MAKING WATER INFRASTRUCTURE INVESTABLE: THE FINANCIALISATION OF WATER INFRASTRUCTURE IN JAKARTA, INDONESIA

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Statement of Authorship

This is to certify that the content of this thesis is my own work. This thesis has not been submitted for any other degree or purpose. I certify that the intellectual content of this thesis is the product of my own work, and that all assistance received in preparing this thesis and all sources have been acknowledged.

During the preparation of this thesis, I used Claude.ai to brainstorm ideas about the thesis structure and Grammarly to improve the grammar. I take full responsibility for the submitted thesis and ensure the work is my own and that I have used generative AI in accordance with University guidelines and policies.

This thesis has received approval from the University of Sydney's Human Research Ethics Committees, project number 2022-591.

Wahyu Kusuma Astuti
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AAJ	PT AETRA Air Jakarta
ABJ	PT Air Bersih Jakarta
ADB	Asian Development Bank
AMDAL	Analisis Dampak Lingkungan (Environmental Impact Assessment)
B-to-B	Business-to-business
Bappenas	Badan Perencanaan Pembangunan Nasional (Indonesian Ministry of National Development Planning)
BBWS	Balai Besar Wilayah Sungai (River Basin Organisation)
BOT	Build Operate Transfer
BPPSPAM	Badan Peningkatan Penyelenggaraan Sistem Penyediaan Air Minum Nasional (Water Supply Development Supporting Agency)
BPS	Badan Pusat Statistik (National Statistics Office)
BT	Build-Transfer
Dinas SDA	Dinas Sumber Daya Air (Water Resource Agency)
DKI Jakarta	Daerah Khusus Ibukota Jakarta (Jakarta Special National Capital Region)
GCA	Government Contracting Agency
IDR	Indonesian Rupiah
IFC	International Finance Corporation
IIGF	Indonesia Infrastructure Guarantee Fund
IMF	International Monetary Fund
IBP	Instalment-based payment
IRR	Internal rate of return
IRSDP	Infrastructure Reform Sector Development Project
Jabodetabek	Jakarta-Bogor-Depok-Tangerang-Bekasi region, or Greater Jakarta
JICA	Japan International Cooperation Agency
Kementerian PUPR	Kementerian Pekerjaan Umum dan Perumahan Rakyat (Ministry of Public Works and Housing)
KPPIP	Komite Percepatan Penyediaan Infrastruktur Prioritas (Committee for the Acceleration of Priority Infrastructure)

KRuHA	Koalisi Rakyat untuk Hak Atas Air (People's Coalition for Right to Water)
KMMSAJ	Koalisi Masyarakat Menolak Swastanisasi Air Jakarta (People's Coalition against Water Privatisation in Jakarta)
LMAN	Lembaga Manajemen Aset Negara (State Asset Management Office)
NCICD	National Capital Integrated Coastal Development
NGO	Non-governmental organisation
Palyja	PAM Lyonnaise Jaya
PAM Jaya	Perusahaan Air Minum Jaya (Jakarta's utility company)
PBP	Performance-based payment
PDAM	Perusahaan Daerah Air Minum (local water utility company)
PMO	Project Monitoring Office
PPP	Public-Private Partnership
PSN	Proyek Strategis Nasional (National Strategic Project)
RISPAM	Rencana Induk Sistem Penyediaan Air Minum (Masterplan of Water Supply System)
ROT	Rehabilitate Operate Transfer
RPAM	Rencana Pengamanan Air Minum (Masterplan of Water Security)
RT/RW	Rukun Tetangga/Rukun Warga (neighbourhood units)
SMI	Sarana Multi Infrastruktur
SMV	Special Mission Vehicles
SOE	State-owned enterprises
SPV	Special Purpose Vehicle
WACC	Weighted Average Cost of Capital
WIKA	PT Wijaya Karya
WTP	Water Treatment Plant

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Abstract

This thesis explores the financialisation of water infrastructure, or the process through which increasing debt relations determine the governance and operation of water supply infrastructures, in Jakarta. Jakarta faces chronic water supply shortages and unreliable service, forcing households and industries to extract groundwater excessively, leading to severe land subsidence over the decades. The crisis disproportionately affects the urban poor living at the edge of the city, who suffer from intermittent or absent water supply due to low pressure and pervasive leakage. This crisis becomes the rationale for the state to roll out massive water supply projects for Jakarta under Public-Private Partnership (PPP) arrangements. These projects are designed not only to solve the water crisis but also to attract private investment in infrastructure.

This thesis extends scholarly work on water infrastructure financialisation by attending to situated political, social, and environmental practices in Jakarta. In doing so, this thesis brings together the literature on infrastructure financialisation and the urban political ecology of water access in Global South cities, underscoring how the flow of water is embedded in and shaped by financial relations, and, conversely, how finance navigates fragmented water governance and splintered infrastructures in these cities. Drawing on grounded fieldwork, event observations, and more than 80 interviews with elite and community groups, this research navigates different sites across Greater Jakarta to understand the processes, frictions, and contradictions embedded in financialisation.

This thesis zeroes in on the extensive role of the state in de-risking private-sector investment and luring private actors to develop and operate water infrastructure, given that water infrastructure is perceived as high-risk and unattractive to private actors. First, this thesis shows how the state mobilises state-owned enterprises (SOEs) to undertake, finance, and guarantee (unbankable) infrastructure projects, while reorganising water infrastructures: unbundling and rebundling the different parts of the infrastructure chain, to make water infrastructure an investable proposition. Second, as the state backstops private returns, it transfers the risks to the public, leading to the displacement of urban-rural communities, persistent disconnection from water access for the urban poor, and higher water tariffs for water users. Third, I demonstrate how financialisation is undermined by the 'spillovers' or uncontrolled water flows – groundwater, bottled water, tanker water – sustained by different state agencies, which challenge the financial viability of PPP projects. This thesis's findings therefore suggest that financialisation is inherently unstable and uneven, imposing fiscal burdens on the state and socio-ecological risks for the public, while investors privatise the profits. For Jakarta, whose privatisation contract just ended after 25 years (1998-2023), the financialisation of its water infrastructure undermines the hope for progressive, non-profit-oriented water service under public control to realise equal water access, which is urgently needed amidst increasing vulnerability to water crises and land subsidence.

Chapter 1. Introduction

1.1. Introduction

This thesis examines the process of making water infrastructure an investable proposition in the Global South. Since the 1990s, international financial institutions have been advocating for private-sector participation in water infrastructure in response to the state's failure to provide public water in cities of the Global South (Bakker, 2010). However, as the experiment with privatisation in the 1990s reveals, private investment into water infrastructure remains sluggish (Bakker, 2013b; Reis et al., 2024). For instance, a World Bank report suggests that the annual funding gap to meet the Sustainable Development Goal of providing universal, safe water and sanitation access is US$140.8 billion from 2017-2030 (Joseph et al., 2024). In 2017 alone, the private sector contributed only around 9% of the total investment of US$20 billion, compared to 80% by the government and 11% by state-owned enterprises (SOEs). This demonstrates that privatisation has failed, and continues to fail, to deliver on its promise of attracting significant investment to develop water infrastructure. For proponents of private sector participation, the solutions lie not only with private actors, whose risks and return interests are prioritised, but with the state, which must remove barriers to allow private investment in Global South infrastructure (World Bank, 2021a). This thesis navigates these attempts: the extensive and arduous efforts to make water infrastructure align with private actors' appetites for risk and return, to make private actors pay for and build the infrastructure.

Private actors perceive water as a risky investment. Multilateral institutions believe that water is undervalued; water tariffs do not reflect the costs needed to sustain water and to develop, operate, and maintain water infrastructures (Rockström et al., 2023). As such, local water utilities are traditionally reliant on local government subsidies to operate on non-full-cost-recovery terms, making them high-risk debtors (OECD, 2019). Meanwhile, water infrastructure also requires significant upfront capital costs, repaid through small instalments over a long period (Money, 2020), in contrast with what private actors demand: a quick turnover of "build, get paid, build, get paid."[1] In particular, Global South cities generally lack institutional and regulatory clarity, planning, and data to support the operations of private actors (Bigger & Webber, 2021). Moreover, in Global South cities, piped infrastructure is unequally distributed, and services are intermittent and limited. Urban citizens access water through various infrastructures and labour, such as purchasing water from vendors, tankers, consuming bottled water, and extracting groundwater (Bakker, 2003; Hofmann, 2021; Kooy, 2014). This variegated water access increases opportunity loss for utility companies and for their investors' revenue, not to mention the high non-revenue water,[2] which also makes water flow difficult to measure and illegible to finance (see Anand,

[1] Notes from the Indonesia Water and Wastewater Expo and Forum, June 2023, Jakarta

[2] Non-revenue water refers to the water produced by the utility but unpaid by customers. This constitutes loss, often from technical leakages, meter reading inaccuracy, and water theft.

2015). State actors must mitigate and absorb these risks to build an investment-friendly climate for private actors.

This thesis demonstrates how the state navigates these risks to secure private returns from water infrastructure. Jakarta is a key site for understanding how the state acrobatically formulates not just any infrastructure solutions, but solutions with "local wisdom" that work to attract investment into water infrastructure.[3] This thesis unpacks the rationalities that make these infrastructural-financial solutions appear legitimate and rational, how governments experiment with them, and how they are made to appear to work despite the contradictions and frictions. My findings show that the state engages in a relentless effort to revamp its institutional, regulatory, and infrastructural configuration to make water infrastructure bankable. Making water infrastructure appear bankable does not end with project preparation; the state consistently reworks the inherent contradictions to financialisation throughout the project lifecycle. This attempt results in the state retaining significant risks, exhausting its fiscal capacity to backstop private returns in the long term. The risks, however, are transferred to the public, leading to increased water tariffs, the displacement of rural and suburban communities, and the persistent disconnection of water access for the urban poor. This thesis, therefore, evidences the messy, unstable, and uneven outcomes of financialised solutions to the water crisis.

For Jakarta, alternative solutions to its water crisis are urgent and necessary – though I argue they should not be driven by private profits. Jakarta, like many other cities in the Global South, was the site of global privatisation experimentations in the 1990s and, subsequently, has witnessed the failure of privatisation to deliver equal and reliable water access (Bakker, 2010). While the failure of privatisation is notable, Jakarta's water crisis did not 'begin' with privatisation: privatisation exacerbated the colonial legacy of splintered water infrastructure, which prioritised water access for the Dutch and other European enclaves while marginalising water access for the local population (Kooy & Bakker, 2008a). For 25 years during the concession, between 1998-2023, private operators in Jakarta, PAM Lyonnaise Jaya (Palyja) and AETRA Air Jakarta (AAJ), did not significantly expand the city's water coverage (from 47% to 67.6%), reduce non-revenue water (from 56% to 45.62%), or mobilise significant additional water supply (from 18,025 litres/second to 20,762 litres/second) (PAM Jaya, 2024a; Pokja PPAS, 2016; World Bank, 1998). Where available, pipe coverage still does not guarantee sustained access: water flow is intermittent with low water pressure, notably in the city's north. Unreliable access makes higher-income communities reluctant to connect to the city-wide pipe system, leading them to seek alternative water supplies such as groundwater (BRPAM, 2014; Furlong & Kooy, 2017). Large-scale groundwater extraction over decades by residents and industries, much of it unauthorised, exposes the city to the risk of land subsidence at rates of 1-15 cm per year (Abidin et al., 2011).[4] Land subsidence contributes to worsening flooding in the city, as seen in 2007, 2013, 2015, and 2020 (Silver, 2022), and increases the city's vulnerability to climate-induced sea-level rise.

[3] Interview #1 Directorate General of Infrastructure Financing, Ministry of Public Works and Housing, May 2023, Jakarta

[4] Batubara et al. (2023) reported that in 2016, there are 4,551 registered wells, while it is estimated that there could be more than 15,000 wells in Jakarta.

This failure of privatisation, followed by the rise of civil society movements against water privatisation, which demanded remunicipalisation, or the return of water services under public control (Marwa, 2024; Zamzami & Ardhianie, 2015), did not prevent the Government of Indonesia from experimenting again with attracting private investment into infrastructure. In 2022, the national government introduced massive water supply projects, Jatiluhur (4,000 litres/second) and Karian-Serpong (4,600 litres/second), under a Public-Private Partnership (PPP) scheme for bulk production and transmission of water pipes to water utilities in Greater Jakarta. Simultaneous to the treatment plant project, at the end of its 25-year privatisation contract with Palyja and AAJ, Jakarta's water utility, PAM Jaya, has entered into a new partnership contract to channel water from the bulk water projects to customers. This contract, called a 'bundling scheme', allows the private developer, Moya, the holding company of AAJ, to manage old and new treatment plants (19,800 litres/second) and extend 7,000 km of pipe in an integrated manner. Another project is also underway: the Djuanda project, the largest water treatment plant project, at 7,000 litres/second, to bring bulk water to Greater Jakarta and build pipe networks. These are not only physical infrastructure projects, as this thesis will show, but financially and technically tailored to attract private investment. Therefore, despite the increasing roles of the state in PPP, Jakarta's water delivery is once again embedded in financial logics, with private actors determining the process and outcomes of water services.

In explaining this shift to PPP, scholars in economic geography have shown the "increasing importance of financial markets, financial institutions, and financial elites in the operation of the economy and its governing institutions" (Epstein, 2002: 3) and have extended this analysis to the provision of public infrastructures, including water infrastructure (Bayliss, 2014; Loftus et al., 2019). The financialisation of water infrastructure has been widely explored by scholars in Global North contexts, but less so in the Global South, where it is path-dependent and contingent on its postcolonial history and socio-political contexts. As this thesis will show, the financialisation of water infrastructure in Jakarta is realised through the state's speculative activity that mobilises funding for its SOEs to undertake unbankable projects, or projects that do not meet private investors' risk and return profiles (Anguelov, 2024; Wijaya & Camba, 2023). This so-called "creative and innovative" financing in Indonesia has become an arena where infrastructure financing solutions are contested, fraught with contradictions, and marked by uneven outcomes (Wijaya, 2024).[5] Moreover, understanding the rollout of financialisation of water infrastructure in Global South cities also requires an analysis of how finance navigates the risks mentioned earlier: unbankable utilities, splintered postcolonial infrastructures, and variegated water access, which all undermine private returns. This thesis aims to address this gap.

I began this research in late 2022. At that time, the Jatiluhur and Karian-Serpong project agreements were signed, the bundling scheme was in its market sounding phase, and the Djuanda project was (and still is) in the preparation stage. Then, in early 2023, Jakarta's 25-year water privatisation contract concluded, and shortly after that, PAM Jaya entered into a new partnership, the bundling scheme, with Moya. These periods, during the recovery from COVID-19, when local and national fiscal capacity hit rock

[5] The jargon is frequently mentioned by my interlocutors and widely used in seminars, including the annual meetings held by the Directorate of Infrastructure Financing of the Ministry of Public Works and Housing called CREATIFF or 'Creative and Innovative Infrastructure Financing'

bottom, marked a new beginning for Jakarta's water service. As PAM Jaya declared, it was reborn, assuming the "full operation" (PAM Jaya, 2024a) of Jakarta's water infrastructure and service. This is an informative period to examine the new water contracts and their financial arrangements, understand how and why water infrastructure financialisation persists, and unpack what the projects and their financial terms mean for Jakarta's efforts to address its water crisis and mitigate land subsidence. Therefore, this research does not aim to evaluate the new, financialised water infrastructure projects; they were only contracted and commenced during the writing of this thesis. The 25-to-30-year contract spans mean that their outcomes are currently unknown. Nonetheless, this early stage remains critical for understanding the logics that drive the rollout of the new water supply projects and how different actors are entangled in the planning, financing, and construction of these projects. As such, the remaining chapters of the thesis will examine the dynamics, contestations, and contradictions that arise in the process of financialising Jakarta's water infrastructure.

The following section outlines my research questions and my contribution to the concept of financialisation by reflecting on how it unfolds and operates in a Global South context, primarily through Jakarta's water infrastructure projects. The subsequent section will outline the historical context of Jakarta's water supply system, showing how recent infrastructure projects constitute a new layer that interacts with preexisting infrastructural and labour relations in water access. The structure of the thesis is presented afterwards. Finally, the last section summarises the main argument of the thesis.

1.2. Research questions

Existing scholarship on water infrastructure financialisation has examined contexts where piped water, notwithstanding inequalities (Christophers, 2018a; Meehan et al., 2024), constitutes the dominant mode of urban water provision in the Global North (Allen & Pryke, 2013; Loftus & March, 2019; Pryke & Allen, 2019). Yet, less is known about how financialisation unfolds in the Global South contexts where water access is splintered, unequal, and intermittent. Studies on the financialisation of water infrastructure in the Global South cities are beginning to emerge (Furlong, 2020; Heckel, 2023; Lucia Britto, 2025; Reis & Sánchez Trujillo, 2024; Williams, 2021), focusing on the institutional setups and rent-extraction mechanisms on which financialisation is established. Still, less research explores how finance navigates the socioecological dynamics of Global South cities: fragmented infrastructures, postcolonial institutions, and undisciplined water flows that undermine private returns. This thesis speaks to this gap, not only in geographical diversity (in Jakarta), but also in attending to the contingent, uneven, and messy operations of financialisation in the Global South (Mader et al., 2023).

Beyond this scholarly gap, the sociopolitical and ecological implications of financialisation warrant unpacking, in their own right. Global South cities have become conduits for the overaccumulation of private capital in the Global North as private actors and development banks scout for new sites to set this capital in motion (Bigger & Webber, 2021; Gabor, 2021; Mawdsley, 2018b). Subsequently, multilaterals and state actors have sought to channel this capital into infrastructure in Global South cities, regardless of whether this would actually solve crises. As Swyngedouw (2009:58) describes, "access to water is understood and seen as organised through market mechanisms and the power of

money, irrespective of social, human or ecological need." The state's reliance on private actors for infrastructure provision overlooks the fact that unequal power relations are inscribed into infrastructure financing and planning, determining whose interests the infrastructure serves and to whom water service connections and disconnections are made. This is the political context and motivation for the thesis.

I ask these research questions:

1. How are narratives of crisis constructed around Jakarta's water problems? How and why do these narratives of crisis gain power and justify particular interventions to address the crisis?
2. How do diverse private and public actors attempt to make erratic water flows legible to finance? What kind of institutional and infrastructural reconfiguration is involved, and what are the dynamics of risk allocation between public and private sectors in water infrastructure projects?
3. What are the socioecological impacts of financialised water infrastructure investment in Jakarta?

In answering these questions, this thesis draws on studies of financialisation and the urban political ecology of water access in Global South cities. I analyse how finance flows through splintered postcolonial infrastructure configurations (Kooy & Bakker, 2008a), which are sustained by neoliberal infrastructure governance (Bakker et al., 2008). Across Global South cities, residents and industries access water through diverse means: pipes, groundwater, water vendors, tankers, and bottled water. As this thesis shows, the multiple means of accessing water create an opportunity loss for utilities, undermining their ability to repay debts to investors and financiers. While private investment requires calculable, predictable flows of water and returns, water-delivery systems in Global South cities, such as Jakarta, produce erratic, overlapping flows that do not easily fit into financial logics.

This raises another critical question: how does the state attract private actors if the infrastructure cannot generate sufficient returns? This leads to the second contribution of this thesis, an examination of the increasing state power required to eliminate barriers to, or de-risk, private investment (Gabor, 2021). This involves the embedding of market logics into statecraft, evident in the state-institutional transformation towards neoliberal governance (Jessop, 2003; Peck, 2001). This blurs the boundaries between public and private institutions, as the state directs its fiscal capacity and restructures its regulatory apparatus to backstop private investment. This thesis particularly examines the global emergence and operation of PPP, a foundational tool for infrastructure financialisation (Bayliss & Van Waeyenberge, 2018; Siemiatycki, 2011), how they are adopted as the state's go-to tool for delivering public infrastructure (August et al., 2022), and how the state attempts to turn water infrastructure into an investable proposition that fits within PPP schemes (Yunita et al., 2023). With these two lenses set up, this thesis delves into the muddy process of financialising water infrastructure, showing its non-linearity, contingency, and limits (O'Brien & Pike, 2017), as well as its uneven processes and outcomes.

1.3. Context: studying the layers of Jakarta's water

Jakarta is home to 10.68 million people, and together with its neighbouring regions (Bogor, Depok, Tangerang, and Bekasi), the population is estimated at 32.3 million, making it the second largest metropolis in the world. Beneath its scale and ambition as a global city, Jakarta consists of "a living,

layered landscape of people and objects – a city of cities" (Martinez & Masron, 2020:2). These layers are built on different historical eras, from pre-colonialisation, colonialisation, independence, the New Order, and current globalisation under Reformasi, with each of the layers woven, embedded, and materialised in contemporary urban Jakarta (Santoso, 2011).

Jakarta has long been a cosmopolitan centre, with *kampung*, the vernacular settlement, serving an important role as a shelter for ethnic and religious migrants before colonialism (Abeyasekere, 1989). Colonial settlers arrived in the late 16th century, opening vast areas for sugarcane plantations (Argo, 1999). This caused river pollution and malaria outbreaks in the 17th century, giving rise to "the first generation of water vendors" (Argo, 1999:44), who sold water from the city's south to wealthier residents along the Batavian canal. In the 18th century, the colonial government built a new town with an artesian system to supply water exclusively to the colonial enclave. The infrastructure was built to maintain a racialised hierarchy, with local natives using and consuming surface water, which was associated with backwardness and a lack of modernity (Kooy & Bakker, 2008a, 2008b; P. W. Putri, 2019). As part of the 'ethical' policy of the early 1900s, the colonial authority built a spring water system, sourcing the water from Ciburial spring in Bogor through a 53 km pipe into the city, "to modernise the native population while affirming the modernity of the European rulers" (Kooy & Bakker, 2008a:1849). From the spring water system, water was provided to the natives through public hydrants, where appointed vendors could tap the water to sell to *kampung* residents.

This uneven distribution of water still characterises water access in Jakarta today. After the independence, President Soekarno focused on large modern monuments, such as WTP, with minimal investment in the pipe system. Two new WTPs, Pejompongan I and II, served where the postcolonial piped system existed (i.e., Menteng and Kebayoran Baru), while excluding the non-modern *kampung.* This pattern persisted throughout the New Order regime under Soeharto's presidency (1967-1998). A water utility company for Jakarta, PAM Jaya, was established in 1968, marking the delegation of water services to a government-owned, corporatised entity. The corporatisation of the utility was followed by a customer registration and metering program to ensure that water consumption could be calculated, billed, and paid for. As a corporate extension of local government, the then-profit-seeking PAM Jaya strategised which connections to prioritise. This is evident in the extension of the piped service to new town enclaves in Jakarta, with their own mini WTPs, such as Sunter Paradise, Taman Kota, and Citra Garden (Kooy, 2008). Meanwhile, *kampung* remain excluded to dissuade the rural-urban migration (Bakker et al., 2008) and because *kampung* residents lacked legal land ownership or citizenship required for formal connection to the city's water service (Colbran, 2017).

In 1990, the World Bank disbursed a US$124 million loan for the PAM Jaya System Improvement Project to "balance the existing production capacity with that of the transmission and distribution facilities" (World Bank, 1998b: iv). In doing so, the loan targeted the development of a new water line from Pejompongan and Cisadane to increase water supply and improve the downstream connection for 2.3 million people. This 'balancing' ensured that produced water was paid for, alongside programs to increase PAM Jaya's management capacity. These engineering and institutional works were laid out by the World Bank to attract private-sector investment in Jakarta's piped network. Private sector

participation was realised in 1998 through the contracting of PAM Jaya's water service to two foreign concessionaires, France's Suez-Lyonnaise des Eaux and the UK's Thames Water, in partnership with Soeharto's cronies and family. For 25 years, the privatisation contract was negotiated, challenged, and reinstated while insignificant improvements were made on the city's water service (Zamzami & Ardhianie, 2015).

Meanwhile, given the limited growth of the pipe service, industries and households have been relying on groundwater, with or without legal permits (Batubara et al., 2023). Without proper sanitation services in the city, shallow groundwater is contaminated. This limits households' access to groundwater, exposing them to polluted water and forcing them to purchase bottled water for consumption. Insufficient piped coverage has severe impacts: over-extraction of deep groundwater causing land subsidence, limited household water sources (most notably for the urban poor) with polluted shallow groundwater, and high costs of relying on bottled water. This interlocking of infrastructural and ecological relations underscores the importance of analysing both reticulated and non-reticulated means of water access and their institutional and ecological contexts in studying financialisation (Furlong & Kooy, 2017).

Jakarta's water story does not end with the privatisation contract in 1998 or its completion in 2023, as I will further demonstrate in the empirical chapters. This section has described how water is accessed and how water inequality has persisted for decades in Jakarta. Studying Jakarta's water landscape means following the flows of piped and non-piped water across different historical periods and sociopolitical, institutional, and ecological settings. These layers are emblematic of "social relations, networks of interconnections across spaces" (Massey, 1995:321), connecting urban water users to levels of government, private developers, and global financial actors at urban-rural and local-global scales. The water supply projects this thesis studies, Jatiluhur, Karian-Serpong, Djuanda, and the bundling projects (Figure 1.1), are not 'reset' moments, detached from the past (Collard & Dempsey, 2022), but ways of reworking current water provision in Jakarta. This thesis interrogates how this most recent layer of financialised infrastructure interacts with other existing layers and how such interaction produces new socioecological relations. In the following section, I will illustrate how I lay out the arguments in each chapter about the infrastructural and financial relations that shape Jakarta's contemporary and future water supply system.

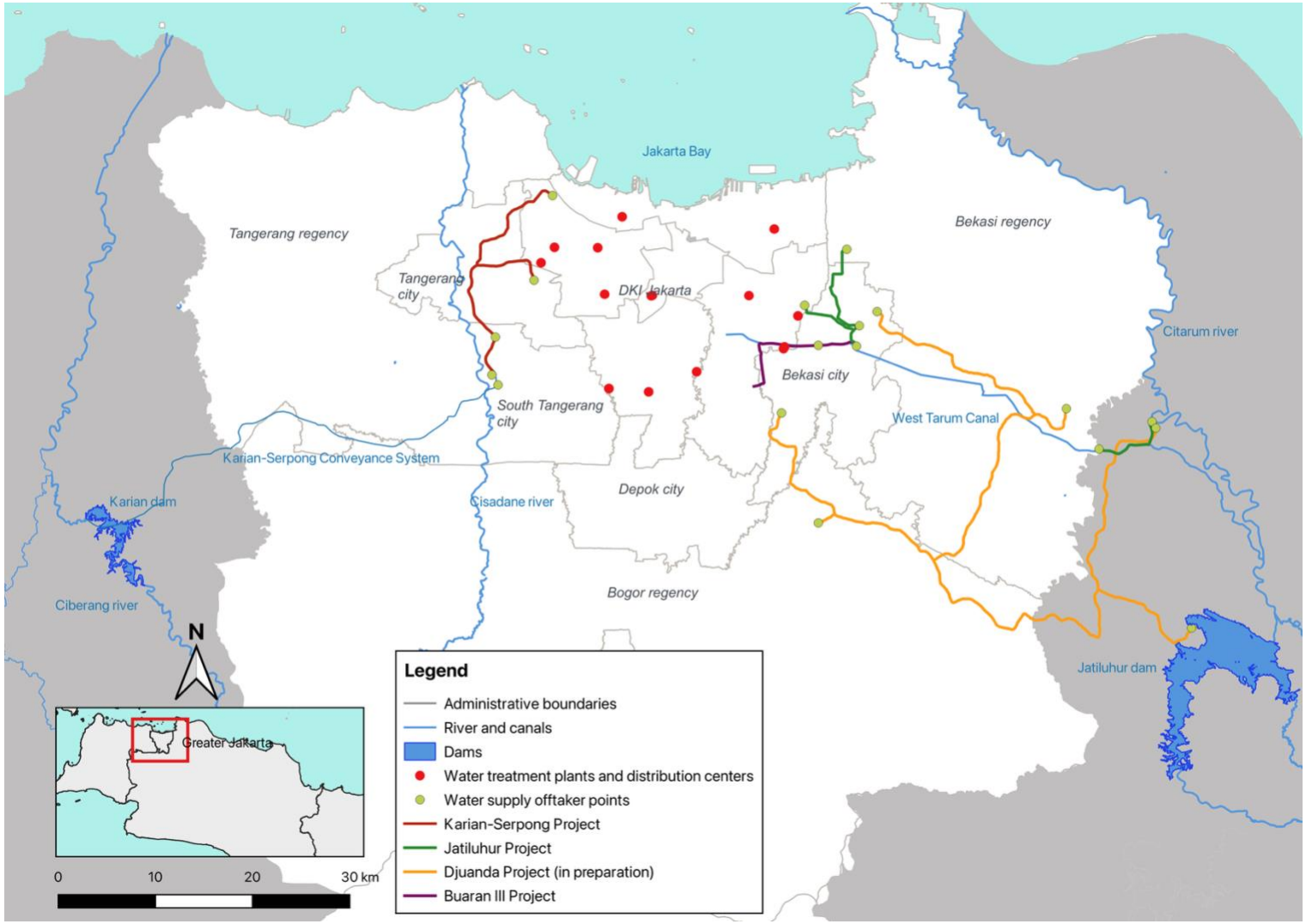

Figure 1.1 Water Supply Projects for Greater Jakarta (map by author)

1.4. Thesis structure

This thesis traces how water infrastructure is financialised by exploring the institutional, regulatory, and material-infrastructural configurations that enable rent extraction through its operation. Drawing on literatures in financialisation and the urban political ecology of water infrastructure in the Global South, the empirical chapters examine: the rationalities for why and how financialisation of water infrastructure is made to be the logical solution to Jakarta's water crisis (Chapter 4), how state and private actors experiment with institutional and infrastructural configurations to make water infrastructure bankable (Chapters 5 and 6), how bankability is established by transferring costs and risks to communities (Chapter 7) and finally how water infrastructure projects operate within institutional and ecological limits which eventually undermine private revenue and destabilise financialisation (Chapter 8). Throughout, I show how this progression of legitimising, building, and disrupting financialisation hinges on attempts to make the erratic flow of water legible for capitalist extraction. The thesis is structured as follows.

Chapter 2 elaborates scholarly works on financialisation and the urban political ecology of water infrastructure in Global South cities. First, this chapter examines research on the rise and fall of private sector participation in water infrastructure and how it mutated, with stronger state roles after the global financial crisis in 2008, to de-risk private investment in Global South cities (Gabor, 2021). Building on the literature on the path-dependency of neoliberalism, I argue for non-linear and variegated forms of financialisation (Anguelov, 2023), exemplified by the state mobilising SOEs to undertake unbankable infrastructure projects in Indonesia. Last, in situating the water infrastructure financialisation in Jakarta, I draw on literature in urban political ecology of water and water infrastructures, underscoring three intersections of urban political ecology of water access and financialisation in Global South contexts: the socioecological risks of water infrastructure financialisation, the financialisation of (unruly) water, and how finance navigates the splintered water access in Global South cities. I conclude by showing how I mobilise several key takeaways from the literature as the 'conceptual vectors' for guiding this thesis: the institutional, infrastructural, and ecological enablers and limits of financialisation, to illustrate how financialisation unfolds and how it results in uneven processes and outcomes.

Chapter 3 interrogates my methodologies, data collection, and analysis methods. It argues that thinking with a 'metabolic lens' (McFarlane, 2013), by tracing the networks, actors, and flows of capital and water in the financialisation of water infrastructure, helps show how financialisation unfolds in Global South contexts. I charted sites in urban and rural areas where water is produced, stored, and distributed, and where technocratic planning and financing activities occur. I reflect on my methods of collecting data online and in person for both interviews and event observation, as well as on my positionality in shaping how the research is organised.

Chapter 4 examines how Jakarta's water crisis is turned into an investable infrastructure proposition. I explore this through the concept of performativity (Callon, 2008; MacKenzie, 2006): how particular crisis narratives rationalise and legitimise particular response that reifies the crisis. I show how performativity works through strategic translations (Callon, 1984), where one process of 'world-making' (Eich, 2025) builds on another. First, state actors mobilise selective water crises: a gap between supply and demand,

or water balance, to justify the rollout of large-scale infrastructure. Second, the need for large-scale infrastructure is translated into another crisis: the state's fiscal gap, rationalising the attempts to attract private investment and to devise bankable infrastructure projects. Third, the state makes water infrastructure appear bankable by mobilising climate change narratives to attract development financiers, and by rendering water supply and demand risks technical and manageable in feasibility studies. Through this translation, the water balance gap produces a new reality to solve Jakarta's water crisis: the need to mobilise large-scale water infrastructure and bankable infrastructure propositions.

Chapter 5 draws on scholarly work on the marketisation of the state (Birch & Siemiatycki, 2016; Carroll, 2012) and institutionalisation of PPP in Global South contexts (Anguelov, 2023). This chapter traces the history of how the Indonesian government has formulated PPP through extensive institutional rearrangement, resulting in path-dependent and contingent modalities of financialisation to grapple with Indonesia's infrastructural and political risks. First, I show how the state mobilises SOEs to finance, develop, and guarantee infrastructure projects, ring-fencing investors from unbankable local utilities. Second, I show how the state manoeuvres around the limit of water service privatisation after the victories of civil society movements in cancelling the pro-privatisation, 2004 Water Law (Marwa, 2024; Zamzami & Ardhianie, 2015). Instead of progressively moving towards public-oriented water service, the state wrestles with splintering water infrastructure, making private investment flow into the bulk water production – the least risky part of the infrastructure chain. I introduce Jatiluhur and Karian-Serpong bulk water supply projects for Greater Jakarta to exemplify the change in water governance under a financialised infrastructure regime. In the long term, I argue that the SOE-led financialisation and the splintering of water infrastructure expose the state to fiscal liabilities to backstop private returns. Despite the promise of PPP to efficiently allocate risk, my analysis shows that the state retains significant risks while investors realise profits.

Chapter 6 builds on the argument in Chapter 5. This chapter explores how the state experiments with 'source-to-tap schemes' by rebundling bulk water production and distribution pipes to mitigate interface risks. I draw on the literature on the urban political ecology of large-scale water infrastructures (Crow-Miller et al., 2017; Loftus & March, 2019), arguing that 'scale' is not self-evident but is constructed as part of risk reallocation schemes that enable private actors to take up complex infrastructure projects. In this chapter, I introduce Djuanda and Jakarta's bundling scheme projects, showing how state and private actors remodel risk allocation in PPP to backstop private investment. Second, I argue that private actors bundle infrastructures and spatially aggregate projects to enable cross-subsidy and anticipate water demand for their real estate projects. The second links to the domination of Soeharto's business ally, Salim Group, through its subsidiary, Moya, in controlling bulk water production in Greater Jakarta, shaping both the path-dependency of Jakarta's water governance on the past privatisation contract, and the way financialisation unfolds to fit oligarchs' interests.

Chapter 7 draws from scholarship in development studies, which demonstrates how development practices render particular issues technical (Li, 2007). I demonstrate this through the practice of risk allocation in PPP: how state and private actors render the complex realities of the water crisis as technical, deliberately socialising risks to the public to reduce costs for themselves and make projects legible to investors. First, I explain how land compensation simplifies displacement risks. By examining

displacement for the Karian dam and the WTP Bekasi, I demonstrate the logic and process of land appraisal and how it produces a simplified risk calculation that discounts the actual costs communities shoulder through lost livelihoods, assets, and social networks (Wilmsen et al., 2025). Second, as water supply projects are translated into engineering fields, financialisation produces exclusions in un-engineerable sites, such as in informal settlements in North Jakarta. Therefore, despite the promise of efficient risk allocation in PPP, risks overflow to rural and urban communities, who must shoulder the costs of inequitable water access and the loss of livelihoods, while managing volatile land subsidence and climate impacts.

Chapter 8 draws on literature on the state as a social relation (Jessop, 2001, 2018) and extends it to studies of financialisation and the urban political ecology of water access in the Global South, arguing on the ecological and institutional limits to financialisation. Multiple state institutions pursue different approaches to water governance: regulating, deregulating, and unregulating groundwater flows, to attract investment in water supply infrastructures, tanker industries, and bottled water companies. I conceptualise these as 'spillovers': the out-of-network water flows that undermine the financial viability of water supply projects. This contradiction produces an unstable outcome for the financialised water supply projects, requiring the state and the public to pay for investors' revenue losses while also retaining the ecological damage from these spillovers.

1.5. Conclusions

This thesis centres on the process of making water infrastructure an investable proposition for private actors in the Global South cities. Drawing on Jakarta as a key site for understanding the process, this thesis debunks the taken-for-granted techno-financial solutions to address the water crisis in Jakarta, namely the large-scale water supply project financed through a PPP arrangement, and analyses the rationalities, processes, and contradictory outcomes of these solutions. This thesis shows how financialisation requires the state's relentless manoeuvres to restructure its institutional, regulatory, and infrastructural configurations to meet the private sector's appetite for risk and return. Finance does not neatly flow into the splintered water infrastructure networks in the Global South; instead, it requires the state to make water infrastructure appear bankable through ongoing, arduous efforts. This results in the state retaining significant risks to guarantee private returns, and socialising these risks to the public through increased water tariffs, land displacement, and persistent water access disconnection for the urban poor. The following chapters demonstrate these frictions, as well as the uneven and contradictory process and outcomes of financialisation in Jakarta's water supply projects.

Drawing on the literature on financialisation and the urban political ecology of Southern water infrastructure, I argue for a situated analysis of how financialisation unfolds within particular sociopolitical institutions and histories, and of how finance charts its way through messy, chaotic infrastructure networks and water access in Global South cities. In doing so, my approach offers a novel understanding of how the state seeks to remove water-infrastructure-associated risks (low tariffs, unbankable utilities, and spillovers from extensive groundwater use) by reworking institutions and infrastructures, evidenced by the unbundling and rebundling of infrastructure projects. Despite the

homogeneous and global PPP models, I underscore that financialisation produces contingent outcomes in Indonesia, remodelled by the state through the empowerment of SOEs and alignment with some oligarchs' interests (Anguelov, 2024; Wijaya & Camba, 2023). The mobilisation of national government-backed SOEs reflects the limit of market-based financialisation, with the state significantly backstopping non-bankable projects to sustain the appearance of market-led infrastructure provision. This appearance of bankability is also maintained through efforts to control spillovers from non-reticulated water use, which the state itself facilitates to promote investment in different directions. Therefore, while demonstrating the making of financialisation, this thesis also argues for its inherent limits and contradictions, showing financialisation not as a smooth, unidirectional technical process, but as a fragile political project that requires constant reworking by the state.

The trajectories of infrastructure financialisation in Jakarta documented here show no signs of abating. From the 1998 concessions, through to PPP and bundling scheme arrangements, and more recently, the plan to privatise PAM Jaya, privatised and financialised infrastructure solutions have longevity. In September 2025, hundreds of urban poor communities gathered in front of Jakarta's House of Representatives, rejecting plans to change PAM Jaya's company structure to a corporation (*Perseroda*). PAM Jaya is seeking IDR 8-15 trillion through an initial public offering (20.detik.com, 2025), thereby privatising not just the infrastructure through PPP and bundling schemes, but also the utility itself. The protesting communities, which barely have access to piped water in Jakarta, demanded reliable and affordable water access, but debt-driven water services will only push PAM Jaya away from this goal towards commercialisation. Aligned with the demands of urban poor communities, this thesis argues that public ownership and non-profit public service provision are essential to ensuring affordable, equitable water access and preventing debt-driven service provision that prioritises private returns over the community's needs. Most critically, without serious attention to providing water to the city and its citizens, households and commercial activities will continue to rely on groundwater, intensifying the risks of land subsidence for the urban poor in North Jakarta who have limited resources to adapt to flood risks. This thesis serves as a reminder that financialised water infrastructure solutions may actually exacerbate the crises, amplifying socio-ecological risks to communities while exhausting the state's fiscal capacity, rather than addressing them.

Chapter 2. Urban Political Ecology of Financialisation

2.1. Introduction

Scholarly work on financialisation has advanced our understanding of how financial activities, rationales, and actors have an increasingly prominent role in modern economies. Krippner (2011) defines financialisation as the increase in financial rather than production-based activities in the economy, in which income is generated through the "provision or transfer of capital in expectation of future interest, dividends, or capital gain" (p. 2). Her categorisation of 'financial' and 'productive' activities does not suggest that financial economies are not productive or that productive economies are detached from financial activity. Instead, she highlights that the benefit reaped from commodity trading is fundamentally different from that generated by trading debts over the commodity. The circulation of debts over commodities is inherent in financialisation (Fine, 2013; Furlong, 2021; Loftus et al., 2019). As Christophers suggests, financialisation involves two actors in a borrowing arrangement, as lender and borrower, and also "multiple credit instruments" where these actors generate additional revenue by trading different loans, despite there being "only one underlying pool of money" (2009:817). This scholarship demonstrates that the growing circulation and exchange of debt are significant for generating revenue under financial capitalism rather than for direct productive investment.

Other scholars have examined the "growing influence of capital markets, *their intermediaries, and processes* in contemporary economic and political life" (Pike & Pollard, 2009:29). This strand of scholarships does not negate the aforementioned conceptualisation of debt-based revenue generation under financialisation, but underscores the intricate process by which financial products (bonds, equity, derivatives), logics and institutions penetrate different aspects of life. In particular, after the 2008 global financial crisis, driven by the collapse of financial institutions that had speculated in the US housing-backed mortgage market, financiers have sought to diversify their asset portfolios beyond housing. In this vein, scholars have demonstrated the "constant searching out, or the construction of, new asset streams" (Leyshon & Thrift, 2007:98) in new frontiers, connecting dispersed local sites and global financial centres (Torrance, 2008), involving diverse public, private, and quasi-public/private institutions (O'Brien et al., 2019). This definition of financialisation offers a comprehensive understanding of the actors, scales, processes, and particular geographical constellations of financialisation (O'Brien & Pike, 2017).

Drawing on those works, this thesis investigates financialisation by unpacking the debt relations and institutional configurations that enable the private sector to generate revenues from water infrastructure in Global South cities. Cities in the Global South, with fragmented water access inherited from the colonial regime and fiscal constraints on expanding water services, are perceived as new outlets for surplus capital accumulated in the Global North (Bigger & Webber, 2021). Especially since the 2008 financial crisis, new asset classes, such as infrastructure, including roads, airports, and water treatment plants (WTP), have become targets for investor speculation due to their potential for long-term and stable income generation (Leyshon & Thrift, 2007). As O'Neill (2019) suggests, the high

investment appetite in public infrastructure stems from the exclusive customer base (actually, citizens) that the infrastructure serves and the right to exploit the underlying material flows (water, traffic) to generate revenue. However, development challenges such as the water crisis in cities of the Global South are not a cause that private investors seek to address. Therefore, matching the investors' expected risks and returns with the state's development goals is the core tension in the process of financialising water infrastructure, transforming it "from a development issue to a financial one" (Bayliss, 2014:295).

In developing the thesis, this chapter sets out its conceptual framework by extending the literature on financialisation into urban political ecologies of water infrastructures in the Global South cities. Urban political ecologists have grappled with questions about the socionatural process of urbanisation, claiming that cities are emblematic of the intense metabolic flow of labour, nature, and materials in and out of the city (Heynen et al., 2006; Swyngedouw, 2006), including water. Scholars have examined how the metabolic flow of water is shaped and structured in response to the flow of capital, governed through market principles under neoliberal regimes (Loftus, 2006; Swyngedouw, 2004). In this vein, literature about 'neoliberal water governance' has discussed different modalities or "key moments" of market-oriented water governance, such as privatisation, corporatisation, financialisation, and marketisation (Loftus & Budds, 2016),[6] which, through particular structural, institutional, and financial arrangements, contribute to the crisis of access and delivery of water services.

However, despite the global but variegated rollout of neoliberal principles and policies, including the financialisation of infrastructure, scholars show the contingent forms of neoliberal projects in Global South cities, such as how they are path-dependent on postcolonial legacies and existing local political and institutional configuration (Peck et al., 2009, 2018; Sheppard et al., 2013). In Global South cities, the flow of financial capital into water infrastructure must navigate local institutional configurations and align with the archipelagos of networked and non-networked water access, which are rooted in colonial-era discrimination (Kooy & Bakker, 2008a; McFarlane, 2008). Understanding financialisation in Global South cities, both empirically and conceptually, therefore requires weaving together the literatures on financialisation and the urban political ecology of water to examine the relations between the flow of debts and the socio-political-ecological processes surrounding the existing water provision.

Bringing together studies in financialisation and urban political ecologies of water infrastructure offers two key insights. First, as Christophers (2018a) suggests, this augments the understanding of how the hybrid, socionatural account of water (or its hydrosocial relations, see Budds, 2008; Linton & Budds, 2014) becomes increasingly embedded in financial relations. The financialisation of water infrastructure in Global South cities is emblematic of the socionatural fix to solve the crisis of capital accumulation in the North (Ekers & Prudham, 2017), but it also, contradictorily, exposes these cities to the risks entailed

[6] The corporatisation of a water service refers to the establishment of a utility as a detached profit-seeking agency from government bodies and bureaucracy which are perceived by its proponents as a hindrance to the professional and accountable operation of the utility . The marketisation of water refers to the trading of water licenses or water rights in markets, argued by its proponents to increase the efficiency of water allocation and use. These modalities are underpinned by market rationalities where water must be priced as an economic good and efficiently allocated based on its best-and-highest use to avoid unsustainable use (Bakker, 2014; McDonald, 2014).

in complex financial and debt relations (Christophers, 2018a). In this regard, investigating the political ecology of financialisation means examining how financialisation is productive of particular socioecological risks, how these risks are mitigated and/or socialised, and who gets to define and who is impacted by these risk management decisions.

Second, adopting the lens of urban political ecology, this research foregrounds the material and social-infrastructural dimensions of water and its infrastructure. Attending to the "frictional encounters of finance and nature" (Ouma et al., 2018:501), this research shows how financialisation is muddied by the uncooperativeness of water as a commodity (Bakker, 2010; Castree, 2003; Loftus et al., 2019). Water's flowing, bulky materiality requires the development of large-scale infrastructure to control and channel it to urban residents, requiring large investments that tariffs, set low to ensure everyone can afford water, cannot cover. Meanwhile, by exploring the social-infrastructural realities of water access in the Global South, this research examines how reticulated infrastructure is only one alternative among many ways of accessing water service (Hofmann, 2021), as Lawhon et al. (2018) term 'heterogeneous infrastructure configurations' in Global South cities. Therefore, utilities must compete with other water providers, including individual groundwater extraction, to ensure they can repay their debts (Williams, 2021). By exploring these natural/material and infrastructural barriers to private-sector profits, this thesis contributes to an understanding of the opportunities and limits of financialisation. Understanding these embedded socionatural contexts and the contingent geographies of water access provides a lens onto the complex process of financialisation, rather than the smooth, unidirectional, homogenising account of a global shift to financialisation in the Global South (Mader et al., 2023).

To sum up, this chapter seeks to fill a gap in the current literature on water infrastructure financialisation, showing that financial relations and logics increasingly shape water access and provision in Global South cities, and conversely, that the uncooperative commodity of water and the realities of unequal water access in Global South cities interact with and limit the attempt to financialise water infrastructure. This chapter is structured into three main sections. Following the introduction, I will elaborate on the literature on the neoliberal turn in water governance, from the privatisation of water service to the emergence of Public-Private Partnerships (PPP) as a modality of financialisation. Then, I will explore research on the path dependency and variegation of neoliberalism in Global South contexts, focusing on how the financialisation of infrastructure unfolds in Indonesia. Then, I will explain how the urban political ecology lens can help study financialisation by illustrating the nodes in which existing research in financialisation intersects with the urban political ecology of water access in Southern cities: the socioecological risks of financialisation, the financialisation of the (unruly) natures, as well as variegated water access in the Southern cities as a socioecological limit to financialisation. The final section will conclude on some "conceptual vectors" (Millington & Lawhon, 2019): the institutions, ecologies, and infrastructural settings of financialisation, which this thesis mobilises to understand the making and unmaking of financialisation.

2.2. Neoliberal turns in water governance

This section will examine the literature on the rise and fall, persistence, and shape-shifting of water service privatisation, showing how the failure of privatisation has instead led to its reformulation, serving as the basis for the financialisation of water infrastructures. This section provides the context before exploring how neoliberal ideologies and policies in water provision intersect with the sociopolitical and infrastructural configurations in Global South cities, producing hybrid, contingent, and uneven outcomes of neoliberalisation. I will begin by exploring bodies of literature on the origins of water service privatisation and how the subsequent failure of privatisation to deliver equal water services and attract private finance led to its mutation, with a more substantial state presence in PPP.

2.2.1. The rise and fall of privatisation in water services

Scholars in urban political ecology have identified the rise of neoliberal water governance as a consequence of the decline of state-centred water provision. Notably, in the twentieth century, the idea of state-centred, integrated water management emerged as a means for hygiene-oriented city planning (and the 'modern' connotation of sanitised city) (Gandy, 2004), increasing agricultural productivity, and industrialisation (Mitchell, 2002a; Sneddon, 2015). Bakker (2013a) argues that water management naturally extends to the 'public' domain where water provision lies under the state's developmental agenda of public health, sanitation, and poverty alleviation. What Bakker (2010) calls the 'municipal hydraulic paradigm' in cities emerged in the 1970s, coinciding with the World Bank's increasing lending to countries to build water supply systems to generate revenue from untapped potential in Global South cities (Goldman, 2007). However, as Bakker (2013a) suggests, the Bank considered the water supply projects a failure. The majority of the projects failed to achieve the targeted goals of improving water access, reducing leakage, and enhancing the technical capacity of the utilities, thereby undermining their ability to repay the Bank's loans. More importantly, the projects failed to extend access to the urban poor and rural areas, as indebted governments focused primarily on serving the wealthier parts of their cities to repay the loans. In the end, the state's (and the Bank's) failure to provide water services justified the private sector's involvement in water provision.

In the early 1980s, many developing countries were heavily indebted due to borrowing in earlier decades. The World Bank, the IMF, and the US Department of the Treasury subsequently rolled out a standard reform package (called 'the Washington Consensus') as a prescription for developing countries, promoting liberalisation, deregulation, and the rationalisation of public-sector spending to reduce their fiscal deficits (Peck, 2001). On the latter, the consensus advised involving the private sector in the provision of public infrastructure, including water services. The 1990s witnessed a global turn to water service privatisation in Global South cities, facilitated by international financial institutions through loans and capacity building from French, British, and Spanish water companies (Bakker, 2013b). As Goldman (2007) suggests, the rollout of privatisation was more about integrating Global South cities into the global economy than about improving service delivery (see also Bakker, 2010, 2013b). The water services in Global South cities, with potential markets of disconnected urban populations resulting from 'state failures' in managing water services, became a new frontier for the expansion of global water corporations.

The modality of privatisation itself takes different forms. Across a spectrum, privatisation denotes the "transfer of crucial decision-making responsibilities […] and an effective transfer of power over assets to private sectors" (McDonald & Ruiters, 2005: 14), while some forms of state intervention, as the enabler of investment, are maintained. If defined as a transfer of ownership to private actors, privatisation that entails selling infrastructure assets to the private sector is a specific phenomenon in the UK. The British model of privatisation – the most extreme version – has not been applied elsewhere. Beyond this case, privatisation ranges from service or management contracts, with only limited private sector involvement in small tasks, to concessions and build-operate-transfer agreements, in which private actors shoulder greater risks and investment (Bakker, 2003; Loftus & Budds, 2016).

As Bakker (2010) argues, proponents of privatisation believe that private actors deliver water services more efficiently because they operate under market-driven logics, meaning that water will be allocated to its highest and best use and paid in accordance with the cost of its delivery. Advocates of privatisation argue that private actors have more competitive technologies and specialised expertise than the government, enabling increased efficiency of water services and higher returns. Ultimately, with the promised potential to attract financing, private actors will be able to invest in extending water services at affordable rates to all customers, thereby compensating for the state's failure to deliver water services.

However, market-led water privatisation has demonstrated its failure in delivering the dream of equal water access while creating profitable businesses (Budds & McGranahan, 2003). While a World Bank study suggests that private actors deliver efficiency in water services, this does not come with larger investments nor decreased water tariffs (Marin, 2009a; see also Loftus & McDonald, 2001). This either means that private actors privatise the revenue generated from operational efficiency (associated with weak regulatory control), or water tariffs are already very low to begin with, so efficiency cannot drive the tariff further down (Leigland, 2018). In cities of the Global South, water access remains fragmented, with pipe networks often extended only to affluent areas, where private operators can recoup their investments (Bakker, 2003; Loftus, 2006; Marwa, 2024). Meanwhile, the private sector has equally failed to attract the significant financing necessary for infrastructure expansion (Bayliss & Fine, 2008; Marin, 2009; Reis et al., 2024). Investing in water networks has become challenging for private actors due to the high sunk costs of infrastructure, as the water tariffs (their only source of revenue) do not even cover the actual cost of producing and distributing water (Money, 2020).

Meanwhile, Bakker et al. (2008) suggest that the failure to achieve universal water service cannot be attributed solely to state- or market-led delivery. Water consumers also refuse to connect to the water service when alternative water sources, such as groundwater, remain available; therefore, connecting to the pipe network seems expensive and unnecessary. The urban poor, who lack land certificates and citizenship recognition, are also excluded from networks due to local governments' discriminatory policies that seek to discourage urban-rural migration (Colbran, 2009). This finding suggests that universal water provision is more than a problem of management or ownership by public and private actors; it is about sociopolitical and ecological contexts that sustain the exclusion of urban poor communities.

The regressive outcomes of privatisation have led to the cancellation of concession contracts in many cities worldwide (Lobina, 2015; Lobina et al., 2014; McDonald, 2018). However, this has not subsequently led to the abandonment of market-led principles for improved outcomes in water service provision (Bakker, 2013b; McDonald & Swyngedouw, 2019). As I will explore later in the empirical chapters of this thesis, the failure of privatisation led to its mutation, with a greater role for the state in activating the market for infrastructure and its debt. This is evident in the emergence of PPP, building on the marketised institutional configuration that has animated water governance over the past few decades, to which I now turn.

