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Cristina C. David

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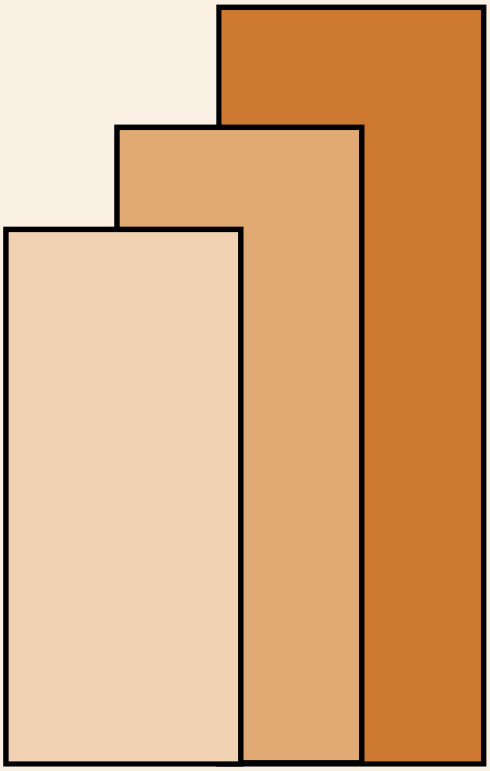

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For comments, suggestions or further inquiries please contact:
The Research Information Staff, Philippine Institute for Development Studies
3rd Floor, NEDA sa Makati Building, 106 Amorsolo Street, Legaspi Village, Makati City, Philippines
Tel Nos: 8924059 and 8935705; Fax No: 8939589; E-mail: publications@pidsnet.pids.gov.ph
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A B S T R A C T

Although MWSS has the responsibility for providing urban water and sewerage services in Metro Manila, actual service coverage has been low particularly for sewerage and quality of service has been poor despite subsidies from the national government. This paper examines the impact of the recent MWSS privatization on the coverage and quality of water and sanitation services and ultimately on the groundwater levels, water pollution, human health, and welfare of the poor.

Analysis of the performance targets and other provisions of the MWSS concession agreement together with revised projections of water demand indicates that a significant share of water supply will have to be met through groundwater pumping by individual households, commercial, and industrial establishments and by private water markets. Moreover, the exception of a significant number of households who already have tap water from own sources, private water markets, as well as industrial and commercial establishments from the performance targets on sewerage coverage suggests that water pollution may not be adequately addressed.

This study foresees that without some adjustments in the concession agreement with the private water concessionaires and acceleration of water supply expansion projects, specifically the Laiban Dam project, the water shortage problem will persist and the poor will continue to pay much higher price for water as they are rationed out of the low-priced MWSS water. The progressive water price structure itself for MWSS water also ends up having regressive effects as the poorer households have to rely on shared water connection or public faucets and thereby pay higher water prices.

MWSS Privatization: Implications on The Price of Water, the Poor, and the Environment*

*Cristina C. David***

In 1997, Metro Manila Water and Sewerage System (MWSS), the government corporation responsible for the water supply and sewerage disposal in the greater Metro Manila area, was successfully privatized. The policy decision for privatization was motivated by MWSS's failure under public management to provide adequate water supply and sewerage services to the largest urban center in the Philippines and the desire to end government subsidies to its operations.

Inefficiencies in the MWSS operations have been widely documented (Binnie Thames Water/TGGI Engineers 1996). It is also commonly believed that these inefficiencies would be extremely difficult to correct under the same institutional framework and political realities. However, the public good nature of water, economies of scale and externalities in its production, distribution, and consumption, and its basic need character mean that private sector management of urban water resources cannot be expected to achieve economic efficiency, social equity, and environmental sustainability without appropriate contractual arrangements, strong economic and environmental regulations, and other government interventions. Such concerns are all the more critical with regards to MWSS because of the government's weak capacity to enforce environmental regulations in the face of severe water pollution problems and rapid groundwater depletion within the service area, the bureaucratic constraints encountered in developing a strong

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** Research Fellow, Philippine Institute for Development Studies, Makati City. The author acknowledges the financial support of DANIDA through the International Institute of Environment and Development. She also acknowledges the excellent research assistance of Debbie Gundaya.

economic regulatory office, and the large number of urban poor often bypassed in the allocation of water and sewerage services.

The post-privatization period of just over a year is too short for evaluating the full impact of privatization. However, changes in water tariffs and operational costs, analysis of the provisions of the concession agreement, and review of the underlying assumptions related to water demand, supply, and other factors enable us to derive some preliminary assessments and explore its potential impact on efficiency, welfare of the poor, and environmental objectives. Moreover, potential problems that may be encountered in fulfilling the service obligations and realizing societal objectives of the MWSS privatization are important to identify at an early stage.

The first section of this paper presents an overview of the institutional and physical characteristics of the urban water and sewerage services in the MWSS service area. In the second section, the nature of private sector participation, contractual and institutional arrangements, and the bidding process are described. The third section examines the general issues and concerns arising from the concession agreement that may significantly affect privatization's impact not only on efficiency, but also on the welfare of the poor and on environmental objectives as analyzed in the subsequent two sections. The last section concludes with some policy implications related to overall water resource management, and specifically to the operations of the various components under the present privatized institutional structure of the MWSS.

Characteristics of the Water Sector

Institutional Structure

The Philippine Water Code (PD 1067) approved in 1976 is considered to be an adequate overall legal framework for the efficient, equitable, and sustainable management of the country's water resources (World Bank 1993). But the regulatory and institutional frameworks governing the water sector are generally believed to be weak and fragmented. The National Water

Resources Board (NWRB) which has overall responsibility for water resource management, i.e., the control, supervision, and regulation of the utilization, exploitation, development, and protection of the water resources, does not have sufficient authority nor financial resources to effectively perform these functions.

Provision of water-related services and many regulatory functions are carried out by other government agencies. Outside the MWSS service area, provision of piped water connection for other urban areas is undertaken mostly by water districts which are provided credit subsidies by the Local Water Utilities Administration (LWUA). Local government units (LGUs) also manage a few water utilities. And since the 1991 passage of the Local Government Code (RA 7160), the responsibility for funding the construction of shallow wells and deepwells for communal use of low income households in their respective political jurisdictions was transferred from the Department of Public Works and Highways (DPWH) to the LGUs. Water use in national irrigation systems is the responsibility of the National Irrigation Administration (NIA), while the National Power Corporation (NAPOCOR) is in charge of the hydro-electric use of water.

Sewerage development is much less organized than water supply and sanitation because of limited investments in sewerage. Among the government water utility firms, only MWSS has a mandate for the construction, operation, and maintenance of sanitary sewers and sewage treatment facilities for its service area, as water districts deal only with water supply. The DPWH constructs and maintains storm sewers and drains in Metro Manila; whereas in other urban areas, the LGUs take responsibility for the construction and maintenance of such facilities.

Regulations in the water sector relate to its quantity, quality, and prices. The NWRB regulates the use of surface and groundwater resources through its responsibility of granting rights and permits for water abstraction. This regulatory power is shared with the MWSS and water districts as they have the monopoly franchise to provide water services in their respective service area. In practice, permits for the establishment of private waterworks and individual

groundwater usage have been granted quite liberally. This is mainly because the water supply and pipe distribution networks of these franchise holders have not been sufficient to meet total water demand. Moreover, the regulation and monitoring of groundwater abstraction particularly by industrial and commercial establishments and households have been extremely weak. In fact, less than 15% of groundwater users are believed to be registered at the NWRB.

For the regulation of water quality, the responsibility is divided between the Department of Health (DOH) for drinking water and the Department of Environment and Natural Resources (DENR) for the regulation of sewerage discharges and industrial effluents. The DENR is also generally responsible for the protection of watersheds except for a few that are assigned to the NIA and NAPOCOR.

Economic regulation has historically been implicit in the MWSS Charter by the provision limiting the rate of return on book value of assets to 12%. Although theoretically the MWSS Board decides on the water tariff subject to the rate of return cap; in practice the price of MWSS water has been politically determined, and ultimately decided upon by the President of the country. For the water districts, the LWUA performs the economic regulatory function, while the NWRB is the responsible agency for the private waterworks.

Physical Characteristics

The MWSS service area consists of all the seven cities and ten municipalities of the National Capital Region (NCR), five municipalities and a city in the province of Cavite and all the fourteen municipalities of Rizal Province. It covers a geographic area of 2.1 thousand sq. kilometers, and by 1995 a total of 2.4 million households or more than 11 million people (Appendix Table 1).

The bulk (97%) of the MWSS water originates from the Angat Dam (Reservoir) and only 3% is from groundwater pumping. The multi-purpose Angat Dam is located north in the adjacent province of Bulacan about 40 kms. away from the Balara and La Mesa Dam treatment plants in

Quezon City from where treated water is distributed through the pipe distribution system. Use of Angat Dam water is shared among the NIA, the MWSS, and the NAPOCOR. The latter is responsible for the operation and maintenance of the facilities including the Angat watershed.

The NIA has historically had a prior water right of 36 cum/s, whereas the water right granted to MWSS has been increasing over time to the current level of 28.8 cum/s. Furthermore, the law provides that in the event of a drought, urban water use takes precedence over irrigation and other uses. While the generation of electricity is not a consumptive use of water, the infrastructure was designed such that the capacity to generate electricity declines when water use is shifted away from irrigation.[1] In recent years as drought episodes have become more frequent, the MWSS had withdrawn an average of 32 cum/s, which is above its water right. Indeed, with the recent severe drought due to the El Niño phenomenon, no water was released for irrigation for

[1]Although water rights exist for Angat Dam water and the Water Code allows for compensation in cases of water rights transfer, short and long-term reallocations of Angat water were made by administrative fiat despite competing uses of its water. A recent ADB study (1996) estimated that during the dry season, the economic value of raw water for urban use, as imputed from the value of consumer surplus per unit of raw water transferred, ranges from ₱2 to ₱5.7 per cu.m. for a 10% and 20% shortage, respectively. On the other hand, the income foregone by farmers ranges from ₱1.6 to ₱2.9 per cu.m., suggesting positive net benefits of reallocation during drought situations. In case of long-term permanent water transfer, the estimated economic value to urban users is less than ₱2 per cu.m.; but the income foregone by farmers range from ₱1.3 to ₱2.1 per cu.m.

most of 1998 to ensure Metro Manila water supply.[2] Even then, MWSS water supply dropped by 20-30% during this period.

