak, even if de jure the requirements are well spelt out. Berg (2013a) states that the introduction of cost and regulatory accounting processes would be largely justified by the difficult access to decent cost related data, as revealed by empirical research on efficiency measurement for instance. Furthermore, elections, discussions in parliament, and so on can hold regulators and the politicians that appointed them to account. This can help reduce the likelihood of arbitrary or corrupt decisions

and increase the sense that regulatory interactions are subject to checks and balances. Perceived lower accountability increases risks that translate in to higher prices and rent as well as lower output and quality (Estache and Wren-Lewis 2009; Soreide et al. 2014).

Camos and Estache (2017) suggest that if the main underlying issue contributing to the lack of accountability is the lack of data either due to the absence of data collection tools (e.g., household consumption surveys), or if regulators do not have the technical capacity to process available information, it may be reasonable to implement a regulatory system that limits the use of information or required skills. This may be achieved by setting price caps informed by available international cost information. An alternative intervention is to strengthen the technical expertise and transparency of regulatory processes as well as the conflict resolution mechanisms. Furthermore, enhancing the role of stakeholders in performance evaluation and conflict resolution could allow for strengthened accountability mechanisms by increasing public awareness of the role played by various stakeholders.

Achieving transparency and accountability entails a range of actions that regulatory processes should comprise. For instance, stakeholder consultations and effective communication and information dissemination methods are crucial to increase consumer voice and engagement within the regulatory process (OECD 2010).

Pro-Poor and Non-Network Services Regulation

There is a need for specific pro-poor approaches to regulation in LMICs in relation to WSS services. Significant segments of the population are not connected to the water and particularly to sewerage networks of major public service companies because they live below the poverty line and cannot finance a connection, it is legally prohibited to make connections to informal settlements, or they live too far from the networks. Regulation may help to ensure universal access to water and sanitation by promoting expansion of

services, redistributing benefits and protecting consumers from possible abuses (Franceys and Gerlach 2008; Trémolet and Hunt 2006).

Recent research on the role of regulators in addressing equity concerns attempts to better understand the factors contributing to the poor performance in this area (Camos and Estache 2017). Limited fiscal capacity to implement pro-poor subsidy schemes is an often-cited explanation for failing to adequately address equity matters of the sector. However, the literature also discusses a number of underlying factors for these poor outcomes. First, regulation does not yet have the capability to rely on solid, reliable baseline data for low-income consumers or their service providers (Camos and Estache 2017). Second, the state of addressing the needs of the poor reflects accountability mechanisms. The weak performance of regulators in specifying service obligations, the absence of regulation of alternative suppliers, and the weak capacity to negotiate with potential investors regarding the inclusion of high-cost consumers may all be related to the lack of transparency or accountability of authorities to these stakeholders (Gerlach and Franceys 2010).

Gerlach and Franceys (2010) and Whittington et al. (2015) find that even in cases in which data are available, poor choices of regulatory tools, processes, and policies fail to address equity challenges of the sector. Camos and Estache (2017) add that research that spans over 30 years documents the failure of subsidies reaching those in need because they target consumption rather than access. However, this conclusion does not take into account that the majority of capital expenditures in many LMICs are heavily subsidized, sometimes financed through external grants or very low concessional financing. Nevertheless, the choice of tariff structures and imposition of service obligations have not been relatively more successful in alleviating the needs of the poor.

Regulatory agencies are rarely mandated to protect poor consumers, or those who are not connected to the

network, and it is a complex task for which there have been historically limited capacities or models. The inclusion of social or pro-poor dimensions to the scope of economic regulation is not supported by all. Groom, Halpern, and Ehrhardt (2006) argue that economic regulation should be clearly defined. While there is overlap with other functions (e.g., consumer dispute resolution and social policy), the domain of economic regulation should be kept narrow, clearly specified, and distinguished from the policy and governance functions. Yet, many concession contracts have included a mandate to extend to poor areas, such as through output-based aid approaches, and there are cases in which regulatory regimes specifically distinguish between economic tariffs and social tariffs, as is being proposed in Egypt (see discussion in the next chapter).

Different tariff and subsidy schemes can be adopted to better serve the poor. Tariff structures have been designed to try and remove disincentives to serving the poor, and better targeting of subsidies to reach the unconnected poor, including possible focus on connection subsidies and direct transfers to consumers (Franceys and Gerlach 2008; Trémolet 2002). For example, the increasing block tariff (IBT) structures entail different prices charged per unit for different consumption blocks. The prices charged increase as consumption increases. However, if the first block is subsidized, consumers on higher tariff blocks will also benefit from the subsidy; therefore, the subsidy is inefficient because it is captured by those who consume more (under the assumption that low-income households consume less, which may not always be correct).

Alternatively, tariffs can be structured under a volume-differentiated tariff, which charges prices based on the last block of consumption, irrespective of the different blocks. Therefore, any household consuming above the subsidized rate will pay a higher tariff for all of their consumption. This can be a more effective tariff structure in achieving demand management objectives and deliver on efficiency targets as water consumption is rationed (Trémolet and Hunt 2006).

Lifeline rates can be introduced in the case where low-income consumers already have access to WSS services. Lifeline rates are targeted subsidies based on household consumption levels. This entails the use of consumption volume as a mechanism to target low-income consumers. Lifeline rates can be considered as an alteration to block tariffs because only the low-income consumption bracket is subsidized, whereas the remainder of the consumption blocks are charged at the commercial rate. In addition to serving the poor, lifeline tariffs offer other benefits, including minimal administrative costs to implement, and offer incentives for a large consumer base to economize and achieve efficiency objectives (Trémolet and Hunt 2006). Another alternative is to set volumetric tariffs based on commercial (marginal cost) rate and to establish rebates for the poor, for example, by taking into account the neighborhood or the income.

It is important to note that these tariff structure approaches do rest on a number of assumptions, which in many cases have been proven incorrect in practice. For instance, one assumption is that consumption of the poor is in the lower blocks; however, poor consumers are not necessarily the small consumers (may serve large or several families), and so the tariffs may be regressive. Although more complicated regarding administrative issues, some countries use sliding blocks, taking into account the number of people in the households. The tariff structure also assumes that poor households have metered access to water services, which is often not the case (Trémolet and Binder 2009). In fact, the percentage of metered connections is low in many countries, which means that tariff structures that embed subsidies benefit only a small portion of the population.

Other regulatory mechanisms used to better serve the poor (specifically the urban poor) include the following:

- **Price and service or quality differentiation:** meaning acceptable relaxation in quality of services to ease

access of the poorest, and coverage targets tied to locations rather than statistics and use of public information campaigns (Baker and Trémolet 2000b); Stallard and Ehrhardt 2004).

- **Incorporating alternative service providers:** including potentially through light-handed regulation that replaces price and quality regulation with public performance data (Trémolet and Browning 2002) or demand minimum requirements such as licensing, drinking water tests and/or maximum prices, relaxing exclusivity rights of utilities, assisting providers to obtain legal rights, and addressing land tenure issues.
- **Customer and civil society:** including the use of participatory and survey techniques to increase customer involvement, and accessible and inclusive regulatory processes (Brocklehurst 2002; Stallard and Ehrhardt 2004).
- **Service obligations and universal service obligations (USOs):** the use of obligatory service (compulsory service to all wishing to connect under the current tariffs) and USOs, which extend this access through tariff design or contractual obligations (Franceys and Gerlache 2008).

3.4 Aligning Institutions and Incentives with the Enabling Environment

The literature agrees that there are no one-size-fits-all solutions; therefore, effective regulatory frameworks must be embedded within political economy and governance structures of a given country and aligned with sector policy and institutional frameworks to achieve sustainable outcomes. Surveys conducted on regulation of SOEs in LMICs and other case studies and empirical analyses provide good evidence that suggests that regulation and institutional frameworks must be aligned to be effective (Berg 2013a).

Mumssen, Saltiel, and Kingdom (2018) promote holistic approaches in shaping WSS sector policies, institutions, and regulation (PIR) that consider the wider

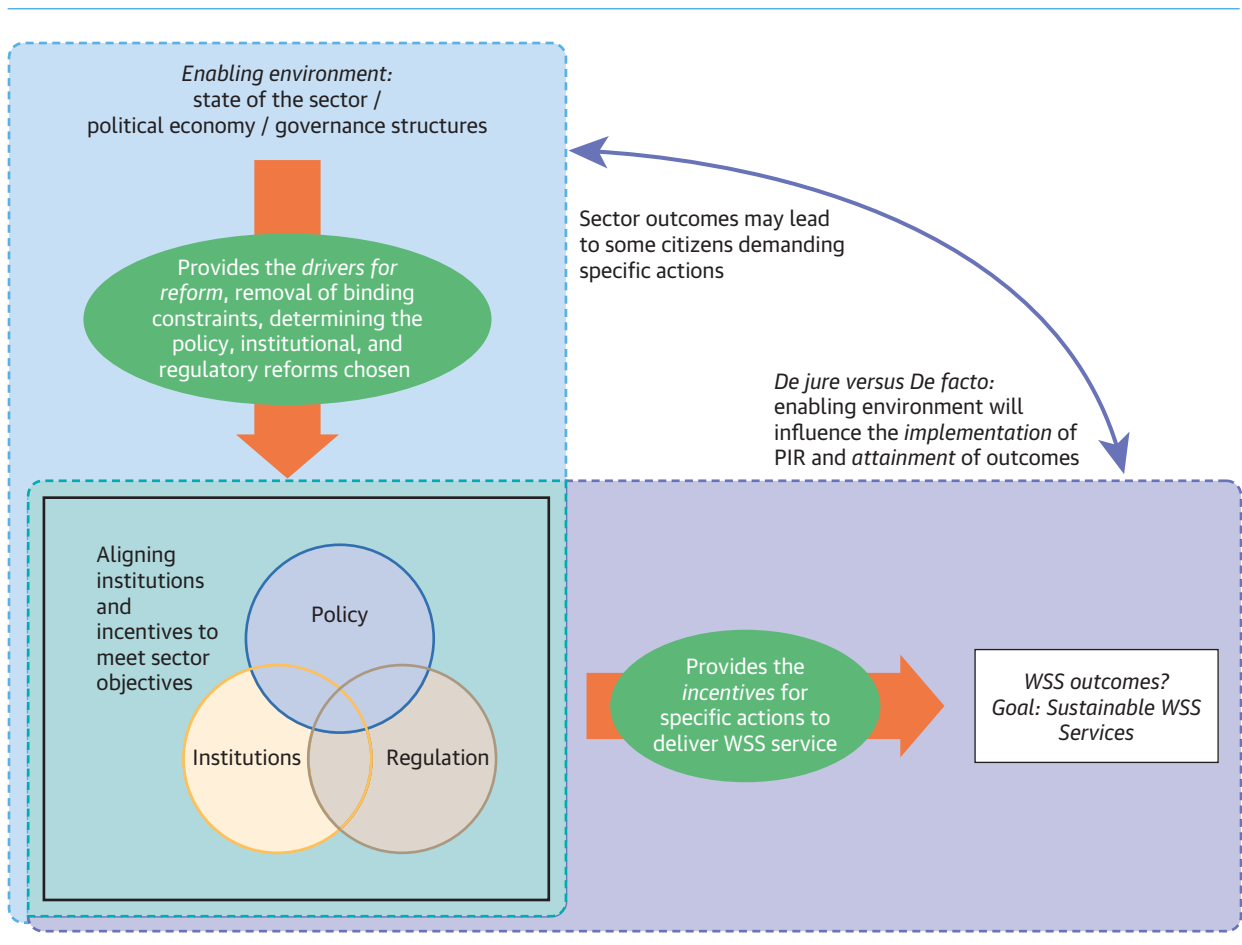
political economy and governance framework to incentivize sustainable actions. **Figure 3.1** demonstrates the role and interlinkages between the enabling environment and WSS sector PIR frameworks that create incentives for sector actors. Specifically, the study explores the interlinkages between two types of incentives:

- **Incentives that emanate from the enabling environment**, which act as drivers for reform and shape PIR frameworks. The enabling environment comprises the broader political economy and governance framework within which the sector sits.
- **Incentives that emanate from WSS sector-level PIR interventions**.

Indonesia provides an example of the damaging consequences of incoherent reform, in which the two main institutional reforms, namely corporatization and decentralization, were supported by two different legal frameworks. This incentivized local governments to establish *Perusahaan Daerah Air Minum* (regional WSS utilities or PDAMs) because they provide a source of revenue for local government, regardless of whether that is the most suitable form of service delivery. This has resulted in small PDAMs with only a few thousand unviable connections, inefficient operation, and poor service quality.

The relationship between the political economy of a given country and its legal system is characterized by

FIGURE 3.1. Schematic Aligning Institutions and Incentives for WSS Services



Note: WSS = water supply and sanitation.

dynamic interlinkages. In turn, a country's legal system has implications on the regulatory objectives, form, and functions adopted. Accordingly, creating “best fit” regulatory interventions entails understanding the legal regime and normative content of the legal framework. There are two main legal systems globally: common law (as practiced in the United Kingdom), and civil law (as practiced in France). A common law system is less prescriptive than a civil law system; hence, it is common to find regulation by contract in most francophone, Spanish and Portuguese-speaking countries that adopt civil law. Whereas, regulation by agency is more common in anglophone countries.

Laws must be available, enforceable, and accessible if they are to adequately support PIR frameworks and to incentivize sustainability of service delivery. In the absence of a solid legal framework, PIR interventions *de jure* may not be implemented *de facto*. For example, Portugal's reform of 1993 was supported by a strong legal framework that clearly separated the policy making (executive), regulatory, and service delivery functions within the sector, and allocated the roles and responsibilities of the institutions. The legal framework also provides guidance on the service provision model: direct public management, delegated public management with or without inter-municipal systems (aggregation of several municipalities to provide WSS services), or delegation to private sector operators. The regulatory framework, which includes an independent regulator to perform the economic regulatory functions, was developed to suit the existing arrangements and to regulate all types of service provider.

An important factor to consider when creating “best fit” PIR interventions is the institutional capacity of stakeholders to respond to incentives. In the context of regulation, the literature highlights that effectiveness of regulatory interventions depends on the degree to which regulatory objectives, forms, and functions are in tune with the institutional constraints and preferences of a country. Regulatory interventions must be

designed within the context of existing institutional realities and capacity in order to achieve desired outcomes. This implies a dynamic regulatory reform process whereby softer incentives may be imposed in weaker institutional environments, and as institutional capacity strengthens over time, stronger incentives may be introduced.

In this regard, Camos and Estache (2017) find that the main lesson learned from 25 years of experience is the necessity of carrying out *ex ante* institutional diagnostics to design regulatory interventions within the context of institutional constraints and opportunities. The legal and public administration literature identifies a number of factors to be considered, including legal, bureaucratic, cultural, capacity, political, and other bottlenecks, or hurdles because they characterize the commitment ability (and hence the credibility) and the technical capacity of regulators. Estache and Wren-Lewis (2009) further elaborate on four broad categories that depict the range of institutional characteristics that should be considered when developing regulatory interventions to ensure that incentives created are effective:

- **Institutional, technical, and legal capacity:** the extent to which regulators or the ministry have the information, technical tools, skills, financial resources, or the mandate to supervise all aspects of utility performance.
- **Credibility of the officials:** the political will of the authorities to make and enforce long-term contractual commitments without unjustified renegotiations. This is particularly important when long-lived investments require long depreciation periods to be covered by tariffs or subsidies.
- **Accountability:** the extent to which sector stakeholders—whether consumers, service providers, financiers (including donors), regulators, ministry bureaucrats, or politicians—can be held responsible for their obligations. This is largely linked to the information flows between stakeholders,

since it is through misuse or lack of transparency of this information that the potential for abuses leading to underperformance in costs, quality, or price can take place.

- **Fiscal efficiency:** the extent to which governments are able to collect adequate revenue when they commit to direct subsidies. These are quite common in the sector as a way of ensuring that the limited ability of consumers to pay for services does not lead to the exclusion of the poorest, or can be used as a way to reduce the financial risk for service providers when investing in a project.

In support of the preceding list, Camos and Estache (2017) find that detailed evidence shows that the particularly large number of failures in WSS contractual arrangements between public and private players, as well as across government levels within countries or across government agencies and ministries, can be correlated with a poor appreciation of at least one of these four sources of institutional weaknesses. However, it is also important to recognize that despite weak utility performance, institutional incentives can exist for sustained poor performance. Berg (2013a) cautions that there are groups that benefit from weak utility performance. Low-level equilibriums reflect excessive governmental discretion in price setting, which ultimately leads to political opportunism.

This chapter has provided a broad overview of literature available specific to the WSS sector covering the following topic areas in theory: (a) what is regulation in LMICs, i.e., the objectives; (b) how WSS regulation is organized in LMICs; (c) regulatory

functions such as tariff setting, standardization, consumer engagement, and so forth; and (d) the different political economy and institutional factors that impact effectiveness of regulatory frameworks and underscore the importance of designing regulatory frameworks within broader institutional contexts. The following chapter discusses what has been observed in practice and explores the workings of the literature review topics in practice in LMICs through case study examples.

Notes

1. This desk review identifies information in published and draft studies on WSS regulatory arrangements in 34 countries as follows: (a) the WSS PIR study that this paper arose from covers 10 case study countries; (b) for this paper the firm PwC studied WSS regulation in five LMICs; (c) a World Bank study of WSS regulators in Middle East and North Africa covers five countries and the West Bank and Gaza; (d) an OECD study of water governance in Latin America and the Caribbean covers regulatory arrangements in 13 countries. However, none of this information includes descriptions of the working of these regulators, such as number of decisions issued, types of determinations in those decisions, number of decisions complied with by utilities, and recourse actions and options of WSS regulators in the event of noncompliance.
2. Although country-specific information is relatively limited, much knowledge is available regarding specific regulatory forms and functions. The Regulation Body of Knowledge (<http://regulationbodyofknowledge.org/>) is an online platform for all topics related to infrastructure regulation, developed by the Public Utility Research Center (PURC) at the University of Florida, and the collaborative efforts of the University of Toulouse, the Pontificia Universidad Católica, the World Bank, and a panel of international experts. This site provides links to more than 500 references, an extensive glossary, and self-testing features to facilitate learning.
3. See the USAID website, <http://www.energytoolbox.org/>.
4. See the World Bank website on PPPs: <https://ppp.worldbank.org/public-private-partnership/node/335/>.

Chapter 4: WSS Regulation in Practice in Low- and Middle-Income Countries

Most studies and evidence anecdotally analyzed demonstrate that regulatory models copied from the United Kingdom, the United States, France, and Australia have not been very effective. In addition to the fact that the WSS sector in LMICs is dominated by SOEs, municipally and community run providers, regulation is faced with the additional challenges of substantial service inefficiencies due in part to poor investment planning and lack of maintenance; poor financial sustainability due both to the inability to charge as well as the inability to pay; weak human resources capacity; poor availability of data; political interference; and many other constraints discussed in the previous chapters. Despite these challenges, various forms of regulatory models are being implemented. Unfortunately, there is a lack of data on WSS regulatory performance in LMICs to provide a sound evidence base for practitioners. The anecdotal and episodic evidence points to a mixed picture, although with one commonality: they are all on a learning path, with some experiencing less challenges than others. Importantly, when determining “effectiveness,” it is important to avoid using a lens “imported” from elsewhere, just as the regulatory models themselves were. For example, although economic regulation following the Ofwat model may not have been achieved as originally intended, regulation in some cases has organically adapted to local circumstances to achieve some, albeit limited, success in improving service delivery and sustainability. One deduction that can be made based on the regulatory experiences investigated here and the literature reviewed in the previous chapter is the utmost importance of ensuring regulatory frameworks are embedded within the broader institutional structures of the sector.¹

4.1 Regulatory Objectives

As described in the preceding literature review, there are some common baseline objectives of regulation of WSS in LMICs. But even then, the degree to which, for example, transparency and predictability, two objectives often cited, are actually demanded from regulation will be dependent on the political economy context. Nevertheless, what can broadly be stated as needs of the WSS sector in most LMICs, and therefore the objectives of effective regulation, are increased access, improved services, and, related to both, increased (good) investments. There will be many other objectives of regulation depending on the specific state of the WSS sector and the political economy context.

Increasing Access, Including to Peri-Urban Areas, Rural Areas, and to Poor and Vulnerable Groups

The important role that regulation plays in creating effective incentives to achieve universal access to services is recognized by many LMICs. For example, in Brazil, the most recent phase of reforms (Water and Sanitation Law, Lei 11.445/07) seeks to achieve universal access through the creation and strengthening of regulatory institutions with administrative, financial, and budgetary independence, as well as incentivizing transparency and collaboration across all levels of government. Additionally, regulation by contract is an alternative whereby increased access to WSS services can be incentivized. In the Philippines, for example, concession agreements (CA) with the Metropolitan Waterworks and Sewerage System (MWSS) stipulate the commitments, roles and responsibilities of each party and includes the responsibilities of concessionaires to increase access within their service

areas in addition to other performance targets. Similarly, in Burkina Faso, as part of the performance contract between the Office National de l'Eau et de l'Assainissement (ONEA) and the government, ONEA implemented a program to expand services to informal settlements and peri-urban areas. The contract sets targets for technical performance by ONEA, which includes investment commitments to expand access.

Improving Quality of Service Delivery and Efficiency of Service Providers

Regulators globally have a number of tools at their disposal that are designed with the purpose of improving service provider performance and, ultimately, quality of service delivery. In Zambia, a clear regulatory framework is implemented by the regulator, the National Water Supply and Sanitation Council (NWASCO), which is responsible for setting minimum service levels and agreements as well as monitoring and benchmarking performance. Utilities are required to sign service agreements, which include minimum service levels, and are monitored by NWASCO. There are penalties if minimum service levels are not met, giving the incentives for utilities to meet these requirements. NWASCO monitors and benchmarks commercial utility performance and publishes results, which creates incentives for utilities to improve performance to move up the rankings in published benchmarking reports. Also, in Colombia, the *Superintendencia de Servicios Públicos Domiciliarios* (SSPD) supervises the performance of all water companies and enforces regulations related to service standards. Moreover, in Peru, the *Superintendencia Nacional de Servicios de Saneamiento* (SUNASS) sets and monitors service quality standards for utilities. Additional examples are highlighted further in this chapter.

