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"Neither Public Nor Private: Mixed Forms of Service Delivery Around the Globe"

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Beyond Privatization: Urbanization and Community Efforts to Secure Clean Water in Southeast Asia

By

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Both *US News and World Report* and the Asian Development Bank have focused on water as one of the major environmental concerns of the 21st century, while others have compared the future demand for fresh water with the energy crisis in its unequal distribution, inefficient pricing, and its ability to drastically affect human societies if left unresolved. Whether the issue is security or equity, the increasing demand and declining supply of fresh water is an important topic of contemporary public debate especially in Southeast Asia (SEA) and other areas of the rapidly urbanizing Global South.

Governance, social organization, and the finance of public goods are central questions in the water debate as societies transition from traditional "urban" and "rural" places to peri-urban ones, the predominant settlement pattern of the future. With more than 593 million residents in 2010 and 682 million anticipated by 2025, SEA comprises a significant share of the global population, and an even more significant share of the global poor without access to improved infrastructure (Montgomery et.al. 2003) as it urbanizes at globally unprecedented rates. According to the United Nations, urbanization in SEA outpaced all regions of the world except for China – which has a more advanced capacity to manage and direct urbanization - between 1990 and 2005 (the year after which greater than half of the world's population has lived in cities), in large part because of the transition from agrarian to urban societies. This massive spatial shift in settlement is felt most acutely on the edges of existing cities where the vast majority of new development is certain to occur: the peri-urban fringe.

Along with peri-urbanization, SEA's living standards and related household consumption have been increasing as the region integrates steadily into global trade networks, and the region is quickly reforming national institutions to accommodate more decentralized and market-oriented principles into the variety of roles and responsibilities assumed by the state. These changes have developed simultaneous with the rapid physical, environmental, and social changes accompanying peri-urban growth, and have placed unprecedented pressure on urban service providers tasked with managing these changes.

The combined pressures of market reform, decentralizing governance, and peri-urbanization, however, have also produced a remarkably wide range of innovative local mechanisms and institutions for residents to gain access to clean water. Such innovations make SEA a potential bellwether for larger political, institutional, and material changes throughout the world, as much of the Global South – especially Sub-Saharan Africa - exhibits similarly rapid growth in peri-urbanization and urban service demand.

On a pragmatic level, the nations of SEA are well known for their adaptation of market principles to local contexts, and administrative decentralization has shifted many state entities from the role of primary provider, to that of regulator of public goods and services, including water resources. This shift has meant that there is increasing space for informal and semi-formal arrangements in water and sanitation provision, a trend that places ever increasing responsibility in the hands of private sector and civil society institutions, especially where they have developed partnerships among themselves and with government institutions.

What does a focus on such providers tell us about planning, governance, and the theory of public goods under a range of urban growth conditions? Since the time of Jane Jacobs, there has been a progressive focus on community-level participation, action, and organizing that has opened up one of the most dynamic areas of Urban and Regional Planning, finance, and public policy. This focus has varied from, for example, the "Ladder of Participation" (Arnstein 1969) to "culture-based epistemologies" (Umemoto 2001), and it has usually emphasized the tensions often felt between local and national state agencies/planners and the informal and semi-formal local entities that influence the implementation of policies and plans. The case of water supplies in rapidly developing urban areas, however, moves beyond this oppositional stance, often demonstrating that community institutions are "bankable" entities capable of co-developing peri-urban settlements in cooperation with state entities. Moreover, these cases illustrate how such informal and semi-formal forms of governance are essential components of sustainable urbanization.A broad conceptual understanding of how these formal and informal systems "inter-operate" suggests to planners and policy makers the importance of understanding the mixed and complex forms of service delivery, and how and when to support alternative institutions in their effective provision of public goods.

The kinds of local partnerships discussed below go far beyond the corporate privatization of water resources, which has been documented well in SEA and elsewhere (e.g. Amis et.al. 2001; Jaglin 2001; Nickson and Franceys 2003; Batley and Moran 2004; Allen et.al. 2004; Moretto 2006; Spencer 2007). Informal and semi-formal institutions, for example, have emerged in peri-urban areas to co-exist alongside rational, expert-based planning in the supply of Viet Nam's and Indonesia's water supply (Spencer 2008a; Spencer and Guzinsky 2010). The changing relationships between the state and society embodied in these cases are similar to other parts of SEA, and contemporary developments point towards existing "innovative" approaches to financing urban services that involve communities as active participants and drivers rather than passive subjects of development (Spencer, Meng, Nguyen and Guzinsky 2008). Such innovative responses to the challenge of urban water provision are partly driven by sensitivities to, and an understanding of "multiple demands" for water, which is characteristic of peri-urban areas (Spencer 2008b; Whittington, Davis and McClelland 1998). By understanding these kinds of complexities, I argue, one can understand peri-urban communities as not simply development subjects, socially and politically empowered activists, or examples of unique and context-dependent organizers. Rather, where there are discrete public and shared objectives, they should be seen as coherent, organized, and "bankable" financial entities much in the same way as local governments. They fit into a larger cycle of urban growth and change that I call the "urban service cycle," and during certain periods should occupy the attention of planners and policy makers.

The complexities of such local partnerships have yet to be fully explored through field-based research and organized into a theoretical framework for understanding peri-urban forms of growth and governance. This paper helps to fill this gap by synthesizing diverse case studies on clean water supplies into a framework for understanding some of the characteristics that make communities "bankable," and that can be applied to the area of public finance as well as to a broader range of urban services. In doing so, it also suggests how community-level institutions might connect to larger spatial, institutional, and financial scales. By taking this approach, the paper follows Laquian's (2005),

argument that the decentralization of urban water supply is both a pressing practical concern and a wide-angle lens into the political, economic and social complexities that the growing cities of Asia – and I would argue transitional economies globally as well - currently face.

The Theory of Urban Services, Periurbanization and Rapid Growth: From binary to mixed heuristics

The provision of clean water is underlain by several theories of management, governance and the environment that obscure the importance of transitional, and generally incremental processes of urbanization. Fully formed, modern cities do not happen overnight, and a look at urban*ization* rather than at the urban in its relatively static form that can help theoretically organize the multitude of service delivery forms found across the globe.