Water Service

The MWSS piped water connection is estimated to reach only about two-thirds of its household coverage (ADB 1997). Its service is generally characterized by low water pressure and intermittent supply, averaging only 16 hours a day. At the same time, the MWSS has had the highest rate of non-revenue water among the main cities in Asia amounting to almost 60% of water production. By contrast, the average rate of non-revenue water among developing countries is 20% to 30% and in Singapore this is only about 7%, one of the lowest worldwide. Prior to privatization, MWSS had 9 employees per 1000 connections, again one of the highest over-staffing record, as the ratio in Bangkok is only 4.6, Jakarta 7.7, Singapore 2.0, and Kuala Lumpur 1.1.

Consequently, a major share of the population and much of the industrial and commercial establishments have had to rely on private waterworks, own wells, and private water markets. A 1990 groundwater study by JICA (1992) reported that about 40% of total water use and as high as 80% of water use among industrial establishments are supplied from groundwater through private water systems and own wells (Table 1). Since the sales of MWSS water grew only at an annual rate of 1.3% between 1990-1996 while population alone in the service area increased at 4.0% during the same period, the proportion of water use supplied by private wells must have significantly increased to at least 50%.

The fact is overpumping has been depleting groundwater resources since the 1970s and water tables are reportedly falling at rates of 6-12 meters annually in some parts of the service

[2] Typically, the Angat Dam provides gravity irrigation for rice cultivation to about 24,000 has in the wet season and 27,700 has in the dry season.

area (Haman 1996; NHRC 1993). As a result, pumping costs are rising and saltwater intrusion and land subsidence have been observed particularly along the coastal areas. Yet, there has been no effective monitoring nor regulation of groundwater abstraction. Less than 15% of deepwells are currently registered at the NWRB, and pumping charges are minimal. With the severe water shortage in the Angat Dam caused by the recent El Niño, the rate of groundwater abstraction has further increased among conjunctive users of MWSS water and own wells and as construction of new wells accelerated. Indeed, the national government granted about ₱100 million for the construction of new deepwells which will be integrated into the MWSS water system. LGUs together with senators and congressmen increased budgetary allocation for construction of new wells in depressed areas (David and Inocencio 1999).

A 1995 survey of households indicated that because of undercoverage and widespread rationing of MWSS water supply, about 30% of households in Metro Manila have had to rely on vended water (Table 2). Ironically, the major share of water sold through vendors is actually MWSS water, a part of the high non-revenue water caused by meter tampering and illegal connections. Thus, despite government subsidies and the relatively low and progressive water price structure of the MWSS, the poor households dependent mostly on water vendors end up paying water prices that are as much as ten times higher than high income households who generally have access to piped water connection. Table 3 shows more clearly that average price of water declines as household income increases.

The effective cost of water to many households is often even higher than reported because of the additional costs incurred by the use of storage tanks and booster pumps; the queuing and fetching time wasted, and the general inconvenience of dealing with MWSS water rationing and vended water. Households relying on private waterworks also absorb the initial capital cost of the water system through higher land prices and any further capital expenditures incurred after the waterworks is turned over to the homeowners' association.

Sewerage Service

The MWSS sewerage service is even more limited than water supply, covering less than 7% of households in the service area. The existing sewerage facilities of MWSS are confined to only some areas in the city of Manila and parts of Makati. Most households and firms utilize own septic tanks or common septic tanks; while those who live in slum areas without public sewers or drains rely on rudimentary latrines without formal drainage facilities.

MWSS Privatization

The passage of the Water Crisis Act (R.A. No.8041) in late 1995, which established the legal basis for the privatization of MWSS, reflected the Ramos government's commitment and belief that privatization would be the most viable approach in improving the efficiency of MWSS operations, raising financial resources for investments, and ending government subsidies. A new administrator was then appointed whose specific responsibility and own personal interest is to privatize MWSS. And the International Finance Corporation (IFC) was commissioned to provide technical assistance in developing the process of privatization, organizing the relevant data and analyses, designing the contractual arrangements, and ensuring transparency in the bidding procedures.

Nature of Private Sector Participation

The form of private sector participation chosen was a 25-year concession agreement, which transfers to a private contractor the overall responsibility for the operations, maintenance, and investments in the water and sewerage system. It was also decided to divide the MWSS service area into the West and East Zones and grant the concessions to two different private companies in order to promote competition and generate yardstick information for more effective regulation (see Figure 1 indicating the boundary between zones). The West Zone accounts for

about 60% of the population and of water connections in the service area and is also more densely populated. It is bounded in the west by the coastal area of Manila Bay, where groundwater depletion has already lowered water tables increasing pumping costs and causing saline water intrusion. Because of an older pipe distribution network, the West Zone is characterized by a higher rate of non-revenue water (estimated to be 60-70% in comparison to 50-55% for the East Zone).

It was also deemed desirable from the point of view of ensuring a stronger financial resource base and technical capability to require foreign private participation; though as the law stipulates, Filipinos must own at least 60% of equity. Other requirements related to relevant experience and financial capability of both local and foreign partners were also imposed for pre-qualification in the bidding process to ensure a competent field of bidders.[3]

Under a privatized MWSS, therefore, the operations, maintenance, and investments for water, sewerage, and sanitation services become the responsibility of the two private concessionaires for the West and East Zones, respectively. The operations of commonly used facilities upstream from the service areas shall also be undertaken by both concessionaires as a joint venture.

A residual MWSS together with its Board is retained to facilitate the exercise by the concessionaire of its agency powers; carry out accounting and notification functions, administer

[3]The Filipino partner must have experience in one or more infrastructure business such as water supply, communications, power, construction, or real estate which generates at least ₱1 billion (US$ 33 million) in revenue annually or involve ₱ 2 billion (US$ 67 million) in equity. The foreign partner, in turn, should have experience in each of water supply treatment and distribution; wastewater treatment and sewerage services; metering, leakage control, and customer service and billing; and design and construction management for system expansion. It should also have had two years experience of supplying potable water and sewerage services to areas with at least 2.5 million population, one million connections, and 10,000 kms. of main pipes. Financially, the foreign partner must be generating $30 million in annual revenues from water and sewerage services and has investments of $ 1 billion in equity. Both the local and foreign partners must each be a single company (not an association of companies though more than one firm may be allowed through a special purpose subsidiary).

domestic and foreign loans related to the existing projects, and manage retained assets including the on-going development and eventual operations of the Umiray-Angat Transbasin Project (UATP)[4] and other large-scale water supply expansion projects. The manpower compliment of the residual MWSS is currently 104, including the members of the Board, an Administrator and Deputy Administrator, and staff members for three departments (Administration and Finance, Engineering and Project Management Office, and Asset Management and General Services).

In addition to the residual MWSS, a Regulatory Office (RO) is established to monitor and enforce compliance by the concessionaires of the contractual obligations under the concession agreement, implement rate adjustments, arrange for public dissemination of relevant information, respond to complaints against concessionaires, and prosecute or defend proceedings before the Appeals panel. There are about 60 employees in the RO, headed by a Chief Regulator and four Regulators corresponding to technical, financial, and customer service regulations as well as for administration and legal matters.

Prior to the privatization, the MWSS also took a number of steps to facilitate that process, ease the transition problems, and minimize political opposition. Since the MWSS was overstaffed and the strongest opposition to privatization stemmed from its labor force, an early retirement program was instituted in August 1996 which reduced the number of employees by a third from 7,500 down to 5,200. The average water tariff was also raised from ₱ 6.43/cu.m. to ₱ 8.78/cu.m., primarily to comply with the loan covenant of an ADB-funded project. Although perhaps unintended, that higher average tariff increased the probability that privatization would

[4] The UATP augments the Angat Reservoir by diverting water from Umiray River which drains its water into the eastern slope of the Sierra Madre. An additional bulk water supply of 800 mld is expected upon completion of the UATP in June of 1999.

lead to lower average price of water, and thus make the shift to private sector management more politically acceptable to the public.

Concession Agreement

The concession agreement specifies the transitional arrangements; the service, financial, and other obligations of the concessionaires; the obligations of MWSS including its residual functions together with the new Regulatory Office; provisions for water charges, rate adjustments, dispute resolution; and other contract conditions. The transitional arrangements relate to transfer of employees, liabilities/revenues, accounts receivables, facilities, existing projects, cash, and marketable securities. More than a year after privatization, the shift from a public to a private sector management of the MWSS which involved organizational restructuring, reduction of the labor force, and resolution of the interconnection charges among others, was implemented without any major difficulties.[5]

Obligations of Concessionaires

In terms of service obligations, the concessionaires are required to expand coverage of water supply, sewerage, and sanitation services; provide 24-hour water supply to all connections not later than June 2000 (and substitute alternative supplies at standard rates if source is interrupted for more than 24 hours); maintain water pressure at 16 psi by 2007 for all connections, and meet the national health and environmental standards on quality of drinking water, wastewater discharge, and industrial effluents.

Tables 4 and 5 report the water supply coverage targets by municipality in the West and East Zones, respectively, starting at 2001 and every five years up to 2021. On the whole, the concessionaires are expected to increase population coverage of water service from an initial 67%

[5] Despite the initial strong opposition against privatization by the MWSS employees, the specific provisions of the Agreement about employee matters such as hiring policies, mandatory severance payments, non-diminution of benefits, and employee stock option plans were accepted and successfully eased potential labor problems during the transition period.

to 85% by 2001, 96% by 2006 and beyond. The targets are somewhat lower for the East Zone and for municipalities in both zones where the population is more geographically dispersed. By the year 2001, the most heavily populated inner cities of Metro Manila - -Manila, Pasay, Quezon, Caloocan, Mandaluyong, San Juan -- as well as Cavite City, are supposed to be fully covered. And by 2006, households in nearly all cities in the National Capital Region except for Las Piñas, Muntinlupa, as well as three municipalities in Cavite and two in Rizal should have been fully covered.

The concessionaires are also obligated to cover households (in depressed areas who typically do not own their home lots and dwellings and may actually be squatters) who may not be able to afford paying individual connection fees (or where the cost of connection relative to expected revenue may be too high) by establishing public standpipes in the ratio of 1 per 475 people.