2.2.2. Public-Private Partnerships (PPP): governing risks in infrastructure financing

In the aftermath of the 2008 financial crisis, which was thought to be a crisis for neoliberalism (Sheppard & Leitner, 2010), the World Bank, IMF, and other multilateral institutions formulated a new financing agenda: the 'Wall Street Consensus'. The consensus, along with the Sustainable Development Goals, has focused global development policies and practices on leveraging limited donor funds to attract private investment in development (Gabor, 2021; World Bank, 2015). The World Bank's 'Billions to Trillions' agenda explicitly articulates that private equity and bond financing will complement foreign aid, expanding the base of development capital, to pay for infrastructure in the Global South while generating development returns (World Bank, 2015:3). This approach to blending public and private finance, including PPP, signals that neoliberalism has been revived through another modality of market-led infrastructure provision in Global South cities.

PPP is commonly structured as a risk-transfer agreement between a government contracting agency (GCA) and a special-purpose vehicle (SPV) (Birch & Siemiatycki, 2016; Siemiatycki, 2013). An SPV functions as a specialised entity to build and operate infrastructure and to seek financing for projects. The SPV is siloed from its investors, protecting their assets from liabilities arising from the project (Fine et al., 2016). The SPV raises financing from a combination of equity (from the infrastructure company and other equity investors) and loans (from financiers) to develop the project (O'Neill, 2019). Equity investors (commonly engineering companies) seek returns through both dividends and direct involvement in the construction and operation of the infrastructure (Siemiatycki, 2013). The equity capital is usually a first-loss tranche, meaning bank loans receive priority in default scenarios. Because it entails a higher risk, equity financing requires higher returns; therefore, the proportion of equity is usually lower in a PPP project (e.g., 30:70 for equity and loan). In advocating for global private infrastructure investment, multilateral development banks facilitate PPP arrangements by offering concessional loans that blend donor funds and institutional lending at below market interest rates. The so-called 'blended financing' is designed to lower project costs, crowd in private project developers, and (supposedly) make infrastructure services more affordable for users (Mawdsley, 2018b, 2018a). The SPV will repay both the equity and debt using revenues from user payments for the infrastructure services. Such financial engineering with a layered structure of debt, equity, and concessional financing exemplifies how financialisation changes the nature of public infrastructure into profit-generating opportunities through complex financial instruments.

At the heart of PPP is the assumption that project risks can be governed and distributed between the state and private actors (Siemiatycki, 2013). As a promoter of PPP, the World Bank issued guidelines on risk allocation and management for water infrastructure projects (Global Infrastructure Hub & Allen & Overy, 2019). For instance, the government is to assume land-acquisition and demand risks when revenue falls short of projections. Meanwhile, project developers shoulder the construction risks, including costs arising from construction delays and project management. Payment default risks are mitigated through a guarantee of payment, ensuring cash flow to the investor regardless of the actual services paid by consumers, commonly known as a take-or-pay scheme (Bayliss, 2014). With partial risks transferred to private actors, the state believes its limited fiscal capacity can be used to leverage additional resources to pay for infrastructure (Birch & Siemiatycki, 2016; Siemiatycki & Farooqi, 2012).

Unlike the concession or privatisation models advised by multilaterals in the late 1990s, PPP appears to be an ideal solution for both the state and private actors. As the state's role in retaining some risks increases, PPP offers the state leverage over private capital to develop infrastructure, and private actors return from operating the infrastructure. The following section will critically assess this seemingly neutral decision to involve the private sector in water infrastructure provision, which, in practice, produces regressive and uneven outcomes of financialisation.

2.2.3. Uneven and contradictory financialisation: the de- and re-risking regime of infrastructure financialisation

Scholarly work has examined the state's growing role in the financialisation of infrastructure (August et al., 2022; O'Brien & Pike, 2017). The global expansion of PPP has been partly facilitated by market-led state restructuring during structural adjustment periods, in which the state enables competition among private actors in infrastructure delivery (Bayliss & Van Waeyenberge, 2023). At the same time, the state adheres to neoliberal prescriptions to rationalise its budget for public infrastructure; therefore, attracting private finance to public infrastructure appears rational and necessary (August et al., 2022). PPP is promoted by multilaterals as the preferred modality of infrastructure financing, recognising that the private sector alone is unwilling to retain all risks and costs of infrastructure provision (Marin, 2009); it needs public funds to shoulder the significant risks, such as demand and climate risks (Gabor, 2021). Infrastructure projects in Global South cities are perceived as high-risk by global investors: cities lack the capacity to develop and implement infrastructure plans and do not have the regulatory and institutional support necessary to facilitate private investment (Bigger & Webber, 2021). The preparation costs for PPP are higher in developing countries, as the state must conduct a robust, comprehensive risk analysis to attract private investment (Leigland, 2018). The high risks of PPP call for the expansion of the state, described as a 'big state' – along with the nationalist industrial policy that marks recent global developmentalist and geopolitical shifts (Gabor & Braun, 2025; Schindler et al., 2023) – to remove the risks for or 'de-risk' private sector investment. Therefore, rather than diminishing, the role of the state under the "de-risking guise" (Gabor & Sylla, 2023:1180) is prominent in financialisation, actively attracting and safeguarding private finance.

Building on the marketised institutional and regulatory framework under neoliberal reform (Birch & Siemiatycki, 2016; Carroll, 2012), the de-risking state forms a new architecture of infrastructure governance that creates markets for both infrastructure projects and the debt (Anguelov, 2024). In doing

so, the state offers infrastructure project pipelines to facilitate private actors' selection of investment portfolios (Yunita et al., 2023). In addition, the state also provides underwriting and subsidies to private actors to ensure their returns from developing and operating infrastructure projects. As scholars have critically assessed, all these activities – institutional restructuring, project pipelining, underwriting and subsidising for private actors – make PPP costly for states. This contradicts the discourse of the fiscally constrained state in infrastructure provision. Still, the state prefers PPP to direct borrowing to offload debt from its balance sheets by making private companies take it on (Torrance, 2008), to be eventually repaid by public infrastructure users.

However, despite its promise to deliver public infrastructure, the de-risking regime is actually "built on a denial of its [the state's] own creative agency" (Eich, 2025:679). De-risking entails the process of rendering risks governable by overlooking uncertainties. The state has actually become more vulnerable to the same risks it seeks to manage, including climate and demand risks, while failing to discipline global private capital or ensure improvements in access to basic services (Gabor & Sylla, 2023). Scholars have documented that, rather than reducing the fiscal burden on the state, PPP exposes the state to contingent liabilities as it becomes the 'residual risk holder', underwriting private revenues against long-term uncertainties (August et al., 2022; Boardman & Vining, 2012). In the end, the state unloads the costs of financing infrastructure to taxpayers through rising infrastructure fees and unmitigated externalities such as pollution from the infrastructure operations, which continues unabated as private actors prioritise revenue over repairing or maintaining the infrastructure (Bayliss et al., 2021; Bel et al., 2017; Christophers, 2018b; Grafe, 2020).

This section has examined the sustained neoliberal principles of privatisation and commercialisation of water services, despite the failure of a similar approach in the early 2000s. As scholars have suggested regarding the mutation of neoliberal practices, the emergence of PPP signifies the persistence of market-driven logics in water governance with increasing state power and fiscal capacity to backstop private revenue. Despite this, the sustained adoption of market principles in water services means that the regressive outcomes of neoliberal water governance persist. On the one hand, the state partially assumes the risks of infrastructure development and guarantees private returns. On the other hand, these risks and incurred liabilities are socialised to consumers and taxpayers at large. These outcomes are more pronounced in the Global South city context, where financialisation articulates with colonial-inherited fragmented water access and the inequalities in access from privatisation. The following section will examine emerging scholarly work on the financialisation of water infrastructure in Global South contexts, including its path dependency, variegated forms, and regressive outcomes.

2.3. Financialising infrastructure in the Global South cities

2.3.1. Finance meets water infrastructure in the Global South

Scholars have studied how water infrastructure is financialised in the Global North contexts. With more advanced capital markets, formalised piped water connections and users, and a distinct ownership structure of utilities, financialisation of water infrastructure in the Global North takes a different form from that in the Global South. For instance, Allen and Pryke (2013) explain two of the underlying processes of water infrastructure financialisation in the Global North: the securitisation of bills and the shift of infrastructure control into the hands of financial actors. The first, according to Allen and Pryke, begins with the securitisation of customers' water bills, which are sold to investors who select their desired investment package based on the assigned risk profile of the debt products. As such, financialisation turns fixed infrastructure into liquid assets in the form of derivatives that can be easily traded in capital markets. What is being traded is not the asset itself, but the risks represented by the debt profiles (Christophers, 2018; O'Neill, 2009). The second process, as Pike and Pollard (2009) suggest, pertains to how infrastructure is increasingly governed to maximise dividends for investors. This structure is predatory, as scholars have examined in the case of Thames Water, as asset managers reaped profits from securitisation and debt refinancing, while being ring-fenced from the regulation and everyday costs of the water service operation (Bayliss, Cramer, et al., 2023; Pryke & Allen, 2019). Meanwhile, little of the leveraged debt is actually allocated to physical infrastructure investment or pollution mitigation, but the high cost of this financial engineering is passed on to customers (Christophers, 2023; Loftus & March, 2019). This literature demonstrates how private actors generate profits not by selling water but by trading derivatives in the capital market, whose financial and environmental risks must be borne by urban citizens.

Research in economic geography suggests that rather than being homogeneously rolled out, neoliberalism consists of uneven dispersion of market ideologies, which navigate and rework existing sociopolitical institutions rather than an empty space in the Global North and South (Peck, 2013; Peck et al., 2009). As such, neoliberalism is always path-dependently materialised and reformulated, resulting in contingent and hybrid outcomes built on institutional configurations that predate its rollout. In Jakarta's water service, structural adjustment policies are built on fragmented colonial infrastructure, as well as on nationalist, large-scale infrastructure projects that lack clear goals to extend piped water services to the urban poor. Multilaterals introduced neoliberal water governance in the late 1990s, notably advocating for the privatisation of water access, but access to water for the urban poor has remained unchanged (Marwa, 2024). The government built pipe infrastructure exclusively in city centres and large-scale developments, following patterns laid out by the colonial regime (Kooy, 2008). The penetration of foreign water companies in Indonesia was facilitated by the nepotistic relations between then-President Soeharto and his conglomerate allies, resulting in a non-competitive contract for Jakarta's water privatisation in 1998 (Braadbaart, 2007; Kooy, 2014). This long historical trajectory of water provision shapes and constrains the financialisation of Jakarta's water infrastructure.

Through this critical lens, scholars have begun to understand how finance wrestles with existing sociopolitical and infrastructural configurations in the Global South. In Kenya, Williams (2021:1889)

suggests that the penetration of financial capital into water projects requires “arduous and long-winded process of transforming socionatural relations.” This process entails revamping water-related institutions and regulations, including increasing the bankability of utilities as debt issuers (see also Heckel, 2023) and formalising household connections. Devising and attracting private finance into a pooled water fund, the Kenyan government received assistance from the Netherlands and the World Bank to transform water infrastructure projects into investable assets and match the investor’s appetite with projects. This study emphasises that finance does not spontaneously flow into Global South cities; it requires intermediary actors, internal preconditions within institutions, and investable infrastructure propositions to attract private investment.

Financialisation in Global South cities is entangled with their subordination as debtors to Global North countries (see also Lapavitsas & Soydan, 2022). Furlong’s (2020) research on Medellin, Colombia and Reis and Sánchez Trujillo's research (2024) on Puebla, Mexico, suggest how the devaluation of local currency led to mounting public debt for infrastructure in the 1960s-70s. This led to more rounds of debt from development banks, which also imposed structural preconditions for utilities to apply cost-reflective pricing. This produces what Furlong calls ‘trickling down debts,’ in which rising water tariffs leave urban residents indebted to utilities and disconnected from water services. Meanwhile, Reis and Sánchez Trujillo (2024) argue that local conglomerates, backed by foreign water companies as shareholders, were able to exploit rents by obtaining water concession contracts and channelling the water into their real estate projects. This demonstrates how financialisation unfolds within the unequal North-South relations, where loans function as a disciplining mechanism for governments in the Global South to enforce neoliberal principles in water infrastructure provision. This literature also argues that financialisation enables local elites to profit from the projects while marginalising less affluent communities and their access to water.

Although Goldman and Narayan (2021) point out that the North-South divides may be misleading (considering that many equity firms are actually registered in tax havens or southern cities, like Bangalore, rather than nationally-owned by Global North countries), nonetheless, this body of research has importantly highlighted that financialisation unfolds within conjunctures of postcolonial development, debt crisis and global financialised capitalism (see Goldman, 2023; Leitner & Sheppard, 2020). At the same time, water infrastructure financialisation is shaped in a variegated and path-dependent manner by past and existing institutional configurations, and different means of attracting finance: public utility debt in Latin America or more advanced schemes like the pooled water fund in Kenya. These studies also demonstrate how market-led logics in financialisation lead private actors to cherry-pick their consumers and projects based on profitability. This ultimately results in the proliferation of inequalities in water access across the Global South and the Global North cities. The following section will briefly illustrate the particular form of infrastructure financialisation in Indonesia, demonstrating how the state expands its power to achieve developmental goals by selectively appropriating market principles. More details about how this strategy is adopted in the water sector will be provided in Chapters 5 and 6 of this thesis.

2.3.2. The "local wisdom" that works:[7] variegated and path-dependent infrastructure financialisation in Indonesia

The global expansion of PPP and the financialisation of development, like earlier neoliberal policies, unfold through variegated and path-dependent processes that reflect local conditions and power structures (Peck et al., 2009; Sheppard et al., 2013). Indonesia exemplifies this contextualised adaptation, where market-based infrastructure procurement strategies are selectively adopted and reconfigured in line with the national development agenda and the interests of political elites (Meckelburg & Wardana, 2024; Warburton, 2016). Scholarly work on Indonesia's political economy of infrastructure shows that, despite the Indonesian marketised approach to infrastructure development via PPP, the state still seeks to exert its power and fiscal capacity by directly appointing its state-owned enterprises (SOEs) to undertake high-risk projects (Anguelov, 2024; Wijaya & Camba, 2023). Particularly since Joko Widodo's presidency (2014-2024), SOEs have assumed central roles in constructing, financing, and guaranteeing infrastructure projects. The state has been able to expand infrastructure significantly by shifting its debt to SOEs' accounts, especially as, under the public financing law (issued post-Asian Financial Crisis), the government has a 3% deficit cap relative to GDP to ensure fiscal stability (ADB, 2022; Ginting, 2003). Anguelov (2023) describes this arrangement as a 'public-public partnership', in which infrastructure projects are contracted between government agencies and SOEs, often through direct appointment by the national government rather than through competitive procurement.

Indonesia's approach to infrastructure development reflects a broader phenomenon that scholars have labelled new state capitalism, in which the state assumes an expansive role not only in developing but also in speculating on public infrastructure through its investments (Alami & Dixon, 2023). Schindler et al. (2023) describe how the de-risking agenda allows the state to fuel its developmentalist goals and expand its role by attracting and guaranteeing private investment (see also Gabor, 2021; Gabor & Sylla, 2023). This expansion of state power manifests through the ideology, planning, and policy formulation of economic nationalism, as well as through state-capital hybrids, including the expansion of SOEs and sovereign wealth funds (Alami et al., 2021; Whiteside et al., 2023). The allocation of state budgets to these hybrid entities fuels the state's ambition for capital accumulation while simultaneously catalysing infrastructure development, especially as many infrastructures in the Global South lack commercial bankability to attract private-sector investment (Bigger & Webber, 2021; Mawdsley, 2018b; Wijaya & Camba, 2023). However, as many scholars have suggested, the increasing role of the state does not signify a return to the welfare state nor a complete dissociation from the neoliberal regime. Instead, the mobilisation of SOEs and sovereign wealth funds signifies the state's strategy for attracting private investment into public infrastructure by reformulating state-capital relations and extending ongoing neoliberal institutional restructuring (Alami et al., 2024; Cumbers & Paul, 2022; Sheppard & Leitner, 2010). Therefore, despite the state's active role in developing infrastructure, profit motives still animate infrastructure development and operation more than public service delivery.

[7] Interview with Infrastructure Finance at the Ministry of Public Works, May 2023, Jakarta, suggesting the adoption of PPP with increasing state power and the direct appointment of SOEs as the kind of strategies that work for infrastructure financing in Indonesia

In Indonesia, while the strategy to mobilise SOEs appears to be successful in accelerating infrastructure development (and secured Joko Widodo's re-election for a second term), scholars have raised concerns about the limitations of this de-risking regime through SOEs investment, which has proven to destabilise the process of financialising infrastructure projects. Anguelov (2024) shows how unresolved issues, such as complex land tenure regimes (see also Davidson, 2016; Salim & Dharma Negara, 2018), institutional fragmentation, bureaucratic cultures, and a lack of interest in undertaking PPP, pose a limit to the financialisation of infrastructure in Indonesia. Undertaking infrastructure projects at a massive scale exposes SOEs and their shareholders, including the Indonesian government, to long-term liabilities, especially when the projects fail to deliver promised returns (Agustin et al., 2025; Negara & Prasetyantoko, 2023).

Meanwhile, politically, SOEs themselves are often associated with corruption and nepotism, following the practice of the then-President Soeharto, who gave his children control over SOEs (Davidson, 2021). These relations between politicians and oligarchs in infrastructure development persist even after the fall of Soeharto's regime (Hadiz & Robison, 2013). For instance, in his analysis of Jakarta's rail transportation, Anguelov demonstrates how PPP operates through the strategic empowerment of SOEs, facilitated by informal networks linking the SOEs to political elites. A similar case is demonstrated by Wijaya (2024) in the context of the Jakarta-Bandung high-speed railway project, where, despite questionable financial feasibility, the project proceeded through a cultivated relationship between investors and political elites. Corruption and nepotism have led to economic mismanagement and poor performance in the SOEs, undermining their capacity to develop and operate infrastructure projects (ADB, 2022; Kim, 2021). This illustrates an institutional limit to infrastructure financialisation in Indonesia, which is path-dependent and contingent on relations between elites and politicians.

In the water sector, the limits to financialisation also stem from the fragmentation of water-related institutions. As Bakker (2010) suggests, the national government oversees water resource management, while local governments and utility companies (local government-owned SOEs) undertake water supply projects. This creates difficulties for some regions, such as Jakarta, which must reach agreements with neighbouring areas to secure water sources from beyond their administrative boundaries (World Bank, 2021b). Meanwhile, these regions lack control over the sources of externalities (polluting industries), resulting in high costs to treat and purify the water. In addition to the fragmented institutions, utility companies are also largely unbankable, with low revenue generation stemming from low water tariffs, increasing the risk of payment default for private actors (OECD, 2023). Moreover, despite utilities' poor performance in water delivery, the public is also wary of the private sector's involvement in water services (Marwa, 2024; Zamzami & Ardhianie, 2015), thereby exposing private investors to political risks of nationalisation. Finally, institutional fragmentation, the unbankability of utilities, and resistance to privatisation constitute the institutional limits to water infrastructure financialisation, producing a contingent and contested rather than a smooth rollout of water infrastructure financialisation in Indonesia.

2.4. The urban political ecology of water infrastructure financialisation

This section will add to existing scholarly work on water infrastructure financialisation by engaging with an urban political ecology lens on water access, addressing Christophers and Castree's (2015) call to examine the ecological context that enables and is shaped by the increasing financial relations underpinning infrastructure provision. As Althouse and Svartzman (2022) suggest of financialisation as a global socioecological regime, financialisation operates through the abstraction, commodification, and trading of nature in its liquid forms (i.e. conservation rights or water license), while also often producing uneven ecological impact, particularly in the Global South, where resources are extracted. Here, I position Global South cities not merely as the 'extraction' sites of nature and labour, but also as sites where financial accumulation is actively produced, through the provision of water infrastructure. The Global South context is essential, given that cities in the Global South simultaneously serve as sites of experimentation to address capitalist-produced environmental crisis and as sites for capital accumulation (Bigger & Webber, 2021). At the same time, financial actors are often the last resort to which nation-states turn to address socioenvironmental crises paradoxically produced by capitalist exploitation of nature (Bernards, 2024; Castree, 2008). At the intersection of urban political ecology, financialisation, and the state-capital nexus in Global South cities, this section will first interrogate the literature on the political ecology of financialisation and, second, the urban political ecology of water access in Global South contexts to help frame the topic of water infrastructure financialisation in Jakarta. In what follows, I include literature about how socioecological risks proliferate under capitalist accumulation and how nature embodies risks that destabilise financialisation.

2.4.1. The socioecological risk of financialisation

Using the urban political ecology lens, scholars in geography have discussed the socioecological relations produced by and productive of the increasing financial logics of the economy. As O'Neill (2019) argues, financialisation is determined by material and labour flows in cities (such as energy, water, and traffic) and, in turn, the operation of infrastructure remakes these flows to ensure revenue generation for the financiers. For instance, Christophers' (2018a) research on the issuance of green bonds for sewerage improvement in Washington D.C. suggests that financialised mechanisms, initially intended to expand the capital needed to develop infrastructure, result instead in unresolved pollution and rising consumer fees to cover debt obligations. In his other study, Christophers (2023) also explores how investors in Thames Water generate profit from debt refinancing and trading, while leaving the utilities underfinanced to extend and repair existing water networks and to mitigate sludge disposal in the river (see also Bayliss, et al., 2023; Loftus & March, 2019). Meanwhile, Bigger and Millington's (2020) study in Cape Town elucidates that the issuance of green bonds leads to water rationing, affecting the urban poor living in informal settlements, who often have larger household sizes to accommodate renters. These studies ultimately show how the financialisation of water infrastructure directly affects the flow of water, determining to whom profit goes and who bears the costs of financialisation.

Other bodies of literature suggest that the impact of speculative finance on water access reverberates through interconnected urban systems. For instance, Goldman & Narayan (2019) and Ranganathan (2015) exemplify how a speculative real estate project in Bangalore, known for its prominence in global real estate and tech industries, drives demand for reclaiming land from lakes that historically served as

the city's primary water sources. Bangalore's emergence as a global tech hub depends on attracting international capital, which simultaneously destroys the ecological conditions necessary for the reproduction of that capital. As a consequence, Bangalore's urban residents continue to rely on off-grid water suppliers, such as water tankers, which are controlled by local mafias that also broker land to investors (Ranganathan, 2014). Colven's (2022) study in Jakarta also shows that chronic flooding, partially caused by land subsidence and groundwater extraction by the real estate industry, has undermined the sustainability of real estate projects. These studies illustrate how financialisation (of land and water infrastructure) links capital accumulation, transformations of urban/natural landscapes, and configurations of local power, producing both structural and environmental effects. Capitalist accumulation through financialisation proliferates social and environmental risks, even for communities that are less able to mitigate and adapt to them.

2.4.2. Financialising unruly nature

Scholarly work in economic geography has discussed how nature is inherent to capitalist production. McCarthy and Prudham (2004) suggest that neoliberalism is an environmental project: the quest to discipline nature (such as land or water) and unlock its value has been a central concern of liberal economic ideology. Nature traditionally signifies the object through which use value is derived by human labour (such as wheat turned into bread). But increasingly, as Smith (2007) suggests, nature is becoming the site where exchange value is abstracted from (as in carbon- or weather-based financial product), alienated from its social relations, and turned into a commodity. Castree (2003) elaborates on how the commodification of nature unfolds through the establishment of a property regime over specific nature, the alienation and abstraction of nature from social relations, and the valuation of nature, which enables its exchange as a distinct commodity in capitalist relations. For instance, the emergence of wetland credits (Robertson, 2006) or the trade of fisheries right (Mansfield, 2004) is emblematic of how the erratic characters of nature – the diversity of plants in wetlands or the mobility of fish in oceans – must be disciplined and selectively represented as what is legible for capital, turning wetlands and fish into saleable credits with distinct owners to allow wetland conversion and mass fisheries. In other words, commodification provides "the conditions for goods and services to be captured by the logic of market" (McDonalds and Ruiters 2005: 23), as natural resources like wetland and fish are exploited according to their highest exchange-value.

In this vein, scholars in economic geography have documented a wide range of nature being commodified and governed according to neoliberal principles of privatisation, marketisation, and financialisation, including water. However, scholars have shown the difficulties of turning water into a commodity; as Bakker (2004, 2010) suggests, water is an uncooperative commodity. Water's constant movement in, on, and above the ground makes delineating property and ownership over water difficult. Its hydrological characteristics make it prone to externalities (such as pollution) and other climate and environmental factors; therefore, it is hard to 'market-discipline' its quantity and quality (Williams, 2018), even when it is contained (e.g., in a dam or WTP). At the same time, containing, treating, and transporting water are geographically challenging and costly due to water's bulk and weight. Dams, WTP, and pipes are technically fixed assets that cannot be repurposed, incurring high sunk costs for

investment in water projects (not to mention the land acquisition and other precluded costs). Therefore, mobilising water on a large scale and recovering the associated costs would be economically viable only under a single, monopolistic entity that determines the water price, reflective of the infrastructure and operational costs.

Meanwhile, water is a basic need. Tariff decisions become a contested arena for debating water's importance as a public good (with a controlled tariff) versus water as a commodity that should reflect its real production and distribution costs. This view is shared by The Global Commission on the Economics of Water (2024), which suggests that water has been underpriced; water tariffs do not reflect the social and environmental costs associated with maintaining the natural hydrological cycle. While the Commission's ecological concern supports neoliberal measures to increase water tariffs to make water infrastructure an attractive proposition for private actors, they do not deny that water itself remains "only partially responsive to the market" (McDonald & Ruiters, 2005: 20) or, as Castree formulates, its biophysical material "resists complete commodification"(Castree, 2003: 285).

Given its high sunk costs and long payback period, the water sector is perceived as high-risk by private investors. This aligns with the views of scholars and numerous reports on the privatisation of water services, which show that private project developers failed to secure the financing necessary to extend water infrastructure (Bakker, 2013b; Marin, 2009). Since its inception in the 1990s, private investment in the water sector has not increased substantially, despite more recent schemes, such as blended finance for PPP, being in place (Reis et al., 2024). On the other hand, Bayliss reports the increasing interest in the financialisation of water where "what is traded speculatively is not units of water but shares in companies engaged in water-related activities" (Bayliss, 2014: 302). Water licenses and the shares of water companies are more liquid (such as through exchange-traded funds) rather than direct investment in water or water infrastructures, which remains muddied by the uncooperative nature of water.

To sum, the two subsections here outline how financialisation produces socioecological risks, and conversely, how nature itself poses risks and limits to its financialisation. The following section will explore the literature on urban political ecology of water access in the Global South, before concluding with how to apply this lens to the financialisation of water access in Global South cities.

2.4.3. Fragmented water access in Global South cities: opportunities for and limits to financialisation

In Global South cities, water provision has long been a combination of public and private actors, even before the period of structural adjustment. Small-scale, local private actors had long filled in the gaps in water access beyond public infrastructure, forming what Bakker (2003) terms an archipelago of water networks. The archipelagos demonstrate interconnected modes of water access: a patchwork of formal networks, informal vendors, community-based systems, and self-provisioning strategies, rather than a singular and centralised water system. Kooy and Bakker's studies (2008a, 2008b) about Jakarta's postcolonial water regime demonstrate how Dutch colonial governance developed water infrastructures exclusively to serve European quarters, while purposively leaving the locals with polluted surface or groundwater (see also P. W. Putri, 2019; McFarlane, 2008, for a similar argument about Mumbai). The

racial discrimination inscribed in water access manifests in both the material infrastructure and the volumes of water distributed. Water allocation was unequal, as European settlements received more water than the (few connected, elite) locals, and the disconnected locals were forced to use a combination of water sources, such as pipes, hydrants, and surface water (Bakker et al., 2008).

In postcolonial, Southern urban contexts, water infrastructures are characterised as heterogeneous (Lawhon et al., 2018) with multiple networked and non-networked ways of accessing basic services (Furlong, 2014; Furlong & Kooy, 2017). These combinations of on and off-grid infrastructures have been central to scholarship in urban political ecology, which has attended to the capacities of non-human actors such as dams, pipes, water taps, and barrels, and demonstrated their constitution with power relations. Infrastructures are "objects-in-themselves [and] wellsprings of power" (Meehan, 2014:216). For instance, Meehan (2014) traced how household water infrastructure, such as barrels and cisterns, enables residents in Tijuana to access water outside state jurisdictions. In São Paulo, Millington (2018a) described everyday infrastructures of storage as adaptive tools of managing water. The combination of networked and non-networked infrastructures demonstrates how the provisional status of Southern networked infrastructures produces some openness for reworking water access (Guma, 2022, 2025). The productive-of-power things, like barrels and cisterns, allow residents to control and be flexible amidst a dwindling piped water supply. These infrastructures are more adaptable for urban residents than centralised, heavily engineered pipe systems. These techno-political dynamics elucidate how the urbanisation of water emerges not through centralised control of infrastructure provision, but through continuous negotiation of access mediated by hybrid networks of human and non-human actors.

However, this heterogeneity of infrastructures is also emblematic of how water access is deeply contingent, unequal, and relational across the city. For instance, Truelove (2018, 2021) reports that in Delhi, urban dwellers with connections to local patrons could have their pipe networks extended into their neighbourhoods or have their illegal water access ignored. This leaves large tracts of the networked infrastructure and the actual water supply and demand undocumented in master plans, making it difficult for the state to allocate water to different urban communities effectively. Furlong and Kooy (2017) report a similar finding in Jakarta, where large-scale groundwater extraction by well-off households and commercial entities in South Jakarta hinders the expansion of piped water services to informal settlements in the North. The disconnection of 'key account' users embodies potential loss for the utility's revenues, which prevents it from extending water service to the urban poor. These examples demonstrate how extending pipe networks in Global South cities is contingent on socio-political and ecological relations.

The fact that Global South cities lack reliable and equal access to water presents an opportunity for private actors to "do good while doing business" (Bakker, 2010:78). However, to speculate on future revenue, financialisation requires mitigating water-related risks, including inconsistent supply and insufficient demand. As Bayliss and Fine (2008) argue about water privatisation in the 1990s in Global South cities, it was too premature to ask private actors to invest without pre-existing infrastructure. The lack of networked infrastructure *and* the diverse means of accessing water in Global South cities, from groundwater, rain harvesting with barrels, or bottled water, limits attempts to attract private finance into infrastructure. Moreover, as Truelove (2018) demonstrates, in many Global South cities, precise

calculations of water supply and demand are absent, thereby rendering project risks incomprehensible to the state and private actors (see also Bayliss & Deekshit, 2024). With high pipe leakages and limited fiscal capacity to monitor and repair the existing networks (Anand, 2015; Björkman, 2015; De Coss-Corzo, 2025), utilities are also constantly deprived of revenues to repay private investment. Thus, financialisation in Global South cities is constrained by infrastructural and institutional conditions, posing financial risks to private investment.

Although governments in Global South cities adopt measures to remove these risks for private actors (see Heckel, 2023; Van Oppenraaij et al., 2022; Williams, 2021, for example, in Kenya), this does not guarantee that financialisation unfolds without frictions or materialises in equal water access. Given the material and socioecological barriers to financialisation that I have explored in the previous section and will demonstrate in the following chapters, the financialisation of water infrastructure will remain unstable and contested. Accordingly, it is essential to interrogate financialisation as contingent rather than inevitable or fixed, requiring state and private actors to continuously reconfigure the socionatures – water, institutions, politics, and infrastructures – to stabilise financialisation.

2.5. Conclusion

This chapter has outlined the theoretical foundations for analysing the financialisation of water infrastructure in the context of splintered water access in Global South cities. In doing so, the chapter developed an analytical approach to understand the institutional, political, infrastructural, and ecological processes and relations that animate, shape, and limit the flow of finance into water infrastructures in Global South cities. The contribution of this chapter is twofold. First, it contributes to understanding how water governance is increasingly entangled in financial relations that are actively preconditioned and sustained by a network of multilateral development banks, experts, and state actors. I evidenced this by drawing on scholarly works on infrastructure financialisation in Indonesia through PPP and the activation of SOEs, including state-owned commercial banks, development banks, and underwriting agencies, to undertake high-risk infrastructure projects (Anguelov, 2023; Wijaya & Camba, 2023). However, critically, these studies also suggest the limit of financialisation: PPP and the activation of SOEs expose the state to long-term liabilities and financial risks, which are then passed on to citizens through increased taxes and water tariffs.

Second, by borrowing the urban political ecology lens, this chapter contributes to unpacking how financialisation is (un)shaped by the socioecological complex in Southern cities. In the Global South cities, finance navigates through the archipelagos of networked and non-networked infrastructures, shaped by the colonial legacy of water discrimination (Kooy & Bakker, 2008a; McFarlane, 2008) and decades of underinvestment (De Coss-Corzo, 2025), resulting in fragmented water access and leaky networks which render water flows illegible for finance. While this has become the crisis that provides a rationale for the expansion of water services and their privatised mode of delivery in the Global South cities, these infrastructural and ecological barriers also constitute the limit of financialisation.

By synthesising the above literature, I conclude on some "conceptual vectors" (Millington & Lawhon, 2019) for my analysis: the institutional, infrastructural, and ecological enablers and limits to financialisation. These nodes offer a nuanced reading of the relations between financialisation, infrastructure, and nature in Jakarta's water supply provision. For this thesis, mobilising these conceptual vectors means understanding the relentless attempts of different actors (state actors, development bank, consultants) to align the unruliness of water with finance (Chapter 4), as well as to mitigate and manage the risks entailed in water infrastructure financialisation (Chapters 5-6). Simultaneously, this also means being attentive to multiple overflows that disrupt the seemingly coherent process of financialisation. This proposes a view of financialisation from the 'outside' or the "raggedy fringes" (Sheppard, 2019) that emerges not only as an impact (Chapter 7), but also as actively (un)shaping financialisation itself (Chapter 8).

This conceptual vector helps understand the messy workings of financialisation, which requires constant efforts of the state to backstop private returns, while socialising the risks to taxpayers and water users. Therefore, beyond its theoretical contribution, this chapter is written with a political message: it serves as a reminder of the risks of sustaining the privatisation and commercialisation of water services – the same tools which have failed to deliver equal water access in the past. The following chapter will illustrate how I mobilise these conceptual vectors by employing the 'metabolic lens' (McFarlane, 2013) as methodology and methods to examine the metabolisms of financialisation.

Chapter 3. Methodology

3.1. Introduction: The metabolic lens

While Chapter 2 conceptualised financialisation through an urban political ecology lens as a theoretical framework for this thesis, this chapter outlines the 'metabolic lens' (McFarlane, 2013) to operationalise this framework. Urban metabolism has been a key metaphor in urban political ecology, indexing how the flows of labour, materials, and resources into, out of, and through the city shape urbanisation (Gandy, 2004; Swyngedouw, 2006). Researching the financialisation of water infrastructure through a metabolic lens requires charting through the actors, institutions, infrastructure, and capital that produce the geographies of water access. This includes attending to "critical connections across nature, political economy, and space (urban and rural)" (McFarlane, 2013:499), tracing through different sites and processes where water is abstracted, channelled, and bypassed, as well as the sites where the ideas and planning about water provision are conceived and brought into being. This requires an all-encompassing scope of examining "process geographies and wherever they lead" (McFarlane, ibid: 500). Here, I offer a slice of the metabolic relational whole by exploring the socionatural connections of Jakarta's recently inaugurated water supply projects: Jatiluhur, Karian Serpong, Djuanda, and Jakarta's 'bundling scheme' projects. These projects serve as the entry points into understanding the complex intertwining of water and capital flows into, through, and out of Jakarta.

Employing the metabolic lens led me to different processes in which various actors (the government, private actors, and their consultants) attempt to plan, model, and analyse Jakarta's water infrastructure to make it appear financially feasible. Following Cousins (2017), I extend the metabolic lens beyond material flows to encompass the technopolitical practices of governing these flows. As such, I attended training sessions on Public-Private Partnerships (PPP), where consultants learned how to conduct market surveys and build financial models, as well as events where development bankers formulated strategies to make water more attractive to finance. I analysed documents such as master plans and project feasibility studies to understand how these actors narrate the water crisis, how unruly water becomes calculable and governable, and how water infrastructure projects become investable. I used these meetings and documents as an entry point into comprehending how financial logics reorganise the flow of and access to water in Jakarta.

The financialisation of water infrastructure embodies "a politics that values particular metabolisms over others" (McFarlane, ibid: 499), justifying connections and disconnections of water access, land dispossession and accumulation across urban and rural areas. Researching financialisation through the metabolic lens leads me to the sites and processes of land dispossession beyond Jakarta's edges: in Sajira, Lebak (for the Karian dam), and in East Bekasi, West Java (for the Jatiluhur project's water treatment plant, or WTP). As Goldman (2023:370) writes: "Although I started in the water agency and its citywide water tanks, pipes, and channels, my field site slid into the murky world of land deals. Whenever talking about water, people of all backgrounds spoke of land grabs and speculation." Like Goldman, tracing the metabolic flow of water in Jakarta expanded my fieldwork to include urban and

rural communities, examining land acquisition, displacement, appraisal, and the contestation surrounding these processes. I also explored sites where inequalities of access are evident, such as in North Jakarta, where communities struggle to connect to the citywide network through temporary water kiosks, cisterns, and 'informal' pipes. By interrogating displacement and disconnection in urban and rural areas, I illustrate how the financialisation of water infrastructure operates not only by facilitating the flow of water and capital, but also by reorganising the social lives of urban and rural communities who may never directly benefit from the water supply projects.

Last, I charted through the "interpenetrating circulations of water" (Swyngedouw, 1996:76) and the "socioecological connections" of water access in Jakarta (Furlong & Kooy, 2017). I examined urban and rural areas where non-networked water extraction and production occur, highlighting the variegated water resources people rely on in Jakarta. I explored the sites where bottled water companies and tankers extract groundwater or purchase water from utilities in the southern part of Jakarta, revealing the unaccounted-for and undisciplined spillovers of water – water flowing through non-networked infrastructure – under the financialised regime. This elucidates the contradictions on which financialisation is built, producing arbitrary and unstable outcomes in the attempt to achieve universal water access in the city.

Ultimately, exploring water infrastructure financialisation through the metabolic lens enables us to analyse the interwoven flows of capital and water. It brings together the technopolitical regimes of calculating and governing water and infrastructure, with realities of capital accumulation and dispossession, water access and disconnection, foregrounding the inequalities and contradictions that inhibit financialisation. The following section examines the methods of data collection and site selection used in this research.

3.2. Research design and methods

Drawing on the methodology of a metabolic lens, I employ a "follow the things" (see Christophers, 2011) approach to navigate across sites and institutions where water infrastructures are devised, governed, and turned into an investible proposition. In doing so, I operationalise my research questions through grounded research, conducting fieldwork at multiple sites, and employing a combination of data collection methods.

3.2.1. Research sites

I gathered data in three rounds of fieldwork in and around Jakarta. The first preliminary fieldwork, conducted between November and December 2022, aimed to narrow down potential research sites and secure research access. The second and third rounds were conducted in May-June and August-September 2023, with a more specific goal of understanding the financialisation of Jakarta's water supply projects. I use Jakarta's water supply projects: Jatiluhur, Karian-Serpong, Djuanda, and Jakarta's bundling scheme as an entry point to identify potential research sites. I conducted multi-sited observations in urban and rural areas, tracking where these projects are devised and pipelined into an investable

proposition, where the water originates and flows into, and where the frictions in this process are revealed.

There are four main research sites or 'nodes' in this research (see Figure 3.1): the financial and bureaucratic 'centres' in Jakarta, the off-taking utilities in Greater Jakarta, the displaced and disconnected communities in East Bekasi (Bekasi City, West Java), Sajira (Lebak Regency, Banten), and Muara Angke (North Jakarta), and the bottled water and tanker industries in Jakarta and Bogor Regency (West Java). First, I explored the making of Jakarta's water supply PPP projects by national governments, private actors, consultants, and banks, all located in Jakarta's business centres and government offices. This site is key to the planning and design of the infrastructure project, to the calculation, valuation, and mitigation of risks, and to governing the flow of water to align with financial logic.

Second, I studied the off-takers to the water supply projects, utility companies and local governments, in Greater Jakarta, including PAM Jaya (Jakarta), PDAM Tirta Benteng (Tangerang City), PT Pembangunan Investasi Tangerang Selatan (PT PITS, South Tangerang City), and PDAM Tirta Patriot (Bekasi City).[8] In this node, I explored how local bureaucrats bridge, facilitate, and navigate water supply infrastructures that were implemented as top-down projects, while also strategising to build water connections to customers.

Third, my research sites also included sites where displacement and disconnection from the financialised infrastructure project unfold. I explored rural and suburban villages where infrastructure projects are being developed, such as those around Karian Dam (Lebak Regency, Banten) and urban *kampung* in East Bekasi (Bekasi City, West Java), where the Jatiluhur project's WTP is located. I visited the communities that stayed and waited for their compensation payments in the old villages, as well as those that had already been displaced and had built new settlements. I also explored communities that remain disconnected from piped water networks, such as those in Muara Angke, North Jakarta, to understand their political and infrastructural strategies to connect to the citywide system.

Last, I investigated the sites of water 'spillovers' from the financialised infrastructure projects, including the agglomeration of water tankers and bottled water industries around Babakan Madang, Bogor Regency. I traced the source of their water in Bogor and back to Jakarta, where they purchase bulk water from the utilities.

[8] These regions, Jakarta, Bekasi city, Tangerang city, and South Tangerang city, are where the water supply projects will operate, in addition to other regions such as Bekasi regency, Karawang regency, and Bogor regency.

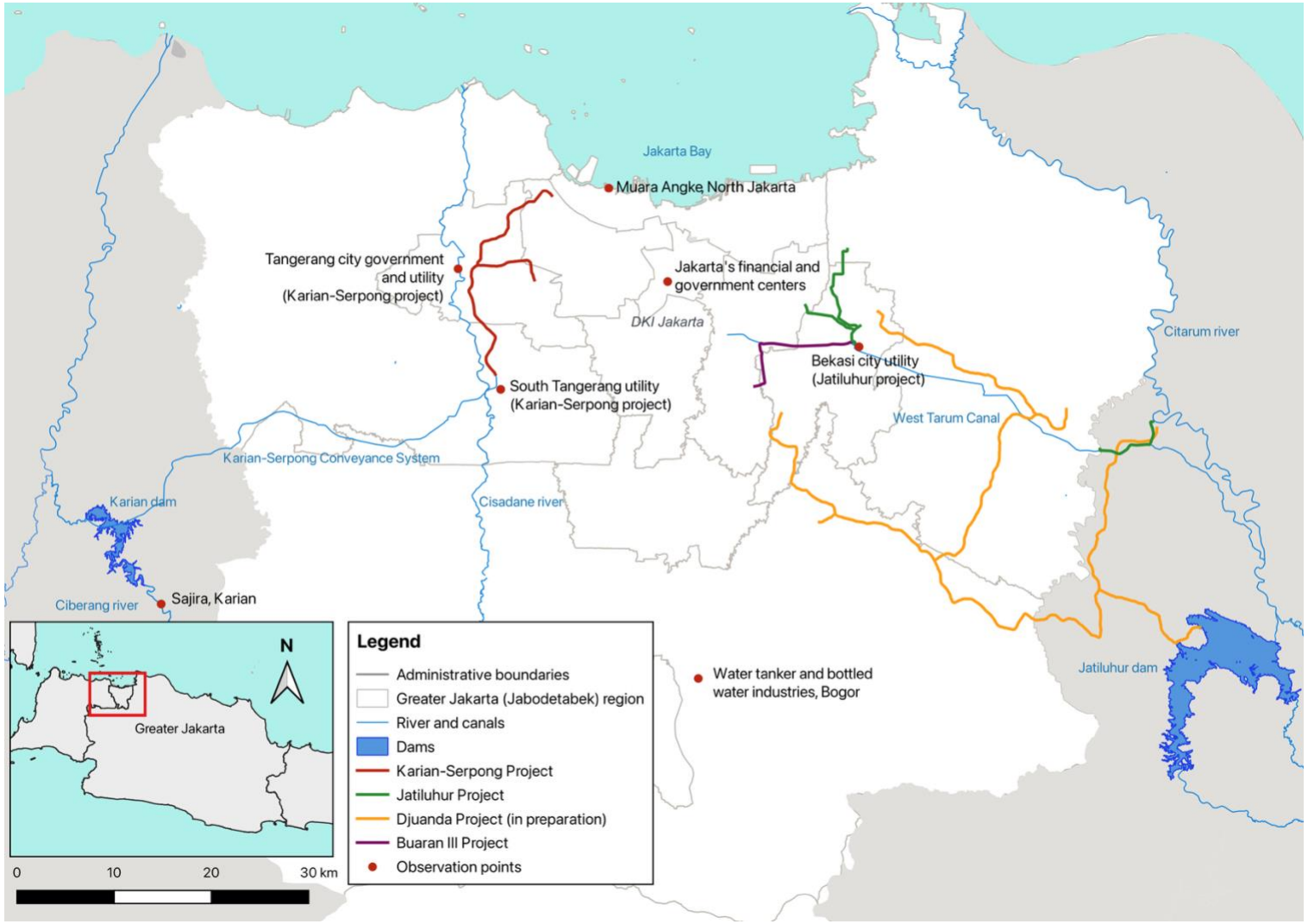

Figure 3.1 Selected research sites (map by author)

3.2.2. Methods of data collection

The research for this thesis was conducted with approval from the University of Sydney Human Research Ethics Committee (HREC 2022-591). Despite cross-provincial research typically requiring a permit from the Ministry of Home Affairs, government-funded research is exempted from this process. Therefore, as the Indonesian government sponsors my study, I submitted my research permit application directly to government offices and local communities (such as Kelurahan or Kecamatan offices).

My data includes secondary data, such as policy documents, government and company reports, donor reports, feasibility studies, previously published research, and news articles, to familiarise myself with the existing policies and regulations before conducting interviews or observations. I triangulated secondary data through observation (in events and field sites) and in-depth interviews with different groups of actors.

During the early stages of my fieldwork, Indonesia was preparing to host the World Water Forum in 2024. This timing enabled me to attend seminars and stakeholder meetings on "creative and innovative financing"[9] for water infrastructure, both online and offline, which were held as side events to the World Water Forum (see Figure 3.2). The World Water Forum is organised by the World Water Council, a think tank that advocates for private-sector participation in the water sector (see Goldman, 2007). Water infrastructure financing was among the most crucial topics discussed in the event series. In addition to the World Water Forum, the Indonesian stakeholders also held frequent public meetings about water infrastructure financing, such as the Indonesia Water and Wastewater Forum and Expo (by the association of Indonesian water utilities or PERPAMSI), Indonesia Infrastructure Roundtable (by the Indonesia Infrastructure Guarantee Fund), and Creative Infrastructure Financing Day (by the Ministry of Public Works and Housing).

[9] These concepts were numerously mentioned by my interlocutors and widely used in seminars, including the annual meetings held by the Directorate of Infrastructure Financing of the Ministry of Public Works and Housing called CREATIFF – creative and innovative infrastructure financing

Figure 3.2 Observation at stakeholder meeting around private financing in water infrastructure

Conducting 'event ethnography' (Koch, 2023) enabled me to interrogate the overarching discourses and the strategies of different actors in infrastructure financing, as well as reflect on the embedded power relations between the state and private actors through their language and gestures. Attending seminars in person also enabled me to introduce my research to various stakeholders and to make direct interview requests. Sometimes, my interlocutors would inform me about another event to attend. I also used social media platforms such as Instagram and LinkedIn, following accounts from various government

agencies, infrastructure companies, and banks to stay informed about upcoming events relevant to my research. Many of these seminars are recorded and made available on YouTube (as webinars). These recordings are also an essential source of data and observation for my research, even though I was not present at the event. When observing these events, I focused on the discourse around infrastructure financing articulated by the speakers. I took notes during the events and, when possible, requested the presentation files afterwards. Appendix A, attached to this thesis, lists the observed in-person and online events during the research.

Second, I conducted semi-structured and in-depth interviews with different groups of actors (Table 3.1; Figure 3.3). I scouted my interlocutors primarily by sending letters of request, either through the government's website or directly to the officials' email addresses when available. My requests were addressed to top-hierarchy officials, but were mainly responded to by mid-level or junior bureaucrats, or sometimes mid-level officials joined the interview together with their supervisor. Interviewing mid-level bureaucrats is crucial because they conduct the technical work of surveying, analysing documents and permits: the actual work of making water infrastructure investable. In addition to formal requests, I also approached my interlocutors at seminars to request interview opportunities. My professional background as an urban planner also enables access to the public infrastructure and planning sector. Although my professional networks also include the banking sector, I find that this group is the most challenging to interview. When possible, I also requested referrals from one interviewee to another.

Table 3.1 Group and number of interviews

Interview group	**Number of interviews***
National government	21**
Local government	4
Utility companies	7
Project developer/water company	8
Financiers	4
Development consultants	11
Engineers	3
Water tanker businesses	11
Real estate developers	2
Non-Governmental Organisations	2
Community members	
a) Margahayu, East Bekasi, Bekasi City	4
b) Sajira, Lebak Regency	6
c) Muara Angke, North Jakarta	4
d) Pegadungan	3

* This includes repeated interviews with the same interlocutor

** This includes government bodies and quasi-public-private SMVs under the Ministry of Finance

Figure 3.3 Interview with a group of government officials

I used a formal procedure for conducting observations and interviews at the community level, which begins by addressing my permit letter to the local authorities, *Rukun Tetangga/Rukun Warga* (neighborhood units, or RT/RW), or Kelurahan level. These local leaders generously introduced me to the residents, sometimes calling them directly to ask if they were at home so I could visit. Some of the RT leaders took me to walk around their neighbourhoods to explain their *kampung* (Figure 3.4). At other times, I would visit again by hanging out at a *warung*, a local snack shop, and have a conversation over tea and snacks with the residents. Most communities, both rural and urban, were very welcoming to visitors and willing to share their experiences. While sitting at the *warung* or during interviews, I would observe what was happening in the *kampung* or villages, watching as an excavator flattened land to build a new settlement for the displaced communities, and observing as a water tanker arrived and filled the water storage in the *kampung*.

Figure 3.4 Pak RT and half-built mosque in Kampung Baru Ciberang, Sajira, Lebak Regency

Given my limited fieldwork time in Jakarta, I prioritised attending events, conducting site observations, and interviewing local communities, as most elite interviews can be conducted online from Sydney. Even when I was in Jakarta, some of my interlocutors, mostly government officials, requested an online meeting. My interlocutors often preferred online interviews because they offered flexibility with their schedules. Online meetings ultimately made up 19 out of the total 73 elite interviews.

Each interview group required a unique set of questions (see Appendix B). With the first group of actors, the elite group (government officials, investors, and consultants), my questions focused on water infrastructure problems, including how they understand the state of the water crisis and water infrastructure in Jakarta, and to what extent efforts have been made to address the issues. I found it helpful to learn about the programs through their reports or by watching their recorded presentations on YouTube before the interviews, and to connect their programs to my research questions. Specifically, I asked the national government officials and private actors (as the parties engaged in the PPP contract) about the infrastructure financing schemes, such as to what extent they view water infrastructure projects as investible, what is required to make water infrastructure projects financially feasible, and what the challenges are to that process. In more detailed, technical terms, I also asked how risks are valued and calculated.

However, I still face limitations in understanding the actual valuation of risks and their impact on determining the project's financial viability. This is partially due to the inaccessibility of documents such as feasibility studies and partnership contracts, despite the word ‘public’ in PPP (see Rogers & Gibson, 2021). This is challenging for my research on financialisation, as one of my interlocutors asked me, “How do you learn about risk allocation when you do not see the contract itself?”[10] When particular

[10] Interview with Jakarta Legal Aid, April 2025

documents were unavailable, I learn from the 'template', which is replicated as a model in planning and feasibility studies (Global Infrastructure Hub & Allen & Overy, 2019; IIGF, 2022). Observing the PPP training also helped me understand the technicalities of conducting surveys, analysing data, and allocating risks, as well as how these methods are used to justify private sector involvement. At times, consultants would share their experience in analysing and developing feasibility studies for government projects. Therefore, I used these interviews to complement unavailable secondary data.

With the local governments in Greater Jakarta, the off-taker for the water supply project, I asked questions about their strategies for extending pipe networks to customers and mitigating the interface risks. These different cities have their own authorities and existing water infrastructure projects with financing schemes in place before the PPP projects (World Bank, 2021b). While it is essential to study these suburban areas through their own historical trajectories, as well as the institutional, infrastructural, and ecological configurations in water provision beyond the Jakarta-centred lens (see Robinson, 2006), the scope of my research was limited to observing the water supply projects through and for Jakarta, positioning the suburban sites somewhat peripheral to this process.

I took notes of my interview and observations to supplement my recordings. However, not all of my interviews were recorded, either at the interviewee's request or because I decided not to make the conversation awkward with recording tools. My research participants either signed the consent form or verbally consented to the interviews. Unless they expressly allowed it, the identities of my research participants have been anonymised. Speakers at seminars, both online and offline, are not anonymised due to the public nature of the events. Recorded interviews were transcribed in their original versions (primarily in Indonesian) and then translated into English.

I analysed my primary and secondary data qualitatively by mapping themes across the data. The themes I coded include: 'the narratives of crises', which necessitate the building and financing of water infrastructure in Jakarta; 'infrastructure financialisation', which consists of the institutional, regulatory, and infrastructural configuration that the state and private actors devise into a sophisticated architecture of water governance under PPP; 'the impact' of water infrastructure projects across urban and rural communities; and 'the spillovers' of water in and out of the city, which cannot be counted, controlled, or governed by financialisation. Each of these themes is developed into arguments in the following chapters.