Institutional debates about water supplies tend to center on several terms. One of the most common is the literature of "public private partnerships" in the water sector (citations???). Since the 1990s, major development banks and governments have promoted the privatization of the urban water sector based on consistent findings that even poor people are willing to pay relatively high prices for high quality household drinking and cooking water (citation from JPER paper???). From these findings, a generation of projects treating water as an economic good priced according to willingness to pay enabled a generation of planners and policy makers to consider some urban services on a cost-recovery basis under which the state is merely the organizer and guarantor of production, labor, capital and technical expertise on behalf of a community or public of interest. Investors will get paid back through a variety of mechanisms to recoup costs, and the government entity will have secured the availability of high quality household water at an affordable price to residents. Highly publicized failures of such arrangements such as in Cochabamba, Bolivia (citations???), as well as successful cases such as Jakarta, Indonesia (citations????), suggest that local and institutional contexts matter greatly. In general, the debate is shifting away from a single public-private dichotomy because scholars find such a diversity of experiences of water privatization (e.g. Budds and McGranahan 2003), towards a more nuanced understanding of scale (Bakker 2003), context and community (Spencer 2007).

This shift challenges one of the central conceptual tenets of urban services: the idea that water supply is inherently a natural monopoly rather than a granted or created one. Conventionally, urban water supply arrangements require "natural monopolies" – conditions under which the state, or an agent of the state, is able to exclude any and all other providers or service, in this case household water, to the consumers who happen to also be the community and public of interest.

In the modern, fully formed city such arrangements are common and generally function well. Economies of scale keep prices low, and therefore enable equal and near-universal coverage. Demonstrated municipal or corporate financial management capacity - often rated through a common bond rating system – enables government and private corporations to assemble capital sufficient to achieve scale; technical expertise is generally available locally in modern, fully formed cities. Moreover, generally low rates

of in-migration and low rates of consumption growth per capita characterize such cities. While not all cities in the industrial world such as Western Europe and North America are in such relatively steady states, this form predominates in these two regions, as it does in developed Asia – Japan, Korea, Taiwan. Regions such as Latin America and the Caribbean share some of these steady-state urban growth dynamics even under economic conditions where poverty rates are much higher (Spencer, Meng, et al???). In the Global South, however, rapidly-growing urban agglomerations are the norm: Southeast Asia and Sub-Saharan Africa face an urbanization context vastly different from most of those of the developed North.

In fully formed cities, water privatization is somewhat straightforward because of a socially- and economically-embedded unified demand for water. First, because clean water is a relatively low percentage of household expenditures, the creation of a (natural) monopoly can drive prices down to a point beyond which consumers care little about price differentials. Once the price reaches this level, rationales for limiting use shift from the economic to the environmental realm. Under these conditions, there is a single and identifiable demand for water that remains relatively stable, requiring only maintenance and operation once the basic service is established.

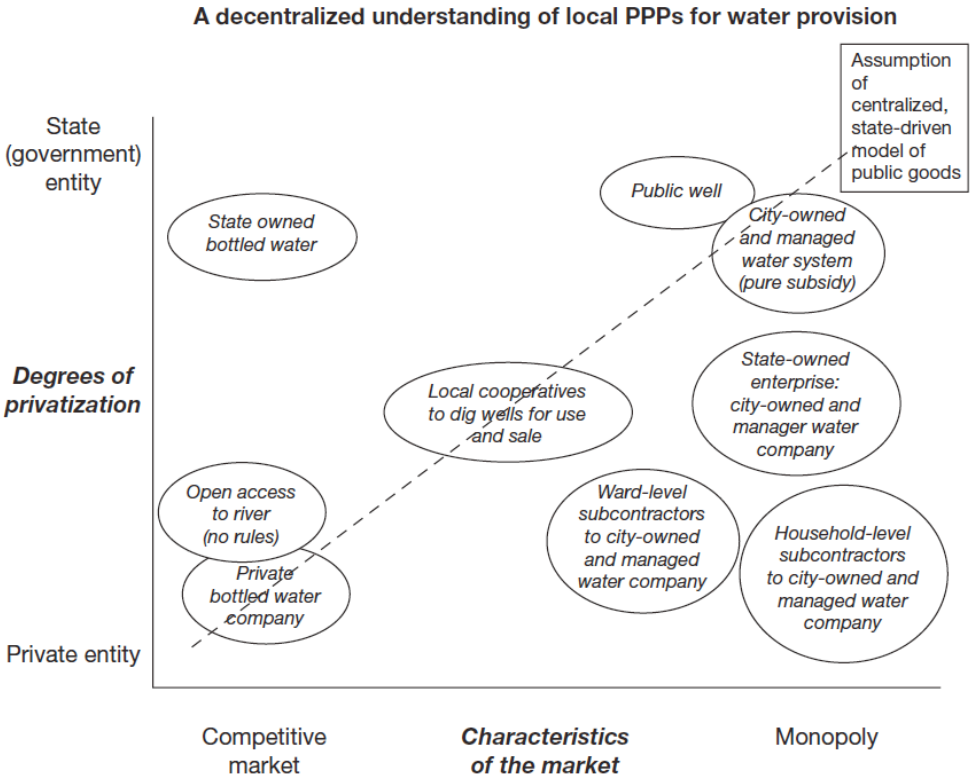
Literature on the Global South, as well as historical studies of the Global North (e.g. North America and Western Europe) have begun to challenge these assumptions. The idea of "multiple demand curves" for water (e.g. Whittington???; Spencer 2008) has begun to usefully identify the importance of differing uses for household water supplies requiring different qualities and reliabilities. In contexts where clean water is a relatively high percentage of household expenditures – due either to relatively low incomes or high costs of water production – the small differences in demand for different qualities and reliabilities of water supply can change consumer behavior quite significantly. Here, the assumption of a natural monopoly can be risky.

Competing Governance?

The use of general descriptions of decentralized versus centralized financing, private versus public management, and community versus local, although useful as general ideal types, can often mask important ad hoc, transitional arrangements that point towards the importance of local pragmatism, leadership and institutional collaboration. None of the cases described above conform neatly to a public–private dichotomy. More important for understanding water supply provision in urbanizing regions are the issues of scale, both geographic and organizational, that are enabled by decentralization of authority and financing. As Bakker (2003) points out, private water providers range from small water vendors to multinational corporations, and state providers range from local water coops to municipal and national corporations. From her point of view, the complexity of the organization and the scale at which it operates are central sources of variation in the alternative ways water is provided.