It should be emphasized that the coverage targets on water supply refer to the population except those who already have piped water connection from a source other than the MWSS system.[6] Hence, the population obtaining water from their own deepwells or from private waterworks located in areas where the MWSS water service is unreliable and/or are not reached by the distribution network at the time of their establishment are not covered by the service obligation. Also, the Agreement does not specify whether or not the coverage includes commercial and industrial establishments. However, the fact that the coverage is expressed in terms of the population may be interpreted that only household or domestic demand for water is considered and not commercial and industrial water use. The exceptions in coverage constitute a

[6] This is how coverage is defined in Schedule 2 which presents targets by municipalities. In the text of the Agreement, the exclusion refers to users who obtain water from a legal source other than the MWSS system. As a rule, large-scale groundwater users such as private waterworks, commercial, and industrial establishments are required to obtain permits from the NWRB. In practice, majority of large wells are not registered and hence are technically speaking, illegal. In this case the two definitions of exclusions may not always be consistent.

major proportion of total water demand. As mentioned earlier, at least 40% of total water use is estimated to be sourced through groundwater mostly from own deepwells and private waterworks (JICA 1992).

The cost of increasing raw water supply needed to meet the water service obligations during the first ten years of the concession period is expected to be paid for by concessionaires' investments. These are to be made directly through efforts in reducing non-revenue water and rehabilitating old and developing new wells; and indirectly through the concession fee payments used to amortize debts arising from existing water supply expansion projects, including the UATP. The bidders for the West Zone were also made to assume that an additional 300 mld of bulk water will be made available by the end of 1999 at no cost to the concessionaire through a Build-Operate-Transfer (BOT) project that will treat Laguna Lake water. It is unlikely that MWSS will absorb the cost of producing such treated water, and thus its cost will have to be eventually passed on to consumers through higher tariff.

Beyond the tenth year, the contract implicitly recognized the need for another major source of bulk water from surface sources, specifically the Laiban Dam project,[7] in order to meet performance targets. It also stipulates that the cost of such investment will be deemed zero for the concessionaire; in other words, the cost will be eventually passed on to consumers.

Sewerage and Sanitation

The coverage targets for sewerage and sanitation services are limited to households connected to the MWSS water system. Tables 6 and 7 show the coverage targets separately for sewer connection and sanitation services by municipality in the West and East Zones, respectively. As a whole, coverage for sewer connection is scheduled to increase slowly from 7% at the beginning of the concession period to 14% in 2001 and 18% in 2006, after which it will

[7] This involves building a new dam and reservoir in the Kaliwa River basin in Tanay, Rizal, east of Metro Manila which can provide a total additional water supply of 1900 mld.

rise up to 62% by 2021 as the development of sewerage infrastructure is completed. In the meantime, sanitation services, defined as desludging of septic tanks every 5 to 7 years, would be the more common method of addressing the domestic sewage problems. Target coverage of sanitation services is scheduled to decrease over time from about 41% in 2001 down to 24% by 2021.

Although coverage is not complete, at least 90% of households in nearly all of the municipalities in the NCR are to be provided with either sewerage or sanitation services. Because of the much higher cost of sewerage and sanitation services in less densely populated regions, coverage targets of households in the municipalities of Cavite and Rizal are generally much lower and limited to sanitation services, except in Cainta and Taytay of Rizal.

The capital and operational costs of expanded sewerage and sanitation services shall be passed on to the customers even before the coverage targets have been fully achieved. The concession agreement specified that by January 2003, the sewerage charge will increase from 50% of the corresponding water bill to 150%, while the 10% environmental fee currently charged to MWSS customers not connected to the sewerage system shall be replaced by a sanitation charge equal to 75% of the water bill.

Financial Obligations

The financial obligations of the concessionaires pertain to the size of equity investments, the performance bond, and the various fees designed to free the national government from having to subsidize MWSS as it had done historically. In terms of equity investments, each of the local and international partners are required to maintain an equity share of 20% for the first five years and 10% thereafter. And the initial cash equity investments shall be in the amount of ₱3 billion ($100 million) for the West Zone and ₱2 billion ($67 million) for the East Zone.

To be renewed annually, a performance bond of $120 million for the West Zone and $70 million for the East Zone must be maintained during the initial ten years, after which the

performance bond declines for each successive rebasing date. The cost of any non-compliance to the Concession Agreement by the concessionaire shall be withdrawn automatically from the performance bond.

Upon the takeover of the MWSS operations, a commencement fee of US$5 million was collected from each concessionaire. Revenues from this fee were used to pay for the cost incurred in the process of privatization, including the technical assistance contract with the IFC.

Annually, concession fees are to be paid to cover the amortization payments of the local and foreign debts of the MWSS, and the costs of the operations of the residual MWSS and its Regulatory Office. For the latter, each concessionaire shall contribute ₱100 million for a total of ₱200 million which will be distributed about equally between the Regulatory Office and the residual MWSS.

In contrast, the West Zone was charged substantially more (90%) of the total amortization payments than the East Zone (10%) as concession fees.[8] Tables 8 and 9 report the concession fees to be paid by the West Zone and East Zone, respectively, which decline sharply over time as existing debts are paid off. It should be noted that while these concession fees are expressed in the peso currency at the exchange rate of ₱26.30 to $1.00 in December 1996, the concession fee obligation for the amortization of foreign loans are denominated in US dollars.

Other Provisions

Water charges. The average tariffs shall initially be set based on the bid price, expressed as the percentage of the current average tariff to which the concessionaire will reduce tariffs. That percentage is to be applied to the current increasing block tariff structure that is higher for commercial and industrial users compared to household consumers. In addition, the

[8]In general, concessionaires are charged 90% of the amortization of all existing MWSS loans which have been disbursed prior to the commencement date; and the total amortization of the foreign and local loans, local component costs and cost overruns of the UATP and other existing projects that have not been disbursed at commencement date.

concessionaire may apply a CERA (Currency Exchange Rate Adjustment) charge of 1 per cu.m. of water consumed and collect a connection charge for water or sewer connection not to exceed ₱ 3000 (adjusted for inflation) for distances of less than 25 meters between the connection point and the customer and at a reasonable cost for customers further away.[9]

Rate adjustments. The Agreement provides for water tariff rate adjustments from time to time, subject to the MWSS's Charter limitation on its rate of return which is equal to 12% of the book value of its assets. As will become clear below, that limitation is essentially redundant because the Agreement's effective cap on the concessionaire's rate of return on its own investments is reflected in the Appropriate Discount Rate (ADR). The Agreement stipulates that the ADR should be "in line with the rates of return being allowed from time to time to the operation of long-term infrastructure concession arrangements in other countries having a credit standing similar to that of the Philippines." At least in the first five years of the concession period, the ADR is what is implied by the financial bid price of the concessionaires, which presumably reflects the rate of return they are willing to accept for managing the concessions according to the contract.

There are three bases for rate adjustment: inflation, extraordinary circumstances, and rebasing. Inflationary factors are explicitly stated as grounds for changes in connection charges. In terms of water tariffs, adjustment for inflation is also allowed implicitly by the fact that bidders were made to assume that over the life of the concessions, inflation rate will be considered zero. Grounds for extraordinary price adjustments include amendments in the service obligations,

[9] The CERA was first imposed in 1984 to increase MWSS revenues and pay the additional amortization cost on its foreign loans as a result of the sharp peso devaluation in 1983. The CERA provision in the Concession Agreement is somewhat of a misnomer; it is a simple surcharge which is not linked to changes in the foreign exchange rate.

changes in the law and other government regulations that affect cash flows, availment of below market interest rate financing from any multilateral or bilateral sources, movements in the exchange rate above 2%, erroneous bidding assumptions provided by MWSS prior to the bid, increases in the concession fees, delays in the completion of the UATP, and increases in the operational cost as a result of an uninsured Event of Force Majeure. The latter includes among others, war, volcanic eruption, unusually severe weather conditions, prolonged strikes, and any other event, matter, or thing which shall not be within the reasonable control of the concessionaires.

Whereas inflation and extraordinary circumstances may be allowed as grounds for price adjustment any time after the first year, rate rebasing follows a five-year cycle. The Agreement specifies that from and after the tenth year or the second rate rebasing date, water tariffs shall be set to allow concessionaires to recover over the concession period, "operating, capital maintenance, and investment expenditures efficiently and prudently incurred; Philippine business taxes and payments corresponding to debt service on the MWSS loans and concessionaire loans incurred to finance such expenditures, and to earn a rate of return (referred to herein as the Appropriate Discount Rate) on these expenditures for the remaining term of the Concession." The Regulatory Office, however, may decide to consider a rebasing adjustment earlier, on the first rebasing date or the 5th anniversary of the concession's commencement date which is year 2003.

Taxes. The concessionaires are granted a six-year income tax holiday, a preferential tariff of 3% on the importation of capital equipment and tax credits on locally fabricated capital equipment until the end of 1997, and exemptions from local government and franchise taxes, and value added tax (VAT) on the supply and distribution of water. But a 10%VAT will be applicable to the business of providing sewerage and sanitation services.

Bidding Process

Based on pre-qualification criteria, four companies were shortlisted.[10] These companies were required to bid for both the West and East Zones by first submitting their technical bids and plans for achieving the service obligations specified in the contract. After evaluation of the technical bids, which all the four companies passed, the second and final step was the submission of financial bids expressed in terms of the percentage of current average tariffs to which the concessionaire would reduce water tariffs.

Unexpectedly, the Ayala/International Water (AIW) financial bids for both zones (25%-30%) were far lower than those made by the other companies which submitted fairly similar bids ranging from 50%-60%. Since a company may only win one of the concessions, the average tariff in the East Zone won by the Ayala/International Water (now called the Manila Water Company), turned out to be only about half (₱2.32 or $0.09 per cu.m. at 26.4% bid) that of the West Zone (₱ 4.97 or $ 0.19 per cu.m. at 56.6% bid) which was won by Benpres/Lyonnaise (now Maynilad Water Services Inc.).[11] The bid prices were generally low even by comparison to the earlier price of ₱6.43/cm which was raised to ₱8.78 /cu.m. a few months before the financial bidding. Metro Manila now has the lowest price of water within the country and in the ASEAN region (see Appendix Tables 2 and 3). Bangkok has the next lowest average price at $0.31 per cu.m. while the highest is in Jakarta at $0.61 per cu.m. (McIntosh and Yñiguez 1997).

[10]Namely: Ayala/International Water (United Utilities and Bechtel), Benpres/Lyonnaise de Eux, Aboitiz/Cie General de Eux, and Metro Pacific/Anglian Water.

[11]If CERA and the environmental fee of 10% are included, the average composite price in the East Zone in $0.14 per cu.m. and $0.25 per cu.m.

