



RESEARCH ARTICLE

Understanding the roles of meso-institutions: a comparative approach to urban water provision in seven Asian cities

O. Jensen¹  and C. Ménard² 

¹LRF Institute for the Public Understanding of Risk, National University of Singapore, Singapore, Singapore and ²Centre d'Economie de la Sorbonne, Paris, France

Corresponding author: O. Jensen; Email: olivia.jensen@nus.edu.sg

(Received 8 November 2023; revised 16 August 2024; accepted 16 August 2024)

Abstract

This article is about a partially untold story: the central role played by intermediate or ‘meso’ institutions in urban water supply. Three central functions are identified: translating policies and laws into operational targets; monitoring; and incentivizing operators. This paper considers which aspects of institutional design and capacity allow meso-institutions to perform these functions successfully, and conversely what constrains them from doing so. It explores this issue through a careful examination of urban water provision in seven Asian cities which represent a range of macro-institutional environments and micro-institutional arrangements. The analysis shows that in many cases meso functions are performed inadequately or not at all for water supply, with negative consequences for the quality of service. This is particularly evident in cases where ownership and decision rights are not clearly defined and allocated.

Keywords: governance; institutions; meso-institutions; network; regulation; water utilities

Introduction

A football match without an umpire to implement the rules of the game would end up in chaos, as Douglass North pointed out (2005: 48). Translated into institutional analysis and notwithstanding a few notable exceptions (e.g. Acemoglu and Johnson, 2005; Ostrom, 2005), this metaphor raises the question of a complex and largely ignored gap: how are the ‘rules of the game’, which are established at the macro-institutional level, transmitted and adapted to the micro-level at which organizations and users develop transactions and provide feedback to rule-makers? Recent contributions argue that this gap is bridged through intermediary institutions which implement rules, hereafter identified as ‘meso-institutions’ (Abbott *et al.*, 2017; Kunneke *et al.*, 2021; Ménard, 2014). Taking the functions of these meso-institutions elaborated in Ménard and Martino (2024), we explore in this paper whether there are distinct institutions which perform these functions and whether the functions are performed effectively, through a careful examination of urban water provision in different Asian cities. The water sector is of special interest because water is so fundamental to human survival, and is at the intersection of social, environmental, economic concerns, with increasing concern with respect to its supply. The cities of our sample were selected because of their significance with respect to the size of populations concerned; the diversity of institutions present; and the definition, allocation, and enforcement of rights exhibited.

We focus on the meso-institutional dimension because of what we view as a major flaw in the existing literature: when it comes to examining the rules and norms that establish the playing field for water

utilities (and other public utilities in that respect) and assessing how they impact the sector, research focuses mainly on national legal and regulatory frameworks (Araral and Ratra, 2016; Araral and Yu, 2013; Saleth and Dinar, 2004; Shirley, 2002). These components are of course crucial in defining the macro-institutional environment of these utilities. However, establishing a clear relationship between general rules and the behaviour and performance of a specific sector has proven challenging, particularly for the water sector since its provision is highly decentralized compared to other network industries. In the case of utilities responsible for the delivery of tap water, on which we focus in this article, the difficulties of substantiating the expected correlation was pointed out early on (see Saleth and Dinar, 2004; Savedoff and Spiller, 1999; Shirley, 2002). Subsequent empirical studies (see the OECD, 2015a and the ‘Studies on Water’ series that followed; also Ménard, 2022) as well as theoretical lessons they inspired (Jimenez *et al.*, 2018) provide evidence of the persistence of these difficulties.

At the other end of the spectrum, the micro-institutional level populated by operators and users, numerous studies have exhibited the variety of arrangements through which the production and delivery of water services and their supportive transactions are actually organized. These include public entities, corporations, cooperatives, public–private partnerships (PPPs), and so on (see Gunawansa and Bhullar, 2013 for numerous examples). However, connecting operators’ performance to attributes of the institutional environment further confirms the challenge mentioned above. The diverging assessments of the costs and benefits of PPPs in different settings is a case in point (De Vries and Yehoue, 2013; Gassner *et al.*, 2009).

The analysis of the seven cases reviewed in this article suggests that these difficulties in assessing the transmission process are largely born out of the neglect or even the ignorance of this missing link: the key role of intermediate, ‘meso-institutions’ and the critical functions they fulfil in bridging the gap between the macro-level within which general rules and norms are established and the micro-level within which actors organize those transactions that make their activities possible. Our sample substantiates the existence of a variety of meso-institutions, beyond the familiar example of regulatory agencies (OECD, 2015b): central government units, local government departments, oversight committees, and other institutions are found to be fulfilling meso-institutional functions. However, although this variety and their differentiated impact on performance of water provision have been acknowledged in the contributions referenced above as well as in more recent investigations,¹ these studies lack an integrative framework that could provide theoretical foundations to the nature and role of meso-institutions and their relation to the other institutional dimensions. Such a framework is essential to allow rigorous comparisons across cases. Building on recent contributions in this area of study (Kunneke *et al.*, 2021; Ménard and Martino, 2024; Ménard *et al.*, 2022; Ostrom, 2005, 2014; Voigt, 2018), our cases illustrate the role of meso-institutions in fulfilling the essential functions of interpreting and translating the ‘rules of the game’ into sector-specific rules and norms, monitoring their implementation, and incentivizing agents to comply. The absence of adequate meso-institutions or their incapacity to properly fulfil their functions (or part of them) impacts negatively the delivery of expected services. In that respect, meso-institutions are critical to the governance of all regulated sectors.²

The analysis of these meso-institutions in the cases of our sample is organized as follows. Section ‘Analytical framework and hypotheses’ introduces a theoretical model that we adapted for the investigation of the water sector. Section ‘Case selection and methodology’ exposes the motivation behind

¹See the numerous in-depth case studies (Brazil, Jordan, Mexico, the Netherlands, Tunisia, etc.) developed in the context of the ‘Water Governance Initiative’ of the OECD; https://www.oecd-ilibrary.org/environment/oecd-studies-on-water_22245081.

²Several examples are provided in the special issue of *Regulation and Governance* of March 2018. ‘Governance’ is a poly-morphic term defined differently according to the institutional layers in which it is embedded. It can refer to the structural arrangement monitoring firms at the micro-level (e.g. ‘corporate governance’; see Roe, 2003), to the modalities of governmental action at the macro-level (e.g. ‘good governance’ of public authorities; see Council of Europe, 2008); or to the way intermediate institutions proceed in implementing and adapting general rules and norms (e.g. the way regulators operate; see OECD, 2015b). This article refers to ‘governance’ in this last perspective (Ménard, 2014; Saleth and Dinar, 2004)

the selection of our seven cases and the methodological strategy adopted for their exploration. Section ‘Contextualization: embedding meso-institutions in their institutional settings’ contextualizes the cases under review by providing key elements of the macro-institutional context in which they are embedded and on the micro-institutional organizations that operate in these environments. Section ‘Meso-institutions: identification and functions’ focuses on the core of our empirical investigation, identifying the meso-institutions involved in the governance of the water utilities under review and discussing if and how they fulfil the functions identified in our theoretical framework. Section ‘Discussion: linking meso-institutional arrangements to outcomes’ draws some lessons about how the water sector imposes specific characteristics on the institutional settings and about the fitness of meso-institutions to the other institutional layers and to expected results. The last section concludes by pointing out challenges in meso-institutional design raised by this analysis and suggests directions for future research.

Analytical framework and hypotheses

The analysis of how institutions impact the production and delivery of water services and other regulated sectors faces puzzling issues. Substantial differences in the institutional environment across countries, e.g. their legal or political systems, are often considered as key factors in explaining why similar micro-institutional arrangements, e.g. PPPs, might perform well in one place and poorly in another one when it comes to delivering expected services (Acemoglu and Johnson, 2005; Levy and Spiller, 1994; Ménard and Peeroo, 2011; North, 2005; Shirley, 2002). Even within the same institutional environment and submitted to the same rules of the game, these arrangements may perform very differently. For example, within relatively well-defined institutional frameworks, e.g. the European Union or the USA, PPPs perform well in some cases and poorly in others (De Vries and Yehoue, 2013; Gunawansa and Bhullar, 2013; Hefetz and Warner, 2007; Ménard and Saleth, 2013).

Notwithstanding the relevance of these contributions and many others emphasizing the role of institutions on the performance of water utilities (e.g. Saleth and Dinar, 2004; Savedoff and Spiller, 1999; Shirley, 2002; OECD, 2015b; WDR, 2017), the persistence of these puzzling issues might come from the ignorance or underestimation of the transmission devices and mechanisms linking the general ‘rules of the game’ to the way actors organize their activities within the playing field thus defined. For instance, in a different context, Acemoglu and Johnson (2005: 989) rightly pointed out how the regimes of property rights that impact the organization of economic activities remains ‘something of a black box’.

Our core hypothesis is that these interactions develop through meso-institutions, whose capacity to fulfil specific functions determines the performance of the targeted sector(s).

Institutions disentangled

As a starting point, we endorse the substantive concept of institutions as the set of rules, norms, and conventions that structure the social interactions among agents (Hodgson, 2015; Kunneke *et al.*, 2021; North, 1990, 2005). When it comes to economics, the key role of institutions thus understood is to provide support to the organization of transactions, that is, the transfer of rights to use goods and services needed to produce and exchange, thus framing the socio-technical conditions under which individuals, firms, cooperatives, and so on develop their activities (Davis and North, 1971; Kunneke *et al.*, 2021: chap. 2; North, 2005: chap. 5; Williamson, 1996: 379). These are illustrated by laws regarding property rights or contract laws and the institutional modalities through which they are defined. These institutions in turn have a major impact on the choice of organizational solutions, their implementation, and the quality and efficiency of their outcomes.