My data originates from a broad geographical context encompassing both urban and rural areas, as well as various infrastructure projects. These sites and projects need to be discussed together rather than treated as siloed cases, to identify their connections, similarities, and contradictions (Leitner & Sheppard, 2020). As such, I examined the connections among different water supply projects rather than treating each as a distinct case. For instance, the Jatiluhur and Karian-Serpong projects (discussed in Chapter 5) are emblematic of the first model of regional-scale PPP: unbundled WTP with a single government contracting agency. Meanwhile, Djuanda and Jakarta's bundling scheme exemplify the second generation of regional-scale PPP with a source-to-tap approach and a more complex governance structure. I explored how the sociopolitical relations and infrastructure complexities of different water

infrastructure projects affect their implementation, such that some projects are realised faster than others despite being similarly structured. This approach enabled me to draw a general conclusion about the rollout of financialised water infrastructure projects, while also highlighting their particularities.

3.2.3. Positionality

As an Indonesian, I was able to communicate with interlocutors in Indonesian, including in research sites where regional languages, such as Sundanese, are dominant. Despite speaking the same language, I am an outsider to the government and financial institutions, as well as the sites where I conducted my research. Sending formal letters and interview requests to governments and local authorities helped me properly introduce myself and my research, follow up on my requests, and have them respond to my requests (either to accept or reject them) based on these documents.

Researching elites also had other challenges. As a student and a woman, interviewing senior male bureaucrats often positioned me as inferior. At times, I was questioned – and tested – for 30 minutes about my research before I got to ask my own questions. I often waited for hours in an office to get a 15-minute interview with bureaucrats and consultants. I had to adjust to my interlocutors' ever-shifting schedule, making my fieldwork seem an intense process of organising one interview after another. I found it easier to engage with elites when I was introduced by a senior colleague, rather than when I sent the research request myself.

Researching communities was easier in terms of access. The urban and rural communities in East Bekasi, Sajira, and North Jakarta welcome visitors, potentially resulting from their perception of my superiority as an academic in Jakarta. My educational trajectory and overseas study background may influence how the community perceives my position, as it means they cannot reject my interview requests. I constantly reflected on this positionality and would only conduct interviews when people were willing to talk to me.

As a mother, I had to balance my time out in the field and with my family. This is why my research is structured as 'patchworks' (Günel et al., 2020) of three short visits (around 2 months) rather than extended fieldwork in and around Jakarta. When I was conducting fieldwork in Jakarta, I prioritised conducting field observations and interviews with communities, as interviews with elites could be conducted online from Sydney. However, juggling the limited fieldwork time and the attempt to map different metabolic relations, my fieldwork resulted in some contexts being less explored than others. This also positions me as a brief visiting researcher extracting knowledge from communities, rather than someone who builds rapport and trust by living with them.

3.3. Conclusion

This chapter has explained how this thesis borrows McFarlane's (2013) account of the 'metabolic lens' to understand the socioecological relations necessary to make water infrastructure fit for financing. By mobilising the metabolic lens, this thesis charts through the networks of actors, capital, infrastructures, land, and water, across urban and rural areas, which precondition and (un)shape the financialisation of water supply projects in Greater Jakarta. During my fieldwork, I charted through different sites across urban-rural sites in Greater Jakarta: government and financial centres in Jakarta, the local governments

and utilities in Greater Jakarta, rural communities in Sajira (Lebak Regency, Banten), in East Bekasi (Bekasi City, West Java), as well as urban communities in Muara Angke (North Jakarta), and last, the groundwater-extractive industries (tankers and bottled water companies) in Bogor Regency (West Java). Despite the comprehensive perspective offered by the metabolic lens, this thesis provides a slice of the whole metabolic relations of Jakarta's water supply projects by identifying three focal nodes: the technopolitical practices of governing water and capital, the dispossession and disconnection of communities, and the spillovers of uncontrolled water flows under the financialised regimes. Each of these nodes serves as the theme that structures my arguments in the following chapters, showing how first, water crisis is translated into an investable proposition (Chapter 4), how water infrastructures projects are realised through structure that aligns it with private sector's interests (Chapters 5-6), how these projects lead to dispossession (Chapter 7), and last, how the projects are undermined and destabilised by the spillovers of waters (Chapter 8). Finally, operationalising the metabolic lens helps this research understand the messy process of water infrastructure financialisation in Jakarta: its making, contestation, and inherent contradictions.

Chapter 4. Translating Water Crisis into an Investable Proposition: Performativity in Jakarta's Water Crisis

4.1. Introduction

The dystopian image of a partially submerged mosque, featured in the New York Times in 2017, has become emblematic of Jakarta's alarming land subsidence (Kimmelman, 2017). Jakarta has experienced severe land subsidence of 1-15 cm/year, driven by excessive groundwater extraction, exacerbating flooding and exposing the city to the impacts of sea-level rise. A dramatic projection of subsidence suggests that by 2025, North Jakarta will be submerged by high tides of 80-100 cm above the current seawall (Brinkman & Hartman, 2009). Adapting to the climate and environmental crisis in Jakarta, therefore, requires controlling groundwater extraction by extending piped water services to substitute groundwater use. Meanwhile, this ecological crisis emerges within a context of persistent inequality: Jakarta's water infrastructure inherits colonial infrastructural segregation and discrimination, which marginalised the local, mostly less affluent, communities while prioritising access to colonial enclaves (Kooy & Bakker, 2008a, 2008b; P. W. Putri, 2019). This pattern of water access inequality persists today, especially for many urban poor communities in North Jakarta, who must also face the risks of land subsidence and tidal flooding (Batubara et al., 2023; Marwa, 2024).

The state's response to this crisis has taken the form of particular solutions: financialised large-scale infrastructure through Public-Private Partnership (PPP). Under Joko Widodo's (Jokowi) presidency (2014-2024), four large water supply projects have been rolled out in Greater Jakarta. Two of them, Jatiluhur (4,750 litres/second) and Karian-Serpong (4,600 litres/second), are bulk water projects under a PPP arrangement between a government contracting agency (GCA), here, the Ministry of Public Works and Housing, and special-purpose vehicles (SPV). The other two are integrated bulk water and pipe network projects: the Djuanda project (7,000 litres/second) is still in the preparation stage, and the Buaran III project (3,000 litres/second) is already contracted under a business-to-business scheme between PAM Jaya and Moya Indonesia. These are not just any infrastructure projects, but ones that are crafted to attract and generate returns on private investment.

This chapter will examine how Jakarta's water crisis has been narrated in a manner that necessitated the development of bankable water infrastructure projects. Drawing on the concept of performativity by Science and Technology Studies (STS) scholars (Callon, 2008; MacKenzie, 2006; MacKenzie et al., 2008) and political ecology scholarship on water modelling (Alba et al., 2025; Molle et al., 2024; Zwarteveen et al., 2018), I argue that the water crisis, depicted in volumetric terms of a demand and supply gap (or, water balance), is, as MacKenzie (2006) describes of a calculative device: "an engine, not a camera." The water balance model does not simply represent the realities, but, in orchestration with an assemblage of calculations, images, policies in planning and feasibility documents, and speeches about the water crisis

and land subsidence, sets the world "in motion" (Callon, 2008: 324) through its enactment. This assemblage performs the crisis for Jakarta and "contributes to the construction of the reality it describes" (Callon, 2008: 316). I will evidence this in how this assemblage enrols actors (government officials, private actors, investors) around a shared narrative of crisis and serves as a reference point for defining an intervention to solve the water crisis: large-scale supply-side water infrastructure financed through PPP.

The performativity of the water crisis works through 'translation': "the drawing of one world-making project into another" (Satsuka quoted in Tsing, 2015:62; Eich, 2025). As Callon suggests, "to translate is to displace" (Callon, 1984:223). In this chapter, I will show how, as the water crisis is translated into an investable proposition, it displaces the actual, complex water crisis. For instance, for the urban poor in North Jakarta, the issue is not merely insufficient water supply volumes, but also low pressure and intermittent flows due to leakage, inadequate distribution pipes, and citizenship issues that deny them access to water (Marwa, 2024).[11] This problem is overshadowed as the state pursues projects that meet with private actors' interests: large-scale, revenue-generating water supply infrastructures, leaving distribution failures and questions of urban citizenship that underpin water access inequality unaddressed. What emerges is a relentless effort to make water infrastructure attractive to private investment, rather than the work of solving the water crisis itself. The two objects, the crisis and its technical solutions, become mutually reinforcing. The water crisis makes financialised infrastructure appear urgent and rational, while financialisation gains legitimacy as a solution to the defined crisis. In other words, this mutual constitution and association (Latour, 2005) between the crisis and the solution emerge as a new world-making project generated by the performativity of the water crisis.

In this chapter, I argue that 'translation' works through a performative mechanism, a "gradual actualisation" (Callon, 2008:320), where the assemblage of figures, speeches, and policy around the water crisis is materialised into an investment proposition for private actors. This chapter elaborates on three strategic translations through which this gradual actualisation unfolds, each of which builds on the other. First, I will illustrate how the volumetric deficit between water supply and demand is translated into a universalised narrative of crisis, justifying the development of large-scale infrastructure, which requires significant investment. Second, I analyse how state actors translate the water crisis into financial registers, framing the solution as the commercialisation of water and cost-reflective pricing, along with the operation of infrastructure under PPP arrangements. Third, I demonstrate the last translation: how the proposed infrastructures are financially engineered and turned into an investable proposition. Through this strategic translation, I illustrate how different calculative devices, such as water balance, fiscal gap projections, project market boundaries, and feasibility analyses, produce new realities: solving Jakarta's water crisis requires financialised, massive infrastructure solutions. In doing so, these devices

[11] Obtaining water access required proof of land ownership (land and property tax payment) and Jakarta citizenship ID Card (KTP) which hinders many rural migrants, renters, or people who occupy lands without legal documentation, from accessing water. The proof of land ownership is today not required per Governor Decree 16/2020, but still does not put these urban poor as a priority for water connections (see Chapter 7).

become reference points for different actors (government officials, private investors, consultants) to realise the projects, while reinforcing the crisis framing they inscribe.

Demonstrating the performativity of the water crisis does not deny its material existence or the reality of land subsidence. This also does not mean that quantifying water or hydrological science is not helpful. Expanding pipe network infrastructure to address land subsidence and inequalities in water access is essential, and quantifying water supports these goals. However, while analysing the assemblage has helped us to think of the heterogeneous elements which produce the water crisis narratives, scholars in political ecology have reminded us to attend to power relations: social relations, values, and interests shape ways of knowing water, and the enactment of this knowledge may override other values and interests (see Budds, 2008; Mehta, 2010). Therefore, following Blok (2011), this chapter seeks to politicise the performativity of the water crisis by examining how the apparently neutral construction of numbers, texts, and figures that represent the water crisis generates authority and a seemingly logical solution, while also discounting other forms of crisis, solutions, and futures.

This chapter proceeds as follows. The second section conceptualises the performativity of the water crisis, drawing on STS scholarship on performativity and urban political ecology analysis of water modelling and quantification. In the third section, I explore how the volumetric deficit performs the crisis and orchestrates different actors around developing large-scale infrastructure to close the gap. The fourth section analyses how state actors translate the crisis and infrastructural solutions into an imperative to commercialise water, while the narratives of fiscal gaps justify the urgency of attracting private financing. Following that, I explore how the state and private project developers attempt to lure financiers by showing the climate angle of the projects to attract cheaper financing from development banks and by rendering supply and demand risks manageable. This produces what appears as bankable projects for financiers, despite proliferating uncertainties which have to be retained by the state in the long term. The concluding section summarises and reflects on the implications of the performativity of the water crisis in producing new realities: solving Jakarta's water crisis requires the turning of its water infrastructure into a bankable asset.

4.2. The performativity of water crisis

STS scholars, including Michel Callon and Donald MacKenzie, have advanced the concept of performativity to comprehend how calculative devices, such as mathematical models, produce rather than represent realities. MacKenzie's (2008) illustration of the options pricing formula demonstrates how economic models do not simply describe the market price for options exchange, but enable the construction of the very market they aim to model by serving as a pricing benchmark for economists. The financial world is "put into motion" (Callon, 2008: 320) by this numerical modelling: "everyone ends up aligning himself or herself to the model and everyone's expectations are fulfilled by everyone else's behaviour" (ibid: 322). According to this view, the model is world-making rather than a mere description of the world (Eich, 2025).

Through an urban political ecology lens, Cusworth and Stanley (2025) provide a framework for understanding performativity through three interconnected mechanisms: object-making, environment-making, and regime-making. First, object-making turns socially and environmentally embedded natures into standardised, calculable units through scientific measurement and calculative devices, producing a stabilised, technical appearance of nature. Second, environment-making shows how this objectification shapes particular environmental worlds and geographies to serve the interests of specific actors. Finally, the interaction between the calculable objects and the sociopolitical constellation in which they are situated translates into an ideological abstraction that determines how problems should be defined and which policy framework fits that definition. Webber's (2013) analysis of performative vulnerabilities in Kiribati illustrates this. Webber (ibid) explains how speech, statistics, and images constitute an assemblage that is mobilised by government actors to define particular vulnerabilities for Kiribati – this is the object-making process. In Kiribati, vulnerabilities are shaped by colonial history and uneven development, alongside its geography as an island state, but its vulnerabilities are represented by the government as siloed objects linked to sea level rise and climate change. Vulnerability is predetermined by the state's political goals to secure funding from multilateral actors whose priorities are climate change and specific kinds of infrastructure – this is the environment-making at play. The alignment of objects (speech, images, figures) and the environment (the state and financiers' interests), effectively produces and sustains the image of Kiribati as the "vulnerable of the vulnerable" (ibid:2724). Webber also illustrates the effect of this performativity as unequal. The narrow climate vulnerability framing rules out other forms of vulnerabilities (such as poverty), while also shaping which projects are deemed more appropriate: seawalls rather than locally oriented projects.

Similarly, scholarly work in urban political ecology has examined how water (like other nature) has been stripped of its socioecological relations and processes and reduced to a universal representation (i.e., H_2O). As Linton (2010) argues, by calculating water, hydrologists model the erratic flow of water worldwide, making the idea of water accountable and universal (hence, 'global water'), despite its geographical and sociopolitical situatedness. Simultaneously, humans are rendered as a countable population whose growth generates predictable demand. Together, the comparison of water availability and growing demand produces a naturalised and technical scarcity narrative (Linton, 2010; Mehta, 2010; Molle et al., 2024), which is addressed by particular expertise (such as engineering and finance) devising solutions to the problem (Li, 2007).

Urban political ecologists have also advocated for politicising the seemingly rational appearance, exploring how water accounting produces a crisis narrative that generates particular solutions, and, how specific solutions precede and determine the construction of crisis (what MacKenzie terms a "backward" move (2008:65)). Budds (2009) shows how hydrological modelling of groundwater flows in Chile's La Ligua valley defines scarcity based on flow calculations, yielding generalised prescriptions to restrict cultivations, despite water scarcity occurs only at particular times and places. As a result, lower-valley farmers are unable to cultivate their land. In Mumbai, Tiwale (2021) shows how the government increased the per capita water consumption standard to justify the rollout of large-scale water infrastructure. The inquiry into larger water supply obscures the fact that the city actually always has enough water – the problem lies not in the quantity of water, but in the reliability and inequity of access

to water for the urban poor. This research shows how, on the one hand, the seemingly neutral hydraulic model defines scarcity, informs policy, and produces socioenvironmental effects, and, on the other, how models are also used to justify particular solutions and create a specific way of representing the crisis.

Both studies inform my approach to analysing the performativity of the water crisis and its alignment with the rollout of financialised water infrastructure in Jakarta. Through its seemingly depoliticised, scientific manner, the quantitative representation of water normalises the pursuit of market approaches assumed to efficiently address ecological and social equity concerns around water access (Bakker, 2014). Scholars have shown how the 'global water crisis' narrative was developed, circulated, and maintained by transnational elite networks, including the World Water Council, Global Water Partnership, and the Global Commission for the Economics of Water, who are backed by multilateral institutions such as the World Bank, UN, IMF, and donor countries (Goldman, 2007; Zwarteveen et al., 2018). For instance, this was explicit in the World Water Council's report *World Water Vision: Making Water Everybody's Business* (2000): "The world population is projected to increase by 1.5 billion people by 2025 […] At a conservative estimate of $50 a person for urban water supply and sanitation, the cost of supplying 3.5 billion people […] will be nearly $1.8 trillion" (Cosgrove & Rijsberman, 2000: 60). The report continues with strategies to meet this financing need, including to "mobilise new investment from the international private sectors", and "make concessional multilateral funds available for water supply and sanitation investment only in countries that have adopted recommended policy and institutional changes" (ibid: 61). Thus, this report renders water needs as commensurable with financial investment. The report translates the global water crisis into the need to mobilise financing, with some preconditions for the state to layout: "full-cost pricing for water services […] good water governance – strong regulations, sound policies, and up-to-date laws" (ibid: 61). This report demonstrates how infrastructural solutions are aligned with market-led strategies to solving water crises. Particularly with the 'state failure' in water provision (Bakker, 2010), private actors have become the state's "go-to tool" (August et al., 2022:532) to address mounting infrastructure needs, thereby eliminating other options for paying for water infrastructure.

The above literature provides a lens on the performativity of the water crisis, namely the self-reproducing loop between the water crisis and its techno-financial solutions. This means examining how (global) water scarcity is constructed and actively aligned to solutions that favour private actor interests, then, vice versa, how the government justifies infrastructure and financial solutions by developing particular crisis narratives – ones that are easily translated into financial logics. The following section will explore how performativity works by illustrating Jakarta's water crisis and its infrastructural solutions.

4.3. Translating the water crisis into financial registers

4.3.1. Water crisis as a volumetric deficit

This section elaborates on how water supply-and-demand imbalance performs the scarcity narratives and rationalises the solutions to develop large-scale supply-side infrastructure, such as dams, conveyance systems, and water treatment plants (WTP), to solve the crisis. For Jakarta, the water crisis and its solutions have been structured since the 1980s, shaping and limiting responses to today's water crisis and land subsidence. The narrowing of the water crisis to a volumetric deficit between water

supply and demand is evident in Jakarta's early master plans for water provision, devised by the Japan International Cooperation Agency (JICA) in 1985. The master plan identifies the crisis by projecting that Jakarta's population will reach 10.5 million by 2005. The master plan suggests the need to provide between 31,500-36,200 litres/second of water, or more than 6 times the WTP capacity in 1980, to meet the urban population's water needs (JICA, 1985b). The gap between water needs and infrastructure capacity becomes the crisis the master plan seeks to solve, while disregarding other crises, such as water access inequality, which has long animated water service provision in Jakarta since the Dutch colonial era (Kooy & Bakker, 2008b, 2008a). Subsequently, the volumetric gap coordinates actors and policies. The master plan suggests immediate network rehabilitation, increasing the number of chlorinators at the WTP, constructing the Buaran plant, and improving distribution lines. In the long term, the masterplan advises the establishment of a system (intake, WTP, distribution lines and centres) from the West Tarum Canal (in the east) and the Cisadane river (in the west) – all to be financed through PAM Jaya's own debt finance (JICA, 1985b).

A similar logic of balancing water supply and demand is demonstrated in the revision of this master plan in 1997. In the revised master plan, JICA expanded the targeted service areas to include Jakarta's neighbouring regions, serving a population of 16.5 million in Greater Jakarta.[12] This expansion was organised around meeting Jakarta's rapid suburbanisation in the 1990s, driven by Soeharto's deregulation policy, which allowed his cronies to speculate in land and real estate projects across the city (see Herlambang et al., 2019; Kenichiro, 2015). Subsequently, JICA advised the need to mobilise additional raw water for Jakarta and part of Tangerang and Bekasi through the development of Karian, Pasir Kopo, Cilawang, Tanjung dam (from the west), as well as Conveyance II (now known as Djuanda) systems and upgrading of West Tarum Canal (from the east) (JICA, 1997, see Figure 4.1). With the proposed infrastructure, water supply to Greater Jakarta would increase by threefold, from 15.4 m^3/second in 1995 to 46.9 m^3/second in 2019 (JICA, 1997). This was a massive plan for Jakarta with an estimated total cost of Y582.8 billion in 1996 (US$4.7 billion in today's currency). Such translation of the volumetric gap between water supply and demand into infrastructure and investment needs abstracts the water crisis from its sociopolitical contexts, depoliticising Jakarta's water provision into techno-engineering problems. As advocated by development banks and multilaterals, this calculation performatively produces a universalised water crisis (Linton, 2010), which rationalises the rollout of neoliberal water governance in the Global South as the state seeks to address the water crisis by liberalising and privatising water services (Bakker, 2010).

[12] This includes 11.9 million population in Jakarta and 4.6 million in part of Tangerang and Bekasi. The master plan revision is also based on another analysis by JICA on the Ciujung-Cidurian integrated water resource bringing water from Banten area (in the west) to Jakarta in 1995.

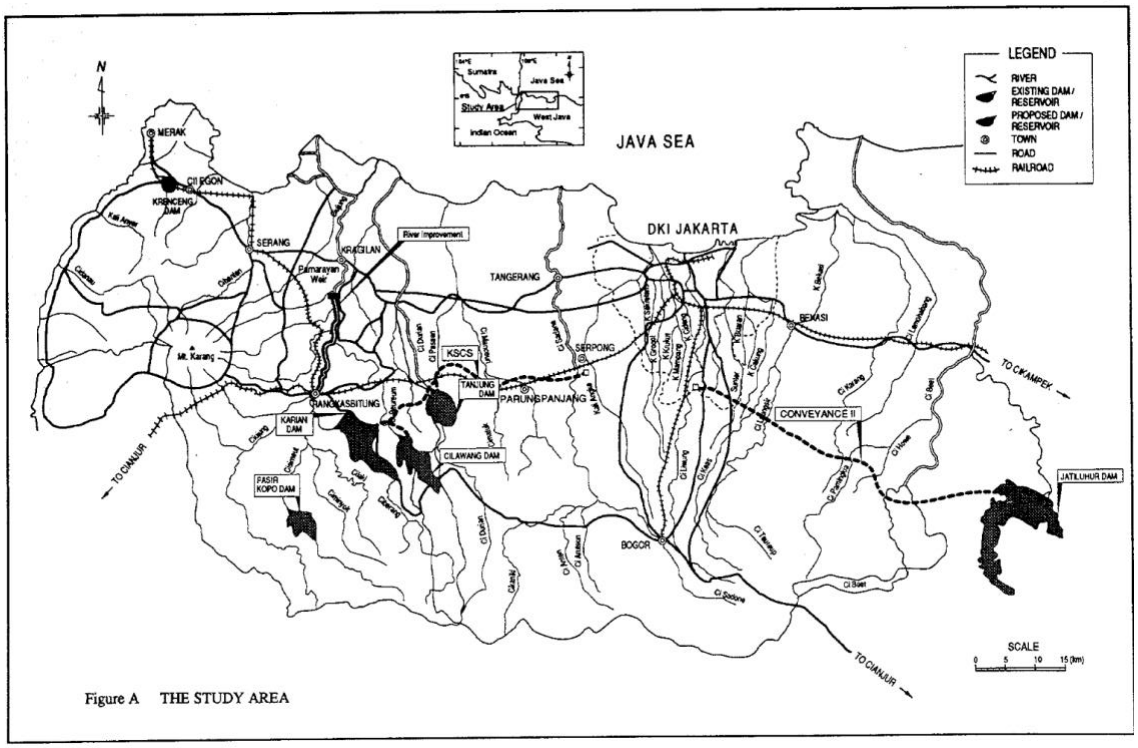

Figure 4.1 The master plan for the Metropolitan Jakarta water supply
Source: JICA, 1995

Evidently, unlike the 1985 plan, the 1997 plan explicitly encourages private-sector involvement in infrastructure development through a risk-sharing mechanism with the government. Described as a "basic policy", private sector participation is recommended to "eliminate the burden of the government funding for public investment", while also proposing to "accelerate project implementation and improve efficiency of management" (JICA, 1997: Summary-5). In parallel to JICA's masterplan study, the World Bank disbursed a loan for the Second Jabotabek Urban Development Project, which aimed to increase production capacity and improve water delivery in Jakarta as a precondition for private-sector involvement (Harsono, 2005; World Bank, 1998). The Bank disbursed a US$190 million loan to rehabilitate the West Tarum Canal and construct new pipelines from the canal to WTP Pejompongan, as well as to build a transmission line from the WTP Serpong (from Cisadane river) to distribution centres in Jakarta (World Bank, 1998). Along with a loan for the PAM Jaya System Improvement Project, which was targeted at eliminating water theft and informalities in the utility's management (Kooy, 2014), the improved water supply infrastructure was expected to increase available raw water for private actors to tap (Harsono, 2005). Jakarta's water privatisation contract began in March 1998 with upgraded infrastructure and "more balanced production and distribution capacities" (World Bank, 1998: v) for private actors to produce bulk water, channel it, operate the service, and receive water payments from formalised water connections. As such, Jakarta's extensive urbanisation, large-scale water supply, and its privatisation became mutually reinforcing projects (Kooy, 2008).

These visions were long-term goals for Jakarta, which are today being revived and repackaged by the national government, with the emerging issues of land subsidence and the climate crisis as their

rationale. The water supply projects, Jatiluhur, Karian-Serpong, Djuanda, and Buaran projects, are predetermined solutions to today's crisis, which also effectively foreclose other alternatives. A local official in Jakarta wonders: "Will the cost of desalination be more expensive or cheaper than if we buy bulk water from the [PPP] projects?"[13] As the official recounted, there were no preceding analyses in comparing the benefits of different project alternatives. Another question was raised in an interview with an urban activist: "Are large-scale, centralised projects better than pursuing smaller, decentralised water projects, in which utilities can play a stronger role, therefore driving down the cost through public investment?"[14] This option is not only less explored but actively concealed, given the state's inclination to solve the water crisis by privatising the water infrastructure.

4.3.2. The inevitable commercialisation of water infrastructure?

Over 25 years of private concession, Jakarta's water service has only seen minor improvements. Water production has increased slightly from 18,025 litres per second in 1998 (Pokja PPAS, 2016) to 20,762 litres per second in 2023 (PAM Jaya, 2024a), despite rapid urbanisation. Insignificant improvements are also evident in Jakarta's water service coverage, rising from 47% to 67.6%, and non-revenue water, from 56% to 45.62% between 1997 and 2023 (PAM Jaya, 2024; World Bank, 1998). The private operators claim that their failure to expand the pipe networks, including to the urban poor, is due to insufficient water supply (Menzies & Setiono, 2010).[15] According to this view, increasing Jakarta's water supply is a precondition for expanding and improving the city's water service.

Decades of insufficient water access have led to over-extraction of groundwater by industries and real estate development. Groundwater extraction at a faster pace than recharge has led to land subsidence. Land subsidence has been slowly swallowing the city,[16] but it received public attention only after a significant flood occurred in 2007 (Silver, 2022). Abidin et al. (2011) suggest that parts of the city have subsided by 1-15 cm/year, particularly in areas such as Cengkareng (West Jakarta) and Sunter (North Jakarta), where industrial activity is extensive, presumably abstracting groundwater on a massive scale. Recent research by Harintaka et.al (2024) suggests that areas at the border of Jakarta and Tangerang as well as Cikarang (West Java), where industrial activities are equally intensive, also record a significant level of land subsidence between 5-10 cm/year. In 2010, 40% of Jakarta's land (especially in North Jakarta) already lay below sea level (World Bank, 2011). Land subsidence contributes to severe flooding in the Jakarta Metropolitan Area, increasing vulnerability in the city's deltaic geography, which is already prone to riverine and tidal floods and to climate-change-induced sea-level rise, exacerbated by

[13] Interview with Dinas SDA DKI Jakarta, May 2023, Jakarta
[14] Interview with water remunicipalisation activist, October 2023, Zoom
[15] This claim is disputed by activists, as private actors' operational costs are not paid by customers' water bills but by the water charge to PAM Jaya (Braadbaart, 2007; Hadipuro & Ardhianie, 2007), meaning that private actors recovered their margin and should be able to reinvest in pipe network extension and rehabilitation.
[16] The Ministry of Geology only started to conduct systematic surveys of land levels in 1978. Therefore, some studies, such as by Abidin et al. (2011) use land levelling data from the 1980s to analyse land subsidence. Other studies, such as Hendarto and Standing's (2019), use the baseline data from 1914 and measure groundwater depletion of 20-25 meter under central Jakarta and more in the west and east of Jakarta by 2014. This means the impact of groundwater extraction to land subsidence might have 'started' before the official recording by the Ministry.

sedimentation that clogs the city's waterways. Therefore, adapting to the climate and environmental crisis in Jakarta requires providing alternative surface water supplies to shift industrial and commercial reliance on groundwater extraction.

This crisis is performatively mobilised by state actors to create solutions that favour private actors' interests rather than addressing its actual causes. Consider my exchange with an official at the Directorate General of Human Settlement at the Ministry of Public Works and Housing:

> Q: How do you think the infrastructures that are being developed now will be able to solve water crises?
>
> E: … If we read the planning documents and literature, Jabodetabek [Greater Jakarta] is lacking clean water. And the lack occurred not just two years ago, but has been ongoing for tens of years, both in terms of supply and increasing demand. Now, the gap can be closed because people use their own water pump, groundwater. And people buy water too, very expensive. Why do they do that? Because there are no other options. Now the possibilities are opening. The question is whether it will be enough. It will only supply part of the areas, not covering 100%. We need more than that. But again, we are facing limitations in terms of investment and water resources. Why, then, can Jatiluhur project be realised quickly? Because the dam is available. And it has been there for a long time. Without the dam, the project today is impossible.
>
> A: So, do you think we will need more dams for Jakarta?
>
> E: Yes, we can see. The dam – what do we have? For example, Saguling dam, where does the water go? Bandung. From Jatiluhur, there will be two projects. One is an ongoing project now [the Jatiluhur project], and the other is Djuanda. There can be more projects if the water is available. The water has to be available throughout the year – in the dry season and the rainy season. You cannot say to the PPP company, "the dam is dry, we cannot give the water." No. …
>
> As long as the resource is available, it can be used [for a PPP project]. Without the dam, we have to search for the resource [out of the city]. […] The problem is, the local governments are not committed. The reason is that they are not ready to extend the pipe network to the households. Household pipe extension is the responsibility of local governments. The expansion of the pipe network really influences water absorption. What happens now is that, when the water is ready to be channelled, the local government has negotiated a lower water purchase for the first three years.
>
> A: Is it because the pipes are still being constructed?
>
> E: First, it is because the pipe is still being constructed, and the second is the tariff. The tariff – apart from DKI's [Jakarta] tariff, so Tangerang, Karawang, is actually below standard.[17] That's why people cannot get water service from PDAM [utility]: the tariff is below standard. The economies are not achieved. … The PPP company today do not want to know – "This is the standard tariff if I build now and have to give the service tomorrow." So, there must be a tariff increase.

This conversation illustrates how a selective narrative about the water crisis, defined as a gap between water demand and supply, is translated by a state actor into the need to develop large-scale infrastructure. Specifically, solving the crisis is equated with building infrastructure to increase supply, necessitating the control of water's unruly nature and rendering it fit for financial operation. For instance, dams are needed to ensure a constant and manageable water supply for private actors to

[17] Other interlocutors suggest that even DKI Jakarta's water tariff are too low and has been frozen for ten years (see World Bank, 2021).

abstract water from, and pipe networks are required to extend this supply to the customers. This continuous flow of water from the dam, through the pipe, and finally to the customers determines how returns for private actors can be generated.

My interlocutor emphasises the need for cost-reflective pricing to ensure private returns under PPP. This is crucial; for instance, under the Jatiluhur and Karian-Serpong PPP contracts, the bulk water tariff will rise by 10% every two years.[18] In contrast, local legislators are hesitant to regularly increase water tariffs to maintain political support from their constituents. Only in January 2025 did PAM Jaya raise its water tariff for the first time in 17 years to achieve full-cost recovery and to pay for the PPP-financed bulk water services. Table 4.1 below illustrates the recent increase in water tariffs in Jakarta. While the new tariff structure maintains the same tariff for the lowest water usage (0-10 m^3), this bracket reflects consumption for 2 people per household, which underestimates the average household size in Jakarta.[19] This means the water tariff increase applies to all users, particularly middle- and upper-middle-income households, as well as industries and commercial users. While the tariff increase is said to be "reasonable … [as] for the low-income group, the maximum tariff does not exceed 4% of the minimum regional wage,"[20] this still demonstrates how the state's formulation of the water crisis produces a consequence: commercialised water projects whose costs are passed on to the customers.

Table 4.1 Comparison of old and new water tariff structures in Jakarta

Customer group	Customer classification*)	Description (based on building area and location)	Old tariff based on water usage in Rupiah (Governor Regulation 11/2007)			New tariff based on water usage in Rupiah (Governor Decree 730/2024)		
			0-10 m^3	10-20 m^3	>20 m^3	0-10 m^3	10-20 m^3	>20 m^3
K I	Very simple household I **)	=< 28 m^2 in dense and irregular settlement	1,050	1,050	1,575	1,000	1,500	1,700
K II	Very simple household II	=< 28 m^2 in regular settlement				1,500	3,000	5,500
	Simple household I **)	28.8-70 m^2 in dense and irregular settlement	3,550	4,700	5,500	3,550	6,750	7,500
	Simple household II	28.8-70 m^2 in regular settlement				4,000	7,500	9,500
	Middle-class household I	70-120 m^2 in dense and irregular settlement	4,900	6,000	7,450	4,900	9,500	12,500

[18] Interview with PPP consultant, October 2023, Zoom

[19] Jakarta's RISPAM advises minimum water need of 150 litres/person/day, which equals to 4.5 m^3 per person/month, or at least 18 m^3 per household/month in a household of 4 people. With the tariff increase, for instance, middle-class household II group with water usage of 20 m^3 would have their water bills increased from 109,000 to 165,000

[20] Interview with former Director of PAM Jaya, May 2023, Zoom. For people whose income is at the minimum regional wage level, the maximum ceiling of water tariff is 4% from the income, or around IDR 216,000 for Jakarta, compared to IDR 2,000 for very simple household I group. The minimum and maximum level of tariff is regulated in Governor Regulation 37/2024.

Customer group	Customer classification*)	Description (based on building area and location)	Old tariff based on water usage in Rupiah (Governor Regulation 11/2007)			New tariff based on water usage in Rupiah (Governor Decree 730/2024)		
			0-10 m^3	10-20 m^3	>20 m^3	0-10 m^3	10-20 m^3	>20 m^3
	Middle-class household II	70-120 m^2 in commercial area				6,000	10,500	14,000
	Upper-middle class household I	120-500 m^2	6,825	8,150	9,800	6,825	12,500	17,500
	Upper-middle class household II	>500 m^2	6,825	8,150	9,800	8,600	15,000	20,000
K III	Small-scale commercial and industry		4,900	6,000	7,450	4,900	9,500	12,500
	Medium-scale commercial and industry		6,825	8,150	9,800	6,825	12,500	17,500
	Large-scale commercial and industry		12,550	12,550	12,550	12,550	17,500	21,500
	Ports		14,650	14,650	14,650	17,500	21,500	23,000

*) Classification based on the new regulation

**) These groups are eligible for *'bantuan air'* (water assistance) of the lowest tariff up to 20 m^3 water usage

Other than the increase in water tariff, the Organisation for Economic Cooperation and Development (OECD) Report on Indonesia's National Dialogue on Water also suggests that the commercial nature of the water supply project will also direct priority to "increasing the number of household connections [which] can support revenue collection, particularly the household connections that can be realised at low marginal costs" (OECD, 2023:29). This means, supply-side infrastructures will prioritise water access to areas with proximity to major networks, potentially leaving settlements which are situated far from the main transmission line out of the network. This means the future water connection will reify the existing network configuration, neglecting access to the urban poor who live at the city's edges. This brazen articulation of unequal access demonstrates the need to be critical of how the water crisis is constructed, how it is made to fit financial logics and operations, and the outcomes it produces. The following section examines how the multifaceted water crisis shares the language of finance, and how private participation in infrastructure is naturalised.

4.4. Justifying privatisation: filling the infrastructure and financing gap

The construction of Jakarta's water crisis narrative as a supply-and-demand issue is reiterated in Jakarta's RISPAM 2024-2044, a master plan that outlines the current state of water provision, a 20-year projection of water needs and supply, and the infrastructural and financial strategies to close the gap between

these projections.[21] Water needs are calculated based on national standards, with water consumption in metropolitan cities with a population of >1 million, such as Jakarta, between 150-200 litres/person/day.[22] Jakarta's RISPAM is built with the assumption of a consumption rate of 150 litres/person/day.[23] With a projected population of around 10.1 million in 2044, domestic water consumption in Jakarta is estimated at 17,600 litres/second. The standard for non-domestic water needs is 15-30% of domestic water, with Jakarta assuming 21%, resulting in water demands of 3,700 litres/second. Adding domestic and non-domestic uses, and factoring in a 1.2-fold increase in water use during peak times, results in projected water needs of 24,600 litres/second in 2044. In 2023, the capacity of the existing WTP is 20,900 litres/second. This simple gap between current supply and projected demand performs the narrative of scarcity.

My point here is not to prove the precision of this calculation nor to question that Jakarta needs more water, but rather to underline how this numerical representation of scarcity translates into a financial concern. For instance, Jakarta's RISPAM illustrates how infrastructure demands are translated into investment needs and identifies the financing sources to meet them. As a former Director of PAM Jaya suggests:

> "For the Jatiluhur project, we need around 10 T, and for the Karian-Serpong project, we need 6 T, to build the pipe networks and channel the 4,000 and 3,200 litres/second water. We already have the planning, and we also plan where the financing will be sourced. At that time, we were firm about the local budget allocation to PAM Jaya. But then, as I said about the COVID-19 fiscal shrinkage, we had to think about the creative financing, which is how we finally entered into the bundling scheme."[24]

This quote suggests that the involvement of private actors through 'creative financing' appears as a logical solution to fill the financing gap when the local fiscal budget was severely impacted by the COVID-19 pandemic. The pandemic exposed local and national governments to budget austerity for massive emergency health and social responses, but the 'fiscal shrinkage' also occurs as the national government maintains large-scale infrastructure projects that are more politically strategic than actually necessary. For instance, in the period following COVID-19, the national government allocated IDR 76.5 trillion (US$4.57 billion) for Jokowi's flagship project, the National Capital Development (IKN) in Kalimantan. This is more than 60 times the budget for developing one bulk water supply project (Adinda, 2024) and more than twice the investment needed to develop the entire water infrastructure network, estimated at IDR 32.5 trillion (US$1.94 billion), as per Jakarta's RISPAM. Even with fiscal space for public service provision, the state did not prioritise the delivery of basic infrastructure, such as water or environmental remediation, and instead delegates these tasks to private actors. Mobilising national and local government budgets directly has become the last option for public infrastructure provision, as the state

[21] The formulation of a RISPAM is mandated by the Ministry of Public Works and Housing Regulation 27/2016
[22] Based on Standar Nasional Indonesia 6728.1:2015
[23] Jakarta's RISPAM is legalised in DKI Jakarta Governor Decree 41/2025
[24] Interview with former Director of PAM Jaya, May 2023, Zoom

would rather use its own money to “leverage private finance”, even if the project ends up more expensive in the long run.[25]

Meanwhile, the state flagship project, IKN, deprived the line ministry’s budgets for water services.[26] For instance, the Directorate General of Human Settlement, which oversees the Directorate of Drinking Water at the Ministry of Public Works and Housing, only allocate IDR 2-3 trillion (US$120-180,000) per year for the water sector, or IDR 10 trillion (US$603,000) for 5 years between 2020-2024.[27] This is far short of the funding needed to achieve the target of increasing safe water access through pipe infrastructure by 15% between 2020-2024, at IDR 123 trillion (US$7.4 million). Of that amount, the national government expects to allocate IDR 77 trillion (US$4.6 million), although this target is unlikely to be met given its priority for other strategic projects, such as the IKN. Meanwhile, local government budgets allocate less than 2% of their funds for water and sanitation.[28] The fiscal gap does not reflect an absolute scarcity, but rather some leftover budgets after the state allocates its priority to politically more strategic projects.

The infrastructure finance gap, as presented by the state, is shown in Figure 4.2. State actors display these figures at public seminars to illustrate that their financing needs exceed their fiscal capacity, requiring them to mobilise ‘creative’ and ‘innovative’ financing strategies (Ditjen Pembiayaan Infrastruktur, 2022). Being creative and innovative means the state must rely on sources of financing beyond traditional public budgets to provide infrastructure. Through this depiction, the private sector’s involvement appears as an inevitable, technical solution to the state’s fiscal gap—the IDR 29.9 T in the red box—rather than a predetermined outcome emerging from strategic funding decisions. This representation erases political questions, such as why water infrastructure is underfunded, while also making other funding sources, such as progressive groundwater taxation, illegible.[29]

[25] Interview with official #3 at the Directorate General of Infrastructure Financing, Ministry of Public Works and Housing, October 2023, Jakarta
[26] Interview with official #3 at the Directorate General of Human Settlement, Ministry of Public Works and Housing, June 2023, Jakarta
[27] Interview #1 at the Infrastructure Financing of the Ministry of Public Works and Housing, May 2023, Jakarta
[28] Interview with Water Resource at Bappenas, July 2023, Jakarta
[29] It is estimated that the potential revenues for local governments from groundwater tax in Jakarta could amount to IDR 2.6 trillion per year, while in 2015, the actual levied tax was only IDR 104 billion or 4.3% of the estimate (Balai Konservasi Air Tanah Kementerian ESDM, n.d.)

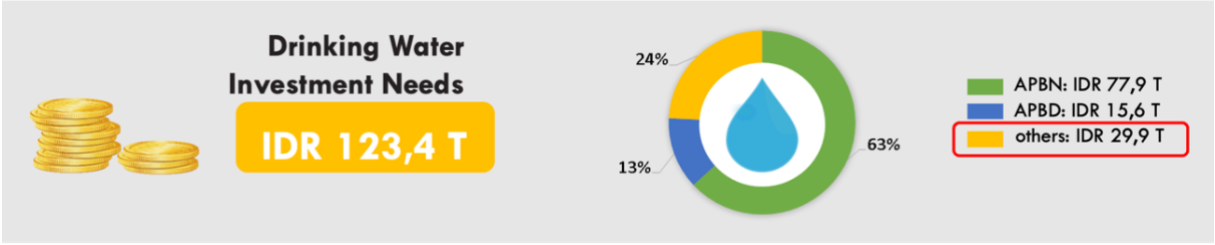

Figure 4.2 The pie chart of the water infrastructure financing crisis [30]

Source: Presentation of the General Director of Infrastructure Financing, shared with the researcher

4.5. Performing the climate urgency

Thus far, I have discussed how a particular construction of crisis, as the gap between water supply and demand, is actively shaped and mobilised by state actors to justify the involvement of private actors and the financialisation of water infrastructure. Yet the performativity of this crisis is effective only when it produces realities; it must realise private investment. The state must articulate the crisis to actually gauge investor sentiment in the market regarding the PPP project. Market sounding, as the World Bank calls it, is an event designed to create "buzz" among investors about the project (Baxter, 2022). The market sounding is a crucial phase; it allows the government (as the owner of the project) to have some "feelings" about the investors' appetite for the project,[31] before then following up with one-on-one discussions to further secure their interest in the project. Consider, for instance how the then-Minister of Public Works and Housing, Basuki Hadimuljono, articulated crisis narratives to attract private investment, during the market-sounding event for the Karian-Serpong water supply project. The Minister suggested:

> "This project is not only about providing water to the west of Jakarta, but it is also part of Jakarta's environmental remediation. When this [project] in the west is completed, we can then stop groundwater [extraction]. When groundwater use is stopped, we will monitor whether the land subsidence stops." (Kementerian PUPR, 2020)

The event, featuring multiple speakers from the Directorate General of Infrastructure Financing, Ministry of National Development (Bappenas), the Ministry of Finance, the Indonesia Infrastructure Guarantee Fund (IIGF), and the Ministry of Investment, highlighted the state's assurance to private investment. For instance, an official from Bappenas illustrated a chart of infrastructure investment needs for 2020-2024, totalling IDR 6,445 trillion, to be fulfilled by the government (37%), state-owned enterprises or SOEs (21%), and the private sector (42%), demonstrating the seemingly inevitable decision to involve private actors in infrastructure provision. He suggested that "the paradigm of infrastructure financing in Indonesia" consists of filtering infrastructure projects, prioritising private financing for public

[30] Chart showing the proportion of the national government budget (APBN), the local government budget (APBD), and the gap in financing in the red box

[31] Interview #1 at the Directorate General of Human Settlement, Ministry of Public Works and Housing, May 2023, Jakarta

infrastructure provision over the mobilisation of state funds (Kementerian PUPR, 2020). When the project does not offer sufficient returns, the speaker suggested, the government will provide facilities to enhance the project's bankability through PPP. A Ministry of Finance representative continued by suggesting that the government's support, including project development facilities, viability gap funding, and underwriting to water supply projects, is "proven." Reflecting on the four existing PPP agreements for water supply projects where the government provided the facilities, she assured that "the private sector should not be doubtful about participating in the project" (Kementerian PUPR, 2020).

The Minister's articulation of Jakarta's environmental crisis is strategic in two ways. First, demonstrating groundwater depletion provides political momentum for the rollout of water supply projects. The groundwater crisis creates a sense of urgency that will benefit private actors in the short run. As a private investor argued:

> "It's only a matter of time until they [people] use our water. Okay, now they use groundwater and not [water from] PDAM [utility company] – but the groundwater [level] in Jakarta has been decreasing. At one point, the government will issue a restriction on wells. That's all… captive, all captive market! (laughing). […] Maybe you know, in Bekasi, in Harapan Indah, not far from here, the [ground]water is already brackish. In Muara Karang [North Jakarta], the [ground]water is also brackish. So, it's just about waiting for the time [to come]. Water business is a matter of time, in my opinion."

Here, the investor implied that the water supply project is a bet on time: as the crisis intensifies, people will have no other alternative but to connect and pay for piped water. Therefore, more than merely describing the water crisis, the Minister's articulation serves as a hook to reassure private investors that their investments will be repaid.

Second, as climate adaptation has become "a paradigm, a discursive frame, and a metatrope for development assistance" (Webber, 2013: 2725), the Minister deliberately enacted the crisis to showcase the project's climate angle and investment opportunities for development banks. As the developer of the Karian-Serpong project suggested in an interview:

> "Every year, the city of Jakarta is subsiding by maybe 10 cm annually because of what – because people are extracting groundwater […] It means your land will collapse. So, our project also addresses […] coping with climate change in Jakarta. That is why our lenders love to participate in the project. We supply water to two million people and then protect [the city from] land subsidence, so lenders are eager to participate in the project."[32]

Rather than implying that investors are actually concerned about repairing environmental degradation, this slice of the interview transcript shows how private actors mobilise land subsidence and climate change as a crisis narrative to their benefit. In this case, a private actor seeks to obtain cheaper financing through concessional loans offered by multilateral development banks. As a development banker suggested: "If a private actor wants to access cheaper financing [through concessional loans], they must align that with the climate [theme] – especially water and wastewater, they certainly have a climate angle."[33] Using climate narratives as the hook, Karian-Serpong project attracts blended financing from

[32] Interview #2 with Karian Water Service, May 2023, Jakarta
[33] Interview with IFC, July 2023, Zoom

the International Financial Corporation (IFC), Asian Development Bank (ADB), and Korea Export-Import Bank. The Asian Development Bank (ADB), one of the financiers of Karian-Serpong project, argued that "the project has strong climate adaptation outcomes […] and – on a systemic level – reduce[s] vulnerability to climate change" (ADB, 2023: 1) by providing alternative water supply to avoid further groundwater extraction in "one of most climate-vulnerable cities in Asia" (ibid: 2). The ADB mobilises US$40 million in loans and an additional US$30 million from the Canadian Climate Fund in return for the projects. Jakarta's water crisis and climate vulnerability are performatively constructed to attract private actors, enabling them to access (cheaper) financing and generating returns for development financiers from the operation of the infrastructure. The following section will examine how the state juggles to make infrastructure projects appear bankable to investors.

4.6. Making water infrastructure (appear) investable

Jakarta's RISPAM document extends beyond master planning; it functions as an active market maker. The document, containing a feasibility analysis and the utilities' financial profiles, serves as a reference for a detailed feasibility study that makes a project appear investment-ready. In this section, I will outline how feasibility studies create calculable risks and returns for financiers at the project level. It achieves this through creative accounting that works backward from a predetermined goal (investor returns) to rationalise the development of water supply projects. Feasibility studies perform two crucial translations here: they translate water needs into predictable market demand within particular market boundaries; and they translate erratic water flows and environmental conditions into manageable technical risks by selectively using data and externalising risks to the public. Both translations work to make projects appear bankable despite proliferating uncertainties around water demand and supply.

4.6.1. Rendering water demand predictable

When asked about where to start with infrastructure development, a consultant suggested, "the feasibility study", then he emphasised, a "*bankable* feasibility study."[34] A feasibility study is a comprehensive analysis required to document a project's viability in technical, legal, economic, financial, and institutional terms. The consultant I spoke to gives an example. "Local government, when they build roads, they just use their senses, sometimes based on their voters' area; … [but] is it technically viable – the soil condition, the traffic? Where will they get the money from? If they want to get loans, they must devise a feasibility study."[35] The consultant implies a shift in the development of public infrastructure, in which basic infrastructure, such as roads or water, is no longer procured solely by the government but must be financed by investors. The feasibility study serves not as a master plan for the government to guide the region's development, but rather as a tool to guide financiers in making investment decisions.

Another interviewee suggested how this bankability is achieved: "[calculate] how much does the water intake, the WTP, then the distribution network cost. Then they are amortised and calculated on a net

[34] Interview with PPP expert #1, May 2023, Jakarta
[35] Interview with PPP expert #1, May 2023, Jakarta

present value basis. Then, define the [bulk water] tariff so that the internal rate of return is accepted [by investors]."[36] This means the calculations work backward from investor returns. This is not about what people need, how much it costs, or how much people can pay. In contrast, my interlocutor suggests that feasibility starts with the returns investors expect, what tariff will generate those returns, and how to justify that outcome. In comparison to a technocratic exercise, the feasibility analysis demonstrates a reverse-engineering approach in which profits are predetermined.

This reverse calculation produces coordinated strategies: manufacturing demand to generate sufficient revenues and spatially matching water demand and supply to make demand appear captive. In detailed feasibility studies, which are built on the RISPAM's identification of infrastructure needs, the commercial viability of a water supply project is determined by balancing water demand and supply. Water demand is measured in volumetric terms, derived from the number of customers, water consumption standards, and customers' willingness to connect and pay based on a real demand survey. Piped water demand is calculated assuming that people also use groundwater and bottled water. In one PPP project, for instance, the number of consumers who use a combination of piped and groundwater is estimated at 40%, while the remaining 60% are assumed only to use piped water. However, how the consultant estimates these numbers is unclear, as a PPP advisor wondered: "[The numbers] used [in calculating demand] are based on [the consultant's] feeling… the numbers just fall from the sky without justification."[37] The lack of data, including on water usage, is a problem for calculating commercial viability (see Bigger & Webber, 2021). In another instance, water data is constructed. In one of Greater Jakarta's water supply projects, a utility operator contested the demand assumption used in the financial modelling: "How do they [the PPP consultant] come [up] with water use of 34 m^3 per month? Impossible. Our customers here only use 13 or 15 m^3 per month."[38] Beyond the technicalities of data errors or data unavailability, these numbers are produced not to represent reality but rather to achieve project bankability. In other words, this is a tool of active market-making by the state, or its consultants, to entice investors, even though, very often, the real demand survey shows a low percentage of people willing to use the infrastructure (see also Bel et al., 2017). According to Jakarta's RISPAM, more than 40% of respondents in the South and East of Jakarta do not want to connect to piped water. The real demand survey for water connections is so low that a consultant suggested, "The demand for water projects must be created,"[39] as if it did not already exist. The survey's results contradict the assumption that the water crisis will inevitably lead users to connect to the pipe network. People are still reluctant to become a captive market for financialised water infrastructure, given that substitutes, such as groundwater, remain available.[40]

The inflated volumetric projection alone, however, is not sufficient; it needs a spatial representation to show where water will flow. Especially given that the four large-scale projects – Jatiluhur, Karian-

[36] Interview with Underwriting Division of the IIGF, July 2023, Zoom
[37] Interview with PPP consultant #3, October 2023, Zoom
[38] Interview with PT PITS, October 2023, South Tangerang
[39] Interview with climate finance consultant, February 2024, Zoom
[40] Interview with Underwriting Division of the IIGF, July 2023, Zoom; Interview with official #2 Infrastructure Financing, Ministry of Public Works and Housing, May 2023, Jakarta

Serpong, Djuanda, and Buaran III – are built at the same time, PAM Jaya must demonstrate how it regulates competition between multiple new and existing projects to ensure returns for investors in each project. In so doing, PAM Jaya constructs market territories for each of the bulk water projects. The map below (see Figure 4.3) depicts how Jakarta is "full [of projects]",[41] as an investor suggests. In the map, Jakarta is zoned into not six supply zones as in the past, but multiple markets for its water projects. In each zone, one bulk water supplier operates under a monopolistic scheme to sell water to the utility. This map serves two purposes. For the urban resident, this map shows that everywhere in Jakarta is (or will be) served by the piped network, and piped water is the only source of water for residents. For the private developers, this map mediates competition, demonstrating that their market areas do not "overlap" and that everyone in the zone is their captive buyer.[42] Once groundwater extraction is restricted (as the Minister promised in the market sounding) and infrastructure is built, residents have no alternative suppliers. This map enacts monopolised water supply areas, guaranteeing that demand in a particular zone, despite being inflated at the outset, will be supplied by a single company to ensure their returns. It also confirms that a feasibility study operates in a backward logic: profit is predetermined and demonstrated through the manufacturing of volumetric and spatial strategies.