Figure 7.1 (reproduced from Spencer 2008) provides, from a water user's standpoint, a stylized scatter plot of the various institutions providing domestic water along public/private and more/less competition gradients. In doing so, it also provides a preliminary heuristic framework for better understanding of the complexity of private and

public institutions in the water sector. The general neoliberal assumption that lies behind efforts to privatize water services is represented by the dotted line running from the origin, where private entities are associated with modes of production that are more competitive, to the upper right corner, where purely state-run institutions are associated with monopolistic modes of production. From a water user's perspective, few of the institutions lie along the stereotypical relationship, let alone at either end. The City of Can Tho water company, for example, is generally monopolistic, yet only quasi-governmental, and the two subcontractor levels tend more towards private entities, yet remain somewhat monopolistic in their mode of water production. Moreover, private and state-owned bottlers also vie for the local user market and represent a production mode that is highly competitive.



7.1 A decentralized understanding of local PPPs for water provision

This heuristic framework of privatization in the water sector provides some structure to the complexities of institutions and competition enabled by decentralization in Vietnam and points out how important it is for community planners and national policymakers better to understand the various mechanisms for water service delivery in rapidly urbanizing areas where little or no infrastructure currently exists.

In this context, the use of simple private/public or centralized/decentralized distinctions may not be appropriate. If organizational and geographic scale are indeed central issues in the provision of clean water under the current conditions in Vietnam, then planning and policy scholars might best ascertain whether the theoretical and empirical understanding of water provision described above applies to processes of

decentralization and privatization elsewhere. If it does, then planners might best consider how both communities and government agencies act as coordinated entrepreneurs in the provision of public services, and how such arrangements perform in providing for the basic urban needs of the urban poor, one of the field's historic concerns.

How water is supplied under conditions of rapid urbanization, and where cities are not yet fully formed provides insight into the fluid nature of urban governance, as well as insight into the lifecycles of urban agglomerations. The literature on water supplies in non-urban areas focuses on the ecosystem health of natural sources, as well as small-scale mechanisms for community based natural resource management (e.g. Ostrom, Peters, NAP paper ???). In these areas, government can be largely absent in the provision of household drinking water, but community level associations and organizations take on the role of managing aquifer use, resource conservation, and rights of access in place of formal pricing. While the use of the good is the same for both the former (modern city) and the latter (rural) human settlements, both the institutions and the process itself is different. In the village, the water is extracted from the natural environment and minimally manipulated before use, while in the city water is produced through an intensive process of accumulation, filtration, purification, treatment and distribution. It is the difference between picking berries in the forest and industrially farming strawberries with hydroponic technology; one is produced with minimal human intervention, and the other the result of intensive human manipulation based on sophisticated scientific techniques and complex social organization. Both berries can taste great, but they come to our table from worlds apart.

Both ideal types of service provision outlined above exist, and are largely a function of environment (natural and human made), human capacity and social organization. Moreover, the literature has documented well the institutional arrangements and technologies appropriate to each. Attention to only these two extremes, however, overlooks the hybrid forms of urban service delivery systems characteristic of transitional settlements; settlements undergoing a rapid transformation from agrarian to urban forms. Modern water systems can, for example, be constructed virtually overnight; however, their use, appropriateness, and prerequisite human settlement conditions are slower processes requiring a more incremental and gradual approach. Emerging research from the Global South has revealed some of the complexities of local water provision and governance that fall between these two extremes.

Empirical Evidence from Southeast Asia Innovations in Local Water Governance in Southeast Asia *(to be condensed)*

Necessity is the mother of invention. Thus, some of the most innovative experiments in the provision of water and sanitation are developed by those with the least access. This truism is confirmed by an brief review of the experience of some of the poorer communities across Southeast Asia that have provided water supplies even as state providers have either collapsed or never been able to provide the services. In some cases these innovations have become substitutes for government provided service, in others they operate in conjunction with the state. The four cases described here represent four structures of national government, both capital cities and major secondary cities, as well

as central cities and peri-urban environments. Each case, however, is characterized by high rates of population growth and increasing per capita and absolute demand for urban services such as water. Data from the Can Tho case was collected in 2005 and combined qualitative interviews and an original household survey of n=200. Data from the other three sites were collected in the same through site visits in January 2007 and July/August 2007, but included an original household survey of n=350 for each site. To the extent possible, the research instrument was consistent across the four sites, and qualitative questions followed the same lines of inquiry. Despite these efforts for consistency, there are significant differences in cross-site methodology and therefore analysis.

In each case study, however, lies a seed for how larger institutional structures such as intermediary organizations, revolving loan funds, or development bank guidelines might maximize the potential of local institutional innovations. Only when they are assessed in a comparative framework may they provide useful guidelines for the development of institutional structures rather than as interesting but highly context-dependent stories.

Can Tho: Innovative Local Financing in Peri-Urban Areas of the Mekong Delta

Since 2000, the City of Can Tho in Viet Nam has experimented with an innovative system for financing and managing water supply for new areas of the city that have recently become incorporated. In that year, the central government of Viet nam designated Can Tho as in independent municipality and planned for a doubling of the population size by 2010. This administrative change has placed tremendous pressure on the low-capacity system, and necessitated an innovative partnership between local landowners, a reforming state owned water company, and ward-level Peoples Committee governments. Local landowners contract with the City Water Company to dig deep community wells. The landowner provides access to difficult-to-access land for the well, the Water Company provides the materials and technical expertise, and the local People's Committee manages a competitive bidding process within the ward to determine who receives the contract with the Water Company. The landowner manages billing and collections in exchange for a management fee and a commission for every m^3 of water used by households on the system. Thus, they have an incentive for connecting community members without access to piped water. The Water Company gains access to land for wells without having to take land from community residents, and is better able to collect fees because the manager is a member of the community. An in-depth analysis of this system can be found in Spencer (2007a, 2007b).