Urban water services operate in institutional environments thus framed (see section ‘Case selection and methodology’). However, the provision of water obeys specific constraints and challenges. First, water provision is influenced by geographical as well as climatic conditions over which decision-

makers have very limited control. Second, the criticality of water for human survival provides water supply a social dimension tightly correlated with equity issues. Third, the production and delivery of water require strict conditions to protect public health, making the choice of organizational modalities a highly sensitive issue. Last, technology options available to fulfil these requirements are limited and partially determined by the physical environment. A consequence of these challenging constraints, which often combine, is that water is everywhere highly regulated, whether by governments or by communities, making institutional mechanisms of transmission a particularly critical issue.

Addressing these challenges involves different institutional layers and even different components within these layers; hence the need to ‘unbundle’ the general concept of institutions to capture the complexity of the issues at stake. Water systems and their usage are framed by ‘constitutive rules’ (Ostrom, 2014) defined at the macro-level, most of the time by policy-makers.³ These rules become ‘operational’ through their implementation at the micro-level by different types of operators (e.g. a monopoly, public or private; a PPP; a coop; a local community; see examples in Gunawansa and Bhullar, 2013; Ménard, 2017; OECD, 2016–2022; Savedoff and Spiller, 1999; Shirley, 2002). However, the complexity and ambiguity of the ‘constitutive’ rules when it comes to their actual implementation necessitate the intervention of intermediate institutions to adapt and apply these rules to specific contexts (e.g. water can be managed at the local level or may require regional coordination). As the cases in our sample show, there can be many different meso-institutions acting as go-between, linking the macro- and the micro-layers, leading to variations in the impact (or absence of impact!) on the characteristics and performance of water utilities. Figure 1 visualizes these three layers, suggests areas of overlap between the layers, and takes note of the role of technology.⁴

Role and functions of meso-institutions in relation to water provision

To substantiate this framework and support our empirical analysis of the role of meso-institutions in the provision of water services we hypothesize that they do so through the accomplishment of specific functions. To identify these functions, we build on three contributions that go beyond the polar distinction by Davis and North (1971: 6) between the macro-level where the ‘rules of the game’ are established and the micro-level at which ‘players of the game’ operate. First, through a careful examination of the governance of common-pool resources and specifically the organization of water supply and other services in local or regional communities, Ostrom (2005, 2014) pointed out the existence of different types of rules (e.g. ‘constitutive rules’ vs. ‘operational’ ones) embedded in different types of institutions. Her concept of ‘polycentric governance’ intended to capture the variety of institutional arrangements through which different rules are implemented, while her institutional analysis and development framework focused on the vertical superposition of institutional layers through which different rules operate, from those correlated with ‘biophysical conditions’ to those framing the ‘action arena’ (Ostrom *et al.*, 1994). Second, almost simultaneously although from different viewpoints, Ménard (2014, 2017) through his analysis of public utilities and network industries in the continuity of the Northian perspective as well as Abbott *et al.* (2017), through their analysis of public administrations and the implementation of public policies, articulated the need to go beyond the mere identification of the set of ‘meso’ or ‘intermediate’⁵ institutions to investigate their key functions.

Building on these contributions and the subsequent work of Ménard (2017) and Kunneke *et al.* (2021: chap. 2), we define meso-institutions as *those devices (entities) and mechanisms (protocols, guidelines) through which constitutive rules are translated/interpreted, monitored, and enforced*, thus

³Not always: for instance, courts may play a role as when they impose restrictions to implement environmental laws.

⁴Although this article does not develop the technological dimension, we are fully aware of its importance, as well illustrated by the complex coordination of the different technologies contributing to provide water in Singapore (see Kunneke *et al.*, 2021, chap. 6).

⁵Hence the qualification of their model as R-I-T, which stands for ‘Regulators-Intermediate-Targets’.

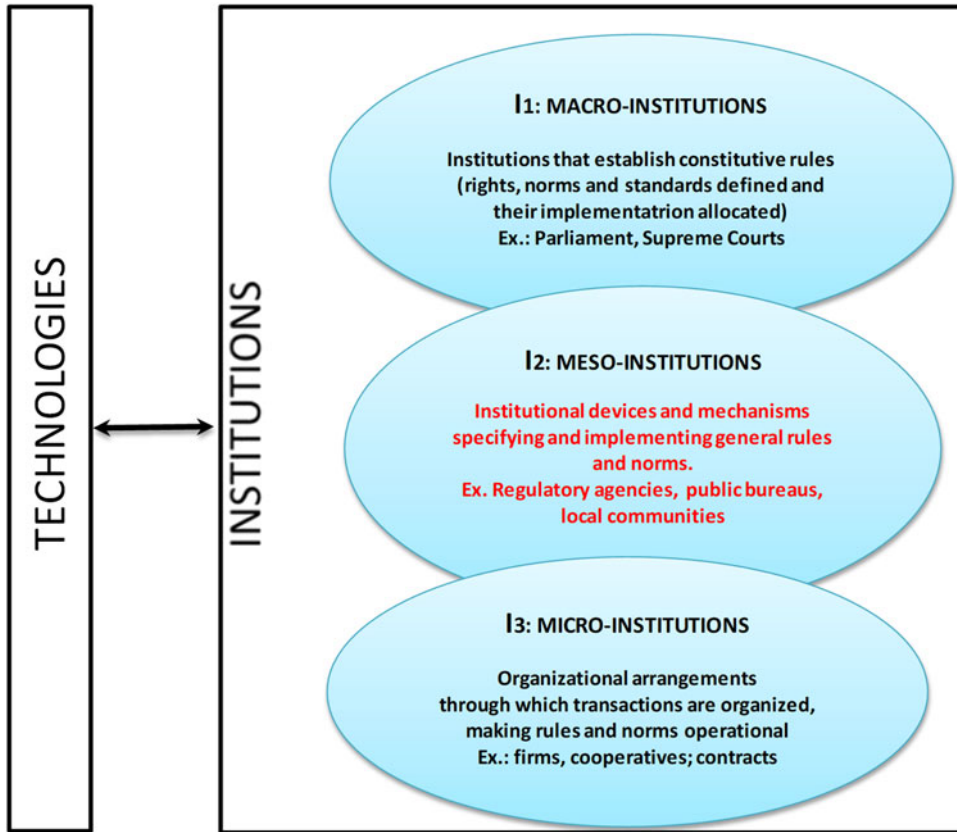


Figure 1. Institutional layers.

Source: Adapted from Kunneke *et al.* (2021: chap. 3).

transforming general constitutive rules into contextualized ones. Following this literature, the implementation functions can be characterized as follows (Figure 2).⁶

The underlying hypothesis is that these functions need to be fulfilled in order for transmission to work. Therefore, through a close examination of our cases, we will need first to identify which of these functions are fulfilled and then see which specific institutions (if any) fulfil them. This approach suggests ways to assess the performance of meso-institutions, captured through their capacity to satisfy tasks associated with these functions. Performance is hereafter understood as the capacity of the system to fulfil the goals assigned by the macro-institutions.

When it comes to the water sector, this implies evaluating the capacity of meso-institutions in: (1) translating national water laws and policies into specific targets understandable and operationalizable by water operators and simultaneously acceptable by users; (2) collecting information needed to monitor the compliance by targeted operators to the rules and norms established by a regulator; and (3) enforcing compliance to the rules by developing mechanisms to incentivize or constrain operators. It also provides indications about how to assess the fitness of meso-institutions to the two other institutional layers, that is, the capacity (or not) of meso-institutions, when they exist, to translate/interpret/adapt rules and norms established at the macro level in a way that allows operators to implement appropriate operational rules at the micro level, and to provide feedback to rule-makers

⁶For a detailed discussion of these functions and their *raison d'être*, see Abbott *et al.* (2017); Ménard (2017); Kunneke *et al.* (2021, chap. 2); and Ménard and Martino (2024).

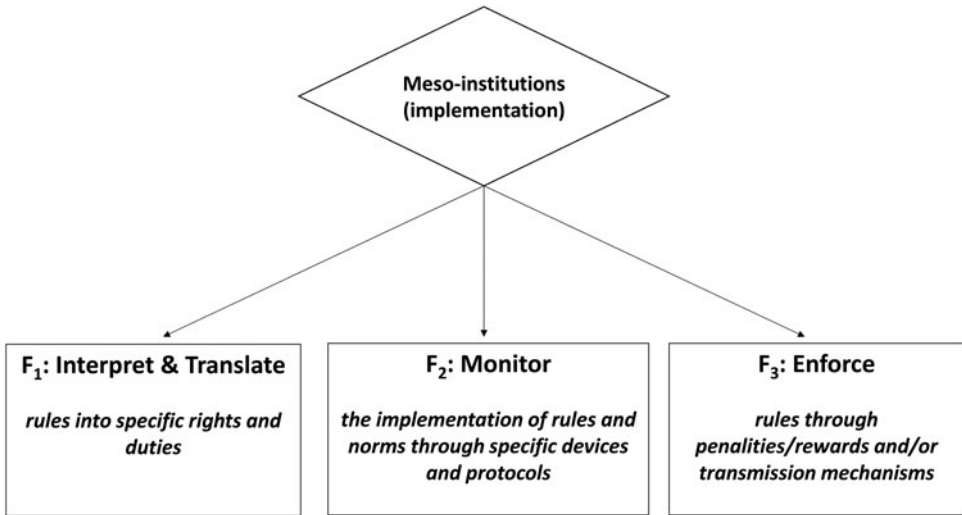


Figure 2. Key meso-institutional functions.
Source: Ménard and Martino (2024).

in order to adapt the general rules to local conditions. For instance, we shall indicate the negative impact of missing or distorted functions or of the absence of appropriate meso-institution(s) on the organization of some water systems of our sample.

