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Disconnected: Poverty, Water Supply and Development in Jakarta, Indonesia

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1. Introduction

Jakarta's water supply system is highly fragmented. As documented in this report, the formal water supply system reaches less than 50% of the city's inhabitants, and is spatially concentrated in higher income areas of the city. The majority of Jakarta's residents make use of a variety of different water sources– bottled water, vendor water, shallow and deep wells, public hydrants, network connections – to meet their daily water needs (Bakker 2003b), often relying exclusively on water abstracted and delivered outside of the network (Bakker forthcoming, Surjadi et al 1994, McGranahan et al 2001). Indeed, a significant proportion of households with connections to the networked water supply system continue to rely primarily upon other sources of water supply given low water quality and intermittent network pressure, and non-networked (or so-called 'informal') water services thrive in areas where networked connections are available (Susantono, Bakker). Documenting and explaining the reasons for this spatial and social differentiation of access, and using this information to intervene in current debates about pro-poor water supply management, are the two primary goals of this report.

Unequal access to water supply and sanitation has been characterized as one of the key development challenges for the South in the next century. Halving by 2015 the proportion of people without sustainable access to safe drinking water and basic sanitation is one of the Millennium Development Goals established by the international community at the World Summit on Sustainable Development in Johannesburg. Because of positive externalities related to water-related infrastructure provision, achieving the water and sanitation goal will also contribute to other Millenium Development Goals, such as those related to child health (Fay et al 2005). The World Health Organisation estimates that 1.1 billion people worldwide do not have access to safe drinking water, and 2.4 billion are without access to adequate sanitation (WHO, 2004). An increasing proportion of users without access to adequate water supplies live in urban areas; despite residing in a metropolitan area, poor families in large cities in the South frequently do not have networked water supply access.

The urban water supply problem presents a particularly acute challenge to the development community, given its persistence despite sustained and significant investment by bilateral aid agencies and multilateral financial organizations. Supplying water to the world's poor has been high on the agenda of the international community for decades. Water supply figured prominently on the agendas of the Stockholm Environment (1972) and Vancouver Habitat (1976) conferences. At the UN's Mar del Plata conference (1977), the United Nations Water and Sanitation Decade was formally agreed; over the period 1981-90, bilateral aid and multilateral finance was directed towards water supply projects in the South in unprecedented amounts (WHO 1992). At the end of the decade, more people (in absolute terms) were being supplied with 'improved water supplies' than ever before; during the decade, it was estimated that 1.2 billion people were provided with a safe and adequate water supply (WHO 1992). Yet, in many countries, the increase in supply had failed to keep pace with population growth, and growing numbers of people remained without access to the World Health Organization minimum of 50 L per person per day of potable water; the number unserved by a safe and adequate water supply fell by only 450 million during the same period (WHO 1992). This failure is part of the reason for the emergence of a wide-ranging debate on new approaches to water supply in the South which emerged in the 1990s, characterized by controversial and contested calls for greater private and reduced public sector involvement in

water supply management; treatment of water as an economic rather than public good; full-cost recovery pricing rather than subsidisation; alternative pro-poor infrastructure (such as condominial rather than in-house connections); and a 'new water paradigm' focused on demand management rather than the conventional supply-side focus (Gleick 2000a; Bakker 2004**)**.

Analyzing Jakarta's water supply system in light of these debates and in relation to broader human development concerns, this paper begins from a different starting point than much of the current debate on water supply and the poor. We demonstrates in **Sections 2 and 3** that, in the case of Jakarta, *both* the public and private sectors have failed to supply sufficient amounts of safe water to the poor[1]. This finding lends support to Budds and McGranahan's argument (2003) that the public-private debates in water supply are 'missing the point' (Budds and McGranahan, 2003). Many of the flaws which underlie failed water supply systems are in attributable not to private sector or governments, but are rather attributable to conventional governance structures associated with large-scale capital-intensive network water supply technologies, together with specific economic approaches to tariffs and financing. The result, in Jakarta, has been a water supply system which has been spatially segregated and socially differentiated since its inception, serving middle and upper-class households in specific residential areas, the business district, and key industrial zones, while excluding lower-income households in the majority of the city.

Attempts to ameliorate this situation have been, to date, of limited success. As explored in detail in **Section 4** through a case study of private and public sector pro-poor water supply programs undertaken in 2005 in Jakarta, 'pro poor' approaches to water supply adopted by both the public and private sectors have consistently misrepresented the reasons why poor customers are both prevented from, and have chosen not to connect to the network. This discussion relates to broader reforms in Indonesia's water sector. As explored in **Section 5**, Indonesia is currently undergoing dramatic and politically contentious reforms to the entire water sector. Indonesians are actively debating the degree to which these reforms are likely to solve – or exacerbate -- the problem of water supply for the urban poor. Much of this debate is highly polarized around support for (or vilification of) conventional public and private-sector solutions. Yet the findings of this report, as discussed in the concluding section of the paper, point to alternative governance, infrastructural, pricing and financing models which transcend this public-private binary. Accordingly, the report closes with some suggestions for where future research might fruitfully focus on the question of water supply for the urban poor in the global South.

[1] This analysis is based on research carried out over the period of three years in Jakarta. An initial visit was conducted in 2001; followed by initial archival work in the colonial archives in the Netherlands in 2003. Subsequent research took place over an 18 month period from 2004 to 2005. Data was obtained from: (1) a household survey of poor households in six Jakarta 'kampungs' (neighbourhoods) in 2005; (2) public and internal reports from the two private concessionaires, the Jakarta Water Supply Regulatory Body, and the Jakarta municipal government; (3) interviews with water supply managers, government officials, international financial institutions, aid agencies, and NGO representatives in 2001, 2004 and 2005; (4) a survey of the KITLV (Koninklijk Instituut voor Taal-, Land- en Volkenkunde/Royal Netherlands Institute of Southeast Asian and Caribbean Studies) and KIT (Koninklijk Instituut voor de Tropen/Royal Tropical Institute) archives 2003 in Leiden and Amsterdam, the Netherlands.

2. A 'public' utility? The history of Jakarta's water supply system

Water infrastructure networks have one of the longest turnover times of any dedicated utility infrastructure; in many cities in both developed and developing countries, it is common to find pipes over 100 years old still in service. Given this longevity, water networks physically embody successive phases of management and investment. Networks of mains, tertiary pipes, pumps, reservoirs, and sewers are artefacts of past decisions, shaped by successive generations of social, technical, and economic practices. Understanding historical choices about water supply networks is thus necessary for an understanding of contemporary water supply networks. In this section of the report, the history of Jakarta's water supply system is summarized. A key finding of the analysis is that Jakarta's water supply system has been highly fragmented since its inception, and access to water supply has consequently been strongly differentiated socially (restricting access to certain types of users) and spatially (through confining access to specific neighbourhoods and water uses). This pattern of differentiation and exclusion was initiated by colonial administrators, and entrenched through urban planning and water supply management practices instituted in the post-colonial period. This analysis contradicts conventional theories of water supply networks (based on studies of large cities in OECD countries) in which a 'modern infrastructural ideal' of universal provision was applied to network utility services throughout much of the 20th century, and in which access is typically more homogenous (Graham and Marvin 2001). Cities in the South have often followed a very different trajectory; this has implications for the debate about strategies for meeting human development needs for water supply in Jakarta, and in the global South more generally.

2a Hygienic 'Normalization': The development of Batavia's water supply system (1873 – 1949)

Jakarta's first water supply system consisted of a series of artesian wells, supplying the European urban population with a water supply through architecturally elaborate communal hydrants. From 1873–1876 seven publicly funded wells were drilled (Maronier, 1929). Initial production capacity was later expanded, so that by 1920, there were 28 wells and 12 reservoirs with a capacity of 750 m^3 available for 'public' (i.e. European) use (Maronier, 1929). These wells were strategically sited in a new neighbourhood (Weltevreden, contemporary site of the Monas Monument and public square) two miles to the south of the old city, located upon higher ground, which Dutch colonials had established in an attempt to escape the regular epidemics which had fostered Batavia's reputation as 'Graveyard of the East' (Abeyasekere, 1987. 1989; Maronier 1929). Relying on racialized discourses, contemporary observers contrasted the 'hygienic' and 'modern' use of groundwater by the Dutch 'colonial' population to the practice of surface water use by native 'kampong' residents in old Batavia, who were 'lacking in modernity' and unwilling to pay for artesian water supplies (which had to be aerated and cooled before being consumed) (Van Breen, 1916; Van Leeuwen, 1920) (ironically inverted in the 20th century, as poor residents often rely on shallow wells, whereas surface water sources originating upstream of Jakarta feed the water supply network, which is largely accessed by wealthier households in the city).

This strategy of restricting formal water supply provision to Batavia's colonial population was increasingly questioned in the 20th century, as increasing awareness grew of new scientific concepts linking water supply and human health, in which a bacteriological conception of disease replaced earlier theories of 'miasmas' (Gandy 1997, Goubert 1986). In the Netherlands East Indies, this new approach was disseminated through the results of water quality tests conducted by

military doctors (Moens 1873), as part of a broader (and unprecedented) set of government initiatives to improve public health through the provision of infrastructure (Argo 1999, Mrazek 2002), Acting on a desire to increase water consumption for reasons of public health, water supplies, usually drawn from surface water, were gradually extended into 'kampongs' through public standpipes ('hydrants') (Eggink 1930).

A new water supply system reliant on mountain spring water, delivered via iron pipes 53 kilometres in length, was in preparation for the first two decades of the 20th century. Finally operational in 1923[2], the spring water network served the Municipality of Batavia, the municipality of Meester Cornelis (incorporated into Batavia in 1935), and the harbour at Tanjung Priok. Water production capacity increased to over 350 l/s, reservoir size grew from 780 m3 to 20 000 m3, the city network was extended by over 150 kilometres, and best of all – the water from the pipes could be used 'straight out of the tap' without need for purification, or cooling, as was the case for artesian water (Smitt, 1922). The planned provision of 90% of European households with a supply of 140 L/capita/day enabled a new kind of life, "imparting to the Batavia house a more European character"...as "most bathrooms have nowadays a shower from which the fresh water from the tap may be showered over the body" (Gemeente Batavia, 1937:70). Based upon scientific knowledge, demonstrating technological mastery, and facilitating a 'modern' urban lifestyle, the source water network symbolized the emergence of a new kind of colonial government, city, and urban citizen: ethical, modern, and hygienic.

The project of modernizing (or, in colonial language, 'normalizing') the native population justified subsequent interventions of the colonial government into water supply, sanitation, housing, and hygiene in the 'problematic' urban spaces (Van Breen, 1919). Of central concern was continued use of the city's *kalis* (canals) for bathing and of 'suspect' groundwater sources for drinking (Gomperts, 1916, Van Raay, 1915). Accordingly, previous plans for the spring water network – that had intended to supply only European neighbourhoods -- were revised, and a new plan was initiated in the 1920s in order to extend water supply into the kampongs (Van Leeuwen, 1917). The system was based on a dual design standard: 140 L/day to be distributed to 90% of the European households in Batavia, in contrast to an *anticipated* delivery of only 65 L/capita/day to only 33% of the native population (van Breen, 1916)[3]. The majority of the 'served' native population was supplied by public hydrants and water vendors, which was initially viewed as a temporary measure. However, the transition into house connections within the kampongs was never achieved on a large scale, in part because of racialized assumptions about different water needs, and also because of concerns over the low potential for cost recovery in the kampungs. Charges for water supply in kampong areas were introduced in 1926, after which water use in the kampong areas actually decreased (Maronier 1929), with some kampongs actively resisting the introduction of 'modern' water (as with other modern amenities) (Argo, 1999; Karsten 1958), and 'tampering' with meters and water 'theft' being reported by colonial administrators (Maronier 1929). Accordingly, the penetration of the water supply network into the non-European neighbourhoods remained limited. The result was a differentiation

[2] The Ciburial springs in Bogor, with a reported capacity of 600 L/s by the end of the colonial period, but supply decreased by the 1980s to around 400 l/s. (PAM Jaya 1992).

[3] The capacity of the newly enhanced water supply system could theoretically have satisfied Jakarta's entire population (of approximately 800,000) up until the end of the 1940s, after which population growth was rapid, assuming a per capita water demand of 50/person/day respectively and reasonable (e.g. 30%) distribution losses.

of access and consumption levels: in 1929, the European population, comprising only 7% of the population, consumed 78% of the volume of water supplied to residential customers (Eggink, 1930)[4].

2b Hydraulic Modernity: Water supply as 'modernist monument' (1949 – 1965)

The pattern of differentiated water supply established during the colonial period was further entrenched following Independence in 1949. Following damage to the colonial water infrastructure during the war, the existing system was incapable of meeting water demands from the rapidly growing population of Jakarta, and so in 1952, plans for the construction of the city's first large-scale water treatment plants (Pejompongan I&II) were drawn up. By 1957, Pejompongan I was operational, adding 2000 l/s of treated river water to the network; Pejompongan II (completed in the mid-1960s) later added another 1000 l/s (PAM Jaya, 1992a). These treatment plants were a political, as well as technical project, reflective of a desire to modernize Jakarta on the part of Indonesia's elite: surface waters, rather than groundwater, were to be resuscitated through intensive Western water treatment technologies, as an example of the transformation of colonial Batavia into independent Jakarta[5].

In the decades following Independence, water supply in Jakarta continued to be highly differentiated, and was characterized by many similarities to colonial patterns of water provision. In part, this was because of technological constraints: the new surface water supply continued to be distributed through the colonial piped network, and was thereby restricted to more affluent areas of the city. But this is only a partial explanation, as investments were made in the first decade following Independence to both rehabilitate and expand the water supply network. This expansion was largely limited, however, to upper class residential areas and the highrise developments springing up underneath the guidance of President 'architect' Sukarno. Most kampong residents were consistently excluded from network access, remaining reliant upon open wells and surface waters (Argo, 1999).

Why did the government adopt this strategy? Production of a new source of water to increase the volume of supply could have enabled the newly independent government to serve its newly emancipated citizens, at a time when the government began to 'reclaim' key industries and land from colonial owners (see Robison, 1986). However, rather than pursuing a welfare agenda, the government focused on broader political economic agendas. Most importantly, government management of water supply focused on its symbolic significance in urban and national governance. Remaking Jakarta as an 'international' city symbolized by 'modern monuments' was a central part of President Sukarno's vision for post-independence Indonesia (Kusno 1997, Leclerc 1993; van der Kroef 1954, as cited in Kusno, 2000). The first postcolonial investments into the city's urban water supply reflected the rationality of the associated 'city beautiful movement' whereby national greatness would be expressed through the physical transformation and modernization of Jakarta (Geertz, 1963; MacDonald, 1995). This 'monumentalist' infrastructure served a dual purpose of

[4] In 1929, 6 926 kampung households were supplied with 24L/s, while 10 392 European households were supplied with 84 L/s. The European population in Batavia in 1930 was 37 067, while the native Indonesian population was over 400 000 (Eggink, 1930).

[5] The spring water source did continue to contribute a small portion of the city's water supply up until 1994. In 1957, after the completion of Pejompongan I, the colonial spring water supply would have provided between 15-30% of the total production capacity (see PAM Jaya, 1992a for details on water production capacity over the years).

urban development and source of pride for the new nation, whereas urban services provision and the urban environment were given relatively low priority (Chifos and Hendropranoto 2000; Firman and Dharmapatni 1994; Ford 1993; Kusno 1997; World Bank 2004b), despite sporadic national government-led development plans to accelerate service delivery (Silas 2002).

The significance of the new urban water infrastructure to the image of the nation was such that the central government provided all of the money for the construction of Pejompongan I[6], based on the argument that Jakarta's water supply was part of the 'national project', and 'not just for Jakartans' (PAM Jaya, 1992a). Designating certain kinds of residential areas of the city as part of the 'modern' Jakarta (those that were 'planned', formal, and demonstrated 'rational' spatial arrangements along orderly roads), the old colonial neighbourhoods in the central areas of the city were laid with postcolonial pipes, and new neighbourhoods in the south were, upon construction, immediately included within the 'modern strip' of the city linked together through the network water supply. In contrast, large numbers of migrants moving to Jakarta during the 1950 and 1960s settled in open spaces of the city, with an increasing density gradually creating "vast block interiors that became the sites of the unserviced urban kampong" (Cowherd, 2002: 173). By the end of the 1960s, it was estimated that only 15% of the city's residents were served with a household connection (Pam Jaya 1992). Consumption was not metered, and rates were low; water was essentially being distribution 'free of charge' to consumers – largely in wealthier neighbourhoods.

Jakarta's water supply company, now known as PAM Jaya, had no explicit 'social policy' during this period. Rather, where the water supply distribution network was extended, this was largely to serve specific, symbolically 'modern' spaces and citizens: an elite residential area (Keborayan Baru[7]), elevated highways and flyovers, Indonesia's first 'international standard' hotel (Hotel Indonesia), the highrise developments along the main thoroughfare Jalan Thamrin-Sudirman, and the Asian Games Complex **(Map 1)**. The piped network mirrors the above ground highways and flyovers built to connect the modern elements of the city, and was neatly positioned to channel water distribution to modern areas of the city, simultaneously excluding the vast majority of 'unmodern' spaces and populations thought to 'lower the status of the nation' (Abeyasekere, 1989), from both spatial proximity to, and services from, the network[8]. This national project was dedicated towards the creation of a "new [urban] space intended to be different from both colonial Batavia as well as the surrounding sea of poor urban neighbourhoods" (Kusno, 2000:52). The capital-intensive water treatment plants were two of the icons of modernity central to this larger project.

Interpreting the Pejompongan I&II water treatment plants as primarily 'modernist monuments' explains why production capacity exceeded distribution capacity in the decades following independence (Martijn 2005). This also explains the limited provision of piped water outside of this symbolically modern space in the center of the city, and provides a partial

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[6] The central government later provided 50% of the costs of Pejompongan II, with the government of Jakarta responsible for the other half of the US $7 million investment (PAM Jaya, 1992a).

[7] Kebayoran Baru, the 'satellite town' originally planned by Dutch post-war government in 1948, had already been fitted with 17 km of network pipes prior to postcolonial government, and pipelines from Pejompongan I were laid to channel its new waters into these 'modern urban dwellings' (see maps).

[8] The construction of the Asian Games complex and adjacent inner-city thorough fare involved the removal of 47 000 kampong residents, moving them out of the central areas of the city needed for these modernist monuments and relegating them to the periphery (Abeyasekere, 1989), to which (as seen in Map 1) the water network did not yet extend. After the completion of Pejompongan I, piped water was reported to be available to only 12% of Jakarta's population (Fischer, 1959).

explanation for the lack of official concern about the fact that the majority of the urban population could not afford to connect to the network (Fischer, 1959). In other words, the persistent pattern of social and spatial differentiation of access to water supply in Jakarta should not be understood a sign of the failure of government to properly manage public infrastructure, but rather as a logical outcome of the state's post-independence strategy of urban governance[9].

2c Water for 'development' in the New Order period (1965 – 1990)

The transition to the 'New Order' era government in 1965 inaugurated a new political vision for Indonesia amidst large-scale violence as the anti-communist regime of President Suharto was established (see Bourchier and Hadiz, 2003; Siegel, 1986; Robison 1990). The New Order regime established new urban water supply management goals: fiscal discipline, and facilitating economic growth through enabling Jakarta's new role as the 'gateway for trade and industrial development' (Argo, 1999; Hill 1996; Robison 1990). These goals, in turn, guided both the growth of the network into certain 'productive' areas of the city, and justified a more 'economically rational' management of network water as an economic commodity.