Ha Noi: The Impact of Bulk Water Retailing in Peri-urban areas

The city of Ha Noi has grown rapidly since the beginning of the Doi Moi period in late 1980s in Vietnam and as with other cities in the developing world the city has begun to incorporate new areas without basic urban services. In new urbanizing areas, infrastructural services are in lack or poorly provided. Hence, majority of people living in these areas do not have access to piped water. In Co Nhue, a commune of Tu Liem district, which is located in peri-urban of Ha Noi, people have to pay higher water tariff than the standard one, which is regulated by Ha Noi People Committee to get access to clean water. Although supplying piped water for Co Nhue commune residents since

1997, Ha Noi Water Business Company (HWBC) does not directly manage the water piped network in the commune, which was built by the Ha Noi Department of Public Works and Transportation. The company has applied the lease contract with the Co Nhue local authority (Co Nhue People's Committee) through providing water in bulk to the commune's piped network through a master water meter, then the local water supply management unit (WMU), selected by local authority, retails water to domestic users.

The WMU is formed to be responsible for operating, maintaining the water supply network and selling water to customers (households), installing new connections and water meters within the communal area. The WMU is also be in charge of repairing leaks and protecting the water system to avoid water loss, billing and collection of revenue, then paying to Cau Giay Water Supply Company, a branch of HWBC, the value of water pumped in bulk to the area. The water tariff charged by HWBC to WMU is at the lowest level in the block water tariff list, regulated by Ha Noi People's Committee. The WMU pays HWBC 85 percent of the total pumped water to the area because HWBC subtracts 10 percent of a non-revenue water rate and 5 percent of the management fee.

The collaboration amongst the HWBC, Co Nhue People's Committee (CPC) and WMU went along well for around eight years (from 1997 to May 2005) until the WMU informed the CPC of a high non-revenue water rate and loss in revenue practically. Due to the constant high percentage of water loss (42 ~ 45 percent in 2005 and up to 59 percent in 2006), caused by the WMU staff's incapacity and poor management and the deterioration of water supply network, many connected households have no piped water. According to the WMU head, of around 3,315 registered households in the commune (by December 2006) and around 3,500 households by July 2007, only 1,500 households intermittently have access to piped water. Also due to the high percentage of water loss, WMU charges Co Nhue water users 6000 VND (37.5 cents) /cubic meter, which is more than double times compared to the one they pay HWBC (2,800 VND/cubic meter). Tensions have been accumulated among the three entities when the CPC was unable to pay HWBC the revenue of water volumes recorded in a master meter since May 2005, and the CPC cannot find any source of funding to pay back the debt. By the end of 2005, the CPC was indebted to the company around 4,000 USD. The debt gradually increased up to 150 millions VND, equivalent to US$10,000 by end of July 2007. Meetings among the engaged parties have been organized together with the participation of representatives from Tu Liem People's Committee and HWBC; however, there has not any solution given to this case so far. For the time being, Co Nhue residents are still suffering from paying a high cost for intermittent piped water supply.

Phnom Penh: Improved public management through cross-subsidy, payment reform, and education

After years of civil war, Cambodia has begun to focus on reconstruction and the development of much-needed infrastructure across the country. While most government institutions at the municipal/provincial level have been unable to provide clean water to most parts of the country, the Phnom Penh municipality, through the Phnom Penh Water Supply Authority (PPWSA), provides the best water service to its residents. PPWSA's water provision currently covers more than 80% of Phnom Penh's population. However,

many households, especially the poor without direct water connection, still rely on informal and semi-formal private, and unregulated, providers who provide water service at 8 to 10 times more expensive than the municipal rate in Phnom Penh (Asian Coalition for Housing Rights 2001). In an attempt to eliminate such water providers, PPWSA has developed an innovative mechanism to provide cross-subsidy for water connection to poor households who are not able to pay the one-time connection and the full cost of connection. The subsidy is given in 4 categories: 30%, 50%, 70%, and 100%. For each category, there are three types of amortized instalment payment schedules: 10 months, 15 months, and 20 months.

To implement this subsidy program, the local community and authority plays a critical role in helping PPWSA identify which households should receive subsidy. A PPWSA evaluation team is to make the final decision on the amount of subsidy each household would get based on its on-site visit, interviews, and evaluation against its criteria. As of May 2007, PPWSA has provided cross-subsidy to 14,872 poor households in Phnom Penh.[1]

An additional problem faced by PPWSA is non-revenue water in areas with large percentages of unconnected households. To fight against the issue, the PPWSA's effort made to overcome this problem and plan to cover 100 per cent connection are well acknowledged. However, the effort is to some extent restricted by its own policy and rapid unplanned urbanization which is about 14 per cent per annum (RGC 2002). PPWSA does not provide connection to households whose water meters are installed farther than 10 meters from its main distribution pipes even though local water stations are set up within service areas. The case of three villages in Kakap Commune, Russei Keo District in Phnom Penh shows that about one third of 348 surveyed households have no direct pipe connection from PPWSA due mainly to their off-main road home location. This situation requires them to get secondary connection as necessary from households that have direct connection.

The cost of transportation to the central payment office is another obstacle for the poor. To help the poor, the PPWSA initially allowed its staff to collect payment upon reading the household water meter since it realized that the cost of transportation even exceeded the price of the monthly water bill in many cases. Eventually, PPWSA opened local cashier stations. As further encouragement for poor residents on illegal or secondary connections to pay, the PPWSA also held community training sessions on how safe and clean water is produced (cleaned, treated, pumped), as well as on how to apply for a formal connection. These two management changes encouraged local residents to report leaks and illegal connections and pay their monthly bills, thereby improving overall service for the area.

Gresik, East Java: Community Deep Well Water Systems in Peri-Urban Java

Gresik is an urbanizing *kabupaten* (district/regency) located 40 kilometers northwest of Surabaya in East Java. Industrialization in Gresik began in the 1960s when it became home to Indonesia's largest cement company. In the 1970s, development

[1] PPWSA's Report of Clean Water Supply to the Poor on May 2007.

continued as industrial spill over from Jakarta-West Java to Surabaya-East Java lead to an industrial expansion in the area, bringing with it petrochemical, plastic and other plants and factories. In 1990s, real estate speculation and the building of housing developments in Surabaya drove land prices to high levels and developers and turned their attention to Gresik. Development has targeted a few *kecamatan* (sub-districts), including Gresik and Manyar sub-districts, which lie closest to Surabaya as well as being located along the coast. Over the last ten years, Gresik has been named one of Indonesia's ten centers for industrial growth, there are plans for a new seaport in Manyar, and the district's membership in the Surabaya mega urban region will undoubtedly lead to continued rapid urbanization.