Considering the interactions between institutional layers illustrated in Figure 1 suggests additional questions for investigation. These include the interaction or ‘fit’ between meso layers and other layers, for example whether higher implementation capacity at one institutional layer compensates for lower capacity in other layers, and whether higher macro-institutional quality is associated with greater clarity in the assignment of functions between institutional layers, or between entities at the meso-institutional level. Looking at PPPs through a meso-institutional lens gives rise to questions about whether functions to be fulfilled differ when property and decision rights at the operational level are separated between public and private entities, compared to cases in which rights are held entirely by public entities.

Case selection and methodology

Before substantiating the nature and comparing the functions played by the different meso-institutions identified in our sample, indications are provided hereafter about the motivation behind the choice of the cases and the methodology we adopted to capture their key characteristics.

Selected cases: why?

We chose the water sector in Asia for our investigation as it provides considerable variety in macro and micro institutional arrangements, providing potential to investigate how different meso-institutions might be present in these different settings and providing potential to investigate a range of interactions between the macro, meso, and micro layers. Drawing on Asian countries with different levels of economic development and macro-institutional quality (MQ from now on) allows us to consider whether meso configurations are associated with overall MQ or with the specificities of the allocation of decision and property rights within the sector in question.

Our research started with the collection of contextual information on institutional settings for water supply for an extended sample of cities in Asia of more than 2 million inhabitants. Because our goal

was to examine the status and role of meso-institutions in contexts that differ in their macro- as well as micro-institutional settings, and considering the feasibility of data-gathering, we then selected seven cities (which total over 100 million inhabitants) for in-depth study: Chattogram⁷ (Bangladesh), Delhi (India), Tokyo (Japan), Johor (Malaysia), Manila (the Philippines), Ho Chi Minh City (HCMC; Vietnam), and Singapore. This selection was carried out along the following criteria.

First, we wanted to consider water systems operating in macro-institutional settings of different quality. We opted to rely on the World Bank measure of general MQ (see the World Governance Indicators, World Bank, 2023). Indeed, a general measure of MQ can be considered more suitable than a water-specific measure of institutional quality for three reasons. (1) There is no generally accepted measure or index of institutional quality in the water sector. Existing indicators (e.g. Saleth and Dinar, 2004) are based on perception surveys and emphasize resource management quality rather than water supply institutions. (2) MQ captures the general quality of non-water-specific institutions (e.g. regulatory, legal, political institutions): we expect this general quality to be related to the clarity of allocation of functions across institutional layers. (3) The usage of the relatively standardized MQ data, which are highly correlated with countries' income, facilitates the selection and comparison of cases.

MQ data for the countries in which our case studies are located are tabulated in Annex 1. Bangladesh, the Philippines, and Vietnam, all lower middle-income countries, have generally negative MQ scores, indicating weak governance on almost all dimensions. India and Malaysia exhibit mixed scores, with Malaysia scoring positively on all but one dimension. Japan and Singapore, both high-income countries, have high positive scores indicating strong governance across all dimensions.

Second, at the micro-institutional level, cases were selected to represent a wide variety of organizational structures, differentiated by the allocation of property and decision rights. We selected cases with public, private, and mixed operators which reflected wide variation in the allocation and exercise of property as well as decision rights. Despite extensive search, we were unable to identify any cases of cities in mixed or high MQ from Asian countries in which water services are supplied by private operators. In fact, examples of purely private solutions for water supply are rare worldwide, while mixed public-private configurations are widespread both in Asia and globally (Marin, 2009; World Bank PPIAF, 2017). Table 1 synthesizes the position of the different cases we selected in terms of these two variables.

Considering the scarce public information available on meso-institutions, another important criterion in selecting our sample was the accessibility of information. We prioritized cities where we were confident that sufficient information would be available, either because some of the researchers mobilized by this project had already worked on these cities, or had contacts with potential key informants in these cities.

How we approached these cases: methodological strategy

To disentangle the overlapping rights and responsibilities among the different institutional layers of our model and better understand the role of meso-institutions in this context, we employed a qualitative case-study method (Skarbek, 2020). Case studies are well suited for the exploration of complex concepts which are difficult to quantify and allow for the identification of additional features and functions to add to and refine the conceptual framework (Bennett, 2024; George and Bennett, 2005).

Data collection and analysis was conducted in three steps. The first step was to develop a case-study template (see Supplementary materials). The main section of the template comprised of a detailed list of meso-institutional functions and related tasks specific to the urban water sector, used to identify the specific organizations to which these functions were assigned on paper and in practice for each case, and to assess the capacity of these organizations to carry out their assigned functions. The template also covered contextual information on the macro and micro organizational arrangements,

⁷Previously known as Chittagong, the official name was changed in 2018.

Table 1. Sample with respect to MQ and micro-institutional arrangements

Institutional score micro-arrangements	High macro-institutional score	Mixed macro-institutional score	Low macro-institutional score
Public	Tokyo	Delhi	Chattogram
Mixed	Singapore	Johor	HCMC
Private	–	–	Manila

technologies in use, and performance outcomes (coverage, service quality, etc.). Initial data collection was conducted through a desk-based review of scholarly literature, policy and lending documents, annual reports of utilities and government agencies, and so on. Documentary review allowed us to identify some likely meso-institutions for each case but yielded insufficient information to complete the template, so we proceeded to data collection from key informants through a questionnaire (provided in the Supplementary materials). Because of the unfamiliarity of the term and concept of ‘meso-institutions’, the questionnaire did not ask directly about the presence of meso-institutions and their functions. Rather, respondents were asked whether their organization played specific functions and how other organizations interacted with their own. Through multiple informants in each case, this allowed us to gather sufficient information about the full set of meso-institutions. Target respondents were senior officials responsible for water supply (municipal/national government), regulators, utility managers, representatives of development banks with active water supply operations in the relevant city, and academics conducting research on water supply in the relevant city.

The questionnaire was pre-tested with three sector professionals from three different cities (two utility managers and one public official). The pre-testing revealed that respondents often found it difficult to answer the standardized questions and were generally only able to answer questions specific to their own organization. Further simplification of the questionnaire would have rendered us unable to identify and analyse the assignment of meso-institutional functions, so we took two further steps: we adapted the questionnaire to each case, for example, by using case-specific terms and providing case-specific examples. Second, after circulating the questionnaire by email, the research team followed up by calling respondents and working through the questionnaire with them in order to be able to provide immediate clarification on any questions they found difficult to understand. In two cases (HCMC and Chattogram), the level of detail provided by respondents remained insufficient to complete the case-study template, so members of the research team carried out field visits to these sites in order to administer the questionnaire face-to-face. Through this process, 20 informants completed the questionnaire. The questionnaire responses were used to complete the case-study template for each city.

The complete set of case studies was then analysed thematically independently by each co-author. The initial set of themes was derived from the conceptual model: identification, function performed, degree to which function is performed (interpret, translate, monitor, incentivize, and enforce), functions not performed (gaps), functions performed by multiple organizations (overlaps), and barriers to the performance of functions (absence of legal/regulatory authority, legal/regulatory ambiguity, capacity [resources/skills]). The authors then discussed all coding jointly. Additional coding themes were identified through the discussions: ambiguity/volatility in policy; organizational/institutional volatility (the frequent re-allocation of authority and responsibility for functions between institutions); proliferation/specialization/redundancy among meso-institutions and performance incentives for the meso-institutions themselves.

This empirical investigation was of course quite demanding, but it was worth the effort since it made possible to collect relevant (and previously unavailable) information about the identification and characteristics of the meso-institutions involved and to proceed to an orderly comparison of the institutional settings of the cities of our sample.

Contextualization: embedding meso-institutions in their institutional settings

This section summarizes aspects of the macro and micro institutions with which, according to our model, meso-institutions interact. This context allows us to understand the role and specificity of meso-institutions and their (limited) capacity to fulfil their key functions.

Macro-environment

Our cases represent a wide range of macro-institutions within which water services are delivered. First, the cases differ according to whether they are federal or unitary systems, the impact of which has been emphasized by political scientists, particularly when it comes to defining and implementing public policies (see Gerring *et al.*, 2009; Weingast, 1995), and the extent of decentralization of decision-making specific to the water sector. Among the cases we studied, two are located within federal systems, India and Malaysia, in which authority over water policy and regulation is shared between the national and state levels, suggesting that there may be multiple meso-institutions to implement policies issued at the national or regional levels. All other cases are found in unitary systems, with policies mainly defined at the central level. However, because of the specificity of water systems mentioned in section 'Institutions disentangled', in all but two cases, the governance over water supply is partly decentralized to local/municipal governments. The exceptions are Singapore, which only has one level of government, and Malaysia, where authority is not decentralized beyond the state level. In Bangladesh, India, Japan, and the Philippines, elected city mayors and assemblies have significant decision-making authority in relation to water services. In Manila, the Metro Manila Development Authority constitutes an additional governance layer between the national and municipal levels. However, despite some decentralization, national governments play a leading role in defining policy and in funding water infrastructure in all the countries covered in this study: relative centralization prevails everywhere when it comes to the rules of the game regarding provision of water.