This focus was reflected in changes to the governance of Jakarta's municipal water supply system. Prior to the mid 1960s, integrated records of actual consumption and numbers of customers were not maintained. Water was not metered and charges were very low; the resulting low rate of cost recovery meant that PAM Jaya was often unable to pay its employees (PAM Jaya, 1992a). Bringing a 'new order' to the management of Jakarta's network water supply, a regional water supply company (now known as PAM Jaya) was established in 1968[10], signalling the fact that water supply to Jakarta was no longer a 'national project', but a *local* government owned business mandated to support regional economic growth, and generate profits, while providing for the welfare of Jakarta's residents through the provision of clean water. Water was now an economic commodity that should be paid for by those who directly benefited (the consumers), and the program of 'meterasasi' [metering] rolled out throughout the 1970s – installing meters, registering customers, and reforming the new tariff structure - demonstrated the new sense of 'new order' in PAM Jaya's operations[11].

The priority given to the newly created water supply company's role in fostering regional economic growth is most evident in the first (and only) major domestically financed infrastructure investment of the New Order period. As the only large scale water treatment plant built over a

[9] Pejompongan I &II were each built at a cost of approximately $7 million US (current cost data) (PAM Jaya 1992a) This tends to be overlooked in the history of public infrastructure in Jakarta (see World Bank, 1974; Hamer et al., 1986; Chifos and Suselo, 2000). The familiar argument that Sukarno's government neglected public infrastructure in favour of public monuments ignores the construction of Pejompongan I&II as both a 'public' infrastructure, and a monument for the modernization of the city.

[10] PAM Jaya (Perusahaan Air Minum – water supply company of Jakarta) took over responsibility for water supply from the Ministry of Public Works, which had built and was operating the first two water treatment plants. PAM Jaya changed from a 'regional company' to the 'local company' of the government of DKI Jakarta in 1977 (see PAM Jaya, 1992a).

[11] During the program of 'meterasasi', illegal consumers were 'legalized' (then calculated to be receiving 40% of the water supply, see World Bank, 1974), the actual number of customers was registered (the first record is given in 1975), and water meters were installed, beginning the billing of consumers according to the volume of water consumed. Average household water bills jumped from the previous flat rate of Rp 100-200/mth to Rp 2000-3000/mth (PAM Jaya, 1992a).

twenty year period[12], Pulogadung (completed in 1982), and its accompanying (limited) network were built to serve the Pulogadung Industrial Estate, an area of the city that Suharto had targeted for the initiation of the New Order strategy of industry-led economic growth[13]. Pulogadung's production capacity has never been fully utilized (Jaya Raya, 1991); unsurprising, given that the locus of industrial activity had already spilled over into surrounding regions of Jakarta by the late 1970s (Castles, 1989), and industrial users in Jakarta prefer to rely on groundwater sources, and industrial demand for a (relatively expensive) piped water supply has never been significant[14]. But despite rapidly growing residential populations, stagnant industrial demand and underutilized production capacity, the Pulogadung distribution network in eastern Jakarta remained limited to industrial areas (Argo, 1999). Indeed, across Jakarta limited network extension was undertaken through the 1970s and 1980s (JICA, 1997).

Where network extension did occur, this tended to focus on upper class residential areas. Partially subsidized by the central government[15], an expansion of the capacity of Pejompongan I &II water treatment plants[16] targeted the 'modern', largely affluent neighbourhoods developed in the colonial and early postcolonial eras (Menteng, Kebayoran Baru, Tebet). Primary pipelines laid down in the late 1960s-early 1970s indicate the water flow directed into these upper class neighbourhoods (see **Map 1**) and the modern strip of highrises, luxury hotels, and developments along the city's center thorough-fare supported by this demographic. Network growth outside the central area of the city was targeted at high income residential neighbourhoods **(Map 2)**[17]. Eight small-scale water treatment plants were built around the city; the criteria that they be 'self-supporting' (i.e. recover costs) constrained distribution largely to upper class residential and industrial areas (Tutuko 2005, Salim 2005). The first, (Cilandak) was completed in 1978 to upgrade service in Kebayoran Baru (PAM Jaya 1993); others were built in cooperation with real estate developers to serve new residential areas on the 'rurban' fringe of the rapidly expanding city (Martijn 2005).

In stark contrast, urban kampongs remained largely excluded from the New Order's 'promise of development' (Kusno, 2000; Jellinek, 1991). Although in the 1970s the kampongs housed 80% of

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[12] Pulogadung was the only large scale water treatment plant built during 1970-1990; while during this time period the population of Jakarta had increased by almost four million, other large scale treatment plants and network extension identified within the 1972 and 1985 Jakarta water supply master plan were deferred until the World Bank's 'PAM Jaya System Improvement Program' (PJSIP), which ran from 1990-1997. See JICA, 1997 and World Bank, 1998 for more details.

[13] There were 76 factories located in Pulogadung Industrial Estate by 1975, see Castles, 1989.

[14] The high commercial tariffs for piped water, coupled with the unsuccessfully regulated exploitation of alternative water sources providing a much cheaper supply have, have led to a preference of non-networked water by industry (see Adzan, 2001). The actual percentage of total water from Pulogadung in the 1970-80s used by industries in the Industrial Estate is unknown, as consumption volumes per consumer are not recorded until the 1990s; a general estimate of industrial consumption usually assumes it to be 1/3rd of total water supply production (JICA, 1997).

[15] Contradicting the new 'economic rationality' of urban water supply, which decreed local financing and payment by users, the central government continued to subsidize major investments into production oriented infrastructure (not distribution), by providing local government with low interest loans from international development funds. Upgrades to Pejompongan I&II were financed from loans from the Japanese government, who drew up the 1972 Master Plan (PAM Jaya, 1992).

[16] Pejompongan I was expanded in 1967, and Pejompongan II was expanded in 1973 (see PAM Jaya, 1992)

[17] Most notably, Pondok Indah, the first 'gated community' built in Jakarta by the developer Ciputra and his New Order financier (Salim), was one of the few new areas of the city in the 1970s where the network was extended Advertised as a 'residential enclave', Pondok Indah is defined as purposefully distinct from its surrounding neighbourhood, and its spatial exclusivity was enhanced by its status as an 'island of services' amidst surrounding non-networked areas of Southern Jakarta. Cowherd (2002) describes how this spatial exclusion was ensured by the construction of a golf course and the re-routing of a river, making Pondok Indah appear on the map as an island fortress surrounded by a moat.

Jakarta's population, and comprised 65% of its land area, 90% of its residents did not have access to piped water supply, leaving them to build their own shallow groundwater wells, or pay up to 20% of their monthly income for water from public hydrants (KIP, 1976; World Bank, 1974). And, while a program of 'kampong improvement' begun by Jakarta governor Ali Sadikin[18] did include water supply as a primary component of 'upgrades', the first decade of the Kampong Improvement Program (KIP) (1966-77) produced only marginal improvements in the access of lower income residents to piped water (Abeyasekere, 1987; Taylor 1983). Public hydrants were still a rare occurrence in kampongs in the 1970s (Argo, 1999). Sewerage systems were non-existence, a legacy of a government policy treating sewage as a 'private concern' (Argo 1999; Cowherd 2002).

By the 1980s, concern had grown over low levels of potable water supply in Jakarta. The city's population had reached 6 million and was continuing to grow rapidly. A reduction in networked and raw water quality had been documented since the 1960s. As the city grew, the lack of a sewerage system meant that surface water sources were increasingly contaminated by sewage and industrial effluent (PAM Jaya 1992a, 1992b). The lack of an effective waste collection system in the city exacerbated the situation, with household waste collecting in canals which provided water sources and flood drainage for the city (Porter 1994). Open canals, largely conduits for sewage, regularly overflowed into city streets during the rainy season. Water quality in the piped network (partially reliant on surface water sources within the city), and in shallow groundwater (the source for the majority of the city's poor residents) was of particular concern. In other areas, groundwater depletion and/or salinisation had occurred, and poor residents were entirely reliant on water vendors. Reported cases of water-borne diseases rose; over the 1960s, reported cholera cases averaged 200 per year with one outbreak resulting in 1320 reported cases (BPP 1971).

Compounding these concerns was the inefficiency of the water supply network and resulting reduction in revenues for PAM Jaya. Although water supply production had quadrupled during the New Order period (while the population of DKI Jakarta had merely doubled), production capacity was still insufficient for meeting the basic water supply requirements (50 L/p/d) of DKI's population[19]. Moreover, the water supply distribution network was not capable of distributing the available water; production capacity had consistently oustripped distribution capacity since the 1960s. From 1965 to the late 1980s, the rehabilitation of existing infrastructure, and the construction of an additional large scale water treatment plant increased water supply production capacity three-fold, but by 1990 the water supply system still only delivered 40% of the potential volumes of treated water (JICA, 1997), and the provision of piped water supply still only extended to less than one-quarter of the city's population (Porter, 1994).

Accordingly, PAM Jaya developed its first major program to focus on water supply for the urban poor (the World Bank-financed Pam Jaya Supply Improvement Project, 1990 – 1997), which originally intended to install 2000 public hydrants in areas unserved by the network (largely in

[18] KIP began as a local government initiative in 1966, 50% of the costs of improvements were paid for by the Jakarta government, and the other 50% were paid for by the residents of the improved kampong. In 1974 the World Bank took up KIP as a national development program, and funding came from the Bank and the Central government (see Karamoy, 1984; Darrundono 2000).

[19] In 1997, the total effective (i.e. operational) production capacity of PAM JAYA was estimated at about 17,000 l/s {JICA 1997; WB 1998}. Distribution losses (essentially leakage) were reported at 56% (JICA 1997), resulting in a theoretical water availability of 140 litres per customer per day (assuming that all use is for residential) – taking into account industrial and commercial water use, this figures drops to 100 litres per person per day.

North Jakarta) and provided household connections elsewhere in the city, resulting in 234,000 new connections *{PAM JAYA 1992f; {WB 1998}.* As a result, the coverage ratio in the 'served area' of DKI Jakarta increased to approximately 50% of the approximately 8.9 million inhabitants (WB 1998). However, less than 200 of the target 2000 hydrants were installed, and poor quality of pipes (many of which were galvanized iron, an inappropriate material for Jakarta's soil which quickly decayed) and poor workmanship undermined the sustainability of the new distribution networks (WB 1998). Nonetheless, the expansion of production and distribution capacity did not catch up to increasing (potential) demand due to population growth: DKI Jakarta alone grew from 1.8 million people in 1950 to 6.5 million in 1980, and 11 million in 2005, with equally rapid population growth in the surrounding metropolitan areas (with the total population of the greater metropolitan area now estimated at 18 million), particularly at the expanding rural-urban fringe beyond the boundaries of DKI Jakarta (Chifos 2000; Firman 1997, 1998, 2000, Lo and Yeung 1996).

Moreover, PAM Jaya's rising block tariff structure provided the water supply company with a strong disincentive to connect the poor. Public hydrants – usually built in kampongs -- were charged higher volumetric tariffs than individual households, creating a counterintuitive cross-subsidy from poor to middle and upper class customers[20].. Banded tariff structures with a rising block tariff beginning with rates below production cost created a disincentive for providing direct network connections to poor customers, who would thereby pay lower amounts per unit volume, and perhaps decrease water company revenues (Whittington 1992). Even in areas with the possibility of network connections, higher tariffs (with the volumetric tariff doubling in less than a decade in real terms), higher connection charges, and a deposit fee meant a high initial fixed cost for a household water supply connection, prohibitive to poor households with low and often fluctuating incomes (section 3). The result was that only a small proportion of the new connections made in the 1990s were for very poor households. By the end of this period, only approximately 10% of kampong residents had household water connections (Azdan 2001, Cestti, 1994; Porter, 1994 and JICA, 1997)[21]. By the end of the 1990s, Jakarta's official water supply coverage ratio remained one of the lowest in Asia (McIntosh 2003).

[20] Until the early 1980s, household tariffs were 25 Rp/m3 for the first 15 m3/mth; public hydrants and water trucks paid Rp 60/m3, more than double the tariff of households, and more than even small businesses (who paid 50 Rp/m3). (Perpamsi 1975a, 1975b, 1975c)

[21] Reported figures vary significantly, due to reasons discussed in section 3.1.

3. **Disconnected: Poverty and access to water supply in contemporary Jakarta**

The previous section discussed underlying political and economic drivers for low coverage rates and differentiation of access to water supply: the reaffirmation of Dutch sovereignty and racial superiority, as concretized in the provision of artesian, and later networked water supply solely to colonial (white) neighbourhoods; the post-Independence approach to water treatment plants as 'monumental architecture' serving 'modern' areas of the city; followed by the New Order period which emphasized the build-up of productive capacity, and an increase in efficiency of networked urban services for the city's high income elites. This section focuses, in contrast, on water suppliers and customers, presenting data on poverty and access to water supply in Jakarta (section 3a), and exploring the disincentives both for poor consumers to choose network connections (section 3b), *and* for the water supply utility to connect poor households (section 3c).

3a. Contemporary water supply in Jakarta: the spatial and social dimensions of poverty and access to water supply

Numerous studies conducted by academics and multilateral organizations have characterized Jakarta's water and sanitation sector as one of the weakest in Asia (Brennan and Richardson 1989; Leitmann 1995; McIntosh 2003; McGranahan et al 2001; World Bank 2004). Official estimates of the proportion of the city's population with water supply network connections in the home ('household connections') range from 46% to 56% (BPS 2005; Jakarta Water Supply Regulatory Body 2004)[22]. Unofficial estimates, which attempt to account for the large number of informal residents in the city, estimate that only 25% of DKI Jakarta's true population is being served {Tutuko 2005}. Domestic water consumption is estimated to be between 70 and 80 L per capita per day -- one of the lowest of the 18 large Asian cities surveyed by the ADB in 2002 (ADB 2003b; McIntosh 2003).

Those not connected to Jakarta's municipal water supply system rely on a variety of sources (rivers and streams, lakes, rainwater, shallow and deep wells), and distribution methods (private household wells or rainwater collection systems, water vendors, bottled water, standpipes, private localized networks connected to deep wells, and water trucks) ((Berry 1982; Gilbert and James 1994; Lovei and Whittington 1993; McGranahan et al 2001). Many of these water supply methods are more expensive, per unit volume, than piped water supply (Figure 2).

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[22] The first figure is taken from the annual SUSENAS socio-economic survey conducted by the Indonesia Bureau of Statistics (BPS 2005). The second figure was calculated using data from the regulatory authority overseeing the management of Jakarta's water supply system (Jakarta Water Supply Regulatory Body 2004). This was cross-referenced with ADB (2003b) which reports a figure of 51.2%. In Jakarta, coverage ratios are always imprecise estimates; their calculation is dependent upon a number of variables which are only imprecisely measured, such as urban population and average size of household. Reported figures vary significantly, and do not indicate the number of households which have a connection but which rely primarily on other sources (e.g. groundwater) due to quality or service concerns (e.g. low pressure). Large numbers of seasonal migrants and 'illegal' residents without land tenure mean that population figures are systematically underestimated and that coverage figures are systematically inflated.

In many instances, alternative water sources are contaminated to a degree that compromises public health. Jakarta has almost no sewer system (with less than 2% of households connected to a sewerage system) (ADB 2003b); the vast majority of wastewater is disposed directly to rivers, canals, or to (often poorly functioning) septic tanks (Crane 1994, McIntosh 2003; Surjadi 2002). Contamination by wastewater and industrial effluent, as well as salinisation due to seawater infiltration due to over-pumping have polluted Jakarta's shallow aquifer -- the sole household source of supply for many poorer families – in many areas of the city. Rivers and canals are usually too polluted to use even for washing clothing. Nor is the water delivered through the network potable; medical studies repeatedly find faecal coliform contamination, and residents are advised to boil their water. The public health impacts of this situation are predictable, and have been well-documented: high rates of water-related diseases, including gastrointestinal illness due to contaminated water and parasite-related illnesses due to poor drainage, particularly in poorer areas (Agtini et al 2005; Leitmann 1995; McGranahan et al 2001; Simanjuntak et al 2001; Surjadi 2003). Results of the first community-based surveillance study of diarrhoea in Jakarta found results that correlated with Indonesia-wide findings: that diarrhoeal is the third leading cause of morbidity and leading cause of morbidity in infants (Agtini et al 2005).

The correlation between poverty and lack of access to a household connection has been documented in household surveys of Jakarta (Crane 1994, Forkami/RTI 2002, 2003; McGranahan et al 2001, Shofiani 2005). National-level data indicate that the urban poor lack access to water supply across Indonesia. Data from Indonesia's census indicates that only 16% of the urban 'very poor' (with monthly incomes of Rupiah 800,000 (approximately $80 USD)) have household connections, while 36% of the urban population is connected, on average, across the country (Woodcock 2005). Poorer households often use sources of water which are more expensive per unit volume (although not necessarily more expensive in terms of total costs – see section 3.2), and spend higher proportions of income on water (**Figures 1 and 2**, and **Table 1**). As **Figure 2** indicates, continuity of income (which is particularly relevant for poor households, whose income may fluctuate significantly weekly or even daily) also influences choice of water sources: households with fluctuating incomes are more likely to rely solely on vended water.

Although significant attention has been given to the relationship between poverty and lack of access to clean water, much less attention has been paid to the spatial differentiation of access across the city. As a result of historical choices (see section 2), the network is concentrated in 'modern', formally planned areas of the central city and surrounding upper-class residential areas, recalling a scattered 'archipelago' rather than a homogenous network (Bakker 2003b) Areas of lower penetration of the network, are correlated with income[23] (**Map 3)**. Moreover, spatial variations in infrastructure quality and pressure are correlated with poorer areas of the city. **Map**

[23] Booth (1997) explores the question of the reliability and meaningfulness of poverty statistics in several south-east Asian countries, including Indonesia. Booth notes that household surveys constitute the main method for estimating poverty rates, but that these surveys are characterized by a number of problems, including a substantial divergence between income and expenditure data (with the latter often being reported as lower than the former), and disparities between personal consumption as reported in household surveys and as derived from national accounts. She concludes that household surveys may be unreliable, and/or have drawn on unrepresentative samples. Temporary migration into the city and high rates of informal settlements further complicate accurate assessments of poverty rates. Accordingly, we use the survey results on numbers of slum households as a proxy for poverty. These statistics were gathered through reports from local government officials (RW and RT heads).

4 indicates zones of low pressure in the network; in these areas, access to water through the network is either highly unreliable or completely unavailable due to low pressure[24]. On a neighbourhood basis, then, access to water supply is spatially differentiated across Jakarta, and strongly correlated with income.

The spatial differentiation of access has a micro-geography with a high resolution. Even in areas with network penetration of tertiary pipes, lower-income streets and houses are unlikely to have access (**Map 5).** Assessing access of the urban poor to water supply is complicated by Jakarta's spatial pattern of urban development and urban services provision. Within the city, an 'estate' pattern of blocks of commercial properties and colonial-era mansions fronting on broad avenues is intermixed with dense 'illegal' settlements of poorly serviced houses and self-built dwellings in the inner blocks (Cowherd 2002; Ford 1993; Leaf 1996, Porter 1996), on empty lots, and along any streets wide enough to accommodate built structures while still permitting the passage of traffic, a pattern originating in 'indische' (Dutch-Javanese) urban planning models which has intensified following the informalisation of much of the city's economy following currency devaluation in 1998 (Cowherd 2002). Many neighbourhoods do not have any access to piped water, as the water network is concentrated in wealthier areas of the city (Martijn 2005). The resulting spatial differentiation of land use and income has created an 'urban dualism', with middle-class houses abutting informal housing in a highly variable urban micro-geography in which multiple water sources will be in use simultaneously.