[41] Interview with an SOE project developer, August 2023, Zoom

[42] Interview with official #3 at the Directorate of Infrastructure Financing, Ministry of Public Works and Housing, October 2023, Zoom

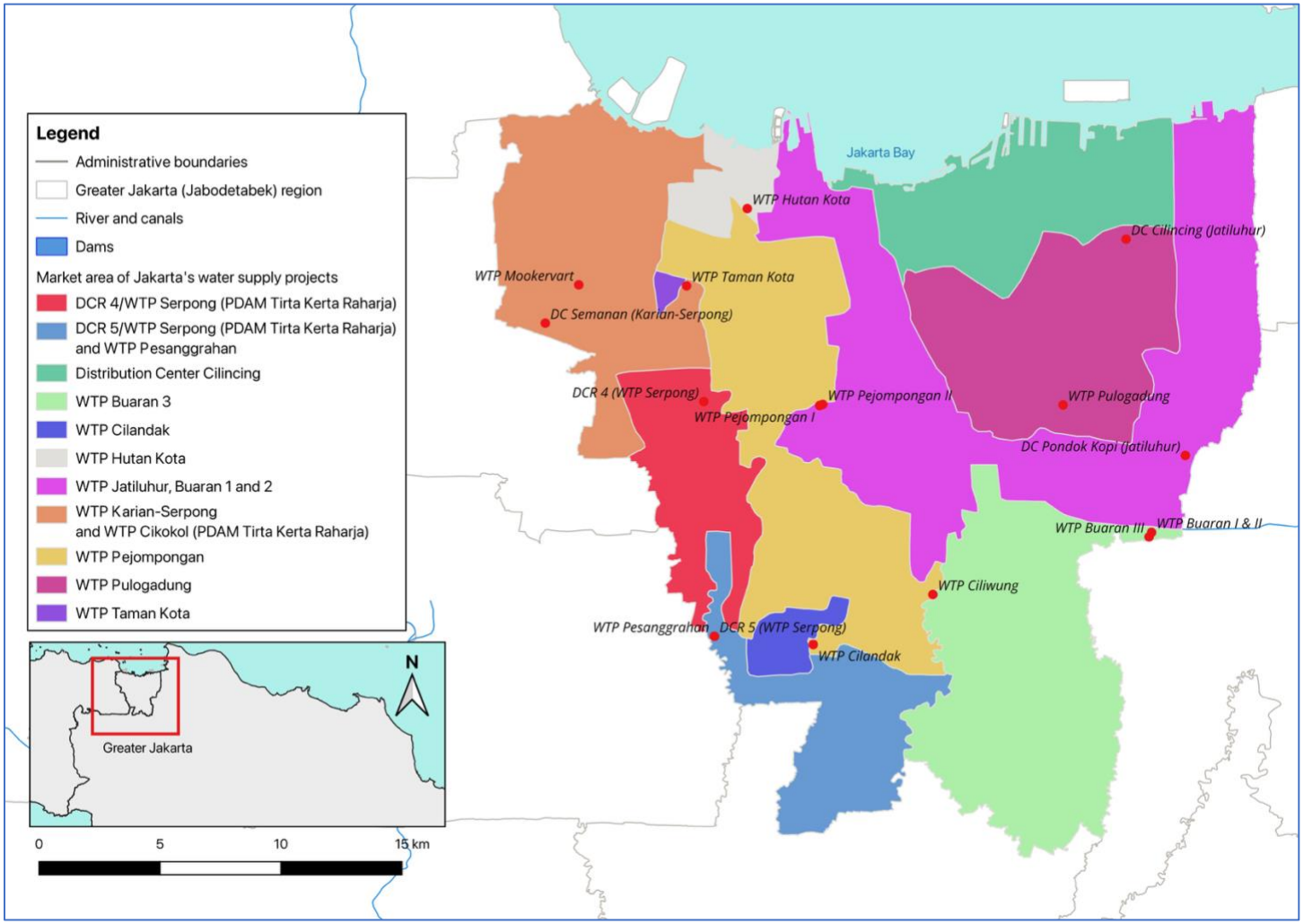

Figure 4.3 The market boundaries of Jakarta's water supply projects

Source: Map remade by author with data derived from PAM Jaya (2024b)[43]

[43] Confirmed in an interview with PAM Jaya officials, 28 April 2025, Zoom

4.6.2. Rendering water supply risks technical

Manufactured demand must be matched with a seemingly stable water supply. The assumed revenue from selling bulk water depends on sufficient water allocation and appropriate project scales. This is important when multiple PPP projects are deployed almost simultaneously, risking tight competition for market catchment and raw water access for project developers. For instance, for the Buaran III and Djuanda projects, whose feasibility studies were conducted around the same time, the critical point for the studies was: "how to allocate raw water, from what initially was only for Djuanda; we [PAM Jaya] allocate 3,000 litres/second for Jakarta's Buaran III project."[44] Djuanda project's capacity must be adjusted to accommodate another project, to the point that consultants question its feasibility and whether the downsized project scale will remain financially viable.[45]

In addition to allocating water between projects, the GCA must also render future water availability as predictable and climate risks as manageable. During interviews, public and private actors are less interested in discussing climate risks than direct financial risks, such as interface or market absorption concerns. For these actors, water risks are perceived as technical issues, or "operational risks",[46] that can be easily solved with technical solutions. For instance, while a long dry season affects the production capacity of WTP, this impact is perceived as temporary and controllable: "if we say that the risk [of water level decline] is high, that is not correct."[47] Similar arguments are applied to water quality issues: "We must treat [raw] water from 2,000 to 0.5 NTU [Nephelometric Turbidity Unit] but in the past 10 years, there was only once where the water was more than 2,000. Maybe, there has been a decrease [of water quality], but it is not a problem."[48]

Central to this technical rendering of risk is the use of historical data to project water availability. Future water concerns are rendered a technical-operational matter, projected based on extensive records of "not just 1-2 years, but 10-20 years"[49] in the past. Long data series are assumed to provide better projections for PPP agreements. As an official suggested: "The record exists, and if the government want to be free of the risk [of decreasing raw water supply], just calculate the average [data]".[50] The IIGF also conducts analyses of water supply to inform its underwriting decisions. As explained by an official: "Despite the BBWS [Balai Besar Wilayah Sungai, the Watershed Agency] saying the water is available, internally we process the data. We pinpoint when La Niña and El Niño occur, so we know, for instance, during this period, the raw water will be decreasing."[51] Any swing in the projection poses a risk not only to the GCA but also to the IIGF, as the project underwriter. Again, the critical point here is not about the accuracy of projections, but that water quantity and quality are made to appear stable in the financial

[44] Interview with former director of PAM Jaya, May 2023, Zoom
[45] Interview with PPP consultant #3, April 2025, Zoom
[46] Interview with private project developer, March 2023, Zoom
[47] Interview with private project developer, March 2023, Zoom
[48] Interview with WIKA Tirta Jaya Jatiluhur, November 2022, Bekasi
[49] Interview at Directorate General of Human Settlement, Ministry of Public Works and Housing, May 2023, Jakarta
[50] Interview at Directorate General of Human Settlement, Ministry of Public Works and Housing, May 2023, Jakarta
[51] Interview with Underwriting Division of the IIGF, July 2023, Zoom

modelling to support the project's bankability, even as climate change accelerates and threatens the assumptions underlying the PPP's financial projections.

In fact, historical patterns illustrate significant instability. For instance, in 2001, the Jatiluhur dam failed to meet water needs for 1.5 months, and, even worse, for 5 months in 2005 (ADB, 2007). In 2040, it is projected that there will be longer dry periods, which threaten the baseflow of the Citarum River (Kementerian PUPR, 2023). A consultant expressed their concern about the water supply quantity, as "the PPP projects relied on planning [from] 30 years ago".[52] The supporting infrastructure and catchment development have changed drastically since then. A PPP expert claimed that utilities had a limited understanding of the impact of watershed transformation on water supply, noting that they "usually just rely on rainfall data."[53] Utilities are now required to establish a strategic plan for water security, but even this planning is still poorly implemented.[54] For instance, transformations in the Citarum catchment regions, with crop cultivation replacing forests, exemplify the challenge. This land-use transformation has caused erosion, reducing the volume of water flowing into the river and increasing turbidity and sedimentation in the canal (Cavelle, 2013). Moya – the private actor contracted for WTP management and distribution network expansion in Jakarta – noticed a "more consistent" increase in turbidity level in 2024 (Moya Holdings Asia Ltd, 2025:7) due to environmental changes affecting the raw water sources. West Tarum Canal's capacity has already been depleted, and supplying sufficient water to Jakarta will require maintaining, rehabilitating, and dredging the canal. The water flowing through the West Tarum Canal faces additional threats, including pollution from the textile and food industries. In 2018, only 15.2% of industries in the watershed held environmental permits, meaning that the vast majority operated without the local government's monitoring of their waste discharge (Satgas PPK DAS Citarum, 2018).

Raw water quantity is mentioned in the IIGF Risk Allocation Guide to be "outside of the GCA's authority and function" (2022:68). Water resource allocation is overseen by the Watershed Agency (BBWS). At the same time, land use conversion in the upstream catchment area is attributed to "the wrongdoings of the urban planners"[55] for failing to control development and land-use change. The realities of fluctuating supply and watershed distress are excluded from the financial modelling of the PPP projects. Projects are made financially feasible by making present and future water allocation calculable and technical, even as the watershed transforms rapidly. However, as the climate crisis intensifies and watershed replenishment remains ineffective (Permana, 2024), it is the national government, as the GCA and underwriter, that will take the fall should the raw water supply quantity or quality decline. Climate risks produce unpredictable and potentially substantial losses, systemic risks that private actors are not keen to retain, leaving governments exposed to the long-term consequences.

[52] Interview with PPP consultant #4, January 2025, Zoom
[53] Interview with Underwriting Division of the IIGF, July 2023, Zoom
[54] Interview with Directorate of Drinking Water, Ministry of Public Works and Housing, June 2023, Jakarta
[55] Interview with BBWS Ciliwung-Cisadane, November 2022, Jakarta

4.7. Conclusion

This chapter has unpacked the seemingly taken-for-granted coupling of environmental and financial solutions, asking how and through what mechanisms Jakarta's water crises are linked and translated to market-based infrastructure projects. To do this, I drew on STS scholarship on performativity (Callon, 2008; MacKenzie, 2008) and urban political ecology to understand how different 'calculative devices' – water balance, fiscal gap, market boundaries, and feasibility analysis – actively sustain a particular narrative of crisis and gradually transform the crisis into an investable proposition for private actors.

This chapter unpacked three strategic, mutually reinforcing 'translations' (Callon, 1984; Latour, 2005), through which performativity works by gradually turning and realising the water crisis into a bankable proposition for private actors. First, I demonstrated how Jakarta's water supply and demand gap, or water balance, performatively shapes the crisis, enrolling actors to mobilise supply-side infrastructures to meet the growing water demand. However, this vision for large-scale water supply is not neutral. It is a solution that multilaterals and donor agencies have long advised on, supported by the market-led neoliberal water regime and the speculative land development for real estate around Jakarta in the 1990s. These solutions determine the response to Jakarta's water crisis today, neglecting other forms of crisis, such as water access inequalities. Increasing supply solves the demand for profit-generating projects for private actors, but does not solve critical problems such as leakages, which cause low water pressure and intermittent flows to the urban poor in Jakarta's north. The solution also simultaneously forecloses other possible, perhaps more sustainable, solutions for Jakarta, such as water recycling, decentralised or small-scale water provision, and alternative sources of financing, such as groundwater taxes.

Second, I argued that the state mobilises the narratives of the fiscal gap, or the shortage of available government budget to pay for infrastructure, as objective and inevitable, obscuring the fact that fiscal space is available but used to pay for flagship projects rather than basic needs such as water infrastructure. This taken-for-granted fiscal gap justifies the private sector's involvement in building and generating returns from infrastructure. By enrolling private actors in the project, the state has turned Jakarta's long-standing water crisis into a need to develop infrastructure and to commercialise water service of water service to ensure sufficient returns for private investors. I showed how this commercialisation has effectively driven up water tariffs in Jakarta and potentially led to new connections being built in areas with lower investment costs around the existing networks, rather than at the city's edges where the urban poor live.

Third, I analysed how the state and private actors strategically mobilise the climate angle of water supply projects to perform the kind of crisis that development banks seek, thereby enabling private project developers to access cheaper, concessional financing. By examining the feasibility analysis, I illustrated how a particular outcome, the accepted rate of return by private actors, predetermines the development of infrastructure. In doing so, the state (via its consultant) engineers projected demand, supply assumptions, and configurations of the water supply market area to ensure the project's financial viability. My concern is not on the accuracy of water supply and demand projections or the boundaries of the market area (although the lack of available data remains a concern for consultants producing

reliable analyses), but rather how the inflated demand, presumably controlled supply, and maps with permanent market boundaries present water infrastructure projects as investable. Under the PPP contract, these figures and maps orchestrate actors to realise the project and ensure returns for private actors. The work around making water infrastructure bankable becomes the new reality set up by the water crisis narrative in the beginning.

However, translation only succeeds when it comes to being realised "through the cooperation it triggers, the oppositions and controversies that it generates" (Callon, 2008:330). Therefore, while this translation of the water crisis has displaced the complex, actual crisis and replaced it with efforts to make water infrastructure bankable, this translation alone does not guarantee success in realising investment. Attracting investment into water infrastructure remains fraught with contestation, and it requires further work by the state to precondition the investment climate. The following chapter heads towards this direction.

Chapter 5. Making water infrastructure "fit to finance":[56] institutional and infrastructural de-risking for Jakarta's water supply projects

5.1. Introduction

In Chapter 4, I discussed how Jakarta's water crisis narrative is performatively translated into an infrastructural necessity and into particular financial and institutional arrangements, such as Public-Private Partnerships (PPP). Building on that, this chapter shows the world "set in motion" (Callon, 2008:324) by the crisis narrative, in which the state undertakes institutional and regulatory restructuring to create an investment-friendly climate, luring private actors to take on and pay for the infrastructure and solve the water crisis. In other words, this chapter illustrates the actual, arduous work of making water infrastructure investable. This includes institutionalising PPP within the architecture of infrastructure governance and financing, enabling the government to de-risk private investment (Gabor, 2021) or retain risks that the private sector is unwilling to bear (Birch & Siemiatycki, 2016; Siemiatycki, 2013). However, as this chapter unfolds, I argue that the government continually draws on its fiscal capacity to guarantee private returns, thereby exposing it to long-term fiscal liabilities despite the promise of efficient risk sharing under PPP (Bayliss et al., 2021).

In elaborating my argument, this thesis examines the de-risking of water infrastructure projects in two directions. First, I examine longue durée market-driven state institutional restructuring (Jessop, 2002; Peck, 2001) to institutionalise PPP, assuming that a debt-averse government can reduce cost overruns by having private actors invest in and generate returns from public infrastructure (O'Brien et al., 2019; Torrance, 2008). Despite universal prescriptions, Indonesia exemplifies variegation and limits to PPP and de-risking measures (Anguelov, 2023, 2024). Through Jakarta's water supply project, I demonstrate how market-driven PPP coalesces with increasing state power in infrastructure development, manifesting through the mobilisation of state-owned enterprises (SOEs) to finance, construct, and guarantee infrastructure projects (Kim & Sumner, 2021; Wijaya & Camba, 2023; Wijaya & Saeran, 2024). The increased involvement of SOEs, often through direct government appointment, catalyses infrastructure development under the former president Joko Widodo's (Jokowi) regime,[57] while also posing a limit to the competitive, market-led financialisation of infrastructure (Davidson, 2021).

Second, pursuing PPP demonstrates that the state has been persistent in attracting private investment into water infrastructure, despite the victories of civil activism to undo the privatisation of (downstream) water services (Lobina et al., 2019; Marwa, 2024). Instead of progressively moving towards public-

[56] I borrow this term from World Water Council and OECD report in 2015, titled Water: Fit to Finance?
[57] This chapter uses reference to presidential tenure to signify different ideology and policy strategies in pursuing infrastructure privatisation and financialisation in Indonesia. My approach is not to personalise these structural changes, but to simplify and thematically discuss different policy changes over periods of time.

oriented water provision, the state wrestled with attracting private finance into the middle part of the water systems, the bulk water production units. These are the lowest risks of the water infrastructure system, compared to the downstream connections and service which have significant construction risks and political contestation with civil society. My second argument in this chapter will show how financialisation unfolds through the reorganisation of infrastructure through such selective unbundling of water systems (Graham & Marvin, 2001) and the reconfiguration of water governance to attract private investment. I will also show how this splintering of infrastructure systems increases the risk that bulk water remains unchanneled to consumers due to insufficient investment in pipe networks, producing another round of crisis for the state to solve.

Illustrating both arguments on the state institutional and infrastructural reconfiguration to attract private investment, this chapter examines how these strategies offer opportunities but also limit financialisation, resulting in uneven outcomes for the state and the public who retain the risks to ensure private actors generate sufficient returns. This chapter unfolds in five parts. First, I outline the scholarly debate on the continuum of water infrastructure privatisation within financialisation. By financialisation, I refer to two aspects. I use the term financialisation to denote the way development problems, such as unequal water access, are rendered technical and financial (Chapter 4; Bayliss, 2014), as well as the increasing financial logics, actors, and debt relations shaping water infrastructure delivery, such as through PPP contracts (Bayliss & Van Waeyenberge, 2023; Loftus et al., 2019). The second section will explore the state's institutional and regulatory transformation, as Williams (2021) describes it, a messy and arduous work to enable the flow of private finance into water infrastructure. Third, I explore how water infrastructure and its governance under PPP are realigned with restrictions on (downstream) privatisation, following the revocation of pro-privatisation Water Law. I will introduce two of Jakarta's new water supply projects that result from these de-risking strategies: Jatiluhur and Karian-Serpong, with capacities of 4,750 litres/second and 4,600 litres/second, respectively, for Greater Jakarta. Fourth, I will discuss the fiscal and political ramifications of the projects for national and local governments, which must continually draw on their fiscal capacity to backstop private investment. Finally, the last section concludes how the state and private actors align the flow of water and capital through institutional and infrastructural de-risking to backstop private investment.

5.2. Financialising water infrastructure

5.2.1. From privatisation to financialisation

In her early work about water privatisation (2005, 2010), Karen Bakker explained that privatisation of the water supply sector in the Global South occurred in the context of the rollout of the Washington Consensus – a set of liberalisation and deregulation policies propagated by international financial institutions (IFIs) such as the World Bank and International Monetary Fund. Following the debt crisis in the 1980s, IFIs advocated for states to delegate public service provision to private actors who were perceived to be more efficient and competitive, including in the water supply sector. To do so, the state had to undergo fundamental restructuring, involving "(partial) *destruction* of extant institutional arrangements and political compromises through market-oriented reform initiatives," followed by the

"(tendential) *creation* of a new infrastructure for market-oriented economic growth, commodification, and capital-centric rule" (Peck et al., 2009:55) to make way for private investment into infrastructure. This transformation of statecraft deepens the permeation of market logics into the state (Birch & Siemiatycki, 2016; Carroll, 2012) and enables the commercialisation and privatisation of public services. As a consequence, public infrastructure becomes an avenue for profit-seeking, with control, management, and sometimes ownership in the hands of private actors.

In the 1990s, the IFIs facilitated the global rollout of water privatisation projects, with build-operate-transfer[58] their dominant contract form (Bakker, 2003; Loftus & Budds, 2016). Water privatisation has seen booms and busts – a steep downturn in the late 1990s due to the Asian Financial Crisis affecting foreign direct investment (Bakker, 2010) and a recent upsurge since the 2010s with the promotion of PPP models (Bayliss & Van Waeyenberge, 2018; Jensen, 2017). The recent revival of privatisation has been driven by two interconnected factors. The first is to facilitate the glut of capital in developed countries, accumulated since structural adjustment, to developing countries (Bigger & Webber, 2021; Gabor, 2021). Secondly, structural austerity has constrained development assistance and government fiscal capacity, prompting the IFIs to advocate for the use of development assistance to leverage private financing to achieve development goals (Mawdsley, 2018b, 2018a). The World Bank's 'From Billion to Trillions', seeking to mobilise billions in development assistance to generate trillions in private investment, is illustrative of this approach. The World Bank suggests that development assistance should be 'blended' with private financing to crowd in private financing to provide concessional loans for infrastructure projects in developing countries (World Bank, 2015). This blending leads to the financialisation of public services in Global South cities (Mawdsley, 2018a), marked by the increase in financial logics, intermediation, and debt relations in public infrastructure provision, along with the translation of development issues (e.g., water access inequality) into financial problems. Financialisation represents an extension of market-driven water governance, building upon the foundations of the marketised state and privatised infrastructure established under earlier reforms.

Scholarly work has shown that the financialisation of water infrastructure involves turning infrastructure into liquid assets by securitising household bills into tradable bonds (Allen & Pryke, 2013; Pryke & Allen, 2019). In cases like Thames Water, it involves a sophisticated institutional restructuring that enables owners, asset managers and pension funds to profit from bond trading and debt refinancing while being protected from the everyday operations of the water service (Allen & Pryke, 2013; Christophers, 2023). Meanwhile, in Global South cities, financialisation emerges through the increasing debt relations that shape the operation of public infrastructure to pay interest to financiers and dividends to the shareholders of project developers. As Williams (2021) argues, financialisation of infrastructure in the Global South is a 'slow' and 'arduous' process. Without existing institutional and regulatory frameworks to support private investment, financialisation must start with formalising water connections and leakage control, increasing the bankability of utilities as debt issuers, and preparing projects to meet investors' interest in risk and return (Heckel, 2023; Williams, 2021). These de-risking measures are combined with other strategies, such as state guarantees to investors through take-or-pay schemes,

[58] Under build-operate-transfer scheme, private actors are contracted to build and operate infrastructure for a certain length of period, then transfer the infrastructure back to the state at the end of the contract

where water will be purchased regardless of volumetric consumption (Bayliss, 2014), and the mobilisation of blended finance at lower interest rates to reduce the project costs for private developers. Therefore, instead of diminishing or rolling back, the state actively facilitates the financialisation of water infrastructure by deploying its fiscal capacity to develop and underwrite bankable projects.

5.2.2. The failure and rebirth of privatisation

Despite decades of promotion, the flow of private finance into water infrastructure has been insignificant to date (Reis et al., 2024). Mobilising private finance into Global South cities is difficult, as private investors perceive that governance and regulatory structures lack certainty and that infrastructure plans lack the financial structure to guarantee sufficient returns (Bigger & Webber, 2021). Privatisation produces adverse outcomes for all stakeholders: it does not generate sufficient returns for private actors, it is more costly for the state, and it fails to deliver efficient, equitable water services to the public (Bakker, 2013b). Large segments of urban poor communities, such as those in Jakarta, remain disconnected from piped services (Hadipuro & Ardhianie, 2007; Marwa, 2024). Meanwhile, despite their investment, private actors must continually deal with low tariffs and high leakages, which undermine the utility's and, subsequently, also their revenue.

These shortcomings have generated worldwide resistance against privatisation and growing civil society pressure for water remunicipalisation, or the return of water service to public control and the retreat of private actors from water projects (Lobina et al., 2014; McDonald, 2018). However, the failure of privatisation does not necessarily mean that it will be abandoned altogether. As Cumbers & Paul (2022) suggest, the claim for remunicipalisation must be situated within the broader dynamic of neoliberalism, understood as a shape-shifting project that is constantly re-appropriated across different scales through its interaction with local/national political contexts (Peck et al., 2009). After all, limitations remain in the remunicipalisation movement about the 'publicness' of water service. Some critical questions remain unsolved: does 'public' mean the opposite of private actors, such as government control, or does it mean transformations in how water is governed, such as decommercialising water services (see McDonald & Swyngedouw, 2019)? As I will elaborate for Indonesia and Jakarta, increasing state control does not necessarily mean the end of privatisation and commercialisation of water services (McDonald & Ruiters, 2012). Instead of signalling a post-neoliberal water regime, current developments in state-led infrastructure investment, including through PPP, represent a reformulation and rebirth of water infrastructure privatisation.

The shape-shifting, incomplete, and variegated forms of neoliberalism unfold within specific national and local economic and political contexts (Sheppard, 2019). In Indonesia, Anguelov (2023, 2024) argues that the hallmark of the recent upsurge of infrastructure development is the activist state deploying its fiscal resources to underwrite, subsidise, and directly invest in infrastructure projects through SOEs (see also Kim & Sumner, 2021) – what he calls 'public-public partnerships'. The Indonesian government's strategy around infrastructure development connects with a broader context of state capitalism, manifested in economically nationalist ideologies, planning, and policies, as well as the expanding roles of SOEs, sovereign wealth funds, and domestic financial restructuring through the activation of state-owned

banks (Alami et al., 2021). This “local wisdom” of conjoining state-led development with private capital enables the state to undertake projects that are not financially viable, such as water infrastructure, speculating on their returns.[59] Anguelov (2023) explains this through urban transportation PPP in Greater Jakarta, where an SOE constructs rail transport not merely as a public service but as a vehicle for speculation in transit-oriented projects, generating revenue from real estate and commercial development around the project sites. The financialisation of infrastructure also operates through Indonesia’s oligarchies, connecting infrastructure projects to the interests of prominent politico-business elites. For instance, the Kamal-Teluk Naga-Rajeg toll road was built to connect and increase the value of real estate projects in North Jakarta and Tangerang owned by some Indonesian tycoons (Wijaya & Saeran, 2024) and the tourism infrastructure projects for Komodo Island and Borobudur to serve a few business elites (Meckelburg & Wardana, 2024).

The state’s speculative strategy reveals another paradox of financialisation for fiscally austere governments: instead of directly disbursing funds to provide public infrastructure, the government acts as an infrastructure broker. It lends its infrastructural power to private actors by creating an infrastructure market and structuring infrastructure bankability, while simultaneously pursuing nationalist development. At the same time, de-risking non-bankable investments by assigning the projects to SOEs also means the state accumulates contingent liabilities in the long term to underwrite infrastructure projects. The state ultimately transfers these costs to taxpayers and public infrastructure users through tariffs and user fees (Bayliss et al., 2021), while maintaining the fiction of private-sector efficiency in public service delivery. The following section explores how the state actively reconstructs itself to facilitate private capital accumulation in water infrastructure. From Soeharto’s nepotistic arrangements to Yudhoyono’s technocratic reforms, and finally to Jokowi’s state-led speculation, each regime reveals the state’s continuing attempt to create profitable conditions for private investment.

5.3. Institutional derisking

5.3.1. Neoliberal state transformation: the birth of privatisation

A hallmark of post-independence Indonesia was the construction of monumental infrastructures to signify the birth of a modern nation, including large-scale WTP in Jakarta (Kooy & Bakker, 2008b; Kusno, 2014). At that time, water production was over capacity as water was distributed through colonial pipes, which were limited to the affluent parts of the city (Martijn, 2005 in Bakker et al., 2008). Even as water services were devolved to local utility, PAM Jaya, in the 1968, large swathes of urban *kampung* were still not served by the piped network due to the state’s antagonism towards urban-rural migrants who settled in the *kampung*[60] (Bakker et al., 2008) as well as the commercialisation of water utilities who preferred to extend networks only to high-paying consumers (Kooy & Bakker, 2008a).

[59] Interview #1 at the Directorate General of Infrastructure Financing, Ministry of Public Works and Housing, May 2023, Jakarta

[60] The government’s reluctance to improve *kampung* was intended to dissuade rural-urban migration after independence. As *kampung* is seen as a temporary and illegal settlement before a more permanent upgrade for migrants; extending pipe networks to the areas symbolises permanency.

Privatisation in Jakarta unfolded amid such failure of the newly independent state to extend water access in the city. Multilateral agencies, such as the World Bank and the Japan International Cooperation Agency (JICA), helped devise the early master plan and institutional framework for Jakarta's water supply system. The plan advised the involvement of private actors to increase the efficiency of water services (JICA, 1997, 2009; World Bank, 1998). London's Thames Water was the first to enter the deal for privatising Jakarta's water service, forming an alliance with the then-President Soeharto's son, followed by France-based Suez-Lyonnaise des Eaux, which teamed up with Salim, Soeharto's closest business associate (Harsono, 2005; Braadbart, 2007). Harsono (2005) reported that having access to local politicians was important for foreign investors as they had to obtain Soeharto's approval to establish businesses in Indonesia. In 1995, despite a lack of relevant regulation and the government's unfamiliarity with privatisation, Soeharto contracted Jakarta's water provision to the two private firms in partnership, dividing Jakarta into two areas: Suez-Lyonnaise under the name of PT PAM Lyonnaise Jaya (Palyja) in the west, and Thames Water, under Thames PAM Jaya, to serve the east (Braadbart, 2007; see Figure 5.1).[61] The 25-year concession contract began in February 1998, only a couple of months before the Asian Financial Crisis hit.

[61] After the 1998 riots, Suez and Thames Water bought out Salim and Sigit's stakes to avoid connections with Soeharto. In 2006, Suez sold part of its ownership to Astratel and US Citigroup. Thames Water also sold its share to ReCapital Advisors and Glendale Partners. In 2017, Suez sold its shares in Palyja to Singaporean company, Future Water Ltd, while Astratel and US Citigroup sold their shares in Palyja to a local company, PT Mulia Semesta Abadi. In 2017, Acuatico sold their shares of AETRA to Moya Indonesia Holdings, owned by the Salim group, marking Salim's return to Jakarta's water business.

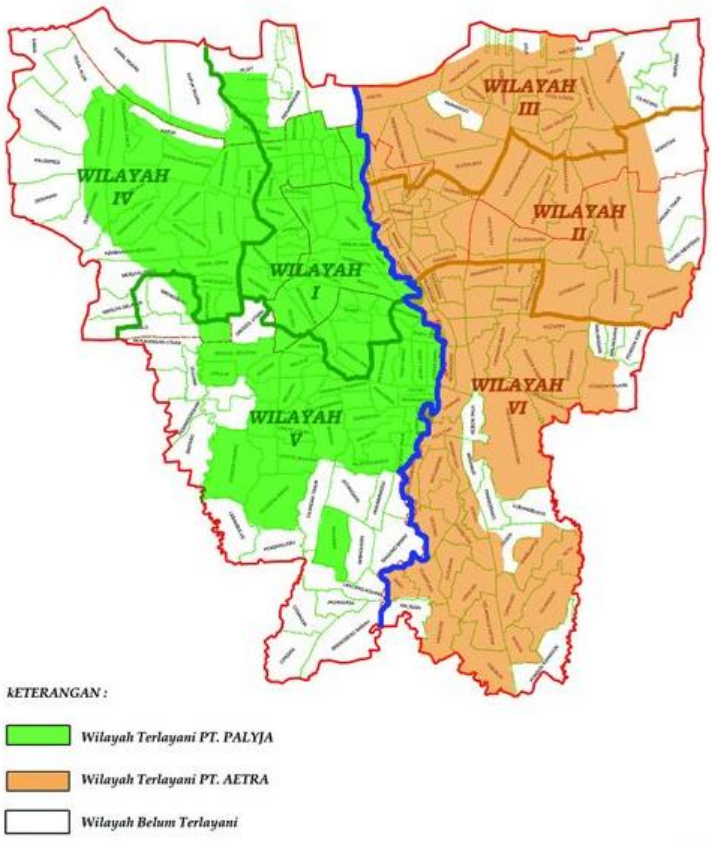

Figure 5.1 Jakarta's water service split into two, governed by Palyja in the west and AETRA Air Jakarta in the east
(Source: PAM Jaya, 2020)

Rather than abandoning privatisation after its corrupt implementation under Soeharto, the Indonesian government refined its approach to market-oriented water reform. In 2005, aligned with the structural adjustment policies of the Washington Consensus, the Government of Indonesia, under the presidency of Susilo Bambang Yudhoyono, with the Asian Development Bank (ADB), the World Bank, and JICA, committed to the Infrastructure Reform Sector Development Project (IRSDP). They hoped the IRSDP would revitalise the private sector's appetite for infrastructure investment following the Asian Financial Crisis. The completion report for the project reads that "at the core of the package was a call for major private sector participation (PSP) in infrastructure, and public-private partnerships (PPP) were chosen as the preferred approach for increasing PSP" (ADB, 2017:1). It is to create such mechanisms and an investment-friendly climate that the state underwent "extensive deconstruction and reconstruction" (Tickell and Peck, 2003:168) in the aftermath of Asian Financial Crisis. Despite Jakarta's water privatisation contract being tainted by nepotism and largely failing to increase equality in the delivery of water services, the state continued to resort to private capital to provide water infrastructure to recover from the Asian Financial Crisis. The return to privatisation, however, sought to shift away from Soeharto's corrupt and nepotic practice, with arguments for clear, transparent, and competitive mechanisms to boost innovation in infrastructure delivery (Ministry of Public Works, 2005).

The IRSDP successfully established a regulatory and institutional vehicle for PPP in Indonesia. Indonesia's first decree on PPP was issued in 2005 (Presidential Decree 67/2005), introducing mechanisms to streamline private sector participation in key target areas. This includes investment in the water supply sector, subject to the following prerequisites: applying cost-reflective pricing for water, which would, in turn, improve utility performance and increase their access to commercial loans (ADB, 2017). A National Water Supply Development Supporting Agency (BPPSPAM) was established under the Ministry of Public Works and tasked with providing technical assistance, evaluating utility performance, and preparing local utilities to serve as off-takers of water supply projects. The modernisation of utilities was also addressed in the Water Law 2004, which was implemented through the World Bank's Water Resources Structural Adjustment loan in 1999 (World Bank, 1999). The loan mandated the adoption of market principles, decentralisation, and private-sector inclusion in Indonesia's water sector (Al 'Afghani, 2006; Bakker, 2010).

The IRSDP assisted in the setup of three special mission vehicles (SMVs) under the Ministry of Finance to facilitate infrastructure investment by the end of 2009: PT Sarana Multi Infrastruktur (SMI), as a project developer and financier, PT Penjaminan Infrastruktur Indonesia or Indonesia Infrastructure Guarantee Fund (IIGF), as a project underwriter, and Indonesia Infrastructure Finance, to finance private infrastructure projects. As I will elaborate in the following section, these institutions demonstrate how the state actively constructed the conditions for private capital accumulation, rather than simply retreating from service provision.

Despite the extensive state restructuring, infrastructure investment was still hindered by a significant problem: land acquisition (Aswicahyono & Friawan, 2008; Manning & Roesad, 2006). Negotiations between landowners and project developers often dragged on for extended periods, benefiting rent-seeking middlemen and local officials and driving up land prices (Davidson, 2016). Some of these land issues were resolved with the issuance of Presidential Decree 36/2005 and Law 2/2012 on land acquisition for public interests. The decree mandated the recentralisation of land acquisition to the national government, with land negotiations capped at 90 days. The latter law reinforced public consultation and mandated fairer compensation for landowners, including accounting for intangible losses such as job losses resulting from relocation (Davidson, 2016; Guild, 2019; see also Chapter 7).

Another barrier to investment during Yudhoyono's tenure was the decentralisation policy, which emanated from the fall of Soeharto's authoritarian regime. The decentralisation policy mandated the devolution of water provision to local governments, creating a 'missing middle' institution to oversee large-scale water projects (World Bank, 2006). Decentralisation risks the downscaling of PPP projects; but for private actors, "large projects are essential for PPP because of the scale economy it provides" (JICA, 2009: S-14). Meanwhile, large-scale water supply projects require coordination among local governments, which are often animated by competing political interests over water allocations or pricing. These institutional barriers to investment in the water supply system prompted the state to experiment with the structure of water governance.

In 2014, Jokowi, as the Governor of Jakarta, signed an MoU with the Governor of West Java for the Jatiluhur project to demonstrate coordination among local authorities as a prerequisite for the project feasibility study (JICA, 2009). The piloting of the institutional structure for the PPP in the Jatiluhur project, however, was hindered by an important question: who would assume the role of the Government Contracting Agency (GCA)? Or, in other words, who has the (fiscal and political) capacity to retain the risks private actors are unwilling to bear? Despite the mandate of decentralisation, utilities in Greater Jakarta generally have poor profitability (World Bank, 2020) and are ill-equipped to bear the significant risks in PPP. Considering the scale of the water supply project, the GCA must be at the national level. Perum Jasa Tirta II, an SOE overseeing water management and distribution from Jatiluhur dam, was initially appointed as the GCA before then being replaced by the Ministry of Public Works and Housing midway due to its lack of fiscal capacity (Yahya & Dirgahayani, 2020).

In sum, the state's institutional and regulatory restructuring – from setting up the vehicles to prepare, underwrite, and finance infrastructure projects, regulations on PPP and land acquisition, to the arrangement of the institutional structure of PPP for water supply – represents the messy trial-and-error of crafting a suitable climate for water infrastructure investment. Notably, the failure of Jakarta's water service privatisation (1998-2023) did not mean that the state abandoned marketised water governance; instead, the state refined past privatisation through a set of de-risking tools, now materialised in the PPP arrangement. This includes the rescaling of infrastructure investment to the national level through a (partial) recentralisation of public services,[62] along with regulations and institutions to shield the private sector from financial failures. Indeed, the national government plays a substantial role in shaping the architecture of PPP, but it now also serves as, in Alami and Dixon's (2023:72) oft-repeated words, "promoter, supervisor, and owner of capital." In the next section, I will explore how the national government, under Jokowi's regime, implement water supply projects, including experimenting with the PPP structure and mobilising SOEs to build and speculate on the returns of infrastructure projects.

5.3.2. Recentralisation of infrastructure investment: "the new generation of PPP"[63]

Under Jokowi's presidency, the state's market-making role intensified through strategic recentralisation designed to overcome the contradictions and failures of earlier neoliberal reforms. Jokowi started his presidency in 2015, realising that decentralisation and local bureaucratic inefficiency had largely impeded infrastructure investment. As such, Jokowi formulated 'economic policy packages', with the first concerned with increasing competitiveness through de-bureaucratisation, deregulation, law enforcement and facilitating private investment (Warburton, 2016). His interest in simplifying bureaucracy to boost investment extended beyond the 'packages'. In his second term, the national government passed the Omnibus Law on Job Creation in 2020 to reduce laws and regulations, such as environmental assessments (AMDAL), that were assumed to complicate business permits (Wardana, 2022), and to re-centralise investment permits under the national government, including for infrastructure. Infrastructure became symbolic of Jokowi's ambition to achieve a "fundamental

[62] The national government oversees bulk water service to utilities and utilities directly serve customers.
[63] Interview #2 at the Directorate of Human Settlement at the Ministry of Public Works and Housing, May 2023, Jakarta

transformation of Indonesia's economy", through "productive programs which directly benefit the people" (Bappenas, 2015). His goal was to massively expand infrastructure, as reflected in a list of national strategic projects (PSN), building on Yudhoyono's Masterplan for Acceleration and Expansion of Indonesia's Economic Development 2011-2025.

Warburton terms the amalgamation of nationalist development and market approaches under Jokowi as 'new developmentalism', noting that Jokowi shared a similar statist-developmentalist perspective as Soeharto, with infrastructure representing his "simple and pragmatic developmental agenda" (2016:316). Jokowi's new developmentalism was realised through the state's interventions to create infrastructure markets, as evidenced by Presidential Decree 38/2015. Upon revising the 2005 regulation for PPP (stipulated under Yudhoyono's regime), the 2015 decree allows the state to provide greater assurance to private investors, such as through underwriting, partial state funding, and land acquisition funds for PPP projects. With a greater role of national government in PPP, the new decree symbolises what an official terms "the new generation of PPP", enabling projects to be consolidated at a regional scale – a shift from "small, sporadic" private concessions at the subnational level.[64]

Jokowi's developmentalist approach was exercised through the mobilisation of state capital into SOEs to undertake infrastructure projects deemed financially unviable by the private sector (Kim, 2021; Kim & Sumner, 2021; Yunita et al., 2023). The mobilisation of SOEs for PPP is important for Indonesia's development agenda, as my interlocutor argued:

> "We cannot just take the rule of PPP as it is, as a theory […] The condition is not great for investors, especially foreign investors. But after it [the project] is complete, there is this [pilot] already, then the private sector, foreign [investor] can come. It is just a matter of how we can manage the problem with the one who can solve the problem. We involve the SOEs because we cannot invite the private sector. Because if we talk with the private sector, the foreign investor, we go with so many lists of these claims. They start with the document first, okay. How about this? How about that? So… we don't start the work […] I call it [the involvement of the SOEs] the local wisdom. Because we cannot just adopt the [PPP] theory – maybe in a more mature country, they involve a longer planning process. Here, we don't have any luxury for planning, because if we do that, we don't do anything."[65]

This quote exemplifies how the state selectively tailors its PPP mechanism by mobilising SOEs rather than genuine private actors to address unbankable infrastructure. The direct appointment of SOEs enables faster infrastructure development, advancing the state's developmentalist goal and allowing the state to actually 'start the work' of developing infrastructure. At the same time, the mobilisation of SOEs also allows the state to deliver market-like, competitive infrastructure provision, while also speculating on the infrastructure projects as shareholders of the SOEs (Anguelov, 2023).

[64] Interview #2 at the Directorate of Human Settlement at the Ministry of Public Works and Housing, May 2023, Jakarta; Private concession was undertaken at city scale, such as Jakarta (1998), Tangerang (2009), and Bekasi (2011).
[65] Interview #1 at the Directorate General of Infrastructure Financing, Ministry of Public Works and Housing, May 2023, Jakarta

Two of the SMVs under the Ministry of Finance are SOEs: SMI and the IIGF. SMI is tasked with undertaking project development facilities by funding consultancy services to conduct feasibility studies for specific infrastructure projects to structure bankable project pipelines (Yunita et al., 2023). These technical assessments translate infrastructure needs into documents to guide investor decisions, bridging the need for infrastructure development with available private financial resources. As argued by an official: "[private] funds are plenty, but there are no projects; the problem is not in the funding but in the project readiness".[66] As SMI crafts bankable projects through its contracted feasibility studies, projects can then be offered to the market, as an official suggested: "the government is the seller; investors and lenders are the buyers."[67] SMI also serves as a project financier for SOE-led infrastructure projects. This means SMI, an SOE itself, requires large capital injections from the state. Kim (2021) reported that one-fifth of the national government budget in 2015-16 was allocated to SMI, increasing SMI's equity sixfold and its assets almost fivefold from 2014 to 2016. With its large budget allocation, SMI has committed IDR 981.29 trillion (US$59.76 million) to financing infrastructure as of 2023, of which 11.30% was allocated to the water supply sector (Sarana Multi Infrastruktur, 2024).

Meanwhile, the IIGF underwrites infrastructure projects. The IIGF determines its guarantee for projects based on risk allocation as outlined in its annually updated 'Risk Allocation Reference'. For instance, the Reference suggests that the government must retain most risks around land acquisition, water supply, water demand (including tariffs) and downstream connection, the most expensive part of water supply projects, while the private sector must bear the construction risk of WTP projects. Other than mapping out risks between the government and private actors, the goal of the IIGF is also to "assess the risks according to the bank's appetite […] and to structure the guarantee so that the bank can accept [the risk and return]."[68] Usually, the IIGF requires project developers to attach a term sheet to the feasibility study that indicates the financier's interest in the project. The term sheet helps the IIGF understand the financiers' expectations for risks and returns, enabling them to offer an underwriting structure that aligns with the financiers' appetite. It is hoped this mechanism will speed up the loan agreement between the project developer and financiers, known as financial closure. Should the GCA fail to perform its financial obligation to the contracted special-purpose vehicle (SPV) or project developer, the IIGF will disburse its guarantee to address the GCA's payment failure. The IIGF's underwriting is, therefore, pivotal. The underwriting ring-fences the state budget from shocks in the event of private-sector claims against the government arising from its payment failure. When IIGF disburses its guarantee to private actors, the GCA must then repay the guarantee payment over the following years rather than at once, thereby reducing shocks to the GCA's budget. Underwriting serves both to safeguard the GCA's budget and to support the SPV's returns.

[66] Interview with PPP expert #1, May 2023, Jakarta
[67] Project Director of PT Sarana Multi Infrastruktur at PPP Symposium, "Connecting the Public and Private Sector to deliver Indonesia's Infrastructure Pipeline" at Konstruksi Indonesia Expo, 1 November 2023, Jakarta
[68] Interview at the Underwriting Division of the IIGF, July 2023, Zoom

Unlike the IIGF and SMI, another SMV under the Ministry of Finance, the State Asset Management Institution (LMAN), is not an SOE.[69] LMAN was established in 2015 and tasked with land acquisition for strategic national projects. With a multi-year funding mechanism, LMAN has greater flexibility to disburse land funds for complex, large-scale projects (such as the Karian dam), unlike the budgeting process at government institutions, which must be planned and spent annually. LMAN initially operated by disbursing land acquisition funds to the private sector. As of 2023, however, the use of private-sector funds for land purchases has been reduced by 70%.[70] In other words, the state is taking on the risks of land purchases from the private sector, while also ensuring that lands are 'clean and clear', free of legal problems, spatial planning requirements, or community-level contestation (Meckelburg & Wardana, 2024).

The establishment of the three SMVs under the Ministry of Finance (SMI, the IIGF, and LMAN) is accompanied by the restructuring of institutions associated with PPP. For instance, Jokowi's regime also established the Committee for the Acceleration and Development of Priority Infrastructure (KPPIP) under the Coordinating Ministry of Economic Affairs, as well as a PPP Joint Office. The PPP Joint Office brings together line ministries associated with specific projects to provide advice to project developers. It is also referred to as a 'de-bottlenecking facility', despite having no direct control to resolve constraints in PPP projects.[71] Meanwhile, KPPIP assesses, classifies, and coordinates national strategic projects, making them eligible for various forms of support for private sector participation, including access to land acquisition funds.

Institutional restructuring is also evident under the Ministry of Public Works and Housing. Under Jokowi's tenure, BPPSPAM, established to improve water utilities' creditworthiness, was disbanded in 2020. Their tasks were transferred to the Directorate General of Infrastructure and Housing Financing (previously only housing financing), whose job is to assist private actors in developing and improving project feasibility, especially for unsolicited projects, and tendering the projects to the market. Once contracted, the project is relayed to the Directorate General for Human Settlements, where the project manager, the Directorate for Drinking Water, establishes a project monitoring office (PMO). The PMO operationalises PPP contracts, dealing with construction permits and project design. An official describes the PMO's role as "the kitchen" of PPP projects: "rushing, seeking budget for planning and permits" for water abstraction to pipe construction.[72] Permits, as the official argued, "are easier [handled] by the government than investors."[73] Therefore, the PMO's role is not merely to manage projects technically, but to facilitate and ease private-sector investment.

[69] Unlike SMI and IIGF, LMAN is Public Service Agency (PSA), and not SOEs. While SOEs are profit oriented and modelled as corporations, PSA is more public-service oriented with limitations in its way of seeking investment.
[70] Interview with Funding and Risk Management of LMAN, August 2023, Zoom; LMAN can only reimburse land acquisition to private project developers based on the Bank Indonesia's interest rate (around 5%), whereas private developers borrow money from commercial bank with higher interest rate, therefore this scheme is unfavored by private developers.
[71] Interview with PPP expert #2, June 2023, Jakarta
[72] Interview with Project Monitoring Office of PPP, Ministry of Public Works and Housing, June 2023, Jakarta
[73] Interview with Project Monitoring Office of PPP, Ministry of Public Works and Housing, June 2023, Jakarta

To sum up, this section has elaborated on how the attempt to de-risk private investment involves a complex state institutional restructuring that troubles neoliberal assumptions about the state's withdrawal from infrastructure governance. Instead, the marketisation of the state (Birch & Siemiatycki, 2016; Carroll, 2012) depends on an active state and substantial fiscal capacity to produce an investment-enabling environment. The neoliberal-led restructuring, evident in the institutionalisation of PPP for infrastructure delivery, is contingent on national political and economic agendas (Anguelov, 2023, 2024; Warburton, 2016). The state has taken on a new role as a market-maker rather than a direct provider of infrastructure. In Indonesia, this is evident in the state's approach of combining statist and market-led strategies to boost infrastructure development, primarily through the mobilisation of SOEs to underwrite, finance, and execute infrastructure projects, building the market for infrastructure projects in Indonesia. The next chapter will explore how, alongside sophisticated institutional restructuring, the state also reconfigures infrastructure to de-risk private investment.

5.4. Infrastructural de-risking: unbundling water supply projects

Chapter 4 has outlined the plans for Jakarta's water supply projects, as advised by the donor and multilateral institutions since the 1980s. However, the massive infrastructure plans were stalled for years. The master plan devised by JICA in 1985 identified key implementation barriers: utilities lacked creditworthiness, cross-regional coordination for achieving economies of scale was absent, and PPP feasibility studies needed refinement (JICA, 2009). These obstacles persisted for decades, even after Indonesia established a PPP regulatory framework after the Asian Financial Crisis. The privatisation challenge intensified after what a private-sector advisor termed a "blunder".[74] The long-standing struggle of grassroots coalitions, led by the People's Coalition for the Right to Water (KRuHA), and later by Muhammadiyah, an Islamic organisation, resulted in the revocation of the pro-privatisation Water Law 7/2004 in 2015. In 2012, the Coalition of Jakarta Resident Opposing Privatisation (KMMSAJ) also filed a citizen lawsuit against Jakarta's water privatisation, and in 2017, the Supreme Court ruled that Jakarta's water privatisation was unlawful (Hadipuro & Putri, 2020; Lobina et al., 2019; Marwa, 2024; Zamzami & Ardhianie, 2015). With these civil society victories, water supply became "a sector where the full private business undertaking is considered sensitive" for private actors (PT Penjaminan Infrastruktur Indonesia, 2022:4), and public demand for remunicipalisation or nationalisation posed significant political risks for private actors (Ray & Ing, 2016).

A new Water Law was stipulated in 2019.[75] The new law mandates that water sources cannot be privatised (Article 7), prioritises the utilisation of water for business by national, local, and village SOEs over private actors (Article 46), and emphasises that the state defends the people's right to water. Meanwhile, the water supply provision is set out in Government Regulation 122/2015, which, following the cancellation of Water Law 2004, prohibits the privatisation of water services. With these regulations in place, privatisation is restricted at the upstream level (private companies cannot acquire water

[74] Interview with private sector advisory, June 2023, Jakarta
[75] Law 17/2019

sources and must buy water from the government) and at the downstream level (private companies cannot provide water services to consumers; only utilities are permitted).

The de-privatisation of water services, however, is somewhat awkward: the new Water Law may reflect a win for the anti-privatisation struggle, but it has been used to facilitate private-sector participation in lower-risk infrastructure investment. Instead of adhering to the law limit on privatisation, the state remains persistent with attracting private investment, opening up opportunities for privatisation on the bulk water production units or the WTP. Commonly organised under build-operate-transfer schemes, the state allows private sector to generate revenue by selling bulk water to utilities for a specific period before the infrastructure is transferred back to the government. Private actors consider WTP the "meaty part"[76] of the whole water infrastructure chain: low-hanging fruit with few risks. When asked about the risks involved in WTP, my interlocutors mentioned "changing [the] dose of chemical substances"[77] and "some technical risks,"[78] such as blackouts. However, most importantly, "technologies for treating water remain the same for many years."[79] The private actors can generate easy returns by selling bulk water to utilities, with prices and volumes guaranteed by the state through the take-or-pay scheme. The CEO of Moya, perhaps now the largest water company in Indonesia, acknowledged at a public seminar: "The take-or-pay scheme makes us, investors, lazy,"[80] as investors are given low-risk, revenue-generating assets while freeing them from the hard work of installing pipe connections.

This selective unbundling of water infrastructure represents a crucial form of infrastructural de-risking that aligns with investors' risk-and-return profiles. Infrastructural de-risking operates through the spatial and technical reconfiguration of infrastructure systems (Coe et al., 2025). This process materially separates high-risk components from profitable elements, creating investable infrastructure fragments that align with private capital's requirements. Infrastructural de-risking is a crucial process because mobilising private finance for infrastructure requires "transforming socionatural relations in line with financial motivations" (Williams 2021:1889). In this case, streamlining water and capital flows is achieved by fragmenting infrastructure systems based on private actors' appetites.

By examining the two de-risking strategies, the institutional and infrastructural reconfiguration to lure private-sector investment, the last two sections have shown how neoliberal principles in water governance interface with situated political and economic contexts. First, the state mobilises SOEs to undertake unbankable infrastructure projects that are unattractive to private actors. Second, the state attempts to attract private investment into the middle part of the water infrastructure system, the WTP, despite the civil activism demanding an end to water privatisation. The subsequent regulatory changes, which prohibit privatisation, have, counterintuitively, invited private actors to invest in the least risky part of water infrastructure chains, the WTP, while local governments retain responsibility for constructing complex and expensive pipe networks. The following section describes how these de-risking strategies

[76] Interview with PDAM Tirta Benteng, August 2024, Zoom
[77] Interview with WIKA Tirta Jaya Jatiluhur, November 2022, Bekasi
[78] Interview with PT ABJ, March 2023, Zoom
[79] Interview with Underwriting Division at the IIGF, July 2023
[80] "Three Bold Action: Terobosan Menutup Funding Gap Infrastruktur", 13 December 2023, accessed in Ditjen Pembiayaan Infrastruktur (2023)

produce long-term liabilities and unmitigated interface risks that the state must control as the “residual financier and risk holder” (Boardman & Vining, 2012:128) of privatised water infrastructure projects.

5.5. De-risking investment, re-risking the public

In 2021, PPP agreements for two bulk water projects for Greater Jakarta were signed: the Jatiluhur (4,750 litres/second) and Karian-Serpong (4,600 litres/second) projects (see Figure 5.2 and Table 5.1). These projects are ‘unsolicited’, initiated and prepared by private actors instead of by the government, indicating that private actors are confident in the project’s potential profitability. The projects include build-operate-transfer agreements for bulk water production and transmission pipes to off-taker points. These projects are pioneers in some ways: Jatiluhur project is the first regional-scale water supply PPP project, establishing an institutional precedent for other projects; meanwhile, Karian-Serpong project is the first water supply project to be developed and financed by international developers and financiers through blended finance, utilising concessional loans from multilaterals to crowd in private-sector investment.