In most of the countries where our case studies are located, there is a multiplicity of water laws, regulations, and policies. National water policies and laws are usually construed in general terms and updated infrequently. In several countries, new water laws and policies have been under discussion for years and there is no clear timeframe for adoption, contributing to uncertainty for lower levels of government and operators about which policies and targets should prevail. On the contrary, new plans, initiatives, and targets relating to particular aspects of water supply, and new institutions to lead them, are launched frequently. Japan and Singapore differ from the other cases in this respect: the legal regime for water in Japan has been stable over the last half-century and in Singapore since 2001, although in the latter case policy priorities are regularly updated.

Annex 2 provides a simplified summary of these complex macro-institutional settings. This overview confirms that the definition of public policies regarding water services and the allocation of rights for the implementation of these policies remain highly centralized with rare exceptions while because of the very nature of water systems the actual governance is largely in the hands of meso-institutions, particularly local or regional governments. This is well illustrated when we turn to the technology aspect: water infrastructure is almost always constructed at the local or regional scale, in sharp contrast to other network infrastructure sectors which are organized at the national level (e.g. telecoms, railways, energy). Thus, local and regional authorities play a more important role compared to in other network infrastructure sectors.

Micro-institutions and the organization of transactions

At the micro-level, institutional arrangements are differentiated by the allocation of rights. Although property rights play a key role in determining the power and responsibilities over which operators have control, the allocation of decision rights is also crucial in that it conditions the actual exercise of these rights and it shapes the organizational modalities through which transactions are implemented. In turn, it influences the modalities available for implementation of rules.

In most of the case studies, ownership of water abstraction, treatment, and distribution infrastructure lies with the local government. The exceptions are Malaysia where infrastructure is owned by a national asset holding company and leased to operators, some of whom are private; Manila, where assets are owned by a dedicated authority under the national government; and Singapore, which is a city-state. Private ownership of assets is relatively uncommon. In Delhi, HCMC, and Singapore, the private sector owns bulk water treatment assets under timebound build–operate–transfer type of public–private contract but ownership of distribution assets lies with the government.

Private operators are also present in some cases. Notably, water and wastewater services in Manila are provided by two private companies under long-term (35 years) concession contracts. In Johor, a private operator delivers services under a renewable lease contract, whereas in Delhi, private operators are engaged under short-term management contracts for water supply service delivery in some zones of the city. The prominence of local government in ownership and decision rights in many of the cases may be associated with distinctive patterns in the fulfilment of meso-institutional functions, in comparison to cases in which ownership and decision rights are distributed across levels of government and between public and private actors (more on this in sections ‘Meso-institutions: identification and functions’ and ‘Discussion: linking meso-institutional arrangements to outcomes’).

Notwithstanding that piped water is delivered by a public monopoly in most of the cities studied, there is considerable variety in the allocation of decision rights. In Tokyo, HCMC, and Delhi, local government plays (or is intended to play) the leading role in organizing transactions, particularly in setting tariffs and performance requirements. In Manila and Johor, these rights lie with specialized agencies, at the metropolitan level and national level respectively. In Chattogram and Singapore, decision rights lie with a national government ministry.

Another influential factor in the way water systems from our sample are organized comes from the technological side. Although there is wide variation in the technologies used across the cases studied, they all offer, or aim towards, individual household pipe connections through a centralized network. In Tokyo, Singapore, and Johor, individual piped connections are universal, whereas in the other cities, a proportion of residents depends on other sources of supply including small-scale private vendors, private wells, and so on. In terms of water treatment technologies, Singapore employs advanced reuse and desalination technologies, whereas Tokyo treats surface water to a high standard using sophisticated tertiary treatment technologies. The other cities studied depend mainly on surface water treated to a secondary standard.

These organizational and technological characteristics are summarized in Annex 3. One central lesson from this simplified overview is that because most utilities in our sample (and more generally in the provision of water services in the countries of our sample) are public, there is significant overlap between the exercise of decision rights by these utilities and the modalities through which public authorities monitor them. As a result, disentangling meso-institutions and micro-institutions is not an obvious exercise.

Meso-institutions: identification and functions

Our central contention – that meso-institutions play a key role in connecting rules of the game and operators and users on the playing field – requires us to identify these institutions in the specific context of the water supply sector and to qualify how they fulfil their functions. In this section, we present our findings on the presence of meso-institutions and their performance of the functions: translating, monitoring, and incentivizing.

Identification of key meso-institutions

At the outset, it is notable that distinct meso-institutions for water supply – *distinct* in the sense of having a degree of organizational autonomy – were absent or overlapping with other institutional levels in many of the cases studied. Indeed, in many cases, meso-institutional functions were not being fulfilled and operators were setting targets and reporting on their own performance without

Table 2. Identification of meso-institutions

Case	Meso-institutions identified
Chattogram (Bangladesh)	<ul style="list-style-type: none"> Local Government Division (LGD) of the Ministry of Local Government, Rural Development and Cooperatives (MoLGRD&C). Chattogram City Corporation. Lenders (Multilateral Development Banks, donors) play meso-institutional roles in relation to certain aspects of water supply.
Delhi (India)	<ul style="list-style-type: none"> State Government of Delhi (National Capital Territory), Chief Minister, and Minister for Water, through appointment of the Chair and Vice-Chair of the DJB Board of Directors: controls tariffs, sets performance targets, provides funding. Central government regulatory entities: National Green Tribunal (in relation to wastewater and water environmental quality), Central Groundwater Board, Central Pollution Control Board (set standards and monitor groundwater and municipal/ industrial wastewater discharge respectively). Central government 'missions', programmes, and funding schemes: AMRUT.
Tokyo (Japan)	<ul style="list-style-type: none"> Ministry of Health, Labour and Welfare, Health Services Dept., Water Supply Division. Tokyo Metropolitan Government.
Johor (Malaysia)	<ul style="list-style-type: none"> Ministry for Energy, Water and Communications (note that in 2022, the Government of Malaysia announced that the MEWC would be merged with the Ministry for Energy to create a new Ministry of Natural Resources, Environment and Climate Change which will have oversight over water policy). SPAN (national water regulatory agency), PAAB (national water asset holding company). State-level: State Government of Johor, UPENJ (state-level department of economic planning), BAKAJ (state water regulatory agency, primarily responsible for water resource management).
Manila (the Philippines)	<ul style="list-style-type: none"> MWSS-Regulatory Office (economic regulator of the concession contract). Legal status provided by the contract until 2021 when it was established as an autonomous entity under a Presidential Executive Order. Financial institutions and equity-holders (concession companies listed on the Manila stock exchange).
Singapore	<ul style="list-style-type: none"> Direct supervision by Ministry of Sustainability and Environment (Historically, high-level political monitoring with Chief Executive reporting to Prime Minister's Office).
Ho Chi Minh City (Vietnam)	<ul style="list-style-type: none"> HCMC People's Committee. Min. of Construction.

the intervention of a higher-level institution. In several other cases, functions were only partly fulfilled through broad (non-specialized) local government oversight, these authorities therefore acting partially as meso-institutions.

Clearly identifiable, dedicated meso-institutions for water supply were found only in Johor (Malaysia's national water regulatory agency SPAN) and Manila (MWSS Regulatory Office, which monitors and enforces the concession contracts). Perhaps surprisingly, given their higher generalized levels of institutional quality, neither Tokyo nor Singapore has distinct meso-institutions for water supply. On the contrary, we found a great number and variety of institutions performing some meso-institutional functions at the local and national levels. These are summarized in Table 2.

In many cases, we also observed divergence between the allocation of meso-institutional functions on paper and in practice. For example, in Delhi and HCMC, the state government and the People's Committee of the local government have authority over tariffs, standards, and policy, but in practice these functions are performed only intermittently and partially. In Chattogram, responsibility for meso-institutional functions lies with the national government ministry, but in practice these functions are not performed and the operator sets its own targets in interaction with its multilateral lenders.

In cases where meso-institutional functions were not being performed, or performed only partly, we would expect wider divergence between national policy targets and the actual performance of

operators. In the following sections, we consider in more detail limitations in the fulfilment of functions in the seven cases.

Translating

The translation function scales down and calibrates national level policy goals to the level of the operator. It is explicitly played by a single meso-institution in only one of the our cases: SPAN in Malaysia. This agency sets specific operational targets for water utilities which are revised every 3 years. Elsewhere, performance of the translation function is implicit and incomplete. In Manila, translation is partially performed by the Regulatory Office, with reference to the concession contracts whose scope and targets reflect national policy priorities at the time of negotiation but are not necessarily consistent with current targets. In Delhi, the state government sets short-term policy directions which overlap and sometimes contradict the targets set out in national water policies. Operators in Chattogram, Tokyo, and HCMC, meanwhile, are left by default to prioritize and interpret national policy direction in the context of local operating conditions. It should be noted, however, that this does not imply that the targets set locally are necessarily lower than the national targets – in fact, in Tokyo, the operator's targets are considerably more demanding than those indicated in national policies.

Singapore is an interesting exception in that this meso-institutional function appears to be unnecessary in the governance context of a unitary city-state. In this case, national water policies are imposed directly on the operator without translation. These policies are detailed, timebound, and responsibility for implementation is allocated to a single entity, the Public Utilities Board.

Monitoring

Monitoring the achievement of targets is a critical part of the incentive framework aligning operators' decisions with national policies, which is carried out at the meso-institutional level. Effective monitoring is demanding in terms of information – it requires complete, reliable, valid, and timely reporting on operational and financial performance by the operator. It also demands specialized capabilities and resources to interpret the information and to make this accessible to stakeholders. In only two of the seven cases studied, Manila and Johor, these requirements are fully met and the function fully performed. In Singapore, this function is internalized as the utility reports directly to the national ministry and only certain performance indicators are reported publicly.