Unfortunately, there are many difficulties facing Gresik's water supply as development continues. Many coastal villages suffer from saltwater intrusion into water sources, groundwater contains large amounts of lime and the only river capable of providing sufficient water for a growing population is located over 60 km away from the areas undergoing the most development.

One village of focus for this research is Yosowilangun in Manyar District. Until the early 1980s, Yosowilangun was a small village whose residents engaged in agri- and aquaculture activities. Water was taken from a stream that ran through the village as well as from a few shallow wells. But industrial development as well the building of housing developments (*perumahan*) to support industry put great strain on local water resources, causing them to dry up, as well as threatening livelihoods of the original residents. The number of households in Yosowilangun has grown from 300 in the mid 1980s to its current number around 2,600. The district water company, PDAM (*Perusahaan Daerah Air Minum)* provides the *perumahan* with water but does not extend its service to the lower income community that is the original inhabitants of the area, though living in close proximity to the *perumahaan*. Without PDAM, shallow wells or streams, this community has began to dig four of their own deep well water systems, funded by residents themselves, through local religious institutions or with assistance from the local village government. All four wells provide sufficient water to residents as well as generate revenues to support repairs and sustainability.

In 2003, the leader of a local government body organized local residents to dig their own well since PDAM was not sufficiently servicing the area, and because other local wells were unable to meet the demand sufficiently. During an initial meeting, 39 residents agreed to contribute Rp 700,000 each to help with the costs of digging a 107 meter well and providing community piping. Since the total cost was Rp 20.5 million ($2,000), he secured credit from the well-digging company. Once the project was working, more residents saw its value and quickly paid Rp 700-750,000 for water service, and all the lines of credit was paid off in one year.

The Urban Service Cycle

Cities are not created overnight. As they gradually develop their infrastructure, expand their boundaries and incorporate new residents they evolve incrementally. Additional people are added requiring expanded and new neighborhoods; new and more densely packed neighborhoods require higher service capacity; and growing per capita

consumer demand for services also increases the need for urban services. While these three phenomena follow one another incrementally, they operate on fundamentally different scales. At the most refined level, individual people and families decide to migrate to a city or choose to consume more services, thereby increasing demand. Any city can absorb these increased demands if they happen gradually, and at some point the city needs to increase its spatial extent to accommodate additional growth by creating new neighborhoods with new spaces for people to live and new infrastructure capacities to provide services. Like any other consumer good, water services are subject to competition in developd cities, a natural monopoly exists that has generally overridden the types of local arrangements described for Can Tho, Phnom Penh and Gresik. As household incomes rise, the lowest quality forms of water slip out of use in favor of public and higher quality systems. However, low quality water use is only avoided where high quality and cheap water supplies meet demand. As cities, and in particular periurban areas grow, these low-quality sources can reappear, as was the case in Gresik.

The rise of hybrid urban services like the three described above result from two characteristics of rapid urbanization that interrupts this gradual change: scale effects, and multiple demand curves for high-low quality water.

Scale Effects: Models where infrastructure and service capacity follow demand growth

Figure 2 (Scale Effects) illustrates a stylized relationship between urbanization and increasing urban service capacity. The horizontal axis displays increasing population growth and the vertical axis shows the total, aggregate capacity of clean water supply and demand for any city. The blue curve shows that as population grows, the household demand for clean water supplies (total clean water at given price "x" per gallon) increases in ways that may at times be linear, but also may change in slope as critical thresholds are reached for population increase. The black curve shows the capacities provided by formal municipal water systems, or "Big Infrastructure." Because such systems are complex arrangements of physical plants, administrative agencies, and large capital investments they cannot be built gradually, but must be implemented in "spurts" of capacity (on this curve, the horizontal lines should be slightly rising to represent gradual increases in existing Big Infrastructure capacity with no new construction). This staircase development pattern defines periods during which there will overcapacity and undercapacity in meeting current household water supply demand. Periods labeled "A" are times during which Big Infrastructure Services provides a surplus of clean water for residents, and periods labeled "B" are periods during which there is a shortage relative to household demand.

<insert Figures 2 and 3>

Figure 3 shows the relative prices that households pay during these alternating periods of Big Infrastructure surpluses and shortages. Assuming that most households in rapidly developing cities make careful choices about how much to spend on urban services, Figure 3 breaks up household water demand into two basic categories of quality: high quality for drinking and cooking, and low quality for washing. The average prices paid for water varies depending on existing service capacities. During "A" periods, where there is a surplus of affordable, reliable, and high quality water, households will pay less

for high quality water. During these same periods, they may also pay more for water for washing because Big Infrastructure water prices can compete with other sources such as household or community wells. On the other hand, during periods of scarcity – "B" periods – households will pay more for cooking and drinking water because they must purchase expensive bottled water. However, they are also likely to resort back to lower quality and much cheaper sources of washing water such as natural sources and personal or community wells.

In general, it is the periods of scarcity ("B"), where mixed forms of water service delivery have tended, in the three case studies, to become important. High prices for clean drinking water requires household to search for and innovate to provide water that substitutes for Big Infrastructure. Likewise, if the quality of washing water becomes too low because of environmental pollution associated with urban density, they likely also have pressures to innovate with local, ad hoc, and socially embedded projects like the ones described above. Thus, we are most likely to see mixed forms of service delivery during "B" periods. However, few frameworks for understanding urban service delivery parse out these dynamics. Rather, most studies, whether they focus on understanding the "A" periods during which capacity exceeds demand or the "B" periods of scarcity neglect to account for how small-scale service providers sometimes step in to support Big Infrastructure capacities, but also can sometimes compete with that same capacity if the pricing does not account for the demand for alternative sources of both high and low quality water use. In other words, scholars of planning and policy have tended to assess long-term planning for water supply through a focus on Big Infrastructure, but generally neglected to focus on the short-term or "transitional" urban service dynamics. Under the conditions of rapid urbanization, such as that seen in Southeast Asia and Sub-Saharan Africa, this cycle happens, and explains the growth of hybrid systems more embedded at lower scales of social organization such as the commune, RT, or other such administrative unit. To focus only on the non-incremental planning timeframe ensures constant over- and under-capacity for meeting urban resident demand for clean water.

Multiple Demand Curves: Models where residents strategically decide on what water quality to consume

The discussion of gradually increasing demand and spurts of urban service capacity growth outlined above begs the question: how does household behavior change during these alternative periods, and how does this affect Big Infrastructure's ability to project cost-recovery schedules. In the cases described above, this dynamics of household water consumption is underlain by three components: changing household capacity to pay, changing demands for use, and the changing availability of alternatives for water supply.