Ironically, the decision to have two separate concessions in order to guard against monopoly profits resulted in a situation where a higher bid price had to be accepted and the price of MWSS water to differ significantly between the two zones. It was generally believed that the higher bid prices provided the normal rate of return, while Manila Water's bid was too aggressive and would not be financially viable over the long-term. But the bidding procedure did not specify any minimum financial bid nor any mechanism to prevent wide disparity in water prices in the event that winning bids differ substantially between the two zones. Although the concession fee is much higher in the West Zone, this was supposed to be balanced by the expected lower operational cost per cu.m. due to the higher population density in this service area, and thus similar financial bids were expected for the two zones.

General Issues and Concerns

It is obviously too early to fully evaluate the impact of the MWSS privatization on efficiency, the poor, and the environment. Nonetheless, an analysis of the provisions of the concession agreement and the underlying technical and business assumptions used in decision-making would be useful in deriving preliminary assessments of its potential impact. Whether or not the societal objectives with regards to water resource management in the greater Metro Manila are achieved, however, depends not only on the performance of the privatized MWSS but on the effectiveness of the overall regulatory and policy framework.

The water sector's performance under a privatized MWSS structure so far indicates a number of efficiency gains. MWSS water service is now delivered at a much lower cost to consumers especially to the East Zone. The number of employees have dropped by another 20-25%, and now average 5 employees per 1000 connections. Meter replacements have accelerated, repairs of leaks are more prompt, and a variety of measures have been adopted to reduce illegal connections. Monitoring of water quality and wastewater effluents from the sewerage system has

become more systematic and enforcement of environmental standards more effective. Quarterly service performance reports relating to the fulfilment of the concessionaires obligations are submitted and these are verified by the Regulatory Office.

Improvements in the management of water supply have also been apparent from the more timely and effective response of the various government agencies concerned to the severe drought caused by the El Niño compared to previous drought episodes. Farmers were informed about the lack of irrigation water before the planting season; an orderly rotation of scarce urban water supply was implemented; mobile and stationary tankers were deployed in depressed areas; and public expenditures for shallow wells and deepwells were increased.

The severe shortage of raw water from the Angat Dam (25-30% reduction) and the sharp devaluation of the peso (about 60%) within the first year of privatization, however, have had significantly negative effects on the concessionaires' net cash flows. By March of 1998, the two concessionaires petitioned for upward rate adjustments, but only a small increase was granted to compensate for the impact of devaluation as the water shortage due to El Niño was considered a recurrent phenomenon that should have been taken into account.[12]

Appeals have been submitted for reconsideration and all parties now expect that a rebasing adjustment will be requested at the first rebasing date or fifth year. Whereas the government should control possible monopoly profits by the private water concessionaires, pricing policy must be evaluated more broadly as a means for establishing the correct level of incentives so that an adequate water, sewerage, and sanitation service may be provided to all at the minimum cost and at prices consumers are willing to pay.

[12] The East Zone requested for an increase of ₱2.06/cu.m., but was granted only 4 centavos per cu.m. plus 21 centavos for adjustment to inflation. The West Zone asked for a 74 centavos increase and was allowed to raise water tariff by 31 centavos per cu.m. plus 53 centavos for inflation.

It should be pointed out that the difference in water rates between the two zones have further widened after the rate adjustment. Interestingly, the concession fee structure was designed to equalize the cost of operations in the two zones. And indeed, financial bids of each company were similar for the two zones. Yet, the bidding procedure resulted in two very different water tariffs and the recent rate adjustments increased this difference. Clearly, such wide tariff differences between the two zones were never intended and are unfair to the customers. Moreover, analysis of the implications of MWSS privatization on efficiency, the poor, and the environment should not be based solely on the MWSS-specific issues, but also from the perspective of the overall regulatory, institutional, and pricing policy frameworks affecting the water sector.

There are at least three major reasons why the potentially positive impact of privatization may be limited:

The pricing policy implied by the concession agreement and the bidding procedure does not take full account of the opportunity cost of water and the cost of externalities in water production and consumption. The water tariff structure now presumably reflects the minimum average financial cost of treatment (and production of groundwater) and distribution of water, as well as sewerage and sanitation services. Prior to privatization, the pricing policy similarly accounted only for the financial cost of MWSS operations but it also covered the cost of inefficiencies under public sector management.

There is no price charged on the raw water from the Angat Reservoir despite competing use of that water among irrigation, urban use, and electricity generation, as already established in the ADB study (1996). The NWRB does not levy any significant pumping charge, although there are competing uses of groundwater, and depletion has already increased pumping costs and caused saline water intrusion and land subsidence in many parts of the service area.

Consequently, such a pricing policy will misallocate water resources in favor of lower valued uses, worsen groundwater depletion, and promote wasteful usage of water.

Politically, the imposition of the appropriate raw water charge for Angat water and pumping charges for groundwater at the time of the MWSS privatization would have been very timely. A raw water charge for Angat water (or a pumping charge) of as much as ₱2 per cu.m. based on the 1996 ADB estimate of the economic value of long-term water transfer from irrigation to urban use could have been imposed without increasing the water tariffs to the consumers.

Apparently, IFC proposed the principle of such a raw water charge for Angat water, but the idea was rejected because that may raise water tariffs after privatization as the very low bid prices were quite unexpected. It was also believed that revenues from such charges will accrue to the general treasury and may not benefit the water sector nor the consumers in the service area. And because of fragmentation of water resource management, the need for stronger regulation of groundwater pumping and for charging the opportunity cost of Angat water through pricing mechanisms were not considered during the MWSS privatization process. Revenues from such charges could have funded the much needed water-related investments in groundwater recharge, watershed protection, administration costs of a more effective water resource planning and management, enforcement of regulations, and possible subsidies for water-related needs of the poor.

Coverage Targets

It should be noted that the interpretation of water supply coverage targets seems to differ between what is socially desirable and thus should be intended by the government and what is actually stipulated in the Agreement.

The Agreement defines the water supply coverage target to exclude users who are connected to a piped source of water other than from the MWSS system and was silent about the

targets for the commercial and industrial users of water. That means a significant number of the households and the bulk of water requirements of the industrial and commercial firms relying fully (or in conjunction with MWSS water) on own wells and private waterworks will not have to be supplied with MWSS water. Yet, surface sources of water supply which can only be developed viably on a large scale will have to replace pumping wells if groundwater depletion is to be addressed. Available data also indicate that the full economic cost of groundwater pumping would likely be greater than the cost of expanding surface water supply through the sectoral reallocation of Angat Dam or the construction of the Laiban Dam (ADB 1996; Electrowatt and Renardet 1997). And certainly, the households and other water users would be willing to pay significantly higher price of water than the new MWSS prices as evidenced by the higher effective cost of water to consumers with MWSS connections who often use booster pumps and storage tanks, and those depending on own wells, private waterworks, and vended water.

According to several former and current officials of the MWSS, the targets were meant to cover all of the population who would want to avail of its water supply. The exclusion clause was not deemed a problem because of the belief that it is to the interest of the concessionaires to expand coverage. But that is only true if the marginal revenue is greater than marginal cost of increasing water supply, or when the Angat water or other bulk water priced at zero, is plentiful. While reductions in non-revenue water (NRW) from 60% to 30% may be easily accomplished by addressing the problem of illegal connections and water theft, that will simply increase revenues but not water supply. Given the present water rate structure, however, the marginal cost of increasing water supply by further reductions of NRW through pipe rehabilitation or intensifying groundwater pumping will likely be higher than marginal revenues.

Demand Projections

Concessionaires determined their financial and technical bids for the rights to operate the MWSS in return for meeting the service, financial, and other obligations. These bids were made on the basis of various information, including projections of water demand, expected raw water supply from the Angat Reservoir and other sources that is supposed to be available at no cost to the concessionaires up to the 10th year, the size and quality of the facilities, current sources of water supply of households and firms within the service area, and so forth.

A recent review of water demand projections for the MWSS service area suggests that these are generally underestimated because of faulty assumptions, limited data availability, and dearth of empirical analysis and economic estimations of water demand relationships (David 1998). For example, official population projections by the National Statistics Office have proven to be consistently underestimated. There is no reliable information about the commercial and industrial water use which are largely supplied from own wells. Although the IFC and the private bidders must have made their own projections(but are not published), these would likely have suffered from the same weaknesses.

Figure 2 show projected surface sources of water supply, sustainable groundwater supply, and more reasonable (i.e. higher) water demand projections conducted by the Electrowatt and Renardet (1991) and David et al (1998) which turned out to be quite similar.[13] If only the sustainable groundwater abstraction of about 500 mld is permitted (100 mld by MWSS and 400 mld for private wells), these numbers indicate substantial shortfalls in surface water supply over the long-term, unless demand for water declines which may be expected only if the price of water

[13]These projections assumed a higher rate of per capita household water consumption to account for suppressed demand due to water rationing and unbilled water that is actually consumed. In the case of David et al. (1998), a higher population growth rate and base year industrial and commercial water consumption were assumed.

is raised to cover the full economic cost and/or regulations against water pollution are strengthened.

In any case, if water demand projections have been underestimated, water supply from surface sources will be quite limited, and water supply performance targets may not be met before the Laiban Dam Project is completed. In cases of water shortages, it is usually the poor who will not have access to the low-priced MWSS water. Even if the narrow coverage targets as strictly defined in the Agreement are met, this would mean increasing reliance on own wells or private waterworks and worsening groundwater depletion because users will not wait for coverage targets to be met on schedule.

Increasing Block Tariff Structure

The MWSS's highly complex, increasing block tariff structure has been initially adopted by the private concessionaires, though the Agreement permits tariff structure adjustments subject to approval by the Regulatory Office (Table 10a and 10b). Four users are distinguished: Residential, Semi-business, Business I, and Business II. Tariffs are lowest for households and highest for large-scale industrial or commercial users of water (Business II). The difference between these two types of users was much greater at the lowest consumption block of the first 10 cu.m. (5 times) compared to the higher blocks (50% differences). Residential and semi-business connections face 9 blocks while 33 blocks are detailed for the business connections. Residential connections are characterized by sharply rising block tariffs (4 times from lowest to highest), semi-business more gradual (2.5 times), while business connections have relatively flat rates (1.4 times).

The increasing block tariff structure is usually justified as a means of cross-subsidizing the poor households, promoting water conservation, and being consistent with marginal cost pricing. There is growing recognition, however, that a highly complicated increasing block

structure have serious disadvantages, often defeating its original purpose (Whittington 1992; Boland and Whittington 1998).