In the majority of cases, monitoring is conducted by an institution with broad responsibility for multiple policy areas and without the necessary capacity to collect and interpret the information. In Delhi, Tokyo, and HCMC, this is the municipal government, whereas in Chattogram it is a central government department. In Delhi, for example, the inability to monitor is exacerbated by the poor quality of data reported by the operator – audited accounts have not been issued since 2016 – and by the absence of leadership. The post of Water Minister within the State Government was unfilled for several years during the period of this study. As of 2023, the post was filled but the Minister was also responsible for multiple other policy portfolios, limiting capacity to monitor the water sector effectively. In Tokyo, the utility reports on financial and operational performance to the mayor and municipal assembly. In this case, the government's monitoring role is passive – documents are reviewed but no further enquiries are conducted and no detailed feedback is given. However, the quality of the financial and operational data provided by the Tokyo utility is high and reporting protocols are well established and fulfilled, which may reduce the importance of this function in the Tokyo case.

The monitoring ability of meso-institutions is strengthened if they can benchmark performance indicators against other utilities. We found very limited evidence of systematic benchmarking in our cases. In Manila, the two concessionaires are benchmarked against each other, and in Malaysia, state operator performance is compared but not formally benchmarked. This absence of benchmarking can be linked to the allocation of monitoring authority to a local-level institution rather than to a regional- or national-level meso-institution which could collect information from multiple operators.

Enforcing and incentivizing

The third key function of meso-institutions is enforcement, implemented ideally by incentivizing operators to perform efficiently and to provide high-quality services in line with policy targets. In order to fulfil this function, meso-institutions need to have both the authority and capacity to reward and penalize operators through mechanisms such as: the authority to award or renew operating licenses; review contracts; set tariffs; impose penalties and offer bonuses; and the power to appoint, promote, or dismiss senior management.

This function was clearly and effectively performed in only one of the cases studied: Manila. In that case, there is a well-defined incentive structure based on periodic rate-rebasing following a price-cap approach. The function is partly fulfilled in a second case, Johor. There, the national regulatory agency is able to incentivize operators through the power to renew operating licenses, and through the authority to review tariffs every 3 years. However, only state governments have the authority to request tariff reviews, rendering this incentive mechanism ineffective if the state government does not request a review, as has been the case in the last three regulatory cycles.

In the remaining five cases, the authority to incentivize and enforce lies with the municipal government (Delhi, Tokyo, and HCMC) or a central government ministry (Chattogram and Singapore). In general, these government entities do not use tariff-setting as a mechanism to incentivize efficient performance by operators. The internalization of the incentivization function within government appears to lead to the prioritization of affordability (Delhi, HCMC, and Singapore up to 2017) and increased access (Delhi) over other policy objectives. In Tokyo, on the contrary, priority has been given to the technical performance of the service.

An additional mechanism available to meso-institutions to incentivize public utilities is control over the appointment, promotion, and compensation of senior management but this appears to be used in only one case studied – Singapore, where management compensation is performance-based.. In four cases (Delhi, Manila, Johor, and Tokyo), the meso-institution with primary responsibility for incentivizing and enforcing does not exercise authority over the appointment or compensation of senior management, and in the remaining two cases (Chattogram and HCMC), this authority has not been used in practice.

Table 3 summarizes how the three different functions are fulfilled in the different cases.

Discussion: linking meso-institutional arrangements to outcomes

The investigation of our panel of cases shows two important commonalities in water supply meso-institutions: (1) lack of clarity in the allocation of meso functions to distinct institutional entities; (2) the predominance of local-level institutions in fulfilling these functions by default, but lacking modalities to do so effectively. This is most clear in relation to the third function of monitoring and in incentivizing. We find considerable variety in the ways in which meso-institutions fulfil their functions, reflecting the variety of macro and micro settings that is characteristic of the water supply sector.

The value of the function-led approach to the study of meso-institutions suggested by Kunneke *et al.* (2021) and Ménard and Martino (2024) is clearly demonstrated through this application to water supply, where distinct meso-institutions do not exist in most cases. The examination of how functions are performed makes it possible to systematically compare cases even when they exhibit a variety of institutional arrangements. This contrasts with an approach that focuses, for example, on regulatory agencies, which limits comparison to the limited number of cases in which such agencies exist.

Missing meso-institutions: local governments operating as meso-institutions

The predominance of the municipal-level government in performing meso-institutional functions in our sample may not be surprising considering the decentralized nature of water sector governance and

Table 3. Meso-Institutional Functions summarized

Cases Functions	Translating	Monitoring	Enforcing and incentivizing
Chattogram (Bangladesh)	<ul style="list-style-type: none"> Major policy goals defined in Bangladesh Delta Plan (2018) ('Enhance water security and efficiency of water usages') and 8th Five Year Plan ('cost recovery in urban water supply'). LGD does not translate these into specific timebound targets for CWASA for coverage, efficiency targets, cost recovery, etc. Additional specific targets under policy initiatives of central government relevant to particular aspects of water service delivery e.g. Smart Bangladesh 2041 (digitalization of public services). World Bank sets performance targets (e.g. extension of coverage, efficiency improvements, and progress) towards cost recovery in the context of project loans (Chattogram Water Supply Improvement and Sanitation Project I and II). 	<ul style="list-style-type: none"> Annual report submitted to LGD covering capital works – available on website. No regular reporting on operational and financial performance indicators. Periodic reporting to World Bank on project progress (capital works and performance indicators) (not public). No benchmarking against other utilities. 	<ul style="list-style-type: none"> Tariffs approved by LGD and Chattogram City Corporation (elected municipal body). WASA Act provides for CWASA to raise tariffs 5% annually with tariff increases beyond the threshold of 5% per annum requiring central government approval but in practice approval is sought for increases. Penalties are not imposed for poor performance. Senior management appointed by LGD. Stability in senior management over last 10 years. No bonuses awarded for high performance. Disbursement of funds under WB project tied to achievement of performance targets, including progress on tariff revision roadmap.
Delhi (India)	<ul style="list-style-type: none"> Policy and performance objectives are set by GoNCTD (Government of National Capital Territory of Delhi). Objectives/policy priorities include: extend coverage of water supply in informal settlements and planned areas; reduce commercial and physical losses, increase metering; improve continuity of supply; extend sewerage network, increase wastewater collection and treatment rate. DJB translates these objectives into targets in annual investment plans. GoNCTD directs DJB to provide water free of charge for households using <math><20\text{ m}^3\text{/month}</math>, waive connection charges, offer amnesty on arrears. 	<ul style="list-style-type: none"> Annual budget submitted by DJB to GoNCTD (includes investment plan, capital receipts, capital works progress, selected performance data, financial projection, and budget request). Operational and financial performance not tracked over time or benchmarked against other utilities. No mechanism for the verification of data provided by DJB. Transparency: audited accounts up to 2015–16 and annual budget plan available on website. No audited accounts issued since 2015–16 	<ul style="list-style-type: none"> Tariff level and structure determined by GoNCTD. No penalty mechanism for missed targets. Senior management of DJB are career civil servants (IAS) appointed on 3-year terms through civil service appointment committee under central government. GoNCTD does not have authority to appoint or remove senior managers. GoNCTD provides incentives to follow policy directions through funding transfers to cover operating losses and provision of budget for capital works. Capital investment funds also provided by Asian Development Bank and bilateral donors (Japan), DJB has received funds from central government for specific capital works which incentivizes investment in particular policy areas, e.g. increasing wastewater collection and treatment.

Tokyo (Japan)	<ul style="list-style-type: none"> • Policy targets are set by central government (Ministry of Health, Labour and Welfare). Largely stable and implicit: full cost recovery, full coverage, high drinking water quality. • MHLW ‘New Waterworks Vision’ envisages greater collaboration between government and non-government entities to meet future challenges of declining, ageing population, and need for infrastructure renewal. • Performance standards set by MHLW are exceeded by TMWW. TMWW plays a role in establishing higher service standards which are subsequently adopted nationwide, e.g. for drinking water quality. 	<ul style="list-style-type: none"> • Annual report and audited accounts presented to Tokyo Metropolitan Government. Investment plans are presented to TMG but are not questioned or contested. • Transparency: Japan Waterworks Association produces national-level performance reports but does not benchmark utilities against each other. 	<ul style="list-style-type: none"> • Tariffs are set to recover total costs but no profit. No record of use of positive incentives (rewards, bonuses, etc.) or negative incentives (disallowance of investment in asset base, penalties, etc.). • Senior management are municipal government career civil servants. Rotation between other municipal engineering departments. Track record of good management but no record of promotion or removal of management linked to performance.
Johor (Malaysia)	<ul style="list-style-type: none"> • SPAN sets performance targets for state water utilities based on central government policies. • National priorities are NRW reduction and increase in reuse of wastewater articulated in Five-Year Plans and supplementary policy initiatives like the Green Technology Master Plan (2017). • Targets for coverage, pressure and continuity of supply, tap water quality, customer service, billing and collection rates, NRW. • State Government of Johor (SGoJ) has not defined additional or different policy targets but gives greater priority to affordability/ lower tariffs. 	<ul style="list-style-type: none"> • Water utilities report on standard set to SPAN. • Annual benchmarking report compares performance of all water utilities against set of financial and operational indicators. Reports are available on the regulator’s website. • Operating company is publicly listed on stock exchange; produces audited annual reports. 	<ul style="list-style-type: none"> • Tariffs set by SPAN at request of water utility. • Cost disallowance possible for inefficient expenditure; penalties can be imposed for failure to comply with performance indicators; bonus can be awarded for strong performance in NRW reduction. Operating licence is short-term and must be renewed every 3 years by SPAN. Investment plans developed by SGoJ are submitted to PAAB for approval and fund allocation. • State government can block applications for tariff increases (and has done so in the last two review cycles) but has no mechanism to provide positive incentives to the operating company. • Management is appointed by the operator and subject to the company’s promotion and remuneration process.
Manila (the Philippines)	<ul style="list-style-type: none"> • Government policy targets are less ambitious in terms of service coverage and quality than the requirements set by the contract and additional Key Performance Indicators and Business Efficiency Measures set by the regulator. 	<ul style="list-style-type: none"> • Comprehensive monitoring of operational and financial performance during 5-yearly rate rebasing, including data verification checks, consultant with customers, etc. • Key Performance Indicators are reported annually and made public. Performance records of the two Manila concessionaires 	<ul style="list-style-type: none"> • Tariffs set by MWSS-RO in accordance with contract provisions for 5-yearly rate rebasing (automatic adjustments for inflation allowed). • Imprudent expenditure is disallowed and excluded from the Regulatory Asset Base on which the appropriate return on capital is calculated.