The changing income profiles of residents is an important prerequisite for establishing natural monopolies. As mentioned earlier, when non- urban service household expenditures increase in their relative proportion of the household budget, fluctuations in water prices will have a decreasing impact on household choices. It is for this reason that relatively large proportional increases in, for example, the price of water in Honolulu do not drive households to create catchment systems and dig illegal personal wells on their land. The savings entailed through these strategies are certainly not worth

the lost time and the up-front costs construction and materials. It is for this reason that the simple export of Corporate Public Private Partnerships from modern urban contexts to poor countries and rapidly developing cities meets such challenges. Because urban services is a relatively high household expenditure in the latter context, residents are much more parsimonious and judicious about economizing on water costs. Thus, while public private parternships are able to establish a natural monopoly over the Big Infrastructure system, they still must compete with natural sources, private wells, community well and rainwater. Where these are relatively high-value goods, residents will distinguish between the kinds of water they use, making economic choices about which sources to buy, for how much, and for what use (see Spencer 2008).

Simultaneous with the importance of relative income profiles of residents and Big Infrastructure is a changing household demand for water of different types. As income profiles improve, education about sanitation and public health, and other development trends increase, residents tend to value urban services such as water differently. As public health awareness increases and population density increases the risk of disease transmission, residents value water for washing hands more and become more willing to pay for that quality of water. Moreover, as household residents move from agricultural work to office work, they increase their use of and demand for water appropriate for bathing and clothes washing.

Finally, the existence of alternatives for water supply delivery change over time, often adapting to immediate resident needs. Figure 1 above shows the range of personal, system, and community-level ways to secure clean water supplies in some rapidly developing neighborhoods, and this level of diversity generally coincides with varying qualities and reliabilities of water, each with its own price. Figure 3 shows how these dynamics likely interact to show that Big Infrastructure, once built within neighborhoods interacts with a complex set of decisions that each household must make. In particular, it proposes a heuristic model for understanding household use, given a fixed set of water supply delivery alternatives, the fluctuating disequilibrium between Big Infrastructure supply and aggregate household demand for water, and the strategic economizing of households in purchasing the supplies of water for each use they have.

Figure 4 identifies three distinct demand curves characteristic of periurban neighborhoods, and proposes alternative ways in which they fluctuate for the “A” and “B” periods of Big Infrastructure surplus and scarcity defined in the previous section. In this model, drinking/cooking water commands the highest price per litre when urban density is relatively low and aggregate demand also relatively low. Similarly, washing clothes and washing the house command lower prices respectively. Under this scenario, drinking/cooking water is typically bottled, washing clothes and bathing well water, and washing the house untreated well water and/or natural sources. As Big Infrastructure is developed and a neighborhood enters a period “A,” high quality clean water becomes relatively cheap. With this surplus, the household will tend to connect to the new system and – if the price is cheap enough – use the water to perform all the necessary functions of clean water: drinking/cooking, washing clothes/bathing, and washing the house. This is the typical situation in modern, developed cities. If the neighborhood or city grows rapidly, beyond the capacity of the fixed-capacity Big Infrastructure, the prices of these three water types will diverge because households will economize on the uses of high

quality water, because they are paying a higher average cost – either through increased prices or less reliability. Under this condition, they will resort back to the cheaper sources of lower-quality water.

<insert Figures 4 and 5>

Figure 5 shows the scenario in which incomes are lower and/or where the relative price of water is high compared to other household expenditures. Here, households pay less for drinking/cooking water, but still use alternative sources because the price differentials between drinking/cooking water and other sources remain important enough for households to distinguish between this and other sources of water.

In general, both figures show multiple demand curves; in Figure 4, these multiple curves converge into a single source and single demand temporarily, but with continued urbanization this unified demand will diverge back into multiple demands as Big Infrastructure service capacity is stressed. These heuristic models for understanding water supply and demand with urbanization explain how mixed and alternative forms of water supply services remain popular even as large-scale urban projects are implemented.

Implications for Policy and Planning: Public Goods for the Public Good

Recognition of the complexities of urban water service delivery under conditions of urbanization is not to say that small scale providers are ideal, or that Big Infrastructure is doomed to failure. Rather, it does suggest that a more accurate theory of public goods provision in urbanized and urbanizing contexts is needed to understand the persistence of mixed forms of service delivery found across the globe. Moreover, understanding and modeling such complexity using the heuristics presented above is necessary for policy makers and planners to develop long-, medium-, and short-term strategies that meet residents needs. These models explicitly recognize that local governance under rapidly urbanizing conditions is fluid, with competing water suppliers and multiple loyalties that local community residents in rapidly developing cities, as well as to develop new classes of institutions better able to meet the material needs of the peri-urbanizing Global South.

Entitlements and Equity

Describing an urban services cycle in which Big Infrastructure sporadically keeps up with increasing resident numbers and per capita demand simply describes a dynamic in which state capacity imperfectly adapts to market needs. Without a more nuanced understanding of alternative forms of social and economic organization such as the local public private partnership in Can Tho or the local water investors in Gresik, planners and policy makers are left only to provide the major infrastructures, knowing that working at this level will perpetually fluctuate between large surpluses and deficits. Because of this disequilibrium, the interstitial periods when deficits (primarily) occur is left to an unregulated market of providers that fill an important need, but potentially operate outside of the public good. The inability of formal state capacities tasked with ensuring the minimum entitlements to residents and citizens during these periods presents a significant gap in the provision of the public good to residents. For example, in the short term, where use of high quality water is low there is the significant risk that more people will get sick and travel long distances to access water. During this period of scarcity, the

situation illustrated by the Can Tho and Gresik cases, government entities cannot provide water services; however, this does not mean they cannot play an important role in supporting public goods provision and ensuring the overall public good. In each case, local and national authorities have an important role to play in water quality control, watershed conservation and management, and price controls, even as they have relinquished the role of direct provision itself. Moreover, thoughtful planning and policy making can predict the surpluses shortages in the urban services cycle, planning the efficient "inter-operability" of the "big" and "small" systems staged to complement one another over the long term. Without such coordination, it is increasingly likely that short-term deficits will lead to long term problems.