Securing Access to Capital Markets for Sector Financing

Given immense infrastructure and operational needs, households' limited ability to pay, and constrained public resources, one of the primary objectives of

regulation in LMICs should be to bring some level of financial sustainability to the sector. In order to raise revenue from users, a tariff system that is perceived to be fair, both in terms of price and quality, must be in place, and that system must be sanctioned by the regulatory authorities. Further, to make the WSS sector an attractive destination for private finance, regulation must provide the certainty and reliability, if not guarantee, of an attractive return on the investment. There are a variety of ways in which private finance can enter the WSS sector, and the regulator can play a critical role in providing an investment-friendly climate. This can take the form of preparing the sector or service providers for opportunities for blended finance, PPP arrangements, performance- (output)-based contracts, and more.

As described previously, regulation is also expected to improve coverage through extension of services to poor, peri-urban, and even rural communities. From an investor's standpoint, however, these goals can be contradictory because the increased coverage mandate can increase costs that would cut into the return on investment, especially if this may mean moving into areas that are seen more as public goods (sanitation) or as low income. The regulator's challenge is to allow the investor to collect timely returns while covering its costs through a combination of tariffs, surcharges, and subsidies as agreed upon, and to try and serve the population mandated through policy. The following sections provide examples of how LMIC governments, through regulation, are attempting to meet this challenge, for example, in Colombia, Albania, Egypt, and elsewhere.

4.2 Regulatory Forms

Regulation through a Dedicated Regulatory Agency

In a study of 123 LMICs, less than half have chosen to establish a regulatory agency that is separate from the line ministry (Camos and Estache 2017). In Latin America, regulators have played an important role in pushing for service improvements, although

the regulators may not always be independent. Colombia provides a successful example of this in which the National Water Regulatory Commission (CRA) handles tariff regulation and SSPD monitors the performance of utilities and has been able to improve data collection efforts (Mumssen, Saltiel, and Kingdom 2018). In Peru, SUNASS's main responsibilities are to conduct and control the tariff system, as well as to evaluate utilities' investment plans (known as optimized master plans), and to set quality service standards for utilities (Lentini 2015).

Examples from other countries include Mozambique where two national asset managers own and operate the water assets and a water regulator that regulates the asset manager and operator (Mumssen, Saltiel, and Kingdom 2018). The regulator (Water Supply Regulatory Council) addresses tariff setting, investments, and quality of service monitoring by supervising and approving the regulatory agreement and the regulatory framework signed by each utility and the corresponding national assets owner. Also, the Philippines lists 14 types of formal and informal WSS service providers and five types of water regulators, with the National Water Resources Board as the main WSS regulatory agency (Mumssen, Saltiel, and Kingdom 2018).²

Additionally, Egypt is one of the few countries in the Middle East and North Africa that has established a specific water sector regulator dedicated to monitoring service provision. The Egyptian Water Regulatory Authority (EWRA) undertakes regulation to achieve universal and affordable access to WSS services; its mandate includes enforcement of regulatory legislation, investment planning, technical standards and assistance, financial monitoring, tariff review and setting, licensing, and performance monitoring. However, the de facto situation is that most of these responsibilities are unimplemented due to limited capacity constraints. An additional example in the Middle East and North Africa is that of the West Bank and Gaza. Although the West Bank and Gaza faces significant

challenges related to WSS service delivery, its government has embarked on an ambitious regulatory and institutional reform program that seeks to transfer regulatory functions from the Palestinian Water Authority (PWA) to the Water Sector Regulatory Council (WSRC), established recently in 2014 (Mumssen and Triche 2017). Finally, water sector regulation in Tanzania is carried out by an independent multisector regulator, the Energy and Water Utilities Regulatory Authority (EWURA). EWURA's stated objectives are to promote effective competition and economic efficiency; protect consumer interests; ensure financial sustainability; deliver equitable access; enhance sector knowledge; and protect the environment.

Table 4.1 provides an overview of the incidence of independent WSS regulators in LMICs. Often sought as a way to attract private sector investment and improve performance, independent regulatory agencies have not been free from political interference, nor have they been linked to sector improvements (Bertomeu-Sanchez et al. 2017).

LMICs confront distinct challenges in terms of limited administrative capacity and budgetary resources. Whether regulation is adequately implemented is a function of the regulators' capacity. Factors such as poorly trained staff, insufficient information, lack of financial resources, and unrealistic time constraints can all impact the capacity of regulators to effectively implement the mandated responsibilities. Without sustainable forms of human and financial resources to carry out regulatory functions, gaps between de jure and de facto can become evident.

In Egypt, EWRA faces significant challenges in terms of its administrative, technical, and financial capacity that prevent it from implementing its intended role de facto. However, it has undertaken a proactive approach, with significant support from the donor community, to develop its technical capacity. In West Bank and Gaza, a new policy document entitled "Capacity Development Policy and Strategy of the Water Sector (2017)" was

TABLE 4.1. Incidence of Independent WSS Regulators in Low- and Middle-Income Countries

	Countries with autonomous water regulator	Countries with PPP in WSS	Countries with both autonomous regulator and PPP	Countries with WSS PPP but no autonomous water regulator	Countries with autonomous water regulator but no WSS PPP	Countries with no autonomous water regulator and no PPP
Full sample (177 countries)						
Number	80	157	69	89	11	8
Share in %	45.2	88.7	39	50.3	6.2	4.5
Low- and Middle-income country sample (123 countries)						
Number	55	108	48	60	7	8
Share in %	44.7	87.8	39	48.8	5.7	6.5

Source: Camos and Estache 2017.

Note: PPP = public-private partnership; WSS = water supply and sanitation.

recently completed. Also, in Mozambique, institutional capacity was significantly weak and thus, private operators were required via contractual obligations to provide training and increase administrative, technical, financial, and management capacity (Mumssen, Saltiel, and Kingdom 2018).

These challenges are particularly exaggerated in federal political structures such as Brazil, India, and Nigeria. As elaborated in the following cases, in the absence of institutionalized coordination mechanisms, regulation between national and subnational levels of government can often lead to suboptimal results. There is an increased risk of duplication of roles, sometimes a lack of clarity regarding the WSS jurisdiction, and often an issue with coordination across national and state mandates. Although the benefits of subnational regulation include the increased ability to better align and tailor regulatory incentives with local needs and institutional capacity, as exhibited in India's case, this is contingent on the existence of other key policy and institutional factors including sufficient regulatory autonomy (Mumssen, Saltiel, and Kingdom 2018).

- **Nationally set standards may not adequately reflect the local needs and capacities of subnational government, as the case in Brazil demonstrates.** WSS service provision is entirely decentralized to

municipalities that may aggregate the function through state level utilities. Regulatory practice at state level varies, with some states establishing regulatory agencies, and similarly different municipalities have different approaches. Fourteen states have created multi-sector public utility regulators, however, independently of each other and the federal government. Several municipalities have also directly implemented their regulatory agencies, and in some regions, they form consortia to regulate in order to create scale (at a regional level) and regulate themselves. Although there are good examples in all levels of regulation (state, consortia, and municipal), they compete between themselves and the same utility can be regulated in a distinct way by different regulators, or they can change the regulator if they disagree with their decisions. Starting in 2007, with passage of Federal Law 11,445, Brazil implemented a coordinated, federal-level WSS policy that all states and state-level regulators are subject to, and represents, the basic foundational framework for WSS regulation in Brazil. For all types of service providers, there are of course provisions in various national laws that are regulatory in nature, specifying, for example, drinking water quality standards and wastewater discharge standards. In respect of economic regulation, particularly the crucial element

of tariff setting, this is left to the municipalities, but again there are federal laws (such as the Law on Fiscal Responsibility), which impose implicit cost recovery requirements on publicly owned service providers.

- **Nigeria's case highlights the importance of sector coordination between national and subnational levels of government.** Federally, the Ministry of Water Resources is responsible for overall policy coordination and more directly for water resources and river basin management while states control WSS sector policies. A recent study on WSS regulation in Nigeria (Goldface 2008) points out the need for coordination in WSS regulation between states and the federal government. Currently, only the state of Lagos has established a regulator. Most states do not implement regulatory responsibilities separately from other sector functions, and tariffs are set by the state ministries and seldom reflect actual costs of service delivery. The same study suggests that a national water commission be set up as an independent regulator at the federal, state, and local levels to provide regulatory cohesion in tariff and standard setting. A recent AMCOW (African Ministers Council on Water) country status overview (World Bank 2010) on Nigeria also posits the same regarding establishing WSS regulation separately from the policy and service delivery functions. What is not clear from these studies and their respective recommendations is what the structure of the WSS regulatory body should take, whether at the state level with protocols for coordination with other states and the federal government, or at the federal level with offices in each state, centralizing the WSS regulatory function for greater coordination, cohesion of standards, and ease of performance benchmarking across states. And what types of incentives would be needed to be put in place to motivate states to respond to policy objectives and priorities of the federal government.
- **India's case presents some of the political challenges of establishing subnational level regulation.** Traditionally WSS service delivery and policy

making have been managed by states through government ministries. In the past 15 years or so, a few states have taken steps to separate the policy, service provision, and regulatory functions and have attempted to create an enabling environment for private operators to enter the sector by establishing, among others, independent WSS regulators (PRAYAS 2011).³ However, this has not been without challenges. The Maharashtra Water Resources Regulatory Authority was the first of its kind, established in 2005, and was followed by similar legal provisions in Arunachal Pradesh (2006), Uttar Pradesh (2008), Kashmir (2010), Kerala (2012), and Gujarat (2012). However, Maharashtra is the only regulatory body that is currently functioning. This is primarily due to political interference from state-level government with WSS operations, for example, on the appointment of officials that may not be either independent or the best fit.

These cases can be contrasted with the national-state coordination of regulation of the WSS sector in Australia, in which a high degree of legal and institutional sophistication along with political will have led to positive results, including broad national coordination on strategic objectives but state autonomy to design and implement regulation. This is described in chapter 2, **Box 2.1** on New South Wales, Australia (Salisbury et al. 2017).

Creative solutions for a decentralized regulatory presence are needed. The decentralized nature of service delivery requires decentralized monitoring and enforcement mechanisms. For example, the national regulator in Mozambique, the Water Regulation Council (Conselho de Regulação de Água, CRA), has developed a decentralized approach to monitoring and problem solving that engages local regulatory committees. This approach, which was designed in collaboration with local authorities, minimizes costs of regulation and promotes local engagement and capacity building (Mumssen and Triche 2017).

WSS Regulation through Multisector Regulation

The key benefit of a multisector regulator is often cited as synergies related to the cost reduction achieved from combining regulation of WSS, telecom, energy, and in some cases transport. By sharing support functions of information technology (IT), finance, human resources (HR), procurement, and housing or estates, considerable savings can be garnered that can be allocated to investment in development of tools and expertise in performing the regulatory functions. On the negative side, multisector regulatory bodies can be thin in sector expertise and there are risks of regulatory capture by one of the dominant sectors. This may be overcome to some extent by recruitment of talented industry experts in each sector that understand the distinction between the underlying technical and market characteristics of industries. Some examples of multisector regulators include Unidad Reguladora de Servicios de Energía y Agua (URSEA) in Uruguay or the Autoridad Reguladora de los Servicios Públicos (ARESEP) in Costa Rica (Marques, forthcoming), as well as some state or provincial regulators in federal countries such as Brazil and Argentina. **Box 4.1** discusses the inconclusive evidence on effectiveness of multisector regulation.

Self-Regulation of WSS Services

As demonstrated in **Table 4.1**, many countries with public service providers have not sought establishment of an independent regulatory agency under the assumption that public service providers would be held accountable to their customers through various accountability mechanisms. Cambodia offers an interesting example of self-regulation whereby the functions of policy making, regulation and service delivery are all provided by one national body: the Phnom Penh Water Supply Authority (PPWSA). The PPWSA is responsible for improvement of services. Some priority tasks include the improvement of water metering and building the capacity of the workforce. Supported by the legal framework, the government has also sought to make PPWSA financially efficient and has

commercialized its operations. Accordingly, the PPWSA has been able to reform its tariff structure while also protecting the poor. For example, subsidies between 30 percent and 100 percent of connection fees, plus social tariffs, have been introduced. Overall sector efficiency and performance have improved; in fact, the PPWSA is considered to be one of few WSS utilities globally to have consistently increased profits since 1993 (PPP Legal Resource Center 2015). However, experiences have differed in other contexts and have led to lower tariffs and limited investments.

Regulation by Contract

It is worth noting here that in many cases, private sector providers of WSS services are often negotiated through contract by the parties. The tariff mechanism—whether a performance-based fee in management contract or cost plus or price cap methods in PPP contracts—and performance targets are normally captured in the contract, pursuant to which the delegating authority or other pays or “allows” the contracting party to be remunerated, or receive a specified return on its investment. There are also cases in which public service providers have “contracts” for performance that are monitored and, in a sense regulated, as in the case of Burkina Faso and Senegal. In Burkina Faso, regulatory mechanisms are enforced through a performance contract between the utility (ONEA) and the government. The *contrat plan*, or performance contract, is sanction free, and includes 20 to 30 target KPIs for technical, financial, and commercial performance of ONEA. Despite the fact that the contract does not provide penalties or rewards, ONEA has largely met its performance requirements (Mumssen, Saltiel, and Kingdom 2018).

Additionally, in Senegal, the urban water supply sector is governed by a system of contractual arrangements between the Ministère de l’hydraulique, Société des Eaux (SDE) and Société nationale des Eaux du Sénégal (SONES). For example, SONES, a public asset holding company, signs a sector planning contract

BOX 4.1. Effectiveness of Multisector Regulators: Inconclusive Evidence

The effectiveness of multisector regulators has been a subject of interest to policy makers and researchers; namely, whether predicted benefits of economies of scale (e.g., in high-caliber professionals, administrative support and services, development, and implementation) outweigh predicted dilution of technical sector expertise or the possibility of industry capture (World Bank 2011). Research shows multisector regulators have mixed results in the water sector, and no causal link between effectiveness of the regulator and its single- or multisector nature.

New South Wales and Victoria (Australia), Uruguay, and Costa Rica demonstrate mostly positive results. IPART in New South Wales is regarded as a technically sound regulator that has contributed to expanding and improving WSS services in the state. The same takes place with the Essential Services Commission (ESC) in the state of Victoria. In the case of Uruguay, the United Nation's (UN's) special rapporteur on the human right to water noted in 2012 that URSEA does not have the adequate capacity nor resources to monitor water quality for the population; however, this cannot necessarily be attributed to the multisectoral nature of the regulator (United Nations 2012). Despite this, Uruguay has a high coverage of WSS services and safely managed services. In Costa Rica, on the other hand, there is not much reported on the regulator as it pertains to the water sector, but the country has high levels of WSS coverage and safely managed services.

Yet a WSS PSP study in the Salta Province (Argentina) shows that having a multisector regulator (*Ente Regulador de Servicios Públicos*, ENRESP) has clear positive effects. In the first place, it allows for sharing resources among the different services regulated, including human resources and regulatory interventions in remote localities. Second, the regulatory system gains credibility by applying common criteria across the different services. And third, it increases regulatory independence because it limits the power of the concessionaires and politicians to influence ad hoc approaches for one sector, as it would have effects on other sectors as well (Saltiel 2003).

Perhaps most telling is the conclusion of a literature review on regulatory agencies with a focus on multisector regulation, which states that the views are “mixed on whether the multi-sector model indeed provides the expected gains, such as increased efficiency, sustainability and fairness, and eventually tangible contribution to infrastructure and economic development in a given country” (Hellerstein n.d., p. 5). The review finds that the use of, implementation, and success of multisector regulation depends on the context: a country's institutional framework, political realities, and economic and technical capacities (Hellerstein n.d.).

(*contrat plan*) with the ministry, which outlines its investment obligations, and SDE, traditionally a private company operating through an affermage arrangement, signs a performance contract with SONES. These contracts form part of the system of “regulation”: remuneration of both SDE and SONES depends on technical and commercial efficiency targets being met,

and in some cases with penalties applied if they are not met. Specifically, the private operator's remuneration is dependent on both leakage reduction (technical efficiency) and bill collection (collection efficiency) targets. Even state- or municipal-owned utilities, corporatized or not, are more and more regulated by contract, as it is the case of Agua y Saneamientos

Argentinos S.A. (AySA) in Buenos Aires in Argentina or the state companies in Brazil. In Europe, it is usual that the municipalities sign contracts with the municipal companies even if they own them.

Regulation through Corporatization and Commercialization

Corporatization might also provide an avenue for achieving regulatory objectives. Although corporatization experiences offer mixed results, some studies document improvements in efficiency and effectiveness of utility performance (van Ginneken and Kingdom 2008). There is near consensus that corporatization reduces the political pressure on employees and allows them to make decisions based on the principle of economic efficiency (Mumssen, Saltiel, and Kingdom 2018). In Latin America, corporatized water utilities are an alternative to privatization. Successful examples in Latin America include SABESP, COPASA, or Companhia de Saneamento do Paraná (Sanepar) in Brazil. São Paulo's mixed capital company SABESP opened its capital on the São Paulo Stock Exchange in 1994 to achieve efficiency improvements of public service delivery. By 2002, SABESP began listing its shares on the New York Stock Exchange, and today half of SABESP's shares are owned by the São Paulo government, and the remainder is traded publicly (Lentini 2015).

Swaziland provides an additional example. The Swaziland Water Services Corporation (SWSC) is a corporatized government-owned company. Its corporatization was embedded in a legal framework that ensured SWSC's autonomy in the management of the corporation, including allowing cost-reflective tariffs.⁴ The autonomy of SWSC has incentivized it to operate efficiently. In its drive to achieve efficiency, the management of the company has introduced its own incentive structures, such as bonuses for area managers who achieve their performance targets (Mumssen, Saltiel, and Kingdom 2018). Furthermore, Uganda and

Cambodia provide interesting examples of using the corporate charter with clear KPI targets and incentives as a different type of regulation by contract for public utilities.

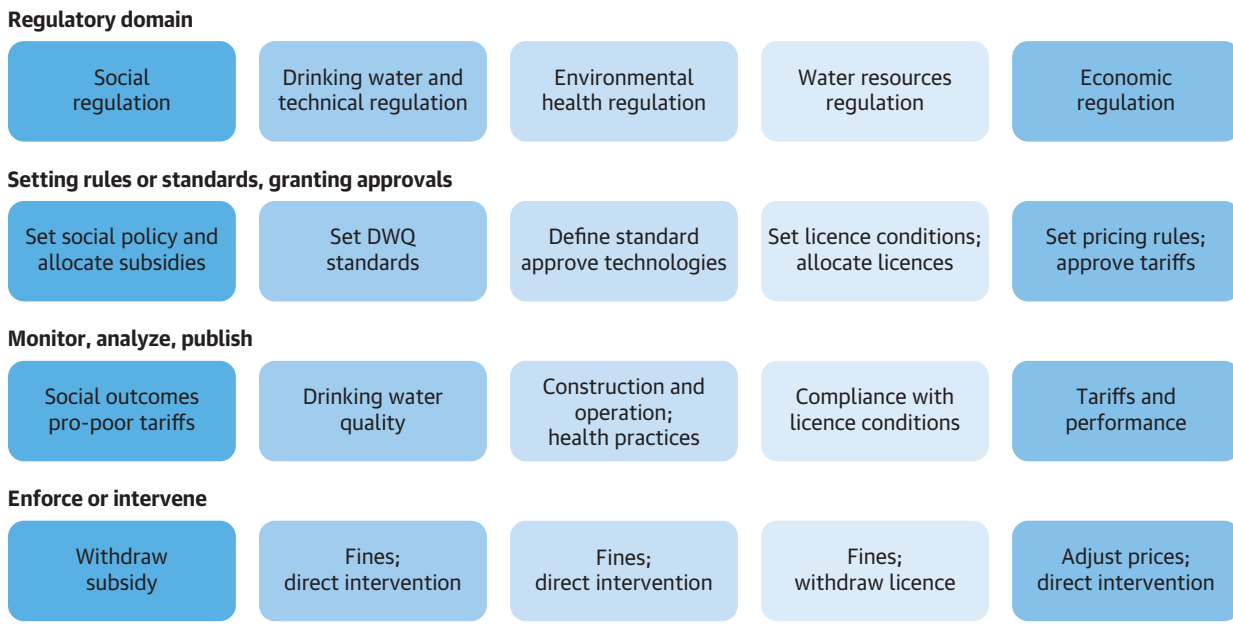
Finally, commercialization provides an in-built regulatory mechanism: markets, for example, through share prices (and dividend payouts) or credit ratings, can provide a strong regulatory discipline to WSS service providers, as we see in the United States. However, there are limited cases of this in LMICs, for example, Kenya and the Philippines.

4.3 Regulatory Functions

WSS regulatory functions can be narrowly or broadly structured. The review of regulatory regimes across a wide array of LMICs highlight that the main regulatory functions, as already identified in the literature review, relate to enhancing **financial sustainability** through appropriate tariff regimes and supporting a climate for investment; incentivizing **service quality** through performance monitoring and other means; and increasing **access**, including for the poor. The success of regulation in these areas is completely dependent on broader government support and political economy, including, for example, credibility of enforcement and punishment, as well as institutional alignment across government (e.g., ministries of finance, planning, water resources and environment, and health).