3b. Choosing household water supplies/Disincentives for the poor to connect

In this section, we discuss choices which households make about water sources, and the disincentives which discourage poor consumers from connecting to the water supply system. Our evidence is drawn from primary survey data[25], and is supported by references to other published survey data.

Poor households in Jakarta choose non-networked water sources for a variety of reasons (Bakker, forthcoming)[26]. Understanding choices about water use must be situated in context; in Jakarta, as in many mega-cities in the South, most residents use multiple sources of water in the home (**Table 2**). Residents of Jakarta obtain their water supply through a complex, heterogeneous set of sources, techniques, and modes of delivery. Few residents rely on one source, using a combination of household piped network water connections, shallow and deep wells, public hydrants, and water vendors for their water supply needs (Surjadi 2002, 2003). According to our survey of 110 households in six Jakarta neighbourhoods in 2005, 61% of households surveyed used multiple

[24] Note that 20% of PSP customers are zero consumption customers – many of these many be in low or no pressure zones (or be wealthy customers who simply have the supply as a backup).

[25] Surveys of 110 households conducted in eleven kelurahan (sub-districts) in North (Kamal Muara, Penjaringan (Marlina & Gedong Kompa), Penjaringan (Rawa Bebek), Pegangsaan Dua), West (Semanan), East (Kampung Melayu, Rawa Terate, Jati, Kampung Tengah) and Central Jakarta (Kebon Melati, Gunung Sahari Selatan). These kelurahan were identified as predominantly poor and targeted for delivery of water services by the Kimpraswil Fuel Subsidy Reduction Compensation program, created to offset the impacts of a reduction in fuel subsidies on poor households.

[26] For a history of the ongoing preferences of the poor, see: Taylor, 1983; Yayasan Dian Desa, 1989; Kreimer et al. 1995; Chifos, 1996; Surjadi et al. 1998, and Surjadi et al. 1994.

sources (the three most frequent combinations being network and vended water, network and groundwater, and groundwater and vended water)[27].

Use of different water sources varies temporally and seasonally, due to quality and pressure concerns. Low pressure in the piped network means that households prefer to have a backup source – usually a shallow well. In many areas of the city, however, both shallow and deep groundwater cannot be used for drinking due to salinisation and pollution of the shallow aquifer (due to pumping, sea-level intrusion, and surface wastewater disposal in the absence of a sewerage system); groundwater in these areas is usually used only for cleaning/washing, to offset total household expenses on water.

Even in those areas with networked water supply, many homes will not have individual household connections. Susantono finds, in an extensive survey, that informal water services "thrive" in neighbourhoods where formal services are available, with households relying on water vendors even when they have the option of house connections with the municipal water utility (Susantono 2001). Households rely on water vendors even when they have the possibility of a direct house connection to the network. In other words, physical proximity of the network (as indicated by the distribution of tertiary pipe networks in the neighbourhood) is not correlated with residential network connections.

Why would this be the case? The answer is that the choice of which source to use is influenced by factors other than physical availability of a network: total cost of water supply; transaction costs; housing and residence status; and, in some instances, perceptions of water quality. The most important factor to consider is the **total cost of water supply** (as distinct from the volumetric cost, or cost per unit volume of water). In a pattern typical of third world cities (Cairncross et al 1990, Gulyani 2005, Swyngedouw 1997), piped water supply costs less per unit volume in Jakarta than other modes of water supply, particularly vended water. In comparisons of the prices of vendor water versus networked water supply, the price per unit volume was found to be from 10 times to 32 times more expensive in the case of vendor water[28]. Poor households typically rely on vendor water, whereas wealthier households have access to the networked water supply system; as a result, many poor households pay more per unit volume of water than do wealthier residents of the city. Given their lower incomes, many poor households pay a much higher proportion of their income for water than do wealthier households. In our survey of 110 households, 43% of households spent more than 5% of their income on water bills (often cited as appropriate threshold by international aid organizations)[29]. Wealthier households with a networked connection, in other words, receive water at a lower cost per unit volume, spending lower proportions of income for much greater quantities of water. Unsurprisingly, levels of water consumption are positively correlated with wealth in Jakarta (McGranahan et al 2001).

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[27] These findings are similar to the results of surveys conducted by Surjadi (1994, 2002, 2003) and McGranahan et al (2001), the two most recent academic studies available.

[28] ADB (2003); McGranahan et al (2001); and a survey conducted by the author in the neighbourhood of Sunter Agung in January 2001. ADB 2003b gives a maximum figure of US $4.17/m3

[29] A study of 1000 households in Jakarta which examined the different prices paid by different wealth groups found that, overall, the poor pay on average twice as much per metre cubed as the wealthy (McGranahan et al 2001), and that water expenditure represents, on average, 10% of income in poor households.

On the basis of cost per unit volume alone, then, it seems counter-intuitive that poor households would not connect to the water supply network where possible. However, the disincentive for connection becomes more obvious when we consider the *total cost* of connecting to the water supply system (as opposed to price per unit volume of water supply). Monthly bills include more than charges per unit volumes of water consumed. Fixed charges (such as the meter fee and the annual charge) are also added on to the bill (**Table 3**). For a poor household whose residents consume 50 L/person/day (the World Health Organization recommended minimum), the fixed charges will be anywhere from 5 to 10 times as high as the volumetric consumption charge; the effective cost per unit volume will thus be higher than that of vended water for the poorest consumers. Moreover, a networked water supply implies additional infrastructure costs to be borne by the consumer, in the form of a water tank or holding device, made necessary because of the intermittent nature of water supply through the piped network (with cutoffs of several hours occurring daily in some areas).

Finally, connection fees may be prohibitive (ranging from 200,000 to 350,000 Rupiah in the households surveyed, with reported figures from other surveys sometimes much higher than this), relative to average incomes of poor households (which averaged 1.4 million Rupiah/month in the households surveyed), and must usually be provided as a lump sum; which may pose significant barriers to households with small, irregular incomes. Connection fees also vary depending on distance from the network; poor households are more likely to live in areas of lower network density (see discussion in section 3a), and thus to pay higher fees for connecting. For all of these reasons, overall costs to poor households of vended water may be lower than networked water supply, even though the latter has a lower price per unit volume.

Transaction costs are also significant; long waiting times at water utility offices to pay bills and clear up meter mis-readings raise transaction costs compared to the ease of complaint handling and convenience of home visits by vendors to collect bill payments. Moreover, payment flexibility permitted by vendors (some of whom even allow customers to buy water on credit); this is an important incentive for poor households, which may have limited budgeting ability, to choose vended water over networked water (Susantono 2001; Shofiani 2003). Although difficult to estimate, bribes demanded by contractors and PAM Jaya staff (or the apprehension that such bribes may be demanded) is another important transaction cost[30].

A third factor is **housing and residency status**. A significant proportion of the city's population lives in rental or temporary (often self-built) accommodation without secure tenure. Deep wells are expensive and have higher maintenance costs, which effectively prohibits development by those without permanent tenure. Moreover, landlords are often unwilling to connect rental properties because of concerns about infrastructure cost and maintenance; similarly, tenants are unwilling to connect, because their investment would constitute an upgrade to the landlord's property. In our survey, households with insecure tenure were less likely to have a household water supply connection (**Figure 4)**. In addition, a large number of the migrants to the city are without legal residency permits. In these instances, water vendors – which provide flexible, easily accessible, 'no questions asked' water supply – are preferable.

[30] See Cowherd, 2002 for a discussion of the culture of 'informal' profits from public services, and Yayasan Dian Desa, 1989 for how this was evident in PAM Jaya's operations in poorer communities.

Perceptions of **water quality** may also factor in to the decision not to connect to the water supply network. In our survey, networked water was perceived by a majority of respondents to be of higher quality than other sources of water (particularly groundwater), particularly by more educated respondents. However, some respondents did perceive groundwater to be of higher quality than either vended or network water. Indeed, the most comprehensive comparative survey of water quality of different sources in poor neighbourhoods in Jakarta to date found that samples of drinking water from the network were more contaminated with fecal coliform than groundwater (Surjadi et al 1994). In other cases, vended water was perceived to be of higher quality than networked water supply. The fact that vendors check water quality and may strain the water or let it settle before delivering explains why perceptions of vended water quality may be higher, despite the fact that vendor water often originates in hydrants connected to the networked water supply system. These perceptions of relative water quality of different sources may not, however, be borne out in all cases; groundwater quality tends to be lower in poorer areas, due to proximity to industrial sites, fewer controls over sewage, density, and infiltration of seawater (particularly in North Jakarta). Dislike of chlorine (as borne out by the widespread practice of leaving buckets of water to sit overnight to dissipate the chemical content) is another contributing factor (McGrahanan et al 2001, and Kreimer et al 1995). Ironically, wealthier households can afford to treat water (via household filters), and thus often choose to access groundwater, reducing the number of wealthier households connected to the network, and decreasing the possibility for cross-subsidies within the tariff regime.

In summary, given their lack of secure land tenure, variable daily income levels, tenuous legal status (lack of residency permits), and inability to cope with large transaction costs and formal billing systems, poor residents of Jakarta, like in the colonial era, continued to persist in their 'irrational' preference of 'local waters' – which provide reliable, flexible, easily accessible, 'no questions asked' water supply[31]. In other words, in contemporary Jakarta as colonial Batavia, poor residents of the city may not only be excluded, but also may not choose to be connected[32].

3c Disincentives for water supply utilities to connect the poor

PAM Jaya, like other Indonesian water supply utilities, operates with several disincentives to connect poor customers. First, the **culture of governance** within urban government in Indonesia does not prioritise the poor (Kusno 1997; Woodcock 2005). The ways in which this low priority has been expressed have changed over time. In recent decades, low priority was placed on the provision of piped water and partially rationalized as a policy to discourage rural migrants, who were blamed for over-taxing the city's public services (KIP, 1976). However, this is not the sole reason; coordination with PAM Jaya to extend piped water supply into poorer neighbourhoods did not greatly improve after the 'closed city' policy was relaxed in 1976 (Taylor 1983). A more fundamental

[31] For a history of the ongoing preferences of the poor, see: Taylor, 1983; Yayasan Dian Desa, 1989; Kreimer et al. 1995; Chifos, 1996; Surjadi et al. 1998, and Surjadi et al. 1994.

[32] This ambiguous relationship of the city's residents to the water supply network is not confined to the poor. As the water supply system founders under the weight of Korupsi, Kollusi and Nepotisme (Corruption, Collusion, and Nepotism), substantial middle class sections of the city have also opted out of the network, either refusing to have a connection or refusing to consume. Approximately 20% of the water network customers in Jakarta are 'zero consumption' customers who have turned to other sources of water supply - a potent symbol of widespread political and economic disconnection from the network.

issue is the lack of a legal requirement mandating utilities to target services to the poor. This is compounded by intermediary institutions between PAM Jaya workers and poor residents (Woodcock 2005); poor residents may be distrustful of PAM Jaya staff (as with any government officials in Indonesia), and staff may be reluctant to deal with the poor because of their low social capital (lack of ability to fill out forms, lack of understanding of rules, possibility inability to pay). Political leaders, on the other hand, are sometimes unaware of the numbers of unconnected residents, or the cost to the unconnected poor of obtaining water from alternative sources (Woodcock 2005) or do not choose to prioritise these issues (unsurprising, given the low degree of political influence of the urban poor).

A second reason for the under-provision of networked water supply in the kampongs has been **cost recovery,** the requirement that PAM Jaya fully recover costs from customers[33] (Taylor, 1983), exacerbated during some periods with budgetary requirements to direct retained earnings to a dividend paid to the utility, rather than reinvested in infrastructure (Woodcock 2005)[34]. The utility preferred to limit the extension of distribution networks to neighbourhoods where the 'user-fee' schemes used to finance network extension meant that costs could reliably be recovered[35]. The discriminatory social policy of PAM Jaya during this period is reflected in its own admission that it was "best situated to serve well established, formal areas comprising concentrated groups of users, rather than newly developed and widely scattered areas [i.e. kampongs]." (Argo, 1999: 71). The limited ability of PAM Jaya to extend water supply network in to poor areas is corroborated in the latest Master Plan for Jakarta's water supply which records the absence of a poverty reduction strategy in network extension policy until the late 1980s (JICA, 1997), and notes the absence of policy targets for supply coverge (in % terms of total DKI population) until the 1970's (WB 1991). Indeed, PAM Jaya's reported coverage figures for the city were usually stated as proportions of the total population in the 'served area', excluding kampongs altogether.

A third set of disincentives stems from **urban governance**. Official development plans for Jakarta encouraged an east-west pattern of urban development, attempting to avoid expansion into irrigated agricultural areas north and south of the city (JICA 1997). Despite the failure of planning controls to stem urban sprawl, network expansion was limited to target zones in official planning. A second governance factor was the influence of informal, and reputedly violent 'water mafia' which profited from local water vending, and actively discouraged attempts to install distribution networks or substitute household water connections for water hydrants (Crane 1994; *{Pandjaitan 2004}).*

A fourth set of disincentives arises in the business model and associated governance culture of Indonesian water supply utilities (Woodcock 2005). Water utilities in Indonesia are controlled by local government; senior appointments are often guided by political patronage rather than technical

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[33] World Bank, 1974; Taylor, 1983 and Kreimer et al. 1995 record how the 'basic needs' development programs in the 1970s and 1980s that intended to provide 'water for the poor' through public hydrants were often frustrated.

[34] For PDAMS across Indonesia, the standard level of this dividend is 55% of net profits, which is paid to the treasury of the local municipality.

[35] The use of 'user-fees' to finance network extension meant that house connections were unaffordable for the majority of the population; the cost of a household connection (not to mention 'additional fees', meter rental, deposit, and actual monthly tariffs) in 1975 was Rp 100 000 ($200 US), whereas the average income in Jakarta at that time was only Rp 15 000/mth (approximately $36 US), with the 80% of the city's residents living in kampongs earning much less than that amount (KIP, 1976; Perpamsi, 1975a).

requirements. Employment in a water utility in Indonesia has conventionally been allocated a low social status (Martijn 2005), and the associated impacts on morale and technical expertise of staff have undermined the efficiency and productivity of most water utilities in Indonesia. Moreover, local governments have typically been unwilling or unable to make politically unpopular decisions (such as raising tariffs) or require water utilities to improve performance (e.g. through measurable performance targets). The treatment of water utilities as 'cash cows' (notably through the payment of annual dividends to the municipality) has distorted long-term planning processes, reducing investment in infrastructure maintenance and renewal.

In short, both water suppliers and poor customers have powerful incentives not to connect to the water supply network *in addition to lack of spatial access to the network*. This explains why alternative water sources such as water vendors flourish even in areas with access to the network. Moreover, the disincentives for the urban poor to obtain household connections reveal why public hydrants and vended water tend to become the sole or primary source of drinking water supply for the city's poor; Surjadi et al found that over 20% of the city's residents regularly buy drinking water from vendors (Surjadi et al 1994). The most recent academic survey found that approximately 1/3 of Jakarta's households purchase water from street vendors (Crane and Daniere 1996); these figures correspond with the results of our household survey, which found that 31% of respondents regularly bought vended water (**Table 2**). This ambivalent relationship of the city's residents to the water supply network is not confined to the poor. Substantial middle class sections of the city have also opted out of the network, either refusing to have a connection or refusing to consume. According to the private water concessionaires operating in Jakarta, approximately 20% of the water network customers in Jakarta are 'zero consumption' customers who have turned to other sources of water supply - a potent symbol of widespread political and economic disconnection from the network.

4. **Market failure, state failure: Public and private sectors serving the poor**

Conventional explanations for the lack of access to sufficient amounts of safe water supplies in urban areas in developing countries usually rest on concepts of either 'state failure' or 'market failure' (see section 4 of this report), the former lending support to private sector involvement in water supply, and the latter justifying public sector-run water supply utilities. In both cases, lack of finance and weak governance are seen to be key contributing factors to the failure to extend water supply services (McIntosh 2003).These views are usually assumed to be mutually exclusive; the ensuing debate about public versus private sector management of water supply has been, as a result, highly polarized. Jakarta is an interesting case study of these issues: it has one of lowest rates of provision of water supply and sanitation services in Asia; and has one of the largest water supply 'private sector participation' (PSP) contracts in the South to date.

Proponents of private sector participation (PSP) in water supply have argued that PSP is a means of improving service delivery to the poor (see, for example, Cross and Morel 2005; Nickson and Franceys 2003)[36], critical in a world in which an estimated one billion people – the 'unserved' in development jargon -- lack access to safe, sufficient water supplies (WHO 2000). Specifically, through efficiency gains, improved management, and better access to finance than public utilities, private companies improve performance (including cost recovery rates) and increase access through extending networks and providing new connections to previously 'unserved' customers. This will benefit the poor, particularly in urban areas, who are often served by a variety of informal arrangements such as water vendors, and typically pay much higher prices per unit volume for poorer quality water than wealthier consumers (Johnstone and Wood 2001; Shirley 2002, World Bank 1994, 1997, 2004a).

Opponents of private sector participation argue that PSPs are not reliable mechanisms to supply water services to the poor, because private companies are unable to supply the poor on profitable terms. As proof, critics point to the withdrawal of the private sector from contracts and regions of the world, in light of risk-return ratios which have remained unacceptably high (Hall and Lobina, this volume; Hukka and Katko 2003, Smith 2002)[37], in part because of the low 'ability to pay' of poor consumers. Moreover, some critics argue that the potential contributions and sustainability of private sector involvement will be undermined by political conflict and civil society resistance to PSPs arising from the belief that water is a human right. Indeed, mobilization of social movements in opposition to PSPs has occurred in many countries, at times resulting in the cancellation of contracts by governments (La Paz and Cochabamba, Bolivia). In other cases, such as Manila, the opposition of social movements has factored into the decision of the private company to withdraw (Barlow and Clarke 2002, McDonald and Ruiters 2005, Shiva 2002, Trawick 2003, Swyngedouw 2005, Wateraid 2003). Many of these critics argue that PSPs are not ethically appropriate, and call

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[36] See, for example, the Global Water Partnership (www.gwpforum.org/) and the World Water Council (www.worldwatercouncil.org/), two influential networks of private water companies, governments, and lending agencies. The Business Partners for Development links the World Bank with private water companies and governments, and 'aims to produce solid evidence of the positive impact' of PSPs (www.bpdweb.org).

[37] For academic studies critical of the privatisation process, with a focus on developing countries, see the Municipal Services Project website (**http://qsilver.queensu.ca/~mspadmin**). For an international public sector union perspective, see the very comprehensive PSIRU website (**www.psiru.org**). For a campaigning NGO perspective, see the Council of Canadians Blue Planet Project (**www.canadians.org/blueplanet/index2.html**) and the US-based Public Citizen's campaign on water supply (**http://www.citizen.org/cmep/Water/**).

for the management of water as a commons, often with reference to idealized models of indigenous water governance. Even where critics agree, in principle, to the management of water by the private sector, they argue that political conflict over the socio-economic identity of water will further elevate risks, and decrease the likelihood of the private sector being able to supply the poor on a profitable basis.