In practice, most of the poor are not able to obtain individual MWSS connection, but instead have to rely on the high-cost vended water. Many of the poor also share MWSS water connections or standpipes or buy water from neighbors with private connections. And because of the increasing block tariff structure these poor households end up paying water prices at the high end of the structure as total water use would exceed the lower consumption blocks. The initial minimum water consumption block of 10 cum per month is also typically higher than water use of the very poor households with individual MWSS connections (estimated at about 3-5 cum), effectively raising the unit price of water for the poor relative to the middle-income households consuming greater amounts of water.

The much higher water tariffs for commercial and business establishments coupled by economies of scale in deepwell operations promote groundwater pumping exacerbating its depletion. There may also be efficiency losses as the marginal cost of increasing water supply from large-scale surface sources may be lower than from deepwells, especially when the full economic cost of groundwater pumping is considered.

The very complex increasing block water tariff structure makes it also more difficult for the operator to project revenues and for the consumer to determine the marginal cost of increasing its water use. The price elasticities of water demand by income class, by type of user, and by size of firm are seldom known, but these parameters are necessary in deriving revenue projections. On the other hand, when the price signals are not transparent, such as in block tariff structure, consumers will not be able to properly respond to it.

Implications on the Poor

The government has historically addressed the water needs of the poor in two general ways. For MWSS (and other public water utility firms), an increasing block tariff structure together with higher prices for commercial and industrial firms is adopted as the pricing policy to cross-subsidize poor households. In Metro Manila, household surveys in 1995 and 1998 (David and Inocencio 1996; 1999) indicate that majority of low-income households do not have individual piped water connection, but rely instead on vended water. Most poor households are not eligible for water connection due to lack of ownership title to the land or permission from public and private owners of the land. Although there have been in the past a black market price for obtaining a water connection, an ordinary low-income household cannot afford its high cost. Many poor households also live in areas outside the pipe distribution network.

The MWSS has established a number of standpipes in squatter areas but these are very few. A recent count (ADB 1992) shows the ratio of standpipes to total number of connections to be less than 0.2%. Furthermore, a preliminary assessment suggests that a significant number of these are not operational either because its management has failed to remit collected funds or water supply is so intermittent that households have not been willing to continue payment.

The other approach has been to directly subsidize the construction of shallow wells and deepwells of varying sizes for common use by communities in depressed areas. Prior to the passage of the Local Government Code in 1991, these constructions were managed by the Department of Public Works and Highways. By 1992, that responsibility was transferred to local governments. In addition, both congressmen and senators have allocated some of their pork barrel funds for that purpose. In the recent election, political candidates also donated funds for construction of wells to win votes among poor households..

The impact of privatization on the poor depends largely on the adequacy of MWSS water supply. Provisions in the Agreement related to the poor are the retention of the increasing block tariff structure and the establishment of public standpipes for every 475 people within depressed

areas free of installation charge. With water supply shortages, however, the poor would tend to receive low priority, especially if concessionaires were compelled to charge the lowest tariff block. The Agreement in fact did not make that provision and thus poorer households covered by the performance targets would most likely be served through sharing of water connection or public standpipes paying higher prices than middle and higher-income households. The price ultimately paid by the poor households would also depend on how the distribution of water from the public standpipe will be managed.

On the ground, a wide variety of formal and informal mechanisms for distributing water from different sources exists and are evolving in the low income areas. Preliminary results in the recently completed survey of low-income households show that only about 20-25% of respondents have individual MWSS connections (David and Inocencio 1999). The majority rely on vended water sourced from MWSS connections or pipes and on sharing the water bill from an MWSS connection. Average cost of shared MWSS water is at the higher end of the tariff structure while the price of vended MWSS water ranged from about ₱30 per cu.m. when based on a fixed rate and picked up from the source, up to about ₱200 per cu.m. when MWSS water is delivered by trucks. More common is the practice of vendors selling MWSS water by container at a price close to ₱50 per cu.m. The remainder would be about equally divided between those who rely on public pumps or public faucets and vended water from deepwells. The price of water from public pumps/faucets range from an average of ₱10 per cu.m. to more than ₱40 per cu.m. depending on the quality of water and location. Vended deepwell water cost about ₱100 per cu.m. on the average when picked up or transferred by hose to high as an average of ₱150 per cu.m. when delivered by trucks.

Comparing the 1995 and 1998 surveys of low-income households, certain trends may be observed (David and Inocencio 1996; 1999). The proportion of household respondents with MWSS connections has decreased, as public pumps and faucets, water vending, and sharing of

MWSS connection have become more important mechanisms for water distribution. It is interesting to note that the price of vended water from both MWSS and deepwell sources have increased significantly despite reduction in the average official price of MWSS water.

The above trends are to be expected as MWSS water supply has declined due to the El Niño, demand for water in general and for other sources of water in particular have increased, and the cost of groundwater pumping have risen. As argued earlier, limited water supply results in the benefits of low-priced MWSS water accruing mostly to the relatively high and middle-income households. While the average price of MWSS water from shared connection is lower than when these are vended, the increasing block tariff structure has caused the perverse pattern that the higher income customers pay a lower unit price of water than lower income households who have to share the water bill from a single connection. This is quite unfortunate since sharing of water connection would be one of the more efficient ways of extending access to MWSS water service to poor households who cannot afford a separate connection. On the other hand, charging the lowest price for water distributed through shared connections and standpipes would only promote cheating and lower incentive for the concessionaires to allocate more of the scarce water supply to low-income areas.

Implications on the Environment

Health and Water Pollution

The privatization's potential major contributions to health and reduction of water pollution relate to the following. It attempts to internalize the externalities in water consumption through a more organized and expanded efforts at dealing with sewerage and sanitation problems and full cost recovery pricing. Stricter enforcement of drinking water and wastewater standards may be expected because the Regulatory Office is adequately funded and dedicated to monitor and enforce these standards. Moreover, there is a greater incentive to comply as non-compliance means breaching one of the service obligations. As mentioned earlier, sewerage and sanitation services prior to privatization have been extremely limited. And though wastewater and industrial effluent regulations exist, enforcement has been very weak. Some progress has been made through the recent imposition of an effluent charge instituted by the Laguna Lake Development Authority (LLDA) which cover a large part of the MWSS service area.

It should be stressed, however, that the exclusion of a segment of the population and the commercial and industrial users of water in the water supply and sewerage and sanitation targets leave a significant part of the population with little government support to ensure good quality of drinking water. That also ignored the larger part of wastewater from commercial and industrial establishments, self-supplied water users and those dependent on private works who will have no access to a possibly more efficient and less costly means of dealing with wastewater and industrial effluents. Nonetheless, without MWSS privatization, expansion of sewerage and sanitation services is difficult to expect, especially in regard to addressing such problems in depressed or squatter areas which may now be covered by the concession agreements. After all, diarrhea a water-borne disease is the most important cause of morbidity and the fourth leading cause of infant mortality in the country (Philippine Statistical Yearbook, 1998).

Water Conservation and Groundwater Depletion

The imposition of higher sewerage and sanitation charges that largely take account of the cost of externalities involved in water consumption will increase incentives to save water, at least the opportunity cost of water, among customers covered by such services. To the extent that conjunctive users of own wells and MWSS water do not have to pay the cost of sewer nor sanitation charge from self-supplied water, the incentive to conserve water is in part dissipated.

The price of MWSS water continues to reflect only the financial cost of production and distribution of water and sewerage and sanitation services and no charges are imposed to cover the opportunity cost of water, the cost of externalities of groundwater pumping nor the externality cost of water consumption among self-supplied water users and those dependent on private waterworks. Thus, wasteful usage of water, overpumping of groundwater, and pollution of water bodies will likewise continue to have negative environmental and health consequences.

The failure to impose any raw water charge to cover the opportunity cost of Angat water and pumping charge for use of groundwater also lessens the incentive for concessionaires to invest in reducing non-revenue water since the net gain would be lower than when these costs are considered. The lack of any significant pumping charge for groundwater use means that groundwater depletion will remain unabated. Severe water shortage in the Angat Reservoir due to the recent El Niño has already led to increased investments in deepwells by households, industrial, and commercial establishments, as well as by the national and local governments throughout the MWSS service area.

Underestimation of demand projections has lessened the perceived severity of surface water shortage and pushed back the scheduling of surface water supply development, specifically the Laiban Dam construction. Such large-scale, long-term water supply expansion project will not be undertaken by the concessionaires, within the contractual tariff rate and provisions for its adjustments. And hence, abstraction of groundwater will accelerate as the concessionaires rely

on deepwells to meet performance targets and real estate developers, households, industrial and commercial establishments cope with the limited service of the water utility firms.

The treatment of Laguna Lake water to provide 300 mld of water supply to the West Zone will partly alleviate the supply gap. Thus far, however, there has been no study on the environmental implications of such consumptive use of Lake water, nor the financial viability of such undertaking if pollution of Lake water remains unabated.

Concluding Remarks

The privatization of MWSS is an important positive step towards improving water resource management in the greater Metro Manila. Realizing the full potential gains from that initial step over the long-term depends critically on the following:

* the ability of the Regulatory Office and the residual MWSS to enforce the contractual agreements (not just the letter but the spirit), anticipate potential problems arising from possible weaknesses in the contract design and changes in the underlying assumptions, data, and analysis used in developing the contract and the technical and financial bids, and expeditiously implement the necessary adjustments in the contract and mode of operation.

* their readiness to adopt a more integrated and holistic approach in dealing with the inherently interrelated issues of water supply and sewerage planning and operations, demand management, pollution control, and watershed and groundwater protection.

* the government's ability to undertake the necessary institutional, regulatory, and policy reforms in the water sector to ensure effective coordination of policies and programs and establish appropriate incentive and control structures for more efficient, equitable, and sustainable management and utilization of water.

It should be emphasized that the regulation and management of the privatized MWSS structure must be evaluated from the perspective of achieving the overall objective of economic efficiency, social equity, and environmental sustainability. These should not viewed narrowly from the perspective of enforcing contractual agreements and minimizing water prices. Clearly, the adoption of full economic cost pricing policy is a critical step which would involve the imposition of a raw water charge on Angat water, pumping charge for groundwater abstraction, and water pollution tax beyond the LLDA coverage area. Government revenues from such charges may be earmarked for water resource management-related activities, including the strengthening of public sector's technical capability for planning, policy analysis and formulation, regulatory design and enforcement. These may involve improvements in statistical data base on groundwater abstraction and recharge, water quality, streamflow of relevant river systems, among others; conducting analytical studies for more accurate water demand projections and water supply and sewerage planning, and other long-term research on resource management issues; subsidizing the cost of water, sewerage, and sanitation service provision to poor households; funding efforts for increasing groundwater recharge and strengthening watershed and groundwater protection; and financing capital and operational cost of water treatment facilities and other methods for rehabilitating polluted water bodies.