Figure 4.1 offers a useful way to think about WSS regulation in terms of what it entails: a matrix of (a) types of domains, such as tariff setting, drinking water, or substance clusters, and (b) types of functions, such as setting the rules, standards, tariffs; monitoring performance, compliance, analyzing and publishing the data; and intervening to enforce compliance including levy of fines or penalties. South Africa's WSS regulation covers many domains, including tariff setting, drinking water quality, environmental and health, water resources, and social regulation. In contrast

FIGURE 4.1. Regulatory Domains in WSS in South Africa



Note: WSS = water supply and sanitation.

to South Africa, Bangladesh’s Water Supply and Sanitation Regulatory Commission (WSSRC), for example, has a narrower mandate covering tariff setting and service standards, for WSS (Government of South Africa 2008).

Regulators utilize numerous tools to incentivize utilities to implement desired actions and achieve the stated sector objectives. For instance, performance management tools include performance benchmarking and yardstick competition whereby KPIs or other metrics are monitored and compared across utilities. Licensing is an additional method of enforcing minimum service quality and operational standards set by the regulator. Other tools include tariff setting, information and data collection, customer engagement, and the provision of capacity building. **Table 4.2** provides examples of regulatory arrangements and breadth of scope in a few countries where the

information was more readily available. Note that Portugal, whilst an OECD country, has been included in the table because its regulatory evolution is considered very relevant to LMICs in the context of this paper. More detailed information and additional country examples can be found in **Table B.1** in appendix B.

Improving Financial Sustainability

Different regulatory regimes are designed to incentivize implementation of a multitude of sector policies including financial sustainability, universal access, sustainable practices, and pro-poor policies. These include respective measures related to tariff methodologies. Regulatory regimes such as rate on return regulation and price-cap regulation aim to create financial incentives by providing opportunities for utilities to cover costs. This also plays a role in remedying cost information asymmetries between the utilities and regulator (Mumssen, Saltiel, and Kingdom 2018).

TABLE 4.2. Examples of Regulatory Arrangements in Selected Countries

Country	WSS institutional context	WSS regulatory form and arrangements	Summary of regulatory functions
Albania	Albania has high access rates; however, much of this infrastructure requires maintenance. Introduction of PSP policies in the 1990s led to creation of an independent regulatory agency: the WRA.	The WRA is directly accountable to parliament. The decision-making body is the NRC.	<ul style="list-style-type: none"> • Licensing and monitoring performance of WSS service providers • Tariff approvals of submissions by utilities • Monitoring and benchmarking the performance of service providers • Protect consumer interests, analyze consumer complaints and support complaint resolution • Administer penalties for nonperformance
Brazil	Highly decentralized, there are state-level water and sanitation companies, some municipalities and state companies have PSP.	No national regulator; different states have different regulatory arrangements both at state or municipal levels.	<ul style="list-style-type: none"> • Law of Fiscal Responsibility requires cost-reflective tariffs • Standards regulations are varied • Higher principles and rules set at the federal level, being implemented by the states and municipalities • National system of data collection
Burkina Faso	ONEA is the state-owned WSS provider and has performance contracts with GoBF and performance management contracts with private firms (Veolia).	Regulation of ONEA is through performance contracts that are assessed by an external auditor.	<ul style="list-style-type: none"> • Multiyear financial equilibrium model for regulating tariff adjustments • ONEA's contract with Veolia includes performance-based bonus/penalties above a fixed monthly fee
Colombia	Decentralized WSS. The WSS market is geographically concentrated with 40 largest utilities serving 70% of urban water users and majority serving small towns.	Water regulator (CRA) established in 1994 promotes competition, sets tariffs, and the Superintendence of Public Services monitors WSS utility performance. For private concessionaires, the contract itself stipulates the service standards and tariff methodology.	<ul style="list-style-type: none"> • Information and data collection • Improving financial sustainability • PSP was stimulated, total of 37 municipalities adopted PSP between 1995-98, but did not incentivize PSP in smaller municipalities
Kenya	WASREB created 2003; 47 water development boards one for each county and currently 91 WSPs.	WASREB's mandate is derived from the 2002 Water Act, set up as an independent, single-sector regulator.	<ul style="list-style-type: none"> • Regulatory tools include license, drinking water guidelines, service standards, NRW standards, tariff guidelines, compliance strategy, and consumer engagement rules. Key regulatory outputs include (a) WSP Creditworthiness Index and (b) WSP performance benchmarking reports

table continues next page

TABLE 4.2. Continued

Country	WSS institutional context	WSS regulatory form and arrangements	Summary of regulatory functions
Mozambique	Challenges include (a) inadequate infrastructure and access; (b) poor financial sustainability; and (c) weak institutional capacity. Urban WSS services devolved in the largest cities; and rural WSS services are decentralized to local government.	The Water Supply Regulatory Council of Mozambique, CRA-Mozambique, reports directly to the Ministry of Public Housing. CRA-Mozambique receives funding through a regulatory levy on gross annual revenues.	<ul style="list-style-type: none"> • CRA-Mozambique is responsible for promoting, monitoring and advising on the design of delegated management contracts • Review and approval of tariffs • Consumer protection • Regulation of service quality • Promote and improve the delegation of water supply services to third parties
Philippines	Service provision is decentralized to local government and supported by DPWH.	Manila has two concessionaires regulated by the Regulatory Office of MWSS and sets rules for tariff adjustment; National Water Resources Board regulates all service providers outside of Manila/MWSS.	<ul style="list-style-type: none"> • MWSS regulates the concessionaires by contract, LWUA regulates water districts, and NWRB regulates other licensed service providers. Regulated entities appear for public hearings for tariff approval
Portugal	Portugal's municipalities are responsible for WSS service provision, however multi-municipal systems exist for bulk water and wastewater treatment systems.	ERSAR, established in 2009, is mandated to improve market efficiency and protect consumers. ERSAR replaced IRAR (Instituto Regulador de Águas e Resíduos) which had been created in 1997 as an autonomous but not independent regulator.	<ul style="list-style-type: none"> • Benchmarking of KPIs across three main areas: utility sustainability, interface with consumers, and environmental sustainability • Monitoring of concession contracts • Tariff regulation of multi-municipal systems • Supervision of cost recovery principle imposed by law
Zambia	Urban WSS services provided by 11 utilities and 6 private schemes. A new National Water Policy was introduced in 1994, which seeks to separate regulatory and executive functions, devolution of authority to local authorities and private enterprises, achievements of full cost recovery, and human resources development.	NWASCO is an independent WSS regulator. It is funded through a 2% levy utility revenues as well as some government funds.	<ul style="list-style-type: none"> • Licensing • SLGs • Regulation by incentive scheme. Two institutional incentives are offered for achieving service-level guarantees. This includes equipment and staff incentives systems. NWASCO would monitor and audit performance data and grant the incentives on positive improvements • WSS performance guidelines • Tariff approval and negotiation • Special regulatory supervision of poor performing utilities • Monitoring and regular reporting

Note: CRA = Comisión de Regulación de Agua Potable y Saneamiento Básico; DPWH = Department of Public Works and Highways; ERSAR = Entidade Reguladora dos Serviços de Águas e Resíduos; IRAR = Instituto Regulador de Águas e Resíduos; KPI = key performance indicator; LWUA = Local Water Utilities Administration; MWSS = Metropolitan Water Supply and Sewerage; NRC = National Regulatory Council; NRW = nonrevenue water; NWASCO = National Water Supply and Sanitation Council; ONEA = Office National de L'Eau et de L'Assainissement; PSP = private sector participation; SLG = service level guarantee; WRA = Water Regulatory Authority; WASREB = Water Sector Regulatory Board; WSP = water service provider; WSS = water supply and sanitation.

a. Building a Solid Analytical Foundation

Tariff regulation is complicated, requires data, the appropriate political will, and time. As demonstrated by the examples herein, one of the problems in LMICs is that there is a trend, sometimes influenced by consultants and international institutions, to implement too sophisticated (and ambitious) approaches often with black box techniques, which are not obviously understood and therefore not transparent. Rather, it can be preferable to initially design a simple and transparent approach, usually through a rate of return- (cost of service)-type regulation. Even the most successful case studies in OECD countries, for example, Australia, started with rate of return regulation and only later did they move to performance-based (price cap-based) regulation.

Moreover, in some cases it is recommendable not to have tariff regulation at the beginning due to the limitations of information and capacity. The focus should be on quality of service regulation (standards and levels of service). This took place in Portugal, where regulation in the first decade was based only on technical performance and service quality standards. Today, 20 years after the creation of the regulator (1998), implementation of tariff regulation is under discussion. In the past, the regulator issued only non-binding opinions regarding contract renegotiations and multi-municipal tariffs for bulk water and wastewater treatment companies. The same took place with ESC in Victoria State in Australia. Only after several years of quality of service regulation did the regulator start to set tariffs.

In Colombia, a phased approach was adopted to tariff reform wherein it focused first on acquiring unit costs and standardizing accounting norms used by utilities, followed by introducing efficiencies to fully reflect operational costs first and then increasingly investments.

In Albania, the tariff setting process is initiated by WSS utility companies, which propose tariff levels for approval from the Water Regulatory Authority (WRA) according to the established methodology. The WRA has the responsibility to ensure that tariffs appropriately reflect costs to

ensure financial sustainability of WSS utility companies, while also protecting customers from monopolistic prices and ensuring affordability. While tariffs were previously based on social considerations, WSS utility companies can now set tariffs based on their real costs. Obligatory WRA approval means the WRA has the right to scrutinize tariff proposals, including appropriateness of costs. The tariff calculation methodology includes an investigation of the costs of WSS service provision. This forces the WSS utilities to look at their costs, which could lead them to identify inefficiencies that can be addressed to reduce costs (Mumssen, Saltiel, and Kingdom 2018).

In Mozambique, tariffs were previously set well below cost-recovery levels, which meant that public sector service providers were losing money on every unit of water supplied. With the poor financial state of public finances, government could not continue to provide subeconomic WSS services while at the same time investing in the sector. Thus, the government introduced cost-reflective tariffs that also incentivized private sector participation (PSP) in the sector, although there is still some way to go to improve performance standards and financial sustainability (Mumssen, Saltiel, and Kingdom 2018).

Another interesting attempt at enhancing financial sustainability through regulatory processes is taking place in Egypt. At the time of this writing, a draft law is being considered in which tariff formulation is split between economic and social tariffs: economic tariffs would be required for the utility to recover costs, while the social tariff recognizes that some form of subsidy would be required in some cases. The regulator is tasked with determining the different tariff levels (details are still being developed).

b. Financial Modeling

Financial modeling may serve as a useful, more effective tool for tariff setting. ONEA in Burkina Faso has successfully developed a financial model agreed with a private company and stipulated in a performance-based

management contract. The goal was the corporatization of ONEA governed by performance contracts between the government and ONEA. The actualization of these contracts was made possible by engaging a private company, Veolia, whose mandate was to achieve stipulated commercial improvements as well as coach and mentor ONEA to improve its ability to deliver WSS services. The remuneration of Veolia was based on a financial model designed to help ONEA achieve “break even” status or financial equilibrium and was used to set tariffs. The key regulatory incentive is said to be consensus among all parties (government, ONEA, Veolia) regarding the tariffs so all parties stayed the course. Without detailed information, it can be said that two interlocking agreements—the performance contract with ONEA and the management contract (with the financial model) with a private company—should reinforce each other because the latter guarantees the success of the former. Thus, all three parties have incentives to make both agreements work because they are linked. However, it is not clear how the financial model was built and what the cost information was or where it came from (Mumssen, Saltiel, and Kingdom 2018).

c. Implementing Blended Finance

A combination of concessional and commercial sources of financing will be needed. “Blended finance” (Leigland, Trémolet, and Ikeda 2016) is the use of concessional finance to mobilize commercial finance. Given their monopoly in the provision of an essential service, WSS utilities should be a long-term source of revenue generation that would be attractive to private financing. The regulator has a role to play in this area. For example, in Mexico, institutional and regulatory reforms implemented during the 1990s and 2000s facilitated the growth of a subnational securitization market. With the objective of supporting a local water conservation project, the Municipality of Tlalnepantla de Baz (Mexico) and its municipal water company Organismo Público Descentralizado Municipal (OPDM) issued unsecured revenue bonds on the local capital market through a specially created trust. The bond, issued in local

currency, was bought by domestic institutional investors. Mexico’s case exemplifies the important role of legal and regulatory frameworks in supporting capacity of subnational governments to engage in innovative financing practices.

d. Assessment of Creditworthiness

WSS regulators can prepare utilities to access financing by doing their job more rigorously, helping to improve the commercial and performance outlook of service providers. An interesting tool implemented in a few countries is development of a creditworthiness index, which is designed to specifically monitor financial performance of service providers. The creditworthiness index is a proxy rating that provides lenders with an initial overview credit screening of WSS service providers and serves as a regulatory tool to help attract investment to the sector.

Regulation played a key role in facilitating increased access to commercial finance for utilities in Kenya. In 2002, a Water Act was introduced that has created the enabling environment for improved financial viability. Specifically, the act establishes utilities as autonomous entities, has ring-fenced revenues within the sector, has created the role of an independent regulator, and has established a framework for utilities to implement cost-reflective tariffs. Demonstrating creditworthiness is an important way to attract commercial finance so as to inform lenders and help them overcome their lack of familiarity with the sector. To that end, the Water Services Regulatory Board (WASREB) developed a mechanism to assess creditworthiness of utilities in Kenya. The result was the production of 43 utility shadow credit ratings to help inform investors’ decisions and their perception of the risk of investing in Kenyan WSS utilities. Key creditworthiness indicators included in the tool include net profit margin, operating cost recovery ratio, debtor days (number of days to collect monies billed), collection efficiency, billing efficiency, NRW, debt service coverage ratio, cash coverage ratio, and a size versus rating comparison.

The ratings also provide utilities with a diagnostic tool to help them identify problem areas. Based on these early efforts, WASREB is in the process of developing a creditworthiness index to assess the credit risk of utilities on an annual basis, with a view to improve transparency and attract commercial financing into the sector (World Bank 2016a).

Similarly, in the Philippines, legal and regulatory reforms were implemented to facilitate mobilization of domestic finance sources. An executive order was issued in 2004, which installs modifications for financing policies of local WSS service providers. This led to development of a system by which WSS service providers are categorized based on their level of creditworthiness. Those qualified as creditworthy were expected to mobilize market-based financial resources (World Bank 2016a). Regulatory reforms are attributed to the success of creating the right enabling environment to attract commercial financing for service providers (World Bank 2016a).

e. Attracting Private Sector Investment

Colombia's experience showcases the successful role of regulation in attracting PPP. A key element of the central government public utility reform agenda was the promotion of private sector management. Accordingly, Law 142 of 1994 defines PSP within the sector (Andres, Sislen, and Marin 2010). This includes the principle of maximizing competitive forces through transparent bidding and award processes. It establishes minimum requirements for contracts and provides a coherent set of performance indicators that serve as the basis for contract supervision and control and tariff setting. The framework is also intended to provide for consistency between the private sector contracts, municipal development plans, and sector policy. The framework established for PPPs in WSS is broad enough to permit and support a variety of PPP schemes. Between 1995 and 1998 private sector operators emerged in 37 municipalities in a variety of PPP models. It tapered off, however, and ultimately the uptake of private sector options was less than hoped (Andres, Sislen, and Marin 2010;

World Bank 2011). Nonetheless, in a review of 118 cities served by 77 utilities in Colombia, PPP has been associated with higher access, increased coverage, higher utility efficiency, lower NRW, and improved labor productivity in comparison with the pre-PPP period (Andres, Sislen, and Marin 2010).

Colombia's regulatory framework is complex and is further complicated by the decentralized nature of the WSS sector, as well as the existence of a wide variety of public and private service providers. Nonetheless, it appears that Law 142 of 1994 and the issue by CRA of a tariff methodology in 1995 was to a large degree effective in creating an enabling environment for and greatly stimulated PSP in the sector (Andres, Sislen, and Marin 2010). In situations in which private service providers operate under concession contracts with a municipality, the general practice is for the contract to set service standards and tariffs, which are to be monitored and enforced by the municipality (Ehrhardt et al. 2007).

However, Colombia implements a centralized methodology for tariff and service standard setting that is enforced by multiple public bodies across all public and private service providers. This separation of regulatory powers is deliberate, because Colombian administrative tradition requires that a single body should not be responsible for both making and enforcing rules (World Bank 2015): the CRA establishes the tariff setting methodology. Providers set their own tariffs in accordance with this methodology (or apply to the CRA to set the tariffs a different way); and service standards are set by the Ministry of Economic Development. The public services superintendent (SSPD) monitors the providers to verify that they are following the tariff setting rules and complying with the service standards.

Improving Service Provider Performance

a. KPIs and Benchmarking

Performance monitoring tools involve establishment of metrics by which services are monitored. Examples of indicators include coverage levels, hours of supply,

staff costs, collection, and efficiency. This is one of the main regulatory functions of regulators in LMICs, as it is in OECD countries such as the United Kingdom and Australia. However, challenges related to data availability, financial and technical resources, and monitoring and enforcement are undeniably much more severe in LMICs. These are compounded when the political economy does not provide credible institutional incentives to the key stakeholders. But, there are varying degrees of success.

Zambia is an interesting example of a relatively good alignment of incentives for public sector WSS service providers. As part of WSS sector reform, Zambia created an independent water regulator, NWASCO, with a mandate to regulate newly corporatized commercial utilities (CUs) that are owned by local authorities and incorporated as utilities for service provision. NWASCO created a performance enhancement and reporting mechanism based on selected metrics and used that reporting to both compare utility performance and provide small financial incentives to high performers. The performance ranking system based on metrics, benchmarks, and weightage points results in a performance scorecard that is publicly available, and winners or top-ranking utilities are rewarded. The 2015 KPIs included water quality, collection efficiency, metering ratio, hours of supply, operations and maintenance (O&M), cost coverage by collection, NRW, staff efficiency, water coverage, sanitation coverage; final ranking based on: [indicator weight] x [score against benchmark] x [CU performance] = final score (Mumssen, Saltiel, and Kingdom 2018).

Performance management using benchmarking and monitoring KPIs is widely implemented across Latin America. A recent study (Marques, forthcoming) on WSS regulation in Latin America highlights that 13 countries out of 20 have sector-specific regulation and all of them in some way use KPIs in their regulatory tasks. Benchmarking generates competition between service providers and creates the incentive to improve performance, and public disclosure of utility

performance indicators can highlight poor performing utilities (Mumssen, Saltiel, and Kingdom 2018). Some countries in Latin America have developed information systems that collect, organize, and (to a greater or lesser extent) disseminate data from service providers at the national level. Among these systems, the performance indicators and regulatory benchmarking of SUNASS (Peru) stand out (Lentini 2015).

Peru offers an alternative method of performance management whereby SUNASS develops weighted performance indicators that are calculated in to a single score for WSS services. A similar scheme is adopted by WICS in Scotland. Additionally, performance results could be reflected in tariff setting procedures to reflect rewards or penalties; this is implemented in Chile (Marques, forthcoming). **Table A.1** In appendix A, developed by Marques (forthcoming), provides a summary of performance management methods implemented by regulators across Latin America.

A particular advantage of the use of KPIs in performance regulation is enforcement of sunshine regulation. Sunshine regulation consists of the public disclosure, comparison, and discussion of a set of performance metrics often based on KPIs. Accordingly, poor performance of service providers is publicly exposed incentivizing service providers to improve performance. Its impact is particularly effective in improving the quality of services. The examples of the State of Ceará in Brazil or of Zambia are noteworthy as well as the case of Portugal or the State of Victoria in Australia. **Box 4.2** shows the regulatory model adopted in the State of Ceará in Brazil for service quality regulation.

In the Philippines, performance management responsibility is fragmented across different institutions. Private operators are regulated through concession agreements with the government, which specify target KPIs, and business efficiency measures (BEMs), which are monitored by the MWSS and the Local Water Utilities Administration. Local government units monitor performance of public systems. Additionally, in

BOX 4.2. Regulation of Quality of WSS Services in the State of Ceará, Brazil

In the State of Ceará, in Brazil, WSS services are regulated by the Regulatory Agency of Delegated Public Services of the State of Ceará (ARCE, or Agência Reguladora de Serviços Públicos Delegados do Estado do Ceará in Portuguese). ARCE undertakes numerous functions of economic regulation, including service quality regulation. ARCE adopts sunshine regulation as its main regulatory method for service quality regulation, which is based on comparison, disclosure, and public discussion of the performance results of the regulated entities obtained through a set of KPIs. The objective of this regulatory approach is to “name and shame” the service providers that perform poorly so that they will more likely improve their performance. To this purpose, the regulator defines a set of 16 KPIs for water supply and 11 for sanitation. These KPIs have been structured into different categories of indicators, such as those related to the service provision, economic and financial sustainability, and environmental sustainability. Moreover, ARCE issues comments regarding the results of each indicator. This assessment is carried out through a scoring system that compares the performance obtained with target values (optimum values that the regulator considers to be reasonable and likely to be reached by the service providers), taking also into account the operational environment in which each service provider serves. ARCE categorizes the performance of each service provider in qualitative terms such as excellent, good, average, or poor, communicating them to stakeholders by a color system.

Source: Marques, forthcoming.

Albania, the WRA monitors and benchmarks performance as part of the license conditions of the utilities. An annual performance report made publicly available, includes performance ranking of utilities (Mumssen, Saltiel, and Kingdom 2018).