Much of the debate on the relative merits of public or private sector involvement in water supply management has been (often implicitly) based on concepts of 'market failure' and 'state failure'. According to the '**market failure**' hypothesis, a certain class of goods exists for which markets fail to efficiently allocate goods and services, due to the 'failure' to meet assumptions of standard neoclassical economic models. Specifically, market failures occur when property rights are not clearly defined or are unenforceable, when goods are non-excludable and non-rivalrous ('public goods'), when prices do not incorporate full costs or benefits ('externalities', which may be negative (pollution) or positive (public health benefits)), when information is incomplete, or in a situation of monopoly which arises when supply by one firm entails lower costs than supply by more than one firm, giving an overwhelming cost advantage to the incumbent firm ('natural monopoly') (Cowan 1993, Winpenny 1994). Accordingly, the health and hygiene effects of lack of access to water, together with the tendency of private companies to fail to extend coverage to the poor (both as a result of the tendency to cherry-pick profitable neighbourhoods and classes of consumers, and the high prices and poor services resulting in a situation of natural monopoly), were two of the most important justifications for bringing water supply under the control of the state, through the creation of regulatory oversight mechanisms. In addition to the 'market failure' argument, the symbolic and cultural importance of water as a (partially) non-substitutable resource essential for life, its strategic political and territorial importance, the intense conflicts that arise over the use of a flow resource required to fulfil multiple functions (agricultural, industrial, drinking water, environmental), and the need in industrialized, urbanized societies to mobilize large volumes — invariably at a high cost relative to the economic value generated, implying large, long-term capital investment requirements which private companies were not always willing to assume — have been used, particularly in the 20th century, to justify public-sector investment and ownership.

In contrast, according to the '**state failure**' hypothesis, governments are inherently less efficient than the private sector; as a result, service delivery should preferably be undertaken by private companies, with the state acting as a regulator rather than service provider. Forms of governance characteristic of governments, it is argued, are not conducive to well-managed water supply utilities: burdensome public sector procurement procedures increase the cost and reduce the efficiency of provision; short-term political cycles undermine the long-term planning necessary for capital-intensive water infrastructure; corruption further reduces efficiency and cost-recovery; and politically expedient pricing strategies (many of which offer tariff options below marginal cost to the poor) are often counter-productive, either reducing cost-recovery rates, or providing disincentives for connecting poor households – loss-making customers for the utility (see, for example, Whittington 1992). The lack of transparency and attenuated accountability characteristic of 'big bureaucracy' reduces consumers' ability to demand improvements to poor services. The result is a 'vicious cycle': low cost recovery, low revenue, low investment, and low levels of service (Bakker 2003a; Cross and Morel 2005; Nunan

and Satterthwaite 2001). Proponents of the 'state failure' hypothesis have used these arguments to justify private sector involvement in water supply. Contemporary development economists often argue that networked water supply is subject to fewer market failures than water in its natural state: property rights are fairly straightforward to define; water supply is excludable and (in some instances) rivalrous, and competition can be introduced through direct competition through competitive bidding for network management or through indirect competition-simulating mechanisms such as yardstick regulation (Helm and Jenkinson 1998). Remaining market failures, such as externalities, can be limited or eliminated through better pricing and more comprehensive information about water supply systems and the ecosystems upon which they depend.

Recent debate internationally has moved away from these polarized positions, acknowledging the limitations of conventional models of both public and private sector water supply management. The chapter on water supply in the 2003 Human Development Report states, for example, that "public provision of social services is not always the best solution when institutions are weak and accountability for the use of public resources is low—often the case in developing countries (UNDP 2003, 111), yet acknowledges that private companies "sometimes also view poor people as being unprofitable [and] some private companies have found ways of excluding poor people from service" (UNDP 2003, 116). In a recent study of private sector provision of urban services provision to the poor, the Asian Development Bank states that: "the private sector is not willing or able to solve the problems of unserved areas on its own" (ADB 2003a 56). Analysis of the discourse of the public statements of senior executives of water supply services firms reveals a retreat from earlier commitments to pursuing PSPs globally, with senior figures publicly acknowledging high risks and low profitability in supplying the poor (Robbins 2003). Britain's influential economic weekly *The Economist* has warned of a 'retreat of the private sector' from water supply in developing countries (The Economist 2004). High-profile cancellations of water supply concession contracts by major private companies and/or governments in the past three years -- including Buenos Aires, La Paz, and Manila -- seem to bear this out.

Simultaneously, civil society groups have been calling for greater recognition of the role of civil society in successful water supply delivery, either as an alternative which excludes privatization (TNI 2005), or as an approach which complements private sector activity through, for example, "public-private-community partnerships' (PPCPs)' (BPD 2005; World Bank 2004a). These developments have raised concerns that the contribution of the private sector to reaching the UN's Millenium Development Goals (the new goalposts of the international development agenda) for water will be relatively limited[38]. In response, a debate about how best to implement a 'pro-poor' agenda through PSPs has arisen amongst consumers, governments, donors, and private water companies (see, for example, Franceys and Weitz 2003; Gutierrez et al 2003).

This section engages with these debates through a case study of the private sector participation (PSP) contract for Jakarta's water supply management sector , and through an analysis of recent, separate public and private sector initiatives to supply water to the poor in Jakarta. Section 4a provides background on the private sector participation contract for Jakarta's water supply sector,

[38] The eight United Nations Millenium Development Goals were agreed upon at the UN Millenium Summit (2000). The MDGs set a specific target for water supply: reducing by half the proportion of individuals without sustainable access to adequate quantities of affordable and safe water by 2015. See http://www.un.org/millenniumgoals/.

one of the largest such contracts in Asia to date[39]. The performance of the private sector with respect to network connections for poor households in Jakarta is analyzed in section 4b. The analysis concludes that the Jakarta PSP contract has not been pro-poor: new connections were preferentially targeted at middle and upper-income households over the period 1998 to 2005, and the numbers of new connections have been lower than the original targets. Section 4c argues that the failure to connect the poor is not solely attributable to the private operators, and identifies disincentives to provide individual network connections to poor households on the part of the municipality, the private concessionaires *and* poor households. In contrast to the economic reductionism of much of the literature on 'pro-poor' water supply, the analysis identifies a range of non-economic factors which must also be taken into account in explaining the failure to connect poor households to the water supply network. To document how these barriers affect both the public and the private sector, section 4d examines pro-poor water delivery strategies enacted by the private sector concessionaires over the period 2001 – 2005.

4a. The private sector contract

Jakarta's government exhibited a renewed interest in the urban environment and services provision in the 1990s, as typified by the then-governor's favourite slogan for Jakarta: 'Bersih, Manusiawi, Wibawa' (Clean, Humane, Powerful) (Leaf 1996). Concerns about the poor level of service in the water sector had persisted for decades, and water shortages and water quality problems were perceived to be increasingly acute (Berry 1982; Lovei and Whittington 1993; Gilbert and James 1994, Indonesia Times, 1996). One response (in Jakarta as in other Indonesian cities) was limited private sector participation: out-sourcing of routine repairs, billing and payment collection by Jakarta's water supply utility, PAM Jaya (Mandaung 2001). Water supply was one of many PSP initiatives ongoing in the country; the Indonesian government had passed legislation enabling private sector participation and privatisation for most public sector utilities in the mid-1990s, and had embarked on private ventures in various sectors over the past decade, such as privately funded toll highways throughout the greater Jakarta area[40]. Over the 1990s, at both the municipal and national scale, the Indonesian state increasingly solicited private sector investment in, and management of key public utility sectors (Robison 1997, Robison and Hadiz 1993, 2004).

Discussions regarding a long-term PSP concession contract with foreign firms began in the mid-1990s. International water companies were keenly interested in entering the water services market in Indonesia, as a large, middle-income country with an expanding middle class with relatively low penetration of networked water supply services. After protracted negotiations, 'cooperation agreements' for the management and expansion of Jakarta's water supply system were awarded in late 1997 to two of the largest water services companies in the world[41]: (British) Thames Water International and (French) Ondeo (Suez-Lyonnaise des Eaux). The process of awarding the contract for Jakarta's water supply was characterized by what the political science literature defines as

[39] Three sources of data were used: data collected through a household survey of poor households in six Jakarta neighbourhoods in 2005; data provided by the two private concessionaires and the Jakarta municipal government; and interviews with water supply managers, government officials, and NGO representatives in 2001 and 2005.
[40] Private sector participation contracts in water supply have been signed in several other Indonesian cities: Bali; Batam; Medan; Lhok Seumawe; Sidoarjo; and Pekanbaru (Baye 1997; ADB 2003).
[41] Sanitation services were not included in the contract, and remain the responsibility of the various municipalities that make up the greater Jakarta area.

'collusive corruption' (where government and private sector officials collude to deprive the government of revenues) (Bardhan 1997, Shleifer and Vishny 1993). This occurred rather than a public tendering process, where international water companies put forward unsolicited proposals directly to the government. Under then-President Suharto, partnership with an Indonesian firm was a prerequisite for international corporations hoping to take over the operations of a utility network. This is not unusual in the international water supply sector, in which private sector consortia typically have local minority shareholders. In the case of Indonesia, however, these private sector consortia were frequently linked directly to the President; by the early 1990s the large Indonesian conglomerates had "already [become] active within other public service areas, and these groups expected to benefit from the privatization of water services" (Baye 1997, 201).

The two international firms were partnered with two local private firms, respectively members of two of the most important conglomerates in Indonesia – Salim Group (run by Bob Hassan, a crony of then-President Suharto) and Sigit Group (run by Sigit Harjojudanto, Suharto's eldest son) [42]. In January 1998, each consortium signed a 25-year contract with PAM Jaya, the municipal water supplier in Jakarta, which retained ownership of the water supply assets. The private consortia were to be responsible for operation of the water supply system, including administration of the customer database and billing. Thames' contract allocated the company the exclusive right to operate and manage the existing water supply system in the eastern half of the city[43], supplying 2 million people connected to the supply system out of a potential customer base of 5 million. Simultaneously, Lyonnaise des Eaux was given a contract to supply the western half of the city (**Map 6**), covering a slightly larger number of potential customers. Ambitious targets were set: the private companies committed to reaching universal coverage by 2023 and to supply potable water to consumer by 2007.

The contracts were expected to be lucrative for both the local and international partners. Under the terms of the contract, this profit was not to be linked directly to the revenues of the municipal water supply system. Instead, each consortium was to receive a fee on the basis of volume of water supplied and billed, *not* on the basis of the water tariff (set by the municipality), or the percentage of cost recovery. With no direct equity stake, and with profit de-linked from cost-recovery rates, the international water companies thus sought to minimise the risk inherent in cost-recovery. An additional safeguard was built into the payment mechanism: an indexation formula, linked to the rupiah-US dollar exchange rate and the (Indonesian) inflation rate was built into the 'water charge' formula used to determine payments made to the private operators – who are paid according to unit volume of water delivered to the distribution network rather than billing revenue. Cost recovery and currency risks, in other words, were to be borne by the local government.

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[42] Corruption in Indonesia is internationally recognized as being particularly pervasive (Transparency International). 'Market consumption' and 'parochial consumption' (where the latter hinges on kinship, caste, etc. and the former on wealth) (Scott 1969) were conflated in a system that came to be known in Indonesia by the triad of 'Corruption Collusion Nepotism' popularized as an acronym (*Korupsi, Kolusi dan Nepotisme* or KKN) which came to symbolize the Soeharto regime (Robertson-Snape 1999). That the contracts were awarded despite national laws prohibiting foreign investment in drinking water delivery (Law No. 1/1967; Ministry of Home Affairs Decision No. 3/1990) and local regulations (No. 11/1992 and No. 11/1993) precluding private sector involvement in community drinking water supply was to be a source of conflict in the early years of the contract (Argo and Firman 2001).

[43] *Indonesia Times* (1998) "Privatised water supply begins soon" January 16th, p. 3.

4b. Re-regulation: Tariffs, profits, and the re-negotiation of the contract

The political and economic turmoil that unfolded in Indonesia in 1997 and 1998 vitiated these strategies. Riots, the resignation of Suharto, and the abrupt and dramatic devaluation of the Indonesian rupiah[44] threw the country into a period of chaos. After a tense interlude in which senior expatriate managers of the private concessionaires fled the country, local managers cancelled the PSP contracts, and senior British and French executives and diplomats pressured the federal government to have the contracts reinstated, the private concessionaires resumed operations (having discreetly abandoned their Indonesian partners, now tainted by their association with ex-President Suharto) (Harsono 2005).

Confronted with public protest over rising prices of staple food items and gasoline, the municipal government refused to raise tariffs to compensate for the devaluation of the rupiah. This delay in tariff increases should not, in theory, have posed difficulties for the private water companies, as revenues are determined by a 'water charge' paid per unit volume of water delivered into the network. This means that revenue of the private operators is not linked to amounts billed or collected from consumers. In other words, the revenue of the private concessionaires is, in theory, independent of cost-recovery as well as tariffs. Indexing the water charge to the Rupiah-USD exchange rate provided protection against currency devaluation; should the rupiah fall in value, the water charge (expressed in rupiah), would rise accordingly.

The limitations of this strategy were revealed when receipts in dollar terms plummeted from 1998 onwards. Given political unrest in Jakarta, the Governor was unwilling to implement agreed-upon tariff increases. The gap between the water charge required for compensating the private companies and the average water tariff increased dramatically. Whereas, the water charge paid to the private operators was 11% below the average tariff in 1997, it rose to over 60% above the average tariff in early 2001 **(Figure 5)**. Subsequent tariff increases did not raise the tariff above the water charge until early 2004 (Jakarta Water Supply Regulatory Body 2004). The result was that the amount charged by the private concessionaires – via the water charge – to the government increased dramatically, while revenue fell just as dramatically. PAM Jaya (and thus the local government) bore the sole risk for the revenue shortfall, and became increasingly indebted to the private companies. The cumulative deficit by the end of 2001 was Rp 469 billion (approximately $46 million USD) and had reached Rp 990 billion (approximately $97 million USD) by September 2003 -- excluding late payment interest and retroactive tariff increases (Jakarta Water Supply Regulatory Body 2005).

The time period for repayment of this debt by PAM Jaya is likely to be protracted. With the fall in the value of the rupiah, its operating revenues fell approximately four-fold in dollar terms. PAM Jaya's revenue can be expected to be on the order of 400 billion rupiah per year (approximately one-twentieth of the outstanding 'debt'); the negotiated tariff increases are likely to be less than 10% per year. Thus, although tariffs were raised and will continue to increase, these increases will not generate sufficient revenue to quickly repay the 'shortfall'.

[44] From 2,396 Rupiah/US$ in February 1997 to 9500 Rupiah/ US$ on February 2nd 1998 (Robison and Rosser 1998).

This shortfall, as well as ongoing labour disputes and disagreements about tariff increases, resulted in a standoff between the private concessionaires and PAM Jaya in 2001 and 2002. After Suharto's departure from power, a 'restated' contract had been signed in 2001, allowing for regular tariff increases and also substantially reallocating risks between the public sector and private concessionaires. In essence, the concession contract was transformed it into a management contract - with a guaranteed internal rate of return of 22% - rather than the original concession agreement[45] (Global Water Report 2002). The result of discussions between PAM Jaya, the private operators, and the local government was an informal renegotiation of the contract to create two-year 'interim arrangement' whereby the operating expenditures of the concessionaires are made available to the rump water company and the regulator for evaluation (Global Water Report 2002). Under the earlier concession contract, this information would not have been made available. However, concerns about the disparity between the water charge and the average tariff, and suspicions on the part of PAM Jaya and the municipality that the private operators were inflating operating expenditure in order to reduce their apparent profit levels, led to the demand for the private operators to open their books. Operating expenditure was re-evaluated, and additional information gathered in studies by PAM Jaya and the regulator (the Jakarta Water Supply Regulatory Body) was used to assist with retroactive restructuring of water tariffs from January 2003. Technical targets have been dramatically scaled back (**Table 4**); most notably, target coverage ratios have been reduced, and the commitment to provide potable water supply at the point of consumption was dropped[46].

The failure to negotiate a mutually acceptable schedule for raising tariffs led to a standoff between PAM Jaya and private concessionaires in 2003 and 2004. After two years of difficult negotiations, a new contract was signed with one of the two private concessionaires in December 2004 (Palyja, for western Jakarta); at the time of writing, a new contract had not yet been signed with the other concessionaire (TPJ, in eastern Jakarta). Poor design of the original contract, weak regulatory capacity (exacerbated by the failure to create an independent regulatory authority at the outset of the contract), and inappropriate design of incentives for tariff policy have been key contributing factors. The implications for poor urban residents are potentially significant, insofar as protracted and at times acrimonious contract negotiations divert regulatory and management attention from network management and expansion, and insofar as major investment decisions are delayed.

The absence of an independent regulatory body in the first years of the contract was of critical importance to the breakdown in negotiations between the private sector concessionaires and the government. Originally, the rump public water company (Pam Jaya) was designated as the regulator of the private concessionaires. In addition to the potential conflict of interest raised when employees transfer back and forth between the operators and the regulator, this model raises more fundamental issues of capacity, funding, and independence. The lack of a sufficiently clear executive/legislative distinction, mistrust of power-sharing between different levels of government, and desire to maintain control over a basic and potentially politically controversial resource are some of the reasons behind the original decision. The resulting regulatory structure was an important factor in the breakdown of the original contract.

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[45] As with many such contracts, profits are 'backloaded'. The Internal Rate of Return is calculated over the lifetime of the contract, and is, to date, negative.

[46] A. Anwar, Jakarta Water Supply Regulatory Body, personal communication (interview) 12 May 2005.

A formally independent regulatory body – the Jakarta Water Regulatory Board - was only created in 2001, four years after the signing of the contract[47]. There are 5 members of the Regulatory Board: the Chairman, and four board members representing four distinct areas of expertise: technical, financial, legal and consumer. The Board has a relatively small staff (8 professional staff and office staff), and relies heavily on outsourcing expertise for its activities. Its budget is approximately 4 billion rupiah per year (approx 400,000 USD); these funds come from the revenues paid by consumers. Its mandate is to monitor and regulate policies and tariffs at the macro level, and to mediate between the parties to the contract. In addition, some regulatory roles have remained with PAM Jaya, which monitors the performance of the private sector concessionaires at a micro-level and has approximately 150 staff. A key weakness with the regulatory framework is that the Governor's decree creating the Regulatory Board does not specify the division of labour between PAM Jaya and the Board. Moreover, neither body is charged with strategic analysis for long-term policy for water resources and supply for the city and region as a whole.

Moreover, the new, independent Regulatory Body has only limited powers; much of its activities consist of technical assessments, on the basis of which it advises the Governor of DKI Jakarta on preferred levels and timing of tariff increases. The purely advisory role played by the Regulatory Body limits its effectiveness and allows political considerations to continue to influence tariff policy decision-making. Moreover, the Regulatory Body has devoted a substantial amount of attention to adjudicating the ongoing dispute between the concessionaires and the Jakarta government regarding contract renegotiations and retroactive restructuring of water tariffs. Accordingly, relatively few resources have been available for broader policy activities or coordination with other regulators or bodies working on water. This is important, given that responsibility for water issues remains fragmented between various departments at the state and federal level; no government agency coordinates the important decisions on issues affecting water resources and supply development (e.g. on land-use). More generally, the lack of a stable and transparent regulatory framework has hindered the ability of both the government, the private concessionaires, and the regulators to determine roles and responsibilities with clarity. Accordingly, key issues (such as long-term strategic planning for water resources development) are not being comprehensively addressed.