(Continued)

Table 3. (Continued.)

Cases Functions	Translating	Monitoring	Enforcing and incentivizing
		<p>are benchmarked against each but not against other cities in the Philippines.</p> <ul style="list-style-type: none"> • East concessionaire Manila Water is publicly listed on stock exchange; company prepare audited annual reports. Owner of West concessionaire also publicly listed as of mid-2023 but expected to delist. 	<ul style="list-style-type: none"> • Set of Key Performance Indicators and Business Efficiency Measures established at the first rate rebasing (2002). Penalties are imposed for failure to meet targets. Central government prioritized affordability during periods of instability and agreed with the concessionaires to temporarily freeze tariffs while lengthening the contract period.
Singapore	<ul style="list-style-type: none"> • Direct translation of government policy into targets for PUB. As the national water agency, PUB is the single entity responsible for delivering water policy objectives. 	<ul style="list-style-type: none"> • PUB produces annual reports (available online) which include financial and operational performance data. • Some aspects of water supply performance are considered confidential and no information on these is in the public domain. • As the single utility in the country, no national benchmarking is possible. No systematic benchmarking against international comparators. 	<ul style="list-style-type: none"> • MSE appoints the PUB Chief Executive and Board members. The CE is usually a senior public servant, often from the Armed Forces and without experience in the water sector or municipal engineering. • The primary incentive mechanism is the use of performance indicators for managers which determine their professional advancement and performance-based bonuses. • Tariff adjustments are proposed by PUB and approved by the Minister. While PUB is expected by statute to cover its costs, this requirement is given lower priority by policy-makers than affordability and water security. In this context, tariffs are not used as a mechanism to incentivize compliance with policy targets.
Ho Chi Minh City (Vietnam)	<ul style="list-style-type: none"> • Over-arching policy goals of national leadership to develop urban areas and modernize infrastructure. Timebound water policy targets set out in multiple decrees issued by central government: continuous water supply, 90% coverage in urban areas, NRW to 15% by 2025. • According to the vertical administrative structure, national targets should be translated into local targets by the HCMC People's Committee. This function is not fulfilled, according to key informants interviewed for this study. • Utility SAWACO develops its business plan based on its interpretation of the policy targets. 	<ul style="list-style-type: none"> • SAWACO regularly publishes audited accounts and brief reports on investment plan implementation. • There are no official benchmarking reports of Vietnamese water utilities in the public domain. • The water distribution companies in HCMC are publicly listed and produce annual reports, increasing the transparency of part of HCMC's water sector. 	<ul style="list-style-type: none"> • Setting tariffs and reviewing investment plans is the responsibility of the HCMC People's Committee. However, HCMC PC does not have dedicated officials providing oversight of the water sector. When approvals/decisions are required, opinions of different departments are solicited. This slows down decision-making and dilutes accountability. • Sector stakeholders interviewed took the view that the oversight of SAWACO by the local government was not adequate or effective.

the considerable variation in conditions for water supply across regions and cities, but it raises the question of whether these arrangements can adequately fulfil the key meso-institutional functions.

The deficiencies appear to be due in particular to restricted capacity and the conflicting incentives of municipal governments relating to their multiple roles in setting objectives and targets (normally a macro-institutional function), incentivizing and enforcing (a meso-institutional function), and operating systems (a micro-institutional function). In principle, a municipal government could translate, monitor, enforce, and incentivize rules, norms, and targets defined at the macro-level given adequate authority, capacity, and organizational separation from the operator but in practice these conditions are clearly not met.

In relation to capacity, the challenge of local governments is not so much being over-ridden or contradicted by macro or micro actors, but rather an absence of the specialized skills and information necessary to assess the efficiency and quality of the operator's service. Even in the case of Tokyo which key informants consider to function effectively, there is no scrutiny of costs or the efficiency of investment, possibly leading to an over-engineered system. In Delhi and HCMC, meanwhile, competing policy priorities mean that local governments fail to provide regular oversight and are incapable of examining the operating and financial performance of operators. By contrast, in Singapore, the meso-institutional layer is rendered redundant by the unitary macro context and the integrated, government owned, and managed utility. In this case, however, institutional separation is achieved and performance incentives are imposed directly on managers of the utility, which has been effective in motivating strong performance by the operator.

Regulatory agencies, meanwhile, as distinct institutional entities, appear to be more effective in fulfilling meso-institutional functions. Despite some shortcomings, the dedicated meso-institutions in Manila and in Malaysia have built up the information base and the specialized skills required for technical and financial analysis, allowing them to monitor effectively, and often to enforce and incentivize. In Manila in particular this has contributed to remarkable improvements in coverage, service quality, and financial performance since the award of the contracts and the establishment of the MWSS-RO as the meso-institution.

A striking contrast between the high-performing operators of Tokyo and Singapore and increasingly Manila in comparison to the other cases in our sample is the relative clarity and stability in the macro-institutional context. In all three cases, the allocation of meso-institutional functions is transparent and there have been no major changes in the allocation of functions for two decades. This is in line with our expectation that a general MQ would influence the performance of meso-institutional functions within the water sector. The absence of well-defined meso-institutions with clear responsibilities regarding the implementation of the resulting rules and norms seems to severely hamper the achievement of these targets.

Across the cases considered, we did not find evidence of beneficial competition between institutions performing meso-institutional functions that would have led to rising performance over time.

Fit between institutional layers

We identified four aspects of 'fit' which were important in determining the ability of meso-institutions to carry out their functions. In relation to the 'fit' between the macro-institutional context and the form of meso-institutions, our cases suggest that it is the water-sector-specific decentralization of asset ownership and decision rights to the municipal level that accounts for the leading part played by local governments in providing meso-institutional functions. Where the allocation of ownership and decision rights is different, as in Manila and Johor, we see very different meso-institutional structures. The proximity between the local authorities and the operator provides some potential advantages – physical proximity may facilitate coordination, understanding of the local context – but may also be associated with fewer levers/tools available to the meso-institution to monitor (e.g. through benchmarking) or to incentivize (although in theory it would be possible to allocate authority to a local regulator to impose penalties/rewards). An additional issue is where the multiple macro-

institutional goals (multiple principals) are present which are competing or incompatible with one another (e.g. federal and state and municipal governments).

The issue of fit is also clearly apparent in relation to the micro-institutional arrangements, particularly when private parties are involved. A distinction is evident here between cases in which ownership and decision rights are clearly separated from the operator, as in Manila and Johor, compared to institutional structures in which ownership, decision rights, and operating responsibility are not clearly assigned to separate entities. In Manila, a new, dedicated meso-institution was established to monitor and enforce when concession rights were allocated to private operators, which contributed to the strong improvement in access and efficiency of water supply in that case. In cases in which meso-institutional functions are not explicitly fulfilled, and target-setting and performance evaluation is internalized within macro- or micro-layers, the risk of divergence between policy targets and performance rises. In the cases of HCMC, Delhi, and Chattogram, meso-institutional functions are perhaps even more critical to quality of water services, given the complex and informationally demanding tasks associated with the fragmentation of ownership and decision rights within the water supply system.

Fit also encompasses the legal/administrative fit between the responsibilities assigned to an institution, its authority to fulfil these responsibilities and whether the institutions assigned responsibility on paper perform their functions, or transfer the responsibilities to other institutions. We saw the latter phenomenon – transfer from the entity with legal authority for monitoring and incentivizing to the utility – in both high-performing and low-performing cases.

A final facet of fit considered was the link between the legal/administrative responsibilities of the institution and its capabilities to perform the functions in terms of financial resources, human resources, and access to skills and technologies necessary to carry out the functions. We saw in many of the cases that institutions were unable to play their part effectively because they lacked the resources to do so – a particular problem was the absence of skilled, specialized personnel within authorities responsible for monitoring and incentivizing.

The exploration of these diverse cases confirms the usefulness of the three-part categorization of functions presented in [Figure 2](#). However, the cases generated an additional observation: that meso-institutions may play another function besides those of translating, monitoring, and incentivizing: the Johor case suggests that meso-institutions can play a role in accumulating knowledge and building the capacity of operators in areas like financial planning and management and procurement (traditional and PPP). In so doing, they could also contribute to enriching the interactions between operators (and thus users) and policy-makers and to supporting the consideration of new technologies like water reuse and stormwater harvesting. Future research could explore whether this additional role is relevant in other regulated sectors.

Conclusion

This article identified and explored the performance of meso-institutional functions in a selection of urban water systems, in a variety of institutional settings. Building on the distinction between three institutional layers, macro-, micro-, and meso-, it focused on the latter, with the assumption that these intermediate institutions play a key role in bridging the gap between rules and standards established at the macro-level and operators organizing transactions at the micro-level. We analysed how the meso-institutional functions of translating and adapting rules of the game, monitoring their implementation, enforcing them and incentivizing operators to comply were fulfilled (or not) in seven different cities (Chattogram, Delhi, HCMC, Johor, Manila, Singapore, and Tokyo) within as many different institutional environments.