In Tanzania, EWURA undertakes performance monitoring responsibilities using a web-based software that allows utilities to submit performance data on a monthly basis. EWURA also carries out site inspection in order to validate the data received. Performance review reports are drafted annually, and best performing utilities are rewarded for their performance achievements.

b. Licensing

Licenses are another tool available to regulators, which allow them to impose WSS service standards on service providers (OECD 2015). Service providers are provided operational permits (usually for a fee) to provide services based on agreed standards (OECD 2015). For instance, in Albania, the WRA is responsible for

licensing of WSS service providers that meet licensing criteria and monitors the performance of licensees to ensure they meet stipulated conditions (Mumssen, Saltiel, and Kingdom 2018).

c. Performance Management through Regulation by Contract

Burkina Faso offers a different experience whereby performance improvements were achieved through implementation of public-to-public performance contracts (contract plans) between the government and the public service provider. The contracts have successfully incentivized efficiency and productivity gains. ONEA has traditionally been regulated by three-year contract plans. The main features of the performance contract include KPI targets for technical, financial, and commercial performance by ONEA, with between 20 and 30 indicators (Mumssen, Saltiel, and Kingdom 2018). From the mid-2000s performance against the indicators has been assessed by an external technical auditor and a follow-up review committee

comprising representatives of the government and ONEA as well as representatives of consumer organizations. The committee meets three times annually and submits a report to the board of directors of ONEA. Despite the fact that the performance contract does not provide for penalties or rewards, ONEA has largely met its performance commitments, and the contract has been largely successful in facilitating dialogue and building alliances between the government and the service provider (WSP 2009).

Moreover, Mehta et al. (2009) find that the performance contract has been effective in part due to the fact that the agreements are short and simple, with clear responsibilities, include a relatively realistic set of indicators, and specify reporting requirements and monitoring and auditing arrangements. However, challenges have been faced during contract development and enforcement including the bidding process, risk management and sharing, and regulatory tools available to ensure contract enforcement.

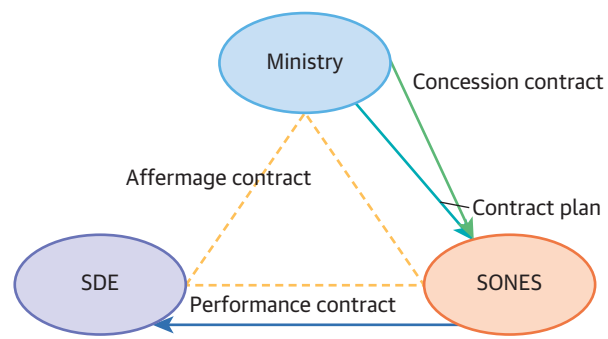
d. Performance Management through PPP Contracts

Senegal also provides an interesting example of performance regulation by contract. In Senegal a performance contract is enforced between the Ministère de l'hydraulique, the SDE (private utility operator) and SONES, the state asset holding company, which is authorized to manage the sector through a 30-year concession contract signed with the state, represented by the ministry. A 10-year affermage contract governing operation of the system is signed between three parties: the state, represented by the ministry, SONES, and the SDE. The contract plan establishes SONES's investment obligations and informs bidders of future investments. In such an affermage arrangement, the operator is a surrogate provider for the government, in charge of WSS services. The operator is usually paid for every cubic meter of water sold and thus is incentivized to reduce leakage. In the case of Senegal, the design of the contract integrates incentives through the remuneration formula. The operator's remuneration is dependent on both leakage reduction (technical

efficiency) and bill collection (collection efficiency) targets. The remuneration formula shares commercial risks and so generates positive incentives to the different stakeholders to make the system work. Remuneration of both the SDE and SONES depends on technical and commercial efficiency targets being met, with penalties applied to the SDE if they are not met (Mumssen, Saltiel, and Kingdom 2018). **Figure 4.2** clarifies the different institutional relationships within the urban WSS sector.

In Burkina Faso, ONEA entered an innovative five-year, performance-based management services contract with Veolia, pursuant to which Veolia provides management support to the commercial and financial departments of ONEA in return for a fee comprising both fixed and performance-based components. The contract was subsequently extended for one year. During the term of the PPP contract, water became available on a continuous 24/7 basis in Ouagadougou, staff productivity improved by 60 percent, and collection of bills from private customers increased by 11 percent to 94.5 percent. ONEA was profitable throughout the term of the PPP contract. Although NRW increased slightly at the early stages of the contract due to increased physical losses, commercial losses fell significantly. Average customer tariffs in constant terms (excluding value added tax [VAT])

FIGURE 4.2. Senegalese WSS Regulation by Contract



Note: The Ministry refers to the Ministère de l'hydraulique. SDE = Société des Eaux; SONES = Société nationale des Eaux du Sénégal.

decreased by 7 percent; but at around US\$0.71 per cubic meter on average, they remained high by the standards of neighboring countries (Fall et al. 2009). It is important to note that the improvements have been sustained since the conclusion of the contract (Mumssen, Saltiel, and Kingdom 2018).

There are many examples of WSS service quality regulation through PPP contract. Albania provides an additional example whereby a performance-based contract was signed for the management of water utilities in Durres, Fier, Lezhe, and Saranda. The contract ended in 2008 and was successful in improving service quality, as well as operational and financial performance. All indicators showed improvement in service quality, and the gap between tariff revenues and costs was significantly reduced. However, the private operator fell short of the improvements in service quality to which it contractually agreed. Additionally, while the contract oversaw a persistent rise in tariffs toward a sustainable level that would eventually cover costs, the operator did not fully achieve financial sustainability before the end of the contracted period.

An additional example is in China whereby a French-Sino consortium operated water supply services in the economy of Macau SAR, China, in 1985 through a 25-year concession contract. The sound performance of the contract, both in operational and financial terms, led the Chinese government to award a renewal of the contract for an additional 20 years, until 2030. In 2016, Macau SAR, China, water boasted a low level of 10.3 percent of NRW and a staff productivity of 1.1 employees per 1,000 customers along with an average tariff of US\$0.59 per cubic meter (based on a domestic consumption of 10 cubic meters per month). Other interesting examples are in Guayaquil, Ecuador; Barranquilla, Colombia; Bucharest, Romania, and Sofia, Bulgaria.

e. Regulation by Corporatization

Regulation by corporatization can be effective in incentivizing improved utility performance. Uganda and

Cambodia provide interesting examples of using the corporate charter with clear KPI targets and incentives as a different type of regulation by contract for public utilities. Uganda's National Water and Sewerage Company (NWSC) became a separate corporate entity from the ministry with a clear mandate to achieve service targets. NWSC leadership formed staff in task teams with some room to explore solutions and improve performance with minimal strategic oversight and strong gain sharing incentives. Between 1998 and 2010, the NWSC made impressive service improvements including expanding coverage from 48 percent to 74 percent, reducing NRW from 60 percent to 33 percent, improving collection efficiency from 65 percent to 98 percent, increasing metered accounts from 65 percent to 100 percent, and a revenue turnover increase from US\$11 million to US\$65 million. The NWSC now has an external services consulting unit that provides technical assistance to WSS utilities in Ghana, Kenya, Zambia, Tanzania, and India. Cambodia's PPWSA is another example of a prior department being corporatized into an autonomous company and has improved its services dramatically.

There is a worldwide trend toward contractualization even between public entities, between service providers, and the owners, which tend to be distinct entities. These contracts can be concession contracts, delegated management contracts, program contracts, or even statutes of the companies in which the rights and duties, including performance standards, are defined. This happens more and more not only in upper-income countries but also in LMICs. For example, in Brazil all state companies, including Companhia de Saneamento Básico do Estado de São Paulo S.A (SABESP), COPASA, Companhia Catarinense de Águas e Saneamento (CASAN), and Companhia Espírito Santense de Saneamento (CESAN) have program contracts with municipalities that are the owners of the services. In Argentina, AySA and most other companies have contracts with provinces or municipalities that are the owners of the WSS facilities.

For example, in Portugal municipal companies sign delegated management contracts (besides the statutes of the companies) with municipalities that are the owners of the WSS service facilities. These contracts have a duration of five years (after that they need to be updated) and have some standard annexes, which include, at least, performance standards of the company; strategic objectives of the company; investment plans; noncore services provided that need to be billed separately (e.g., storm water); and the tariff system trajectory (fixed for the five-year periods).

Increasing Accountability, Transparency and Consumer Voice

Regulators can be instrumental in institutionalizing citizen engagement and consumer protection mechanisms that can enhance accountability, performance, consumer responsiveness and awareness, and governance issues in general. Consumers are key in determining which services they find relevant, convenient, and affordable. Accordingly, clear and publicly agreed standards for service delivery are crucial (WSP 2007). Conflict resolution is an additional mandate that can be enforced by regulators. In Peru, for example, an Administrative Court for Complaints Resolution (TRASS) is housed within its national regulator SUNASS. TRASS is responsible for resolving consumer complaints related to billing, operational, and commercial issues. Uruguay has also established a Protocol of Procedures for Conflicts.

Additionally, Zambia's NWASCO has designed an innovative mechanism for engaging with water users. Water watch groups (WWGs) operate in 12 Zambian towns to improve NWASCO's footprint in service areas. WWGs are made up of volunteers from the community who are trained on aspects of WSS service delivery, reporting, and dispute resolution. WWG members help users to know their rights, file complaints, and verify service information provided by the service provider. This type of mechanism may not work in some environments, but if culturally appropriate it can be effective in providing a

counter to the utility's functioning and serve as the eyes and ears of the regulator on the ground (Mumssen, Saltiel, and Kingdom 2018). An additional example is that of the WRA of Albania, which publishes annual performance reports publicly and includes performance ranking of utilities. Performance ranking also serves as a tool to improve accountability by making consumers aware of how their service providers are performing (Mumssen, Saltiel, and Kingdom 2018).

Furthermore, regulators in the Latin American region implement adequate stakeholder engagement mechanisms; however, there are cases in which no formal consultation procedures are implemented, particularly in Brazil. **Table 4.3**, developed by Marques (forthcoming), offers a summary of the different stakeholder engagement practices implemented by regulators across the region.

Pro-Poor and Non-Network Services Regulation

Pro-poor and non-network services regulation aims at developing regulatory instruments to provide or improve the access of the poorest to WSS services at affordable prices. Implementation of pro-poor and non-network services regulation is especially relevant to LMICs because a majority of citizens in these countries are not connected to the water networks of major public service companies: they live below the poverty line and cannot finance a connection, or they live too far from the networks (this is particularly the case in the peri-urban areas of major cities, small towns, or rural areas) (Mumssen, Saltiel, and Kingdom 2018). This situation is prevalent across the LMIC context and calls for regulatory interventions that are best fit to address the challenges of providing sustainable services that are unique to poorer communities. In addition to social tariffs, other areas of pro-poor regulatory interventions include incentivizing differentiated levels of service and regulating on-site sanitation and informal service providers. **Box 4.3** provides a summary of pro-poor regulatory mechanisms, some of which are elaborated further in this chapter (Mumssen, Saltiel, and Kingdom 2018).

TABLE 4.3. Summary of Stakeholder Engagement Practices in Latin America

Regulator	Public participation
ERAS and others (Argentina)	Although public hearings are promoted, there is no register of that on the regulatory activity. There is a board for users (Sindicatura de Usuarios). Existence of formal consultation processes include public hearings and participation in consultation responses. Promotes the evaluation of users' satisfaction.
AAPS (Bolivia)	Public hearing is promoted, but there is no register of that on the regulatory activity. Existence of formal consultation processes include public hearings and participation in consultation responses.
Brazil (several)	Some regulators promote public hearings. Users are able to complain to the regulator. Existence of formal consultation processes including public hearings and participation in consultation responses.
SISS (Chile)	SISS promotes training days (<i>SISS Capacita</i>). Existence of formal consultation processes including public hearings and participation in consultation responses. There is an advisory board for civil society (Consejo de la Sociedad Civil).
CRA (Colombia)	Promotes public participation, through complaints, suggestions, and chat. Existence of formal consultation processes including public hearings and participation in consultation responses.
ARESEP (Costa Rica)	Although public hearings are promoted, there is no register of that on the regulatory activity. Existence of formal consultation processes including public hearings and participation in consultation responses.
ERSAPS (Honduras)	Promotes public hearings through the website and local trainings (<i>capacitaciones</i>), on legal and regulatory aspects. Existence of formal consultation processes including public hearings and participation in consultation responses.
INAA (Nicaragua)	Public hearings are promoted; however, there is no register of that on the regulatory activity. Existence of formal consultation processes including public hearings and participation in consultation responses.
ASEP (Panama)	Public hearings are promoted, publicizing regulatory activities through public hearings. Existence of formal consultation processes including public hearings and participation in consultation responses.
ERSSAN (Paraguay)	Public hearings are promoted, but there is no register of that on the regulatory activity. There are formal consultation processes including public hearings and participation in consultation responses.
SUNASS (Peru)	Regulatory activities are publicized through public hearings. Existence of formal consultation processes including public hearings and participation in consultation responses.
URSEA (Uruguay)	Main practice is through public hearings. Promotes the evaluation of users' satisfaction. Existence of formal consultation processes including public hearings and participation in consultation responses.

Note: AAPS = Autoridad de Fiscalización y Control Social de Agua Potable y Saneamiento Básico; ARESEP = Autoridad Reguladora de los Servicios Públicos; ASEP = Autoridad Nacional de Servicios Públicos; CRA = National Water Regulatory Commission; ERAS = Ente Regulador de Aguas y Saneamiento; ERSAPS = Ente Regulador de los Servicios de Agua Potable y Saneamiento; ERSSAN = Ente Regulador de Servicios Sanitarios; INAA = Instituto Nicaragüense de Acueductos y Alcantarillados; SISS = Superintendencia de Servicios Sanitarios; SUNASS = Superintendencia Nacional de Servicios de Saneamiento; URSEA = Unidad Reguladora de Servicios de Energía y Agua.

a. Universal Service Standards

Universal service standards could be an efficient and effective way to benefit the poor. Regulators could utilize a number of tools to expand access of WSS services to the poor. For instance, regulators could provide clear coverage targets for service providers (with enforceable penalties if targets are unmet). However, coverage targets can often be vague due to problems of definition, lack of data, and ambitious levels. In other cases, the lack of financial resources

constrains ability to achieve targets. For this particular reason, utilizing incentives to foster coverage expansion may be a more appropriate solution. Regulation (by contract, agency, or other) could allow for performance-based instruments such as output-based aid (OBA) to subsidize costs of installation of water connections for the poor, supporting the incentive regimes while ensuring through appropriate financial modeling the sustainability of the interventions. In Manila, OBA is being used to extend access to water

BOX 4.3. Pro-Poor Mechanisms in LMICs

Regulatory mechanisms used to better serve the poor (specifically the urban poor) include the following:

- *Price and service or quality differentiation*: relaxation in quality of services to ease access of the poorest, coverage targets tied to locations rather than statistics, and use of public information campaigns (Baker and Trémolet 2000a; Stallard and Ehrhardt 2004).
- *Tariffs and subsidies*: tariff reform to remove disincentives to serving the poor, and better targeting of subsidies to reach the unconnected poor, including possible focus on connection subsidies and direct transfers to consumers (Franceys and Gerlach 2008; Trémolet and Browning 2002).
- *Incorporating alternative service providers*: through light-handed regulation that replaces price and quality regulation with public performance data (Trémolet and Browning 2002), or demand minimum requirements such as licensing, drinking water tests and/or maximum prices, relaxing exclusivity rights of utilities, assisting providers to obtain legal rights and addressing land tenure issues.
- *Customer and civil society*: including the use of participatory and survey techniques to increase customer involvement, and accessible and inclusive regulatory processes (Brocklehurst 2002; Stallard and Ehrhardt 2004).
- *Service obligations and universal service obligations*: the use of obligatory service (compulsory service to all wishing to connect under the current tariffs) and universal service obligations (USOs), which extends this to promotion of *socially* desirable consumption through tariff control (Franceys and Gerlach 2008).

A good example of pro-poor regulation incorporating alternative service providers can be found in the institutional changes for pro-poor financing in Zambia. In 2003, Zambia established the Devolutionary Trust Fund (DTF) to improve WSS coverage in peri-urban and low-income areas, administered by NWASCO. The DTF is a basket of three funds: the General Fund for Water, the General Fund for Sanitation, and the Performance Enhancement Fund targeting WSS service. DTF's General Funds target low-cost, high-impact projects such as water kiosks, water meters, improvements on pipelines, and sewerage pipes. Experience with DTF has been very positive. It has proven itself effective in distributing governmental and external funds to improve the WSS sector in peri-urban Zambia.

Source: World Bank 2016b.

services for poor households. The project subsidizes water connections for households under the poverty line. Connection subsidies are paid directly to the Manila Water Company (MWC) for every new water connection that is installed and operating. Other OBA arrangements have been implemented to increase access to the poor in Morocco, Cameroon, Kenya, Colombia, and Uganda with either private operators

extending coverage through contractual incentives, or even through SOEs.⁵ There is not yet much experience to date of regulatory agencies intervening in OBA-type approaches—most of the experience documented to date is regulation by contract—but what is clear is that this is a performance-based tool regulators may consider when targeting subsidies to increase access for the poor.

b. Social Tariffs

As explained in chapter 3, lifeline rates can be introduced when low-income consumers already have access to WSS services. However, it is important to note that subsidy schemes specifically target households that already have access to WSS services (albeit unaffordable) and do not benefit the poorest and most vulnerable populations lacking access all together. Relatedly, implementation of social tariff schemes is often cited as one of the key regulatory challenges in Latin America (Marques, forthcoming). Although cross-subsidized tariffs are widely implemented, this is often inadequate to provide access and deliver services to low-income groups, so other tools may be used with the cross-subsidies. For example, in Chile approximately 600,000–800,000 poor households pay subsidized WSS tariffs on an annual basis, accounting for almost 13.5 percent of total clients in 2015—allowing service providers to raise the tariffs as needed to ensure the sustainable operation of the utility (Baer 2017).

Additionally, in Colombia, households are categorized in six strata, in which strata 1 represents the poorest and strata 6, the richest portion of the population. This categorization allows targeting subsidized rates to the poorest households, and taxed rates to the wealthy portions of the population (Meléndez 2007). **Table A.2** in appendix A, developed by Marques (forthcoming), outlines some of the different methods by which subsidies are implemented in Latin America and the role of the regulator in doing so.

It is important to note that these tariff structure approaches rest on a number of assumptions that in many cases have been proven incorrect in practice. As mentioned, the tariff structure could assume that poor households have metered access to water services, which is often not the case (Trémolet and Binder 2009). In Kenya, for example, less than 25 percent of customers are metered. Where no meter is installed, a monthly flat fee is charged at approx. US\$2.56, whereas the first tariff block for consumption up to 10 cubic

meters is charged US\$0.18. Moreover, Trémolet and Hunt (2006) cite a review of tariff structures in seven countries across Africa (Burkina Faso, Kenya, Mali, Senegal, Tanzania, Uganda, and Zambia), which finds that all countries except Uganda implement increasing block tariffs. The study finds that the size of the social block varies between 5 cubic meters in Tanzania to 20 cubic meters in Mali or Senegal, where the difference in tariff level between the first block and the second block is also the sharpest (Trémolet and Hunt 2006). A study by Komives et al. (2005) finds that Asia implements significantly large social blocks, in which the size of the first block averages 13 cubic meters per month, or Latin America, which averages 24 cubic meters per month (Trémolet and Hunt 2006).

c. Differentiated Service Standards and Alternative Service Providers

An additional regulatory intervention to expand access to the poor is in the form of incentivizing service providers to subcontract smaller operators and to allow differentiated service levels provided by public networks as well as smaller, private networks. This form of regulatory intervention is operational in the concession contract in Manila. Moreover, regulators play a crucial role in evaluating equity efficiency trade-offs. Service providers will seek to analyze the benefits of expanding access in comparison to achieving efficiency gains of existing services. Regulators could formulate recommendations to policy makers to determine the rate of network expansion and identify other transitional service solutions (Trémolet and Hunt 2006).

d. Regulation of Non-Networked Services

A World Bank study showcases the experiences in Bangladesh, Indonesia, Peru, and Tanzania, regarding the role of regulation and access to on-site sanitation as a way to achieve progress towards universal access. There are no one-size-fits-all solutions, and accordingly each country offers a different approach, as summarized in **Table 4.4**. The functions outlined are typically envisioned for implementation by

TABLE 4.4. Summary of Approaches in Regulation of On-Site Sanitation in Select Low- and Middle-Income Countries

Function	Bangladesh	Indonesia	Peru	Tanzania
Policy for on-site sanitation	n.a.	Regulations govern PPP for sanitation infrastructure. Users cannot opt-out	Recent statement expresses interest to engage private sector	Water Act of 1966 mentions PPPs. However, no regulations
Regulation of on-site sanitation	Local communities emphasize promotion rather than enforcement/ regulation	Standards exist with varied implementation across local government	Approaches in development for on-site solutions for rural and poor households	Local institutions monitor that households have latrines

Source: Adapted from Sy, Warner, and Jamieson 2014.

Note: n.a. = not applicable; PPP = private-public partnership.

independent regulators. Interestingly, in this case, the extent of government intervention is widely varied from limited intervention in Bangladesh to more expansive roles in Tanzania and Peru.

e. Regulation of Informal Service Providers in Fragile and Conflict Affected States (FCS)

In some cases, communities have no alternative options but to rely on informal WSS suppliers. In the Republic of Yemen, the collapse of the public sector has led to the rise of informal private service providers to serve communities. Specifically, private tanker trucks have increased their importance in the water delivery supply chain as the availability of municipal water services declined. Although the current institutional context in the Republic of Yemen is fragile, a very limited degree of oversight is exercised over the provision of tanker services, including registration of tankers, and the development of a database that includes information such as: (a) contact information, water tank capacity and areas of operation; (b) inspection and standards compliance of tankers; (c) water quality testing; and (d) some level of consumer awareness raising. Much of this oversight is done by the National Water Regulatory Agency and the United Nations Children’s Fund (UNICEF) through a World Bank-financed program, which is also working in some cases with the local utilities. Regulation is limited and is currently intended to help mitigate risk of spreading

cholera and to manage the Republic of Yemen’s scarce resources. This area is being explored further.