4c. Private sector participation and the pro-poor debate: Connecting the poor?

Implicit in the original technical target of 100% service coverage, and explicit in public justifications of the PSP contracts, was the belief that private sector participation in water supply would lead to a higher rate of connection of poor households. Service coverage has increased since 1998, but the distribution of new connections has not been 'pro-poor', if this is defined as a rate of connection equal or greater to the percentage of poor in the urban population.

An important goal of the original concession agreement was the extension of the network and increase in coverage, for which targets were specified in the original contracts. By 2002, however, service coverage level for two concession areas remained just above to 50%, well below the 70% target specified for 2002 in the initial contract (Global Water Report 2002) **(Table 4)**. New

[47] Interview with Alizar Anwar, advisor to the Regulatory Board, May 2005.

connections have occurred, but these have not targeted poor customers in proportion to their representation in the urban population **(Table 5)**. **Figure 3** illustrates the disproportionate weighting of consumer connections in middle-income tariff bands in 2003; whereas the majority of residents in Jakarta would fall into the 'lower middle' and 'low income' categories, 87% of networked connections are provided to tariffs for middle-income households or above. This is, to some extent, the legacy of public sector management, attributable to unwillingness by the municipally managed utility to extend the network into poor areas due to fears about low cost recovery (Taylor 1983), and to a tariff pricing policy in which water rates for public hydrants (used by poor households and water vendors) were higher per unit volume than water rates for individual households – implying a reduction in revenue when a poor household was connected to the network (Crane 1994).

This legacy of the public sector under-provisions of individual household connections to poor customers was not, however, redressed by the private concessionaires. **Table 3** provides data on the numbers of new consumers connected in each tariff band by one of the two private concessionaries (Thames PAM Jaya) over the period 1998 to 2004. Only 25% of new connections were targeted in the two lowest tariff bands (public hydrants, intended to serve those without household connections; and 'poor' and 'very poor' households). In other words, three quarters of new connections were for middle-income and upper-income households, government enterprises and commercial enterprises.

Given that the private concessionaires are paid via a 'water charge', which is linked to volumes of water delivered into the water supply system but is independent of revenues and tariffs, this bias towards wealthier consumers might seem surprising. There is no apparent direct disincentive to the private concessionaires to connect low-income households. Why, then, were customers in the lowest tariff bands less likely to be connected? An important part of the explanation lies in the pricing levels of the tariff bands **(Table 3)**. The lowest tariff (May 2005 data) is 550 Rupiah/m3, well below the production cost (of approximately 3000 m3)[48]. Increasing the number of connections in the lowest tariff band thus decreases the average revenue per cubic metre supplied. Reducing the average revenue per cubic metre by connecting poor households would lower the municipality's revenues, in turn reducing their ability to pay the water charge, and to repay the debt shortfall owed to the private operators.

A secondary disincentive is the higher average cost per connection in poor neighbourhoods, which raises installation costs: given the lack of land-use planning in informal settlements, the highly dense and disordered distribution of homes means that installing connections may be more time-consuming (if conventional below-ground infrastructure is used).

The municipality thus has two direct incentives not to target poorer neighbourhoods for new connections. This is an important explanation for why the utility, when under public management, did not connect poor customers. In turn, this produces an indirect disincentive for the private operators to connect poor customers: the revenue received by the municipality is the source of funds from which the private operators are paid, and decreasing revenues implies a greater chance of debt, longer repayment period, and increased possibility of municipal default.

[48] Interview with Alizar Anwar, Advisor to the Jakarta Regulatory Body, May 2005.

The perverse disincentives built into Jakarta's water supply tariff structure are an example of how pricing strategies intended to increase access have counterproductive goals (Whittington 1992). The remedy, as most commonly prescribed by international financial institutions, is to increase tariffs (a seemingly counterintuitive strategy), thereby removing the disincentive for connecting poor consumers and providing more capital to finance new connections (e.g. Azdan 2001; Yepes 1999). This recommendation is supported by studies, which assert that 'willingness-to-pay' and 'ability-to-pay' of poor customers is higher than previously thought. Frequently, the higher rates per unit volume paid by poor customers relying on water vendors are cited as evidence for this argument (e.g. Soto Montes de Oca et al 2003; Winpenny 1994). Indeed, the response to the problem of low tariffs in Jakarta has been a series of negotiated tariff increases, which have disproportionately raised tariffs for poorer and middle income groups (**Table 3**).

The above argument is flawed for at least two reasons. First, it overlooks the fact that water customers are 'price takers' rather than 'price makers'. Water vendors typically operate as spatial monopolists; in Jakarta, vendors do not compete, but rather collude to establish monopoly supply zones and a captive clientele (Susantono 2001). Information about willingness-to-pay can not be extracted, I would argue, in this context – particularly where lack of surface or ground water availability in urban neighbourhoods makes water vendors the only source of water (apart from bottled water, which are even more expensive per unit volume).

Second, this argument overlooks the fact that monopolistic control of water vending creates a political barrier to network expansion to the poor. Water vending is controlled by a complex network of middlemen running tankers, ambulatory water vendors and public standpipes connected to PAM Jaya's network (Lovei and Whittington 1993). The monopoly rent extracted from the cities' poor represents an attractive source of profits. Indeed, the potential profitability of extracting rent from the captive market of water consumers is recognized through the practice of selling informal 'licenses' amongst water vendors (Susantono 2001). In Jakarta, as in other cities, this monopolistic behaviour is sometimes linked with organized crime, and at times characterized by intimidation (if not outright violence) of customers, competing vendors, and police and city officials who attempt to eradicate informal water vending practices (e.g. Swyngedouw 1997). To put it crudely, mafia-like control of water vending in poor areas of the city is a significant barrier to network expansion, which an increase in tariffs will not address. This is significant, as surveys have found that approximately one third of Jakarta's households purchase water from street vendors (World Bank 1993; Crane and Daniere 1996, 1997; and survey by author in June/July 2005) (**Table 2**). This implies that solutions to the problem of water supply in Jakarta must also address issues of governance – particularly in the context of an approach to state power and urban planning in Jakarta in which state activities are often geared towards the reaffirmation of prestige and reinforcement of networks of patronage, rather than public welfare *per se* (Cowherd 2002; Kusno 1998, 2000).

A third critique of the 'raise prices to improve access to the poor' argument arises in situations where, as in Jakarta, other attractive sources of water are readily available. The existence of shallow and deep aquifers in the city means that groundwater is a viable alternative to networked water, for both wealthy residents (who rely on cleaner, but more expensive deep wells) and poor residents (who rely on shallow wells, often contaminated by urban runoff and saline due to seawater intrusion). Reliance on groundwater as one of multiple sources of water is common in poor areas of the city (**Table 2**); however, depletion of groundwater has led to salinisation in some areas,

rendering water unfit for drinking and cooking (Braadbaart and Braadbaart 1997). Reliability (in contrast to low pressure and intermittent flow in the networked water supply system), low cost, and quality are important factors determining consumer preferences for groundwater. Groundwater and wells in the city are regulated by the national government's Ministry of Mines, which has no formal mandate to cooperate with municipal water suppliers; this has meant that initial plans by the private concessionaires to prohibit users from accessing private wells have not been implemented. Raising networked water prices may lead, in the absence of governance reform and networked water quality improvements to groundwater 'crowding out' networked water supply, and to a further reduction in revenues. Indeed, water managers for the two private companies have noted, with some consternation, the growing number of 'zero consumption' customers – some of whom may be switching to other water sources.

This, in turn, raises a more general point about water pricing, pertaining to the limits of cross-subsidisation within a water-pricing regime in cities, such as Jakarta, with a large proportion of poor residents. With a ratio of domestic to industrial customers of 80/20 and with relatively few users in higher tariff bands, possibilities for cross-subsidies in Jakarta are relatively limited. This suggests that in the absence of subsidies external to the water supply pricing regime -- as are used in Chile, and were used in OECD countries such as the UK (Bakker 2004; Gomez-Lobo 2001) -- raising tariffs will not necessarily have the desired goal of increasing revenues and increasing rates of connection of the poor. As discussed in the following section, additional measures to reduce or remove disincentives for poor customers to choose network connections will also be required.

4d. Pro-poor initiatives by the private sector

Recognizing some of these barriers to connecting the poor, both private concessionaires have undertaken limited initiatives to improve access for poorer households. To render in-house connections more affordable, Palyja introduced a policy allowing poorer households (on the lowest tariff bands) to pay the connection fee in 12 monthly instalments included in the monthly water bill[49]. Partly as a result, in West Jakarta, the number of poor people served increased from 72,816 in February 1998 to 177,164 in December 2000 (ADB 2003a), but the monthly bills remain at a level above what many households can afford.

In the eastern concession area, the community of Marunda was targeted by TPJ, which used a grant (of approximately 60,000 GBP (approximately $100,000 USD) from its British parent company to subsidize the provision of in-house connections. Over the five years of the contract, 1,600 households were connected. To facilitate payment, connection fees were waived and households were instead required to pay a deposit (of approximately US $2.50) (ADB 2003a). Levels of water consumption have reportedly increased dramatically, while water bills have fallen substantially (ADB 2003a). Prior to the concession contract, households in Marunda District generally received their water from private vendors who purchased water from tankers. Households used to spend, on average, US$7.50 a month for 3 m^3 of water (five 20-litre containers of water at $0.05 a container) now pay approximately $1.125 for 30 m^3 of water (at $0.0375 per m^3 –most customers being on a low tariff, reflecting the small size of their dwellings), consuming 10 times as much water

[49] The pro-rated monthly connection fee of $0.71 included in the monthly water bill. A household consuming 20 m^3 a month will thus have a monthly bill of about $1.50 ($0.0375 x 20 + $0.71).

but paying approximately one-seventh of their previous monthly bills, partly the reason for high levels of cost recovery from the newly connected households (BPD 2003). Recognizing the limited penetration of water supply network into poor neighbourhoods, the federal government launched a water supply program in some of the poorest *kampungs* in 2004[50], but the provision of household connections was severely limited by the disincentives discussed above, compounded by an unwillingness of private partners to extend the network in conjunction with the government, and by suspicion on the part of some public sector managers that publicly-provided infrastructure would end up providing implicit subsidies to the private sector (Shofiani 2005).

Given the high level of indebtedness of the municipal water utility to the private concessionaires, little interest has been shown on the part of the private companies in extending what are essentially charitable, loss-making initiatives. Accordingly, these 'pro-poor' initiatives have remained limited in scope, and have not been duplicated elsewhere in the city. Without an explicit 'pro-poor' policy on the part of the Government, and in the absence of specific pro-poor targets in the contract, new connections in poorer areas are likely to lag in proportion to the overall increase in new connections for the reasons discussed above. Recognizing this, donors have begun re-funding community water supply in Jakarta. The (American bilateral aid donor) USAID, through its Environmental Services Program (with a budget of $40 million USD over five years) is funding small-scale community water supply systems in West Java, including Jakarta; these community systems will include alternative water supply technologies (such as wells) and will not necessarily connect users to the network. In both cases, USAID-ESP intends to initiate alternative water governance mechanisms, whereby a currently unconnected community would get access to a main pipeline, and a community based organization would then facilitate 'group access' to a network connection, thereby reducing the costs of networked water supply by sharing fixed charges (including connection fees and meter rental charges). The second major project being brought on line by donors is the World Bank's $5 million US 'output based aid' project for expanding network coverage in Jakarta[51]. Funded by the UK's bilateral aid agency, DfID, the project provides cheap capital to the two concessionaires to connect the poor[52]. UK-based NGOs have been highly critical of DfID's funding of private sector activity in the water sector, allegedly linking it to British government support for British water companies operating abroad (WDM 2005).

Output-based aid is an increasingly important part of the World Bank's approach to private sector development, which delegates service delivery to non-governmental third parties (non-profit or for-profit private sector, or public sector agencies operating on a 'commercial' basis) under contracts that tie payments to the outputs or results actually delivered to target beneficiaries. Such performance-based subsidies are justified, according to the World Bank's Rapid Response Unit (which focuses on fostering private sector involvement in development) where policy concerns, such as the affordability for particular groups of users, justify public funding to complement or replace

[50] Under the auspices of the Kimpraswil Fuel Subsidy Reduction Compensation program, created to offset the impacts of a reduction in fuel subsidies on poor households.

[51] At the time of writing (October 2005), the USAID project was underway and the World Bank project was in the tendering stage.

[52] This approach has been used for water connections for the poor in Cambodia and Paraguay. In 2003, DFID and the World Bank established the Global Partnership on Output-Based Aid (GPOBA), a multi-donor trust fund administered by the World Bank.

user fees. Results are defined in specific terms: for example, the number of children immunized, or the number of operational electricity or water connections.

This, in turn, raises questions about the long-term ability of PSP contracts to supply water to the poor. Similar questions were raised in the World Panel on Financing Water Infrastructure report[53] released at the Third World Water Forum in Kyoto in 2003. The panel articulated the need for a new financial architecture to stimulate and support flows of private capital for water and sanitation (Winpenny 2003) including, controversial calls to use official aid funding to support private sector involvement through the provision of low-cost finance and risk mitigation mechanisms such as currency guarantees for private investors in developing countries[54]. Implementing the pro-poor approach in this way would entail a potentially dramatic transformation in the premises and mechanisms of official ODA finance, in which public funds are provided to subsidize poorer households, enabling private sector operators to manage water supply systems at a profit. Ironically, one of the key promises by advocates of PSP contracts has been the independent financing that private companies could provide under some types of PSP agreements. In contrast to these promises, some private water companies have more recently argued that they must have access to public funds, on concessionary terms (from governments, bilateral aid agencies, or multilateral developments banks) if they are to meet universal service coverage targets.

Simultaneously, private companies are under pressure to perform from consumers and the new regulatory body (the Jakarta Water Supply Regulatory Body), which has gradually been given increased oversight powers since its inception in 2001. Customer complaints have increased dramatically, according to the Indonesian Consumers Foundation (YLKI)[55]. A successful class action law suit brought by a consumer's organization (KOMPARTA - the Jakarta Water Consumers Community) against the private companies for raising tariffs by 40% in 2003 without concomitant improvements in performance is indicative of greater willingness by consumers organizations to use litigation where government regulation has proven to be ineffective, reflective of a broader trend across Indonesia following the end of the New Order era (Hadiz and Dhakidal 2005, Heryonto and Mandal 2003).

4e Rethinking private sector involvement?

The Jakarta case illustrates the difficulties faced by private companies in extending supply networks to poorer areas. Implicit in the arguments in favour of PSP during the early phase of the debate was the assumption that the benefits of improved water supply would 'trickle down' to the

[53] Commissioned by the organizers of the Third World Water Forum, and chaired by former IMF General Manager Michel Camdessus, the Panel brought together the Presidents of major multilateral development banks (IADB, ADB, EBRD, WB), and representatives of the IFC, Citibank, US Ex-Im Bank, private water companies (Suez, Thames Water), government representatives (from Mexico, Ivory Coast, Pakistan, Egypt, and France) and two NGOs (Transparency International and WaterAid).

[54] These proposals, as well as the composition of the Panel and the lack of public consultation on the report have been critiqued by a number of organizations, which have raised numerous points: the focus on large-scale infrastructure and lack of emphasis on alternative technologies, levels of service, governance models, citizen input, and methods of improving public sector performance; the focus on encouraging private sector involvement to the exclusion of other business models; and the ethics and feasibility of providing risk mitigation and cost reduction to the private sector via the use of public funds (Bakker 2003b).

[55] Personal communication, Indah Sukmanisingh, Director, YLKI, 13 May 2005.

poor. Accordingly, relatively few contracts contained detailed 'pro-poor' elements such as subsidy mechanisms, below-marginal cost tariffs, or explicit cooperation with and mobilization of the multitude of NGOs frequently already operating in larger urban centres in the South (ADB 2003a). Indeed, the logic of 'full cost recovery' implicit in the commercialization of services – in which consumers pay the full cost, with no cross subsidies – runs counter to the principles upon which utility services were provided throughout much of the twentieth century, particularly in the North, where cross subsidies between classes of consumer and subsidies from central government to local governments responsible for water services were widespread (Bakker 2004). State provision of water supply, together with cross-subsidies between classes of consumers, was initiated in many areas to address the low ability-to-pay of many consumers, while providing all citizens with a necessity so basic to social life that affordable water supply became understood in many countries as a material emblem of citizenship.

Private sector providers have rediscovered this 19th century lesson – that extending water supply to informal settlements of largely poor consumers in rapidly expanding urban areas, often in the context of an absence of tenure systems and rent-seeking on the part of local elites, is fraught with difficulty (Bakker 2003a). The promise of private sector delivery is seductive: "private participation in infrastructure can help poor people by tapping private initiative to extend access to basic infrastructure and reduce costs…[for example] where modern water systems extend service to additional poor customers, typically in peri-urban areas, prices paid by poor people drop precipitously by factors of ten or more, as poor people are no longer dependent on expensive private water vendors" (World Bank 2002, 13). In the first wave of PSP contracts, however, private companies found that they were less able than promised (as signified by targets agreed to in contracts) to extend supply into poor neighbourhoods – due to low ability to pay, low profitability, and poor fit between the payment demands of formal systems (large, relatively infrequent payments, backed up by security in the form of land/property tenure) and the household economy of the poor (intermittent access to smaller amounts of cash – often living in situations without secure tenure). The ensuing failure of many PSP contracts to extend water supply to poor areas over the past decade has in some cases led to cancellation and/or renegotiation of contracts – bringing the logic of commercialization into question. The 'pro-poor' issue has thus become increasingly central to the debate over whether the private sector should be involved in supplying water, and in public services and 'development' more generally.

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5a: The debate over water sector reform

The water sector in numerous countries has been undergoing significant change over the past decade. These reforms can be characterized as a shift towards a 'new water paradigm' (Gleick 2000a), which prioritizes demand management ('non-structural') rather than traditional supply side (infrastructure-intensive) management (Lacey 2004), treats water as an economic good (Winpenny 1994; Rogers, de Silva et al. 2002), seeks to address basic ecological as well as human needs, and entails broad-based changes to water governance, including involving stakeholders to a greater degree than in the past (Cesano and Gustafsson 2000; Gleick 2000a; Saleth and Dinar 2000, 2005). Water reforms have occurred in both the North and South, but vary in emphasis. In the global South, private sector participation in water supply in urban areas has increased dramatically over the past two decades, and the irrigation sector has been the target of pricing and market reforms in rural areas; in the global North, in addition, ecological restoration and water quality amelioration have been given greater priority (Bakker 2003a; Huffaker and Whittlesey 2003; Kijne 2001; Kloezen 1998; Kumar and Singh 2001; Landry 1998; Takahashi 2001; Ward and Michelsen 2002).

These changes have generated debates about the socio-economic identity of water: is water a 'commons' or a 'commodity'? At the risk of over-simplification, the commodity view asserts that private ownership and management of water supply systems (in distinction from water itself) is possible and indeed preferable. From this perspective, water is no different than other essential goods and utility services. Private companies, who will be responsive both to customers and to shareholders, can efficiently run and profitably manage water supply systems. Water conservation will be incentivized through pricing – users will cease wasteful behaviour as water prices rise with increasing scarcity. Proponents of the 'commodity' view assert that water must be treated as an economic good, as specified in the Dublin principles and in the Hague Declaration[56].