To resolve the other issues and concerns raised about the provisions of the Concession Agreement, there is a need to undertake the following. Water demand-supply projections need to be reviewed taking into account the problem of groundwater depletion in order to make the necessary adjustments on water supply development projects and coverage targets. Reducing the difference in water tariffs between the two zones and simplifying the water tariff rate structure to narrow the wide price difference across types of users and consumption blocks should be considered. And finally, there may be a need to review the appropriate level of sanitation charge, especially if water tariffs increase significantly.

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Table 1. Estimated water consumption by type of user and source of water supply in the MWSS service area, 1990 (mld).

	Households	Industry	Commercial	Total	
				(1)	(2)
MWSS	785[a]	75[a]	304[a]	1,163[a]	1,744[b]
				(58)	(67)
% of MWSS	68	6	26		
% of user	69	19	76		
Private wells	379	355	107	841	841
				(42)	(33)
% of PW	45	42	13		
% of user	31	81	24		
Total	1164	429	411	2,004	2,585
	(58)	(21)	(21)	(100)	(100)

[a] Refers to billed water only.

[b] Refers to billed water plus estimated non-revenue water consumed through illegal connections and tampered meters. The latter is assumed to be 20% of water production based on findings of David and Inocencion (1996).

Figures in parenthesis are % shares to total

Source of basic data: JICA 1992.

Table 2. Average cost of water and distribution of households by source of water, Metro Manila, 1995.

Source	% of household	Average cost (P/cu m)	Monthly income (P/capita)	% of water bill to income
MWSS				
(w/o sewer)	51	5.5	2887	2.0
(w/sewer)	6	8.5	5648	1.5
Private waterworks	5	7.9	7249	1.9
Individual tubewell	2	n.a.	5031	n.a.
Public faucets	1	22-44	n.a.	
Water vendors	23			
MWSS water	19			
Pick-up		30.4	1168	4.2
Hose (container)		48.3	1223	6.2
Hose (fixed charge)		21.8	1325	2.7
Delivered		71.9	1359	11.9
GW water	4			
Pick-up		40.2	854	5.7
Hose (container)		44.0	2500	4.8
Hose (fixed charge)		58.9	2245	3.8
Delivered		62.3	1850	4.3
Combinations	12			

Source: David and Inocencio, 1996. Based on survey of 500 households in Metro Manila
n.a. = not available

Table 3. Average cost of water by income class in Metro Manila, 1995.

Income class	Average cost * (₱/cu.m.)	% of water bill to income
Under P30,000	36.4	8.2
P 30,000-39,999	15.9	4.4
P 40,000-59,999	15.9	4.2
P 60,000-99,999	15.9	2.9
P 100,000-149,999	13.9	2.2
P 150,000-199,999	9.2	1.6
P 200,000-249,999	5.9	1.4
P 250,000-499,999	8.0	0.8
P 500,000-749,999	6.0	0.8
P 750,000-999,999	9.3	0.8
P 1,000,000 and over	7.1	0.6

* Note that these prices represent the average cost of water various sources.

Source: David and Inocencio 1996.

Table 4. Water supply coverage targets in the service area West Zone (%).*

City/Municipality	2001	2006	2011	2016	2021
NCR					
Manila*	100	100	100	100	100
Pasay	100	100	100	100	100
Caloocan	100	100	100	100	100
Las Piñas	58	91	93	95	98
Malabon	84	100	100	100	100
Valenzuela	84	100	100	100	99
Muntinlupa	53	86	88	90	95
Navotas	92	100	100	100	100
Parañaque	76	100	100	100	100
Cavite					
Cavite City	100	100	100	100	100
Bacoor	58	90	92	93	95
Imus	36	61	63	65	72
Kawit	84	100	100	100	100
Noveleta	60	100	100	100	100
Rosario	42	90	90	90	90
Total area **	**87**	**97**	**97**	**98**	**98**

* Expressed as a percentage of the total population in the designated city or municipality at the time of the target (excluding users who are connected to a piped source of water other than from the MWSS system).

** The Concessionaire (West) shall also be responsible for meeting the new water supply coverage targets (but not the corresponding sewerage targets), in the percentages set out in the Table 5 as it appears in the Other Operator's (East) Concession Agreement, for parts of the following cities or municipalities in service area east: Quezon City, San Mateo, Makati, Marikina and Rodriguez.

Source: Concession Agreement

Table 5. Water supply coverage targets in the service area East Zone (%).*

City/Municipality	2001	2006	2011	2016	2021
NCR					
Mandaluyong	100	100	100	100	100
Makati**	92	100	100	100	100
Marikina**	92	100	100	100	100
Quezon City**	100	100	100	100	100
Pasig	92	100	100	100	100
Pateros	84	100	100	100	100
San Juan	96	100	100	100	100
Taguig	44	100	100	100	100
Rizal					
Angono	51	96	98	100	100
Antipolo	78	95	95	95	97
Baras	34	51	53	55	58
Binangonan	40	81	83	85	87
Cainta	64	80	77	75	79
Cardona	34	51	53	55	58
Jala-Jala	34	51	53	55	58
Morong	34	51	53	55	58
Pililla	34	51	53	55	58
Rodriguez	83	95	95	95	98
San Mateo	84	100	100	100	100
Tanay	39	75	75	75	76
Taytay	92	100	100	100	100
Teresa	52	60	60	60	61
Total area * **	**77**	**94**	**94**	**94**	**95**

* Expressed as a percentage of the total population in the designated city of municipality at the time of the target (excluding users who are connected to a piped source of water other than from the MWSS system).

*** The Concessionaire (East) shall also be responsible for meeting the new water supply coverage targets (but not the corresponding sewerage targets), in the percentages set out in the Other Operator's (West) Concession Agreement, for part of Manila in the service area West.

** A portion of this municipality is covered by the West Zone.

Source: Concession Agreement

Table 6. Sewer and sanitation coverage targets in the West Zone (%).*

	Sewer **					Sanitation ***				
City/Municipality	2001	2006	2011	2016	2021	2001	2006	2011	2016	2021
NCR										
Manila	55	71	77	83	91	9	9	9	9	9
Pasay	0	0	0	16	95	73	68	66	47	0
Quezon City	0	0	0	0	54	41	37	38	97	45
Caloocan	3	2	2	32	79	30	61	47	42	21
Las Piñas	0	0	0	0	50	46	57	50	41	27
Malabon	2	2	2	38	94	7	42	39	35	6
Muntinlupa	0	44	57	54	61	27	36	31	26	24
Navotas	3	3	3	36	90	14	65	60	54	10
Parañaque	0	0	0	0	52	53	59	53	46	42
Valenzuela	0	0	0	24	59	67	90	80	68	36
Cavite										
Cavite	0	0	0	0	0	100	89	84	91	86
Bacoor	0	0	0	0	0	52	67	60	56	50
Imus	0	0	0	0	0	11	15	15	24	24
Kawit	0	0	0	0	0	67	68	61	52	47
Noveleta	0	0	0	0	0	28	41	39	35	33
Rosario	0	0	0	0	0	14	25	23	20	18
Total	**16**	**20**	**21**	**31**	**66**	**43**	**46**	**43**	**39**	**27**

* Expressed as a percentage of the total population in the designated city or municipality connected to the Concessionaire's water system at the time of the target. For areas designated by the cities or

municipalities as depressed areas, these targets may be met by the installation of one public standpipe for each 475 people.

** The Concessionaire will also be responsible for meeting sewer coverage targets in the part of the City of Manila covered by the other Operator unless obstructed from doing so by a natural waterway.

*** The Concessionaire shall also be responsible for meeting sanitation coverage targets (in the percentages set out in the other Operator's Concession Agreement) for parts of the municipalities of Makati, San Mateo, Marikina, and Rodriguez in the East Zone.

Source: Concession Agreement

Table 7. Sewer and sanitation coverage targets in the East Zone (%).*

City/Municipality	Sewer **					Sanitation ***				
	2001	2006	2011	2016	2021	2001	2006	2011	2016	2021
NCR										
Quezon City	0	0	83	87	98	24	21	16	12	2
Mandaluyong	0	0	100	100	100	0	0	0	0	0
Makati	22	52	100	100	100	0	0	0	0	0
Marikina	0	0	0	0	0	63	79	73	64	60
Pasig	0	41	68	68	68	83	58	32	27	25
Pateros	0	60	100	100	99	0	0	0	0	0
San Juan	0	0	100	100	100	0	0	0	0	0
Taguig	0	52	75	84	100	0	0	0	0	0
Rizal										
Angono	0	0	0	0	0	19	30	49	44	41
Antipolo	0	0	0	0	0	57	53	63	50	44
Baras	0	0	0	0	0	0	0	0	0	0
Binangonan	0	0	0	0	0	12	21	26	23	22
Cainta	0	0	0	0	14	38	40	34	28	27
Cardona	0	0	0	0	0	10	13	12	10	10
Jala-Jala	0	0	0	0	0	0	0	0	0	0
Morong	0	0	0	0	0	0	0	0	0	0

	Pililla	0	0	0	0	0	0	0	0	0	0
	Rodriguez	0	0	0	0	0	0	0	0	0	0
	San Mateo	0	0	0	0	0	66	65	58	49	44
	Tanay	0	0	0	0	0	0	0	0	0	0
	Taytay	0	0	0	0	15	82	78	70	60	54
	Teresa	0	0	0	0	0	25	25	23	21	20
Total		**3**	**16**	**51**	**52**	**55**	**38**	**32**	**27**	**24**	**19**

* Expressed as a percentage of the total population in the designated city or municipality connected to the Concessionaire's water system at the time of the target. For areas designated by the cities or municipalities as depressed areas, these targets may be met by the installation of one public standpipe for each 475 people.

** The Concessionaire will also be responsible for meeting sewer coverage targets specified in Schedule 4 in the part of the cities or municipalities of Makati, San Mateo, Marikina, and Rodriguez covered by the other Operator unless obstructed from doing so by a natural waterway.

*** The Concessionaire shall also be responsible for meeting sanitation coverage targets as it appears in the other Operator's Concession Agreement for the part of the city of Manila in the West Zone.

Source: Concession Agreement

Table 8. Breakdown of concession fees, West Zone (million pesos).