In Nigeria, communities without access to networked water services rely on informal cart vendors and tanker trucks that are largely unregulated. There are limited examples of formal contract regulation between associations, businesses, and the Bauchi State Water Supply Company (BSWSC) in Nigeria; however, these contracts do not stipulate standards for service delivery, including water quality. Furthermore, although there is a formal partnership between private operators and BSWSC, the relationship is predominantly governed by informal arrangements as opposed to the contract. Stakeholders interviewed as part of a World Bank diagnostic study in Nigeria shed light on the need for strengthened regulation to improve service delivery and to monitor pricing of services (OPM n.d.).

It is clear that although informal service providers play a significant role in the WSS market, much of their experiences remain undocumented mainly due to the issue of absence of regulation of these key market players. As with a few other topics highlighted in this discussion paper, further investigative work is necessary to better understand the challenges of providing differentiated service levels, regulating non-networked services including on-site sanitation, and regulating informal service providers.

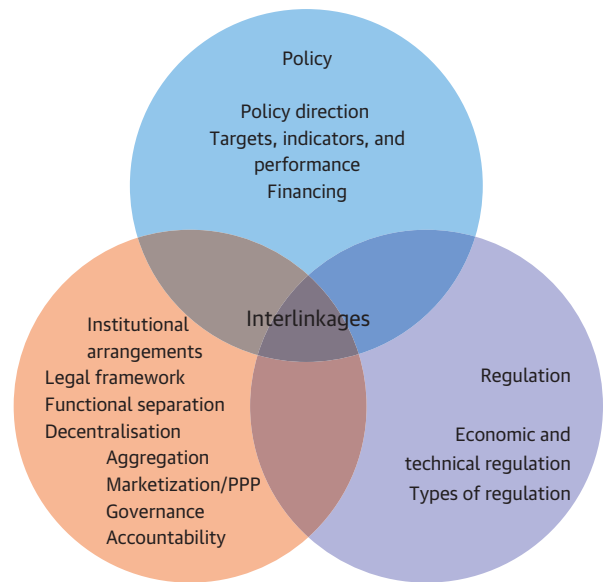
4.4 Aligning Institutions and Incentives with the Enabling Environment

Regulatory frameworks are part of a wider enabling environment within which service providers operate. A multitude of interconnected institutional factors determine whether a regulatory framework is able to successfully deliver results in line with sector policies and objectives. Broadly, these factors refer to the wider economic and legal foundations, political economy, and cultural influences in a given country that influence regulator priorities and choices, in addition to water sector laws, policies, strategies, and the institutional structures and relationships within the sector (Mumssen and Triche 2017; Mumssen, Saltiel, and Kingdom 2018).

Additionally, an effective regulatory framework is one that is tailored to institutional capacity, whereby softer incentives are created for weaker institutions and vice versa. Thus, ensuring stakeholders are equipped to respond to incentives created. Essentially, this implies that a well-designed regulatory framework is one that is interlinked and embedded within the policy and institutional frameworks of the sector as demonstrated in **Figure 4.3** and is adaptable to existing institutional capacity to respond to incentives (Mumssen, Saltiel, and Kingdom 2018).

Portugal's case illustrates how well-designed policies, institutions, and regulation (PIR) interventions can create strong incentives to improve the WSS sector. The reforms in 1993 were supported by a strong legal framework that clearly separated the policy-making (executive), regulatory, and service delivery functions within the sector, and allocated the roles and responsibilities of the institutions. The legal framework also provides guidance on the service provision model: direct public management, delegated public management with or without inter-municipal systems (aggregation of several municipalities to provide WSS services), or delegation to private sector operators (often through PPPs). The regulatory framework, which currently includes an independent regulator to perform the economic

FIGURE 4.3. Interlinkages between Policy, Institutions, and Regulation



Note: PPP = public-private partnership.

regulatory functions, was developed to suit the existing arrangements and to regulate all types of service providers. The comprehensive WSS sector reform in Portugal has resulted in sustainable improvements in the sector: investment in the WSS sector has increased significantly and can move the sector to higher levels of access to WSS services (Mumssen, Saltiel, and Kingdom 2018).⁶

Albania offers another example in which interlinkages between the regulatory and policy and institutional frameworks can be said to have created a stronger enabling environment to incentivize improved sector outcomes. In Albania, the development of the regulatory framework, including the establishment of the independent regulatory agency (WRA), was mostly influenced by the EU Directives for Drinking Water, and was linked to international best practice in WSS sector reform. This includes regulating water quality and price of services, corporatization of water utilities, and decentralization of services to local authorities (World Bank 2011). With the support of enabling

legislation for the agency, WRA has the incentives to fulfill its mandate and supervise the sector's performance through the various changes. In the absence of an umbrella policy and legal framework specific to the WSS sector, the WRA provides some form of guidance to the reform process (including decentralization and corporatization processes) (Mumssen, Saltiel, and Kingdom 2018).

Sector institutional structure plays an important role in supporting regulators to promote accountability and transparency of service delivery. Institutional separation refers to the separation of operational entities from political and regulatory entities. Separating these functions reduces conflicts of interest and makes the costs of service delivery and performance of service providers more transparent to sector stakeholders. A degree of regulatory autonomy enables regulators and service providers to make decisions based on technical and financial criteria and makes it possible to hold both sides accountable for results. Marques (forthcoming) provides examples of regulators in Latin America and their role in enhancing transparency in **Table 4.5**. Examples of regulators that stand out because of their good transparency practices within the sector include SISS in Chile, Autoridad Reguladora de los Servicios Públicos (ARESEP) in Costa Rica, and Agência Reguladora de Serviços Públicos Delegados do Estado do Ceará (ARCE) in Brazil.

Market structure is another aspect of institutional structure. For example, market integration, either horizontally or vertically, may be used to promote economies of scale, especially in small markets. Disaggregation may be used to attract investment in production or treatment, or to improve the responsiveness of service providers to customers at the local level, to make the cost of each activity more transparent, or to make it possible to introduce competition for the market or comparative competition. Provision of different services, such as water and wastewater or even including urban waste or energy services, can lead to economies of scope. For these reasons it may be

desirable for an economic regulator to play a role in determining market structure, especially if there is no other agency, such as a competition authority, charged with doing so (Berg 2013a).

Mumssen and Triche (2017) highlight another important component of context, which is the reality on the ground. This can include factors that are outside the immediate control of the government, such as the availability of water resources, the strength of the economy, the capacity of public institutions more broadly, the current physical condition of WSS services, and the percentage of the population that is able to pay full cost. In some situations, the best strategy—both technically and politically—might be to increase capacity and promote technical improvements and efficiency before increasing tariffs significantly. In some cases, for example in FCS or very low-income economies, simple regulatory approaches such as the collection and analysis of information on service provider performance and quality of services combined with public awareness campaigns about the value of water may be more appropriate and likely to succeed. In others, more complex regulatory approaches may be appropriate and effective.

In Indonesia, the WSS regulatory framework is complex and is often not followed as written, implying key realities the sector exhibits are not being taken in to account in the design of the sector PIR framework. Indonesia mandates PDAMs (local water supply companies) to provide piped water supply; PDAMs are “commercialized or corporatized” and aided technically by the centralized Department of Public Works, for managerial guidance by the Department of Home Affairs, and are owned by the city, municipal, or local governments. Local bodies set PDAM tariffs and do not necessarily follow the regulations of the decrees they were mandated to implement. Local Government Law No. 22 of 1999 mandates that PDAMs generate revenues for their owners, and if revenues of local bodies fall below self-sufficiency they must be

TABLE 4.5. Transparency Practices in the Regulatory Agencies of Latin America

Regulator	Transparency
ERAS and others (Argentina)	Minutes of the board of directors are publicized occasionally. Legislation, sector information, and information on the regulated entities are public. Decision and regulatory opinions, benchmarking and quality of service regulation, and major staff information are available online.
AAPS (Bolivia)	Management and financial information, legislation and sector information, information on the regulated entities, decision and regulatory opinions, benchmarking and quality of service regulation, consultations and hearings, supervision and auditing activities, and major staff information are publicized.
Brazil (several)	Management and financial information, legislation and sector information, information on the regulated entities, decision and regulatory opinions, economic regulatory activities (e.g., ARSESP), supervision and auditing activities are publicized.
SISS (Chile)	Management and financial information, legislation and sector information, information on the regulated entities, decision and regulatory opinions, economic regulatory activities, benchmarking and quality of service regulation, consultations and hearings, supervision and auditing activities and major staff information are publicized.
CRA (Colombia)	Management and financial information and minutes of the board of directors are publicized. In addition, legislation, sector information, and information on the regulated entities are available on website. Decision and regulatory opinions, economic regulatory activities, consultations and hearings, supervision and auditing activities, and major staff information are public.
ARESEP (Costa Rica)	Management and financial information, minutes of the board of directors, strategic plan, legislation and sector information, information on the regulated entities, decision and regulatory opinions, economic regulatory activities, benchmarking and quality of service regulation, consultations and hearings, supervision and auditing activities, and major staff information are publicized.
ERSAPS (Honduras)	Information regarding management and financial aspects, legislation and sector, regulated entities, decision and regulatory opinions, economic regulatory activities, benchmarking and quality of service regulation, consultations and hearings, supervision and auditing activities, and major staff are public.
INAA (Nicaragua)	Legislation and sector information, information on the regulated entities, decision and regulatory opinions, benchmarking and quality of service regulation (but need to be updated), consultations and hearings, supervision and auditing activities are publicized.
ASEP (Panama)	Management and financial information and minutes of the board of directors are public. Information regarding strategic plan, legislation and sector, regulated entities, decision and regulatory opinions, economic regulatory activities, benchmarking and quality of service regulation, consultations and hearings, supervision and auditing activities, and major staff are also publicized.
ERSSAN (Paraguay)	Management and financial aspects, performance self-evaluation, legislation and sector, regulated entities, decision and regulatory opinions, benchmarking and quality of service regulation, supervision and auditing activities, and major staff are publicized.
SUNASS (Peru)	Management and financial information, minutes of the board of directors, strategic plan, legislation and sector information, information on the regulated entities, decision and regulatory opinions, economic regulatory activities, benchmarking and quality of service regulation, consultations and hearings, supervision and auditing activities, and major staff information are publicized.
URSEA (Uruguay)	Information regarding management and financial aspects, minutes of the board of directors, legislation and sector, regulated entities, decision and regulatory opinions, economic regulatory activities, benchmarking and quality of service regulation, consultations and hearings, supervision and auditing activities, and major staff are publicized.

Note: AAPS = Autoridad de Fiscalización y Control Social de Agua Potable y Saneamiento Básico; ARESEP = Autoridad Reguladora de los Servicios Públicos; ARSESP = Agência Reguladora de Saneamento e Energia do Estado de Sao Paulo; ASEP = Autoridad Nacional de Servicios Públicos; CRA = National Water Regulatory Commission; ERAS = Ente Regulador de Aguas y Saneamiento; ERSAPS = Ente Regulador de los Servicios de Agua Potable y Saneamiento; ERSSAN = Ente Regulador de Servicios Sanitarios; INAA = Instituto Nicaragüense de Acueductos y Alcantarillados; SISS = Superintendencia de Servicios Sanitarios; SUNASS = Superintendencia Nacional de Servicios de Saneamiento; URSEA = Unidad Reguladora de Servicios de Energía y Agua.

merged with neighboring local bodies. This puts enormous pressure on PDAMs to generate revenues by any means without regard to utility performance.

Between 1998 and 2005, 128 out of 319 PDAMs had foreign debts and, due to the financial crisis, caused financial distress to the indebted PDAMs. Of these 128 PDAMs, only 22 PDAMs increased their service coverage, nine PDAMs increased installed capacity, and 52 PDAMs reduced NRW; 125 PDAMs increased their tariffs (Hadipuro 2010).² Additionally, maintaining existing customers and providing 24/7 service enhances consumption and revenues as consumers will pay the higher rate of the block tariff. In contrast, expanding coverage to new customers—depending on the customer class served—may result in them paying the lower or first block of subsidized tariff, which does not enhance the PDAM’s profit and may result in a net loss.

Notes

1. Brown, Stern and Tennenbaum (2006, 2) provide guidance to evaluating country-level regulatory systems, stating that “individuals who make decisions on whether to undertake changes in a country’s existing regulatory system are typically not interested in

multi-country studies that prove or disprove the general propositions about the theory and practice of economic regulation. Instead, their principal concern is whether specific reforms should or should not be applied to their existing regulatory systems.” This makes the case for “best fit,” and context-specific regulation and evaluations.

2. The case of Philippines is an important example of fragmentation of the regulatory function: concessions in metro Manila being regulated by contract between MWSS and the concessionaires (in which MWSS allowed pass through of corporate income tax to users through tariff), local government-run utilities by the National Water Resources Board (NWRB) and local governments and rural systems and cooperatives are self-regulated. Philippine water practitioners have lobbied for an independent regulator covering all service providers both public and private. Senate Bill 1585 (16th Congress) sought a water regulatory commission that would license all providers of piped water supply and sewerage services (without exclusivity in service areas), but did not pass.
3. The Planning Commission is reviewing a model bill for states to consider that addresses the challenges of the current statutes of the states that have passed laws to establish WSS regulators.
4. See the SWSC website: <http://www.swsc.co.sz/>.
5. See the GPOBA website, <https://www.gpoba.org/>.
6. World Bank 2017.
7. Hadipuro (2010) notes that since the 1980s Indonesia’s infrastructure policy has largely been shaped by the World Bank; Indonesia received 27 water loans between 1983 and 2003 for over US\$2 billion. Two outcomes of the overall policy guidance are (a) PSP in water services, and (b) water commoditization.

Chapter 5: Prioritizing Key Challenges of WSS Regulation in Low- and Middle-Income Countries

5.1 Context Matters

The global study “Aligning Institutions and Incentives for Sustainable Water Supply and Sanitation Services” (Mumssen, Saltiel, and Kingdom 2018) shows that practitioners must think holistically about a country’s sector policies, institutions, and regulations, and the incentives engendered by each, to see how they must complement each other to achieve the government’s desired sector outcomes (see **Figure 3.1** and **Figure 4.3**). As such, the design of any regulatory system has to be considered as part of a package: it is not a simple “add on” to whatever sector framework currently exists. This was, perhaps, one of the weaknesses of past regulatory interventions in LMICs in which donors, clients, and consultants believed that the creation of a regulator would solve all problems. In fact, it was often considered that the more sophisticated the regulatory intervention, the better the outcome would be, and resulted in the adoption (or semblance of adoption) of regulatory models from OECD countries.

This situation was a classic example of “best practice” being applied without consideration of the local situation in terms of its technical, financial, and human capacity; its governance; or its political economy. The “copy and paste” model ignored the fact that good quality data do not exist in many countries (and the sophisticated models adopted depended on extensive data requirements); human capacity is weak in both the regulator and the regulated entities; political will for real sector reform (including greater transparency and accountability) is often muted, and, therefore, incentives and penalties cannot be established or enforced. At the same time, the advanced models came from situations in which service providers have

already achieved near universal coverage with reasonable levels of service—not struggling to provide even a basic level of service to a portion of their service areas. Efficiency and improving service was the name of the game—not achieving modest service levels and universal access. Finally, the regulatory models taken from OECD countries typically oversee private, or at least corporatized, entities, in which regulatory levers can substantially impact management behavior. This is compared to LMIC service providers, which are predominantly public-sector entities and subject to a range of political and governance forces not felt by their regulated brethren in upper-income countries.

Any regulatory model for an LMIC must be fit for purpose, designed to the context at hand, while drawing on good practices and global experiences, but not blindly adopting them. This means designing regulatory frameworks embedded within political economy and governance structures and aligned with policy and institutional frameworks. It also means recognizing the need to develop regulatory designs that correspond with existing institutional capacity to respond to PIR incentives and adapt over time as the regulator and the service providers learn and improve (e.g., softer incentives for weaker institutions and vice versa). The regulatory model in England and Wales has been in place now for almost 20 years and has been modified in each five-year regulatory cycle to reflect learning and changes in the operating environment, be that technical, political, environmental, or customer expectations. With this in mind, the conclusions here are framed around the subsection themes in the preceding chapters.

5.2 Regulatory Objectives

There are some common baseline objectives of WSS regulation in LMICs. The degree to which some objectives often cited, for example, transparency, accountability, and predictability, are actually demanded from regulation will depend on the political economy context. But what can broadly be stated as objectives for the WSS sector in most LMICs, and relatedly, the **key objectives of WSS regulation in LMICs are to provide the framework and instruments, and in turn incentives, that support the following:**

- Increasing access, especially to peri-urban and rural areas, and to poor and vulnerable groups;
- Improving quality of service delivery;
- Improving efficiency of service providers; and
- Securing access to capital markets for sector financing.

There will be many other objectives of regulation depending on the specific state of the WSS sector and the political economy context. But it is important to note that regulation will usually help define only the mechanisms to incentivize service providers, users, and other key stakeholders in the sector; it is the role of sector policy to determine what the objectives are, which will shape what type of regulation will ultimately be needed.

5.3 Regulatory Forms

Although the form of regulation that was often imported from OECD countries in the 1990s and 2000s was a dedicated national sector regulatory agency, often with aspirations of “independence,” the reality with regard to the forms of regulation that exist and that may be most effective in LMICs is varied, depending on the local institutional context. This includes a multitude of factors such as the existing legal foundations, WSS sector policies and strategies, governance structures, extent of decentralization, whether the country is a federal system, the extent of national SOEs or municipally run service providers, etc. See **Table 3.1** for the main

stylized examples identified through the literature and the examples analyzed (note that it is not exhaustive).

5.4 Regulatory Functions

The ultimate success of achieving given regulatory objectives is completely dependent on broader government support and political economy, including, for example, credibility of enforcement and punishment, as well as institutional alignment across government (e.g., ministries of finance, planning, water resources and environment, and health). Regulators can use numerous tools to incentivize utilities to implement desired actions and achieve the sector objectives; some of the tools and approaches identified for the WSS sector in the LMIC context are described here.

Improving Financial Sustainability

The role of regulation in designing and implementing tariffs and subsidies in a manner that is transparent and predictable is critical in enhancing financial sustainability and meeting the objectives of improved access and services and supporting an appropriate investment climate to attract the necessary investments. Regulators aim to ensure that utilities recover costs while protecting customers from monopolistic price setting and ensuring affordability. Accordingly, tariff regimes such as price cap regulation and rate of return regulation aim to provide utilities with the opportunity to recover costs and incentivize performance improvement.

Adopting phased approaches in tariff implementation may be optimal in LMIC contexts, which exhibit common challenges such as the lack of data, capacity, and political will. This entails placing an initial focus on quality regulation until the required information and capacity levels are met by utilities. Thereafter, tariff setting processes that support transparency may be implemented, such as rate of return regulation. In Colombia, a phased approach was adopted to tariff reform wherein it focused first on acquiring unit costs and standardizing accounting norms used by utilities, followed by introducing efficiencies to fully reflect operational

costs and then increasingly investments. Noteworthy, achieving financing sustainability allows utilities to demonstrate creditworthiness, which is an important way to attract commercial finance. As observed in Kenya, regulation played a key role in facilitating increased access to commercial finance for utilities.

Improving Service Provider Performance

Another regulatory tool to help provide incentives for improved access and service delivery is the process of performance monitoring, carried out through measurable metrics, often coupled with some form of reward or penalty—or, at least, shining the light on good or poor performers (“sunshine regulation”). In LMICs, key challenges related to data availability, financial and technical resources, and monitoring and enforcement persist. These are compounded when the political economy does not provide credible institutional incentives to the key stakeholders. Nonetheless, there exists a multitude of performance management tools implemented with varying degrees of success, including but not limited to the following:

- **Benchmarking:** a practice implemented widely across LMICs that creates the incentive to improve performance through associated rewards and penalties. A prerequisite for benchmarking is establishment of data collection and dissemination systems, as in Albania, Peru, and Tanzania.
- **Licensing:** issuing licenses allows regulators to monitor agreed service standards, as is in Albania’s WRA, which is responsible for ensuring service providers meet stipulated service standards.
- **Performance- and results-based contracts:** performance improvements can be achieved through development of KPIs through public-public contracts, as in Burkina Faso, or public-private contracts, as in Senegal. Performance contracts can be effective in delivering performance improvements if they depict some of the following desirable features: simplicity of agreements, clear responsibilities, realistic targets, reporting requirements, and

monitoring and auditing arrangements. However, risks remain in terms of tools available to regulators to ensure contract enforcement, and risk management and sharing.

- **Corporatization:** allows for implementation of results-based approaches and sets clear KPI targets and associated incentives.
- **Client and service provider contracts.** Such contracts allow for clearer performance improvement targets to be set. For example, in Brazil all state companies have program contracts with municipalities, which are the owners of the assets. In Argentina, the state-run utility Agua y Saneamientos (AySA), the Buenos Aires operator, and most other utility companies have contracts with provinces that are the owners of the WSS facilities.

Increasing Accountability, Transparency, and Consumer Voice

Implementing mechanisms that enhance accountability and transparency within the WSS sector is crucial for achieving objectives. Regulators play an instrumental role in implementation of various mechanisms that allow for institutionalization of consumer protection and engagement practices that support accountability and transparency in order to improve overall sector performance. A variety of successful mechanisms are implemented across LMICs range from WWGs of local volunteers in Zambia or public hearing and consultation processes implemented widely across Latin America.

Pro-Poor and Non-Network Services Regulation

A variety of regulatory instruments are available that offer utilities incentives to expand access to poor communities, including (a) universal service standards (setting clear access targets with enforceable penalties in the case targets are unmet); (b) regulation (by contract, agency, or other), which could allow for performance-based instruments such as OBA to subsidize costs of installation of water connections for the poor, supporting the incentive regimes while insuring

through appropriate financial modeling the sustainability of the interventions⁵; and (c) differentiated service standards and alternative service providers. However, when low-income households already have access to services, regulators might implement social tariffs to secure affordability of services for the poor (e.g., lifeline schemes, although with varying success at pro-poor targeting), or provide targeted subsidies through direct transfers. Ultimately, regulation is the mechanism to incentivize service providers and users; pro-poor social and sector policies will ultimately shape the objectives regulation should try to achieve.