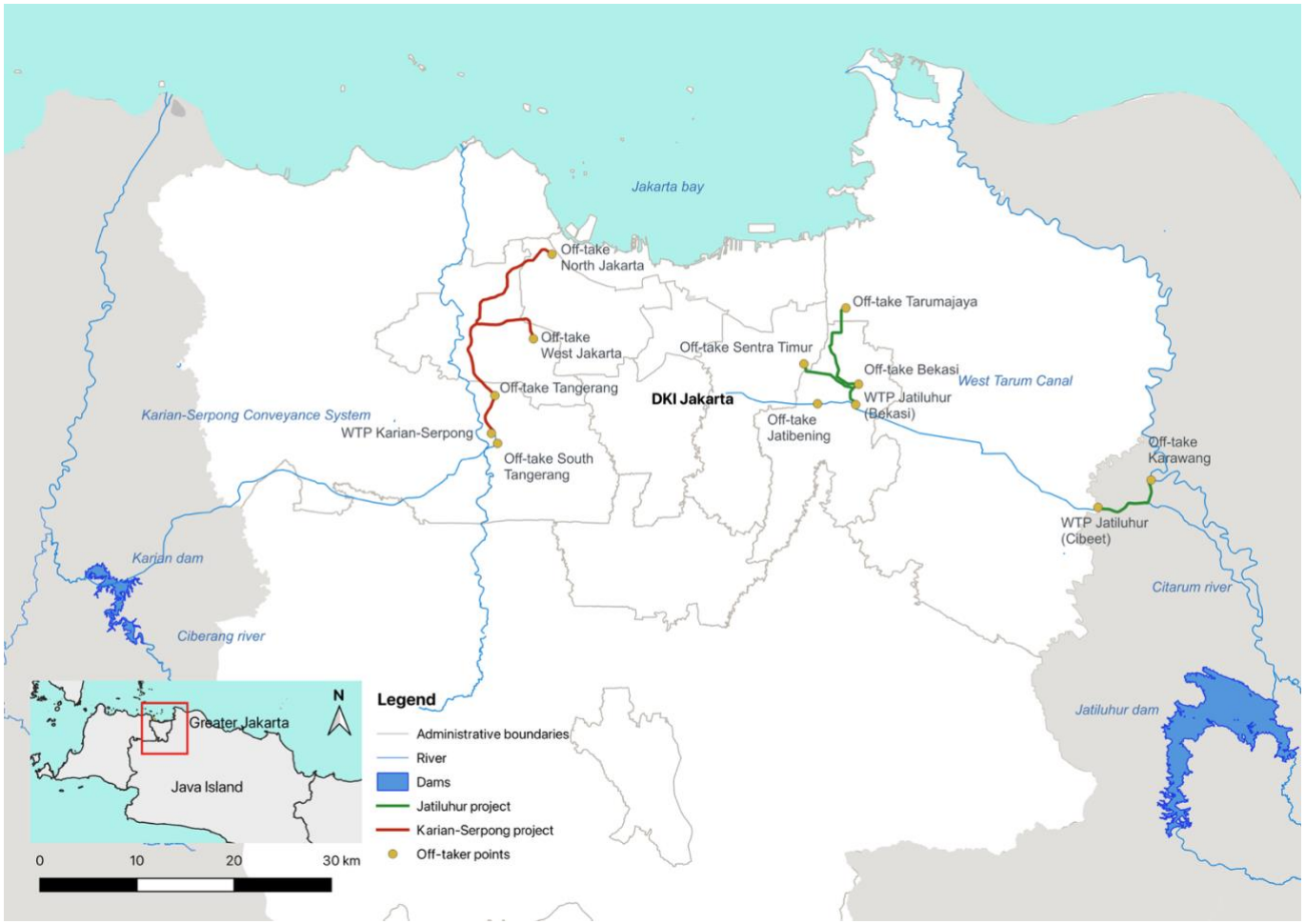

Figure 5.2 Jatiluhur and Karian-Serpong project for Greater Jakarta (marked white)[81] (map by author)

[81] The project information is derived from simpulkpbu.pu.go.id

Table 5.1 Regional bulk-water supply projects for Jakarta Metropolitan Area[82]

	Project developer	Contract period[a)]	Investment value	Financiers	Area of service and capacity (in litres/second)	Projected number of served households	Payment scheme
SPAM Regional Jatiluhur	WIKA Tirta Jaya Jatiluhur; consortium of PT Wijaya Karya (SOE), PT Jaya Konstruksi Pratama, PT Tirta Gemah Ripah (local SOE of West Java government)	34 years 11 months	IDR 1.75 trillion	Mandiri (state-owned bank), BJB (West Java and Banten development bank) and PT Sarana Multi Infrastruktur (financial close per 6 April 2022)	**Jakarta line** Jakarta (4,000) Bekasi (300) **Karawang line** Bekasi regency (100) Karawang regency (350) Total: 4,750	380,000	Take-or-pay
SPAM Regional Karian-Serpong	Karian Water Service, consortium of Korean Water (Korean Government SOE) and PT Adhi Karya (SOE)	35.5 years	IDR 2.5 trillion	IFC, ADB, and K-Exim (project has not reached financial closure per the writing of this draft)	Jakarta (3,200) Tangerang (750) South Tangerang (650) Total: 4,600	539,000	Take-or-pay

[a)] This includes construction period which is usually 2-3 years

[82] The data in this table is collected from simpulkpbu.pu.go.id, IIGF (2021a) and IIGF (2021b)

In terms of governance, both projects feature the Ministry of Public Works and Housing as the GCA and a joint venture of an Indonesian SOE and other companies as the SPV or project developer. Jatiluhur project is carried out by a consortium called Wika Tirta Jaya Jatiluhur, which consists of Indonesian SOE Wijaya Karya (WIKA) as the majority stakeholder, and two local SOEs, Jaya Konstruksi and Tirta Gemah Ripah. Meanwhile, the Karian-Serpong project is led by a consortium comprising Korea Water (K-Water), a Korean SOE, and Adhi Karya, an Indonesian SOE. Each GCA and SPV signed a guarantee agreement with the IIGF. Additionally, the GCA also sign off-taker contracts with each of the bulk water-receiving local governments (representing local utilities), who will also extend tertiary networks to consumers (see Figure 5.3 and 5.4).

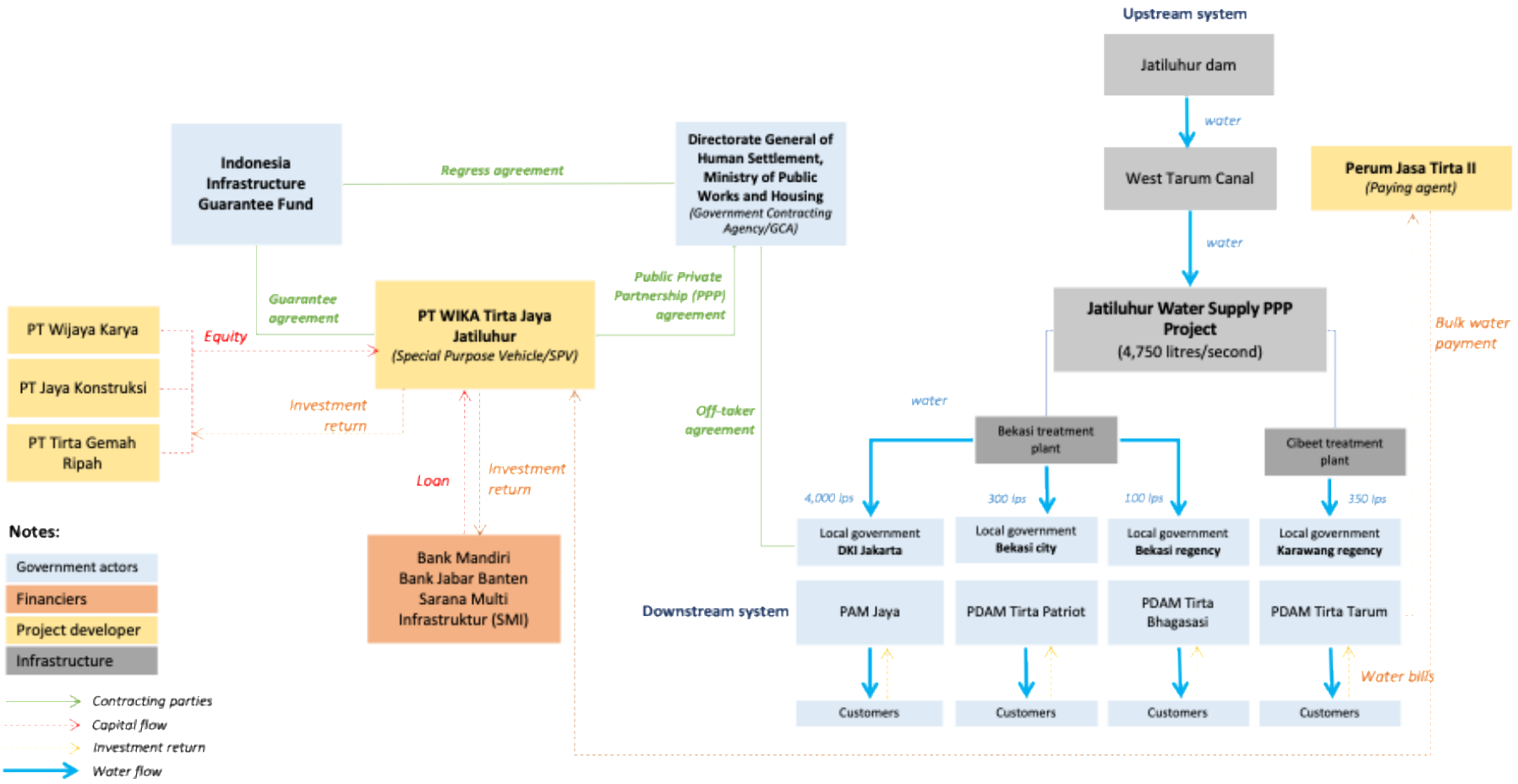

Figure 5.3 Project structure; flow of water and capital in Jatiluhur water supply PPP project

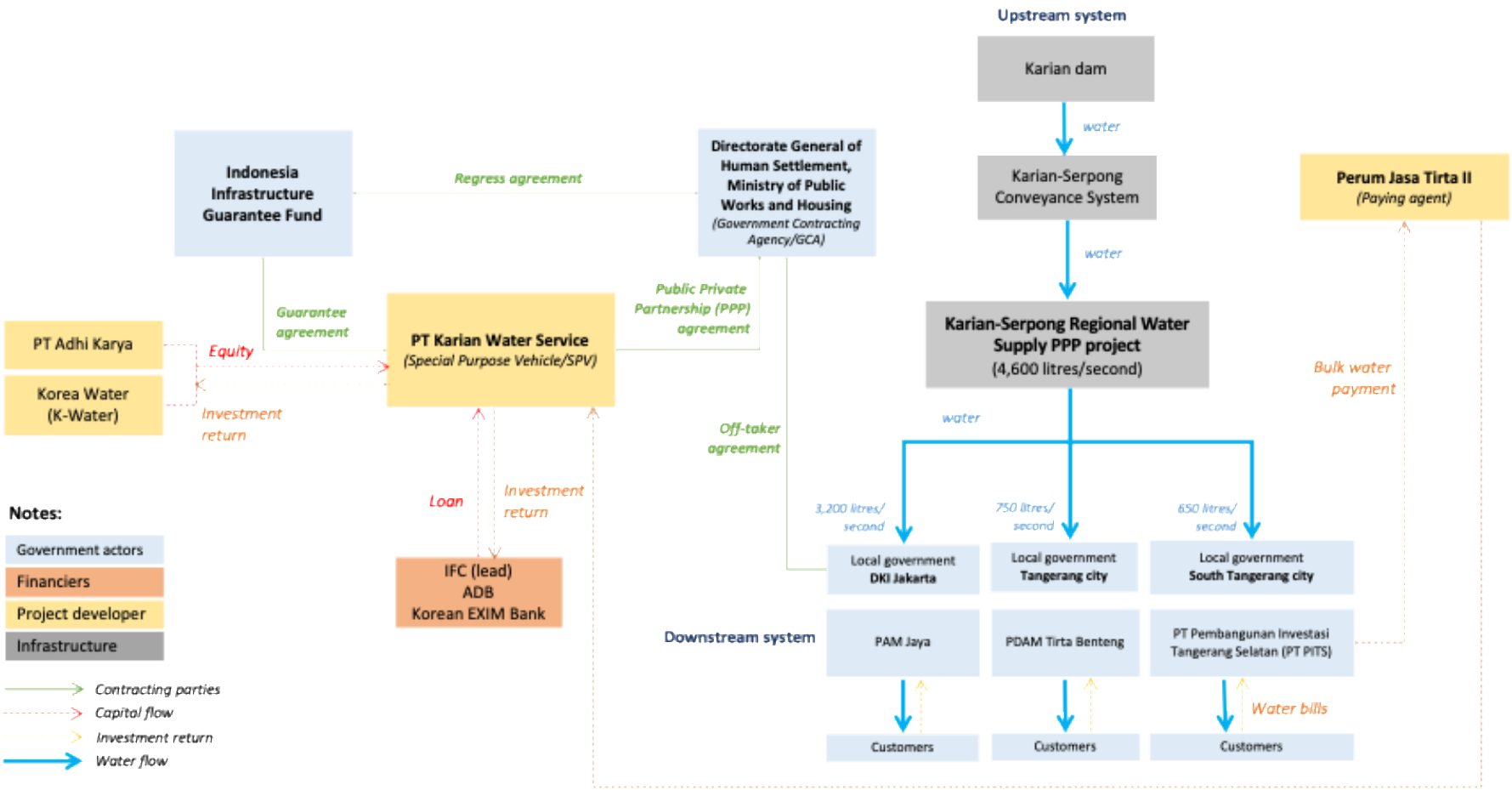

Figure 5.4 Project structure; flow of water and capital in Karian-Serpong water supply PPP project

These two-tiered governance structures – between the SPV and the GCA, and between the GCA and local governments – ring-fence private developers from uncreditworthy local utilities and high-risk pipe connection work. As a PPP advisor suggested, "There is no problem with the PPP contract; the problem is with the off-taker."[83] Under the two-tiered structure, utility payment failures will be absorbed by the GCA, which will pay the SPV for the bulk water. Any non-payment becomes an intergovernmental debt issue; "if we [the GCA] ask for the money and they [local governments] do not pay, then what? It's just debt between governments."[84] As such, the PPP's structure demonstrates a form of de-risking, shielding private actors from taking up high-risk projects and from contracting with non-bankable utilities.

The two-tiered structure relies on the user charges flowing from the utilities to the GCA, then to the SPV. The SPV finances its operations through a mix of equity from shareholders and loans from financiers, usually at a 30:70 ratio. The development of water infrastructure is driven by this 'interest-bearing capital' (Fine, 2013), where returns flow from consumers' water bills to investors, including the Indonesian government itself, which holds stakes in SOEs through its sovereign wealth funds.[85] This profit-driven, rather than public-service-oriented, project is exemplified in how PPP projects are designed to meet private returns. For instance, the Jatiluhur project's internal rate of return (IRR) is planned at 12.36%, higher than the weighted average cost of capital (WACC) of 10.43% (Ditjen Pembiayaan Infrastruktur, n.d.).[86] A higher IRR indicates the project is profitable and therefore attractive to private actors.

However, an official questioned whether such margins are justified for public infrastructure provision:

> "If the IRR is the same as the WACC, it is already enough. But [for] some [investors], they take another 4% above the WACC […] Is that correct? [he wondered] We put this additional margin [of returns] for public goods to the private [sectors]."[87]

This official highlighted the tension that arises when infrastructure is financialised and built for private returns while imposing costs on the public, such as increased water tariffs. More importantly, with investment pouring into the WTP and less into the distribution networks, there is a risk that water will be produced and stored in reservoirs, neither channelled to customers nor paid for. The unbundling of water infrastructure results in "a myriad of individually financed and managed infrastructure projects" (Graham and Marvin, 2001:97), posing coordination challenges across different levels of government. These interface risks – the coordination failures that emerged when construction and financing responsibilities are separated across different actors and infrastructure components – initiate another round of crises to be solved by state actors. With low fiscal capacity, water services that do not operate on a full-cost recovery basis, and water tariffs that are "far from

[83] Interview with PPP consultant, April 2025, Zoom
[84] Interview with Project Monitoring Office of PPP, Ministry of Public Works and Housing, 27 June 2023, Jakarta
[85] Indonesia's new sovereign wealth fund, Danantara, owns a 91% of stake in WIKA and 64% in Adhi Karya.
[86] WACC represents the cost of equity and debt that a company must pay to finance the project, while IRR represents the annual rate of returns on the investment.
[87] Interview #1 with Directorate General of Infrastructure Financing, May 2023, Jakarta

reflecting its [waters'] economic value",[88] local water utilities struggle to invest in new pipe connections and pay the bulk water charge. Meanwhile, under binding take-or-pay contracts, the GCA must still pay for the water at contracted volume and price; as an official noted, "we are paying for wind [for nothing] … no water, but we must pay." This means the state must absorb interface risks to ensure the private sector generates its expected returns, while water service to the communities remains uncertain.

Given these risks, local governments have been renegotiating the bulk water price and minimum volume uptake with the GCA even after signing off-taker agreements.[89] This constant negotiation over bulk water payments frustrated the GCA, as an official asked: "How [do we] structure a project not in the promise, but in the contract?"[90] Investors believe that local government actors should adhere to "business ethics"[91] by not renegotiating or violating contracts, to maintain an investment climate. Meanwhile, local governments are bound to sign the agreements: the projects were implemented as a top-down national strategic project, for which the national government had absolute control over development and implementation. The constantly changing contract is only the beginning of the risk management process, which is just as arduous as establishing project feasibility. Moreover, now the state is tied to a long-term contract: "controlling this [PPP project] for 20-30 years is perhaps equal to the length of someone's career… and we [have] never had something like that."[92] Especially as water supply projects lack financial feasibility, with persistent risks such as low full-cost recovery and interface risks across different infrastructures (dams, conveyance lines, WTP, and pipes), managing PPP projects means mitigating those risks also during implementation. This requires ongoing de-risking work throughout the contract period, potentially exhausting future state fiscal capacity (August et al., 2022; Bayliss & Van Waeyenberge, 2018).

Even after the relentless work of establishing the institutional structure for PPP, uncertainties around the projects linger. Jatiluhur project faced land-acquisition delays at the WTP Bekasi and the Pondok Kopi distribution centre.[93] Meanwhile, SOE WIKA, the majority stakeholder of SPV WIKA Tirta Jaya Jatiluhur, is overleveraged due to large-scale infrastructure projects, notably the Jakarta-Bandung high-speed train (Wijaya, 2024). WIKA reportedly delayed its principal bond repayment to investors and was suspended by the Indonesia Stock Exchange (Shabrina, 2025). It plans to divest some of its entities, including WIKA Tirta Jaya Jatiluhur (88.38% ownership), to increase its cash liquidity (WIKA, 2025). The extent to which the change of shareholders will affect WIKA Tirta Jaya Jatiluhur and its operation is still unknown at the time of writing. However, this signifies one failure in the state's speculative strategy: its ambitious infrastructure project backfires when it seeks to expand and carry out investment in many projects at once (Negara & Prasetyantoko, 2023). This also shows how the

[88] Interview #1 at the Directorate of Human Settlement, Ministry of Public Works and Housing, November 2022, Jakarta
[89] Interview with WIKA Tirta Jaya Jatiluhur, November 2022, Bekasi; PDAM Tirta Patriot, June 2023, Bekasi; Dinas Pekerjaan Umum dan Perumahan Rakyat Kota Tangerang, June 2023, Tangerang
[90] Interview at the Directorate General of Infrastructure Financing, Ministry of Public Works and Housing, May 2023, Jakarta
[91] Interview with WIKA Tirta Jaya Jatiluhur, November 2022, Bekasi
[92] Interview #1 at the Directorate General of Human Settlement, Ministry of Public Works and Housing, May 2023, Jakarta
[93] Interview with WIKA Tirta Jaya Jatiluhur, November 2022, Bekasi; Field notes in WTP Bekasi, November 2022

mobilisation of SOEs reveals the limits and contradictions of Indonesia's PPP-based financing model (Anguelov, 2024).

For the Karian-Serpong project, the PPP agreement was signed before the completion of the Karian dam and the conveyance system (see Figure 5.4). This raised a critical question "how can a water project operate without water?"[94] This mismatch in timing, budgeting, and operations across different infrastructure elements explains IIGF's reluctance to underwrite water supply risks.[95] Financial closure or a loan agreement with the project's prospective lenders, the ADB, IFC, and Korean Export-Import Bank, was also stalled, despite having signed the loan common terms agreement. To mitigate supply risk, the GCA has been exploring alternatives to the dam and conveyance system, including building a transmission line and a 500 litres/second water intake from the Cisadane River in Tangerang (Bappeda Kota Tangerang, 2025). However, Cisadane river's water balance is already estimated to be in deficit, with new town developments in Jakarta, Tangerang, and South Tangerang relying on it as their water source (Ministry of Public Works and Housing, 2019:231). Therefore, this plan to shift the project's water source remains uncertain.

Finally, even with the de-risking schemes in place, "there is still no success story around water supply projects" as "three out of five projects guaranteed by the IIGF are plagued with [financial] problems".[96] Now, with insufficient investment at the local level, the GCA has to make up for the financing gaps by paying for the intermediary infrastructure, reservoirs, and transmission lines for Jatiluhur and Karian-Serpong projects. Meanwhile, Jakarta needs around IDR 11 trillion (US$670 million) to develop the downstream network for the Jatiluhur project and around IDR 3 trillion (US$179 million) for Karian-Serpong – equal to a staggering 1-5 times the entire investment value of the bulk water projects (RISPAM DKI Jakarta 2024-2044). The Ministry of Public Works and Housing allocated IDR 1.44 trillion (US$87.7 million) from the 2023 state budget and sharia bonds to Jakarta to pay for Jatiluhur's downstream projects, such as the Sentra Timur off-take and distribution centres at Pondok Kopi and Cilincing (Komisi V DPR RI, 2023). The same goes for Tangerang; the Ministry allocated IDR 205 billion (US$12.48 million) to build reservoirs, transmission, distribution, and reticulated lines for the downstream system of the Karian-Serpong project (Pemerintah Kota Tangerang, 2023). Therefore, in contrast to the illusion of the state's fiscal gap, "in total, the state investment is bigger than private sector […] but [it] is needed to attract private investment."[97] To achieve the additionality of leveraging, the state must shoulder the interface and downstream risks, forcing them to provide more and more funding to ensure the smooth-running of the PPP projects.

Rather than a predetermined risk allocation as suggested in the technocratic analysis of PPP, Jakarta's water supply projects require what Wijaya (2024) calls 'ex-post risk management'. The state and private actors manage risks along the project lifecycle, undertaking the project despite the foreseen contingent risks. As a result, the state's fiscal burden has mounted, leaving few resources to support water access in other cities and regions in Indonesia.[98] The de-risking state is now entangled in long-term contracts that will continue to absorb public funds to keep the too-big-to-fail projects running.

[94] Interview with project developer, November 2022
[95] Interview with Project Monitoring Office of PPP, Ministry of Public Works and Housing, June 2023, Jakarta
[96] IIGF official at the 25th Indonesia Infrastructure Roundtable Focus Group Discussion, 29 August 2023
[97] Interview at the Directorate General of Infrastructure Financing, Ministry of Public Works, October 2023
[98] Interview with Project Monitoring Office of PPP, Ministry of Public Works and Housing, 27 June 2023, Jakarta

As such, paradoxically, the water supply projects that were once thought to save Jakarta from its sinking and flooding crisis have become new sources of fiscal crisis for state actors.

5.6. Conclusion

This chapter has examined the state's de-risking strategies to usher private investment into Jakarta's water infrastructure. Jakarta is suffering from a water supply crisis and water access inequality, leading to decades of reliance on groundwater and severe land subsidence. In response, state actors turned the water crisis into a financial problem of making water infrastructure investable. Here, I explained two joined strategies. First, I explored the restructuring of state institutions and regulatory architectures to produce an enabling climate for water infrastructure investment. The rollout of neoliberal policies under Soeharto and Yudhoyono's regime – the marketisation, privatisation, and decentralisation of the water sector – laid the groundwork for new developmentalist, but marketised state activism under Jokowi's tenure. The mutating state has assumed a centralised role in financing infrastructure, attracting private finance by empowering and capitalising its SOEs to construct, guarantee, and finance high-risk, unbankable projects, such as water supply infrastructure.

Secondly, state institutional restructuring is oriented towards financialised infrastructure. The realignment of infrastructure as unbundled projects – perversely resulting from an anti-privatisation struggle that barred the private sector from controlling water services up- and downstream – has produced a fragmented, risky PPP structure. Subsequently, water supply projects are structured into two layers of contracts: first, the PPP contract between the GCA, SPV, and the IIGF; and second, the off-taker contracts between the GCA and local governments. This structure de-risks 'in disguise' (Gabor & Sylla, 2023): the SPV is protected from uncreditworthy local utilities by transacting with the national government, the Ministry of Public Works and Housing, as the GCA. In a separate contract, the off-takers sign an agreement with the GCA so that any downstream debts are borne by the GCA rather than private actors. This structure has enabled the rollout of two of Jakarta's bulk water projects: the Jatiluhur and Karian-Serpong projects under PPP arrangements.

This fragmentation of infrastructure and institutional configuration benefits private actors but poses risks to the government and the public, whose increase in water access remains uncertain. Investment in WTP has materialised without sufficient investment in the downstream networked infrastructure to extend water access in the city. Local governments and utilities have limited capacity to pay for the reticulated systems. Subsequently, the GCA is managing interface risks across the infrastructure chain to compensate for local governments' funding shortages. This is the actual cost of PPP for the state, as they must continually draw on their own budgets to attract private investment over the extended contract period. The risks, in the end, are passed on to the public, who must endure insufficient access to piped water and the severity of land subsidence, all while still subsidising private-sector investments.

Chapter 6. Rebundling risks, infrastructure, and territory

6.1. Introduction

The Indonesian Government has responded to Jakarta's water crisis and land subsidence by seeking to build massive bulk water projects. The cost of these projects has led the fiscally constrained state to seek private finance. Chapter 5 demonstrated how the state underwent market-led institutional restructuring and rolled out new forms of statecraft to attract private investment. The marketised state manifests in the institutionalisation of Public-Private Partnership (PPP) (Birch & Siemiatycki, 2016; Carroll, 2012), combined with a developmentalist agenda and state resource mobilisation through state-owned enterprises (SOEs) (Anguelov, 2023; Warburton, 2016; Wijaya & Camba, 2023). Aside from restructuring the statecraft, water infrastructure is selectively unbundled, based on its risk and return profiles to meet investor expectations of profitability (Graham & Marvin, 2001). The result is the siloing of water treatment plants (WTP), "the meaty part"[99] of the water infrastructure chain. However, the bulk water projects, Jatiluhur (4,750 litres/second) and Karian-Serpong (4,600 litres/second), caused another crisis for the state. The national government must continually expand its fiscal capacity to mitigate 'interface risks', or the non-simultaneous construction and operation of WTP and distribution pipes, to prevent water from accumulating at WTP, neither channelled to customers nor paid for. Chapter 5 showed how de-risking private investment requires continuous state intervention throughout the project lifecycle.

This chapter advances two main arguments. First, I will analyse how state and private actors re-engineer their projects' "business models" into integrated, source-to-tap schemes, from the WTP to distribution networks.[100] This transformation involves a process of 'ontological reconfiguration' (Çalışkan & Callon, 2010; Ouma, 2016) of water infrastructure: the re-assembling of water infrastructure to make it fit for finance. Scholars have examined the emergence of different forms of water infrastructure bundling, including conjoined water, energy, food, and waste infrastructures (Loftus & March, 2019; Williams et al., 2019) and pooling of smaller water projects (Williams, 2021). This chapter argues that the rebundling of infrastructures represents more than a physical connection between systems; it is an inherent reconfiguration of risk allocation. By re-integrating the infrastructures, the state transfers the previously retained interface risk in the bulk water supply project back to private actors, thereby ensuring smooth water flows to urban customers. However, exposing private actors to interface and downstream risks results in a higher bulk water tariff, as private actors incorporate the cost of extending the pipe into the bulk water charge that utilities must pay. Financialising the integrated system rather than only some of the parts produces a large and stable revenue base for private actors, enabling them to match bulk water flows, pipe investments, and consumers' water payments.

Second, following Williams et al.'s (2019) call to examine and politicise bundling infrastructures, I will demonstrate how the financialisation of Jakarta's supply projects is linked to the political and economic interests of Indonesia's oligarchs. The Soeharto-backed Salim Group, through its subsidiary,

[99] Interview #2 with PDAM Tirta Benteng, August 2024, Zoom
[100] Interview with Infrastructure Financing #1 at the Ministry of Public Works and Housing, May 2023, Jakarta

Moya Holding Asia Limited (Moya), has returned to Jakarta's water service at the end of PAM Jaya's contract with the two private operators, PAM Lyonnaise Jaya (Palyja) and AETRA Air Jakarta (AAJ). While the extent to which oligarchic relations with Soeharto or the current ruling regime enable the company to secure a new water supply contract in Jakarta remains to be researched, having Salim Group, with its enormous capital endowment and vast experience running a water business in South-East Asia, provides financiers with assurance about the project. Their return to the sector is also justified technically: the companies and their engineers are assumed to have knowledge and experience operating Jakarta's water system. These financial, political, and technical rationalities justify Salim Group/Moya's return to Jakarta's water governance, despite civil society's protests against water privatisation and their role in it (Lobina et al., 2019; Marwa, 2024). This also signals the path-dependency of past water governance regimes to today's Jakarta water services, demonstrating the lock-in of oligarchic power (which has failed to deliver equal and reliable water services), while plugging Greater Jakarta's water into a structure of global rent-extraction in which the company is entangled.

I show that Moya's portfolio aggregation in Greater Jakarta enables Salim Group to address another crisis: water shortages in Salim Group-backed real estate projects. This consolidation solves problems for their profits: water supply projects secure large-scale, unsubsidised consumers to generate revenue, and vice versa, property development secures water supply. However, this means that private actors' influence in directing water flows and access remains pivotal despite the cancellation of the pro-privatisation Water Law. They become an 'unelected government' (Castree and Christophers, 2015) who, through their partnership with the utilities, control and benefit from the water supply business across Greater Jakarta. Bundling projects result in spatial and temporal integration of Jakarta's infrastructure for oligarch accumulation, horizontally (geographically, at scale) and vertically (between water users and global investment actors) (see Pryke and Allen, 2019), connecting the past and the future of Jakarta's water crises.

This chapter proceeds as follows. In the next section, I will situate this chapter within scholarly debates on the scalar problems of dis/integrated infrastructure, showing how risk shifting is inherent to the reintegration of water infrastructures in Jakarta. Then, I will exemplify the rebundling of water infrastructures through the Djuanda and Jakarta bundling projects. I will demonstrate how these bundling projects enable Moya to control bulk water production and thereby control water flows into their large-scale real estate projects developed by the same holding, Salim Group. I conclude by reflecting on a key question for this thesis: how the flow of water to Jakarta is built on state and private actors reconfiguring project risks and scales, once unbundling, now rebundling infrastructures, to fit private actor appetites.

6.2. Scale-making and infrastructure financialisation

In the context of water infrastructure, financialisation entails, first, the problematisation of crisis, where water shortages are translated into infrastructural problems requiring financial solutions (Bayliss, 2014; see Chapter 4). And second, financialisation relates to the processes and structures from which value from water projects is generated and distributed, indicating the increasing role of financial actors and logics (Epstein, 2002), particularly via the expansion of the interest-bearing

capital (Fine, 2013) in water service provision. Water project developers pay for projects using loans and equity, therefore, requiring infrastructure to operate to maximise shareholder returns and debt service payments (Pike and Pollard, 2009). Financialisation is thus signified by the architecture of rent extraction – the (vertical) integration of water customers whose water bills are entangled with interest-bearing capital (Allen & Pryke, 2013; Pryke & Allen, 2019; Purcell et al., 2020), and the spatial (horizontal) breadth of infrastructure which is designed to operate across diverse geographical contexts to maximise revenue extraction. Financialisation logics shape how different forms of infrastructural scale-making are realised.

Geographers have long argued that scale is not predetermined but politically produced through complex interactions of social and natural processes (Sayre, 2005). This section will argue that scale-making in infrastructure financialisation, via unbundling and rebundling infrastructure, functions as a modality of risk management, deliberately designed to meet investor appetite for risk and return. Bodies of literature have explored various ways of integrating water infrastructure, including combining water with other resources (e.g., energy) through the so-called 'nexus' approach (Schmidt & Matthews, 2018; Williams et al., 2019). While investment in water infrastructure alone is high risk for private actors, bundling water-energy infrastructure could appeal to private actors seeking a climate-related portfolio. This is as water alone, said a development banker in an interview, is "not climate enough" to attract climate-related finance.[101] This means that attracting investment into water infrastructure requires a matchmaking process that bridges different project sizes and risk-and-return profiles with the various investor appetites (Blended Finance Taskforce, 2022). Here, bundling projects function to "smooth out differences between contexts in order to create a marketable financial product" (Williams, 2021:1877); it is a way of de-risking private investment by spreading out risks between diverse projects. For instance, the Organisation for Economic Co-Operation and Development (OECD) and the World Water Council (2015) advocate that water projects must be cross-subsidised by other profit-generating infrastructure, such as hydropower electricity. The integration process functions as a de-risking mechanism in water supply projects, producing "multi-purpose water infrastructure" that is "set to become an increasingly important asset class by itself" (ibid: VII).

However, scholars have documented how de-risking via upscaling water infrastructure overrides the actual needs for water access or to solve the water crisis. Loftus and March (2016) exemplify this through their analysis of integrated water-energy infrastructure in London, which is not genuinely needed by citizens (as opposed to network maintenance) but is produced instead to satisfy the appetite of institutional investors and their profiteering activities. Therefore, emerging big water infrastructures can be understood as arrangements of financial expectations of risk/return, rather than as a direct response to climate change or community needs (Crow-Miller et al., 2017).

Infrastructure scale-making can take another form, such as pooling smaller but similar infrastructure projects. For instance, in Indonesia, water services fall under municipal government authority, and the absence of mid-level/metropolitan authorities prevents the aggregation of water projects (World Bank, 2006). Meanwhile, institutional investors find small projects unappetizing, preferring project size to be large to curb costs such as technical, financial, and legal due diligence costs on the project

[101] Interview with development bank, July 2023, Zoom; Fieldnotes on the 2nd stakeholder meeting for World Water Forum, October 2023

(Alaerts, 2019). Therefore, international financial institutions have advocated for aggregating different water projects to achieve economies of scale before offering them to investors (Delmon, 2014). A development consultant suggested how he advised utility to bundle their projects:

> "At the beginning of the projects, what they [utilities] offer to private developers is only around 100 billion [Rupiah]… then we advocate 'why don't you make this as one package and offer this as PPP with BOT [Build-Operate-Transfer]?', and they agree. Finally, projects that initially were around 100 billion [Rupiah] are bundled and tendered as one package of around 2.4 T [Rupiah]. … There are many investors interested."[102]

This chapter extends research about bundling projects, arguing that attracting finance into water infrastructure requires adjusting risk exposure and revenue potential rather than simply scaling up or integrating project size. In Djuanda and Jakarta's bundling scheme projects, private developers internalise larger risks to accommodate more complex projects, potentially with a higher chance of cost overruns (Flyvberg, 2014). Therefore, the state must establish a larger revenue base – greater bulk water capacity and number of customers – to incentivise private actors to undertake the project. Thus, increasing project scale functions as a negotiated compensation mechanism for risk allocation: private actors expand their revenue opportunities in exchange for assuming the risks that the state seeks to transfer.

PPP serves as a key mechanism of financialisation by structuring risk allocation between state and private actors in ways that guarantee returns to investors (Birch & Siemiatycki, 2016). The Indonesia Infrastructure Guarantee Fund (IIGF) issues a risk allocation booklet that contains an exhaustive list of risks for every PPP project, explains how risks can be allocated, and outlines how to manage them in accordance with "best practices" (IIGF, 2022). It is not clear how or where the best practices were derived, especially given that there are still no apparent best practices for water supply PPP projects in Indonesia. Yet the publication serves as a reference—a "general template"—for consultants developing feasibility studies for infrastructure investment.[103] In the booklet, risks are categorised around their infrastructural and delivery forms. For instance, the booklet recommends that state actors shoulder significant risks as a precondition of the PPP agreement in bulk water projects, such as land acquisition, raw water availability, interface risks, income risks (volume and tariff increases), network connection (including the risks of competition and groundwater use), as well as political risks. Meanwhile, private actors should bear the risks of designing, constructing, and operating water supply plants, as well as financial closure. Following these guidelines, PPP schemes are devised to reflect a combination of risks and delivery functions, selectively tailored to attract private investment.

The following section introduces the Djuanda project and the bundling scheme in Jakarta as case studies to illustrate how risks and scales are made in bulk water projects (see Figure 6.1). These projects are not part of the water-and-other infrastructure nexus nor portfolio pooling, which other scholars have studied, but they share a similar logic in integrating and seeking efficiency by combining existing unbundled elements of the water supply system. The projects exemplify the state's strategy to address interface risks while enabling private actors to build substantial water capacity that can be sold to utilities as a source of revenue.

[102] Interview with development consultant, June 2023, Jakarta
[103] Fieldnotes from PPP Training Workshop, May 2024

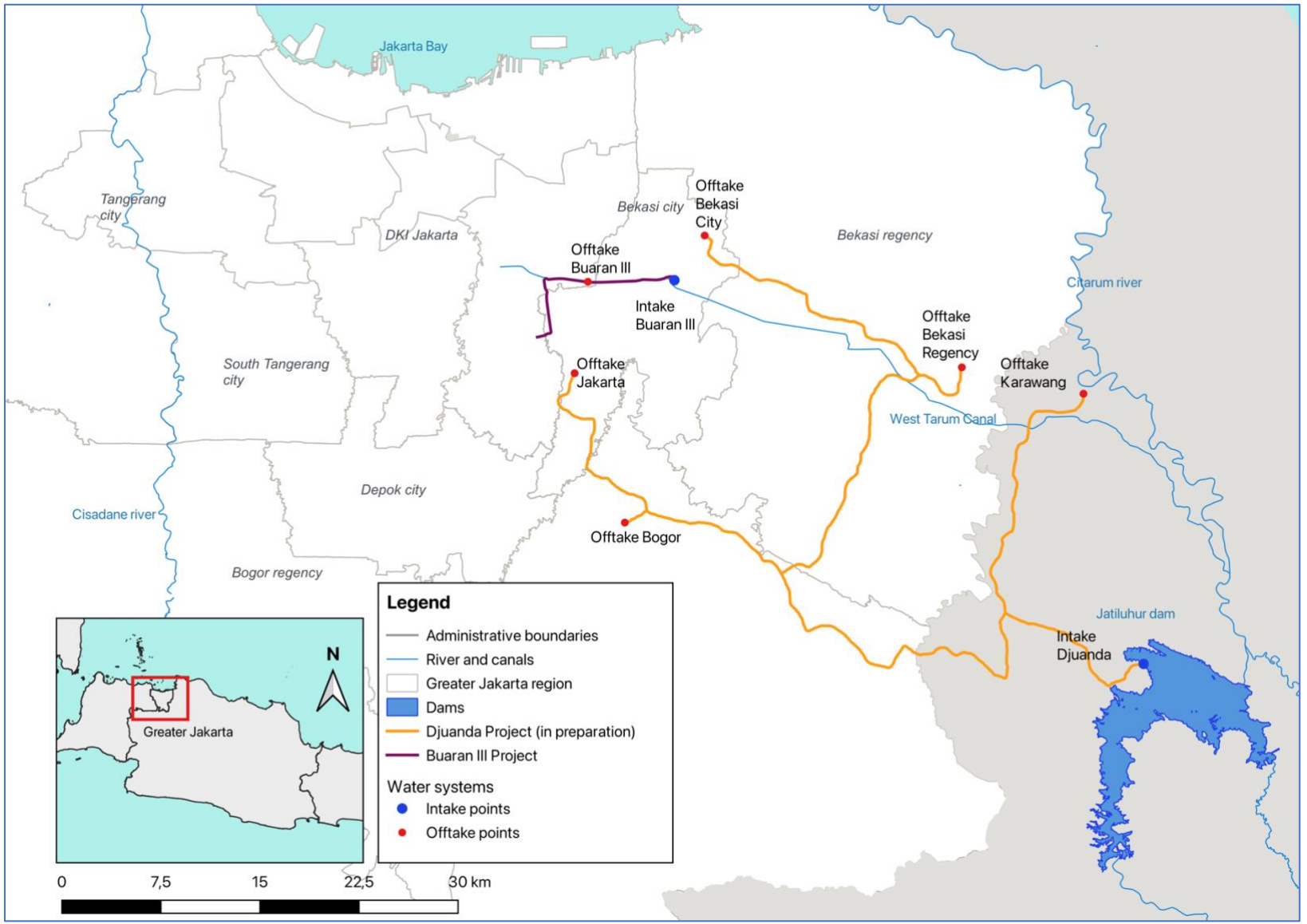

Figure 6.1 Djuanda and Buaran III water supply project (map by author)

6.3. Rebundling at scale: the Djuanda project

The Djuanda project is the first water supply project in Jakarta to experiment with a source-to-tap approach. The bundling strategy is drawn from the experience of financing toll roads, where "fat toll roads", or more revenue-generating roads, are bundled with those with less traffic.[104] Borrowing from the toll road strategy, the Djuanda project restructures water infrastructure "business models", coupling the most and least risky parts of water infrastructure to enable cross-subsidies.[105]

The project's capacity is 7,000 litres per /second,[106] making it the largest in Jakarta compared to Jatiluhur and Karian-Serpong. The Djuanda project will deliver water to Bekasi Regency (1,371 litres/second), Bekasi City (1,051 litres/second), DKI Jakarta (2,054 litres/second), and Bogor Regency (2,012 litres/second) (Bappenas, 2023).[107] The project is led by a Special Purpose Vehicle (SPV) consisting of Ranhill Utilities (private company based in Malaysia) with a 74% stake in the project, and other members in the consortium, including PT Varsha (an Indonesian private company), PT PP Persero and PT PP Infrastruktur (Indonesian SOEs), and Maynilad (Philippines-based water company backed by Salim Group through Metro Pacific Investment Corporation) (Ranhill, 2023). The Djuanda project includes the development of a water intake at the Jatiluhur dam intended to minimise contamination, channelling water through a 95 km closed transmission pipe, and extending network connections to 2.4 million new and old customers through more than 6,400 km of distribution pipe.[108] The project's total cost is estimated at US$860 million (Ranhill, 2023), or approximately 5 to 8 times larger than Jatiluhur and Karian-Serpong bulk water projects, respectively.[109]

In the Djuanda project, the private developer internalises interface, downstream construction, and leakage risks.[110] By reintegrating the infrastructure (see Figure 6.2), the state allows private developers to control the balance of water production and distribution – their expenditure and revenue generation. Technically, this integration would prevent water from accumulating in the WTP without reaching the customers, given that local governments often underinvest in the pipe network.

[104] Interview with Former Director of PAM Jaya, May 2023, Zoom
[105] Interview with Infrastructure Financing #1 at the Ministry of Public Works and Housing, May 2023, Jakarta
[106] Planned capacity before water loss in production and transmission
[107] The initial plan of the project also includes Karawang regency (Parama, 2020)
[108] Presentation on Djuanda project, shared to researcher
[109] Presentation on Djuanda project, shared to researcher
[110] Interview with Infrastructure Financing #1 at the Ministry of Public Works and Housing, May 2023, Jakarta

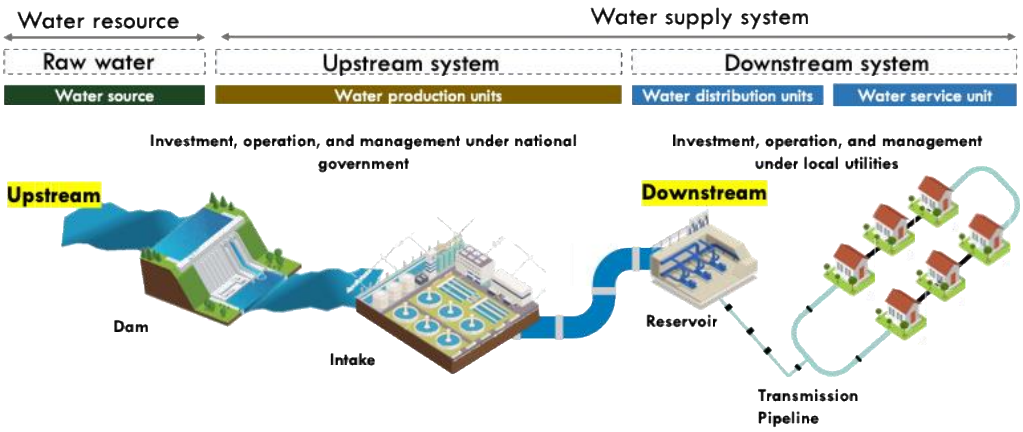

Figure 6.2 Source-to-tap water supply system

Source: Adapted and translated from the Director General of Infrastructure Financing's presentation (Zuna, 2023)

The production unit, or WTP, will be constructed using the build-operate-transfer (BOT) PPP model. Off-takers will pay through a 'take-and-pay' scheme, meaning they purchase water at the volume used. This will protect the Government Contracting Agency (GCA) from being penalised when water consumption and revenue fall short of the target, which is likely to occur given consumers' reliance on groundwater. Meanwhile, the downstream pipe will be built using the build-transfer (BT) scheme, where private actors build and transfer the pipes to the utility. Utilities pay for the pipe based on an 'availability payment scheme', meaning that project developers will receive payment for pipe construction after they develop the pipe and meet the agreed key performance targets, such as certain construction quality, with utilities (Siemiatycki & Farooqi, 2012). This kind of performance-based contract is seen as a recent breakthrough in global water supply projects. Compared to the standard input-based contract, a performance-based contract can incentivise the private sector to achieve the targeted output (Jamieson et al., 2024).

The project appears to be a better deal for state and private actors in terms of financing and technical structure, but its rollout faces many challenges. First, the Djuanda project is structured in a complex PPP scheme: it consists of two-tiered PPP projects bundled into one (see Figure 6.3), with the Ministry of Public Works and Housing as the upstream GCA and four local governments as the downstream GCAs. As the project is contracted upstream and downstream, the developer must approach each local government to conduct the feasibility study. This is the first time such a complex governance and financing structure is being tested for PPP. Consequently, project preparation was complicated: "The challenge is in the preparation, which takes a lot of time and a lot of money… but it will work really well [compared to] doing it partially [in the unbundled system]."[111] The lengthy project preparation details the costs and risks that private developers consider in their investment decisions. The second challenge arose as the project's capacity was significantly reduced. The project was initially designed for 10,000 litres/second, but was reduced to 7,000 litres/second to make way for another project, the Buaran III

[111] Interview with Infrastructure Financing #2 at the Ministry of Public Works and Housing, May 2023, Jakarta

water supply project (introduced in Section 4 in this chapter).[112] This decrease brought it to the point where, as a consultant notes, its economies of scale are questionable, raising concerns among stakeholders about whether the project's profits still justify the financial risks.[113]

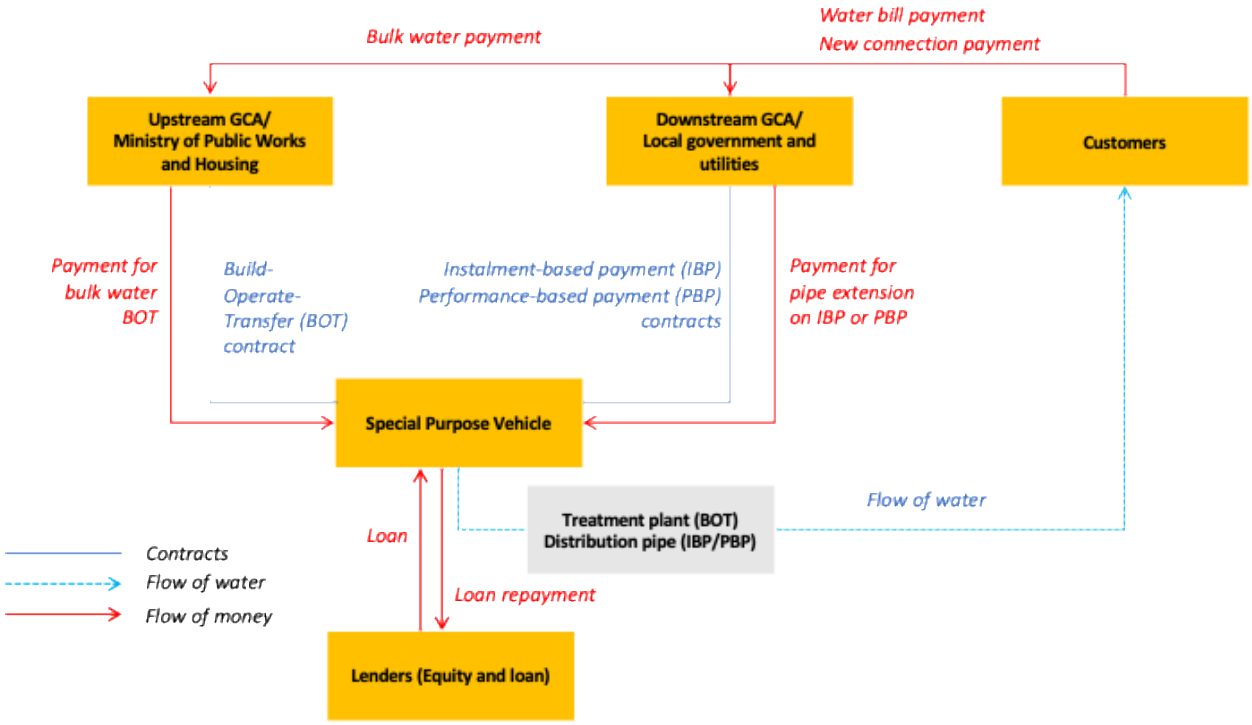

Figure 6.3 PPP structure for Source-to-tap water supply project
Source: Redrawn and translated from SPAM Djuanda Presentation for Bekasi city (Ranhill, 2022)

The source-to-tap approach creates a contradictory dynamic. While the complex two-tiered governance was designed to attract private investment, the project simultaneously produces higher tariffs to compensate for the increased risks. For instance, in Bekasi city, where the feasibility study has been approved by the local government, the consumer tariff is estimated at IDR 9,700 per m^3 on average (US$0.59; equal to the tariff for upper-middle-income families for large-scale water consumption in Jakarta).[114] This tariff will increase by 10% every two years.[115] The project developers justify this cost, noting that the water will be potable and cheaper for families than purchasing bottled water. Yet local governments perceive this increased water tariff as too high, especially in Jakarta, where several water

[112] Djuanda project public consultancy meeting in May 2020 introduced the project with 10,000 litres/second (Ditjen Pembiayaan Infrastruktur, 2020); Interview with former Director of PAM Jaya, May 2023, Zoom
[113] Interview with PPP consultant #3, April 2025, Zoom
[114] This tariff includes bulk water payment, downstream connection with installment- and performance-based payment, as well as service costs.
[115] Interview with PPP consultant #3, October 2023, Zoom

supply projects are already underway, imposing fiscal burdens on the local government to pay for bulk water.

The Djuanda project exists as an investment opportunity rather than as a response to the needs of urban residents. Its size does not reflect water supply necessity but compensates for the risk investors must retain in complex, lengthy, and costly projects. Jakarta's local government questions the need for more water supply projects, given the already contracted Jatiluhur, Karian-Serpong projects, in addition to PAM Jaya's projects including Buaran, Pesanggrahan, and Ciliwung plants, will already produce surplus to Jakarta's water supply in 2044 (RISPAM DKI Jakarta 2024-2044). Moreover, with the Djuanda project, some parts of Jakarta (notably in the east, the market area of the Djuanda project) will be served by an exclusive pipe system that delivers potable water without backup from other sources.[116] Finally, without reaching agreement with local governments, the project has not proceeded to contract signing and financial closure, ultimately leading to its removal from the National Strategic Project (PSN) lists in early 2024. This further increases the project's uncertainty: being removed from this list deprives it of access to various forms of government support, including debottlenecking facilities and land-acquisition funds.

To sum up, the Djuanda project shows a tension in the financialisation of large-scale water supply projects. Despite the promise of efficient risk transfer between state and private actors, risks are socialised onto consumers through higher tariffs to compensate for the large and complex project risks retained by private actors. This subsequently produces resistance from local governments, who must impose higher tariffs on their citizens while managing fiscal pressure from multiple ongoing financialised water infrastructure projects. Moreover, the water allocation from the Jatiluhur dam has become constrained by numerous competing projects, threatening the economies of scale that justify large-scale investment. The Djuanda project shows how financialisation meets its institutional, economic, and scalar limits.

6.4. Rebundling the downstream

6.4.1. (Selective) Risk allocation in the bundling scheme

During the preparation of Jatiluhur project, PAM Jaya had struggled to secure the necessary downstream pipe investment for the Jatiluhur project: IDR 11 trillion (US$670 million), which is almost 5 times the investment size of the Jatiluhur project itself.[117] Then, the COVID-19 pandemic exacerbated this fiscal constraint. The pandemic has simultaneously been used as a rationale to enable a new form of water privatisation in Jakarta – one that appears to address past privatisation failures while actually restoring elite control through 'creative financing' schemes (see Chapter 4).