The approach of initially identifying meso-institutional functions and then identifying the entity performing the function allowed us to conduct a systematic analysis of the seven cases, despite the fact that distinct meso-institutions were only identified in two of the cases. This function-led approach may be a fruitful way to investigate further the meso-institutional layer in other regulated sectors.

Notwithstanding our limited sample, some regularities emerged that may carry lessons when it comes to institutional reform and regulatory design. First, there is no ‘one size fits all’ solution – meso-institutional arrangements are not in themselves superior or inferior to one another. Rather, it is the interaction and the fit between the institutional layers which affects the ability of the system to deliver high-quality water services. Second, ambiguity in the allocation of meso-institutional functions, found more often in settings with lower general MQ, is associated with inadequate authority and capacity of meso-institutions to perform these critical functions. Ambiguity appears to be a source of confusion and inefficiency when it comes to the implementation of rules and norms. It is also a major handicap to transparency, which hampers the capacity of meso-institutions to monitor operators properly. This in turn is likely to lead to weaker alignment between policy targets and operator performance. In future studies, it would be valuable to investigate further whether a causal relationship exists between meso-institutional function performance and operator performance, and the nature of this relationship. A process tracing methodology applied to a small number of cases could be well suited to this endeavour. Third, stability, not only in the rules of the game but also in the identity and role of those meso-institutions in charge of a sector, seems to be a major factor in efficiency. Reforms might be necessary in many cases, but multiple changes within relatively short periods in rules and in institutions assigned to their implementation hamper efficiency.

These are only a few of the many directions of research opened by our analysis and the model on which it is based. Indeed, a value-added of the model supporting our empirical exploration is precisely to open room for a rigorous investigation of different institutional settings.

Supplementary material. The supplementary material for this article can be found at <https://doi.org/10.1017/S1744137424000250>.

Acknowledgements. We acknowledge the Institute for Water Policy (National University of Singapore) for its financial support. We also benefited from the help of our research assistants – Pawan Sachdeva and Shivani Ratra, from discussions at a special session of the WINIR Conference held in Catania (September 2023), and we are grateful for the insightful comments from four referees of this journal.

References

- Abbott K.W., Levi-Faur D. and Snidal D. (2017). Theorizing regulatory intermediaries: the RIT model. *The Annals of the American Academy of Political and Social Science* 670(1), 14–35. <https://doi.org/10.1177/0002716216688272>
- Acemoglu D. and Johnson S. (2005). Unbundling institutions. *Journal of Political Economy* 113(5), 949–995. <https://doi.org/10.1086/432166>
- Araral E. and Yu D.J. (2013). Comparative water law, policies, and administration in Asia: evidence from 17 countries. *Water Resources Research* 49(9), 5307–5316. <https://doi.org/10.1002/wrcr.20414>
- Araral E. and Ratra and S. (2016). Water governance in India and China: comparison of water law, policy and administration. *Water Policy* 18(S1), 14–31.
- Bennett A. (2024). New developments in case study methods for institutional economics. In Menard C. and Shirley M. (eds), *Handbook of New Institutional Economics*, New Edn. Berlin, New York: Springer.
- Council of Europe. (2008). 12 Principles of Good Governance. Available at www.coe.int/en/web/good-governance/12-principles
- Davis L. and North D. (1971). *Institutional Change and American Economic Growth*. Cambridge: Cambridge University Press. Available at <https://www.eh.net/page/2/?s=institutional>
- De Vries P. and Yehoue E.B. (2013). *The Routledge Companion to Public–Private Partnerships*. Abingdon and New York: Routledge.
- Gassner K., Popov A. and Pushak and N. (2009). *Does Private Sector Participation Improve Performance in Electricity and Water Distribution?* Washington, DC: The World Bank, Public–Private Infrastructure Advisory Facility.
- George A.L. and Bennett and A. (2005). *Case Studies and Theory Development in the Social Sciences*. Cambridge, MA: MIT Press.
- Gerring J., Thacker S.C. and Moreno C. (2009). Are parliamentary systems better? *Comparative Political Studies* 42(3: March), 327–359.
- Gunawansa A. and Bhullar L. (2013). *Water Governance: An Evaluation of Alternative Architectures*. Cheltenham and Northampton, MA: Edward Elgar Publishing.

- Hefetz A. and Warner M. (2007). Beyond the market versus planning dichotomy: understanding privatisation and its reverse in US cities. *Local Government Studies* **33**(4), 555–572. <https://doi.org/10.1080/03003930701417585>
- Hodgson G.M. (2015). On defining institutions: rules versus equilibria. *Journal of Institutional Economics* **11**(3), 497–505.
- Jimenez A., Menard C. and Tropp H. (2018). Addressing the policy-implementation gaps in water services: the key role of meso-institutions. *Water International* **43**(1), 13–33. <https://doi.org/10.1080/02508060.2017.1405696>
- Kunneke R., Ménard C. and Groenewegen J. (2021). *Network Infrastructures: Technology Meets Institutions*. Cambridge: Cambridge University Press.
- Levy B. and Spiller and P.T. (1994). Institutional foundations of regulatory commitment: a comparative analysis of telecommunications regulation. *The Journal of Law, Economics and Organizations* **10**(2), 201–246.
- Marin P. (2009). *Public–Private Partnerships for Urban Water Utilities: A Review of Experiences in Developing Countries*. Washington, DC: World Bank Publications.
- Ménard C. (2014). Embedding organizational arrangements: towards a general model. *Journal of Institutional Economics* **10**(4), 567–589.
- Ménard C. (2017). Meso-institutions: the variety of regulatory arrangements in the water sector. *Utilities Policy*, **49**(December), 6–19. <https://doi.org/10.1016/j.jup.2017.05.001>
- Ménard C. (2022). Institutional challenges to efficient governance: water, sanitation, and wastewater in Egypt. *Water International* **47**(2), 205–222.
- Ménard C. and Peeroo and A. (2011). Liberalization in the water sector: three leading models. In Finger M. and Kunneke R. (eds), *International Handbook of Network Industries: The Liberalization of Infrastructure*. Cheltenham and Northampton MA: Edward Elgar, pp. 310–317.
- Ménard C. and G. Martino. (2024). Can we assess institutions? A conceptual and methodological strategy. Working Paper.
- Ménard C. and Saleth R.M. (2013). The effectiveness of alternative water Governance arrangements. In Young M. and Esau C. (eds), *Investing in Water for a Green Economy. Services, Infrastructure, Policies and Management*. Abingdon and New York: Routledge/United Nations Environment Program, chap. 8: pp. 152–174. Available at <http://halshs.archives-ouvertes.fr/halshs-00624250>
- Ménard C., Martino G., De Oliveira G.M., Royer A., Saes M.S.M. and Schnaider P.S.B. (2022). Governing food safety through meso-institutions: a cross-country analysis of the dairy sector. *Applied Economic Perspectives and Policy* **44**(4), 1722–1741. <https://doi.org/10.1002/aep.13278>
- North D.C. (1990). *Institutions, Institutional Change and Economic Performance*. Cambridge: Cambridge University Press.
- North D.C. (2005). Institutions and the performance of economies over time. In Ménard C. and Shirley M. (eds), *Handbook of New Institutional Economics*. Berlin, Heidelberg: Springer Berlin Heidelberg, pp. 21–30. https://doi.org/10.1007/978-3-540-69305-5_2
- OECD. (2015a). *OECD Principles on Water Governance*. Paris: OECD. Available at <https://www.oecd.org/cfe/regionaldevelopment/OECD-Principles-on-Water-Governance-en.pdf>
- OECD (2015b). *The Governance of Water Regulators*. Paris: OECD.
- OECD. (2016–2022). *OECD Studies on Water*. Paris: OECD. Available at https://www.oecd-ilibrary.org/environment/oecd-studies-on-water_22245081
- Ostrom E. (2005). *Understanding Institutional Diversity*. Princeton, NJ: Princeton University Press.
- Ostrom E. (2014). Do institutions for collective action evolve? *Journal of Bioeconomics* **16**, 3–30.
- Ostrom E., Gardner R. and Walker J. (1994). *Rules, Games, and Common-Pool Resources*. Ann Arbor, MI: University of Michigan Press.
- Roe M.J. (2003). *Political Determinants of Corporate Governance: Political Context, Corporate Impact*. Clarendon Lectures in Management.
- Saleth R.M. and Dinar A. (2004). *The Institutional Economics of Water: A Cross-Country Analysis of Institutions and Performance*. Washington, DC: World Bank Publications.
- Savedoff W.D. and Spiller P.T. (eds.). (1999). *Spilled Water: Institutional Commitment in the Provision of Water Services*. Washington, DC: Inter-American Development Bank (IDB).
- Shirley M. (ed.). (2002). *Thirsting for Efficiency: The Economics and Politics of Urban Water System Reform*. Oxford: Elsevier.
- Skarbek D. (2020). Qualitative research methods for institutional analysis. *Journal of Institutional and Economics* **16**(4), 409–422.
- Voigt S. (2018). How to measure informal institutions. *Journal of Institutional Economics* **14**(1), 1–22.
- Weingast B.R. (1995). The economic role of political institutions: market-preserving federalism and economic development. *Journal of Law, Economics, and Organization* (Spring 1995) **11**, 1–31.
- Williamson O.E. (1996). *The Mechanisms of Governance*. New York: Oxford University Press.
- World Bank (2023). Worldwide Governance Indicators. Available at [https://www.ppiaf.org/ppiaf-annual-reports](https://databank.worldbank.org/source/worldwide-governance-indicatorsWorld BankDevelopment Report (WDR). 2017. Governance and the Law. Washington, DC: World Bank.</p>
<p>World Bank PPIAF. (2017). PPIAF Annual Reports. Available at <a href=)
- World Development Reports (WDR) (2017). *Governance and the Law*. Washington, DC: The World Bank Group.