5.5 Regulation Fit for Purpose: What Does it Take?

Any regulatory model must be fit for purpose and, customized to the institutional context and political economy at hand. In other words, regulatory functions are tailored to existing realities. This entails a dynamic learning process and a need to adapt over time as the regulator and the service providers learn and improve. After reaching more advanced stages, regulators would be able to contribute to better sector governance. Data and capacity are essential features of this approach.

Data Availability

Data availability will depend on the incentives and resources for collecting, validating, and analyzing data. For evidence-based policy making, decision makers, including regulators, will rely on what they can measure and observe when determining policies and rules of the game. Without the data and related resources for developing and sustaining decision analysis tools, it is unlikely that sector objectives such as financial sustainability and increased access will be achieved. Because private sector participation will heavily rely on the ability to analyze operational data regarding costs, service quality, revenues, and forecasts of financial and operating performance, it is unlikely that significant private sources of financing and investment will take place in the context of

poor data. As we have seen through past PPP attempts in the sector, when it does happen, contentious contract renegotiations are likely to ensue due to actual baselines being quite different than those reported prior to contracting.

Furthermore, data are necessary to create incentives through the setting of performance targets and to enable a multitude of factors that contribute to enhanced sustainability ranging from operational efficiency to financial sustainability. Regulators are well-positioned to carry out data collection, management, analysis, and sharing activities because these are aligned with stated regulatory mandates, objectives, and general functions. Accordingly, basic regulation should predominantly focus on data collection, validation, analysis and dissemination, the objectives of which are twofold: (a) *identification of key problem areas* (collecting and analyzing financial, operational, governance, and citizen engagement data and devising action plans that would lead to improved utility performance and sustainability of services in the long run); and (b) *performance measurement* (measurement of performance data allows for the implementation of incentive mechanisms that identify and reward best performers and allows for utilities to learn best practices and continue progress on areas of performance improvement). An effectively designed data collection system usually comprises the following elements: (a) a dedicated team that has the capacity to identify the relevant data and sources; (b) a participatory approach to data development and collection; (c) protocols and guidelines and schedules for data collection; (d) securing data reliability and consistency to allow for comparisons to be made across utilities; (e) developing policies and standards for public disclosure of data; and (f) analyzing data to improve policy development, implementation, and performance evaluation.

Considering the context of LMICs, data collection efforts rely significantly on the collaboration of several entities across different government institutions and even sectors. In some cases, regulators could

incentivize data collection initiatives for local leadership and communities. This is particularly essential in areas where informal service providers operate. Therefore, recruiting and training people to collect, validate, and report data is key to delivering sustainable services and to improve performance in the long run. Business plans are good tools with which to establish performance targets and monitor whether citizens' expectations are being met (Berg and Philips 2017).

Liberia has developed a digital map that includes inventories of safe water points with collaboration between government institutions and donors. Initiatives such as this need to be embedded within utility and regulatory frameworks and procedures. In Nigeria, the Ministry of Water has made it mandatory that all state utilities implement the International Benchmarking Network (IBNET) system, thus encouraging the collection of basic KPIs. In Uganda, a national monitoring system has been developed in line with a sector performance management framework that monitors 11 KPIs. These include data on water access, quality, and quantity. A number of government entities collaborate to set the same definitions for KPIs and to collect the data. These efforts have facilitated the development of annual performance reports that provide information on achievements as well as challenges and recommendations (Berg and Philips 2017).

When the regulator lacks tools, requiring the submission of business plans presents one way to consistently report utility objectives and targets. SUNASS in Peru utilizes benchmarking as a tool to identify strong and weak performance. However, in addition to this, the law requires that utilities develop business plans to be submitted to SUNASS for review and approval. This has allowed SUNASS to collect financial data, operating variables, and targets. Additionally, publicly disclosing the business plans has allowed for improved transparency (Mumssen, Saltiel, and Kingdom 2018).

Capacity

Outcomes of regulatory interventions depend on the capacity of regulators to implement their mandated roles and responsibilities in an effective manner. In the majority of LMICs, experience demonstrates that regulatory capacity is often weak and is a major contributing factor to unsustainable services. Although capacity building strategies should be designed to build the institutional capacity of regulators to address the complexity of service delivery challenges, it is important to recognize that capacity building is a long-term, continuous process. Therefore, regulatory functions must be tailored to existing capacity levels such that responsibilities would evolve over time in terms of variety and complexity as capacity levels improve. After reaching advanced capacity levels, regulators would be able to contribute to better sector governance and effectively implement transparency and accountability mechanisms that result in the creation of an appropriate enabling environment that provides incentives for improved service provision.

Multiple forms of capacity building are available although the impact of capacity building programs greatly depends on many factors including the commitment of participants to engage. More importantly, technical knowledge needs to be applied to the local institutional context and key lessons learned applied to the realities of the participants. Moreover, leadership must support capacity building programs undertaken by individuals. This requires some level of reform in organizational culture in order to allow and motivate professionals to apply their newly acquired skills. It is also useful to ensure that capacity building programs are evaluated regularly in order to ensure that continued education contributes to sound technical and strategic decisions.

Delivering capacity building programs in an effective manner requires that linkages are made between knowledge dissemination and implementation, such that the following steps are followed in development

of the program: (a) diagnostic and capacity needs assessment; (b) knowledge selection and creation; (c) knowledge dissemination; (d) learning process; and (e) implementation. The most typical capacity building approaches include the following (World Bank 2017):

- **Self-study:** vast resources are available for professionals to enhance their personal skills and knowledge on regulatory practices and interventions that could lead to performance improvements. Despite this, much of the existing information is inaccessible and out of date. In addition, although a lot of good material exists regarding the promotion of sound infrastructure regulation, there is still a need to identify interventions that are well tailored to best fit the local institutional and sector context.
- **Open-enrollment programs:** these comprise training courses for which interested individuals may apply. There are multiple formats through which these courses are delivered, including lectures, exercises, and case studies. A particular advantage of open enrollment programs is that participants can benefit from cross-country learning.
- **Customized courses:** the greatest advantage of this form of capacity building is that training is customized to the needs of the agency and is tailored to the specifics of the local context.
- **University-based certification programs:** such programs could address fundamental skill gaps required to improve effectiveness and efficiency of regulators. The greatest incentive to enroll in a university-based program is the certification obtained upon completion.
- **Study tours:** comprise site visits, peer-to-peer meetings, and in some cases collaborations with other organizations. A notable advantage of study tours is the opportunity for participants to engage in informal discussions and to share information about specific challenges they face. However, care must be taken in collaborating with agencies that have

comparable or similar challenges and resources in order to gain the most benefit.

- **Global and regional networking:** allow agencies to obtain outputs that could otherwise be unavailable or expensive. Dedicated organizations act as intermediaries within the region to provide a forum for discussions, sharing data for benchmarking purposes, providing capacity building, and evaluating best practices. This form of training promotes knowledge exchange of practical advice regarding regulatory processes and substantive rules. The Danube region provides an example of an effective regional program whereby regulators and utilities have developed a shared database of KPIs and technical training on a vast number of issues. Space is also given for discussions to promote the exchange of ideas across organizations.

5.6 Strengthening Regulation: The Way Forward

There are no one-size-fits-all solutions. Developing a regulatory framework that delivers sustainable outcomes depends on how well regulatory interventions are embedded within a country's enabling environment and aligned with the existing policy and institutional frameworks of the sector. Designing effective interventions is a continuous learning and adapting process. Mumssen, Saltiel, and Kingdom (2018) provide the following guiding principles that can generate positive incentives through context-specific policies, institutions, and regulation (PIR) interventions:

- a. **Identify key reform drivers.** The main motivating factors for reform and improvements of the WSS sector that stem from endogenous factors (politicians or government officials) or exogenous factors (donors and development agencies).
- b. **Understand the existing institutional environment of the sector.** Identify the key actors in the sector, leadership, national policies and strategies; legal framework; and regulatory framework.

- c. **Understand the political economy of the country and sector.** Identify how the public sector has developed over time, cultural influences in the design of the public sector, or cultural attitudes to WSS services.
- d. **Identify intrinsic incentives of key actors.** Analysis of intrinsic incentives of the people expected to implement reforms.
- e. **Design institutional interventions that align exogenous and endogenous incentives.** Consider WSS sector and country-specific characteristics as well as aligning WSS sector objectives and institutional interventions with intrinsic incentives of key actors.
- f. **Design interventions that are fit for purpose.** Ensure that interventions are not overly complex for the given context and capacities.
- g. **Provide sufficient capacity support.** To ensure reform objectives are realized, capacity building should be grounded in the realities on the ground.
- h. **Ensure there is sufficient financial capacity.** To sustain results and obtain human resources required to implement the desired interventions.

The depth and complexity of a regulatory regime in any country not only depends on the country context and needs, but also capacity. In some cases, for example, FCS or very low-income economies, require simple regulatory approaches such as the collection and analysis of information on utility performance and quality of services combined with public awareness campaigns about the value of water. In others, more complex regulatory approaches may be appropriate and effective. But what is clear is that in all cases, for any start to be made along the ladder of regulatory reform, basic quality data collection is a prerequisite. Without understanding the state of the sector and the gaps in financing, quality, and access, for starters, it is very difficult to develop a regulatory regime to direct incentives for performance. WSS sector stakeholders must recognize the importance of beginning data collection efforts and developing the capacity in financial and technical terms to be able to adequately do so. Data are

pivotal for most, if not all, regulatory tools. This not only requires capacity building but also the ability and readiness to take the decisions regarding incentives and targets that reflect reality rather than political aspirations.

For LMICs, the role of regulation will and should evolve over time. Thus, establishing a successful regulatory regime is best accomplished by taking a phased, or step-by-step approach. For example:

1. **For countries without a WSS regulator and/or that are considering one,** a simplified RIA can clarify the objectives, costs, and benefits of regulation, and reveal opportunities for incentivizing utility performance. In turn, clarification of regulatory objectives and functions enable the development of the legal and other frameworks that support regulation in the sector, aligning it with existing political economy and sector policies.
2. **Building data capacity is an essential first step for regulation.** Whether the chosen form of regulation is through an independent regulatory entity, contract, decentralized department, or utility, data is key. During the incipient stages of regulation, before a more formalized regulatory arrangement is developed, creating a ring-fenced unit within a ministry or department might be the best or only option. Resources and data capacity building should be provided so that the tasked unit can establish a system to monitor and evaluate service providers and service delivery, and can be the initial foundations for a more substantive regulatory arrangement.
3. **As institutions continue to build their capacity,** regulators should focus on improving utility performance through monitoring, benchmarking, and appropriate performance incentives.
4. **As institutional capacity and utility performance improve,** regulators can take on additional responsibilities, such as accounting for their regulatory base; gradually installing protocols for covering CAPEX

once all operating costs are covered by tariffs; and introducing development of rigorous business planning, information management, and customer engagement.

5. **As utilities begin to achieve performance objectives and service standards set out by regulators,** norms and methods to monitor creditworthiness can be established to raise capital through available markets.
6. **Finally, regulators can work with multiple stakeholders and may often provide important input into policy discussions.** This includes interfacing with the ministries—including the Ministry of Finance in case transfer of funding and subsidies is needed—as well as with development partners. However, most regulatory objectives and functions imply that regulators must engage with all sector stakeholders at arm’s length, including utilities, consumers, and the government. Through implementation of citizen engagement mechanisms and oversight of utility performance, regulators are well positioned to contribute evidence-based recommendations to policy makers. Accordingly, regulators may sometimes play a role in resolving policy-related issues; at the least providing expert advice and data without compromising their regulatory decision-making process.

The Body of Knowledge on Infrastructure Regulation² is a key source for practitioners seeking further information and guidance on all topics relevant to regulation. The site offers some of the best and most up to date thinking on infrastructure policy and provides links to over 500 references comprised of publications, government decisions, policy advisory and research. It also includes multiple tools and guidelines to help users think through specific regulatory challenges. An example is the self-assessment tool designed to assist decision makers develop appropriate strategies to reinstate regulatory systems or to improve effectiveness of regulation.³ For guidance specific to the institutional dimensions of regulation and policy making, Mumssen, Saltiel, and Kingdom (2018) offer analysis

and practical insights on the dynamics of reform and underpinnings of how the political economy influences WSS sector policies, institutions, and regulation, and, in turn, how they can deliver sustainable outcomes. The study provides actionable guidance that would benefit the design process of reforms. In addition, practitioners interested in exploring and understanding the current policy, institutional, and regulatory situation in a specific client country may start by employing the Institutional Diagnostic Tool (IDT), developed by the World Bank-Water, Poverty, and Economics Global Solutions Group. IDT may serve as a first step to understand the WSS sector of a specific country as well as its enabling environment to better understand the institutional dimensions. **Table 5.1** highlights a small number of World Bank tools and guidelines relevant to this discussion paper.

This discussion paper is intended to explore the salient issues for regulating the WSS sector in LMICs, learning from the experience of the past two decades. As such it should be seen as complementary to the many documents on the more detailed technical aspects of regulation. The paper also alludes to areas of future work, including deep dive reviews exploring regulation in specific countries or on specific topics to provide additional lessons and ideas for sector officials who intend to operationalize the next generation of regulatory reforms in their country, seeking out “best fits” for their respective context as well as the most appropriate implementation strategy. Some of the specific topics highlighted for further research include:

1. role of regulation in incentivizing differentiated service levels,
2. regulation and informal service providers,
3. regulation and sanitation (non-network services),
4. more effective regulation of SOEs,
5. improving links between WRM and WSS regulation,
6. further development of appropriate regulation of PPPs.

TABLE 5.1. Regulatory Assessment Tools and Guidelines

Tool	Description
World Bank (IDT)	The IDT is an Excel-based tool designed to help World Bank task teams map and evaluate institutions in the WSS sector in client countries, isolate problems (to an extent possible), determine “entry points” where sustainable changes can be made, and design appropriate project activities to address the identified challenges. Specifically, the tool guides the user through a list of targeted questions to identify institutional gaps and priority areas, and suggest activities to strengthen institutions.
Regulation Body of Knowledge Self-Assessment Tool Infrastructure Strategies for Fragile or Conflict-Affected Situations	This instrument provides a self-assessment of six categories: economic activity, political stability, social cohesion, governance, security, and infrastructure performance. These characteristics affect infrastructure development and performance, and the types of regulatory systems that can be effectively developed, and they serve as indicators of areas of weakness that should be worked on if possible. ^a
World Bank Approaches to Private Participation in Water Services	This tool is designed for stakeholders to use when they begin their search for private operators. This toolkit outlines the issues that must be explored to identify which private sector arrangement best meets a given country’s context. Most of the toolkit focuses on the details of the design of arrangements for PSP. ^b
World Bank Structuring PSP Contracts for Small-Scale Water Projects	This toolkit provides guidance for water authorities and sector professionals who intend to contract private operators on how to structure a contract and bidding documents for PSP in small-scale water projects. The toolkit focuses on small-scale water schemes typically serving a settlement with a population from 1,000–10,000. ^c

Note: IDT = Institutional Diagnostic Tool; PSP = Private Sector Participation.

a. See the World Bank website: <http://regulationbodyofknowledge.org/self-assessment-tool/#/home>.

b. See the World Bank website: http://regulationbodyofknowledge.org/wp-content/uploads/2013/07/WorldBank_Selecting_an_option.pdf.

c. See the World Bank website: <http://www.wsp.org/sites/wsp.org/files/publications/PPP-Contracting-Toolkit.pdf>.

Notes

1. Identified in many countries, including the Philippines, Morocco, Kenya, Colombia, and Uganda.
2. The Body of Knowledge on Infrastructure Regulation is an online platform for all topics related to infrastructure regulation, developed by the Public Utility Research Center (PURC) at the University of Florida, and

the collaborative efforts of the University of Toulouse, the Pontificia Universidad Católica, the World Bank, and a panel of international experts. This site provides links to more than 500 references, an extensive glossary, and self-testing features to facilitate learning and can be accessed here: <http://regulationbodyofknowledge.org>.

3. The self-assessment tool can be accessed here: <http://regulationbodyofknowledge.org/self-assessment-tool/#/home>.

Appendix A

TABLE A.1. Performance Management Implemented by Regulators in Latin America

Regulator	Quality of service regulation	Use of performance indicators	Sunshine regulation	Tariff consequences
ERAS and others (Argentina)	Yes	Accessibility of service (2) Protection of public health (5) Service provision (3) Asset maintenance and demand fulfillment (7) Environment protection (4) Needs fulfillment and expectations of users (3) Operational sustainability (2) Financial sustainability (5) Activities costs (6)	Yes	No
AAPS (Bolivia)	Yes	Reliability of resource (4) Stability of service (6) Environment protection (3) Service management (9) Administrative and economic sustainability (10)	Yes	No
Brazil (several)	Only few cases	–	Yes (when exist)	No
SISS (Chile)	Yes	Service provision (3) Financial management (3) Quality of service (7)	Yes	Yes
CRA (Colombia)	No (provided by SSPD)	No	No	Yes
ARESEP (Costa Rica)	Yes	Service coverage (2) Continuity (2) Water quality (1) Others for other purposes	No	No
ERSAPS (Honduras)	Yes	Water quality (1) Some financial indicators	No	No
INAA (Nicaragua)	Yes (but not updated)	General (5)	No	No
ASEP (Panama)	Yes	Commercial (4) Financial (5)	No	No

table continues next page

TABLE A.1. continued

Regulator	Quality of service regulation	Use of performance indicators	Sunshine regulation	Tariff consequences
ERSSAN (Paraguay)	Yes	Water quality Service coverage	No	No
SUNASS (Peru)	Yes	Service access (2) Quality of service (3) Sustainability of services (4) Clients (3)	Yes	No
URSEA (Uruguay)	Yes	Service coverage (1) Quality of service (3) Financial (3) Commercial (5)	No	No

Note: – = information unavailable; AAPS = Autoridad de Fiscalización y Control Social de Agua Potable y Saneamiento Básico; ARESEP = Autoridad Reguladora de los Servicios Públicos; ASEP = Autoridad Nacional de Servicios Públicos; CRA = National Water Regulatory Commission; ERAS = Ente Regulador de Aguas y Saneamiento; ERSAPS = Ente Regulador de los Servicios de Agua Potable y Saneamiento; ERSSAN = Ente Regulador de Servicios Sanitarios; INAA = Instituto Nicaragüense de Acueductos y Alcantarillados; SISS = Superintendencia de Servicios Sanitarios; SSPD = Superintendencia de Servicios Públicos Domiciliarios; SUNASS = Superintendencia Nacional de Servicios de Saneamiento; URSEA = Unidad Reguladora de Servicios de Energía y Agua.

TABLE A.2. Subsidization Mechanisms in Latin American Countries and the Role of Regulators

Regulator	Subsidization mechanisms	Role of regulator
Argentina	Cross-subsidization (among users and locations)	Setting the level
Bolivia	Cross-subsidization (among users)	Setting the level
Brazil	Cross-subsidization (among users)	Setting the level
Chile	Cross-subsidization (among users). There is also a subsidization from municipalities to utilities for the poor (Law No. 18.778 of 1989) in quantity.	Setting the level of cross-subsidy among the type of users but not the eligibility
Colombia	Cross-subsidization (among type of users and their income)	Setting the level of subsidy but not the customers eligibility that is defined by general law of essential services
Costa Rica	Cross-subsidization (among users and locations)	Setting the level of subsidy and tariff structure
Honduras	Cross-subsidization (among users)	Setting the level
Nicaragua	Cross-subsidization (among users and locations)	Setting the level
Panama	Cross-subsidization (among users)	Setting the level of subsidy and tariff structure
Paraguay	Cross-subsidization (among users)	Setting the level
Peru	Cross-subsidization (among users)	Setting the level
Uruguay	Cross-subsidization (among users and locations)	Setting the level

Source: Marques, forthcoming.

Appendix B

TABLE B.1. Typology of WSS Regulatory Frameworks and Tools in Low- and Middle-Income Countries

Country	WSS institutional setting	WSS regulatory structure and accountability	Summary of regulatory tools and methods
Africa			
Benin^a	<p>The parastatal utility Société Nationale des Eaux du Bénin (SONEB) is in charge of providing drinking water in urban and peri-urban areas of more than 20,000 people. SONEB is present in 69 cities over 77 municipalities.</p> <p>In rural and semi-urban areas of less than 20,000, the provision of water (and sanitation) services is the responsibility of municipalities.</p> <p>At central level, responsibility for rural and small-town services sits within the Ministry of Energy, Petrol Research, Water and Renewable Energy Development (Ministère de l'Energie, de la Recherche Pétrolière, de l'Eau et du Développement des Energies Renouvelables, or MERPMEDER) through the DG-Eau. Through its Directorate of Drinking Water Supply, DG-Eau is responsible for proposing water policy, informing national strategies for water services, and overseeing their implementation at municipalities level.</p>	<p>In 2013, a regulation unit was created within DG-Eau, with responsibility for regulating the rural water sector. The scope of these regulatory functions is yet to be fully defined. The primary objectives of this unit include but are not limited to the following:</p> <p>Monitoring the sustainable management of rural infrastructure, and piped water schemes (PWS) in particular, including PSP; enforcing compliance with standards; supporting SONEB in its assistance to communes in implementing the delegation of rural water services, particularly in relation to PWS.</p> <p>Regulation by contract: since 2007, the sector actively supported the implementation of PPP contracts for operating PWS. The sector introduced an affermage-type PPP model to connect decentralized municipalities and small-scale private operators (POs). The number of PWS managed through an affermage contract went from 1 in 2007 to 269 (57% of the total number of PWS) in 2014. These 269 PWS under affermage deliver water services to an estimated 1.7 million people (28% of the population).</p>	<ul style="list-style-type: none"> • Municipalities are in charge of setting tariffs as well as fees and charges paid by POs for operating PWS. Tariffs are calculated based on a methodology provided by DG-Eau, generally higher in rural areas and small towns than in urban and peri-urban areas. • DG-Eau is also responsible for monitoring the water sector. The main monitoring tool is an integrated database (Base de Données Intégrée, or BDI), shared with the municipalities, which gathers data on water resources and infrastructure. DG-Eau also provides technical assistance to the municipalities to help them carry out their responsibilities for water and sanitation.
Burkina Faso	<p>Office National de l'Eau et de l'Assainissement (ONEA) is the state-owned WSS utility responsible for service provision across all urban and peri-urban areas. Communes are responsible for WSS services in other rural areas. ONEA has performance contracts with the government. ONEA has performance management contracts with private firms (Veolia).</p>	<p>ONEA is owned and managed by the government through performance contracts; regulation of ONEA is through performance contracts stipulating targets for technical, financial, and commercial performance. Contract lays out government and ONEA commitments that are assessed by an external auditor.</p>	<ul style="list-style-type: none"> • Multiyear financial equilibrium model for regulating tariff adjustments. • ONEA's contract with Veolia includes performance-based bonus/penalties above a fixed monthly fee.