Year	Concession fee 1[a]	Concession fee 2[b]	Total concession
1997	1,475	218	1,693
1998	2,047	445	2,492
1999	1,731	390	2,121
2000	1,424	378	1,802
2001	1,158	362	1,520
2002	1,067	454	1,521
2003	1,038	398	1,436
2004	839	396	1,235
2005	799	394	1,193
2006	688	392	1,080
2007	584	391	975
2008	252	389	914
2009	493	388	881
2010	425	387	812
2011	431	386	817
2012	444	385	829
2013	368	385	753
2014	343	426	769
2015	142	307	449
2016	133	317	450
2017	131	69	200
2018	132	57	189
2019	135	58	193
2020	138	59	197
2021	6.3	0	6.3

[a] includes:

i - 90% of the aggregate Peso Equivalent due under any MWSS Loan which has been disbursed prior to the Commencement Date

(including MWSS Loans for Existing Projects and the UATP project) on the relevant payment dates; plus

ii - 90%of the aggregate Peso Equivalent due under any MWSS Loan designated for the UATP project which has not been disbursed prior to the Commencement Date on the relevant payment date; plus

iii - 90% of the Local Component costs and Cost Overruns related to the UATP project

[b] includes:

iv - 100 % of the aggregate Peso Equivalent due under any MWSS Loan designated for Existing Projects which have not been disbursed prior to the Commencement Date and have been either awarded to third party bidders or been elected by the Concessionaire for continuation; plus

v - 100 % of the Local Component costs and Cost Overruns related to Existing Projects

Source: Concession Agreement

Table 9. Breakdown of concession fees, East Zone (million pesos).

Year	Concession fee 1[a]	Concession fee 2[b]	Total concession
1997	164	134	298
1998	227	219	446
1999	192	240	432
2000	158	215	373
2001	129	203	332
2002	118	301	419
2003	115	260	375
2004	93	257	350
2005	89	255	344
2006	76	217	293
2007	65	217	282
2008	58	216	274
2009	55	215	270
2010	47	215	262
2011	48	214	262
2012	49	214	263
2013	41	213	254
2014	38	236	274
2015	16	160	176
2016	15	158	173
2017	14	56	70
2018	15	57	72
2019	15	58	73
2020	15	59	74
2021	0.7	0	0.7

[a] includes:

i - 90% of the aggregate Peso Equivalent due under any MWSS Loan which has been disbursed prior to the Commencement Date

(including MWSS Loans for Existing Projects and the UATP project) on the relevant payment dates; plus

ii - 90%of the aggregate Peso Equivalent due under any MWSS Loan designated for the UATP project which has not been disbursed prior to the Commencement Date on the relevant payment date; plus

iii - 90% of the Local Component costs and Cost Overruns related to the UATP project

[b] includes:

iv - 100 % of the aggregate Peso Equivalent due under any MWSS Loan designated for Existing Projects which have not been disbursed prior to the Commencement Date and have been either awarded to third party bidders or been elected by the Concessionaire for continuation; plus

v - 100 % of the Local Component costs and Cost Overruns related to Existing Projects

Source: Concession Agreement

Table 10a. Water tariff rate structure of the MWSS before and after privatization for residential and semi-business dwellings (₱ per cum).

Blocks	Residential			Semi-business		
	Before	After		Before	After	
		MWC	MWSI		MWC	MWSI
First 10 Cu.m.	29.50 *	7.78	16.69	49.50 *	13.06	28.01
Next 10 Cu.m.	3.60	0.95	2.03	6.05	1.59	3.42
Next 20 Cu.m	6.85	1.81	3.47	7.45	1.97	4.21
Next 20 Cu.m	9.00	2.37	5.09	9.45	2.49	5.32
Next 20 Cu.m	10.50	2.77	5.94	11.00	2.9	6.22
Next 20 Cu.m	11.00	2.90	6.22	11.50	3.03	6.5
Next 50 Cu.m.	11.50	3.03	6.50	12.00	3.16	6.79
Next 50 Cu.m.	12.00	3.16	6.79	12.50	3.29	7.07
Over 200 Cu.m.	12.50	3.30	7.07	13.00	3.43	7.35

* Per connection, otherwise ₱ per cum.

Source: MWSS

Table 10b. Water tariff structure of the MWSS before and after privatization for Business I

and Business II establishments (₱ per cum).

Blocks		Business I			Business II		
		Before	After		Before	After	
			MWC	MWSI		MWC	MWSI
First 10	cum	134.00 *	35.36	75.75	145.00 *	37.24	82.05
Next 90	cum	13.45	3.54	7.61	14.60	3.75	8.26
Next 100	cum	13.50	3.56	7.63	14.70	3.77	8.31
Next 100	cum	13.55	3.57	7.66	14.80	3.80	8.37
Next 100	cum	13.60	3.59	7.69	14.90	3.83	8.43
Next 100	cum	13.65	3.60	7.72	15.00	3.85	8.45
Next 100	cum	13.70	3.61	7.75	15.10	3.98	8.54
Next 100	cum	13.75	3.63	7.78	15.20	4.01	8.60
Next 100	cum	13.80	3.64	7.80	15.30	4.03	8.65
Next 100	cum	13.85	3.65	7.83	15.40	4.06	8.71
Next 100	cum	13.90	3.66	7.86	15.50	4.09	8.77
Next 200	cum	13.95	3.68	7.89	15.60	4.11	8.82
Next 200	cum	14.00	3.69	7.72	15.70	4.14	8.88
Next 200	cum	14.05	3.70	7.95	15.80	4.16	8.63
Next 200	cum	14.10	3.72	7.97	15.90	4.19	8.99
Next 200	cum	14.15	3.73	8.00	16.00	4.22	9.05
Next 500	cum	14.20	3.75	8.03	16.10	4.25	9.10
Next 500	cum	14.25	3.76	8.06	16.20	4.27	9.16
Next 500	cum	14.30	3.77	8.09	16.30	4.30	9.22
Next 500	cum	14.35	3.79	8.11	16.40	4.32	9.27
Next 500	cum	14.40	3.80	8.14	16.50	4.35	9.33
Next 500	cum	14.45	3.81	8.17	16.60	4.38	9.39
Next 500	cum	14.50	3.82	8.20	16.70	4.40	9.44
Next 500	cum	14.55	3.83	8.23	16.80	4.43	9.50
Next 500	cum	14.60	3.84	8.26	16.90	4.45	9.56
Next 500	cum	14.65	3.85	8.28	17.00	4.47	9.61

Next 500	cum	14.70	3.87	8.31	17.10	4.51	9.67
Next 500	cum	14.75	3.89	8.34	17.20	4.53	9.73
Next 500	cum	14.80	3.90	8.37	17.30	4.56	9.78
Next 500	cum	14.85	3.91	8.40	17.40	4.59	9.84
Next 500	cum	14.90	3.93	8.43	17.50	4.62	9.90
Next 500	cum	14.95	3.94	8.45	17.60	4.64	9.95
Over 10000	cum	15.00	3.95	8.48	17.70	4.67	10.01

*Per connection, otherwise ₱ per cum.

Source: MWSS

Appendix Table 1. Land area, number of households, population, and population density of the cities and municipalities in the MWSS service area, 1995.

	Area (sq. km.)	Number of Household (000)	Population (000)	Population Density (000/sq.km.)
MWSS Service Area	**2,125.6**	**2,392,272**	**11,424.6**	**5.4**
NCR	**636.0**	**1,985,299**	**9,453.6**	**14.9**
Manila	38.3	347,173	1,654.8	43.2
Mandaluyong	26.0	61,096	268.9	11.0
Marikina	38.9	73,617	357.2	9.2
Pasig	13.0	104,242	471.1	36.2
Quezon	166.2	415,788	1,989.4	12.0
San Juan	10.4	25,694	124.2	11.9
Kalookan	55.8	215,122	1,023.2	18.3
Malabon	23.4	74,657	347.5	14.8
Navotas	2.6	49,471	228.0	87.7
Valenzuela	47.0	94,377	437.2	9.3
Las Piñas	41.5	82,618	413.1	10.0
Makati	29.9	100,922	484.2	16.2
Muntilupa	46.7	80,981	399.8	8.6
Parañaque	38.3	82,692	391.3	10.2
Pasay	13.9	86,253	408.6	29.4
Pateros	10.4	11,377	55.3	5.3
Taguig	33.7	79,219	381.4	11.3
Cavite	**185.7**	**138,388**	**659.1**	**3.5**
Bacoor	52.4	52,594	250.6	4.8
Cavite City	11.8	20,059	92.6	7.8
Imus	97.0	36,846	177.4	1.8
Kawit	13.4	11,701	57.0	4.3
Noveleta	5.4	5,725	27.3	5.0
Rosario	5.7	11,463	54.1	9.5
Rizal	**1,303.8**	**268,585**	**1,312.5**	**1.0**

Angono	26.0	12,561	59.4	2.3
Antipolo	306.1	71,475	345.5	1.1
Baras	23.4	3,998	20.1	0.9
Binangonan	72.7	28,129	140.7	1.9
Cainta	10.2	40,671	201.6	19.8
Cardona	31.2	7,206	35.5	1.1
Jala-Jala	49.3	3,871	19.9	0.4
Montalban (Rodriguez)	312.8	16,759	79.7	0.3
Morong	37.6	7,322	36.0	1.0
Pililla	73.9	7,555	37.1	0.5
San Mateo	64.9	19,652	99.2	1.5
Tanay	243.4	14,042	69.2	0.4
Taytay	33.7	30,419	144.7	4.3
Teresa	18.6	4,925	23.9	1.3

Appendix Table 2. Water charges of selected water districts (₱/cu.m.).

Water district	Average tariff	Minimum charge (₱/conn)	Consumption bracket 11-20	21-30	31-40	41-50
Metro Manila						
MWSS[1]	6.43	29.40	3.57	4.36	5.46	6.30
		(47.30) [3]	(5.42)	(6.29)	(6.82)	(8.42)
MWSS[2]	8.78	29.50	3.60	6.85	6.85	9.00
		(47.00)	(5.42)	(9.00)	(9.00)	(11.36)
East zone	2.32	7.78	0.95	1.00	1.00	2.37
		(19.60)	(2.15)	(2.20)	(2.20)	(3.71)
West zone	4.96	16.69	2.03	3.87	3.87	5.09
		(29.40)	(3.33)	(5.36)	(5.36)	(6.70)
Metro Cebu		90.65	10.00	11.76	32.26	32.26
Baguio City		120.00	13.50	15.00	17.00	17.00
Metro Iloilo		80.00	8.00	8.80	10.40	10.40
Metro Siquijor		99.00	14.70	16.30	18.40	18.40
General Santos		50.00	5.60	6.08	7.04	8.00
Davao City		50.00	5.25	6.80	9.00	15.00

[1] MWSS tariff schedule effective July 16, 1995 until July 30, 1996

[2] MWSS tariff schedule effective August 1, 1996 until July 30, 1997

[3] The figures in parenthesis denote the composite price, i.e., including CERA (₱1.30 prior to privatization and ₱1.00 after), and an evironmental fee of % of base price.

