



Evaluation Study

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ADB Assistance to Water Supply Services in Metro Manila

Operations Evaluation Department

Asian Development Bank

CURRENCY EQUIVALENTS

(as of December 2007)

| | | |
|---------------|---|----------|
| Currency Unit | – | peso (₱) |
| ₱1.00 | = | \$0.0242 |
| \$1.00 | = | ₱41.2250 |

ABBREVIATIONS

| | | |
|-------|---|---|
| ADB | - | Asian Development Bank |
| ADTA | - | advisory technical assistance |
| AEPA | - | accelerated extraordinary price adjustment |
| AR | - | accounts receivable |
| BME | - | benefit monitoring and evaluation |
| CAPEX | - | capital expenditure program |
| CDS | - | central distribution system |
| CERA | - | currency exchange rate adjustment |
| CPI | - | consumer price index |
| DILG | - | Department of Interior and Local Government |
| EIRR | - | economic internal rate of return |
| EPA | - | extraordinary price adjustment |
| FCDA | - | foreign currency differential adjustment |
| FIRR | - | financial internal rate of return |
| IFC | - | International Finance Corporation |
| LGU | - | local government unit |
| LWUA | - | Local Water Utilities Administration |
| MWC | - | Manila Water Company, Inc. |
| MWSS | - | Metropolitan Waterworks and Sewerage System |
| NEDA | - | National Economic and Development Authority |
| NRW | - | nonrevenue water |
| NWRB | - | National Water Resources Board |
| O&M | - | operation and maintenance |
| PCR | - | project completion report |
| PPTA | - | project preparatory technical assistance |
| PSP | - | private sector participation |
| RA | - | republic act |
| RAL | - | rate adjustment limit |
| RRP | - | report and recommendation of the President |
| SES | - | special evaluation study |
| SRC | - | staff review committee |
| TA | - | technical assistance |
| TCR | - | technical assistance completion report |
| WSS | - | water supply and sanitation |

WEIGHTS AND MEASURES

| | | |
|----------------|---|-------------------------|
| cms | - | cubic meters per second |
| km | - | kilometer |
| m ³ | - | cubic meters |
| MLD | - | megaliters per day |

NOTE

In this report, "\$" refers to US dollars.

Keywords

asian development bank, adb, private, water supply, water concessions, metro manila, water privatization, private sector participation, water regulation, evaluation, nonrevenue water

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The guidelines formally adopted by the Operations Evaluation Department (OED) on avoiding conflict of interest in its independent evaluations were observed in the preparation of this report. The fieldwork for the socioeconomic survey was undertaken by consultant Keith Stallard (water sector specialist) and Mildred Rollolazo (national consultant) under the guidance of the team leader. To the knowledge of the management of OED, there were no conflicts of interest of the persons preparing, reviewing, or approving this report.

EXECUTIVE SUMMARY

Background

The Asian Development Bank (ADB) has had more than 3 decades of partnership experience in supporting the development of water supply services in Metropolitan (Metro) Manila. During this period, ADB provided nine loans and seven technical assistance (TA) grants. The objectives of this special evaluation study (SES) are to assess the performance of ADB assistance to the Government for improving water supply services in Metro Manila and to draw lessons for future partnership operations. The findings, lessons, and recommendations of the SES were used as input to the Philippines Country Assistance Program Evaluation completed in 2008.

This SES assesses the relevance of ADB's strategies to government priorities for development of Manila's water supply and sanitation, the relevance of project designs, the effectiveness and efficiency of ADB assistance, the sustainability of outputs and outcomes, and impact. It also assesses progress made in private sector participation (PSP) through water concessionaires and the expected impact of improving water supply on people in Metro Manila. For project level performance assessment, the SES examines the three recently completed projects: (i) the Angat Water Supply Optimization Project, (ii) the Manila South Water Distribution Project, and (iii) the Umiray-Angat Transbasin Project, based largely on their project completion reports.

Sector Context

Metro Manila's water supply is entirely dependent upon a single source of raw water, the Angat Reservoir, located about 30 kilometers northeast of Manila, which provides about 98% of the metropolis' water supply or 4 million cubic meters per day. The remaining 2% is sourced from deep wells. In addition to two private concessionaires regulated by the Metropolitan Waterworks and Sewerage System (MWSS) Regulatory Office, numerous small private vendors supply water to local households. Nonrevenue water (NRW) and high receivables are a major constraint to the water services sector development and viability.