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TABLE B.1. continued

Country	WSS institutional setting	WSS regulatory structure and accountability	Summary of regulatory tools and methods
Ghana ^b	<ul style="list-style-type: none"> The Ministry of Water Resources, Works and Housing (MWRWH), through its Water Directorate (WD), is responsible for providing leadership for sector activities in policy development, implementation, coordination, monitoring and evaluation. The Ghana Water Company Limited (GWCL) is a state-owned limited liability utility and is responsible for urban water supply throughout the country. The Community Water and Sanitation Agency (CWSA) is responsible for facilitating delivery of water and sanitation services in rural areas and small towns. 	<p>The Public Utility Resources Commission (PURC) is a multisector regulator that covers the urban water sector. PURC is an independent body. The Office of the President exercises administrative oversight for the Commission.^c</p> <p>Standard setting: the Ghana Standards Authority (GSA) sets drinking water standards for water services in Ghana. The Environmental Protection Agency (EPA) was established to, among others, protect water resources and regulate activities within catchment areas including effluent standards.</p> <p>Water allocation: the Water Resource Commission (WRC) is responsible for water resources regulation and management, implementing the Integrated Water Resource Management Strategic Plan (2011-15) and granting water rights.</p>	<p>PURC's responsibilities include the following:</p> <ul style="list-style-type: none"> Tariff setting: review and approval of tariffs and ensure financial sustainability of the urban water system. It provides guidelines to utilities for tariff setting. Consumer protection: the PURC is responsible for receiving and investigating complaints as well as resolving issues between consumers and utilities. Promoting transparency: information is publicly available on the PURC website. Public participation: PURC undertakes public consultations, including stakeholder consultations regarding tariff reviews. Details regarding consultations are documented on the PURC website.
Kenya	<p>Pursuant to Water Act No. 8 of 2002, the Water Sector Regulatory Board, or WASREB, was created in 2003. Under new Water Act of 2016, there are 47 water development boards, one for each county; there are currently 91 water service providers (WSPs).</p>	<p>WASREB's mandate is derived from the 2002 Water Act, set up as an independent, single sector regulator; it is governed by a board of directors and performs its functions through technical directorates; it regulates all 91 WSPs.</p>	<ul style="list-style-type: none"> Regulatory tools include licensing, drinking water guidelines, service standards, nonrevenue water (NRW) standards, tariff guidelines, compliance strategy, and consumer engagement rules. Key regulatory outputs other than determinations on each of the above tools include (a) WSP Creditworthiness Index, and (b) WSP performance benchmarking reports.
Mozambique	<p>The main challenges facing the WSS sector in Mozambique include (a) inadequate infrastructure and access; (b) poor financial sustainability; and (c) weak institutional capacity. In 1995 a National Water Policy (NWP) was devised to address these challenges. This policy entailed (a) devolution of WSS services for urban WSS services in the largest cities. Responsibilities were centralized in an asset holding company that in turn delegated management of the private sector through the delegated management framework; (b) rural WSS services were decentralized to local government that provided capacity building; and (c) financial sustainability of WSS services.</p>	<p>CRA-Mozambique reports directly to the Ministry of Public Housing. Its board members are appointed by the Prime Minister's office.</p> <p>CRA receives funding through a regulatory levy on gross annual revenues, which incentivizes CRA to encourage higher revenues.</p>	<ul style="list-style-type: none"> CRA-Mozambique is responsible for promoting, monitoring, and advising on the design of delegated management contracts Review and approval of tariffs Consumer protection Regulation of service quality promote and improve the delegation of water supply services to third parties

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TABLE B.1. continued

Country	WSS institutional setting	WSS regulatory structure and accountability	Summary of regulatory tools and methods
Nigeria ^d	<p>The Federal Ministry of Water Resources' (FMWR) 2000 National Water Supply and Sanitation Policy defined the following roles for the delivery of WSS service delivery:</p> <ul style="list-style-type: none"> • Federal government: formulating and coordinating national water policies; managing water resources, including allocations to states; and approving development projects. It is also responsible for data collection, resource and demand surveys, monitoring, evaluation, and coordination, research and development, national funding and technical support, and creation of an enabling environment for PSP. • State government: agencies such as water supply authorities, state water boards, and the Small Towns Water and Sanitation Agency are responsible for the establishment, operation, quality control, and maintenance of urban and semi-urban water supply systems (and in some cases for rural supply). They are also responsible for licensing and monitoring private water suppliers. • Local government: local government authorities and local government councils, of which there are 774, are responsible for establishing, operating, and maintaining rural water supply and sanitation facilities with the beneficiary communities. 	<p>State governments are responsible for WSS regulation. Currently only Lagos state has a regulatory entity: Lagos State Water Regulatory Commission (LSWRC), established in 2004.^e</p>	<p>Tariff setting: Nigeria generally lacks an explicit water tariff policy. Therefore, water tariffs between states vary significantly. While Bayelsa, Benué, and Zamfara provide water free to residential consumers, others charge based on groupings of customers, which can mean they have 20 or more different tariff schedules. State water agencies (SWAs) report that not only do they not have power to set tariffs but also they do not regularly review them. State governments set tariffs for SWAs, and it is not clear who is responsible for regular tariff review.</p> <p>State governments establish tariffs and set water services regulation for their water boards. The main regulatory functions of the LSWRC include monitoring water quality; access to services; demand management; consumer protection; dispute resolution; assess tariff affordability, cost recovery, return on investment, subsidies, and pro-poor policies; licensing of service providers; collection and publication of sector information; and facilitate PSP.</p>
Senegal	<p>Senegal has promoted PPP in WSS sector since 1996, starting with the large PPP contract between Sénégalaise des Eaux (SDE) and Société Nationale des Eaux du Sénégal (SONES). One of the major aspects of these reforms has been the contractual framework between the different stakeholders, which established the principle of regulation by contract.</p>	<p>SONES, as the state asset holding company, is authorized to manage the sector through a 30-year concession contract signed with the state, represented by the ministry. SONES signs a sector planning contract (<i>contrat plan</i>) with the ministry, which outlines its investment obligations (and was included in the request for proposals for the affermage contract).</p>	n.a.

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TABLE B.1. continued

Country	WSS institutional setting	WSS regulatory structure and accountability	Summary of regulatory tools and methods
	The urban water supply sector is governed by four types of contract: concession, planning, affermage, and performance, between the Ministère de l'hydraulique, the SDE, and SONES.	The 10-year affermage contract governing operation of the system is signed between three parties: the state, represented by the ministry, SONES, and a private operating company, the SDE. The SDE signs a performance contract with SONES (including the affermage contract) for the same duration (10 years). The contract is renewable every five years after the first 10 years, and contains provision for review of the performance targets every two years.	
Uganda ^{4,9}	<p>The Ministry of Water and Environment (MoWE) is responsible for determining priorities, setting policies and standards for water development, as well as managing and regulating water resources.</p> <p>Over 100 local governments are responsible for the implementation of rural water supply and sanitation programs at the district level.</p> <p>The National Water and Sewerage Corporation (NWSC) is a parastatal that provides water and sewerage services in 23 large urban centers.</p> <p>Local governments play a significant role in overseeing piped water supplies while the private sector is increasingly taking up construction and operation and maintenance (O&M) roles in the sector, in small towns and rural growth centers.</p>	<p>Uganda adopts regulation by contract as its predominant form of regulation. The Water Utility and Regulation Department (WURD) was established within the MoWE to regulate water authorities managing piped water systems by contract. A performance contract defines relationship between the ministry and the Water Authority. The contracts detail the terms of reference and service targets that the Water Authority must deliver.</p> <p>As a requirement in the performance contract, a management contract defining the operation and management roles is signed between the Water Authority and the private operator. Normally, the board hires a private operator to operate and maintain the system and provide services through a management contract of no more than three years.</p>	<ul style="list-style-type: none"> • Monitoring and evaluation: a sector performance report is published annually providing information on budgets, expenditure, and outputs, as well as progress against a balanced set of indicators (including access to water and sanitation, functionality, equity, value for money, and compliance with permit conditions). • Performance management: in the case of the NWSC, performance contracts setting out goals and targets have been signed since 2000, with the fourth contract signed in 2010. Performance of utilities is benchmarked, and results are produced and publicized online. • Standards setting: define KPIs and specify performance targets to be fulfilled by NWSC and the water supply and sewerage authorities (WSSAs) together with incentives or penalties applied to achieving such performance targets. Develop guidelines for tariff setting, water quality, corporate governance, and customer handling. • Tariff setting: receive and review business plans and tariff proposals from NWSC; WSSAs and their respective service providers provide approvals accordingly.

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TABLE B.1. continued

Country	WSS institutional setting	WSS regulatory structure and accountability	Summary of regulatory tools and methods
Zambia	<p>Urban WSS services are provided by 11 utilities and six private schemes. The Zambian urban WSS sector presents the following problems: (a) overlapping institutional roles and responsibilities; (b) lack of investment; (c) inefficient legislation; (d) lack of skills in WSS service provision. In many towns water was only available for six to eight hours a day. A National Water Policy was introduced in 1994, which has sought to separate regulatory and executive functions, devolution of authority to local authorities and private enterprises, achievements of full cost recovery, and human resources development.</p>	<p>National Water Supply and Sanitation Council (NWASCO) is an independent WSS regulator. It is funded through 2% levy utility revenues as well as some government funds.</p>	<ul style="list-style-type: none"> • Licensing: utilities have to meet certain requirements to obtain a license and pay a fee. • Service level guarantees (SLGs): SLGs are set by NWASCO, which benchmarks performance utility performance against minimum service level targets. If a utility's performance falls below the minimum service level, the utility and NWASCO form a three-year improvement plan. • Regulation by incentive scheme. Two institutional incentives are offered for achieving service level guarantees. This includes equipment and staff incentives systems. NWASCO would monitor and audit performance data and grant the incentives on positive improvements. • WSS performance guidelines • Tariff approval and negotiation • Special regulatory supervision of poor performing utilities • Monitoring and regular reporting
Zimbabwe	<p>WSS service delivery (rural and urban) is decentralized and is the responsibility of local government. Local governments may choose to contract with the proposed national water supply services utility as a water services provider (but they are not obliged to do so), provide services themselves, create utilities, or outsource supply.^h</p> <p>The District Development Fund is a technical parastatal responsible for rural water supply and maintenance</p>	<p>The Zimbabwe National Water Authority (ZINWA) is both a service provider and regulator. The National Water Policy of 2013 includes the establishment of a Water and Wastewater Services Regulatory Unit (WWSRU) housed within the Ministry of Water Resources Development and Management.</p>	<p>Responsibilities of the WWSRU include the following:</p> <ul style="list-style-type: none"> • Monitor performance and quality of service standards. • Receive and assess tariff applications in collaboration with relevant ministries. • Monitor, oversee, and provide guidance to water services authorities related to the licensing of water service providers by water services authorities. • Coordinate between all sector entities, particularly regarding tariff revisions.

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TABLE B.1. continued

Country	WSS institutional setting	WSS regulatory structure and accountability	Summary of regulatory tools and methods
Europe and Central Asia			
Albania	Albania has high access rates due to infrastructure spending during the Soviet era, however much of this infrastructure requires maintenance. WSS sector reforms began in 1992. Upon independence Albania acquired 52 SOEs. Introduction of PSP policies in the 1990s led to the creation of an independent regulatory agency, the Water Regulatory Authority (WRA).	The WRA is directly accountable to parliament, which it reports to through its annual report. The decision-making body is the National Regulatory Council (NRC). The Chair of the NRC is also the executive director of the WRA and is appointed by the Council of Ministers in addition to four other NRC members.	<ul style="list-style-type: none"> • Licensing all WSS service providers. The WRA issues licenses to water utilities that meet licensing criteria and monitors the performance of licensees to ensure they meet licensing conditions. • Ensure quality services are offered at affordable rates. • The WRA is responsible for tariff approvals of submissions by utilities. Regulate tariffs to ensure financial sustainability of service providers and affordability. • Monitoring and benchmarking the performance of service providers. KPIs are monitored and an annual sector performance report is published on WRA's website. • Protect consumer interests, analyze consumer complaints and support complaint resolution, • Administer penalties for non-performance.
Portugal	Portugal's 308 municipalities retain responsibility for WSS service provision; however, multi-municipal systems for bulk water supply and wastewater treatment were formed by merging at least two municipalities and creating a company in which the state is the majority shareholder.	ERSAR, established in 2009, is mandated to improve market efficiency and protect consumers.	<ul style="list-style-type: none"> • Benchmarking of KPIs across three main areas: utility sustainability, interface with consumers, and environmental sustainability • Monitoring of concession contracts • Tariff regulation of multi-municipal systems
Latin America and the Caribbean			
Argentina	The Ministry of Public Works is responsible for urban WSS policy making and the provinces or municipalities are responsible for urban WSS service delivery.	<p>Regulation is implemented through provincial regulators in 14 out of 23 provinces. For Buenos Aires the regulator is ERAS, and other regulators are financially autonomous (does not depend on state budget) and enjoy administrative autonomy.</p> <p>The ERAS board (three members) is appointed by the president with a four-year mandate, which is renewable once. The board can be dismissed based on merit.</p>	<ul style="list-style-type: none"> • Tariff setting: ERAS is responsible for setting tariffs and implements the cost plus methodology. Tariffs are reviewed annually. • Performance management: ERAS undertakes performance management and regulates service regulation using KPIs. Sunshine regulation is implemented.

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TABLE B.1. continued

Country	WSS institutional setting	WSS regulatory structure and accountability	Summary of regulatory tools and methods
	<p>There are a range of service providers:</p> <ul style="list-style-type: none"> • Public company: AySA operates in the capital and 17 municipalities • 14 provincial public companies • Municipal and multi-municipal companies • 12 private companies • More than 1.700 cooperative (11% of population) • Neighborhood associations 	<p>The Agencia de Planificación (APLA) was established as a technical regulatory agency overseeing technical evaluation, study, planning, design, execution, and control and supervision of the investments of AySA.</p> <p>Regulation of AySA continues to be regulated mostly by a contract together with ERAS and APLA.</p> <p>The concessionaire of AySA, in collaboration with APLA, develops a business model, which contains, besides the financial maps, the investment plan to improve, maintain, and expand the water services for the next five years.</p>	<ul style="list-style-type: none"> • Promoting transparency: legislation, sector information, and information on the regulated entities are publicly available. Decision and regulatory opinions, benchmarking and quality of service regulation, and major staff information are available online. • Public participation: although the public hearing is promoted, there is no register of that on the regulatory activity. There is a board for users (Sindicatura de Usuarios). Formal consultation processes such as public hearings take place. There is also promotion of consumer satisfaction surveys. • Pro-poor regulation: cross-subsidization mechanisms implemented by the regulator. • Consumer protection: ERAS enforces conflict and complaint addressing mechanisms.
Bolivia	<p>Municipalities are responsible for WSS service delivery. There are 14 WSS service providers (Empresas Prestadores de Servicios de Agua Potable y Alcantarillado, or EPSA).</p> <p>EPSAs can be decentralized public companies El Servicio Autónomo Municipal de Agua Potable y Alcantarillado (SAMAPA) and Servicio Municipal de Agua Potable y Alcantarillado (SEMAPA), cooperatives (e.g., Servicio de Agua Potable y Alcantarillado Sanitario, SAGUAPAC), or mixed companies (e.g., EPSA in Mancomunidad del Chaco MANCHACO); juntas; or water committees in rural areas.</p>	<p>Regulation is undertaken via a national agency, the Autoridad de Fiscalización y Control Social de Agua Potable y Saneamiento Básico (AAPS), established in 2009.</p> <p>AAPS enjoys administrative, financial, legal, and technical autonomy, under the Ministry of Environment and Water. The director is nominated by president of the republic. The revenues cover the costs (50% from state budget). The director can be dismissed based on merit.</p>	<ul style="list-style-type: none"> • Tariff setting: AAPS is responsible for setting tariffs and implements the cost plus tariff setting methodology. • Performance management: KPIs specific to service quality and management are monitored. Utility performance is also benchmarked. • Promoting transparency: the regulator ensures that key regulatory is publicly available • Public participation: public hearing is promoted, but there is no register of that on the regulatory activity. • Pro-poor regulation: cross-subsidization scheme of tariffs is developed by the regulator. • Consumer protection: AAPS enforces conflict and complaint mechanisms to address consumer grievances.

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TABLE B.1. continued

Country	WSS institutional setting	WSS regulatory structure and accountability	Summary of regulatory tools and methods
Brazil	Highly decentralized political and WSS/water supply, sanitation, and hygiene (WASH) structures; overall 26 states and 5,570 municipalities (more like districts); there are state-level water and sanitation companies, some municipalities have PSP; Ministry of Cities is responsible for urban WSS and Ministry of Health for rural WASH. Key legal mandates: 2007 Water and Sanitation Law and 2013 National Sanitation Plan.	No single sector WSS regulator; different states have different arrangements. PSP accounts for 70% of WSS provision; local public suppliers constitute 25% and private suppliers represent 5% of WSS service provision.	<ul style="list-style-type: none"> • While regulation is diverse, Law of Fiscal Responsibility requires cost reflective tariffs. • Standards regulations are varied and derived from various legal mandates including drinking water quality, wastewater discharge, and treatment.
Chile	53 (mostly private) companies operate in urban areas. Local water cooperatives and water committees are responsible for WSS service delivery in rural areas.	Chile has an established national water sector regulator: Superintendencia de Servicios Sanitarios (SISS) . Superintendent appointed by the president, through the Ministry of Public Works, for a period of four years, which is renewable. The SISS is considered to be financially autonomous (does not depend on state budget).	<ul style="list-style-type: none"> • Tariff setting: SISS sets tariffs and shares responsibility with municipalities to enforce subsidies. The tariff setting methodology follows the price cap method and is reviewed every five • Performance management: KPIs are used to monitor service quality. Performance is benchmarked with consequences reflected in tariff decisions for underperforming utilities. Sunshine regulation is also enforced. • Promoting transparency: the following type of Information is made publicly available: management and financial, legislation and sector, regulatory decisions; economic regulatory activities; benchmarking and quality of service regulation; consultations and hearings; supervision and auditing activities and staffing. • Public participation: there are formal consultation processes in the form of public hearings. An advisory board for civil society is established (Consejo de la Sociedad Civil). • Consumer protection: SISS enforces conflict and complaint addressing mechanisms.

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TABLE B.1. continued

Country	WSS institutional setting	WSS regulatory structure and accountability	Summary of regulatory tools and methods
Colombia	<p>WSS is decentralized to municipalities (Law 60 of 1993 and Law 715 of 2001) pursuant to Constitution of 1991. The WSS market is geographically concentrated with the 40 largest utilities serving 70% of urban water users (equaling 55% of total population) with majority serving small towns, total of 12,000 WSS service providers (3,000 are registered water service providers and 1,180 registered sanitation service operators).</p>	<p>National Water Regulatory Commission (CRA) established in 1994 to promote competition among service providers; initial wave of PPP in 1995 with large companies and small private local companies in small towns. CRA promotes competition, sets tariffs, and the superintendent of Public Services monitors WSS utility performance. Regional environmental corporations (37) implement water resources management (WRM) and environmental standards and billing and collecting retributive fees and taxes. For private concessionaires, the contract stipulates the service standards and tariff methodology.</p>	<ul style="list-style-type: none"> • Tariff setting: CRA is responsible for tariff setting in accordance with price cap methodologies. Tariffs are reviewed every five years. • Performance management: performance management and standard setting are undertaken by a different entity: the SSPD. Poor performance of utilities results in tariff consequences. • Promoting transparency: the regulator makes information publicly available, including that related to management, finance, minutes of board meetings, strategic plans, decisions and regulatory opinions, economic regulatory activities, benchmarking and quality of service regulation, consultations and hearings, supervision and auditing activities, and major staff information. • Public participation: Formal consultation processes are in the form of public hearings and public consultations. • Consumer protection: the regulator enforces consumer protection mechanisms for complaints and grievance redressal.
Costa Rica	<p>The following are the main service providers in Costa Rica:</p> <ul style="list-style-type: none"> • Instituto Costarricense de Acueductos y Alcantarillados (AyA): 46% of pop. • Municipalities: 16% of pop. • La Empresa de Servicios Públicos de Heredia (ESPH S.A.): 5% of population. • Comités Administradores de Acueductos Rurales (CAARs) • Asociaciones Administradoras de Sistemas de Acueductos y Alcantarillados Sanitarios (ASADAS): rural areas. 	<p>Water services are regulated by a multisector regulator: Autoridad Reguladora de los Servicios Públicos (ARESEP). Its board of directors comprises five members and has mandates equal to that of the government. ARESEP has some level of financial autonomy; however, although revenues cover costs, it relies on partial funding from the state budget. The board can be dismissed based on merit.</p>	<ul style="list-style-type: none"> • Tariff setting: ARESEP is responsible for setting the level of subsidy and tariff structure. Accordingly, it is responsible for determining cross-subsidization levels among users and locations. Cost plus tariff methodology is implemented and reviewed annually. • Performance management: KPIs on service coverage, continuity, and water quality are measured. • Promoting transparency: the regulator makes all relevant regulatory information publicly available.