Two areas of work would greatly facilitate this kind of long term urban services planning. First, state support for local water user groups to meet demand during periods of scarcity would both help ensure that this essential human need meets basic coverage, price, accessibility and quality goals during disequilibrium. Secondly, developing alternatives to single-demand urban water supplies would provide greater flexibility to residents and water providers to adapt to the fluctuating availability of drinking-quality tap water. In particular, the categorical "disaggregation" of demand into scale economies (i.e. smaller than "household water", but still large enough to gain economies of scale) targeted at the variety of water uses that local households employ would ensure prices appropriate to residents' ability and willingness to pay for the variety of types of water they need. Ensuring that a minimum supply of water at these quality and prices as Big Infrastructure systems build up capacity consistent with residents' income profiles and their rapidly changing needs for clean water.

Figure 2: Scale Effects

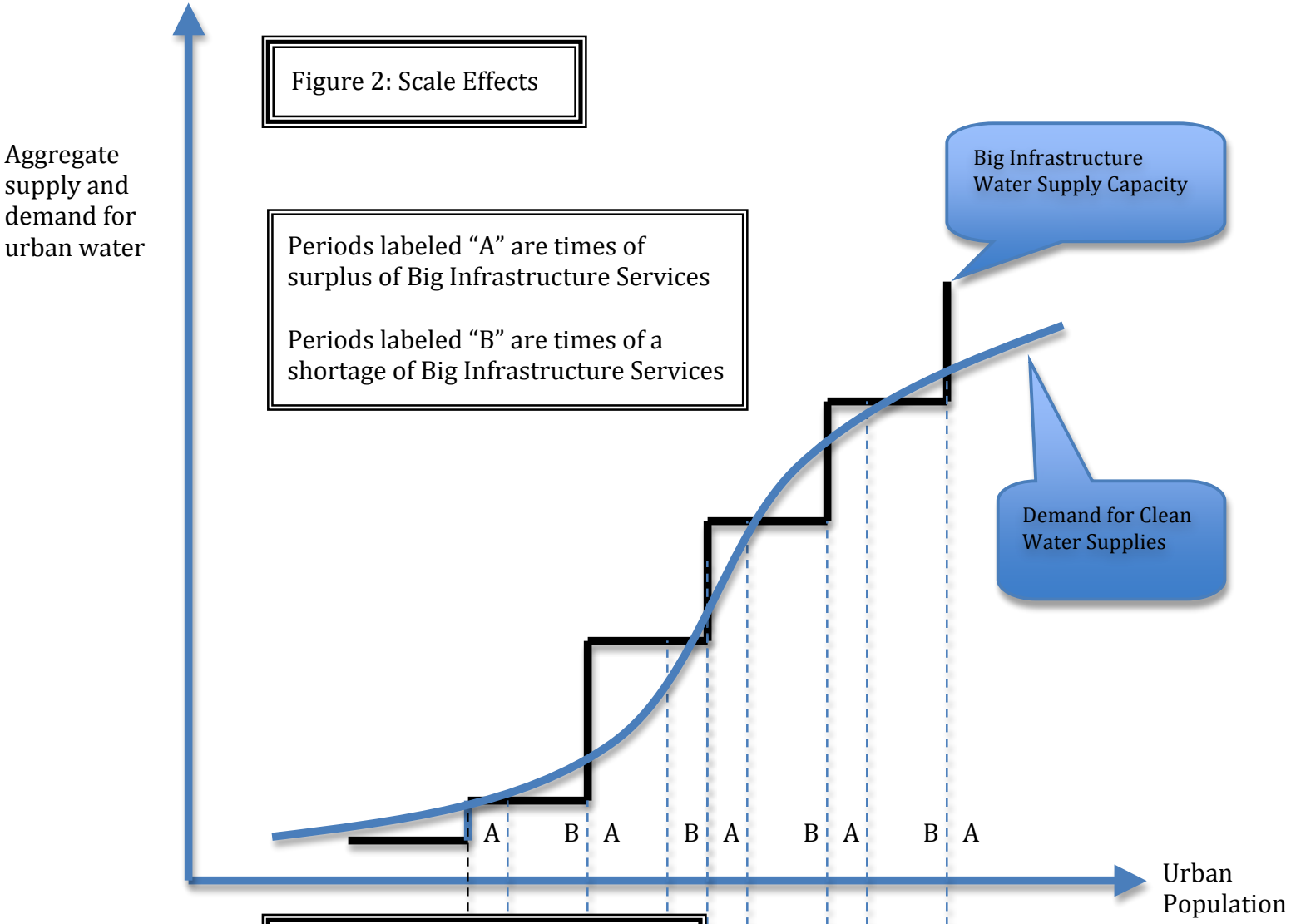
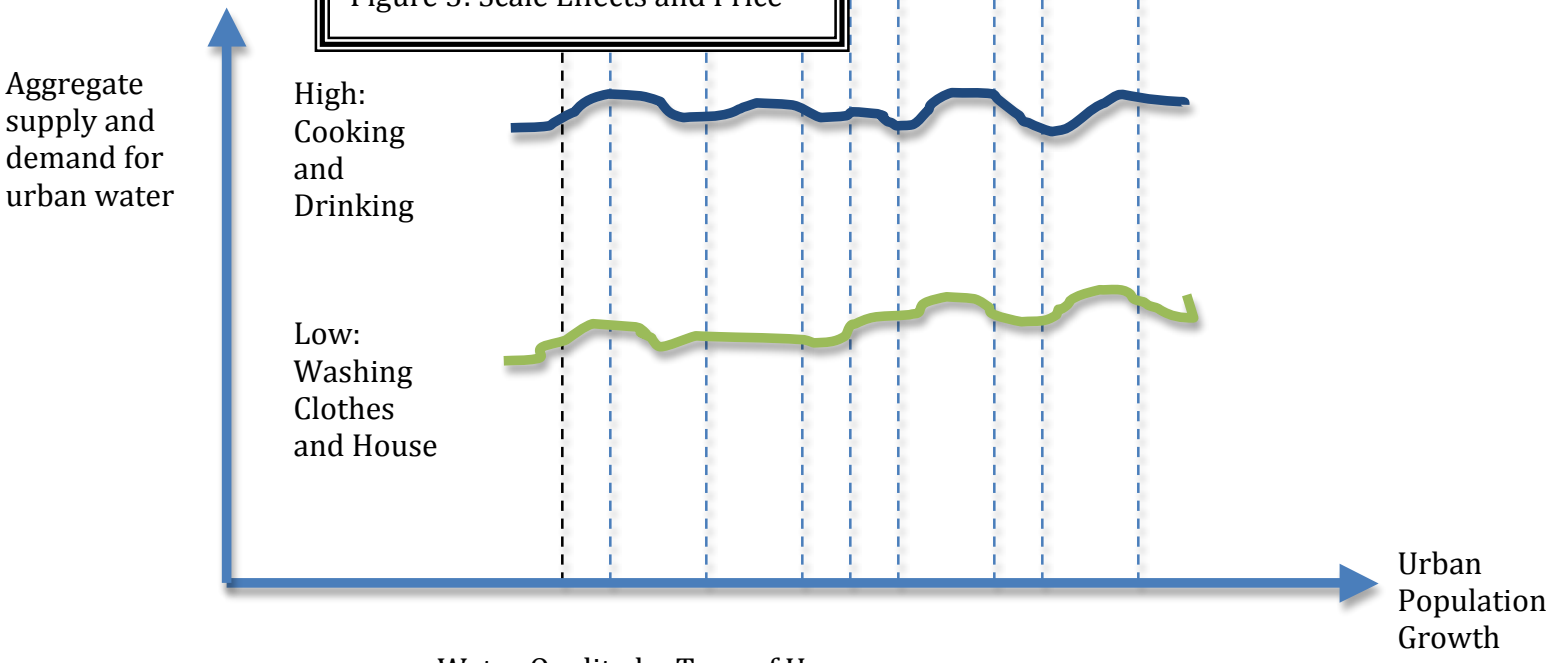