In January 2022, the Ministry of Public Works and Housing, the Ministry of Home Affairs, and then Jakarta Governor, Anies Baswedan, and witnessed by the Coordinating Ministry of Maritime Affairs and

[116] Interview with PPP consultant #4, January 2025, Zoom
[117] Interview with PPP consultant #3, April 2025, Zoom

Investment, formed a joint planning agreement for water service delivery, "to harmonise the plan between national and local government."[118] The deal signifies how water infrastructure, which is a local government's responsibility, has become a national concern requiring intervention across scales. The agreement set an ambitious target: one million new connections in Jakarta by 2030. PAM Jaya's director characterises this target as "mission impossible" given post-COVID-19 fiscal constraints.[119] Meanwhile, the Ministry of Public Works and Housing, as the GCA for the Jatiluhur and Karian-Serpong projects, has to ensure the pipe system reaches customers so utilities can generate the revenue needed to pay for the delivered bulk water. To do this, the Ministry of Public Works and Housing facilitated new partnerships between private actors and the municipalities of Jakarta and Tangerang in the so-called bundling scheme.

The bundling scheme in Jakarta was signed between PAM Jaya and Moya, the holding company of the past concessionaire, AAJ. Moya establishes a new subsidiary for Jakarta's bundling scheme: PT Air Bersih Jakarta (ABJ). Like the Djuanda project, the purpose of the bundling scheme is to externalise interface and downstream risks to private actors by allowing private actors to accumulate large-scale bulk water capacity as their revenue base. Jakarta's bundling scheme agreement includes different brownfield and greenfield projects. The brownfield scheme, called "asset optimisation" (Moya Holdings Asia Ltd, 2022b), follows the mandate of the then-Ministry of Finance, Sri Mulyani, to ensure that "assets should not be left dormant, but must work hard to generate maximum benefits" (Rully & Erlangga, 2023). Asset optimisation includes the management and operation of existing major WTPs: Pejompongan I, Pejompongan II (previously managed by Palyja), Buaran I, Buaran II, and Pulogadung (previously managed by AAJ), at a total capacity of 16,800 litres/second. The greenfield projects include the construction and operation of a new WTP, Buaran III (3,000 litres/second), as well as downstream pipe networks from WTP Jatiluhur, Karian-Serpong, and Buaran III. With the addition of the Buaran III project, ABJ now manages a total of 19,800 litres/second of bulk water – this is 80% of Jakarta's projected water need in 2044.[120]

For the project developer, bundling the WTP and water network means distributing risks between infrastructures:

> "The most difficult part is if we only invest in distribution pipe[s] – we do not get regular income from the activities of managing water; that is riskier. But because we also control the WTP that is more secure with monthly earning[s], we allocate the risks between the two [distribution pipe and WTP], balancing the risks, from the upper and lower streams." [121]

For utilities, the bundled projects are more cost-effective: "As the base volume increases, the value of bulk water that we must pay for and the investment that we must make is less than if each project

[118] Interview with former Director of PAM Jaya, May 2023, Zoom
[119] Interview with Director of PAM Jaya, October 2023, Jakarta
[120] Jakarta's water supply master plan (RISPAM) suggests that the projected water demand in Jakarta in 2044 is 24,674 litres/second
[121] Interview with PT Air Bersih Jakarta, March 2023, Zoom

[Karian-Serpong and Jatiluhur pipe networks] were built separately."[122] Bundling old and new projects reduces the bulk water price from IDR 2,900 to 1,900 per m^3 (US$0.18 to 0.12).[123] Meanwhile, extending the new pipe network will reduce the aggregate percentage of non-revenue water. It is a "quick win" with fewer technical difficulties than controlling leakages, and it is favoured by PAM Jaya, project developers, and financiers.[124] Jakarta's bundling project is widely praised as "innovative",[125] demonstrating how local SOEs can creatively seek external financing support with less dependency on the government's subsidies.

However, building a new pipeline system is costly and is disrupted by the existing road network and dense urban development. As an expert emphasises: "One cannot imagine if Jakarta's streets are dug for planting pipes."[126] Pipe construction would mean excavating large parts of Jakarta. As a PAM Jaya staff member describes: "On the main road, you see a pit, as you go to the local road, another pit, and once you arrive at home, there is another pit."[127] The distribution network, however, will be constructed under an availability payment scheme, so that utilities will make payments to the project developer upon completion of each project, area by area. Such a scheme, called an 'instalment-based contract', frees project developers from having to construct the entire pipe network at once, which might require more upfront capital. The pipe connection "will be divided into packages – so, building transmission pipe this kilometre, done, and instalment paid. Then, we build distribution pipe this kilometre, done, instalment paid. … So, it does not depend on the 100% service coverage [target]."[128] By slicing the entire pipe project into 'packages', the private sector avoids taking on too much debt at once. This also prevents utilities from paying before the pipe construction is completed.

However, despite promising more coordinated infrastructure development and investment, the source-to-tap approach involves selective investment in water infrastructure. As ABJ handles pipe construction, PAM Jaya is tasked with recruiting new customers, which is not easy. PAM Jaya has been working on extensive marketing, from the city level to *Rukun Tetangga/Rukun Warga* (neighbourhood units, or RT/RW) and community groups, mobilising a sales force of around 250 marketers.[129] Even so, recruiting customers is not easy with competing sources of water still available: a "new pipe connection costs 1.5-3 million [Rupiah] for the customers, depending on the areas and pipes. [It is] not easy to ask people to pay that much upfront when there is still a substitute – groundwater."[130] According to Jakarta's RISPAM, 42% of the surveyed respondents in South Jakarta and 44% in East Jakarta do not want to connect to PAM Jaya's network, as groundwater is still available in good quality. Other potential new customers come from households and businesses that were initially served by real estate developers. Real estate developers must hand over their WTP assets and, consequently, transfer their customers to utility

[122] Interview with former Director of PAM Jaya, May 2023, Zoom
[123] Presentation at Indonesia Water and Wastewater Expo and Forum, Jakarta June 2023
[124] Interview with former Director of PAM Jaya, May 2023, Zoom
[125] Interview with former Director of PAM Jaya, May 2023, Zoom
[126] Interview with water infrastructure engineer #1, November 2022, Jakarta
[127] Interview with PAM Jaya, April 2025, Zoom
[128] Interview with PT Air Bersih Jakarta, March 2023, Zoom
[129] Interview with PAM Jaya, April 2025, Zoom
[130] Interview with underwriting division at the IIGF, July 2023, Zoom

companies, following the revocation of the pro-privatisation water law. Yet, residents of these estates, who already have good access to clean water, raised concerns about the reliability and quality of the new water service by PAM Jaya.[131] With difficulties in recruiting new customers, connecting pipes remains a risky task for PAM Jaya.

In addition to customer recruitment, PAM Jaya still faces a 45.62% leakage rate in 2023. Projects to improve non-revenue water is unbundled from the bundling scheme agreement as it is difficult to turn leakage into an investable proposition, as an official suggested:

> We must make an interesting investment scheme. Why [bundling with] a WTP? Because it provides certainty [to private investors], once the WTP is operational, the water is channelled, and [investors] will receive tariff payments from customers. However, non-revenue water is a loss, so we recover the loss of water. The key performance index would be if [investors] succeed in recovering water, they get paid. It is more difficult to attract investors with this [reducing non-revenue water]."[132]

Unlike capitalising on WTP, which is easy for ABJ as they only need to produce bulk water, fixing leakages requires high accuracy in detecting the leakage and replacing old pipes; a task which, as Anand (2015) reminds us, justifies the ignorance of the utility in dealing with the problems. It is also costly: Jakarta will need an investment of IDR 9 trillion (US$536 million) to reduce its non-revenue water from 46% to PAM Jaya's target of 25%.[133] Therefore, while the private actor continues to secure its revenue, PAM Jaya potentially faces a squeeze due to its inability to quickly recruit customers (its revenue source) and control non-revenue water losses, while being obliged to pay multiple private bulk water suppliers.

To sum up, this section highlights how Jakarta's bundling scheme serves as a modality of risk allocation to ensure private returns. I illustrate two implications here. First, as the bundling scheme exposes private actors to greater risks, it requires the state to expand the revenue base for private actors, allowing them to operate old and new WTP and build pipe connections, thereby streamlining their revenue and the flow of water to customers. Second, despite the goal of integrating upstream and downstream infrastructure, the source-to-tap approach focuses only on selective projects – WTP and pipe distribution, but not non-revenue water reduction – driven by private actors' risk and revenue expectations. Subsequently, the rebundling of projects does not ultimately guarantee smooth water flow to consumers, particularly for customers served by the existing pipes, as high leakage rates reduce water pressure, resulting in unreliable access for these customers. However, the bundling scheme allows private exploitation of low-risk projects, leaving PAM Jaya to retain the fiscal burden of purchasing bulk water (even from its existing WTP) from private suppliers and operating water services with high leakage rates. This ultimately undermines PAM Jaya's fiscal resilience and its capacity for remunicipalisation now, and in the long future.

[131] Interview with real estate developers in West Jakarta, October 2023, Jakarta
[132] Interview with Dinas Sumber Daya Air DKI Jakarta, 17 May 2023, Jakarta
[133] Interview with former Director of PAM Jaya, May 2023, Zoom

6.4.2. The reprivatisation of Jakarta's water governance

Jakarta's bundling project came as an unsolicited proposal from Moya. Moya won the bid from Manila Water by exercising its right-to-match privilege as the project solicitor to match the competitor's bid and secure the project. The project is financed as a business-to-business (B-to-B) scheme. B-to-B schemes are a "done deal" (Wijaya, 2024), often favoured by private actors because they require less bureaucratic engagement and are therefore faster than PPP.[134] B-to-B transactions are not as regulated as PPP, and unlike PPP, B-to-B agreements are only subject to the "internal regulation of PDAMs [utilities]".[135] As such, B-to-B contracts are tailored to local utilities and are more flexible in responding to the needs of utilities and private developers.

The bundling scheme requires heavy investment: capital expenditure of IDR 26.75 trillion (US$1.6 billion) and operational expenditure of IDR 24.41 trillion (US$1.48 billion) (PAM Jaya, 2022b). For the first two years of the project, ABJ has received IDR 8.8 trillion (US$535 million) of credit from Bank Central Asia (lead syndicate), together with OCBC Bank, OCBC NISP, Bank Tabungan Negara, Bank Tabungan Pensiunan Nasional, KB Bukopin, China Construction Bank Indonesia, and PT Sarana Multi Infrastruktur. With anticipated bankability, the B-to-B project does not benefit from state underwriting. A PPP advisor wondered: "How could Moya agree without a guarantee?" For the financiers, the answer is the equity holder, Salim Group, that ensures the business's financial viability.[136] PAM Jaya also recruited Palyja and AAJ's former staff, considering that the 25-year privatisation has left PAM Jaya with a "lack of information … and lack of knowledge"[137] about water management and its day-to-day operation. As the director explained: "Suddenly, there are big pipe leakages, and so on, those are *new* experiences for PAM."[138] For the financier, having Moya on board ensures the technical viability of the project, given its role as the 'experts' in the water business, even though the same actor has failed to extend the pipe service and control leakages, depriving the utility of fiscal stability for the past 25 years.

Jakarta's bundling scheme was quickly replicated in Tangerang, which is also in dire need of finance to pay for the downstream pipes of the Karian-Serpong water supply project. Facilitated by the Ministry of Public Works and Housing, the Tangerang bundling scheme was signed at the end of 2023 as a 30-year partnership which includes the operation of an existing WTP (Sitanala I; 500 litres/second), the construction of new WTP (Sitanala II, ASDAM II, and III; together 1,500 litres/second), as well as the development of new pipe connections for the new plants and the Karian-Serpong project. In this bundling scheme, Moya is joined by Palyja, previously the concession holder in Jakarta's west, under a new company, Air Kota Tangerang (AKT), to achieve 85% water service coverage in Tangerang by 2030. This equals 225,000 new connections in Mekarsari, Neglasari (Zone 2), Ciledug and Larangan (Zone 3).[139] What government officials proclaimed as innovative financing was quickly becoming a standardised

[134] Fieldnotes from FGD at the Indonesia Water and Wastewater Expo and Forum, Jakarta June 2023
[135] Fieldnotes from Webinar PERPAMSI 'Mekanisme Kerjasama B2B Sektor SPAM', November 2024
[136] Interview with PT SMI, June 2023, Jakarta
[137] Interview with the Director of PAM Jaya, October 2023, Jakarta
[138] Interview with the Director of PAM Jaya, October 2023, Jakarta
[139] Interview with Interview with PDAM Tirta Benteng, August 2024, Zoom

model for privatising water infrastructure across the metropolitan region.[140] Most critically, the bundling projects have brought back the old players of privatised water governance in Jakarta: Moya, Palyja, and Suez, with the latter providing technology and technical service for the Buaran III project (Suez, 2024).

Jakarta's water governance is, once again, entangled in a long-term contract with private actors, even without any formal public evaluation of past concessions or meaningful public consultation on the projects.[141] The Director of PAM Jaya emphasises that the partnership scheme differs from the previous contracts: "[for] water distribution service, absolutely, there cannot be privatisation. PAM Jaya controls the service and water quality. Moya does not hold any roles [at] the endpoint, only in the middle" (Salam, 2023). In a similar tone, local governments also deny that Jakarta's water infrastructure has again fallen into the trap of privatisation, as water infrastructure is only "leased out to the third party – like [recruiting a] cleaning service … but we call it [a] 'bundling scheme' because [the operator] will operate the new and old assets."[142] These schemes are rebundling and unbundling at the same time: rebundling WTP and pipes, but re-splintering WTP operations among private actors and the utility. Through this confusing roll-out of unbundling, rebundling, and re-splintering, governments and private actors reintroduce and remodel privatisation. Jakarta's water governance is re-privatised, undermining hopes for remunicipalisation and public-oriented water delivery. The following section will illustrate how private actors determine how water will flow, to whom, and on whose benefit, under this new model of privatisation.

6.4.3. Portfolio bundling: local-regional-global integration of Greater Jakarta's water

Under the un/rebundled infrastructure regime, local utilities share authority with private developers over water infrastructure, despite owning the physical assets. In Figure 6.4 below, I illustrate the 'chain' of water payment, "linking actors and actions at different scales, mutually dependent on and complexly articulated with one another" (Leitner and Sheppard, 2020:500). This figure shows how Jakarta's water flow is fuelled by a chain of payment and contracts between utilities and private actors. It demonstrates how water flowing to Jakarta is controlled primarily by one company: Moya. In addition to Moya, PAM Jaya also purchases bulk water from Wika Tirta Jaya Jatiluhur (Jatiluhur project), Karian Water Service (Karian-Serpong project), Jakarta Utilitas Propertindo (Hutan Kota project),[143] and utilities in the Tangerang region. Through this payment chain, water is produced, treated, and siphoned to customers. At different scales, from the upper to the lower stream, these private and public actors extract value from the same water, adding costs to customers along the chain.

[140] Similar bundling scheme is also replicated in East Bandung between Moya and PDAM Tirta Raharja
[141] Interview with Jakarta Legal Aid, April 2025, Sydney
[142] Interview with SDA DKI Jakarta, May 2023, Jakarta
[143] Jakarta Utilitas Propertindo (subsidiary of state-owned Jakarta Propertindo), through its subsidiary, Jakpro Memiontec Air, manages and sells bulk water from Hutan Kota plant

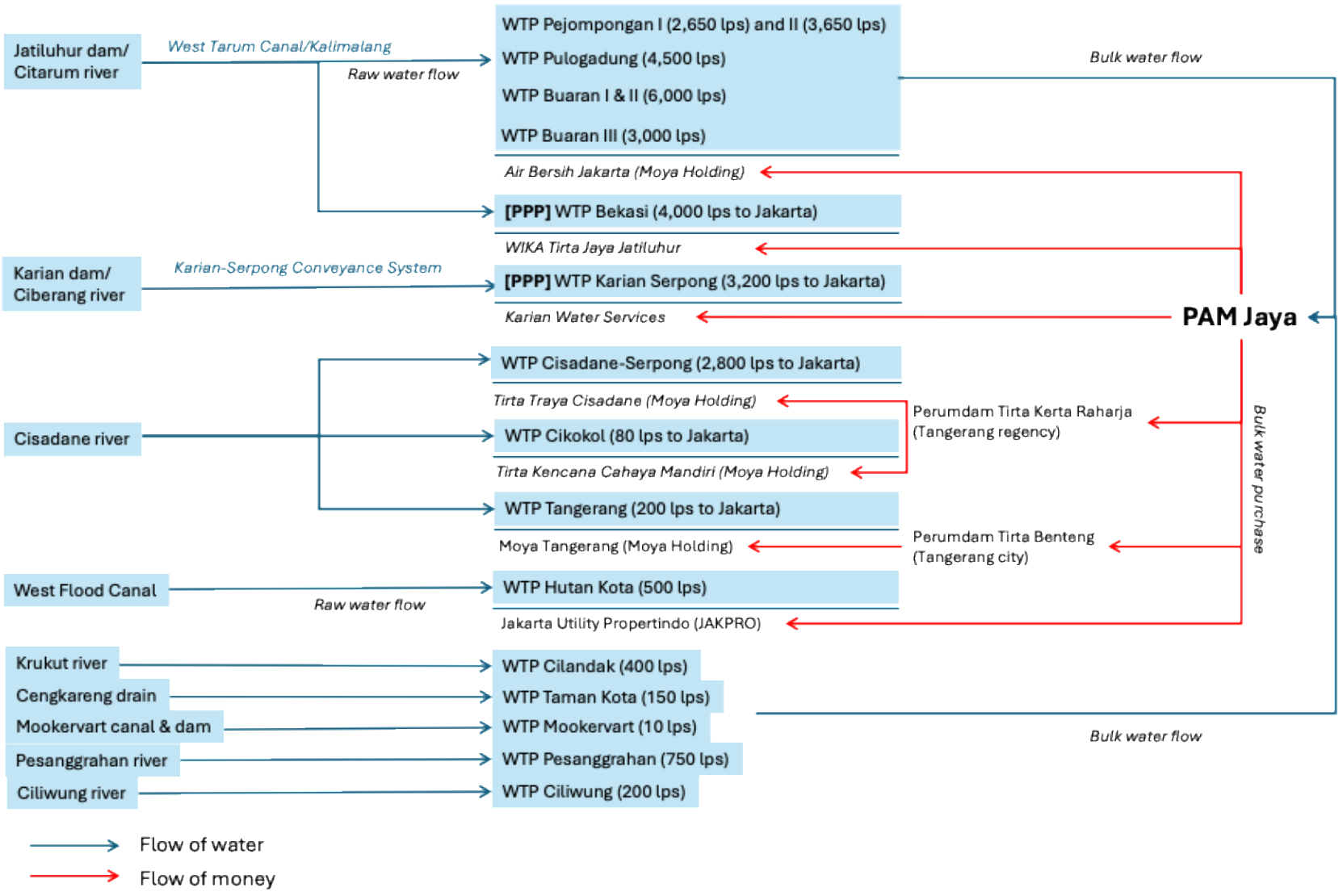

Figure 6.4 Chain of water supply to Jakarta (graph by author)

Moya Holdings, the company that oversees Moya Indonesia and therefore ABJ, was established in 2007 as a joint venture of the Saudi Bushnak Group and Bahrain-based Gulf One investment bank (Mahdi, 2007). Moya set its feet in Indonesia by establishing Moya Indonesia in 2011, with a 25-year build-operate-transfer contract for a 1,000 litres/second WTP in Bekasi Regency and a 950 litres/second WTP in Tangerang city (Moya Holdings Asia Ltd, n.d.). However, the projects were stalled due to a lack of investment. In 2015, when Salim Group, through Tamaris Infrastructure Pty. Ltd, invested S$29.3 million in Moya, the projects were resumed with Salim Group holding 61.8% ownership of the company (Moya Holdings Asia Ltd, 2016). Having portfolios in Bekasi and Tangerang was strategic for Moya, as both regions witnessed the proliferation of new-town real estate developments and industrial estate investment on the periphery of Jakarta. They constitute large water demand for the bulk water supply. In 2017, Moya acquired Acuatico from Recapital Advisor, owned by Sandiaga Uno, Jakarta's deputy governor at the time, along with its subsidiaries: PT AETRA Air Jakarta, PT AETRA Air Tangerang, and PT Acuatico Air Indonesia (The Jakarta Post, 2017). The acquisition of Acuatico marked Salim Group's return to Jakarta's water services.[144]

Moya's 2020 Annual Report suggests that Moya is owned 72.84% by Tamaris Infrastructure and 13.15% by GW Redwood (Moya Holdings Asia Ltd, 2021), signalling the retreat of Bushnak Group and Gulf One Investment Bank in the company. In 2020, Moya further consolidated its water business in Greater Jakarta by acquiring Obor Infrastructure's Tirta Kencana Cahaya Mandiri and Tirta Traya Cisadane, which operate two major WTPs in Tangerang: WTP Cikokol and WTP Cisadane-Serpong. In 2024, Almar Water, a Saudi-backed Spanish firm, acquired a 50% stake in Obor Infrastructure, bringing in US$55 million investment to Moya (Almar Water, 2024). These details demonstrate the financialised nature of the company: Moya (itself a foreign investment from Singapore) plugs Greater Jakarta's water infrastructure operation into the global architecture of rent extraction, by bundling different water infrastructures in Greater Jakarta (see Table. 6.1), as its revenue base to match the interests of global shareholders and investors.

Table 6.1 Moya Holding's current water project portfolio in Greater Jakarta

Subsidiary companies	Capacity (in litres/second)	Partner	Contract (years)	End date	Service area	Scope of service
Air Bersih Jakarta	19,800	PAM Jaya (DKI Jakarta)	25	2048	Jakarta	Bulk water production for utilities Pipe network construction for Jatiluhur, Karian-Serpong, and Buaran III projects
Acuatico Air Indonesia	85	Rasuna Epicentrum CBD	25	2043	Rasuna Epicentrum CBD	Bulk water production, transmission,

[144] Salim was initially Suez's partner in running Palyja for West Jakarta's water service, appointed through its connection with the ruling president, Soeharto. However, Suez later bought Salim's share following the 1998 upheavals when Soeharto and his business tycoon lost their political support (Harsono, 2005).

Subsidiary companies	Capacity (in litres/second)	Partner	Contract (years)	End date	Service area	Scope of service
						distribution, and customer service (source-to-tap)
Moya Bekasi Jaya	1,650	PDAM Tirta Bhagasasi (Bekasi Regency)	25	2036	n/a	Bulk water production for utilities
Moya Tangerang	2,200	PDAM Tirta Benteng (Tangerang City)	25	2041	Zone 1 Tangerang [a]	Bulk water production for utilities
Air Kota Tangerang	2,000	PDAM Tirta Benteng (Tangerang City)	30	2053	Zone 2 & 3 Tangerang [b]	Bulk water production for utilities Pipe network construction for Karian-Serpong projects
AETRA Air Tangerang	1,200	PDAM Tirta Kerta Raharja (Tangerang Regency)	25	2034	6 districts in Tangerang regency [c]	Bulk water production, transmission, distribution, and customer service (source-to-tap)
Tirta Kencana Cahaya Mandiri	1,600	PDAM Tirta Kerta Raharja (Tangerang Regency)	20	2037	Soekarno Hatta International Aiport and parts of Tangerang city	Bulk water production for utilities
Tirta Traya Cisadane	3,300	PDAM Tirta Kerta Raharja (Tangerang Regency)	20	2034	Bumi Serpong Damai and part of west Jakarta	Bulk water production for utilities

[a] Zone 1 includes Benda, Batuceper, Neglasari, Cipondoh, Tangerang, covering Tangerang city centre and new towns such as Metland and Green Lake City.
[b] Zone 2 Tangerang includes Periuk, Karawaci, Jatiuwung, Cibodas with industries and new development area. Zone 3 includes Ciledug and Pinang, mainly residential areas
[c] Includes Cikupa, Sepatan, Jayanti, Sindangjaya, Sukamulya, Balaraja, including to large real estate development projects such as Lavon Swancity, Suvarna Sutra, Telaga Bestari, and Jaya Imperial Park.

Table 6.1 elucidates the extraordinary concentration of Moya's operations in Greater Jakarta. Jakarta's water accounts for more than 40% of Moya's total water capacity nationwide (Moya Asia, 2021).[145] During the past concession, in 2021, AAJ (with 10,500 litres/second) contributed 47.2% and 83.5% of the parent company's revenue and net profit, respectively (Moya Holdings Asia Ltd, 2022a). As Moya's Annual Report in 2021 suggested, "it is possible that future operation results of the Group could be

[145] AAJ managed 10,500 litres/second, from total 25,085 litres/second of bulk water managed by Moya

materially affected if AAJ could not obtain a business continuation agreement" (p. 78), after the end of the concession. Beyond Jakarta, Moya also holds B-to-B contracts with utilities in Bekasi Regency, Tangerang City, and Tangerang Regency. The capacity of all those projects in Greater Jakarta exceeds 80% of the water managed by the company (Moya Asia, 2021). Moya today is the largest water company in Indonesia, holding eleven projects with nine contracted through business-to-business schemes and two through PPP schemes, with a total WTP capacity of up to 31,435 litres/second.[146] The CEO of Moya, Mohamad Selim, stated that the company looks forward to expanding its portfolio to reach a target of 50,000 litres/second in the next 4-5 years.[147]

Moya is known among other investors for offering very competitive bid prices: winning and aggregating project portfolios is their way of managing risk.[148] By operating multiple projects, the CEO of Moya suggested they could cross-subsidise, covering the costs of one project with funds from other projects.[149] "*Enake piye*", or "how to make this comfortable for you", is how the CEO described the relationship between local utilities and the company, implying that they do not strictly adhere to the contract but give utilities the space to negotiate their payments.[150] This 'informal' relation between utilities and Moya is not surprising; it is fostered by the bureaucratic and oligarchic connections between both institutions. For instance, the Director of PAM Jaya at the time the bundling project was prepared served as the Director of Aetra Air Tangerang (Moya's subsidiary in Tangerang regency) (Marwa, 2024), and now PAM Jaya has recruited Palyja and AAJ's workers at the end of their concession. By managing relations with utilities, Moya is able to mitigate payment risks. As its CEO contended in a seminar:

> "If we just let the contract be and not be 'united' with PDAMs [utilities], our [water] investment will not be fully utilised… the target will not be realised if we don't intervene with the PDAMs' business, meaning that we have to learn PDAM's system, their network planning, pipe system, etc… There must be good teamwork between PDAMs and investors, and not just depending on the minimum [volume] offtake. The minimum [volume] offtake is quite promising, but if PDAMs do not have the money, what will they pay us with? It is just a delusion."[151]

After all, water, "unlike investment in coal that goes boom and bust",[152] offers a stable return. And, justifies the CEO: "it is a satisfaction to be able to help the government."[153] Similar arguments were made by Anthoni Salim, the son of Lim Soe Liong, the founder of Salim Group, about their involvement in Jakarta's water supply project in 1998. As Borsuk (1996) noted in his interview with Anthoni Salim, the Group sees that "privatisation conforms with central government policy," and is interested in "solution games," looking for business opportunities by making water available to cities in crisis. Investment in water is relatively small compared to the Group's other business lines, such as palm oil, retail, and real

[146] Moya's CEO at Indonesia Water and Wastewater Expo and Forum, Jakarta June 2023
[147] Moya's CEO at Indonesia Water and Wastewater Expo and Forum's FGD session, Jakarta 6 June 2023
[148] Interview with investors and PPP advisor; Moya's CEO at Indonesia Water and Wastewater Expo and Forum's FGD session, Jakarta 6 June 2023
[149] Moya's CEO at Indonesia Water and Wastewater Expo and Forum's FGD session, Jakarta 6 June 2023
[150] Moya's CEO at Indonesia Water and Wastewater Expo and Forum's FGD session, Jakarta 6 June 2023
[151] Moya's CEO at CREATIFF 2023 (Ditjen Pembiayaan Infrastruktur, 2023)
[152] Moya's CEO at Indonesia Water and Wastewater Expo and Forum's FGD session, Jakarta 6 June 2023
[153] Moya's CEO at Indonesia Water and Wastewater Expo and Forum's FGD session, Jakarta 6 June 2023

estate, but it is the 'basics' as Borsuk (1996) noted – water is a fundamental human need. Crucially, the Salim Group shares the concern about the water crisis with other urban residents, given their real estate projects in Jakarta.

However, Moya's large-scale investment in Greater Jakarta's water supply cannot be merely explained as the ever-expanding financialisation of infrastructure. Instead, it must be situated within the influence of oligarchs in Indonesia's political economy, most specifically, Jakarta's water privatisation history. Moya's know-how of Jakarta's water system, in technical and financial terms, has been built since Soeharto appointed Salim to manage water supply in Jakarta's west in 1998. Salim Group's return to the water business through the acquisition of contracts in Greater Jakarta reveals how old oligarchic power remains deeply cemented in the post-Soeharto regime today (Hadiz & Robison, 2013). It is also nurtured through the everyday relations between investors, utilities, and officials, and technically justified through Moya's expertise in operating Jakarta's water infrastructure. The latter makes it appear natural and logical that Moya is re-contracted to build Jakarta's water service, even after they failed to improve water services during the previous concession. The following section will illustrate how Moya's control over Greater Jakarta's water has enabled it to solve the water crisis in real estate projects backed by the same tycoon.

6.4.4. Water and real estate bundling: against water crisis?

Acquiring the new contract for Jakarta's bundling project is essential for Moya for two reasons. First, AAJ already contributed more than 40% of Moya's revenue in 2021. Meanwhile, the new contract is appetising in terms of scale: it is almost twice AAJ's current water capacity, at 19,800 litres/second (including Buaran III). Second, Moya's extensive portfolio in Greater Jakarta has enabled the company to supply water to real estate projects under the Salim Group, which are as threatened by the water crisis as other residents in the city.

Pantai Indah Kapuk (PIK) 1 and 2, elite urban developments co-developed by the Salim and Agung Sedayu Groups, exemplify the water security challenges facing Jakarta's premium real estate sector. PIK 1 residents report intermittent and low water quality during the dry season (Winata, 2019). Their piped water was so polluted that the developer instead supplied water through tankers to the residential areas. Restaurants, too, must put up signs declaring to their customers that they do not use water from the developer's WTP (Pramono, 2015). Meanwhile, PAM Jaya could not intervene in the township as their water management is under the authority of private developers even though the residents requested PAM Jaya's water service (Wicaksono & Dono, 2015).

Against the persistent water crisis, PIK 2 development actively markets its water features and guarantees: flood-free areas with its polder system and potable water. Located at the northern tip of the city, the area's surface water is contaminated and saline. In response, the developer promotes their pre-treatment water processing and seawater reverse osmosis technology to make water potable (Magister Pengelolaan Sumber Daya Air ITB, 2022). Staged in a marketing clip, two men drink water directly from the WTP, demonstrating it to be potable (Agung Sedayu Group Official, 2022) and in another, a visit from the Office of Health of Tangerang Regency to the WTP confirms that the water quality complies with

health standards (Agung Sedayu Group Official, 2023). Under the existing Water Law, which mandates private actors withdraw from directly serving customers, utilities now oversee water service in new town areas.[154] More than 70% of the water in PIK 2 is now sourced from the utilities' bulk water (Pantai Indah Kapuk Dua, 2023), as treating the already saline surface water by themselves is costly.[155] As shown in Figure 6.4, behind the utilities' water production are Moya's subsidiaries, which secured contracts to operate major WTP throughout Greater Jakarta. Moya Tangerang, for instance, will supply 500 litres/second of water to the PIK developments via PDAM Tirta Benteng.[156]

Moya's control over bulk water production in Greater Jakarta provides Salim Group's other business line, real estate development, a protection against water supply risks that have haunted its past projects. This evidences Colven's (2022) claim of environmental speculation, in which speculation is geared not just to raising property values but also to the dream of escaping Jakarta's water crisis (see also Kusno, 2013). And for Salim Group, the speculation centres on acquiring both the city's land and water supply systems simultaneously. This is a different form of bundling; matchmaking land development and massive water supply investment simultaneously. Moreover, as part of PIK 2 was designated as a National Strategic Project at the end of Jokowi's presidency, the project has significant political interest from conglomerates and the Indonesian government (Wijaya & Saeran, 2024). Piping water into these real estate projects ultimately resonates with the company's concern to "help the government",[157] and as a national strategic concern, perhaps the PIK 2 project will never be left without water.

It is through these complex, inter-scalar water transfers and the financialisation of infrastructure that the Salim Group has secured water for its real estate projects. While earlier in this chapter I illustrated how the government devised a bundling strategy for source-to-tap infrastructure, this section describes another form of bundling in which private actors assemble WTP and real estate projects to ensure that both can efficiently generate revenue for each other. On the one hand, water supply infrastructure needs paying consumers to avoid idle, unused water. On the other hand, property projects need water for the residents and to avoid decreasing property values. It is in the city's interest that real estate projects receive piped water and stop extracting groundwater. However, if utilities are extending networks based on high demand and high supply rationales, how will this affect the public beyond private property enclaves, who are also at risk of water crises? The next chapter will address this concern.

6.5. Conclusion

This chapter has examined experiments in rebundling water infrastructures, from WTP to pipe systems, or so-called source-to-tap schemes, drawing from Djuanda and Jakarta's bundling projects. Against the fragmented operation of bulk water supply PPP projects where the state retains interface, demand, and leakage risks (as in the Jatiluhur and Karian-Serpong projects), the rebundling of water infrastructure

[154] Interview with PDAM Tirta Benteng, August 2024, Zoom
[155] Interview with PDAM Tirta Benteng, August 2024, Zoom
[156] Interview with PDAM Tirta Benteng, August 2024, Zoom
[157] Moya's CEO at Indonesia Water and Wastewater Expo and Forum's FGD session, Jakarta 6 June 2023

aims to externalise these risks to private actors. In turn, private actors are lent the power to manage and balance public water supply and its delivery, extending pipes in accordance with the payments they receive from selling bulk water to the utilities. Water infrastructure privatisation was not only promoted by state actors, as in the past, but actively crafted via bundling schemes, as an ongoing experiment to identify the institutional and infrastructural configurations through which private sector investment can be de-risked.

First, by examining the source-to-tap scheme, I illustrated how the state enlarges WTP capacities for project developers to cover the associated costs and risks of extending pipe networks. The large-scale infrastructure here, therefore, serves the goal of de-risking and generating private revenue rather than addressing the city's and its residents' needs. I illustrated my argument through the Djuanda project, which serves as a testbed for the source-to-tap scheme within PPP agreements, structured with two GCAs: national and local governments. Given the complex structure and infrastructure risks, the Djuanda project plans for large-scale water capacity as its revenue base (initially 10,000, then down to 7,000 litres/second) to address the risk profile. This size does not respond to the need of Jakarta's water supply, given that various projects will produce surplus to Jakarta's water demand needs by 2044. Instead, this reflects the state's aim to expand the frontiers of private investment. The large-scale project also produces perverse results. The complex project structure, initially aimed at reducing financial risks, has instead produced political backlash, with local governments refusing to pay the high-water tariff. Financialisation of water infrastructure also reaches its ecological limits here: the ever-expanding competition for raw water from the Jatiluhur dam has downscaled the Djuanda project to 7,000 litres/second, threatening the financial viability of the high-risk source-to-tap scheme.

Second, this chapter demonstrated the limits of the sophisticated bundling scheme that arises from the selective uptake of bankable infrastructures. In Jakarta, ABJ, Moya's subsidiary, is tasked with building and operating WTP and selling bulk water to PAM Jaya as its primary source of revenue. Then, ABJ is contracted to extend pipe services on a site-by-site basis, getting paid by utilities per project. This scheme protects ABJ from heavy upfront capital expenditure and avoids unresolved debts should utilities be late in paying for the bulk water. This seems a better proposition for the state and project developers, as interface and demand risks are minimised, but the costs of managing these risks are passed on to the public through higher water tariffs. Moreover, the ongoing problem of non-revenue water remains unaddressed, given its complexity and the difficulties of turning it into an investable proposition for private actors. The water service remains unreliable, with low pressure and intermittent flows in areas served by the existing pipes. At the end, the integrated infrastructure does not guarantee a smooth, continuous flow of water to customers. This also leaves PAM Jaya potentially facing fiscal constraints: having to pay multiple bulk water suppliers, without receiving sufficient income from its operation due to persistent leakages.

Last, I showed how Moya's return to Jakarta's water governance through the bundling scheme organises the spatial and financial integration of Greater Jakarta's water at the metropolitan scale, as well as the integration of Jakarta's water into a global architecture of rent extraction. Water infrastructure financialisation in Jakarta is shaped not only by its colonial infrastructure but also by the embedded power and business interests of oligarchs, which limit public control over water governance. Moya's

control over bulk water production has also enabled them to bring water into Salim Group-backed real estate projects – yet another form of bundling. Jakarta's water has (again) become a vehicle for rent extraction and, interestingly, speculative urban development. Perhaps this ultimately benefits the city, as large-scale projects are not dependent on groundwater. At the same time, from a business perspective, real estate development generates significant, unsubsidised revenues for the water supply projects. However, the financialised nature of water infrastructure operations and the bundling of water infrastructure projects with real estate development mean that private actors still determine how water flows, to whom it flows, and for whose benefit, despite the revocation of pro-privatisation Water Law 2004.

While the victories of civil society against water privatisation hold a progressive promise for the remunicipalisation of water services, the end of privatisation remains distant. As evident in Chapters 5-6 of this thesis, rather than directly addressing the water crisis, the state continues to financialise and privatise water infrastructure. The unbundling and rebundling of water infrastructure show how state actors wrestle with the existing legal constraints of water service privatisation, remodelling privatisation to craft infrastructure assets that generate revenue for private actors, and re-embedding oligarchic influence into the city's water service. Financialisation has driven Jakarta's water service towards profiteering, away from addressing the basic needs of its people.

Chapter 7. Whose risks are (dis)counted? The financialisation of water supply projects and the externalisation of risks to urban-rural communities in Greater Jakarta

7.1. Introduction

Scholarship on the financialisation of water infrastructure has contributed to our understanding of how financial logics and relations shape people's access to water. Through mechanisms such as bill securitisation and debt/bond issuance, household water consumption becomes integrated with financial markets, exposing households to higher water tariffs to help utilities recuperate the financier's investment (Allen & Pryke, 2013; Loftus et al., 2016). With priority given to paying dividends and debts to financiers, utilities underinvest in the network, leaving major issues like leakages (Loftus & March, 2019) and wastewater pollution unresolved (Christophers, 2018a). As recently highlighted in the story about Thames Water, financialisation has left the utility bankrupt, unable to sustain its business, thereby prompting further tariff increases for consumers to fund infrastructure repairs (Christophers, 2023). These studies illustrate how households (and the city) become what Fields (2017) calls the 'unwilling subject[s] of financialisation': those involuntarily enrolled in financial markets without giving consent to their subjection to financial operations, yet bearing the consequences of financialisation. Financialisation generates risks which overflow beyond its specific targeted project, including onto the "segments of our society that are often unprepared for, even unaware of, the risks that they are being subjected to" (Prasch, 2004:410). Financialisation, therefore, reinforces existing inequalities in water access by binding households to risks beyond their control.

This chapter adds to the above scholarly works by underlining the mechanism through which risks are socialised. Drawing on the Public-Private Partnership (PPP) arrangement for risk allocation (between state and private actors) in Jakarta's water supply projects, I argue that the socialisation of risks is not just an 'impact' to be evaluated ex-post to financialisation, but designed to make projects appear financially and technically feasible. I will demonstrate how, through the selective calculation and inclusion of risk, Jakarta's water supply projects expose urban and rural communities to unmitigated risks, forcing these communities to shoulder risks that neither state nor private actors are willing to assume.

Borrowing Tania Li's (2007) concepts of rendering technical and problematisation, I will unpack how risks are rendered technical, leading to the partial externalisation of risks to communities to minimise risks for private investors. I elaborate my argument through two cases. In the first case, I argue that displacement risk is translated into the administration of compensation money, which does not sufficiently account for the socioeconomic relations that communities build with their lands and

neighbourhoods. As a result of displacement, communities are dispersed without basic infrastructure (water, electricity), jobs, and social support, making the seemingly significant compensation insufficient given the costs and risks they must shoulder. In the second case, I argue that the technical rendering of financialisation fails to acknowledge that extending pipe connections requires solutions beyond engineering interventions. I will demonstrate this by illustrating the disconnection of informal settlements from networked water infrastructure, as they are entangled in socio-legal (i.e., illegal tenure) and socio-material (i.e., non-permanent or unstable settlement construction) worlds that complicate the extension of the pipe network. These complexities resist a technical problematisation of water access, but must be wholly accounted for if the state aims to deliver universal water access in Jakarta.

This chapter continues by detailing literature on risk socialisation under financialisation. Then, I will examine the first case study: the displacement of communities for the Karian dam and the Bekasi water treatment plants (WTP). I will explore how displacement is rendered technical through the accounting of land compensation, and then explore its impact on urban and rural communities. I will continue to the second case study about the disconnection of *kampung* in North Jakarta and how the community attempts to reorganise temporary infrastructures to meet their need for water. The point is not to advocate for these communities' inclusion in the financialised water regime or to improve the technicalities of accounting for risks. Instead, I aim to highlight the logics that justify the financial feasibility of a project: an exclusion of urban-rural communities at the cost of making infrastructure appear bankable, thereby reproducing existing vulnerabilities for these communities. Finally, I reflect on how financialisation produces unequal water access across urban and rural areas.

7.2. Whose risks are (dis)counted?

Through a Foucauldian lens, Tania Li (2007) conceptualises how development embodies governmentality, or the conduct of governing population, under the banner of societal improvement. To achieve such a goal, development must be translated into projects framed to solve particular problems through the practice of 'rendering technical'. Development problems must be defined and streamlined according to expertise, or the "intelligible field" (p. 7), making them appropriate for predetermined expert solutions. Development becomes a vehicle that translates structural problems like poverty into the need for capacity-building and training, rather than the equal distribution of the means of production in rural areas.

Taggart and Power (2024) augment Li's conceptualisation of rendering technical to understand how, under the Sustainable Development Goals and the rhetoric of 'billions to trillions' (World Bank, 2015), development must be 'rendered investible'. The technicalities of development must be streamlined to attract private investment and generate private returns. This process includes translating complex development challenges into investable propositions, in the form of project pipelines, so that private actors can easily match the projects with their expected risk and returns (Yunita et al., 2023). By framing the problem of infrastructure needs and the state's limited fiscal capacity together, the technical and financial rendering of development justifies private investors' involvement in developing public infrastructures, including through PPP (see Chapter 4).

PPP emerges as a logical solution for the state to share the risks and costs of infrastructure development, thereby de-risking investment and crafting an investment-enabling environment to attract private investment (Bayliss & Van Waeyenberge, 2018; Gabor, 2021). PPP is rationalised through the calculation of value for money, where risks are allocated, quantified, and weighed, making PPP appear as a logical and efficient method for delivering infrastructure (Birch & Siemiatycki, 2016; Siemiatycki & Farooqi, 2012). This technocratic process, however, has obscured the state's political bias to involve private actors (August et al., 2022). The state's inclination towards private actors means it retains major risks and passes them on to citizens to minimise those risks for private actors. As risks are only selectively allocated to private actors, its quantification purposively leaves an 'outside' – risks that neither the state nor private actors retain – producing what appears to be a failure in the development program (Li, 2007). This 'outside' produces other crises, leading to the devising of new programs to address the very situation left out in the beginning.

Therefore, rather than containing risks between public and private actors, PPP externalises risk and minimises investor exposure to it, making projects appear investible. Scholarly work has documented this pattern: government actors face higher costs under PPP, passing these costs on to the public by imposing massive liabilities when the project fails (Bel et al., 2017). Similarly, Fields' (2017) analysis of New York's rental housing financialisation suggests that tenants are not exempt from its impacts, despite not being directly tied to financial markets (e.g., they do not have mortgages). These tenants are what she calls the 'unwilling subjects of financialisation': people who live in properties acquired by private equity investors without their consent or knowledge. As houses are turned into sites of investment, these 'new landlords' prioritise yield maximisation over the tenant's living conditions, causing their housing situations to deteriorate.

The public retains these risks in contrast to the minimal risks private actors face. This occurs not because of a miscalculation of risk, but by design. Projects become investable by shifting risks to the public, which, if properly counted, could raise the cost and complexity of public objections and decrease the confidence of financiers investing in the project. This is why, despite the liabilities that the state and the public hold, PPP is often devised through unsolicited proposals, enacted through high-level deal-making between the state and private actors without substantial public participation (Gibson et al., 2023; Rogers & Gibson, 2021). PPP project contracts are sealed under a commercial agreement, avoiding accountability to the public (Bayliss et al., 2021). As such, the public is excluded from the process rather than merely impacted at the end. The following section will analyse how financialisation externalises risks to the public, resulting in the displacement and disconnection of communities.

7.3. Displaced communities

7.3.1. Compensating for what loss?

Land was (and still is), as an official characterises, the 'deal breaker' for infrastructure investment. One hurdle to land acquisition for infrastructure in Indonesia is the puzzling land tenure system, with a mix of colonial-inherited and 'liberal' state-imposed land registration systems, which often produce

overlapping claims, uses, and registries of land (McCarthy & Robinson, 2016). Without a clear ownership registry, land acquisition is subject to contestation between the state and the people, making it costly and potentially dragging on for years. To address the land challenge and improve the investment climate, under Yudhoyono's regime, Law No. 2/2012 sought to accelerate land acquisition by giving the state the power to acquire lands from the people under the discourse of 'public interest'. The law operates within a regulatory framework to enable PPP and gives the state the power to procure lands from the people to cultivate an investment climate (Davidson, 2016; Guild, 2019a; Meckelburg & Wardana, 2024). In this law, land *must* be given to the state after fair compensation, or a court ruling if people object to compensation.

The Government of Indonesia uses land compensation as a tool to de-risk private investment. By paying for land compensation, the state unloads significant upfront costs for the private project developers, making land available for them to start project construction. In doing so, the state also eliminates the costs that may arise due to fuzzy land tenure in Indonesia, such as land conflict. In other words, the state subsidises private developers to make the project appear financially viable for the investors.

Under the Ministry of Finance, a special mission vehicle, the State Asset Management Office (LMAN) was established in 2015 and specifically tasked to pay for land compensation. Unlike in Ministerial offices, where land acquisition must be planned for and spent in the same budget year, LMAN allows compensation to be paid across years, aligning with the sluggish and slow process of land acquisition. In disbursing compensation, LMAN will refer to a list of nominated beneficiaries mapped and identified by local land offices (BPN), and to the appraisal of the beneficiaries' assets and losses. LMAN conducts the administrative work of verifying beneficiaries, opening bank accounts, and disbursing the funds directly to the beneficiaries on the date decided by local land offices. Land acquisition is "one chain" of processes,[158] connecting people with different bureaucratic functions of measuring, administering, and valuing land.

Land compensation is paid based on 'reasonable replacement value' (*nilai penggantian wajar*), defined by the Indonesian Appraisal Society to include both physical and non-physical damages caused by land acquisition (KPSPI MAPPI, 2015). Properties are appraised at their market value based on the principle of highest and best use. Accordingly, properties are assumed to realise their highest productivity in relation to location (such as accessibility and proximity to facilities) and land use or zoning regulations. This differs from the previous law on land acquisition (Presidential Decree No. 36/2005 and 65/2006) where property appraisal was based on taxable land value, which is lower than the market value. In addition to properties, the appraisal standards also establish compensation for crops, which are valued for 1-2 cropping cycles, and business loss, which is equated to 3-6 months income. In addition, non-physical damages are included in land compensation, such as loss of a job, emotional distress (solatium), transaction costs, and the waiting period until the government pays compensation. This results in higher payments than in the past (i.e., during the Soeharto regime), when land was forcibly taken by the authoritarian government without fair compensation (Davidson, 2016). This makes compensation

[158] Interview with LMAN, August 2023, Zoom

commonly referred to as '*ganti untung, bukan ganti rugi*', meaning it is a replacement for benefits, not for losses (Sutaryono, 2022). Through this process of translation, the social relations entangled in land are dissolved into categories reflecting market values.

However big and enticing, the compensation fails to account for the complex social relations that people maintain with their land. The appraisal process elucidates this limitation through its technical assumptions. For instance, crop appraisal (typically for 1-2 growing cycles) reflects an assumption about the timeframe during which farmers can still benefit from their crops and the time required for them to transition to alternative employment. However, the question many people I spoke to asked was: how are they going to find jobs in agriculture when there is no land? Rendering displacement risks technical is also apparent in how the non-physical aspects of land are valued. For instance, solatium payments are calculated using the duration of residence as a proxy for attachment. A residential period of less than 3 years is compensated at 5% of the building and land valuation, while a residential period of more than 30 years is valued at 30%. This calculation converts people's embodied relations with land into calculable units, reducing their loss to a monetary equation. This translation also makes land compensation fiscally manageable for the state, while externalising the cost of uncertain future livelihoods to the individuals. By limiting compensation to the market value of assets, the state discounts the actual cost of displacement: the loss of social networks, cultural practices, and economic security that cannot be easily translated into monetary terms. Governing displacement as a transaction, the state limits how affected communities can respond to loss. Communities find themselves arguing on the same financial terrain with the state over how much compensation they want, rather than questioning why they are being displaced in the first place.

Despite sophisticated technologies that translate displacement risks into compensation, my observations in East Bekasi (Bekasi city, West Java) and Sajira (Lebak Regency, Banten) reveal that this translation process is contested. Land appraisal is fraught with disputes, given the complex land relations and temporal gaps of valuation and compensation.

The PPP contract for the Jatiluhur project, including WTP Bekasi, was signed before land acquisition was completed. The land plot was relatively small, 3.2 Ha, "But it [the land acquisition] takes too long just for a piece of land that small. It is not like we are building a toll road."[159] The project affected two Rukun Warga (neighborhood units, or RW) in Kelurahan Margahayu, Bekasi city, where 57 houses were demolished, around 40 of which did not have land ownership certificates.[160] The project involved a consultation process with the affected public (*sosialisasi*) in 2017, but "things got faster after 2020."[161] Land acquisition started in 2021. I was in the middle of my fieldwork in November 2022 in Kampung Poncol when a community meeting with National Land Agency (BPN), land valuers, and the Ministry of Public Works and Housing was held. There were only a few houses left; many had already been disassembled and left by their owners (see Figure 7.1). Ibu N, with whom I spoke, said, "It is chaotic there; people disagree with the price." Some land in Kampung Poncol was owned by the Ministry of

[159] Interview with WIKA Tirta Jaya Jatiluhur, November 2022, Bekasi
[160] Interview with local RW leaders, November 2022, Bekasi
[161] Interview with local RW leaders, November 2022, Bekasi

Public Works and Housing, where houses were built for their officials, but part of the *kampung* has been occupied without certificates. For the land valuers, it was challenging to determine land value without clear land ownership. In Ibu N's words, in these cases, "It is not compensation, but compassionate money (*uang kerohiman*)." Not long after, her neighbour came and said the meeting was over. "How much?" she asked, "not much (with a four-finger gesture, signalling four million Rupiah)", the neighbour replied. "That's already good, don't move out just yet", she added, noting that many of her neighbours have already left the neighbourhood and had their houses demolished. "You should buy a cart, which should make some money. There will be construction workers here; you can sell food," suggesting that an economic opportunity for her neighbour may be possible given future construction activities. Obviously, the construction activities would not last for long, and they would need to search for other jobs near where they will live in the future.

Figure 7.1 Rubbles in Kampung Poncol for WTP Bekasi

The land acquisition for WTP Bekasi was aimed to be completed by April 2022.[162] The land was initially appraised at a very low value, prompting protests from communities (see Figure 7.2). Subsequently, the land appraisal was changed, and communities were offered higher compensation. Pak S, who lived without legal land ownership, said his house was valued at IDR 450 million (US$27.4 thousand) after the protest, up from IDR 300 million (US$18.2 thousand) before the protest. Community members from a neighbouring RW, who also protested, received only IDR 1.6 million (US$97.4), far below the market price. Their land is designated as a green zone in the city's master plan and has small access roads. In land appraisal terms, the land is not utilised in accordance with the market's highest and best use. Meanwhile, people with land of 300 sqm and more elaborate buildings received around IDR 4-4.2 billion (US$243-255 thousand). All this information came from communities comparing their rates of compensation or compassionate money. This is emblematic of how the lexicon of benefit and loss that animates the community's protests is centred on monetary claims rather than arguments for staying put.

[162] Interview with WIKA Tirta Jaya Jatiluhur, November 2022, Bekasi

The framing of land compensation creates externalities for the PPP project developer as well, as they must deal with community claims and delayed projects.

Figure 7.2 Communities' banner protesting land appraisal results for WTP Bekasi.
'We demand compensation that is appropriate, fair, and humane', 'Appraisal office (KJPP) must be professional'

The scale of land acquisition for WTP Bekasi, however, was not as large as the Karian dam (see Figure 7.3). Early planning documents for the Karian dam were written by JICA in 1985, showing irrigation and flood control functions (JICA, 1985a). In 1995, JICA revised the document to include Jakarta's water supply system and dam construction, together with other infrastructure: the Karian-Serpong conveyance system and the Karian-Serpong water supply project. The land required for the Karian dam is 2,226.44 Ha, including 1,200 Ha in a rural settlement with more than 3,000 households in 11 villages (Kompas, 2008). The land acquisition for the Karian dam began in 2008. As an ADB (2017) report on the safeguard assessment suggested, 38% of the land was acquired under the old regulations (No. 36/2005 and 65/2006), while the rest is based on the most recent Law No. 2/2012. This means the earlier appraisal of properties was based on the taxable property value, which is lower than the more recent acquisitions. However, this does not necessarily mean that the more recent acquisitions result in better outcomes for residents. More recent acquisitions were based on the 2016 land acquisition planning document, but the prices are based on the 2014 local government standard unit price (Yudhanto et al., 2021). As the dam was impounded in 2023, hundreds of people have still not received their full compensation (Winarti, 2025). There is always a time gap between compensation and loss. That 'project time' (Wilmsen et al., 2025), or the defined planning and construction time, is constituted by multiple overlapping times, represented in many documents, that aim to capture the *present* value for property and assets. Nonetheless, the time of land compensation always fails to catch up with the present value, and, as time devalues money, this generally means loss for the displaced communities.