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TABLE B.1. continued

Country	WSS institutional setting	WSS regulatory structure and accountability	Summary of regulatory tools and methods
Honduras	<p>Municipalities are responsible for delivery of WSS services in some urban areas. Service providers operating within the sector:</p> <ul style="list-style-type: none"> • Servicio Autónomo Nacional de Acueductos y Alcantarillados (SANAA): 50% of pop. • About 5,000 Juntas Administradoras de Agua (JAA) in rural areas and peri-urban areas • All urban water services are public, except three: San Pedro Sula, concession for 30 years (2000); Puerto Cortés (1999), and Choloma (mixed company) 	<p>A national regulator undertakes regulatory functions within the WSS sector: Ente Regulador de los Servicios de Agua Potable y Saneamiento (ERSAPS). The regulator was established in 2003 and is managed by a board of directors that comprises three members appointed by the president, proposed by CONASA. The regulator depends almost entirely on the state budget and, therefore, is not financially autonomous.</p>	<ul style="list-style-type: none"> • Tariff setting: ERSAPS is responsible for tariff setting and implements cost plus pricing methods, which are reviewed on an annual basis. • Performance management: KPIs measure various indicators for service quality and sustainability; however, no consequences are incurred in terms of tariff reviews if a utility performs poorly. • Promoting transparency: the regulator makes all relevant regulatory information publicly available. • Public participation: public hearings are promoted through the regulator's website and local trainings (<i>capacitaciones</i>) on legal and regulatory aspects are provided. Formal consultation processes such as public hearings also take place. • Consumer protection: ERSAPS adopts conflict and complaint addressing mechanisms to protect consumers. • Pro-poor policy: ERSAPS is responsible for implementing cross-subsidization policies and for setting the level of subsidies.
Nicaragua	<p>Various operating models exist in Nicaragua:</p> <ul style="list-style-type: none"> • Empresa Nicaragüense de Acueductos y Alcantarillados (ENACAL) delivers WSS services to 60% of the population. • 30% of the population is served by community organizations, in rural areas. • Less than 10% of users are served by a departmental water company in Rio Blanco as well as 26 other small municipalities. 	<p>Instituto Nicaragüense de Acueductos y Alcantarillados (INAA) is a national WSS regulator established in 1979. It is managed by a board of directors (appointed by the president with a term of six years, which is renewable). The board may be dismissed based on merit. INAA is financially dependent on the state budget.</p>	<ul style="list-style-type: none"> • Tariff setting: tariffs are implemented using the cost plus methodology. Tariffs are not revised regularly. • Performance management: KPIs regarding general quality aspects of service delivery are collected. However, information is not up to date because data collection efforts are not carried out regularly. • Promoting transparency: the following information is made publicly available: legislation and sector information, information on the regulated entities, regulatory decisions, benchmarking and quality of service regulation, consultations and hearings, and supervision and auditing activities.

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TABLE B.1. continued

Country	WSS institutional setting	WSS regulatory structure and accountability	Summary of regulatory tools and methods
			<ul style="list-style-type: none"> • Public participation: public hearings are promoted by the regulator. Formal consultation processes such as public hearings take place. • Consumer protection: conflict and complaint addressing mechanisms are available to consumers through INAA.
Panama	<p>The following WSS service delivery models operate in Panama:</p> <ul style="list-style-type: none"> • Instituto de Acueductos y Alcantarillados Nacionales (IDAAN), urban areas (> than 1,500 inhabitants, unless in Boquete) • 3,300 water systems in rural areas, of which 1,800 are managed by Juntas Administrativas de Acueductos Rurales (JAARs) • Health committees manage the remaining 	<p>Autoridad Nacional de Servicios Públicos (ASEP) is a multisector regulator established in 1996.</p> <p>The board of ASEP comprises three members appointed by the government and ratified by the Legislative Assembly. The board is mandated a five-year term, which is renewable once. ASEP is considered to be financially autonomous.</p>	<ul style="list-style-type: none"> • Tariff setting: ASEP implements cost plus approaches to tariff setting. Tariffs are reviewed annually. ASEP is also responsible for implementing cross-subsidization policies. • Performance management: KPIs on commercial and financial indicators are collected. • Promoting transparency: most relevant regulatory information is publicly available. • Public participation: Public hearing is promoted by ASEP. There are also formal consultation processes such as public hearings. • Consumer protection: conflict and complaint mechanisms are available for consumers.
Paraguay	<p>In Paraguay, the national enterprise Empresa de Servicios Sanitarios de Paraguay (ESSAP) is responsible for serving urban populations greater than 10,000 inhabitants.</p> <p>Water associations are responsible for delivery WSS services in rural communities and small towns (with less than 10,000 inhabitants).</p> <p>500 small suppliers (private and informal, <i>aguateros</i>)</p>	<p>Ente Regulator de Servicios Sanitarios (ERSSAN), established in 2000, is responsible for WSS regulation. It is managed by board comprising five members with a five-year term. The board can be dismissed based on merit. Revenues received by ERSSAN cover its costs; however, it partly depends on the state budget.</p>	<ul style="list-style-type: none"> • Tariff setting: tariffs are set by the regulator using the price cap tariff setting methodology. Tariffs are reviewed every three years. Cross-subsidy mechanisms are implemented. • Performance management: KPIs covering service quality and coverage are monitored. • Promoting transparency: publicly available information: management and financial aspects, performance self-evaluation, legislation and sector information, regulated entities, regulatory decisions, benchmarking and quality of service regulation, supervision and auditing activities. • Public participation: regulator promotes public hearings. Formal consultation processes such as public hearings are carried out. • Consumer protection: conflict and complaint mechanisms are available for consumers.

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TABLE B.1. continued

Country	WSS institutional setting	WSS regulatory structure and accountability	Summary of regulatory tools and methods
Peru	<p>Until the 1990s, the urban water services were centralized, being responsibility of the SENAPA (Servicio Nacional de Abastecimiento de Agua Potable y Alcantarilhado). In 1994 with the enactment of the national law no. 26.338 (Ley General de Servicios de Saneamiento), SENAPA was dissolved and the water services were transferred to the local government, creating the Empresas Prestadoras de Servicios de Saneamiento (EPS). In 2003, with the general act of decentralization of public administration, EPS model powers were reinforced. In the rural area, the decentralization movement was similar. First, the rural water services were a responsibility of Dirección de Saneamiento Basico (DISABAR), a national department of the Ministry of Health. In the 1990s, they were transferred to the local government, which could delegate them to local communities.</p>	<p>Regulation is carried out by a national water sector regulator: Superintendencia Nacional de Servicios de Saneamiento (SUNASS).</p> <p>The board comprises five members, appointed by the president. The board can be dismissed based on performance. SUNASS is financially autonomous.</p>	<ul style="list-style-type: none"> • Tariff setting: SUNASS implements the price cap methodology in tariff setting. Tariffs are reviewed every five years. It also devises cross-subsidy schemes. • Performance management: SUNASS weights KPIs to develop a single score of performance of WSS service delivery. Indicators cover the following performance areas: (a) service access; (b) quality of services; (c) sustainability of services; and (d) clients. • Public participation: Public hearings are carried out; activities and regulatory activity are publicized through public hearings. • Consumer protection: TRASS is a technical body of SUNASS, in charge of solving in the second and last administrative instances customers' complaints related to billing, operational, or commercial issues, among others.
Uruguay	<p>The following national institutions are responsible for overall management of the WSS sector, as well as service delivery:</p> <ul style="list-style-type: none"> • The Ministry of Economy and Finance is responsible for setting tariff policies. • The Ministry of Housing and Environment is responsible for the definition of water policies. • The Office of Budget and Planning is responsible for determining required investment levels. • The Administración de las Obras Sanitarias del Estado (OSE) is a public utility and provides water and sanitation services to all of Uruguay with the exception of Montevideo (where the municipality provides sanitation and OSE provides water supply only). OSE serves 2.8 million customers with water services and 0.5 million customers with sanitation services. 	<p>A multisector regulator oversees WSS services: Unidad Reguladora de Servicios de Energía y Agua (URSEA).</p> <p>URSEA was established in 2002 as a decentralized executing unit that reports to the presidency. It is technically autonomous.</p>	<p>URSEA's regulatory functions include the following:</p> <ul style="list-style-type: none"> • Tariff setting: the study of tariff proposals and the presentation of these to the president, who grants approval on behalf of the national government. • Standard setting: URSEA is responsible for the definition of quality and safety regulations and oversight of utility compliance with existing norms and regulations. • Promotion of transparency: the promotion of competition and transparency through the publication of information and the holding of public audiences. • Consumer protection: protection of consumer rights and the resolution of complaints.

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TABLE B.1. continued

Country	WSS institutional setting	WSS regulatory structure and accountability	Summary of regulatory tools and methods
Middle East and North Africa			
Egypt, Arab Rep.	<p>Egypt's WSS sector is publicly owned. Policy-making responsibilities are carried out by the Ministry of Housing, Utilities and Urban Communities (MHUUC). Responsibility for works planning and implementation of infrastructure investments is under the National Organization for Potable Water and Sanitary Drainage (NOPWASD) and the Cairo Alexandria Potable Water Organization (CAPWO), which operate under the supervision of MHUUC. Operation and management of assets are the responsibility of the Holding Company for Water and Wastewater (HCWW), through its 25 local subsidiaries, the Water and Sanitation Companies (WSCs). A Program Management Unit (PMU) (service delivery unit) is housed within the MHUUC to oversee all WSS investments and is responsible for policy making within the sector.</p>	<p>The Egypt Water and Wastewater Regulatory Authority (EWRA) operates under the MHUUC and is mandated to regulate the quality of services, monitor WSS tariffs, and undertake consumer protection responsibilities.</p>	<p>According to Decree No. 136 of 2004, EWRA is mandated to carry out the following regulatory functions:</p> <ul style="list-style-type: none"> • Enforcement of regulatory legislation: EWRA is responsible for data and information collection used to prepare an annual information report (AIR) presented to MHUUC. • Investment planning • Setting technical standards and providing assistance • Financial monitoring • Promotion of PSP • Performance monitoring and information dissemination • Consumer protection • Tariff review and setting: tariff setting responsibilities are currently allocated to the ministerial cabinet; however, a recent draft law mandates EWRA to set economic tariffs, which are stipulated as an amount to be provided to WSCs for provision of WSS services. Social tariffs are to be set by the ministerial cabinet in addition to the economic tariff. • Licensing: the draft law envisions the provision of operational licenses. A licensing regime would provide EWRA additional autonomy to obtain information from WSCs as well as a mechanism for obtaining funds through license fees.

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TABLE B.1. continued

Country	WSS institutional setting	WSS regulatory structure and accountability	Summary of regulatory tools and methods
Jordan	<p>The Jordanian water sector is highly centralized and nationally integrated:</p> <ul style="list-style-type: none"> • The Ministry of Water and Irrigation (MWI) is responsible for overall leadership on water matters, including strategy formulation and provision of services, pricing and monitoring. • The Water Authority of Jordan (WAJ) is responsible for ensuring bulk water supply and for developing and operating WSS services throughout Jordan. WAJ owns and provides bulk water to three limited liability WSS utilities. • The Program Management Unit of the MWI is responsible for auditing and monitoring performance of corporatized utilities. 	<p>Regulatory responsibilities are split between several national entities as opposed to adopting regulation by agency or contract:</p> <ul style="list-style-type: none"> • Ministries of Health and Environment: responsible regulation of drinking water and effluent quality. • WAJ: responsible for licensing of utilities (subject to approval of the MWI). • MWI: responsible for groundwater extraction. 	<ul style="list-style-type: none"> • Tariff setting: WAJ and JVA recommend water tariff changes as well as capital investment projects to the council of ministers for approval. Cost recovery is currently inadequate, and tariffs for residential customers are low. • Customer protection: a customer's first point of contact is with the utilities. If complaint is unresolved, the customer may contact the WAJ and finally the MWI. • Performance monitoring: a PMU within MWI is charged with developing PPPs and promoting PSP. It also monitors implementation of donor-funded projects and audits performance of three corporatized utilities. Other duties of the PMU include data collection, performance evaluation, periodic inspections, and investment policy feasibility reviews.
Morocco	<p>Municipal councils have ultimate responsibility to manage WSS services. Municipalities may provide the services themselves, delegate, or form regional autonomous agencies. The sector comprises four different service delivery models:</p> <ul style="list-style-type: none"> • Delegation to National Office of Electricity and Drinking Water Supply (ONEE) • Autonomous agencies whereby the government has a contract between ONEE and 12 regional collectives • Delegation to private sector operators in four large cities through concession like arrangements • Direct management by municipalities 	<ul style="list-style-type: none"> • The Ministry of Water Resources undertakes policy-making responsibilities of the sector. • The Inter-ministerial Price Committee (CIP): housed within the Ministry of General Affairs and Governance, the CIP plays an important role in tariff setting and a quasi-regulatory role. Contracts, whether private or public, define the relationship between the government and the service providers. • The Ministry of Interior (MoI): responsible for monitoring and supervision of the sector as well as renegotiation of private concessions. However, most monitoring and supervision responsibilities are delegated to ONEE. • At present, there is no independent regulator. The prevalent arrangement in Morocco is the contractual model and, thus, regulation is through contract. • The CIP is the closest formal body to a price regulator and approves tariff revisions and negotiates programs and contracts. 	<ul style="list-style-type: none"> • Tariff setting and reviews: ONEE may submit a petition to the CIP for a tariff increase. Tariffs of regional autonomous agencies are negotiated and fixed by government based on CIP's advice. Tariffs with private companies are first negotiated with the municipalities, and then with the government. • Service quality standards: each contract operational within the sector has its own specified quality standards. The MoI is responsible for oversight and enforcement of technical standards. • Financial audits and enforcement: CIP and other government agencies, such as the Court of Accounts, are responsible for regulation of financial standards and audits. • Consumer protection and citizen engagement: ONEE plans to improve customer service by extending the mandate of its Electricity Customer Relation Center to the water sector.

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TABLE B.1. continued

Country	WSS institutional setting	WSS regulatory structure and accountability	Summary of regulatory tools and methods
West Bank and Gaza	<p>Much of the sector management and operations activities to date have been implemented by the Palestinian Water Authority (PWA), which include investment planning, regulation, and project implementation responsibilities. Water service providers are commercially weak, with poor service quality, intermittent supplies, and high levels of NRW.</p> <p>The Water Law, introduced in 2014, enforces a reformed institutional framework that separates roles and responsibilities between the following institutions:</p> <ul style="list-style-type: none"> • PWA: drafting sector laws and legislations to be submitted to the cabinet of ministers for approval and overall policy making • Water Sector Regulatory Council • National Water Company: extraction and transmission of bulk water supplies. To the regional water utilities (RWUs) and joint water service councils (JWSCs). • RWUs: aggregation of utilities in larger municipalities will form RWUs • JWSCs: aggregation of small village councils in rural areas where political or geographical constraints exist; eventually, these will be absorbed in to RWUs • Local government units: LGUs are to be aggregated in to the RWUs • Water user associations: responsible for management of irrigation services 	<p>The 2014 reforms established a Water Sector Regulatory Council (WSRC) as legal entity that reports to the cabinet of ministers and is responsible for overall monitoring and regulation of the sector. The WSRC is currently developing its institutional arrangements and is completing its staffing.</p>	<p>The WSRC is responsible for the following:</p> <ul style="list-style-type: none"> • Licensing: to be administered by the WSRC for service providers and by the PWA for water resources. • Standard setting: the PWA and WSRC are responsible for setting operational, technical, financial, and administrative standards. • Tariff setting: the PWA is responsible for setting tariff policies, and the WSRC is responsible for reviewing and approving tariffs.

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TABLE B.1. continued

Country	WSS institutional setting	WSS regulatory structure and accountability	Summary of regulatory tools and methods
South and East Asia			
Indiaⁱ	<ul style="list-style-type: none"> Responsibility for WSS services is shared between the central and state governments. Although state governments have jurisdiction over water resources within their borders, they are subject to regulation from central government. Central government is also responsible for regulation of interstate water projects. Institutional arrangements for urban WSS service delivery vary between states. Some cities have created municipal utilities. There is limited private sector involvement with some operational and management contracts in Karnataka, Bangalore, and Maharashtra. The government is the main stakeholder within the rural WSS sector.^j 	<ul style="list-style-type: none"> State governments are responsible for WSS sector regulation. Some states have established independent regulators. For instance, the Maharashtra Water Resources Regulatory Authority (MWRRA) was set up as an independent regulatory authority under the Maharashtra Water Resources Regulatory Authority Act, 2005. The MWRRA model has been emulated by other states including: Andhra Pradesh, Jammu and Kashmir, Gujarat, Arunachal Pradesh, and Uttar Pradesh, among others. The members of the MWRRA are to be appointed by the governor of Maharashtra, on recommendation of a selection committee. In 2011, the Planning Commission of India introduced the Model State Water Regulatory System Act, which allows all states to implement regulatory arrangements similar to the MWRRA model, and would lead to uniformity in the governance of water resources. 	<p>The core obligations of the MWRRA are to ensure the following:</p> <ul style="list-style-type: none"> Independence from executive and political systems and processes. Fixation of entitlements including individual and bulk water entitlements as well as intersectoral allocations. Under the MWRRA Act, the term <i>entitlement</i> refers to an authorization by the River Basin Agency (RBA) to use water. Rationalization of water tariff: the MWRRA is required to establish a water tariff system, and to fix the criteria for water charges at sub-basin, river basin, and state level after ascertaining the views of the beneficiaries. The water charges must reflect the full recovery of the cost of the irrigation management, administration, and O&M of water resources project. The Uttar Pradesh Water Management and Regulatory Commission also includes the cost of depreciation and subsidies while calculating the water tariff.
Indonesia	<p>2004 Water Law covers both WSS and WRM. Key actors:</p> <ul style="list-style-type: none"> Ministry of Public Works, in charge of asset creation, maintenance. Indonesian Ministry of National Development Planning (BAPPENAS), in charge of planning. Ministry of Home Affairs provides guidance and support to local governments (local government-owned WSS utilities, PDAMS, which are charged with service provision. Ministry of Health guides drinking water quality standards. Ministry of Finance allocates budget for asset creation and service provision (including providing loans). 	<p>2004 Water Law does not provide for regulation or regulators.</p>	<p>Tariffs setting is carried out by PDAMS, which require approval by local governments, and performance monitoring is carried out by various agencies.</p>

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TABLE B.1. continued

Country	WSS institutional setting	WSS regulatory structure and accountability	Summary of regulatory tools and methods
Malaysia	The 2003 reforms established WSS as the shared responsibility between the states and the federal government. The Water Services Industry Act of 2006 establishes a national Water Asset Management Company and a Water Forum to give voice to previously underrepresented stakeholders such as consumers.	The National Water Services Commission (SPAN) is responsible for WSS sector regulation.	SPAN is responsible for the following: <ul style="list-style-type: none"> • Licensing WSS service providers, mainly state water companies; and • Setting and enforcing performance monitoring standards and indicators. Licenses can be revoked if performance standards are not met.
Philippines	Department of Public Works and Highways (DPWH) is the lead agency charged with achieving the goals of the GoP's new policy as stated in the 2011 Water Supply Sector Roadmap. Service provision is decentralized to local governments supported by DPWH; two concessionaires provide services to metro Manila. National Anti-Poverty Commission (NAPC) governs special projects for outreach to the poor.	<ul style="list-style-type: none"> • Manila has two concessionaires that are regulated by the Regulatory Office of Metropolitan Water Supply and Sewerage (MWSS) which sets the rules for tariff adjustments; its discretion is limited by contract between MWSS and concessionaires that provide services. • National Water Resources Board regulates all service providers outside of Manila or MWSS. 	Distribution of duties: <ul style="list-style-type: none"> • MWSS regulates the concessionaires by contract. • LWUA regulates water districts. • NWRB regulates other licensed service providers. • Regulated entities appear for public hearings for tariff approval

Sources: Primarily from extensive case study work undertaken by the Policy, Institutions and Regulatory (PIR) thematic group of the Water Supply and Sanitation Global Solutions Group, specifically: the global case studies included in *Aligning Institutions and Incentives for Sustainable Water and Sanitation Services* (Mumssen, Saliel, and Kingdom 2018); the case studies included in the report on "Water Sector Regulation in the Middle East and North Africa" (Mumssen and Triche 2017); and the PIR LAC case studies. Additional information was drawn from previous published World Bank reports and from online sources in some cases.

a. Migan and Trémolet 2015.

b. Beck 2015.

c. See the PURC website, <http://www.purc.com.gh/purc/node/170>.

d. Macheve et al. 2015.

e. See the State of Lago website, <http://lswrc.lagosstate.gov.ng/>.

f. WSP. 2011. *Water Supply and Sanitation in Uganda*. Washington, DC: World Bank. <http://wsp.org/sites/wsp.org/files/publications/CSO-uganda.pdf>.

g. See the Government of Uganda website, <http://www.mwe.go.ug/dept/water-utility-regulation-department>.

h. World Bank 2013.

i. Koonan and Bhullar 2012.

j. Manoj Kumar and Rohini Muckerjee, "Safe drinking water for rural populations in India: An effective service delivery model by Naandi Foundation", *Field Actions Science Reports* [Online], Special Issue 12 | 2014, Online since 21 October 2014, connection on 08 April 2018. URL: <http://journals.openedition.org/factsreports/3655>

Note: n.a. = not applicable.

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