Appendix Table 3. Domestic water price structure in selected utilities in the ASEAN region, 1995 (US$/cu.m.).

	Average price[c]		Consumption bracket 1-10	11-20	21-30	31-40	41-50	51-60
Metro Manila								
MWSS[a]	0.23		0.11	0.14	0.26	0.26	0.34	0.34
	(0.31)	**	(0.18)	(0.21)	(0.34)	(0.34)	(0.43)	(0.43)
East zone	0.09		0.03	0.04	0.04	0.04	0.09	0.09
	(0.14)		(0.07)	(0.08)	(0.08)	(0.08)	(0.14)	(0.14)
West zone	0.19		0.06	0.08	0.15	0.15	0.19	0.19
	(0.25)		0.11	(0.13)	(0.20)	(0.20)	(0.25)	(0.25)
Jakarta	0.61		0.16	0.16	0.16	0.31	0.31	0.35
Bangkok	0.31		0.16	0.16	0.16	0.22	0.23	0.25
Kuala Lumpur	0.34		0.17 [b]	0.26	0.26	0.26	0.42	0.42
Singapore	0.55		0.39	0.39	0.56	0.56	0.82	0.82
	(0.62)		(0.46)	(0.46)	(0.63)	(0.63)	(0.89)	(0.89)

Source: ADB Water Utilities Data Book, 1997.

* Currency conversions are based on foreign exchange rates as of 1 July 1997, i.e., P 26.384/$1.00

** Figures in parentheses represent the composite price including a currency adjustment factor, and an environmental fee of 10% of base price. For Singapore, figures in parentheses include sewerage charge.

[a] Effective August 1996 to July 1997

[b] 0.17 applies to consumption up to 15 cubic meters; 0.26 applies to consumption from 15 to 40 cubic meters.

[c] Refers to average price across all users.

Figure 1. Metro Manila Water Supply System
Concession Service Area

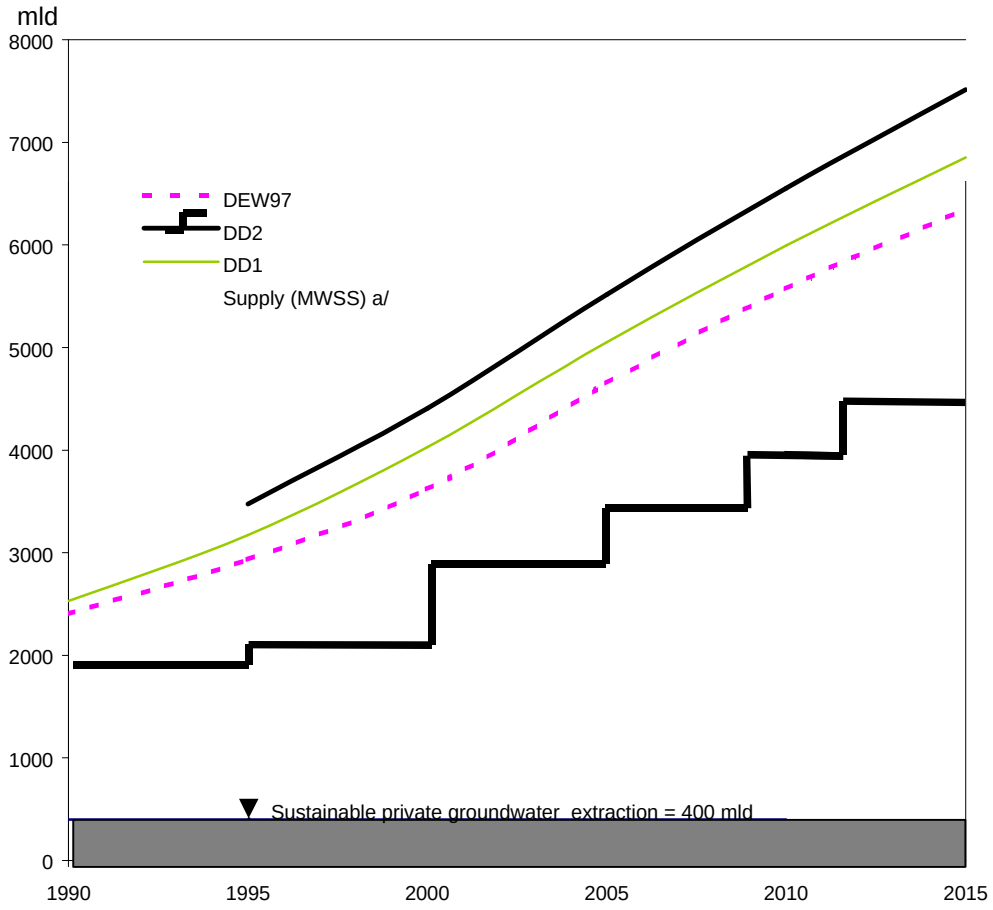


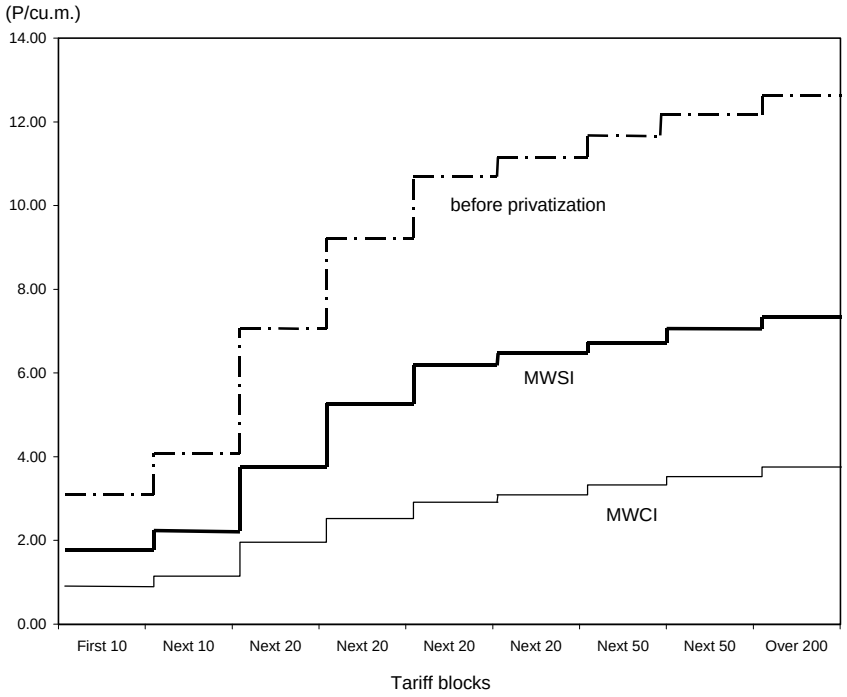
Figure 2. Projections of water demand and supply in the MWSS service area, 1990-2015

a/ Projected net supply of MWSS water, i.e., net of unaccounted for water. The base year 1990 estimate is equal to the 1989, 1990, and 1991 average sales plus adjustment for the amount of non-revenue water that is actually consumed but unbilled. The latter is assumed to be onte-third of non-revenue water. Non-revenue water is the difference between the actual water production and teh actual sales; for 1990 and 1995, NRW are 58% and 56% respectivley, while for 2000, it was assumed to be 30% and for 2005-2015, 20%. By 2000, net supply of 770 mld will be added with the completion of t UATP that wil produce 800 mld and the BOT contract to produce 300 mld of treated Laguna Lake water. By 2005, 2009 and 2012, the proposed completion of the Liaban Dam if it starts in 1998 will raise gross supply by 650, 650, and 600 ml respectively.

Source: David, C. C., A. B. Inocencion, R.P. Abracosa, R.S. Clemente, and G. Q. Tabios. 1998. "Optimal Water Pricinç Metro Manila.", Draft Final Report, PIDS-DENR Project.

Figure 3a. Water tariff structure for residential and semi-business dwellings before and after privatisation p/m3

Residential



Semi-business

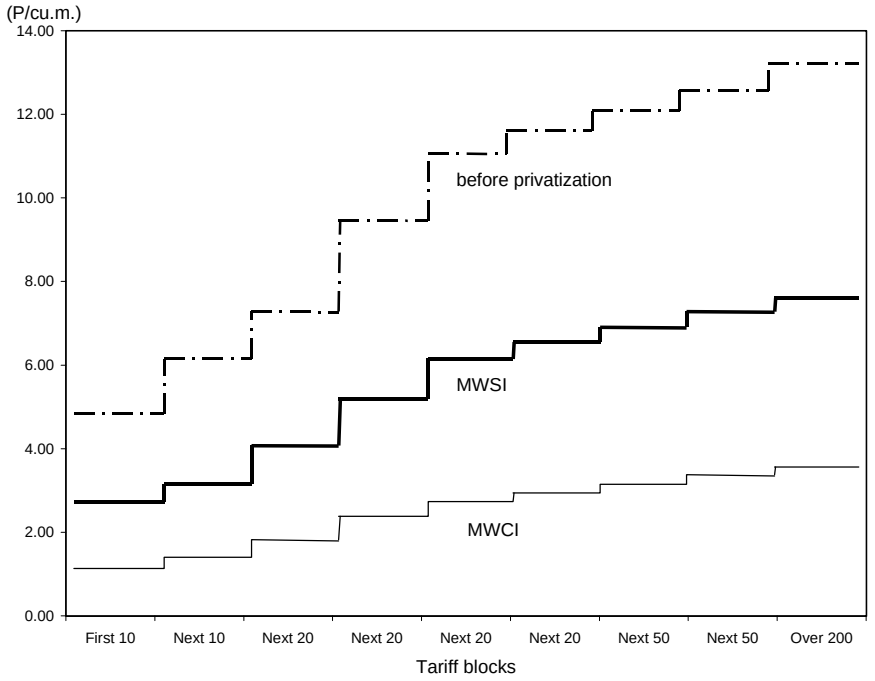


Figure 3b. Water tariff rate structure for Business I (commercial) and Business II (industrial) establishments before and after privatisation (P/cum)