Annex 1. Macro-institutional quality

	Control of corruption	Government effectiveness	Political stability	Regulatory quality	Rule of law	Voice and accountability
Bangladesh	-0.96	-0.63	-0.97	-0.85	-0.61	-0.77
India	-0.29	0.28	-0.62	-0.08	-0.08	0.11
Japan	1.57	1.40	1.03	1.38	1.58	1.08
Malaysia	0.17	0.99	0.14	0.72	0.56	-0.15
The Philippines	-0.51	0.07	-0.93	0.08	-0.64	-0.15
Singapore	2.17	2.29	1.49	2.23	1.86	-0.14
Vietnam	-0.29	0.28	-0.11	-0.40	-0.15	-1.30

Source: World Bank (2023) Worldwide Governance Indicators

Cite this article: Jensen O. and Ménard C. (2024). Understanding the roles of meso-institutions: a comparative approach to urban water provision in seven Asian cities. *Journal of Institutional Economics* 20, e36, 1–25. <https://doi.org/10.1017/S1744137424000250>

Annex 2. Macro-institutions and global policies relevant to water supply

Cases Macro-institutes	Political regime	Main laws and regulations	Main sector policies
Chattogram (Bangladesh)	Unitary state. Centralized policy-making, decentralized responsibility for water delivery (local)	2008: Chattogram CWASA 2013 Bangladesh Water Act: Define broad orientation	Multiple policies and documents, e.g. 1998 National Policy for Safe Water Supply and Sanitation 2015. 8th Five Year Plan 2020–2025 2018: Bangladesh Delta Plan 2100: long-term integrated plan for water
Delhi (India)	Federal state, decentralized: water and wastewater at state level. 1992: 74th Amendment (under municipalities). – Delhi: dual state-municipality status.	No umbrella legislation; water covered under separate acts. Largely state based. Delhi: 1998 Delhi Jal Board Act (autonomous utility). 2016 National Water Framework Bill drafted but not adopted.	2012 National Water Policy: overall principles and direction. Various ‘ initiatives ’, e.g. – Swachh Bharat policy initiative (2014): end open defecation by 2019; – Urban transformation; Jal Shakti Abhiyan – Namami Gange programme – river restoration.
Tokyo (Japan)	Unitary state, centralized policy-making, decentralized provision (local)	1957 Waterworks Act: Targets: universal coverage; full cost recovery. 1999 Private Finance Initiative Act (amended 2011)	– Min. Health Labour and Welfare: regulation, monitoring, standards – Min. of infrastructure: 5-year targets; requires municipal plans for infrastructure renewal.
Johor (Malaysia)	Federal (constitutional monarchy), shared water responsibilities (federal and state).	2005 Constitution amended: federal and state can legislate and regulate water services 2006 Water Services Industry Act: assets transferred from state to national asset holding company; National Water Services Commission Act (SPAN Act): national agency (licenses and tariffs).	2016-2020 11th Malaysia Plan: Targets: 99% clean and treated water coverage; 80% sewerage connection coverage; reduction of NRW to 25%. 12th Malaysia Plan and Water Sector Transformation Agenda 2040 – integrated water resources management
Manila (the Philippines)	Unitary. Centralized regulation, decentralized services Local Government Code 1991 – Metro Manila Development Authority coordinates local governments in metropolitan area.	1976 Presidential Decree 1067, Water Code: MWSS (for Metro Manila) and water districts (other cities) Succession of decrees and acts from 1973 to 2004, with increased Private Sector Participation. 1997 Metro Manila Concession Contracts signed	Planning and policy tasks shared by NEDA, NWRB, LWUA, and LGUs. 2010 Philippines Water Supply Sector Roadmap (universal access by 2025); 2017-2022 Philippine Development Plan (led by NEDA) medium-term targets: access to safe water supply (95.2%) and access to basic sanitation (97.5%).
Singapore	Unitary state, Centralized policy-making	2001 Public Utilities Act: Single agency (PUB) for water supply, sewerage and drainage; separated from other utility services. Details functions, duties and powers of PUB.	Long-term: water self-sufficiency by 2060 (increased wastewater reuse and desalination). Strategy regularly updated, e.g. document ‘Our Water Our Future’ (PUB, 2018). PUB’s corporate plan sets out annual targets.

Ho Chi Minh City (Vietnam)	Unitary state, centralized policy-making. Monitoring, tariff-setting and service delivery assigned to municipal government.	2012 Law on Water Resources: Framework for all types of water resources. Sets priority for domestic use. Hundreds of secondary regulations (quality, wastewater discharges, groundwater licences, environmental fees and taxes, data collection, etc.)	2009 Decision No. 1929 on ‘Orientations for development of water supply in Vietnam’s urban centres and industrial parks’: details plans up to 2025 and a vision towards 2050, sets targets for supply coverage (100%), NRW (<15%), and continuity of supply (24/7) by 2025 for all urban areas.
----------------------------	---	--	--

Detailed version available from the authors.

Annex 3. Organization at the micro-level and overlapping in allocation of rights

Cases Arrangements	Property rights – ownership	Allocation of decision rights	Implementation: operators	Technologies
Chattogram (Bangladesh)	<ul style="list-style-type: none"> – Assets: Central Gov. – Supply and treatment assets: CWASA (utility) – CWASA can retain and invest tariff revenues – PPP possible but not adopted 	<ul style="list-style-type: none"> – Tariffs, investment plans proposed by utility; Min. of Local Gov't reviews and approves – Performance targets: central government and donors, local planning process 	<ul style="list-style-type: none"> – Autonomous utility 	<ul style="list-style-type: none"> – Surface water (minor GW use, being phased out) – Secondary treatment – Service: piped house connections vs. group connections for slum areas managed by NGOs; tanker delivery.
Delhi (India)	<ul style="list-style-type: none"> – Assets: state government – DJB: Delhi government; PPP contracts: BOT for bulk water supply; 3 short-term local performance-based management contracts 	<ul style="list-style-type: none"> – Tariffs proposed by the DJB, approved by Chief Minister of Delhi – DJB sets investment plans and performance targets 	<ul style="list-style-type: none"> Public utilities. DJB and some other utilities in large cities are autonomous or semi-autonomous. 	<ul style="list-style-type: none"> – Surface and groundwater. – Secondary treatment. – Service differentiation: piped household connections; shared connections; public taps; tanker delivery
Tokyo (Japan)	<ul style="list-style-type: none"> – Municipal ownership. – Infrastructure: national or prefectural government – PPP: Some short-term operating contracts – Tokyo water authority: publicly owned/managed 	<ul style="list-style-type: none"> Tariffs, investment plans, performance targets: TWSS in accordance with government policies. Reports performance to Mayor 	<ul style="list-style-type: none"> TWSS: public utility Others: Utilities managed by local gov. No corporatization but accounting separation; Water and wastewater managed separately 	<ul style="list-style-type: none"> – Surface sources (no more groundwater) – Large-scale advanced treatment (3 plants) – Metering universal – Non-revenue-water low (<2% in Tokyo)
Johor (Malaysia)	<ul style="list-style-type: none"> – Assets: National holding company – PPP: short-term operating contracts; previous concessions restructured/terminated. 	<ul style="list-style-type: none"> – Tariffs, investment plans, performance indicators: national regulatory agency SPAN. – State governments can add requirements. 	<ul style="list-style-type: none"> State water utility. Private operators with short-term renewable contract. 	<ul style="list-style-type: none"> – Surface water. – Secondary treatment. – Individual household piped connections
Manila (the Philippines)	<ul style="list-style-type: none"> – Assets owned/managed by multiple entities (local level). – Metro Manila: Water resource infra owned by Metropolitan Water and Sewerage System – Private concession contracts since 1997 – Policy support PPP. 	<ul style="list-style-type: none"> – Tariffs, investment plans, performance indicators determined by MWSS Regulatory Office according to contract. Tariff adjustments approved by MWSS Board 	<ul style="list-style-type: none"> – Metro Manila: two 35-year private concessions. 	<ul style="list-style-type: none"> – Mostly surface water – Metro Manila: through aqueducts; secondary treatment. Small-scale water reuse plant with decentralized direct potable supply. – Individual household piped connections; boundary (group) connections in slum areas managed by community organizations

Singapore	Water assets owned by the government through PUB.	Tariffs, investment plans and performance indicators by PUB; approved by Ministry	<ul style="list-style-type: none"> – PUB: statutory board. – 7 Desalination and reuse treatment plants under design–build–operate–transfer contracts 	<ul style="list-style-type: none"> – Surface water import from Malaysia; stormwater capture; desalination; water reuse. – Tertiary treatment (membrane): 65% of total capacity. – Individual household piped connections.
–Ho Chi Minh City (Vietnam)	Water assets owned and controlled by local government.	Local governments: set tariffs, review investment plans and determine performance standards within national guidelines.	<ul style="list-style-type: none"> – Utilities restructured as corporate entities ('equitization'). – HCMC: 6 distribution 'joint-stock' companies serving districts; – BOT for bulk supply; one performance-based management contract. 	<ul style="list-style-type: none"> – Secondary treatment of surface water. – Service standard is individual households piped connections.

Detailed version available from the authors.