Figure 7.3 Rubble in Kampung Somang, Lebak, Banten.
People disassembled materials to be reused for their new house after their *kampung* was displaced for Karian dam

7.3.2. Adapting to loss

Displacement means different things to different actors in rural areas: loss for some, but opportunities for others. Upon hearing that land would be acquired for the Karian dam, some local elites bought up land, expecting its value to increase by the time of appraisal (ADB, 2017; Fieldwork notes, November 2022). This led land prices to double in the area, as demand for land in new development areas increased. Local elites and landowners assembled land to develop new projects. For instance, in Kampung Karian Baru, a local elite bought up and prepared the land: cutting and filling hills (see Figure 7.4), dividing them into 15x10m plots, and selling them to the displaced communities for IDR 25 million per plot (US$1,500; around 160,000 per sqm) with the help of the local leaders as middlemen. In Kampung Baru Ciberang, a local leader who owned 2.5 hectares of land plotted his land while summoning others to consolidate and issue land certificates together with him. Together, they made up 12 hectares of land with 574 plots available for new settlement. They sold the land for IDR 25 million per plot (US$1,500): IDR 10 million (US$6,000) to flatten the rocky and hilly areas, and IDR 15 million (US$913) for themselves.

Figure 7.4 Flattening the ground for new settlement in Kampung Ciberang Baru

This is the physical work of market making: certifying, consolidating, clearing and filling, and pricing land, to make it available to the market. It is also the work of accumulating from and speculating on land. As a result, the areas around the Karian dam project and the Ciberang river have transformed into vast new housing areas (see Figure 7.5), with prices ranging from IDR 25-70 million/plot (US$1,500-4,200) in 2022. Especially with the seemingly high compensation, it is common for people to buy more than one plot, hoping to use them for small-scale farming or to be inherited by their children. For these elites and influential local leaders, land displacement provided a fertile ground for accumulation and speculation (Leitner et al., 2022).

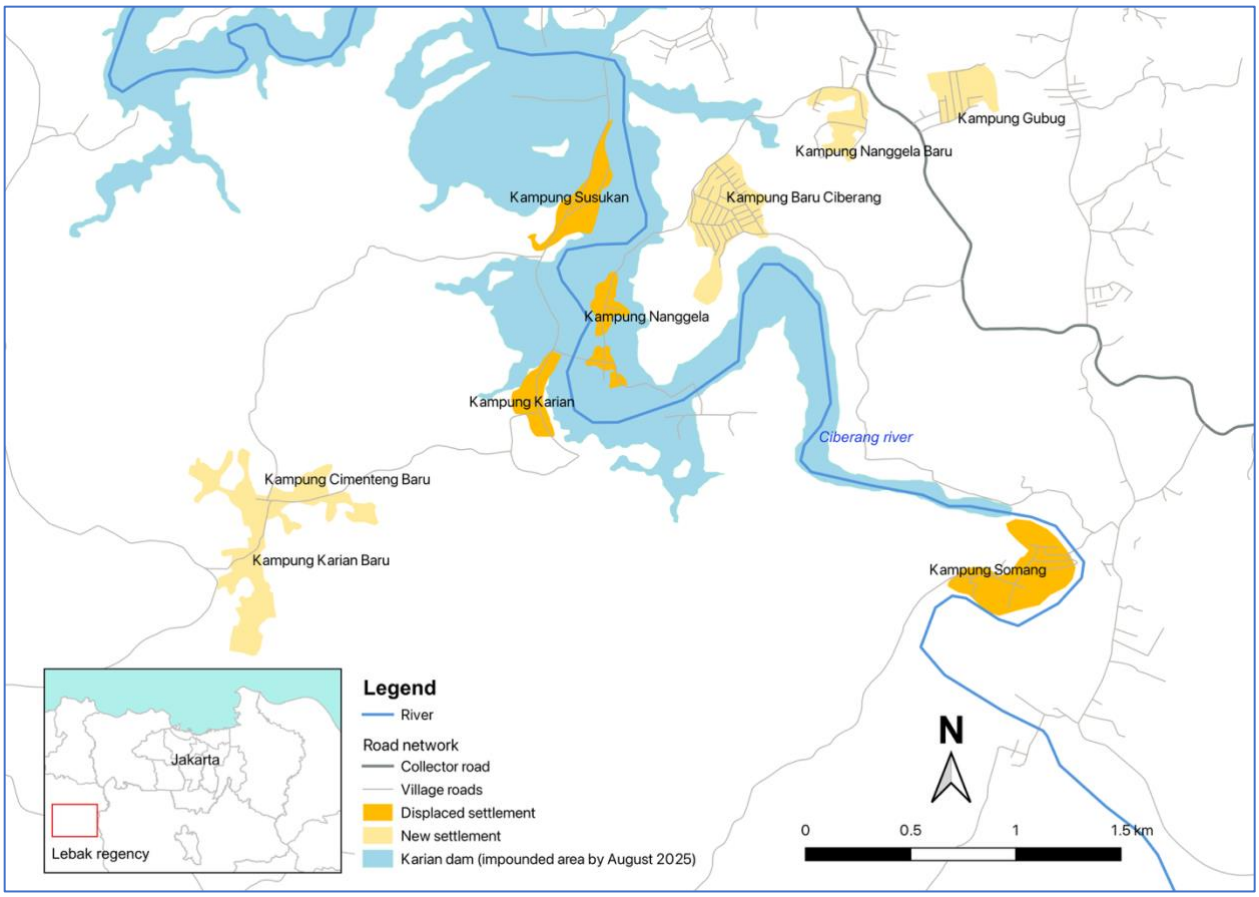

Figure 7.5 Observation sites around Karian dam, including the displaced and new settlements around the dam project (map by author)

While the local elite benefit from selling land, the majority of communities are worried about their future. People are no longer engaged in farming, as most of their agricultural land is now flooded by the dam project. During my fieldwork, I noticed that many people opened small stores, *warung*, at their houses. A community leader in Kampung Ciberang Baru wondered, "Many people have *warung* now, but no jobs; who will go shopping?" There were some newly established construction material stores in the *kampung*. Yet, even the owner complained that many of his customers are indebted, unable to pay because their compensation had not been fully paid. Local people from these villages are not recruited for the dam construction. The leaders said many of the dam workers are sourced from other cities in West and Central Java, as well as South Korea, the country disbursing loans for the dam and conveyance system. Men in the villages are engaged in construction jobs for new houses, but these jobs are only short-term. "Why doesn't Jokowi build a factory here?" asked a woman I spoke to. The displaced communities wish for labour-intensive jobs to be established near their village, though if any were available, they knew they would not be recruited without a proper education. They realised that their seemingly big compensation money would eventually run out.

Moreover, any new economic activity is impossible without good road access, stable electricity, and, most importantly, water access, which these villages all lack. When this research took place,

communities were only recently relocated, and many public facilities were not yet developed (Figure 7.6). Ironically, these displaced communities are not beneficiaries of the water supply project. In Lebak, the Karian dam will be channelled to the urban areas around Rangkasbitung and Maja (Prabowo, 2022). In Kampung Baru Ciberang, for instance, people access water by digging wells. These risks of losing jobs, changing livelihoods, and the vulnerabilities of settling in underserved areas are discounted from land compensation, and the displaced communities instead retain the risks individually.

Figure 7.6 Establishing new *kampung*.
A new mosque is under construction in Kampung Karian Baru (above) and new houses are underway in Kampung Ciberang Baru (below)

As suggested by McDonald-Wilmsen & Webber (2010), involuntary resettlement caused by dam projects has generally low standards. Indeed, in these resettlement instances, there are almost zero efforts to assist the displaced in transitioning into new housing, jobs, or social networks. Consequently, people's livelihoods deteriorate after displacement, even when some receive compensation for their lands (Blake & Barney, 2021; Wilmsen et al., 2011, 2025). The displacement produces unequal outcomes. A few local elites (despite also being displaced themselves) are able to speculate on selling lands to displaced people. Meanwhile, most village communities must navigate building new livelihoods after losing their homes and jobs in agriculture. These outcomes are not incidental impacts of the dam, but rather predictable consequences of the risks externalised from the technical process of translating displacement into a compensation scheme. These risks are rendered technical, turned into measurable and also, arguably, fiscally manageable compensation for the state. The 'reasonable' compensation reflects what is reasonable for the state's budget, rather than adequate support for affected communities.

7.4. Excluded communities

7.4.1. The socially, materially excluded city

The work of building water infrastructure revolves around standardised practices of excavating soil to install pipes. An engineer I talked to joked, "I cannot imagine if Jakarta's streets are excavated for pipes".[163] Another proudly bragged about their method of constructing pipes: "We do not open cut the roads, we made pits ... we dig at several points simultaneously so we do not cause traffic. This is the experience we used in the Ciliwung project, MRT … when it comes to drilling, we are the champ!"[164] Yet, these engineering practice assume a particular kind of urban ground – one that is 'excavated' and fits within standardised technical categories. The question is then, what if the ground – the land and soil where Jakarta is built, along with its social relations – are of a different category to the engineer's imagination of modern cities? What if the grounds are, as Keller (2023) describes, "gradually filled […] using marine sediment, rubble, and mussel shells?" How would the technicalities of bringing piped water fit within the cosmopolitan material that builds the city?

Figure 7.7 below exemplifies how pipe construction is imagined. This standard, issued by the Ministry of Public Works and drawn by engineers, defines what is considered engineerable sites. Pipe construction standard applies to both stable ground (i.e., hard, concretised land) and unstable lands (non-concretised lands). However, Muara Angke, in Jakarta's north, is emblematic of where this technical imaginary breaks down. The *kampung* is built from many things – Kampung Tembok Bolong stands on marshland, Kampung Kerang Ijo, as Keller (2023) described above, is built on mussel shells, and Blok Eceng sits on the edge of a sea dike (Figure 7.8). They represent a bricolage of non-human materials, which confuses the engineers' portrayal of the ease of constructing pipes. These materials are "unstable […] needs to be excavated or removed; or if a special foundation is needed, it requires soil replacement, or landfills with

[163] Interview with water engineer, November 2022, Jakarta
[164] Interview with WIKA Tirta Jaya Jatiluhur, November 2022, Bekasi

proper materials" (SNI 7511:2011: 7). As an engineer asked me, "How are we going to extend pipes there? Pipes cannot be built under the sea, nor float on the sea."[165] Or if pipes are built on the sea dike, how is the sea dike going to protect the city from flooding if it is being excavated and compromised? These materials constitute the technical rationalities that keep urban poor communities disconnected from water access; therefore, it is necessary to improve the living conditions in the *kampung* to ensure that people receive basic services.

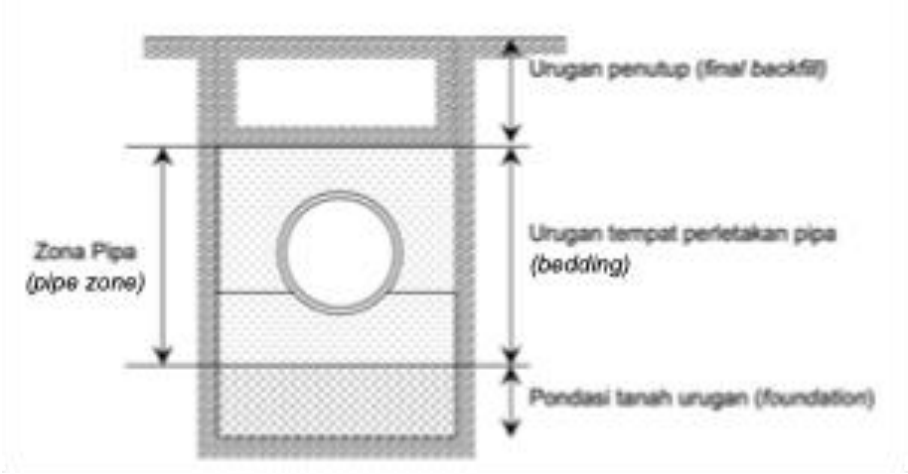

Figure 7.7 Pipe construction standard
(Source: SNI 7511:2011)

[165] Interview with PAM Jaya, April 2025, Zoom

Figure 7.8 Houses sitting on the dike (above) and on marshland (below) in North Jakarta

However, the question of extending pipes is not only about the city's material constitution, but also the social and legal citizenship of the urban poor. As Kooy and Bakker (2008a, 2008b) argued, unequal water access in postcolonial Jakarta is produced alongside the enactment of colonial discrimination – pipes for the rich and non-reticulated means for the poor. Following independence, pipes still do not reach the poor to discourage rural-urban migration (Bakker et al., 2008). Water access for the urban poor also did not significantly improve under privatisation. Under the concession, priority for water connection was given to 'key account' customers or large-scale, commercial customers instead of the urban poor (Colbran, 2017; see also Palyja, 2017). The urban poor, many of whom are migrants, were also unable to prove their legal citizenship, as citizen ID and payment of land and building taxes are required for pipe water installation (Colbran, 2017). As a result, the urban poor in areas like Muara Angke have been relying on non-piped infrastructure to access water, such as purchasing water in jerrycans from vendors at a higher price than piped water.

Differentiated water subjects and infrastructure were reified under Anies Baswedan's governorship (2017-2022). Governor Decree No.16/2020 classifies users into two groups: general and special users. General connections are extended to areas that technically and legally allow for a piped water connection. On the other hand, special connections can be made with pipes or master meters (a collective water distribution point) in areas where the network, water supply, and meter locations are available, or with water kiosks. Under this special user category, people are exempt from submitting proof of land and building tax payment, allowing those who do not own land to connect to the city's pipes. People in this category must fill in a form stating that they will not object if the landowners or the government cancel their connection "if there are any programs or relocation of the sort".[166] Therefore, in these cases, a pipe connection is only temporary and does not index land ownership. This approach has,

[166] Interview with PAM Jaya, April 2025, Zoom

in fact, enabled water access to Kampung Kebon Kosong, which is situated on government land (under PPK Kemayoran, the Ministry of State Secretary) (PAM Jaya, 2024a). However, it was different in the Muara Angke area, where the kampung's material form does not allow for pipe connections, even though it has been legally recognised by the Jakarta government.

The formal citizenship status of community members in Muara Angke is acknowledged thanks to the Urban Poor Consortium's political contract with Anies Baswedan during his gubernatorial candidacy in 2017. Anies Baswedan, who was then elected as Governor (2017-2022), signed a contract not to evict the communities but to help them improve their *kampung*. As Abdi and Mariani (2023) reported, communities in Muara Angke were given formal citizenship documents by the Jakarta government, through the establishment of neighbourhood units (RT/RW), issuance of citizenship ID cards, building permits, and zoning alterations to the area (see also Irawaty et al., 2023). Facilitated by RUJAK, a Jakarta-based civil society organisation, the communities in Blok Eceng and Blok Limbah devised a plan to change the city's delineation of their *kampung* as an industrial zone (see Figure 7.9). More than 80% of the communities in Blok Eceng and Blok Limbah have agreed to this plan (above the required 60% under the Ministry of Agrarian and Spatial Planning regulation).[167] Only with this acknowledgement of their housing and citizenship, and after the *kampung* is upgraded (Anjani, 2022), will the communities be connected to the pipe system in the future.

[167] Interview with co-op leader, Jakarta, October 2023; Ministry of Agrarian and Spatial Planning Regulation 12/2019 mandates that land consolidation requires the approval of at least 60% of community members.

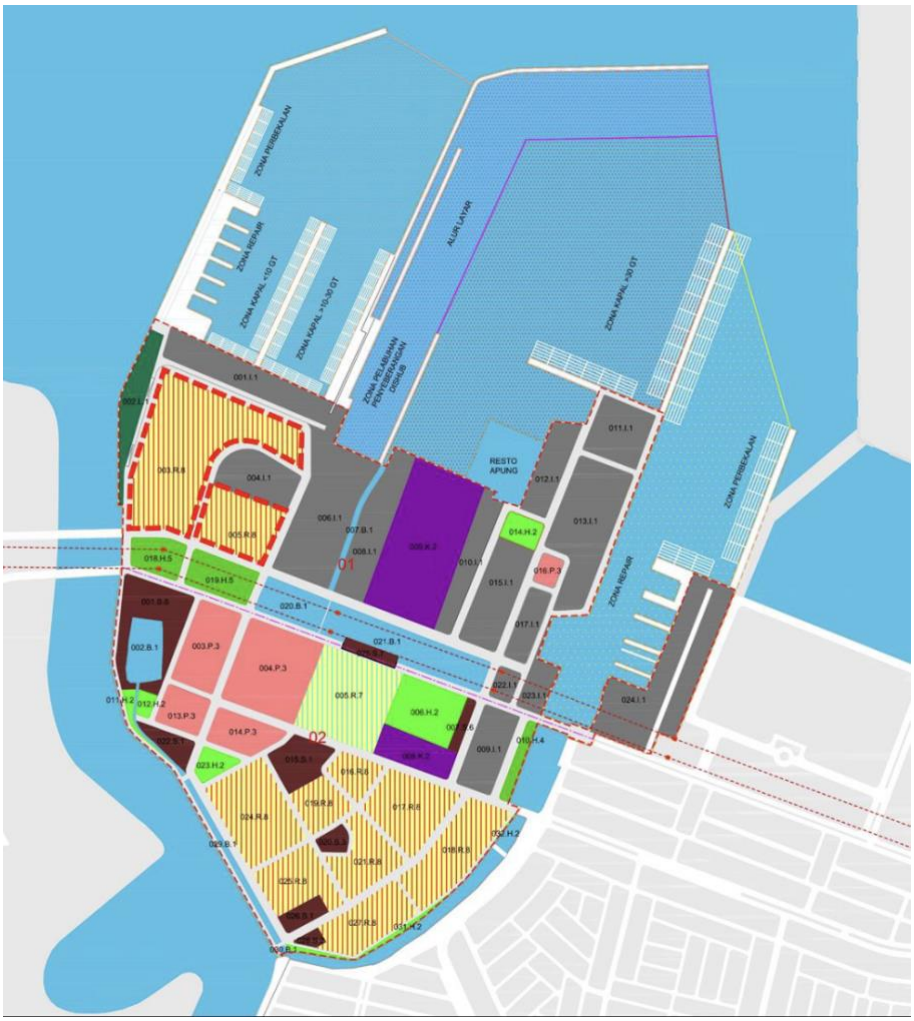

Figure 7.9 Muara Angke's urban design guidelines, marked in red is the proposed housing area for *kampung* (Source: Governor Decree 83/2021)

This section illustrates how informal settlements complicate the engineering works of extending pipe networks, revealing the material limits of construction works and the economic constraints on the financialisation of infrastructure. This complex story about connecting water access is hidden from planning processes and simplified to an output target, such as the length of the pipe network, without addressing how the pipe network will really serve the urban poor community. The financial costs and complexities of extending pipes in Muara Angke are externalised onto the community, forcing them to bear the risks of water insecurity. This means achieving universal water access in Jakarta extends beyond technical intervention to encompass recognition of the urban poor's citizenship and right to housing. For now, however, the community must navigate temporary infrastructure solutions, such as water kiosks, work. In what follows, I will describe the community's effort to integrate itself, even temporarily, into Jakarta's water system.

7.4.2. Building system: pipes on and above the ground

I was chatting with Pak M when his daughter came, "Bapak, isi." Father, fill it up*. Pak M stood up and turned the tap. Water started filling in his two cisterns. He said the water is from PAM Jaya but he built the pipe connection himself. The water flows only by gravity, without a pump. And the pipe is 'floating' above the ground (see Figure 7.10 Fieldnotes, October 2023).*

Figure 7.10 Pak M opened the lid of two cisterns, with the pipe connected to his house

Pak M is one of the community leaders in Muara Angke. Before receiving water from PAM Jaya, he and his neighbours bought *pikulan* water from water vendors, delivered with 2 jerrycans of 40 litres carried on the shoulder (*pikul*), sold at IDR 4-7,000 per *pikul* (US$0.24-0.43). His neighbours dug wells and sold the water to people, but the it was yellowish and slimy (his neighbour joined our conversation and showed me the water from his well). The communities proposed a piped network for the 970 households in the *kampung* to PAM Jaya, but PAM Jaya could not extend their pipes and instead introduced water kiosks to the community (see Figure 7.11). In Jakarta, there are 102 water kiosks and PAM Jaya plans for 70 more in West, East, and North Jakarta (PAM Jaya, 2022a). Of the 45 kiosks requested in Muara Angke in 2022, 7 were realised: 2 in Blok Empang, 3 in Blok Eceng, and 2 in Blok Limbah. "This is far from enough," Pak M suggested. However, water kiosks also require land, and the community struggled to decide where to place more kiosks in the *kampung*. The kiosks must be located on a wide road with access to allow the water tanker to get through. For Pak M's area, the kiosk is placed on his neighbour's land, and the communities agreed to pay some money to rent the land.

Figure 7.11 PAM Jaya's water kiosk

People can take water directly from the water kiosk using jerrycans on a pushcart. People pay at PAM Jaya's standardised price: IDR 400 (US$0.02) per jerrycan if bought at the kiosk or IDR 1,200 (US$0.07) per jerrycan if delivered to the house. By asking "who wants to get paid IDR 800 (US$0.05) to push the carts?", Pak M suggests that the price is too low for the arduous work. Pushing carts is also tricky in a *kampung* sitting on stilts and wooden plates, as in Tembok Bolong. In many other communities in North Jakarta, such as Pegadungan, where pipes are not connected to houses, people continue to rely on water vendors who deliver door-to-door, leaving water idle at kiosks. This is precisely the same interface risks of financialised water infrastructure, the disconnect between supply and demand infrastructures as in PPP projects (see Chapter 4 and 5), happening at a very local scale. In this case, however, all these risks and costs are shouldered by the communities, not the state or private actors.

Some communities in Muara Angke, such as in Blok Eceng and Blok Limbah, decided to install a pipe system themselves, organised as a cooperative. People must pay instalment fees to the cooperative to have water flow directly to their homes. People now pay IDR 500 (US$0.03) for water, slightly higher than the PAM Jaya rate, but they receive piped water to their homes. In addition to pipes, there are other infrastructures, such as cisterns in the middle of the settlement, to allow water to reach deeper into the *kampung* (Figure 7.12). Acting like a reservoir, the cisterns contain water from the kiosk before channelling it to the houses. Without the cistern and the pipes, the central cistern at the kiosk would remain full. The water managers, like Pak M, will allocate water from the kiosks to the middle cisterns. "Not much [is allocated to the middle area]", a water manager spoke to me in the conversation, "just so that people by the front road can have sufficient water".[168] The water managers are tasked not only with

[168] Interview with co-op leader, October 2023, Jakarta

allocating water but also with ordering water through a WhatsApp group (where they can coordinate with PAM Jaya and other kiosk managers). For this job, they get paid a small fraction of the water costs, which Pak M describes as, “not commercial work, not big money, only to maintain the flow of water.” [169]

Figure 7.12 Four cisterns in the middle of *kampung*

The water tanker (Figure 7.13) comes three times a day. The cooperative leader, also a water manager himself, said he asked for water to be delivered at 9.00, 11.00, and 13.00, though sometimes it arrives late. The times of their orders organise the flow of water. Water is delivered at the kiosk, so he must make sure that the middle cisterns are empty to receive more water. If water is delivered every two hours, these cisterns are already empty and can be refilled. When the water delivery is too early – as in during our interview, where the central cistern was still half full – and the tanker leaves with some water left, the communities risk running out of water at the end of the day. Water access is, therefore, infrastructural as much as it is temporal.

[169] Interview with co-op leader, October 2023, Jakarta

Figure 7.13 Water tanker delivering water to the main cistern at the main access road

This section outlines how water access is both infrastructural and a matter of citizenship (Lemanski, 2020). Water poverty is produced through materially embedded imaginations of modern pipes, whose effects are infrastructural, folded together with discriminatory regimes that categorise who can access water and how. Ensuring equal water access, therefore, requires recognition of citizenship beyond documentation of IDs and tax bills, as well as equitable access to land and housing. While these are externalised from the financialisation scheme, the risks of water insecurities are individualised, forcing communities to navigate water access by themselves.

In Muara Angke, poor communities organise to address their socioenvironmental risks, reworking their relations with the state. Their strategies included signing a political contract to obtain citizenship recognition (see Irawaty et al., 2023) while also mobilising infrastructure and labour to make piped water available. As such, their claim for citizenship is made with, without, and against the state. Extending water through pipes, hoses, and cisterns, or what Lawhon et.al (2018) called heterogeneous infrastructure configurations, is emblematic of their infrastructural strategies to work against *and* within the state's 'formal' water supply system (water kiosks and tankers). The metabolic flow of water to these settlements is orchestrated through various infrastructures and labours: ordering water on WhatsApp, checking the cisterns, allocating water, and fixing pipes, as well as temporal strategies that make sure that water is *always* available and flowing. These are ways of exercising 'hydraulic citizenship' (Anand, 2017) which are liminal and partial, against the imaginary of universal modern water supply. Importantly, this inequality will persist despite the massive investment in Jakarta's water supply, if the state does not ensure safe access to land and housing for everyone.

7.5. Conclusion

This chapter has demonstrated how the financialisation of water infrastructure relies on externalising risks that neither state nor private actors want to retain, shifting these risks to the general public to make projects appear financially viable. Instead of seeing the externalised risks as the impact of financialisation, I argued that the socialisation of risks represents the very process of making infrastructure investable. I borrowed Tania Li's (2007) conceptualisation of 'rendering technical', arguing that the technical approaches to risk calculation and allocation discount complex social realities while shifting the costs to vulnerable communities.

First, I analysed how the state uses land compensation and acquisition as discursive and technical tools to manage displacement risks. Monetary compensation renders technical people's multifaceted social relations with land by turning what is measurable about land (its plot size, location, accessibility) into a discrete monetary value. As such, it deliberately leaves discounted outsides: the social relations entangled in land, which then destabilise community livelihoods after displacement. The two cases in East Bekasi (Bekasi City, West Java) and Sajira (Lebak Regency, Banten) demonstrate how risks in financialisation are passed on to communities in the upstream and downstream regions, who do not even have access to water from the financialised infrastructure projects. While communities may receive substantial compensation, the cost of losing their livelihoods, social networks, and economic activities lingers.

This technical rendering makes land compensation inherently contested. In the case of WTP Bekasi's community, the community disputes the appraisal result. In the case of the Karian dam, some elites benefit from speculating on and selling land to displaced people, reproducing inequalities in the villages, with most communities bearing the cost of developing their new *kampung,* which still lacks basic infrastructure, such as roads, electricity, and water. State compensation for land fails to account for these present and future costs, forcing communities to subsidise the state's infrastructural ambitions.

In the second case, I analysed how water access inequalities are translated into technical problems of installing pipe networks, which exclude informal settlements whose water problems require recognition of their citizenship and right to housing. This technical rendering is limited by two things. First, the imaginary of standard pipe construction is challenged by the cosmopolitan materialities of Jakarta, as *kampung* are built on heterogeneous materials (shells, rubble, concretised dike, marshland). Secondly, water (in)access is a byproduct of discriminatory regulation, which categorises who can access what water and through what means. Extending piped water access is implausible without the state recognising the community's secure land tenure and housing.

The communities subsequently mobilise tactical strategies – sometimes with, without, or against the state. One strategy is to build a political contract with politicians in exchange for electoral votes, to protect them from eviction and to secure a legal basis for their *kampung* (such as the establishment of neighborhood units, citizenship IDs, building permits, and a change of land-use zoning). Another is their infrastructural strategy to access water, combining state-backed water infrastructure (water kiosks and tankers) and community-based infrastructure (pipes, cisterns, organised under co-operatives) to bring water to their houses. As in the previous case of compensation, all these excesses of establishing

settlements and connecting to infrastructure are borne by urban poor communities, on top of the already alarming flood risks they must mitigate.

These cases show that Jakarta's financialisation of water infrastructure is inherently contradictory. While PPP promises to reduce the state's fiscal burden via efficient risk transfer, the state actually retains more risks (as exemplified in Chapters 5-6) while simultaneously imposing economic, social, and environmental risks to communities. Rather than containing risks, PPP passes risks onto the public and increases the vulnerabilities of communities that perhaps have the least capacity to manage them. This finally shows the limits of financialisation as a solution to infrastructural challenges.

Chapter 8. (Un)financialising Jakarta's water supply projects: the ecological and institutional limits to the financialisation of water infrastructure

8.1. Introduction

While scoping around Babakan Madang, Sentul, I came across Pak K, a security guard of a water vending company. On the wall of his station, seven switches control the pump's operation: green buttons to turn the pump on, red to turn it off. Water tankers arrived and parked under the *belalai* (Indonesian word for 'elephant trunk') while the drivers climbed up the tanker to pull the *belalai* into their tanks (Figure 8.1). "This truck will carry *buangan* [spillover] to Jakarta,"[170] Pak K said as he switched on the pump. The word *buangan* means something you throw away; in this case, it refers to the abundant water the village will never run out of, even during the dry season, and thus can be discarded as surplus into the thirsty city.

Figure 8.1 *Belalai*, literally looks like elephant's trunk, to channel water into the tankers

This scene from my fieldwork illustrates the shaky logics at the heart of Jakarta's financialised water supply projects. If financialisation is premised on absolute water scarcity (as illustrated in Chapter 4), the water tanker business embodies a contradiction: there is so much water that it becomes *buangan*. Most areas to the south of Jakarta, within and beyond the city's administrative boundary, lie in aquifer recharge zones and safe zones for groundwater extraction (see Subsection 8.4.1; Badan Geologi Kementerian ESDM, 2017). South Jakarta also exhibits better groundwater quality with less contaminants (E.Coli and other dissolved pollutants) compared to the central and northern parts of

[170] Interview with bulk water business operator "K", Bogor, November 2022

Jakarta, especially as its groundwater table is deep (> 40 meters below sea level) and therefore more protected from surface pollution (Dinas Lingkungan Hidup DKI Jakarta, 2024).

My goal here is not to justify the over-extraction of groundwater, especially given that in some parts of Bogor, Depok, and South Jakarta, groundwater levels are already in a pressing condition (Dinas Sumber Daya Air Provinsi Jawa Barat, 2022). Instead, I show that the adverse impact of groundwater over-extraction is not experienced by all urban residents, at least for now, and what appears is abundant, clear groundwater that makes pipe connections seem expensive and unnecessary. PAM Jaya records that South Jakarta's pipe water coverage is only at 29.12% (RISPAM DKI Jakarta, 2024). This perpetuates unequal access, as Kooy et al. (2018) suggest, when well-off residents in South Jakarta do not connect to piped water, it lowers the utility's revenue and prevents investment in the poorer neighbourhoods which require cross-subsidies. Thus, the lack of water access and the deteriorating groundwater quality in the northern parts of Jakarta are inherently linked to groundwater extraction in the south. Instead of a generalised, absolute crisis, the flow of water in Jakarta reveals both abundance and scarcity across connected geographical contexts. Importantly, this uneven but connected combination of water scarcity/abundance and networked/non-networked is the reality that finance navigates under the financialisation of water infrastructure.

This chapter extends Furlong and Kooy's (2017) concept of "socioecological connections" to studies in financialisation, exploring how the "intersecting pathways through which water is urbanised" (ibid: 890) shape and limit the financialisation of water infrastructure. First, this chapter examines the ecological settings and connections between pipe and groundwater access, materialised in the flow of water through water tankers and bottled water across urban and rural sites. I conceptualise these groundwater-extractive industries as the 'spillovers' or the uncontrolled out-of-network flows of water that continuously destabilise the financialisation of water infrastructure.

Second, I interrogate the institutional arrangements that sustain this spillover and how they impact financialisation. In doing so, I draw on the literature about the state as an "institutional ensemble" (Jessop, 2018:48), arguing that spillovers are actively produced, sustained, and normalised by the state through the work of its different institutions. I interrogate how agencies, such as the Ministry of Industries, the Ministry of Energy and Mineral Resources, the Ministry of Public Works and Housing, the Ministry of Investment, local government, and utilities, strategically engage with investment in water resources and pursue divergent goals regarding water infrastructure and access. This incoherence of the state in pursuing financialisation reflects the institutional limits to financialisation (Kay & Tapp, 2022). In Jakarta's case, I will demonstrate that on one hand, the state encourages the use of piped water to increase the revenue for financialised water supply projects, but on the other hand, the state facilitates the spillovers of water to satisfy the profits of other private actors.

Finally, building this argument, the chapter contributes an understanding of financialisation as unstable and incoherent. This messy financialisation results from its inherent limits. Limits to financialisation are not merely "social",[171] as an interviewee suggests, referring to people unwilling to connect to the piped

[171] Interview with SDA DKI Jakarta, May 2023, Jakarta, and former Director of PAM Jaya, May 2023, Zoom

network and pay for the water, but ecological and institutional. These inherent socioecological limits to financialisation then produce arbitrary outcomes, undermining the goal of providing universal piped water access in Jakarta. This does not suggest that financialisation needs to be made more coherent, nor that financialisation is the only approach to solve Jakarta's water crisis. While water infrastructure is necessary, water access should not be provided only to generate profits. With its inherent contradictions and inability to discipline water flows, financialisation potentially exposes urban communities to greater risks, such as higher water tariffs and unequal access to water connections, while normalising other forms of crisis, such as the over-extraction of groundwater in rural areas and the consumption of costly bottled water.

This chapter progresses as follows. The second section will discuss the literature on contingency, path-dependency, and the limits to financialisation to understand the inherent contradictions that the state has brought into financialisation. I draw on Jessop's (2001, 2018) scholarship, which understands the state as relations rather than a unified entity, and on Furlong and Kooy's (2017) argument about the socioecological connections of water access in Global South cities, to identify the institutional and ecological limits to financialisation. Then, I continue by illustrating the abundance of water in Jakarta's south area and the rise of private water suppliers there. The following section will analyse how the state incoherently engages with water access, namely by regulating and deregulating groundwater, as well as by selectively unregulating bottled water industries, in pursuing investment (in non-water sectors). I will conclude by reflecting on how state-enabled spillovers will perpetuate rather than address Jakarta's water crisis.

8.2. (Un)financialising water infrastructure

While scholarship on financialisation has documented the state's strategies to reconfigure its institutional and regulatory architecture to attract private investment, it has also recognised that the process and outcomes of financialisation are contingent and path-dependent on its articulation with local social, historical, and political settings. I Indonesia, Wijaya & Camba (2023) and Anguelov (2023) document how the financialisation unfolds through the increasing mobilisation of state funds and appointment of SOEs to undertake infrastructure projects, in contrast to market-led strategies which encourage competition in the infrastructure market. The financialisation of infrastructure operates through 'informal' connections between state actors and local politico-business elites who participate in and benefit from the projects (Meckelburg & Wardana, 2024; Wijaya, 2024). Simultaneously, financialisation is also shaped by civil society organisations' victories against the privatisation of water services (see Bayliss & Deekshit, 2024), resulting in the state juggling with the prohibition on privatisation. These studies exemplify how the state persistently pursues financialisation through contradictory and contested processes.

To further understand the limits of financialisation, in this chapter I borrow Bob Jessop's argument about the state as social relations (Jessop, 2001, 2018). He conceptualises the state as an "institutional ensemble" (Jessop, 2018: 48) whose power is exercised by plural agencies, including politicians,

government officials, and others beyond the state apparatus. Through the joining and frictions of these agencies, state power manifests strategically as selective and conditional rather than cohesive and universal, reflecting the "changing balance of forces […] in, through, and in opposition to the state" (ibid: 48). Kay and Tapp (2022) demonstrate this through how the US government strategically mobilise land as an asset to generate additional value, such as through monetising development or conservation rights, while also controlling this monetisation. While landowners are permitted to 'sell' their conservation easement to keep their land, for instance, to corporations that seek to reduce their tax liabilities, this mechanism is riddled with abuse of tax appraisals. Therefore, the government suggests that this can only be done if corporations can demonstrate the economic substance or genuine conservation goals of purchasing the credit, rather than just avoiding tax. This study demonstrates how financialisation operates through the contested agencies of different state actors (lawmakers, conservation agencies, tax agencies), resulting in the gatekeeping of financialisation and the limiting of land assetisation. The state simultaneously makes and unmakes land as financialised assets.

Ethnographic studies also demonstrate contested state agencies in realising development programs. For instance, ethnographic studies by Gupta (2012) suggest that rather than exhibiting homogeneity, the state consists of officials whose agencies facilitate, impede, and redirect state objectives in their everyday practices. He documents that, in delivering poverty alleviation programs in rural India, local officials often act indifferently towards poor people and impose bureaucratic requirements for the poor to access the state's support. This study demonstrates how the state manifests in different people, tools, and programs, whose actions can align or conflict with one another. Borrowing from this account, Truelove (2018) explains how the state's contingency articulates with infrastructural relations to water access. In Delhi, Truelove illustrates that unequal water access is produced by and through urban residents' connections with different states, in plural: the city's assemblymen who direct water into its constituencies (albeit unequally), as well as local engineers who facilitate and maintain the operation of these very networks, and witness the construction of illegal tubewells by urban residents. Therefore, instead of seeing the state as unified and homogeneous, the state manifests as "*a type of governing power* that was *infrastructural in nature*" (Truelove, 2021: 288, emphasis in original), which includes government and non-government actors whose presence is linked with the knowledge and capacity to increase urban water access.

State arbitrariness does not imply random actions. Officials deliberately and selectively act and comprehend the outcomes of their actions, such as when they "turn a blind eye" (Truelove, 2018: 963) to the construction of illegal tubewells. This resonates with what Anand (2015) terms 'ignorance'. It is not that officials do not have the competency to address problems like leakages, but because they embody the "limits of human power to govern, regulate, and control the obdurate material infrastructure that structures the city" (p. 310). The officials cannot force people to close their wells without piped water supply (as in Jakarta), and engineers are indifferent towards leakages because leaks are challenging to measure. These studies provide insights into my research in two ways. First, they demonstrate that the state is emergent and relational, and second, that it manifests in infrastructural power, which shapes and limits the goal of providing citizens with water access.

This links to a second body of scholarship: the socionatural relations of water flow in Global South cities. Interrogating the socionatural relations of water means attending to the "social, economic, political and environmental networks on and beneath the ground that remake urban relations" (McFarlane, 2013: 500), encompassing "multiple temporalities and interpenetrating circulations of water" (Swyngedouw, 1996: 76). Water access in Global South cities emerges from variegated and overlapping infrastructures and labours, embodying unequal power relations that are path dependent from colonial, industrialised, and neoliberal governance histories. Urban political ecologists have widely explored the techno-political dimension of urban water metabolism, demonstrating how water infrastructure embodies power by actively integrating or marginalising parts of the city (Kooy & Bakker, 2008b; Loftus, 2006) and how diverse means of accessing water produce possibilities for more democratic or decentralised infrastructures (Lawhon & Nakyagaba, 2022; Meehan, 2014). These techno-political arrangements are situated within particular ecological contexts (Gandy, 2022). Furlong and Kooy (2017) exemplify this claim by attending to the "socioecological connections" that enable the inclusions/exclusions of water access. For instance, Furlong and Kooy (ibid) explain how deep groundwater extraction by urban elites in Jakarta produces scarcity for those who operate shallow wells (Batubara et al., 2023). With unreliable pipe service, having a groundwater alternative means high-income communities can easily opt in and out of the network. In contrast, without pipe connections, the urban poor have no choice but to use polluted groundwater (Kooy et al., 2018). The disconnection of rich and other 'key account' users from the piped network undermines utilities' revenue, which is needed to expand pipe service to urban poor neighbourhoods. Therefore, inclusion/exclusion from the piped network is not only politically produced, but also socioecologically determined.

These two literatures provide a lens for understanding the institutional and ecological limits of financialisation in water infrastructure in Global South cities. Borrowing Jessop's conceptualisation of the state as an ensemble to understand financialisation means unpacking the converging but also contested capacities and interests of different actors in financialising water infrastructure. This involves the deliberate ignorance (Anand, 2015), but also active participation (Truelove, 2021) of the state in shaping the spillovers of water beyond the networked system. These spillovers flow "beyond the accounting regimes of the state" (Anand, 2015: 323), such as through leakages and illegal groundwater extraction, and out of the pipe infrastructure. In this regard, as many scholars have shown, messy and leaky pipes, and the specific knowledge about them that few engineers possess, undermine modern audits of water, contributing to the slowness (Williams, 2021) or rejection of financialisation (Bayliss & Deekshit, 2024). Financialisation requires the state to discipline these spillovers by making water calculable within the network and ensuring that private investment is paid back – without which financialisation is undermined. Instead of suggesting that financialisation is coherent, by borrowing theories on the state as social relations and the urban political ecology of water access in Southern cities, I argue that financialisation is destabilised through the ignorance, indifference, or deliberate actions of the state in producing spillovers from water infrastructure. The following section will demonstrate these spillovers of water – the ecological limit to the financialisation of water infrastructures in Jakarta.

8.3. Spillovers: the ecological limits to financialisation

Jakarta's water crisis extends far beyond the city's boundaries, entangled in ecological and economic dependencies that stretch into its hinterlands. This section examines how Jakarta's inadequate water supply has generated private water suppliers that rely on resources from Bogor, to the south of Jakarta. I conceptualise them as spillovers, representing the water that flows out of the pipe networks and undermines the financialisation of (pipe) water infrastructures.

The relationship between Jakarta and Bogor's water resources has deep colonial roots. Jakarta lies on lowland, traversed by 13 rivers flowing down from Bogor's mountainous region to the city's south. Bogor Regency has served as the backbone of Jakarta's urbanisation, supplying sand, gravel, cement (Webber & Astuti, 2025) and crucially, water. In 1922, the Dutch colonial administration built a 64-kilometre piped network connecting Jakarta (then, Batavia) to Bogor's Ciomas-Ciburial spring, channelling 89 litres/second to the European residents (Abeyasekere, 1989; Argo, 1999). This colonial infrastructure continues to shape contemporary water flows, albeit through a different mechanism. The spring wells still flow to Jakarta, moving through water warehouses (*gudang air*) in Bogor (Cibinong)[172] and Jakarta (Pasar Rebo), brought by tanker trucks rather than pipes (see Figures 8.2 and 8.3). The warehouses function as retail hubs for water tankers. "Tankers were queuing in line, day and night," the manager of Pasar Rebo's water warehouse, Pak A, recalled in his memories of the golden age of the water tanker business in the 1980s. The tankers used to supply water to high-income houses in North Jakarta located on streets wide enough for trucks and who usually had water storage, while lower income families who live in *kampung* rely on vendors selling water from carts (Lovei & Whittington, 1993).

However, since decentralisation in 1999, Ciburial spring and Cibinong warehouse are managed by PDAM Kabupaten Bogor, while Pasar Rebo water warehouse remains under PAM Jaya's control and stores water from the West Tarum Canal. Tankers purchase water from utilities, indicating that utilities generate profits through out-of-network water supply. Utilities acknowledge this "commercialisation", but suggest that "this [distribution of water via tankers] is only for emergency, for instance, when there are underserved areas due to pipe leakages, we supply the water via tankers, and it is free. Commercialisation is very, very limited."[173] While this commercialisation of water remains underexplored in my research, further research needs to unpack the extent to which utilities in Jakarta and Bogor profit from the tanker business.

[172] The area is known as 'Bakos', located close to Bakosurtanal office (National Survey and Mapping Agency)
[173] Interview with former Director of PAM Jaya, May 2023, Zoom

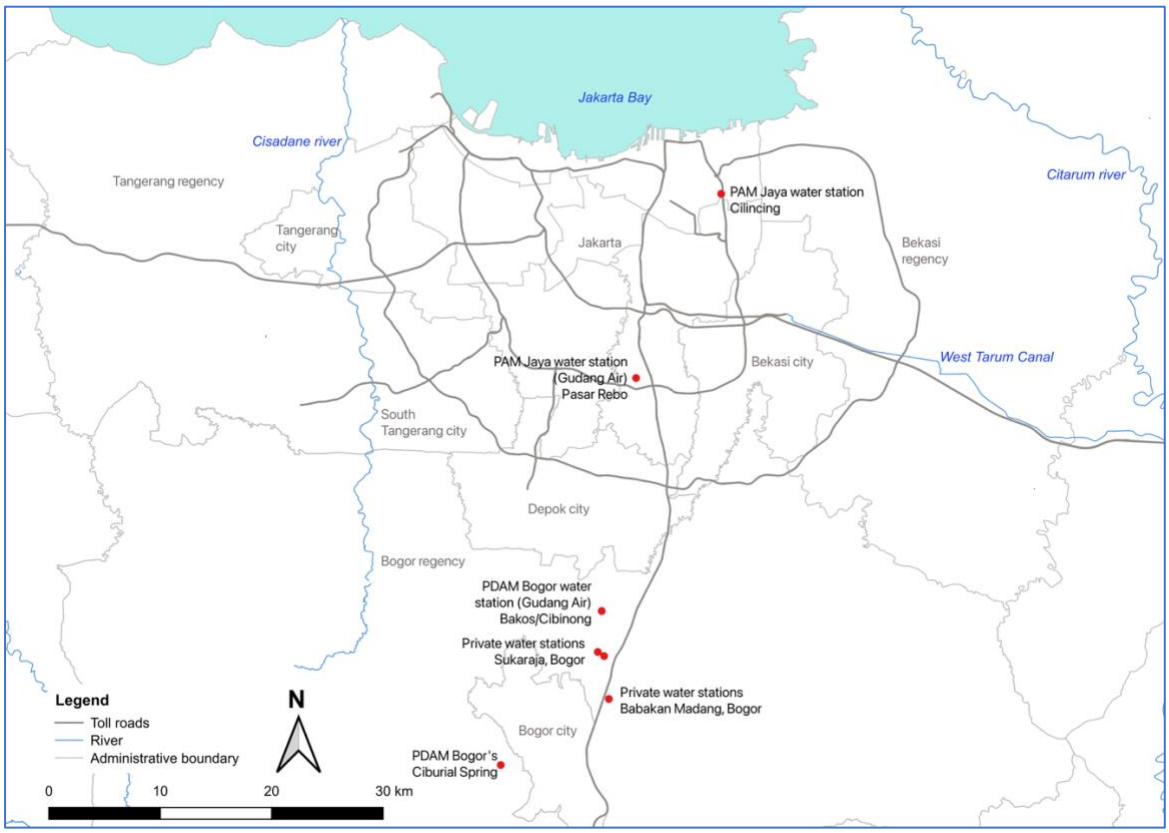

Figure 8.2 Sites of water stations for purchase by tankers in Jakarta and Bogor

Figure 8.3 Water warehouse in Cibinong, Bogor, with year '1922' written on its roof and trucks parked to fill up their tankers with water

The fragmentation of colonial water infrastructure led to the emergence of private water suppliers in Bogor. In the early 2000s, the tankers at the Pasar Rebo warehouse lost their premium water source, as

the Ciburial spring was now managed by PDAM Bogor, and they thus moved to Sentul to be closer to the Cibinong warehouse where the springwater still flows into. These areas benefit from excellent toll road access, facilitating the tankers' mobility to Jakarta. However, with the relocation of tankers to Bogor, Pasar Rebo warehouse manages only half the transactions as in the past. During my two-hour conversation with the manager, I saw only four drivers filling up their tankers (see Figure 8.4), compared to the numerous tankers at a water retailer in Bogor. The manager relayed that the water from West Tarum Canal is of lower quality, due to high levels of industrial and domestic pollution entering the canal, making it only suitable for construction or swimming pools (see also Aritonang et al., 2021).

Figure 8.4 Tankers filling up water at Gudang Air Pasar Rebo

In addition to utilities, tankers in Bogor also purchase water from private vendors that abstract groundwater. Susilawati (2022) explains that most of Bogor's groundwater basin is a safe extraction zone, except for smaller parts around Cibinong and Sentul – where many bottled water and tanker companies operate – as well as in Bogor city centre (see Figure 8.5; Rengganis & Harnandi, 2011). In 2007, there were 853 companies with groundwater extraction permits in Bogor; 731 of them extracted 338,727 m^3/day (Dinas Lingkungan Hidup Kabupaten Bogor, 2007), but this figure could be an underestimate, as many borewells are unregistered. This shows how Greater Jakarta's water crisis produces an ecological footprint not only around the piped water sources, like in Jatiluhur and Karian dams, but also around the non-piped water sources.

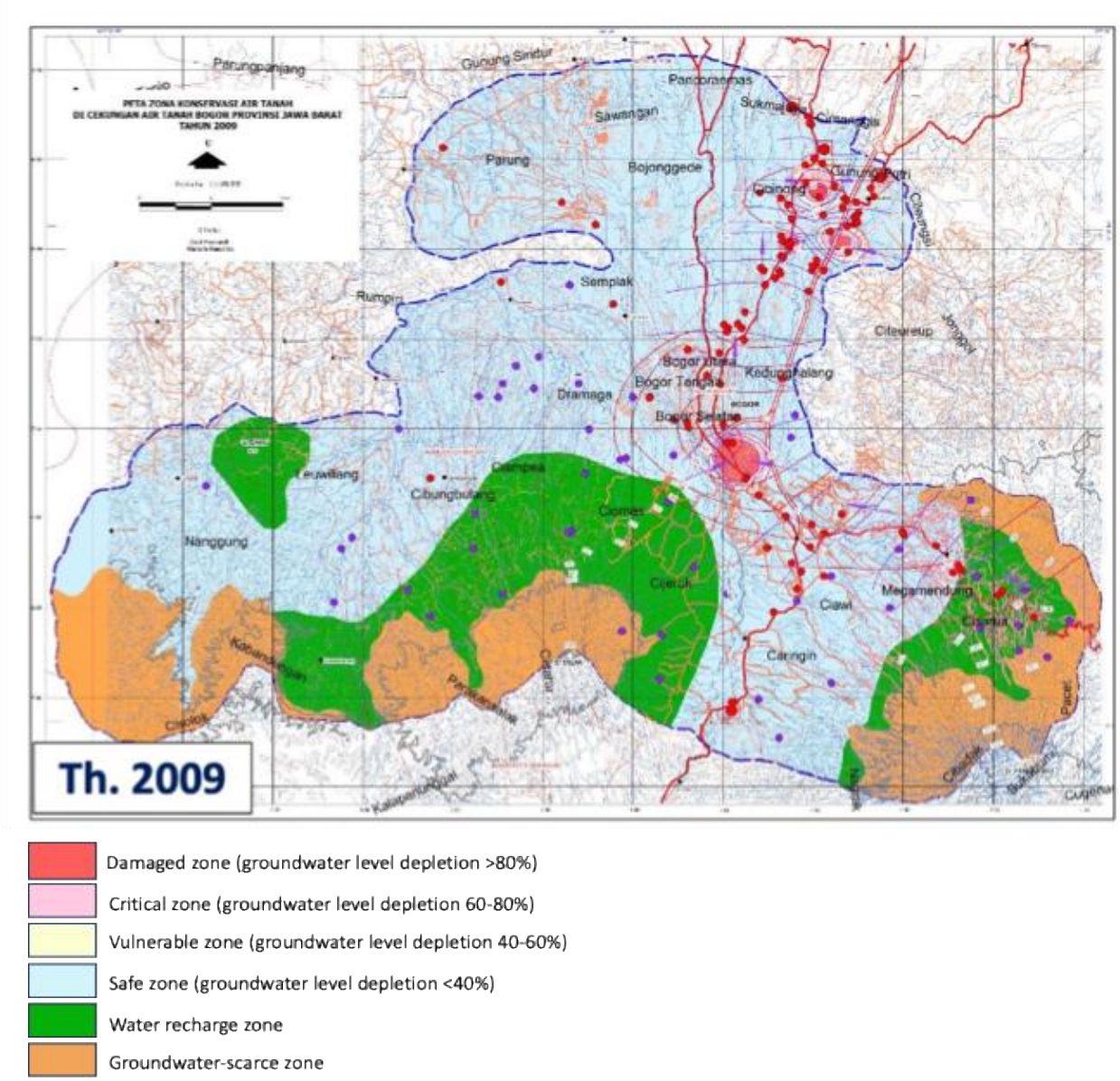

Figure 8.5 Conservation map for confined aquifer 30-180 m in Bogor groundwater basin
(Source: Susilawati, 2022; Rengganis & Harnandi, 2011)

An estimated 1,000 water companies operate in Bogor, extracting groundwater to meet Greater Jakarta's water needs (KompasTV, 2018). In Sentul, the water tanker business varies in scale. Large-scale private water vendors, shown in Figure 8.6, operate across the drinking water supply chain. These businesses purchase water from the warehouse, transport the water with their fleets, and deliver the water to the depots of similar brands. The companies also have workshops and garages for their fleets. This ecosystem of water depot suppliers emerged in the early 2000s, during the peak popularity of gallon water, after large water companies like Danone (under the brand 'Aqua') introduced domestic water products such as the 19-litre *galon*. Water tankers marketed their water as drinkable water, processed with filtration and purification technologies at the depots where consumers could purchase water and refill their empty *galon*. These companies operate on a large scale: one of the companies that I observed

owns 70 trucks and hires 150 drivers to supply water to Greater Jakarta.[174] The company receives between 100-150 orders from Greater Jakarta daily and delivers water to their water depots, swimming pools, or ground tanks in commercial buildings, such as hotels and malls. These companies exclusively source their water from Ciburial Spring, purchasing from PDAM Bogor, which has such "clear and cold water, that even after the truck arrives in Jakarta you can touch the [truck] tank, and it is still dewy".[175] An interviewee from one of the large water companies stated that they have between 10-20 depots in each of the 267 sub-districts in Jakarta.[176] At the water depot, water is contained in a tank for filtration and radiation, before being purchased by customers at a price between IDR 8-9,000 per one 19-litre *galon.*

Figure 8.6 Private water tanker companies in Bogor

In contrast, smaller water vendors operate as stations where individual trucks purchase water; unlike the large-scale vendors, they do not have fleets themselves. Business at this scale includes Pak K's water station, which I introduced earlier in this chapter. Like other vendors, Pak K contended that his pool of water never dries out. His pool was the second I saw during fieldwork; another, smaller business also has a groundwater spring in its backyard, which the owner claimed never runs dry. The businesses claim that the groundwater in this area is abundant and of good quality. An operator showed me a letter issued by the local health office regarding the water quality in his pool, stating that it had undergone regular checks by the authority. Around 10-15 trucks (each equal to 8,000 litres) purchase groundwater from each private well in the village every day at IDR 70,000 per tanker (US$4.26) (see Figure 8.7). It is a common sight to see water trucks passing through 4-metre-wide roads around the village. The water is delivered to water depots in the city and also to apartments, offices, and industries in Jakarta at a cost of IDR 350,000-700,000 per truck (US$21-43) depending on the distance to the destination. At the

[174] Interview with bulk water business operator "T", Bogor, November 2022
[175] Interview with bulk water business operator "H", Bogor, November 2022,
[176] Interview with bulk water business operator, "A", Bogor, May 2023

depots, the water is priced at IDR 6-7,000 (US$0.45) per 19-litre *galon*, slightly lower than the companies that source the water from Ciburial spring.