Figure 3: Scale Effects and Price



Water Quality by Type of Use

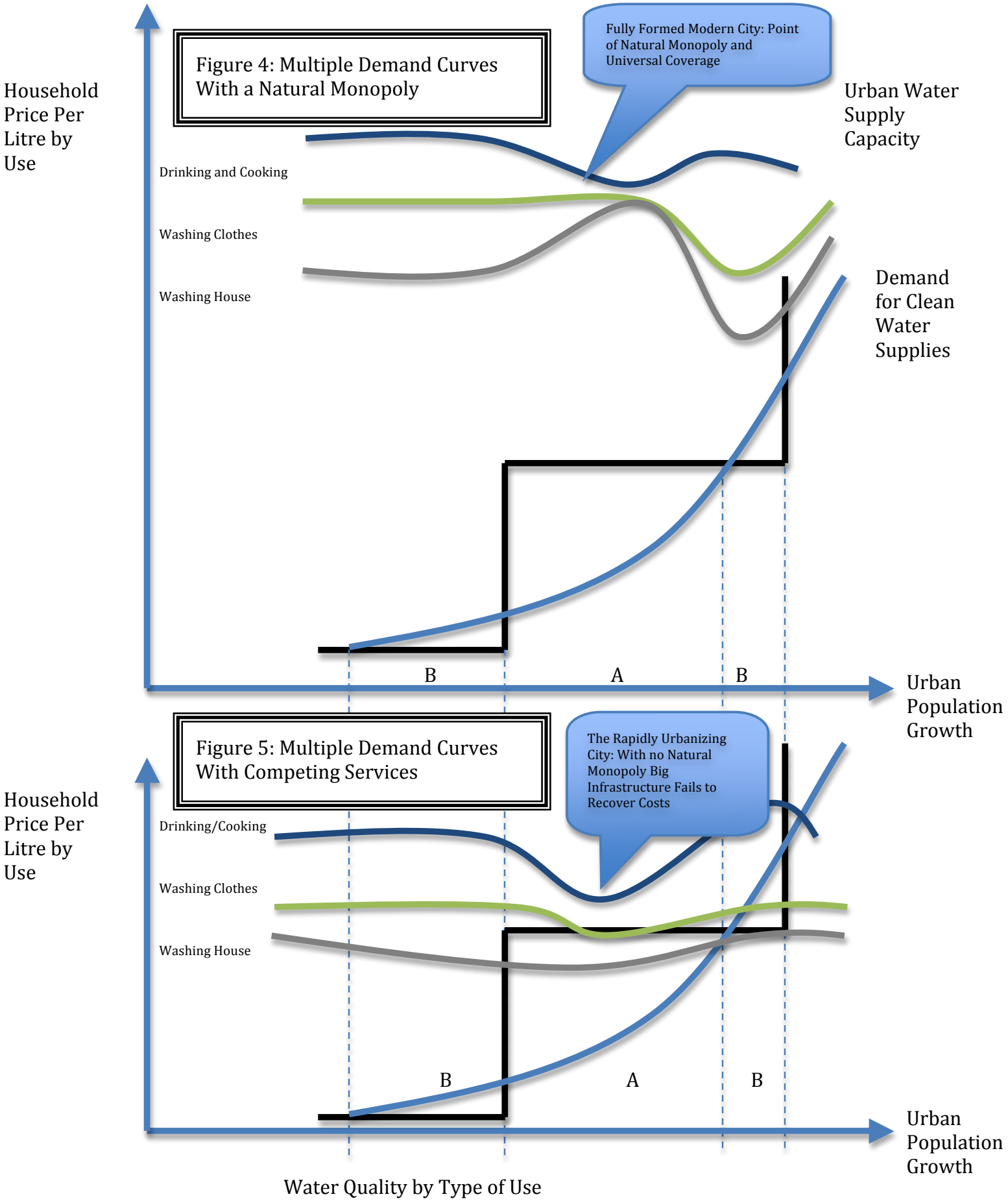


Figure 4: Multiple Demand Curves With a Natural Monopoly
Fully Formed Modern City: Point of Natural Monopoly and Universal Coverage
Household Price Per Litre by Use
Urban Water Supply Capacity
Drinking and Cooking
Washing Clothes
Washing House
Demand for Clean Water Supplies
B
A
B
Urban Population Growth
Figure 5: Multiple Demand Curves With Competing Services
The Rapidly Urbanizing City: With no Natural Monopoly Big Infrastructure Fails to Recover Costs
Household Price Per Litre by Use
Drinking/Cooking
Washing Clothes
Washing House
B
A
B
Urban Population Growth
Water Quality by Type of Use