The water services sector has always been accorded a high priority by the Philippine Government, for which the key principles include (i) provision of a favorable environment for the improvement of water supply by local governments, (ii) encouragement of PSP in the distribution of water, (iii) provision of incentives for contiguous water district amalgamation to increase efficiency, and (iv) adoption of a holistic approach to water resources development.

Following the Water Crisis Act of 1995, the process to allow for PSP culminated on 1 August 1997 when the operational and investment functions of MWSS in water and sewerage services were transferred to Manila Water Company and Maynilad Water Services, Inc. under two separate concession agreements. The concession agreements transfer to the concessionaires site tenancy and operational fixed assets and exclusive rights to (i) produce and treat raw water; (ii) transport, distribute, and market potable water; and (iii) collect, transport, treat, dispose, and eventually reuse wastewater, including industrial effluent discharged into the sewerage system. Under the concession agreements, whatever is transferred to, acquired by, or built by the two concessionaires remains in the name of MWSS and will revert to MWSS upon termination or expiration of the concession agreements.

ADB Assistance

The underlying objective of ADB assistance to the water services sector in Manila has been the extension of services by expansion of the water and sewerage systems and increasing the availability of water through the provision of new infrastructure and the rehabilitation of infrastructure no longer fit for the purpose.

Since 1974, nine loans, amounting to \$425.3 million, have been approved. The loans have all been executed and implemented by MWSS. The first loan, for \$51.3 million, was approved in 1974 to assist in increasing the supply of water to Metro Manila through facilities development and assistance to MWSS to reduce its NRW. Since then eight more loans, including seven investment projects and one TA loan for new water source development have been provided. ADB also provided seven TA grants, amounting to about \$3.6 million over the same period, of which four were for project preparation and the rest for advisory services. The advisory TA operations were for carrying out studies, training workshops, and technical advice for MWSS operational strengthening and capacity building for its regulatory office.

Key Findings

Overall, the SES rates ADB's assistance to improving water supply services in Metro Manila as "partly successful." All projects are rated relevant, as they were consistent with the sector challenges and with ADB's and the Government's strategic priorities, and were well coordinated with other development partners. With the exception of the Manila South Project, they were generally effective in achieving their immediate objectives, efficient in resource use, and likely sustainable from the financial and economic perspectives, which was eventually strengthened following upward tariff revision. The Manila South Project experienced a shortage of raw water and did not utilize the full loan amount; hence, it could not meet its immediate objectives.

While ADB assistance was strategically positioned and was consistent with the strategies and priorities of both ADB and the Government, it fell short in addressing the fundamental issues related to NRW. Addressing the unacceptably high NRW was one of ADB loan conditionalities in all projects. The focus of ADB assistance, however, continued to be on the supply of hardware (e.g., equipment, construction materials) rather than dialogue and assistance to address policy and institutional weaknesses. While policy dialogue and institutional development assistance alone would not have been sufficient, there should have been a balance between hardware and software aspects to address issues holistically and improve water services in Metro Manila, learning from past experience and building upon the acquired knowledge and expertise. Project performance thus varied from unsuccessful to successful for various reasons.

ADB-financed projects for Manila's water supply have successfully contributed to the construction of major infrastructure components of the water conveyance system from the Angat Reservoir, which are crucial for securing water supply for the Metro Manila area. However, Metro Manila is still dependent on a single source of raw water, and the ADB-MWSS partnership has so far not been successful in developing alternative sources of raw water, although support from ADB and other development partners to develop new water sources continue to be offered. The partnership in the past also did not include the sanitation subsector. Although sewerage in Metro Manila had always been financed primarily by the World Bank, ADB financed a small project for water sewerage (\$42.8 million).

The ADB support for the Angat Optimization and Umiray-Angat projects had a positive impact on the development of PSP in water distribution through TA supporting PSP in MWSS operations. The original MWSS system was designed to operate under an integrated single system. To accommodate the lease to the two private concessionaires, this system needed to be split between the east and west zones, involving operating design modifications. Although ADB did not play a major role in the development of the PSP strategy, the investment projects it has supported have benefited the development of the private concessionaires by providing improved raw water supply, supporting the growth of their businesses, and achievement of the supply targets set out in the concession agreements.