Figure 8.7 A water truck filling up its tank with groundwater at a 'station' in Bogor

The relationship between Jakarta and Bogor's water intensifies during dry season. The tankers' purchases double during dry periods when local utilities cannot meet consumer demand.[177] A tanker company, "T", mentioned that, for instance, a superblock in Tanah Abang, Central Jakarta, once ordered 50 water trucks to fill its ground tank when Jakarta's water supply system was shut off. An apartment in Tanah Kusir, too, once ordered 80 trucks in the dry season. Another tanker company, "A", supplied water to glass manufacturing business, Ancol recreation area, and to Jakarta's power plant with almost 100 trucks. The reliance of Jakarta's commercial sector on water tankers from Bogor is predictable given the intermittent supply from PAM Jaya's pipe network and the lower cost of purchasing water via tanker than paying the groundwater tax.[178] There is a growing demand for water from Bogor, even as Jakarta aims to achieve 100% piped water service in the city. As a business owner suggested: "maybe [universal access of water in Jakarta] will happen in the next generation, but I don't think anything will change significantly in the next 10 years."[179] For that reason, these companies are still optimistic about their future; expanding their businesses by purchasing fleets and land, building more depots, or investing in the bottled water industry.

[177] Interview with water tanker business, "A", Bogor, May 202
[178] Based on a simulation of DKI Jakarta Governor Regulation 94/2021 on groundwater tax, an industry with allowable groundwater extraction of 3,000 m^3 per month in area where pipe network is available would have to pay IDR 490,659,618 per month (US$29,800). For the same volume purchased via tanker, the industry would pay IDR 288,750,000 (US$17,500). With piped water, the industry will only have to pay around IDR 56,250,000 (US$3,400) per month (excluding the cost to connect to the pipe system)
[179] Interview with bulk water business operator, "A", Bogor, May 2023

This section has laid out the ecological linkage between the water crisis in Jakarta and the bricolage of networked and non-networked water suppliers: tankers, bottled water industries, and utilities, at Jakarta's southern edge. I demonstrate how colonial water infrastructure is sustained to provide water to Jakarta, albeit through non-piped networks following decentralisation. Second, I show how private water suppliers such as tankers and bottled water mushroom in Bogor, profiting from the abundance of spring and groundwater, often through unsustainable extraction. Meanwhile, the thriving private water suppliers in Bogor undermine the demand generation needed to meet investors' returns in Jakarta's financialised infrastructure projects. As Anand suggests, the state selectively engages with (and sometimes ignores) these permanent spillovers to the financial projection of Jakarta's water projects. Having mapped these spillovers, I now turn to how the state actively produces them through contradictory regulatory practice.

8.4. The arbitrary state in governing water

8.4.1. Regulating groundwater

When asked about how they are ensured of their return while groundwater use is still expansive, financiers and project developers always suggested that they rely on the local governments' plans to stop groundwater permits.[180] Throughout my fieldwork, different actors noted that, aside from the non-revenue water, groundwater is their biggest fear in investing in piped water projects:

> "Investment in WTP [Water Treatment Plant], commercially, the feasibility [of the project], is not very evident because they depend on the revenue from customers. These customers, you know, sometimes they don't pay, they use groundwater, not to mention the loss, the leakage; who will be responsible for that?"[181]

Jakarta's deep aquifer extraction for water consumption started to escalate in the 1970s (Whincup et al., 2024). The provincial government recorded that Jakarta's groundwater use has decreased, from 36 million m^3 in 1995 to only 6 million m^3 in 2020, as cited by Governor Anies Baswedan in claiming this decrease as his success in controlling groundwater use.[182] However, this data is an underestimate; building owners with well permits often do not report their actual groundwater use and many wells operate without permits. For instance, in 2016, only 60% of permit holders reported their groundwater use (Kompas.com, 2016). Even though Jakarta's land subsidence is often attributed to groundwater depletion, extraction is highly unequal. As Batubara et.al (2023) recorded, it is the use of deep wells (>40 m) by high-income or commercial users rather than shallow wells by households that causes land subsidence. This is confirmed by Figure 8.8, which maps areas with damaged and critically confined aquifers (marked pink and red) as those where industrial and commercial activities are concentrated

[180] Interview with WIKA Tirta Jaya Jatiluhur, November 2022, Bekasi; CEO of Karian Water Service, May 2023, Jakarta
[181] Interview with syndication department, state-owned bank, 20 June 2023, Jakarta
[182] Presentation at Webinar IA-ITB, 'Jakarta Tenggelam', 10 August 2021

such as in Tambun and Cakung area (East Jakarta), Cengkareng and Kapuk (West Jakarta), and central Jakarta.

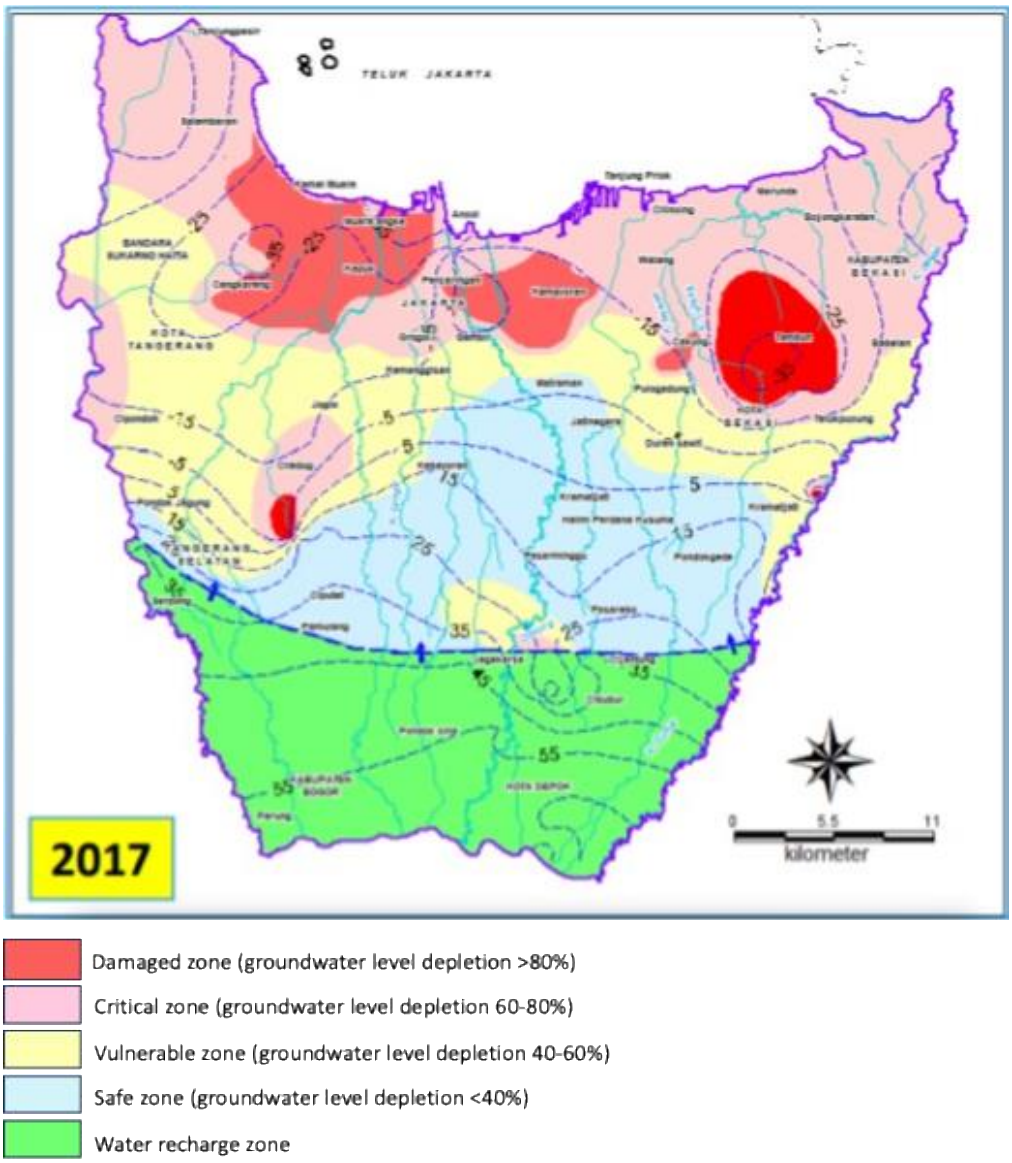

Figure 8.8 Conservation map for confined aquifer 40-140 m in Jakarta groundwater basin
(Source: Badan Geologi Kementerian ESDM, 2017)

In 2018, Governor Anies led a team to inspect 80 high-rise buildings in the Sudirman-Thamrin corridor, revealing more than 50% of them violate groundwater permits (B. Putri, 2018). Wells are "people's kitchen problem (*urusan dapur orang*)",[183] as they are physically inside the property (sometimes literally in the kitchen) and far underground, unseen from the street and from the public, making it impossible for officials to inspect. Colven (2020) argues that this kind of invisibility allows groundwater extraction to

[183] Interview with PDAM Tirta Patriot Kota Bekasi, 23 June 2023, Bekasi

be overlooked in comparison to more spectacular, visible flood-protection projects. With the impossibility of monitoring groundwater use, the government prioritises mitigating the impact of land subsidence rather than controlling groundwater extraction. The massive use of groundwater by big water consumers (such as industrial or commercial actors) means the loss of potential revenue for utilities who extend the pipe service, and the often illegal conduct also means tax losses for the public to rehabilitate the groundwater or to mitigate the impact of land subsidence (Kooy et al., 2018).

In Jakarta, groundwater controls were introduced in 2009. Some reduction in groundwater extraction is evident (Whincup et al., 2024), although it is still minor. Even so, this does not imply that private developers will automatically connect to piped water once it is available. Groundwater control propels private developers to use alternative water sources, such as recycling, rather than abstracting more piped water (Kooy et al., 2018). It is cheaper to invest in water recycling technology – it saves 60-65% water use in commercial buildings – than buying water from utilities, especially for non-potable purposes.[184] This means that more loss of demand is to be expected for pipe investments in the future as big water users recycle their water instead of using groundwater.

In order to control the groundwater extraction by commercial buildings, the government of DKI Jakarta recently issued decree No. 93/2021 which maps groundwater extraction-free zones where the piped network is available. An official contrasted two methods: "With the people, our approach is to persuade them (*sosialisasi*) […] with industries, it is about law enforcement."[185] Regulating all borewells is not feasible – there are at least 15,000 wells in Jakarta alone (Batubara et al., 2023) – therefore regulating by classifying users is more tactical. The governor's decree, for instance, delineates commercial zones and strips where groundwater extraction is prohibited (see Figure 8.9). This decree applies to buildings with $\geq$ 5,000 m^2 area and $\geq$ 8 floors in Jakarta. Around 527 buildings are identified and targeted in the zones. Under the new regulation, groundwater use will be monitored through Dinas SDA's system through which building owners are instructed to install and calibrate their groundwater meter.[186] Nonetheless, this measure is very limited as the delineated zones are relatively small and even critical areas with severe groundwater depletion in the north and west Jakarta are still exempted.

[184] Interview with water engineering consultant, October 2023, Zoom
[185] Interview with PAM Jaya, April 2025, Zoom
[186] Sosialisasi Peraturan Zona Bebas Air Tanah di Wilayah Jakarta Utara, 12 Juli 2023

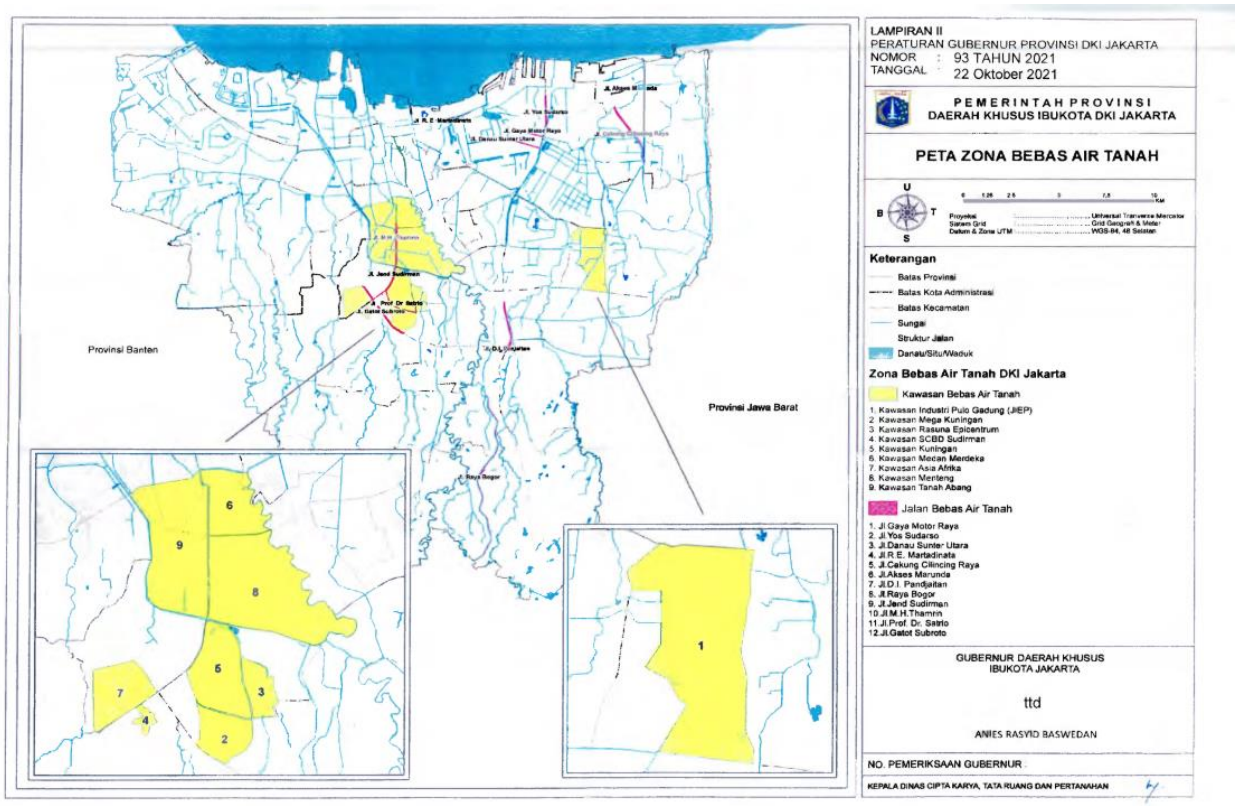

Figure 8.9 Groundwater-free zone *(Zona Bebas Air Tanah)* in Jakarta
(Source: DKI Jakarta Governor Decree 93/2021)

To sum up, this section has analysed how the provincial government of DKI Jakarta, as a shareholder of PAM Jaya and the mandated agency for water services, struggles to address groundwater extraction and to develop the city-wide piped network. Groundwater extraction remains an unresolved problem in Jakarta despite attempts to monitor and control it. Perhaps controlling groundwater use is not an issue; as a project developer suggested, "not far from here, in Muara Karang, the water is already brackish […] It is just a matter of time until they use our water."[187] The water will continue to degrade, and perhaps this environmental constraint will finally force industries to shift to the pipe network. Until then, however, the state (local and national governments) must shield the private project developers and their financiers from demand risks and guarantee them returns.

In the next section, I contrast the attempt to control groundwater extraction with the investment-friendly narratives that are consolidated by some Ministerial offices. Groundwater extraction remains contested across and within institutions, entangled between saving Jakarta from environmental chaos and fostering the image of an investment-friendly government through the ease of obtaining groundwater permits.

[187] Interview with WIKA Tirta Jaya Jatiluhur, November 2022, Bekasi

8.4.2. Deregulating groundwater

Ministerial elites, women and men, stand on the stage and behind a big, pretend valve. Under the valve is the logo of the Ministry of Energy and Mineral Resources. As the master of the ceremony calls, they twist the valve together, performing a theatrical act of making water flow as cameras are pointed towards them. For the investor audience, the government is literally 'turning on the tap' for their business. [188]

I wrote this observation note at the launch of Indonesia's new groundwater permit system by two ministerial offices, the Ministry of Energy and Mineral Resources and the Ministry of Investment. A video was played at the beginning of the event, directed to the water, industry, and real estate business audiences: "1 step, 3 requirements, 14 days". In a dramatic visual, the video suggests that groundwater permits will be significantly simplified through the new system, showing to the audience that the government is business friendly. The Vice Minister of Energy and Mineral Resources, Yuliot Tanjung, who delivered the opening remark, is a career bureaucrat and was a Vice Minister at the Minister of Investment. Likewise, the current Minister of Energy and Mineral Resources, Bahlil Lahadalia, was the Minister of Investment during Joko Widodo's tenure. The apparent alignment between the two ministries makes their collaboration on the new system unsurprising.

Following the omnibus bill on Job Creation,[189] groundwater permits for business purposes in cross-provincial and strategic water basins, including the Jakarta basin, are administered through an online platform under the Ministry of Investment. Permit issuance is based on the zoning stipulated by the Ministry of Energy and Mineral Resources, which delineates aquifer conditions by extraction level (see Figures 8.5 and 8.8 as examples). The zoning is powerfully performative; it forms a foundation for groundwater permitting. For instance, in the 'safe zone' and 'vulnerable zone', a water permit will be given based on the optimum debit.[190] Meanwhile, in the 'damaged zone' and the 'critical zone', new applications will be declined, but extensions of old applications will be allowed for a maximum of 10 m^3/day. As a business-friendly regulation, this policy prescription is more relaxed than the 2008 regulation,[191] which prohibited groundwater extraction in the 'damaged zone'. In this new groundwater regime, the map officially titled the 'groundwater conservation zone' now functions as a 'groundwater for investment' guide.

The new permit system is accompanied by a real-time monitoring system for groundwater levels and land subsidence (see Figure 8.10). The system displays groundwater levels and quality data from monitoring wells across the Jakarta region, making previously hidden groundwater visible to the public. Generating real-time and long-term data seeks to inform decision-making for the zoning, which is important for conservation and for investment decisions. For project developers, for instance, this real-

[188] Based on the Ministry of Energy and Mineral Resource Regulation 14/2024; event documentation available at https://www.youtube.com/watch?v=6mKxVKZPXBk&t=2822s
[189] Law 11/2020; the law seeks to facilitate private investment by easing and centralising business permits to national government
[190] Optimum debit refers to the allowable water abstraction which does not impact the aquifer.
[191] Government Regulation 43/2008

time survey can inform them of surrounding groundwater level and water quality, helping them decide on the depth or technology for exploiting groundwater.

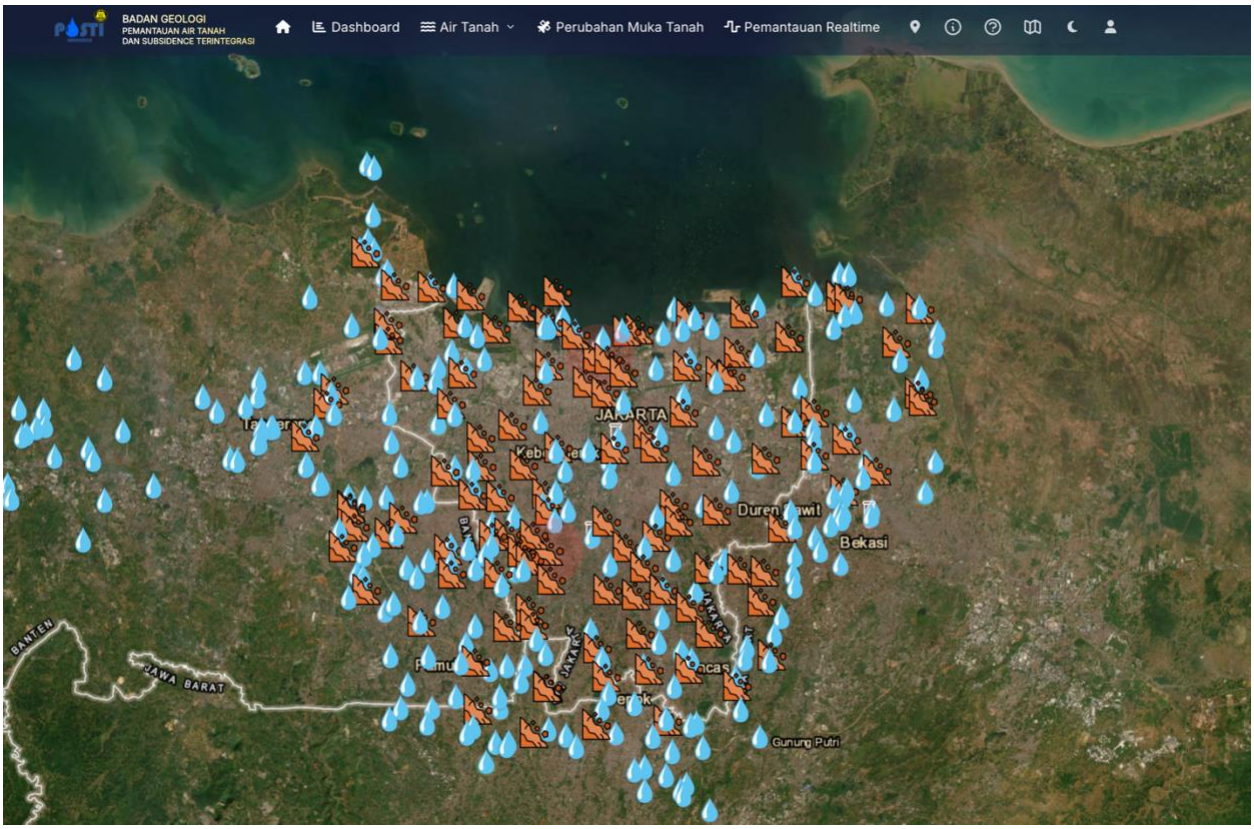

Figure 8.10 Real time monitoring of groundwater level

(Source: https://geologi.esdm.go.id/sipasti/app/map/water_level/)

For the Jakarta basin (Figure 8.8), a large proportion of which is in a safe zone (blue), critical zone (yellow) and recharge zone (green), the new permit regime means groundwater extraction is still allowed, despite some limitation in the yellow (max. 25 m^3/day) and green zones (max. 10 m^3/day). The blue zone, where groundwater can still be optimally withdrawn, covers most of South Jakarta where Jakarta's potential piped water 'key account' customers, or customers with large water usage (Palyja, 2017), reside. Based on the zoning, the regulation allows (new and extended) groundwater extraction in these areas, potentially deterring the residents and businesses from connecting to the piped water. With sustained groundwater extraction, utilities will receive less revenue and unable to reinvest in developing pipe networks. In the new groundwater regime, the state, here, the Ministry of Energy and Mineral Resources and Ministry of Investment, is indifferent to attempts to conserve Jakarta's groundwater and to provide universal piped water access to Jakarta. This demonstrates how state arbitrariness maintains the very crisis that Jakarta's water supply project aims to solve.

8.4.3. Unregulating water: bottled water industry

In 2022, 76.66% of people in Jakarta used bottled water as their main source of drinking water compared to 15.33% and 7.06% who used groundwater and piped water respectively (BPS DKI Jakarta, 2023). The

consumption of bottled water is pervasive: the lower-middle class are likely to consume non-brand packaged water (Kooy & Walter, 2019) such as that delivered by tankers from Bogor, while the upper-middle class rely on branded bottled water. Greater Jakarta absorbs 60-65% of the total national bottled water demand (Yogatama, 2014) with 88 litres per person per year (Tempo, 2023), almost 765 million litres per year in total.[192] Should this amount of water be purchased from utilities at the lowest tariff rate (IDR 1,000 per m^3 for the poorest households), it would equals to IDR 765 billion (US$46.5 million) or 25% of PAM Jaya's operating revenue in 2023 (PAM Jaya, 2024a).[193] Instead of going to PAM Jaya, this potential revenue goes instead to the bottled water industry. The heavy reliance on bottled water is a significant factor in the bankability of water infrastructure projects. With pervasive bottled water consumption, even when the pipe infrastructure is built, consumer uptake and utility revenue generation will remain uncertain.

Bottled water industries market their products as superior than other water. Aqua, the most popular brand under Danone, a multinational water company, for instance, campaigns that 'not all waters are the same' (*tidak semua air sama*), emphasising the quality of bottled water against other water supplies, such as groundwater, piped water, and non-brand bottled water (*air isi ulang*) which are susceptible to contamination. However, as Kooy and Walter (2019) suggest, simplifying bottled water consumption as a matter of individual choice between different water suppliers obscures the unequal power relations and historical settings that underpin the growing market for bottled water. For instance, Prasetiawan et.al (2017) identify the high consumption of bottled water as a post-colonial legacy. During the colonial times, bottled water, known as 'Dutch water', was popular among the European settlers. Prasetiawan et al. (ibid) suggest that the image of consuming bottled water was initially attached to upper-class communities, especially after the brand Aqua marketed its products specifically to expatriates. Bottled water only started to expand to the lower classes in 1978, in the form of bottled packaging, and then in the late 1990s, in the form of 19-litre *galon* packaging, when it started to 'enter' the household market.

Classed and racialised associations with bottled water, now coupled with the environmental crisis, fuel the growth of the bottled water industry; in 2024, its growth rate was 5.5% (Kementerian Perindustrian, 2024). It is such a lucrative business that even utility and water authorities (like PDAM Bekasi City, PT PITS in South Tangerang, and Perum Jasa Tirta II) produce bottled water. The sustained growth of bottled water consumption is backed by the supposedly anti-privatisation Water Law No. 17/2019, which followed the Constitutional Court's annulment of Water Law No. 7/2004. The new law limits the definition of 'water as basic needs' to reticulated water, excluding bottled water, which is said to be a 'lifestyle product'. As a consumer good, the price of bottled water is decided by its producers, unlike piped water whose price is regulated by the government, including with subsidies (Al 'Afghani & Maulana, 2018). The differentiation of water is stated in law, but also discursively enacted and materially justified. For instance, an industry representative suggested that "piped water is basic needs. If people do not consume pipe water, their life quality deteriorates. … But, there is no standard for bottled water consumption [that will define one's wellbeing] – you can drink one bottle, one gallon, or

[192] Jakarta's population in 2024 is 11.35 million people and 76.6% of them are bottled water consumer
[193] PAM Jaya's operating revenue in 2023 is IDR 2.943 billion (US$176.6 thousand)

nothing at all." He further argued, "We [bottled water and pipe water] are really [from] different worlds".[194] The categorisation of water, regardless of its interconnected hydrological cycle, lays the foundation for their governance. This also evidences that undoing privatisation, limited to utilities and infrastructure operations, will not fully address the problem of water access inequality without addressing the commodification of water (McDonald, 2018).

The operation of bottled water industries is endorsed by state actors as a contribution to economic growth with industrialisation. For instance, the Ministry of Industry seeks to increase the contribution of bottled water industries (including beverage industries) in national growth and to modernise the industries, given that 90% of bottled water industries are small and medium enterprises (Kementerian Perindustrian, 2024). As an official suggested: "We still cannot drink our tap water; this becomes an opportunity for the domestic bottled water industry to grow quickly" (quoted in KumparanBISNIS, 2024). This normalisation of crisis-turned-opportunity risks local utilities losing potential revenue. The pervasiveness of the bottled water industry elucidates a fundamental contradiction in Jakarta's water governance. Despite the aim to promote universal piped water access in the city through financialisation, state actors (such as the Ministry of Industry) simultaneously pursue investment growth from industries, substantially challenging utilities' returns and financial capacity to invest in pipe infrastructure.

To summarise this section, I recount a public official suggesting that: "we are in a state of crisis, but people do not feel it yet."[195] This official implies that people are still reluctant to connect to the pipe system, despite the alarming water crisis. However, people do understand and feel the crisis, and indeed many of them, like the urban poor in North Jakarta, shoulder the greatest burden: paying for the most expensive water while also living at the highest risks of tidal floods and land subsidence. The reason that many people are still disconnected from the pipe service is because the spillovers, such as over-extracting polluted groundwater or consuming bottled water, are normalised. The rationalisation that some waters are superior to others is deeply ingrained. Like the Dutch colonial elites who had the privilege of clean water, piped and bottled water symbolises a modern lifestyle for Jakarta's urban poor (Kooy & Bakker, 2008b; Prasetiawan et al., 2017). This depiction of modernity is reinforced by the state, allowing simultaneous investment in bottled water and piped water, which undermine each other. Therefore, the water crisis is not emblematic of a technical failure to match supply and demand, but rather of the inherent contradiction in investment-driven water governance, which makes these spillovers appear normal and justified. Beyond problems of competing bureaucracy, the different ministerial agencies actively produce the spillover and sustain the water crisis in Jakarta.

[194] Interview with the Association for Bottled Water (ASPADIN), 18 October 2023, Zoom
[195] Interview at the Directorate of Water Resource, Ministry of Public Works and Housing, February 2024, Zoom

8.5. Conclusion

The simultaneous rollout of multiple water infrastructure projects in Jakarta holds the promise of universal piped water access in a city where water crises, exacerbated by land subsidence and the climate crisis, have reached alarming levels. However, this chapter suggests that these financialised water supply projects are fraught with contradiction and contestation, shaped by the institutions and the ecologies where water is (over)flowing, which undermine the goal to provide universal water access in the city. In elaborating my argument, I drew on existing scholarship about the path-dependent and contingent process and outcomes of financialisation, and extend this to two bodies of literature: the state as relational (Jessop, 2018) and the socioecological connections of water access in Global South cities (Furlong & Kooy, 2017).

First, I described the post-colonial infrastructure and flows of water that shape Jakarta's water access through piped and non-piped networks across urban and hinterland areas. I conceptualised them as 'spillovers' that lie beyond the control of financialisation. I illustrated this through the growth of private water suppliers, such as tanker and bottled water businesses, which have mushroomed across Bogor, south of Jakarta, extracting groundwater and purchasing piped water from local utilities through colonial-inherited infrastructure. I showed how the abundance of ground and springwater in Jakarta's hinterland limits infrastructure financialisation by providing viable substitutes for the piped water system. With colonially inherited norms of differentiated waters – that one form of water is better than the other – the operations of the tanker and bottled water industries are woven into the everyday lives of Jakarta's urban residents, undermining attempts to connect urban communities to the piped network supply.

Second, I elucidated how the state produces these spillovers through selective and strategic engagement with groundwater resources. I elaborated on three different ways the state produces spillovers: regulating, deregulating, and unregulating waters. I started this section by exemplifying the DKI Jakarta government's attempt to monitor groundwater. As a shareholder in utilities, the provincial government has a direct interest in controlling groundwater extraction and in fully implementing the pipe network project. Then, I illustrated how ministerial agencies, such as the Ministry of Energy and Mineral Resources and the Ministry of Investment, centralise and deregulate groundwater permitting to create an investment-friendly climate. I illustrated how these agencies use tools such as conservation maps and real-time water monitoring to provide information and certainty to investors, including bottled water companies. Last, I analysed how another agency, the Ministry of Industry, arbitrarily applies the anti-privatisation water law, treating bottled and piped water as different objects: one as a 'lifestyle product' and the other as 'basic needs'. Therefore, while the privatisation of water services is prohibited by law, the same law shields the bottled water industry from anti-privatisation efforts.

These findings illustrate the tensions between the attempt to financialise water infrastructure and the variegated means of accessing water in postcolonial cities. It is not that the state fails to control groundwater, but the state deliberately allows groundwater extraction by strategically engaging with

the private water industry to propel investment. These spillovers ultimately fill in the gaps that piped supply cannot reach, thereby reproducing today's splintered water access.

Chapter 9. Conclusion

9.1. Summary

This thesis interrogates the process of turning water infrastructure into an investable proposition, making access to piped water a business that fits the appetites of financiers rather than a public service for human flourishing. Drawing on literature on financialisation and the urban political ecology of water access in Global South cities, my thesis has shown how water infrastructure financialisation operates within complex natural-infrastructural and sociopolitical configurations that animate postcolonial cities. Instead of understanding financialisation as uniformly implemented, this thesis underscores how the financialisation process is fraught with contradictions and contestations, producing messy, uneven outcomes, undermining its claim as a solution to the water crisis in Global South cities. Therefore, while exploring the making of financialisation, this thesis also simultaneously reveals its unmaking.

I use Jakarta as a key site to understand how the financialisation of water infrastructure emerges as a taken-for-granted solution to urban water crises. Jakarta's water access was and remains 'splintered' by past colonial policies that provided water to European enclaves while disconnecting local Jakartans (Kooy & Bakker, 2008a). This pattern worsened after privatisation (1998-2023), with private operators making little investment in water treatment plant (WTP), distribution networks, and pipe rehabilitation. Without a sufficient water supply, the city has relied on groundwater extraction for decades, causing land subsidence that exacerbates flooding. This entangled crisis provides the backdrop for the infrastructural and financial solutions that the state and private actors craft for Jakarta: large-scale water supply projects under Public-Private Partnership (PPP) arrangements.

This thesis extends the existing literature on financialisation into the urban political ecology of water access in the Global South. Financialisation, or the increasing role of financial actors, logics, and intermediaries, as signified by the circulation of debts (Epstein, 2002; Fine, 2013), in water infrastructure requires that water flow be disciplined through infrastructural means and aligned with financiers' profit expectations. Extending this to debates about the urban political ecology of water access means unpacking how water access and infrastructure governance are increasingly integrated into financial relations (Christophers, 2018a) and how finance flows through and reworks particular infrastructural and sociopolitical configurations in postcolonial cities in the Global South. These are both gaps that exist in the literature, as studies on financialisation heavily emphasise Global North contexts. The thesis addressed these gaps.

Chapter 4 addressed my first research question: how do Jakarta's crisis narratives gain legitimacy and necessitate infrastructural and financial solutions? Extending the concept of performativity into the urban political ecology of the 'global' water crisis, I outlined four translation processes that turn the water crisis into an investable proposition. First, I showed how the accounting of water supply and demand performs the narrative of the water crisis for Jakarta, producing what appeared to be a logical solution: the mobilisation of supply-side water infrastructures and their privatisation. Second, the state mobilises narratives of infrastructure and fiscal gaps to show its fiscal constraints in developing

infrastructure and to rationalise private-sector participation. To attract private investors, the state mobilises the climate angle to secure cheaper financing from development banks, and renders water supply and demand risks technical and manageable in the feasibility studies, producing what appears as a bankable infrastructure project for private actors. Through these translations, Jakarta's (narrowed) water crisis emerges as an investable proposition for private actors, detached from the complex realities of the crisis, such as inequality, severe leakages, or unreliable water access, which cannot be addressed by supply-side investment.

Chapter 5 and 6 examined the thesis's second research question: how does the state attempt to make water infrastructures attractive for private investors? Chapter 5 elaborated on that question in two directions: institutional restructuring and infrastructural reconfiguration. The chapter demonstrated PPP development in Indonesia, from the institutional restructuring following the post-Asian Financial Crisis recovery to a state-centred investment strategy via SOEs. I detailed the governance of Jatiluhur and Karian-Serpong, which are emblematic of investment in WTP, following the prohibition of water service privatisation after the revocation of the 2004 Water Law. These projects represent the siloing of bulk water production units, which offer the lowest investment risk for private actors, but create interface risks due to asynchronous upstream and downstream infrastructure systems.

Chapter 6 examined the rebundling of WTP and distribution networks, or the source-to-tap approach, in Djuanda (in preparation) and Jakarta's bundling scheme, as the state's way to build a larger revenue base for private actors and to compensate them for taking on the risks associated with more complex project structures. The chapter demonstrated the reinstatement of Salim Group (former President Soeharto's ally) into Jakarta's water supply projects, through Metro Pacific Investment in the Djuanda project and through Moya (the parent company of AETRA Air Jakarta) in Jakarta's bundling scheme. Moya also controls large volumes of bulk water production across Greater Jakarta, enabling it to channel water to Salim Group's premium real estate projects. Chapters 5 and 6, together, concluded that the financialisation of water infrastructure in Jakarta does not merely replicate the global PPP model. It is contingent and path-dependent on Indonesia's political and institutional contexts, and it tends to serve particular oligarchic interests. Finally, by reconfiguring the institutional and infrastructural setups: mobilising state-centred financialisation through SOEs, while unbundling and rebundling infrastructure, Jakarta's water infrastructure projects are made to fit finance. The established institutional-infrastructural framework, however, is inherently fraught with frictions and contradictions that, in the long term, require the state to backstop private revenues while exhausting its fiscal capacity.

Chapters 7 and 8 answered my last research question: What are the socioecological impacts of financialised water infrastructure investment in Jakarta? If PPP assumes efficient risk-sharing between the state and private actors, Chapter 7 argues that this is achieved by externalising risks to the public. State and private actors selectively share risks to make infrastructure investment calculable and manageable, while discounting public risks. I illustrated how the state renders displacement risks manageable through the calculative regime of land compensation, displacing communities in Sajira, Lebak Regency (for the Karian dam), and East Bekasi, West Java (for the WTP Bekasi). Second, I argued that the dominance of engineering expertise in water supply projects leads to pipes being exclusively connected to engineerable sites, while excluding *kampung* built on non-permanent foundations,

including those in Muara Angke in the city's north. This is not a failure of financialisation but a strategy to make risks appear manageable, thereby increasing financiers' confidence in the project.

While Chapter 7 illustrated how risk is rendered technical, producing a limit to financialisation, Chapter 8 described the institutional and ecological limits of Jakarta's water-supply financialisation projects. I explored groundwater abundance in South Jakarta and Bogor, as well as groundwater-extractive businesses as the 'spillovers' of out-of-network water, which undermine the viability of water infrastructure financialisation. These spillovers are sustained by different state actors pursuing investment growth in different directions, on one hand, by financialising the infrastructure system (the pipe networks) and, on the other hand, by opening the tap for myriad water investments (bottled water and other groundwater-extractive industries). Therefore, rather than seeing financialisation as coherent, I argued that financialisation is unstable and undone by different state actors, undermining its promise to deliver universal water access in Jakarta.

My empirical findings advance scholarly work at the intersection of financialisation and the urban political ecology of water access in Global South cities. First, this thesis contributes to studies in situated urban political ecology which seek to understand the everyday realities of water access, by showing how financial relations shape that access. Financialisation determines how water flows (through unbundled or rebundled infrastructures) and to whom it flows (from rural to urban sites and to affluent, high-paying water users rather than to the urban poor), aligned with the profit-making interests of private actors. I showed how financial logics determine how water-related risks are allocated and governed under PPP agreements to ensure a financially viable project. As such, this thesis also affirms other scholars' findings that financialisation externalises risks onto citizens rather than allocating them solely between state and private actors (Bayliss et al., 2021; Bayliss & Van Waeyenberge, 2018).

Conversely, attending to the urban political ecology of water access also unpacks the complex and incoherent processes of financialisation, shaped by the particular historical, institutional, and ecological contexts of water access provision in the Southern cities. While studies on the financialisation of water infrastructure in the Global South are emerging, this study offers a socionatural perspective, navigating through the 'metabolic lens' (McFarlane, 2013) of financialisation to provide a situated understanding of its unfolding in Southern cities. Critically, I argue that unequal infrastructures inherited from postcolonial and market-led water regimes, and undisciplined spillovers of water, produce the crisis that underpins but also undermines financialisation. This thesis offers an understanding of financialisation as non-linear and unstable, rather than homogeneously and neatly rolled out.

9.2. Future research

This thesis navigates the diverse and extended socio-natural and financial relations of Jakarta's multiple new water supply projects. As a result, it trades an extensive approach against an intensive one. This research has shown how the financialisation of water infrastructure in Jakarta operates through the state's strategy to align actors, infrastructures, and the flow of capital, and also how this attempt is fraught with contradictions, thereby reproducing inequalities and undermining the goal of realising

universal water access in Jakarta. By using Jakarta's water infrastructure projects as the entry points, this research focuses on financialisation at the project scale, while lacking an understanding of how financial operations work at the upstream (watershed level) and downstream (water user levels). Therefore, future research could explore how financial relations penetrate the metabolic flow of water: from water resource management to water access, as well as to the attempts of controlling spillovers such as leakages. I detail some potential research avenues here.

First, there remain gaps in understanding how finance shapes water conservation at the watershed level. As Chapter 4 has depicted, the financialisation of water infrastructure relies on assumed availability, calculability, and stability of water flows, for which conserving and controlling water quality at the upstream would be central to the operation of finance. There has been evidence of multilateral development banks' investment in water resource management (such as the Asian Development Bank's loan for the Citarum improvement, see ADB (2018)). However, less is understood about the rationale, mechanisms, and implications of these loans for water governance and supply across competing actors: utility companies, industry, and farmers. These studies could suggest what ecologies are produced by these financial relations and how they shape downstream water infrastructure financialisation.

Second, this research's extensive lens lacks an understanding of the everyday financialisation and water access at the microscale. Further studies need to engage with how water infrastructure financialisation enrols subjects and how debt relation shapes the everyday water access (Loftus et al., 2016). While Chapter 7 has illustrated some of the impacts of financialisation on specific urban *kampung* communities, further investigation is needed to understand how the broader urban communities are enrolled in financial relations through their water services, and how financial logics reshape their water access. Programmes such as household pipe connection debts, prepaid water systems (see von Schnitzler, 2008), or water user apps are being rolled out in Southern cities. The financial and political relations that enable and inhibit these innovations demand unpacking.

While Chapter 8 has elaborated on the spillovers of water under the financialised regime, this could be further enriched by examining unaccounted-for water flowing through leaky pipes, which is key to understanding the instability of water infrastructure financialisation in Global South cities. Exploring leakages requires ethnographic fieldwork with engineers tracing and repairing broken pipes (Björkman, 2015; De Coss-Corzo, 2025), as well as with utilities that seek to turn non-revenue water reduction into an investable proposition. This would add empirical detail to the technical and labour challenges of financialisation and infrastructure repair, providing detailed pictures of the metabolic flows of water and labour within financialisation.

Lastly, as the water supply projects investigated in this research are only in formation and/or early stages of operation, future research could revisit how the projects are implemented, examining the challenges and strategies for national and local governments, as well as private actors, in realising the projects. Most importantly, it needs to evaluate to what extent Jakarta's water connection and access are achieved under the financialised regime, and advise on how the national and local governments should mitigate the severe impact of financialisation on urban communities.

9.3. On Jakarta's water future

This thesis has illustrated how infrastructure financialisation depoliticises urban water governance and has inherent contradictions and inequalities. I explored how water crisis narratives are selectively built and addressed through specific infrastructural and financial solutions: large-scale water supply projects through PPP that fit market-led water governance. While these crisis narratives and supply-side projects gain attention, the questions of access equality, service, and repair are largely unaddressed, as these problems are not amenable to financial solutions. My findings serve as a reminder that infrastructure planning and financing must be examined beyond their technical boundaries. Rather than being politically neutral, financing choices are inherently political decisions that determine whose needs are prioritised, to whom risks are socialised, and who will generate profits.

Jakarta is now entangled in financial contracts and will remain so for the next 20-30 years. The promise of remunicipalisation achieved through the victories of the anti-privatisation movement remains uncertain. Tracing the outcomes of financialised water governance against remunicipalisation requires national, local government, and private actors to be transparent and accountable to citizens regarding contracts and agreements. While conducting this research, I could not access documents such as feasibility studies, as well as the PPP and bundling scheme contracts for Jakarta's water supply projects. Despite the public-ness of PPP, the taxpayers who paid for these infrastructures are unable to scrutinise the deals that structure their water services. Public engagement in evaluating past contracts and agreements, and in future infrastructure decision-making, is necessary to avoid being trapped into supporting profiteering projects again. The choice, as McDonald and Ruiters (2012) remind us, is not between public and private water provision, but how to establish a water supply system that prioritises public wellbeing rather than profit extraction. More critically, amid intensifying climate threats, land subsidence, and a water crisis that perpetuates unequal impacts on urban residents, Jakarta urgently needs such a publicly accountable water governance.

On a hopeful note, the cancellation of the pro-privatisation 2004 Water Law and the regulatory limit around water service privatisation prove that the state is non-unitary and continuously reshaped by different forces, including civil society and the urban poor movements. These groups influence how water should be governed, in contestation with the hegemonic discourse of privatisation imposed by multilaterals, private, and government institutions. This means that, even under the financialised regime, there are still opportunities to shape better alternatives for Jakarta's water provision. The thesis's findings invite us to consider and shape these possibilities.

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Appendix A: Event observations

List of event observation (online and offline)

Direct observation	Date	Location/URL
Indonesia Water and Wastewater Forum and Expo (IWWEF)	6-8 June 2023	Jakarta
2nd Stakeholder Consultation Meeting for the 10th World Water Forum	12-13 Oct 2023	Bali
BNI Investor Daily Summit 'Sustainable Growth Global Challenges'	24-25 Oct 2023	Jakarta
Konstruksi Indonesia 2023	1-3 November 2023	Jakarta
Online observation		
Focus Group Discussion of the Indonesia Infrastructure Roundtable 'Amplifying Partnerships: Collaborative Drive To Strengthen Indonesia's Water Sector'	29 August 2023	Online on Zoom; seminar available on https://www.youtube.com/watch?v=9Ry_kMh0mBY
Launching Perizinan Air Tanah	8 January 2025	https://www.youtube.com/watch?v=6mKxVKZPXBk
Sosialisasi Perizinan Air Tanah Melalui OSS-RBA	27 October 2022	https://www.youtube.com/watch?v=1dddIW-J-os
Sosialisasi Percepatan Infrastruktur Air Minum Daerah untuk Pencapaian SDGs	7 September 2022	https://www.youtube.com/watch?v=AU-HUr3RJJA
Sosialisasi Zona Bebas Air Tanah (ZOBAT) Jakarta Selatan	11 July 2023	https://www.youtube.com/watch?v=r9FsvZGjsv4
Sosialisasi Zona Bebas Air Tanah (ZOBAT) Jakarta Timur	6 July 2023	https://www.youtube.com/watch?v=wt1ee_hcef8
Sosialisasi Zona Bebas Air Tanah (ZOBAT) Jakarta Utara	12 July 2023	https://www.youtube.com/watch?v=8ngmKCDyqb4&t=6494s
Sosialisasi Zona Bebas Air Tanah (ZOBAT) Jakarta Pusat	17 July 2023	https://www.youtube.com/watch?v=arfXtw8qkMg
Indonesia Infrastructure Roundtable 'Equitable Risk Allocation'	8 July 2022	https://www.youtube.com/watch?v=2Ro6kjul4jw
Workshop 3 - Sustainable Water Finance: "Secure and Increase Funding for Basic Access to Safe	4 July 2023	https://www.youtube.com/watch?v=ZdFG-xYIqzc&t=11150s

Direct observation	Date	Location/URL
Water and Sanitation for All at All Scales"		
Creative Infrastructure Financing Day 2022	1 December 2022	https://www.youtube.com/watch?v=QC5eaprsOjM
Creative Infrastructure Financing Day "3 Bold Actions: Terobosan Menutup Funding Gap Infrastruktur"	13 December 2023	https://www.youtube.com/watch?v=AXmORogLfCc
Market Sounding Proyek SPAM Karian-Serpong	17 April 2020	https://www.youtube.com/watch?v=MCfc8Ja7Z2E
Inovasi Pembiayaan Infrastruktur Air Minum di Indonesia	11 November 2022	https://www.youtube.com/watch?v=Zwzw3KdodqM
Kapan Sumber Air Jakarta Dapat Diandalkan?	8 June 2022	https://www.youtube.com/watch?v=vkNZyi9sPyI
KSAN 2015 – Jakarta Masa Depan: Erlan Hidayat	3 March 2016	https://www.youtube.com/watch?v=XYyzr3j63Qo
Webinar PKB IATPI - Pengelolaan SPAM Regional	30 June 2024	https://www.youtube.com/watch?v=TQGiO-YeJ4o
Webinar #67 "Mekanisme Kerjasama B2B Sektor SPAM"	15 November 2024	https://www.youtube.com/watch?v=UIePZlWjjrs

Appendix B: Interview questions

Interview guidance for government, consultant, and financiers

Water infrastructure problems

1. How would you explain the state of water crises in the Jakarta Metropolitan Area today?
    a. How would you explain these crises in Jakarta's relationship to its neighbouring regions?
2. How would you explain the problem of water infrastructure in the Jakarta Metropolitan Area today?
3. How has the infrastructure plan changed from its initial design in the 1990s?
    a. What factors are considered in the change? What are the assumptions?
    b. How has the feasibility of the project changed since then?
4. To what extent do you think there have been efforts to manage the problems?
    a. To what extent do you think there have been efforts to manage the impact of water infrastructure provision in rural areas where water is extracted?

Public-Private Partnerships for Water Infrastructure Financing

1. How would you explain the potential of water infrastructure co-financing in the Jakarta Metropolitan Area? Do you think it is a competitive sector in attracting investors?
    a. How would you define the characteristics of projects that are fit for the PPPs scheme?
    b. How to make water infrastructure a bankable proposition?
2. What are the differences between the PPPs scheme in place today and the old PPP scheme?
    a. Do you think it makes a stronger case for institutional support for infrastructure development? Why?
3. How would you discuss the recent annulment of the Water Law (with some nuance on anti-privatisation) alongside the enactment of PPPs for water services?

Investment and speculation

1. What are the risks in water infrastructure investment? How do you think private sectors calculate and mitigate the risks?
    a. Would you consider the uncertainty of climate change as one factor contributing to the risks? If not, why?
2. What kind of instruments are in place to ensure the security of private sector's investment in the project?
3. What do you think of the future challenge or potential of PPPs implementation?
    a. What are the next investable water infrastructure projects for Jakarta? Do you think the project will be attractive to investors? Why?

Interview guidance for displaced (rural) communities

Development history

1. What do you think have changed in the village/in your neighbourhood in the past 30 years? (make reference to when the water infrastructure was initially planned)
   (a) How did that change relate to land (agricultural, non-agricultural) ownership in the village? How has that changed your job in the village?
   (b) How has that changed your relationship with other people?
2. Who has actively promoted the development of dam in the village?
3. What was your response and aspiration when the development was finally about to happen after long delay?

Relocation process

1. What was the community's response and aspiration when the development was finally about to happen after a long delay? Did everyone agree to be relocated?
2. How was the relocation carried out?
   (a) How much was your land compensated? How were your other assets compensated? Do the same prices apply to everyone? (refer to different time periods where relocations occurred)
   (b) Did you negotiate on the land price? If yes, how did the negotiation around land relocation happen? What terms were offered by the communities to the authorities?
   (c) What do you use the compensation money for?
   (d) Where did people move after being relocated? What was the consideration of moving into different places?
   (e) How was land division made in the new village? Do you move next to your old neighbours, or were people relocated to random land?

Resettlement process

1. How do you think life has changed now that you moved into the new village?
2. How do you think agricultural land and productivity have changed after you were allocated different plots?
3. How do you think access to water (drinking water and irrigation) have changed in the new relocation area?
4. What facilities do you have in your new neighborhood?

Interview guidance for urban *kampung* communities

Development history

1. What do you think have changed in your neighbourhood in the past 30 years?
2. How do you think water access has changed in your neighbourhood in the past 30 years?

Water access

1. How do people in your neighborhood access water? At what price are you purchasing water?
2. Why do you think water access has been limited in your *kampung*?
3. How has the PAM Jaya's water kiosk program changed how people access water in your *kampung*? To what extent has the water kiosk program helped you to access water?
4. Who manages the kiosk in your *kampung*?
5. What challenges does the water kiosk program face in your *kampung*?
6. How do you choose to overcome or not overcome this problem with the water kiosk program?

Interview guidance for water vendors

Water extraction

1. How do you extract water?
    a. What is the water source?
    b. What kind of technology do you use to extract water?
2. Do you have a permit for extracting water?
    a. If so, could you explain the process for applying for a permit for water extraction?
    b. If not, why would you choose not to apply for a permit?

Business characteristics

1. How would you explain the start of your business?
    a. How did you initially get the idea to run a water vending business?
    b. What did you speculate would be your long-term and short-term profits?
    c. How did you get the initial capital to start the business?
2. How has this business run so far?
    a. How many assets do you have? (Trucks, pump, water storage, land plots, etc.)
    b. How many staff do you hire?
3. How would you explain the characteristics of your customers?
    a. Who are your customers?
    b. At what price do you sell water to your customers? Do you charge different water price to different groups of customers?
4. What do you think has been the challenge of running this business?
5. How would you explain the future of this business?
6. What would you consider to be the main challenge of the water vending business?
    a. What do you think are the risks in investing in the water vending business in the Jakarta Metropolitan Area?
    b. Do you think there is an impact of your business on water access in your neighbourhood? Have you ever received complaints from surrounding neighbours about the impact of your business? If yes, how would you explain the solutions to the conflict?