In contrast, the commons view of water asserts its unique qualities: water is a resource essential for life, the conversion of which into a business opportunity is unethical. From this perspective, collective management – whether by communities or the state – is not only preferable but also necessary; private ownership of water supply will, it is argued, invariably conflict with the public interest. Those who advance the 'commons' view assert that conservation is more effectively incentivized through an environmental, collectivist ethic of solidarity, which will encourage users to refrain from wasteful behaviour. The real 'water crisis' arises from socially produced scarcity, in which a short-term logic of economic growth, twinned with the rise of corporate power (and in particular water multi-nationals) has 'converted abundance into scarcity'. As a response to the Hague Declaration, the P7 Declaration (2000) outlined principles 'water democracy', of decentralized, community-based, democratic water management in which water conservation is politically, socio-economically and culturally inspired rather than economically motivated. Central to these critiques of the 'new water paradigm' is the view that water is a basic human right (Gleick 2000b, Morgan 2004).

[56] The Ministerial Declaration of the Hague on Water Security in the 21st century followed the inter-ministerial meeting known as the '2nd World Water Forum' in 2000. See www.worldwaterforum.net.

5b Debates over water supply sector reform in Indonesia

The debates explored in the preceding section are ongoing in Indonesia[57]. International financial institutions argue that one of the most important factors contributing to low levels of water services provision in Jakarta is the low levels of infrastructure finance (see, for example, Akhtar 2005; World Bank 2004), exacerbated by the Asian financial crisis and currency devaluation. Initiatives such as the Indonesia Infrastructure Summit (held in Jakarta in early 2005) have explicitly targeted foreign direct investment. The government has identified a significant shortfall in financing requirements for rehabilitation and extension of urban infrastructure. Promotion of water sector reform by multilateral financial institutions has targeted changes that could enable greater non-domestic and private financing of the water sector.

A second focus of the reforms is water governance. Jurisdictional fragmentation has reduced the ability of any one level of government in Jakarta to effectively govern water resources within a watershed, or even within urban boundaries[58]. Municipal governance structures are particularly weak. In Jakarta (as with other cities in Indonesia and indeed around the world), water utility budgets were not ring-fenced from that of the municipality. Rather, a small tax base and presence of few alternative revenue-generating activities for the municipal government encouraged the use of water utility revenues for non-water related expenditure by municipal politicians and managers. For many water supply utilities in Indonesia, this had the effect of reducing the amount of revenues available to cover operating costs and fund capital expenditure (notably infrastructure rehabilitation and improvement), exacerbated by relatively low cost recovery rates. Like water supply utilities across the South, Indonesian water providers are often caught in a vicious cycle: low cost recovery, low revenue, low investment, and low levels of service (Bakker 2003a; Cross and Morel 2005; Nunan and Satterthwaite 2001).

In summary, a shortage of finance and weak governance have been identified by IFIs as two key reasons for the poor performance of the water supply sector in Indonesia. The result, as in many other countries, has been a twinned response: the support of private sector participation in the water supply sector in the hopes of attracting increased private investment, including an ADB technical assistance grant supporting private sector participation in the water sector (ADB 2005); and broad-based market-oriented water sector reform, including a controversial new Water Law passed in 2004 (No. 7/2004), which decentralized management of water resources, established

[57] Debates over water sector reform also pertain to water resources, irrigation, and rural areas. The discussion in this section is constrained to municipal water supply in urban areas.

[58] In the Jakarta region, for example, the majority of the JMA is a politically constituted as an independent territory with a status of a province – 'DKI Jakarta' (Special Capital Region of Jakarta). The city governor is independent from West Java province, and (together with the municipal government) controls the city's water supply company: PAM Jaya. The province of West Java is responsible for the urban areas which fall outside of DKI Jakarta, and for the watershed in which the main Jatiluhur reservoir for Jakarta's water supply is sited (well upstream from the city). Environmental and urban planning regulations are not systematically applied within the watershed, and the open canals which act as conduits for Jatiluhur water are polluted by residential and industrial effluent, posing serious water quality challenges to the municipal water supply utility engineers. Meanwhile, within the city, tackling groundwater pollution from effluent within the city is complicated by the division of responsibility amongst the sewerage authority, the municipal water utility (which controls networked water supply), and the national government's Ministry of Mines, which bears responsibility for regulating deep (i.e. drilled) wells, from which a substantial proportion of the city's residents draw water.

(potential) tradable water rights and redefined water as an economic good (Jakarta Post 2003; World Bank 1999a, 2004b, 2005). These developments are in line with the evolution of governance frameworks internationally over the past two decades, in which state authority has been increasingly delegated to non-state (usually private sector) actors (Pierre 1995, 2000; Rogers and Hall 2003), characteristic of neoliberal framings of solutions to environmental problems (for recent critiques relevant to water, see Bakker 2005; Goldman 2005; Haughton 2002; McDonald and Ruiters 2005; Swyngedouw 2005).

The NGO response to water sector reforms in Indonesia has been highly critical. The basis of the reforms – conducted as part of a USD $300 Million structural adjustment package agreed between the World Bank and the Indonesian government in 1999 (World Bank) – are critiqued as a form of 'conditionality', in which a 'neoliberal' package of reforms is enforced on governments in return for much-needed funds – exacerbated, in Indonesia's case, by currency devaluation in 1998 (Grusky 2001). The NGO campaign has brought together environmental, consumers, anti-globalization, and religious groups in an alliance unusual for its diversity.[59] Amongst the concerns articulated by the NGO campaign regarding the new Water Law are:

- the possibility of increased private sector involvement and a weakened legal regime protecting municipal governments in their contractual negotiations with private companies (Articles 29 and 46),
- overly constrained water quality standards (Article 40),
- inter-basin diversions (Article 49), rising prices due to full cost-recovery pricing requirements (Article 60),
- weakened government oversight arising from decentralization of resource management to the watershed level,
- privatization of (as opposed to private sector participation in) water supply system (Article 46),
- participation by non-governmental actors (including the private sector) in resource allocation decisions at the local level (leading to the 'privatization' of water rights) (Articles 40 and 41), and
- the absence of robust conservation norms related to broader environmental goals in the Law.

On this basis, the NGO campaign launched a Constitutional Court case asking for a judicial review of the new Water Law, which was rejected by the Court in 2005 (Hadad 2003; Jakarta Post 2005, Siregar 2004, 2005)[60]. The World Bank and supporters of the new law maintain that the reforms will help to address structural weaknesses in the water sector, through four principal changes that will be enabled by the Water Law:

1. a structured, transparent institutional framework for water resource development and management;
2. the organizational and financial framework for river basin management

[59] - *KRuHA (Koalisi Rakyat untuk Hak atas Air* ~ Coalition for Water Rights) was formed in 2002, and is made up of 44 NGOs, including WALHI (Indonesia's leading environmental NGO), the Indonesian Consumers Federation, the Indonesian Forum on Globalization (INFOG), the Farmers Initiative for Ecological Literacy and Democracy (FIELD), the Jakarta Water Consumers Community (KOMPARTA), and the International NGO Forum on Indonesia Development (INFID).

[60] In an unprecedented move, the Court has allowed the claim to be refiled; the case is still before the Court.

3. a framework for regulatory institutions and implementation instruments for regional water quality management; and,
4. irrigation management performance and fiscal sustainability through farmer organization empowerment for participatory irrigation management (World Bank 1999b).

As in other countries, these two perspectives offer competing views of the implications of the water sector reforms. Both opponents and proponents of the new Water Law argue that reform is necessary, but their core visions of necessary reforms are seemingly incommensurable.

6. Conclusions

This report has analyzed the social and spatial differentiation of access to water supply in Jakarta, Indonesia. Section 3 explored how poverty is correlated with lack of access to a household connection, with the use of alternative water sources, with low levels of water consumption, and with spending higher proportions of household income on water supplies. Access has a spatial dimension: those lacking access are concentrated in specific districts of the city, and within lower income areas in neighbourhoods across the city. This is partly related to the geography of the distribution network, which penetrates less into poorer neighbourhoods (or avoids them altogether), and which is characterized by low pressure in many poorer parts of the city. Section 2 argued that this differentiation of access has deep historical roots. The current lack of access by large areas of Jakarta's 'kampongs' is due, in part, to the legacy of segregated colonial water supply systems, and deliberate under-investment in the post-colonial period, as policy-makers sought to discourage rural-urban migration, and gave low priority to extending water supply access to the urban poor, focusing instead on economic development of key sectors, or on an urban redevelopment agenda focused on 'monumental' infrastructure.

This analysis reminds us that we should be wary of viewing cities such as Jakarta through a Northern lens. In Jakarta fragmentation of utility services such as water is due not to the recent trends of 'splintering urbanism' characteristic of cities in the North (Graham and Marvin 2001), but rather to a model of urbanization with roots in the colonial era which produces persistent pattern of differentiation of spaces, classes, and races. Moreover, we should closely examine the rationalities of those excluded from access to water supply networks. Reinterpreting the relations established around water supply, identity, urban space, and agency in the colonial era can also be used to inform current analyses of water supply provision in Jakarta. First, social differentiation of access was an outcome of particular urban planning and macro-economic goals pursued by municipal and national governments, and not merely to an 'anti-poor' bias of the private sector. Moreover, urban residents continuing to use more 'traditional' and communal forms of supply are perhaps not a homogenous entity of 'the thirsty poor' waiting to be quenched through formal models – whether 'colonial', 'modernising' 'developmental' or 'neoliberal' -- of networked service provision.

Is private sector management of the formal water supply network a solution? Section 4 of the report examined the private sector participation contracts in water supply initiated in 1998, which were intended to extend household connections in Jakarta. The private sector participation contract signed in 1998 with two international operators promised to improve water quality, mobilize international finance for network expansion, and thereby improve and increase access to water supply for Jakarta residents – particularly the poor. As documented in this report, a survey of performance of the private sector concessionaires indicates that key original performance targets have been dramatically scaled back. Moreover, there is evidence that new connections have targeted middle-class customers, and that tariff increases have been higher for poorer customers, without concurrent attempts to address issues of ability to pay, income thresholds, and cross-subsidy mechanisms. Tariff pricing (with lower tariff bands below marginal costs), decided by the municipal government in negotiation with concessionaires, is implicitly 'anti-poor', providing a disincentive to both the municipality and the private concessionaires to connect the poor.

Moreover, Section 3 documented how poor users have multiple disincentives to connect to the network. Total costs of networked water supply may be higher than alternative sources (such as groundwater or vended water). Other disincentives include insecure tenure, the need for flexibility of payment, convenience, status, and high 'transaction costs' associated with dealing with the formal water utilities. 'Transaction costs' (infrastructure costs to build storage because networked water supply is only intermittent; line-ups and time off work to pay bills (for those without bank accounts and regular income); fear of time required to deal with meter mis-reading and bill over-charging) are other disincentives.

These findings echo results of other studies regarding urban water supply in the South (eg. Almansi et al 2003; WaterAid 2003; Whittington 1992). Much of this literature is, however, characterized by a narrow economic reductionism, in which the failure of water utilities to reach the poor is attributed largely or solely to an inability-to-pay, or to inappropriate pricing. In this literature, the concept of poverty is used as a 'regulating fiction' (Rahnema 1992), obscuring the non-economic factors that act as important disincentives for poor households, which choose not to connect to the water supply system. In a manner analogous to the colonial state's active construction of the peasant (Mitchell 2002), the concept of the poor functions as a 'post-colonial device' (Bell 2002) that has become a preoccupation and focus for action by Northern aid and development organizations. This report has suggested that other questions should receive greater attention in the pro-poor debate, namely: the nature of urban governance (which, in Jakarta's case, has systematically prioritized monumental infrastructure and elite residential services at the expense of universal public services); the inequitable spatialisation of network access (a legacy of public sector management to serve largely elite interests); and the multiple disincentives for the poor to choose network connections, and for network managers – both public and private -- to connect the poor.

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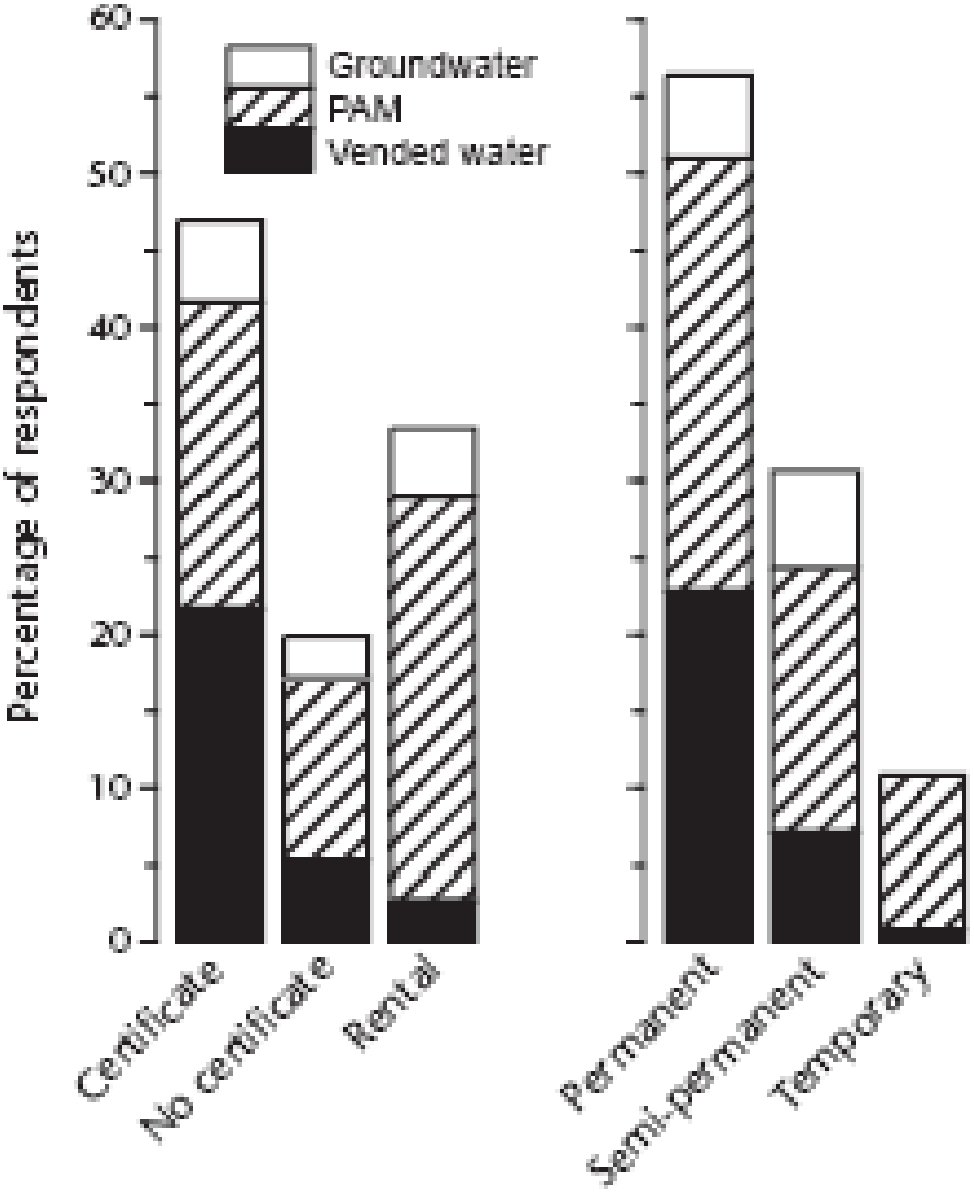
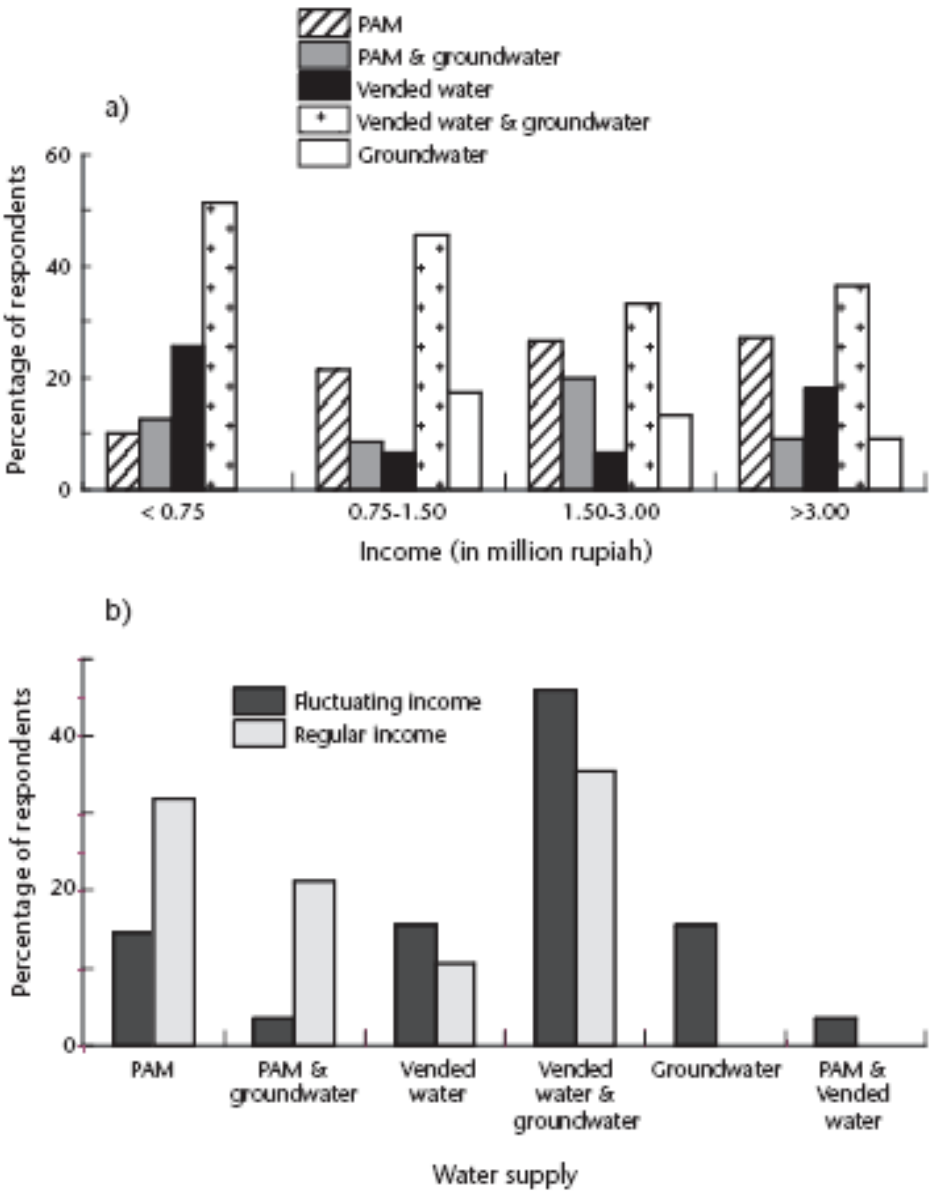
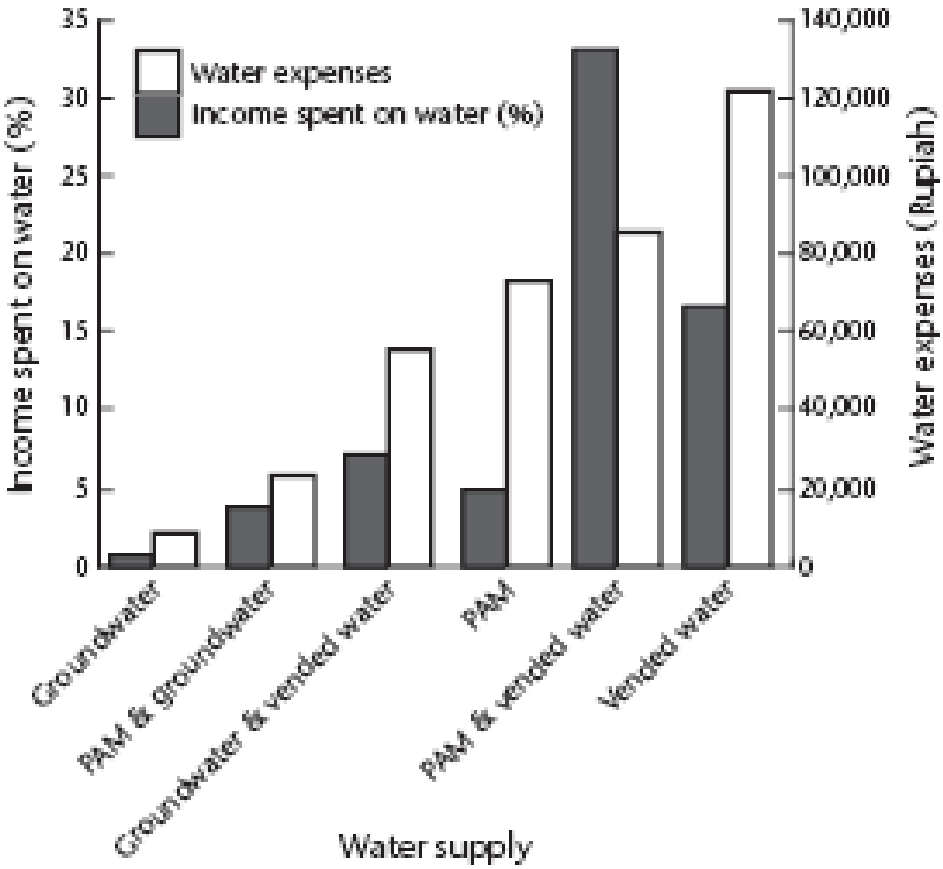
Land tenure and water supply access