ADB's long-term engagement in water supply infrastructure development in the MWSS service area has facilitated monitoring of performance of the nine investment projects it has supported. The water supply services sector under MWSS suffered from two chronic operational problems: high levels of NRW and accounts receivable. Despite this long known problem, the Manila South Project carried optimistic performance assumptions, but experienced poor performance against targets. Project components to reduce NRW, a responsibility of the private concessionaires, were generally successful through Manila Water Company in the East Zone but unsuccessful through Maynilad Water Services, Inc. in the West Zone. Significant improvement in NRW reduction in the East Zone was realized once a suitable solution was found.

While ADB's role in assisting MWSS in the design and implementation of water concessions through PSP was limited, contributions are evident. A study provided background materials for preparing an agenda for private sector participation. Complementary ADB assistance to MWSS for building its regulatory capacity role was deemed useful. The assessment of PSP indicates that there was a positive impact in terms of mobilization of private capital, managerial skills, operational efficiency, better urban services, and benefits to the poor. However, the degree of success was skewed heavily on Manila Water Company rather than Maynilad Water Services, Inc., which initially ran into problems such as additional debt burden because of the peso depreciation following the Asian financial crisis, lack of sufficient flow of raw water, different management styles, and different perceived requirement for addressing NRW. The SES also revealed that there were significant water supply activities by local private water vendors. However, it was unclear who regulates them and how the quality of services is ensured. A related issue is the continuous extraction of groundwater with implications for the environment.

The value addition of ADB assistance to Manila water services was largely limited to augmenting raw water supply to the MWSS water treatment and supply system. Both concessionaires depend on this source of water for distribution. ADB also pilot tested water connections targeting the urban poor under a regional assistance program for water and has achieved encouraging results in the majority of cases. ADB contributed to the preparation of the PSP program through TA operations, providing the groundwork for the eventual PSP. There is evidence of positive socioeconomic impacts with piped water bringing a variety of economic benefits to local people. In the area of environmental protection, e.g., overextraction of groundwater, the results hitherto have been mixed.

Lessons

Key lessons identified from experience with implementing water supply projects in the Philippines relate to the need (i) for greater attention to demand-side issues in project design; (ii) to reduce the high levels of NRW as an integral way of responding to rapidly increasing demand; (iii) for water utilities to give priority to adequate maintenance of existing water supply facilities and investment for rehabilitation to reduce NRW over the investment in new assets; (iv) for better readiness for project implementation; and (v) to improve transparency and accountability in preparing concession agreements.

Project designs need to consider both supply and demand issues. Given the systemic problems in the distribution system, small-scale water suppliers targeted unmet demand for water in the project area, although at a relatively high but affordable price. Such alternatives to meeting demand and the higher than expected willingness-to-pay for alternative services need to be considered in feasibility assessments. The potential for expanding the private sector role in water supply focused on MWSS operations. On the supply-side, attempts to augment the raw water supply in Metro Manila focused only on the Angat River, the traditional single source of raw water for Metro Manila, and alternative sources were not fully explored or attainable (for example, no decision was made on development of the Laiban Dam to date).

Project designs need to consider NRW lessons from previous projects. Despite implementing a number of NRW reduction programs, Maynilad was not successful in reducing NRW levels in the West Zone. As a result, project effectiveness fell short in achieving the objective of serving and benefiting the number of beneficiaries targeted due mainly to the high NRW. This had a significant impact on the ability of Maynilad to improve water supply coverage in its service area. In future project designs, the issue of sequencing investments for enhancing system capacity as against NRW reduction and efficiency improvement needs closer examination. In sequencing investments, the greater emphasis needs to be given to reducing NRW over the investment in new distribution assets. Investment for rehabilitation, where required, should be earmarked for NRW reduction.

Longer-term sustainability of water supply services depends to a large extent on the success of an appropriate tariff policy and tariff revenue collection to cover operation and maintenance costs, debt service, as well as new development to meet rising demand. A two-pronged solution is needed to ensure that sufficient finance is available for sector development and operation: (i) a tariff policy that allows an increase, where justified, after the service is improved; and (ii) a support mechanism that covers the interim operational shortfall over the early years to the service provider. Furthermore, foreign exchange risks need to be adequately factored into the financial analysis and management of water companies, particularly those having foreign debt-service obligations.

Private sector participation in MWSS operations has brought benefits where connections were put in place and water supplied, but several areas for improvement remain. The following design lessons for water concession are noted: (i) concession agreements and contracts need to include technical and financial specifications on the concessionaire's performance including NRW reduction, new investments, and tariff flexibility; (ii) mechanisms are needed for holding water concession designers accountable for arrangements; (iii) concession arrangements were difficult to adjust after the initial agreement, which may require a mechanism for review and change where justified; (iv) adequate separation of policy, regulation, and operations, especially independent and effective regulation is essential; and (v) strong and consistent political leadership is required for successful water concessions.

Recommendations

Based on the findings and lessons presented in the foregoing sections, the SES recommends the following for future operations:

- (i) **Given the long partnership with MWSS and the rising demand and widening demand-supply gap for water in Metro Manila, ADB should provide further lending assistance to improve Metro Manila's raw water supply by drawing from known but untapped sources and surveying other possible sources.** The high population density in urban areas in general and Metro Manila in particular, coupled with high growth rates and a relatively high incidence of poverty, leads to significant challenges in provision of water supply and sanitation services. Provided the population in Metro Manila continues to grow, the demand for water will continue to rise. The concessionaires are developing new sources but can do so only on a small scale. Additional raw water on a large scale to meet the pressures of the growing metropolis will require substantial investment to develop a significant alternative to the Angat Reservoir.
- (ii) **There is continued potential for an ADB role in developing water distribution services in Metro Manila, particularly in the West Zone.** The Government's Socioeconomic Report 2006¹ reported that in Metro Manila, only 52 waterless areas² were serviced with potable water. The Government plan is to have potable water for the entire country by 2010, with priority given to 210 waterless barangays in Metro Manila and 633 waterless municipalities outside Metro Manila. However, given the possibility of alternative, sometimes lower cost bilateral and multilateral financing sources, ADB will need to package and deliver its assistance more efficiently than before.
- (iii) **Assist in developing new mechanisms for addressing NRW reduction issues.** Reducing NRW has been a difficult task in the past, with little success. To address the NRW issue, project design should take into account both demand- and supply-related factors that contribute to NRW, including new investments, policy and institutional factors, system weaknesses, risks, and the role of small-scale water suppliers/vendors and their regulation.
- (iv) **Consider providing lending assistance for groundwater-related environmental protection and wastewater management.** Assistance in the water supply and sanitation sector has been mostly in water supply. The sector continues to be faced with problems of indiscriminate extraction of groundwater, and pollution from municipal and industrial wastewater. Solid waste management is a serious problem in urban areas, which has led to serious flooding, air pollution, and spread of diseases. There has been only one loan project in this area, the Manila Sewerage Project, which was completed in 1990. Watersheds surrounding Metro Manila have been under threat from deforestation and rapid encroachment of settlements, which is contributing to severe degradation of water resources. Further support for these areas should be assessed.

¹ National Economic and Development Authority. 2007. *Socioeconomic Report 2006*. Manila.

² The *Medium-Term Philippine Development Plan 2004–2010* defines waterless areas as those with less than 50% water supply coverage.

I. INTRODUCTION

A. Study Background and Objective

1. The Asian Development Bank (ADB) has been providing loan assistance to the water supply and sanitation (WSS) sector of Metropolitan (Metro) Manila for over 30 years. Nine loans, including one technical assistance (TA) loan, totaling \$425.26 million, have been approved since 1974.¹ The loans were all executed and implemented by the Metropolitan Waterworks and Sewerage System (MWSS) and guaranteed by the Government of the Philippines.
2. The objectives of this special evaluation study (SES) are to assess the performance of ADB assistance to the Government for improving water supply services in Metro Manila and to draw lessons for future partnership operations.