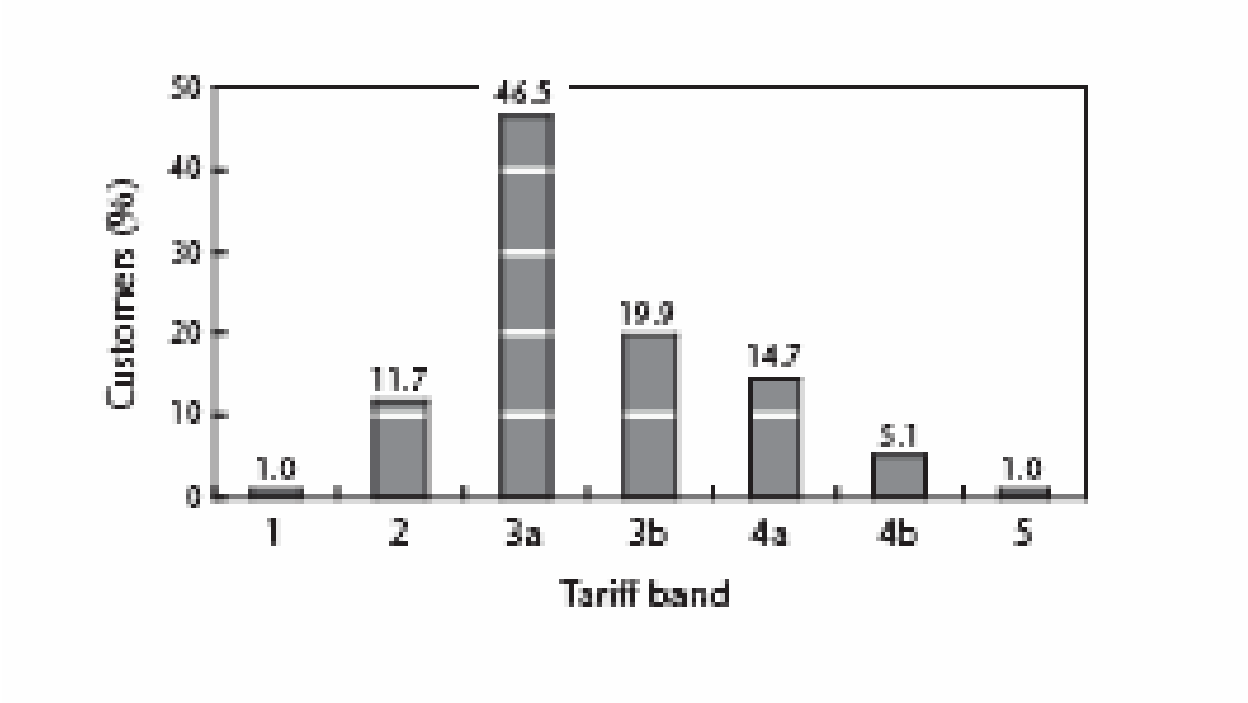
Income and water supply access



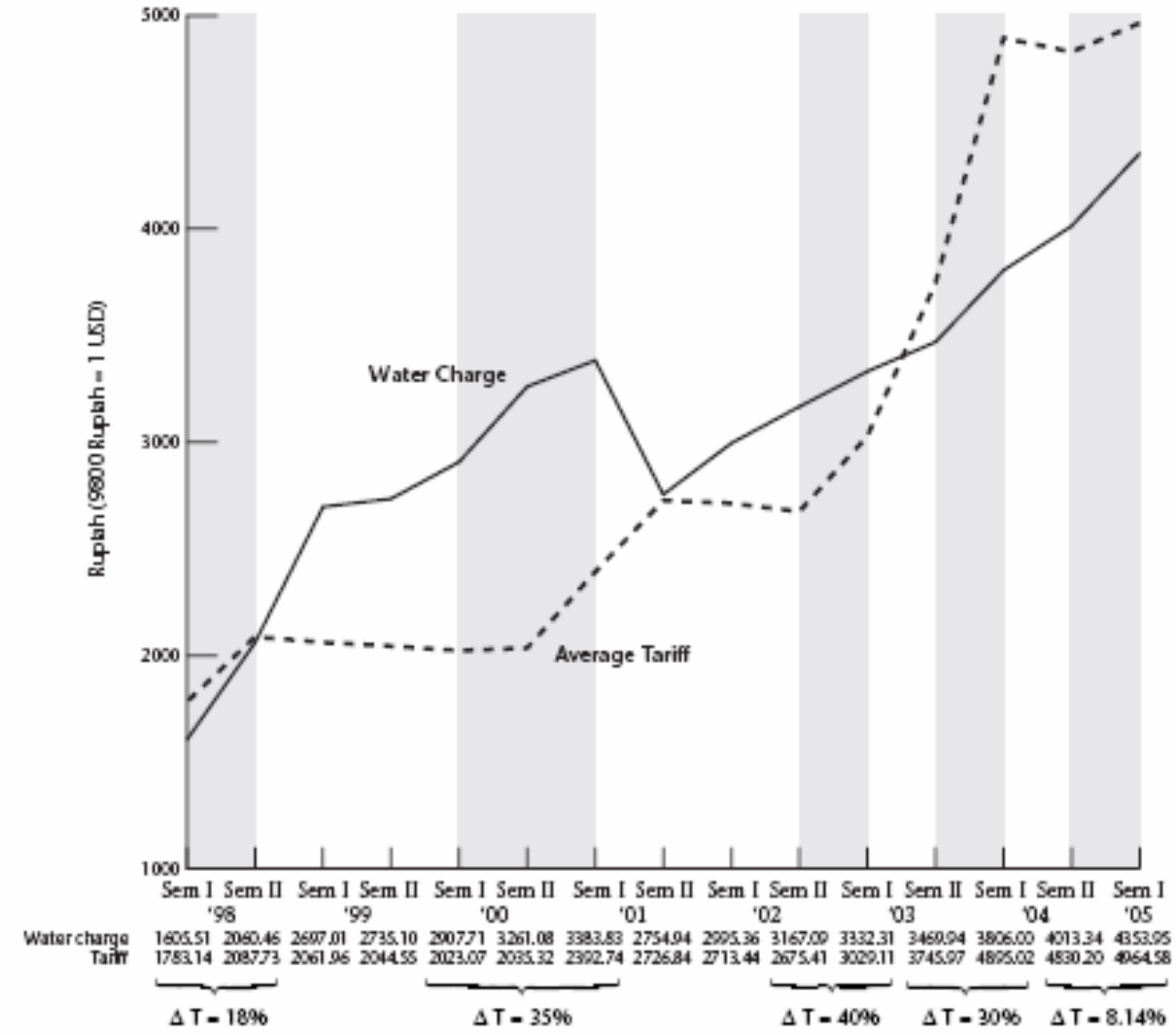
Water source, income, and water expenses



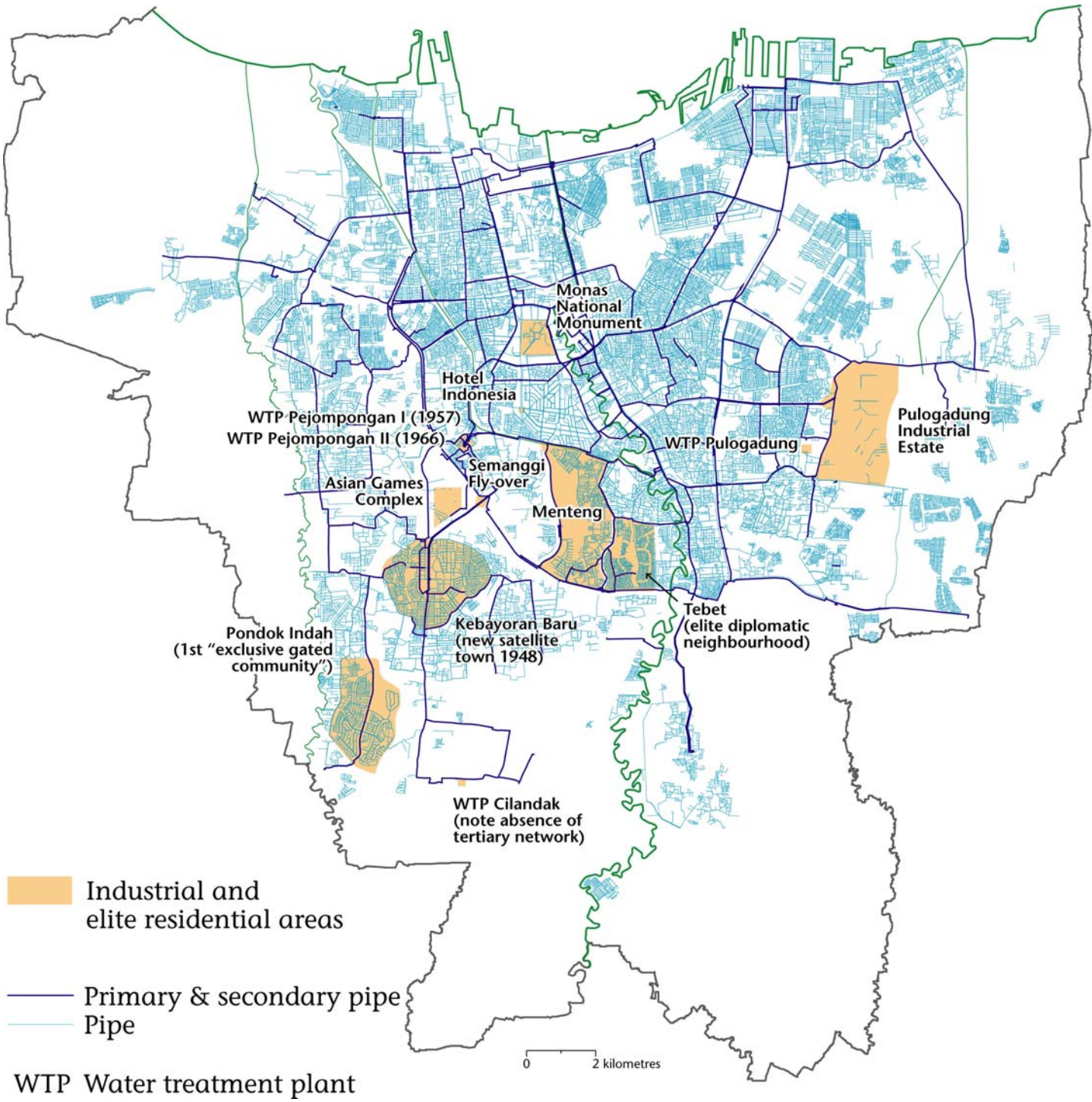
Customers per tariff band (%, 2003)

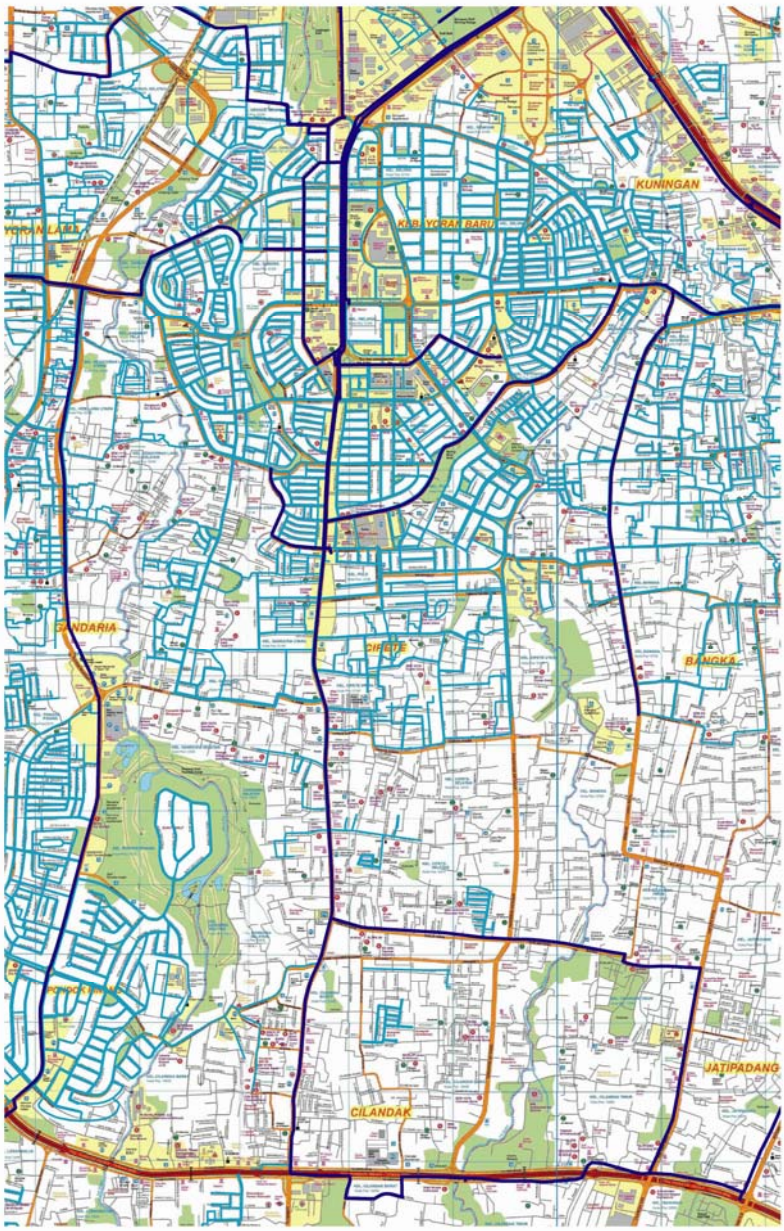


Water charge and average tariff (1998 – 2005)



Tariff increases per semester are linked to inflation. Δ T indicates % increase of tariff in real terms (ie above inflation).


Monas
National
Monument
Hotel
Indonesia
WTP Pejompongan I (1957)
WTP Pejompongan II (1966)
Semanggi
Fly-over
Asian Games
Complex
Menteng
WTP Pulogadung
Pulogadung
Industrial
Estate
Tebet
(elite diplomatic
neighbourhood)
Kebayoran Baru
(new satellite
town 1948)
Pondok Indah
(1st "exclusive gated
community")
WTP Cilandak
(note absence of
tertiary network)
Industrial and
elite residential areas
Primary & secondary pipe
Pipe
WTP Water treatment plant
0
2 kilometres

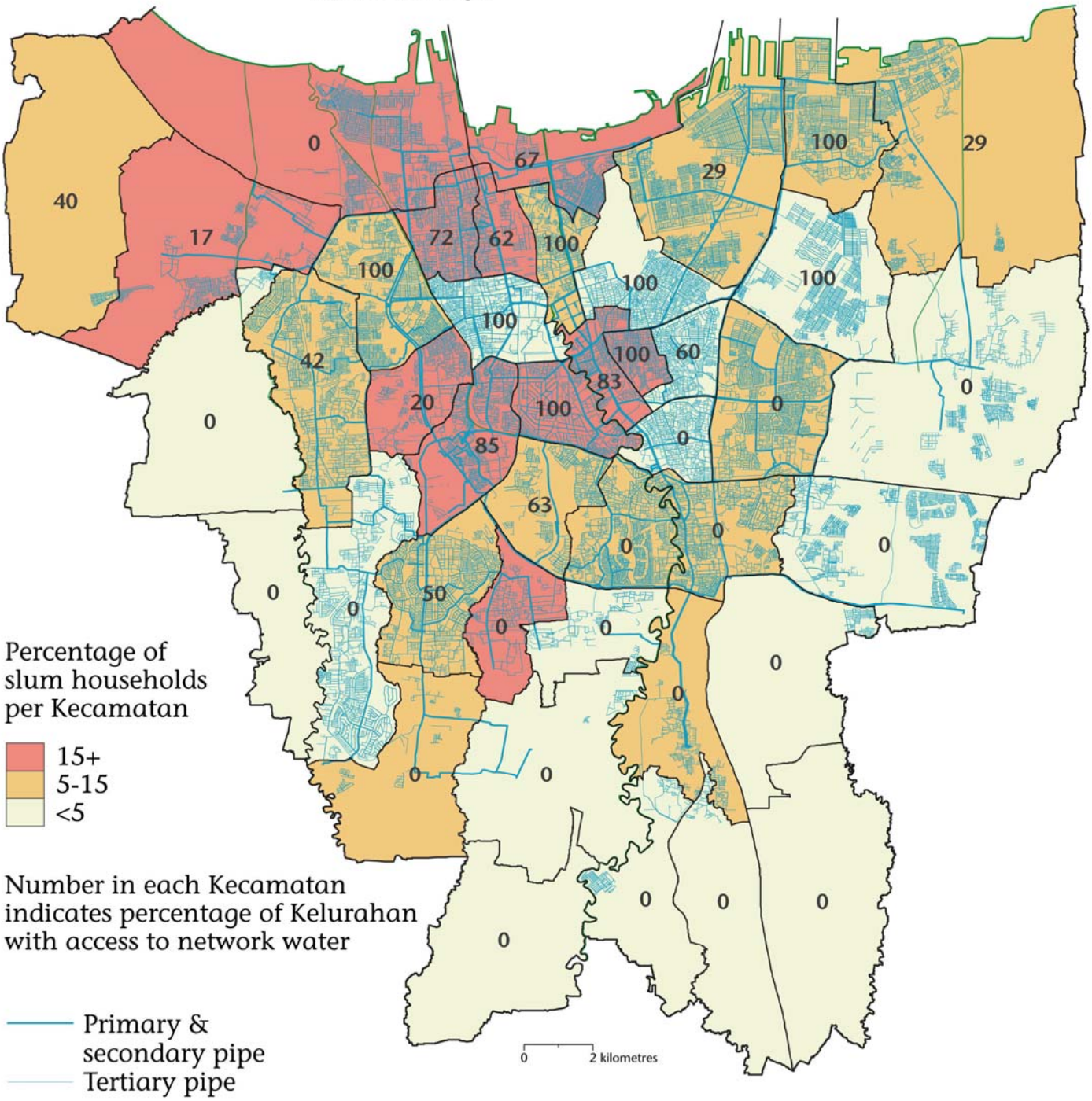


Primary & secondary pipe

Pipe

* Permission to reproduce not yet obtained for street map

Wealthier neighbourhoods (Kecametan) in lighter shading
have full coverage (city centre) or no coverage (city periphery).
Lower-income neighbourhoods (darker shading)
have lower coverage.



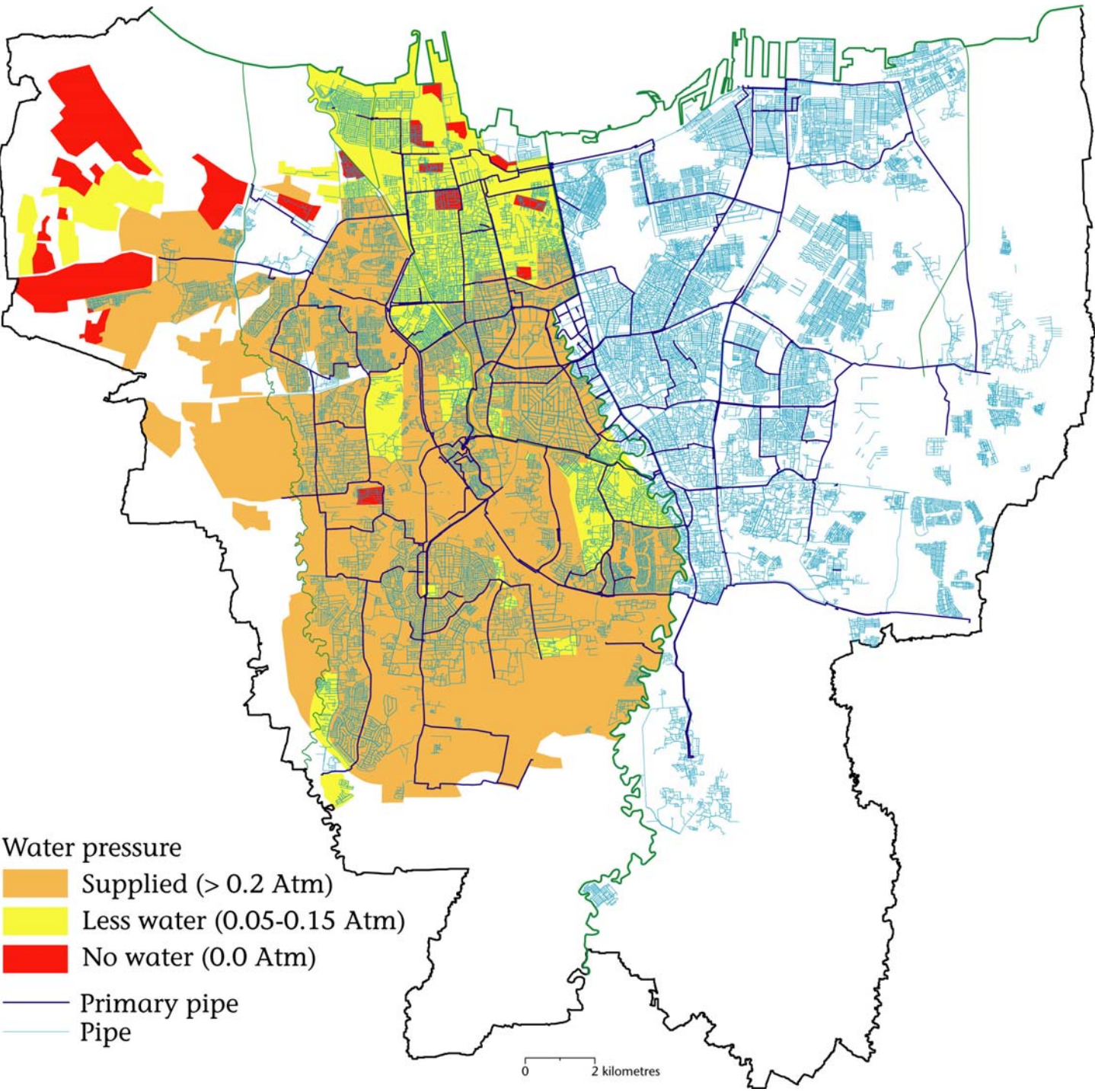
Percentage of slum households per Kecamatan

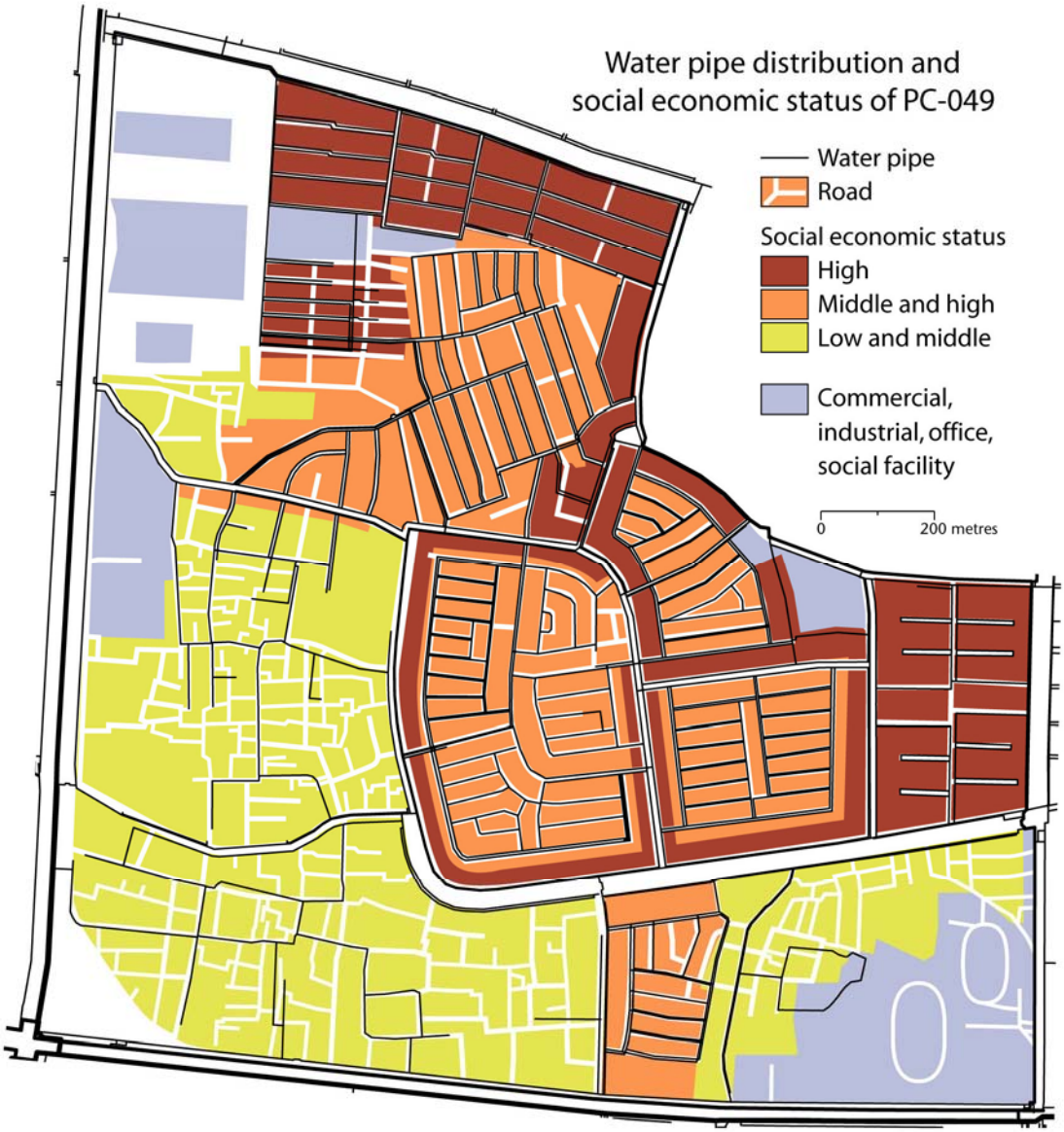
- 15+
- 5-15
- <5

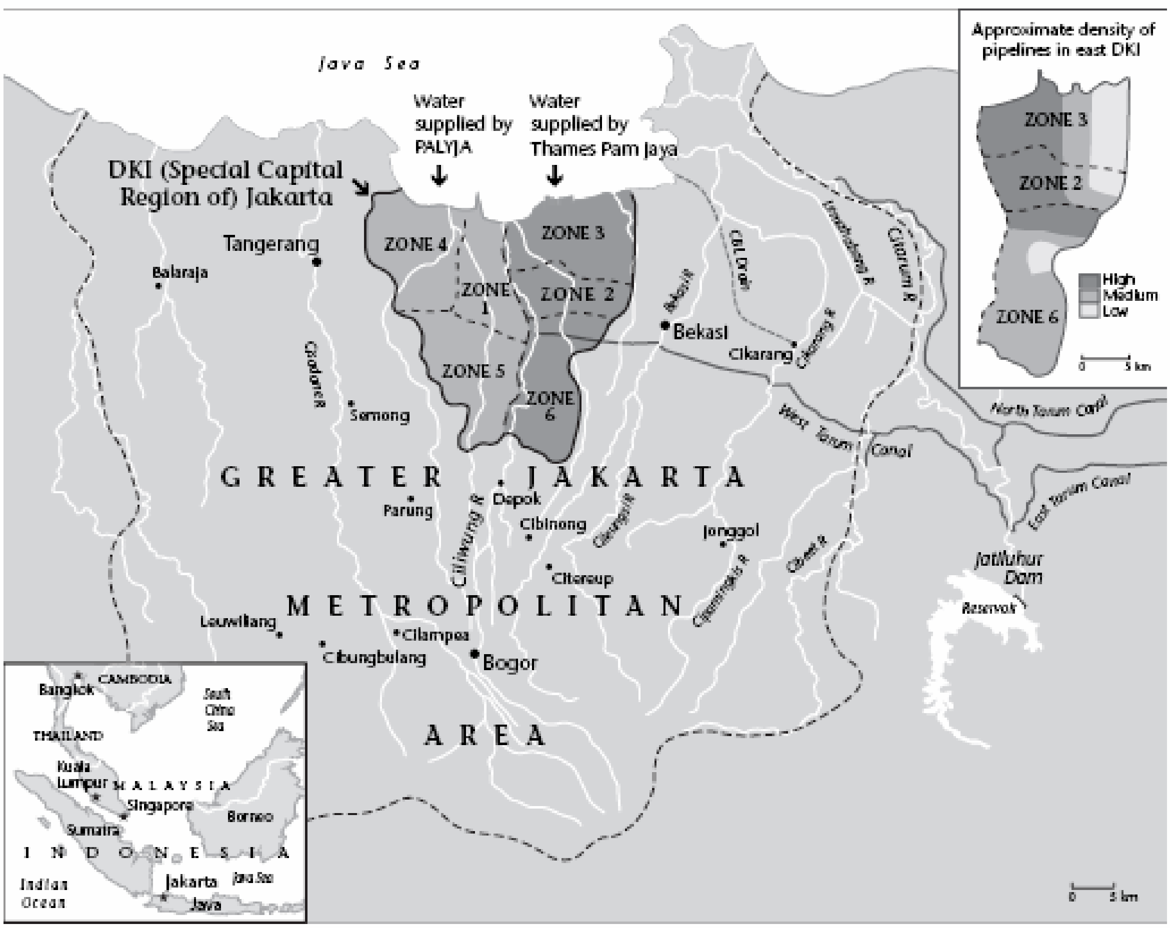
Number in each Kecamatan indicates percentage of Kelurahan with access to network water

- Primary & secondary pipe
- Tertiary pipe

Lower pressure (intermittent or no water flow) is more frequent in poorer neighbourhoods (Kecametan) of North Jakarta.




Water pipe distribution and
social economic status of PC-049
Water pipe
Road
Social economic status
High
Middle and high
Low and middle
Commercial,
industrial, office,
social facility
0
200 metres



Java Sea
Water supplied by PALYJA
Water supplied by Thames Pam Jaya
DKI (Special Capital Region of) Jakarta
ZONE 4
ZONE 3
ZONE 1
ZONE 2
ZONE 5
ZONE 6
Tangerang
Balaraja
Bekasi
Cikarang
Serpong
GREATER JAKARTA
METROPOLITAN
AREA
Depok
Parung
Cibinong
Citereup
Jonggol
Leuwiliang
Ciampea
Cibungbulang
Bogor
Ciliwung R
West Tarum Canal
North Tarum Canal
East Tarum Canal
Jatiluhur Dam
Reservoir
CBL Drain
Citarum R
Approximate density of pipelines in east DKI
High
Medium
Low
Bangkok
CAMBODIA
THAILAND
South China Sea
Kuala Lumpur
MALAYSIA
Singapore
Borneo
Sumatra
INDONESIA
Indian Ocean
Jakarta
Java Sea
Java

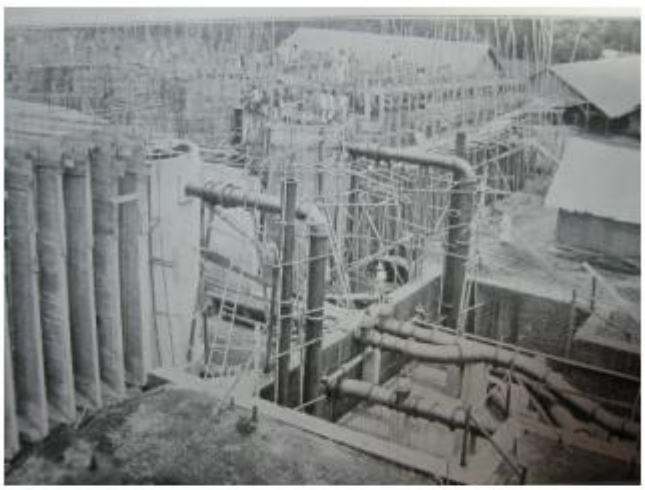
1. **Vervoort, M. 1926.** Glimpses along Batavia's Canals. Inter-Ocean, Vol.7(5), p.265-72.
2. **Prumpung 2005**. Doing laundry outside MCK, by river (just on right hand side)

Taking water from the hydrant Passar Baroe-East

The water is hauled in petro-cans

Drost, D. 1918. Ontwerp Brondwaterlieding voor Batavia.
Gedrukt bij Albrecht and Co.: Weltevreden, November, 1918.

Marlina 2005



1. **(left) Smitt 1922**,
   High-reservoir and chamber for cast iron pipes.
2. **(top-right) Kamal Muara 2005**.
   House cxns attached to deep bore well.
3. **(bottom-right) Kamal Muara 2005**.
   House cxns/PVC pipes attached to deep bore well.

Note the discrepancies in the 2 sets of pictures: first is about centralized provision (although segregated according to race, then class); the second picture set the multitude of pipes is a reflection of decentralization/fragmentation ---- everyone in Jakarta needing to provide for themselves. The fragmentation of the WS system in Jakarta, each zone/region/neighbourhood autonomous, with multiple pathways of WS. Refer to notes made on 'Imagining Jakarta'. Now segretated/fragmented according to economic class.

Income Range (Rp)	Average (%)	Maximum (%)
< 750,000	14	96
750,000 - 1,500,000	5	23
1,500,000 - 3,000,000	5	19
3,000,000 - 6,000,000	2	5
> 6,000,000	1	1

a)

Water source	# houses	%
Groundwater	39	37
Groundwater with bottled water/ vendedwater/public hydrant	41	39
Network water	10	9
Network water with groundwater	2	2
Public hydrant/vended water with rainwater	14	13
Total	106	100
Total households using at least two sources	65	61

b)

Water source	# houses	%
DW	3	3
bottled water	12	11
groundwater	70	64
vended water	34	31
HU	7	6
PAM	32	29
other: public toilet	4	4
public hydrant	8	7
TA	13	12
Total	183	166

Total % exceeds 100 because some households use multiple water sources.

	Average Tariffs per Tariff Band Rp/M3 (2005)	Monthly fixed charges (Rp) (2005)	Tariff Group Description (2003 - 2005)	% customers per tariff band (2003 data)	% increase in tariffs (2003 - 2005)
I	550	4,695	Social institutions (e.g. religious facilities) and public hydrants	1.0	47
IIa	550	5,060	Public hospitals and very poor households	11.7	47
IIb	2,450	10,440	Low income households	46.5	44
IIIa	3,500	11,950	Middle income households and small-scale businesses	19.9	59
IIIb	5,100	19,390	Upper middle income households and government offices	14.7	32
IVa	9,750	19,390	Large hotels, highrise buildings, banks and factories	5.1	48
IVb	11,500	27,665	Harbour/port	1.0	31

	Volume of water billed million m3		Water production l/s		Unaccounted for water %		Number of connections Unit		Service coverage ratio %		Population served people		Population in concession area people	
	TPJ	Palyja	TPJ	Palyja	TPJ	Palyja	TPJ	Palyja	TPJ	Palyja	TPJ	Palyja	TPJ	Palyja
Baseline (before privatization)	98.00	90.11	7,612	5,220	53.00	53.00	231,607	176,980	52.00	38.00	2,180,060	1,920,159	4,180,000	5,054,267
Original Targets (1997)	168.00	174.00	8,531	6,300	35.00	35.00	361,607	395,522	70.00	70.00	3,173,745	3,796,747	4,536,200	5,459,500
Revised Targets (2002)	131.32	118.73	7,309	5,100	43.03	47.72	335,413	301,048	62.00	45.00	2,831,927	2,434,222	-	-
Realization (2002)	128.96	126.20	8,032	4,875	48.28	45.30	336,550	312,879	62.17	44.17	-	-	-	-

	Tariff Group	# New connections	% increase
I	Social institutions and public hydrants	1,101	1
II	Public hospitals, poor and very poor households	21,898	24
IIIa	Middle-income households and small-scale businesses	51,847	58
IIIb	Upper middle income households and government offices	11,150	12
IVa	Large hotels, highrise buildings, banks and factories	2,323	3
IVb	Harbour/port -	1,849	2
Total		90,167	100