B. Evaluation Methodology

3. The SES broadly follows the performance evaluation framework for public sector operations (relevance, effectiveness, efficiency, sustainability, and impact). The SES sought answers to the following evaluation questions: (i) How has ADB assistance to Metro Manila's water service performed? (ii) Did ADB manage its assistance to Metro Manila's water sector effectively and efficiently? (iii) In what ways did ADB contribute to the improvement (or otherwise) of water service to Metro Manila? (iv) Have ADB projects to support water services in Metro Manila benefited residents? (v) What actions does ADB need to take to improve its performance in delivering assistance to support water services in urban cities in general and Metro Manila in particular? (vi) What was ADB's contribution and role, if any, in the process leading to private sector participation (PSP) in MWSS operations? Could ADB have played a more active role?
4. The SES has the following main components:
 - (i) **Retrospective situation analysis of the water services in Metro Manila.** This component included a literature review and interviews to identify policies, programs, priorities, challenges, and issues of water services in Metro Manila.
 - (ii) **Analysis of strategies.** This included assessment of (i) how closely ADB's strategies and priorities matched the Government's strategies and priorities and the challenges facing water services in Metro Manila, and (ii) how closely ADB's projects were aligned with these strategies and coordinated with other development partners.
 - (iii) **Evaluation of completed ADB projects.** Three recently completed projects were evaluated following the *Guidelines for Preparing Performance Evaluation Reports for Public Sector Operations*:² (i) the Angat Water Supply Optimization Project,³ (ii) the Manila South Water Distribution Project,⁴ and (iii) the Umiray-Angat Transbasin Project,⁵ based largely on their project completion reports (PCR).

¹ See Table 4.

² ADB. 2006. *Guidelines for Preparing Performance Evaluation Reports for Public Sector Operations*. Manila.

³ ADB. 1989. *Angat Water Supply Optimization Project*. Manila. (Loan 0986-PHI, for \$130 million, approved on 14 November).

⁴ ADB. 1991. *Manila South Water Distribution Project*. Manila. (Loan 1150-PHI, for \$31.4 million, approved on 19 December).

⁵ ADB. 1995. *Umiray-Angat Transbasin Project*. Manila. (Loan 1379-PHI, approved for \$92.0 million, approved on 21 September).

- (iv) **Socioeconomic survey.** A rapid household-based socioeconomic survey was commissioned to collect information on stakeholders' perceptions of socioeconomic impacts in relation to progress made by water concessionaires in improving water supply and benefiting people in Metro Manila and areas where further improvements could be made.
5. The information gathering included:
- (i) Interviews and in-depth discussions with key stakeholders in water services in Metro Manila, including (a) officials of MWSS, Manila Water Company (MWC or Manila Water), and Maynilad Water Services, Inc. (Maynilad); (b) development partners including the World Bank and the International Finance Corporation (IFC); and (c) project beneficiaries.
 - (ii) Field inspection of Angat, Ipo, and La Mesa dams.
 - (iii) Review of documentation, including but not limited to, appraisal reports, reports and recommendation of the President, PCR's, TA completion reports, back-to-office reports, annual reports of the concessionaires and MWSS, and consultants' reports.
 - (iv) Survey of selected households covered by the Manila South Project.
6. The SES was carried out at ADB Headquarters through a combination of studies, interviews, document reviews, and field visits to (i) MWSS, Manila Water, and Maynilad offices; and (ii) Angat, Ipo, and La Mesa dams.

II. WATER SERVICES SECTOR IN METRO MANILA

A. Introduction

7. Metro Manila's water supply is entirely dependent upon one source of water, the Angat Reservoir, located about 30 kilometers (km) northeast of Manila, which provides about 98% of the metropolis' water supply or 4 million cubic meters (m³) per day; the remainder comes from deep wells. During the 1920s, Ipo Dam was constructed using water resources from the Angat basin. By 1938, the treatment capacity was 200 megaliters per day (MLD), serving a population of 900,000. The Angat Multipurpose Dam (Angat Dam) was built between 1962 and 1968 to provide the water network with an additional 1,900 MLD. In 1989, the Angat Reservoir, a multipurpose dam that combines urban water supply, irrigation, and hydropower generation, had a maximum yield⁶ of 2,500 MLD. The allocation of raw water between urban water supply and irrigation is regulated through water rights awarded by the National Water Resources Board.

8. The water from Angat Dam flows through two concrete diversion tunnels down to the Ipo Dam, from where it is conveyed through three intake structures at the dam going to three connecting tunnels. The three tunnels are connected to five aqueducts that deliver raw water to Metro Manila to two treatment facilities—the Balara and La Mesa treatment plants.

9. The legislative and regulatory environment in which the MWSS functions reflects its evolution from an arm of government delivering vertically integrated water and wastewater services across a large service area to the current arrangement whereby MWSS and its Regulatory Office respectively contract, manage, and regulate water and wastewater services delivered by private companies operating in two geographically defined concession areas.

⁶ The capacity of Angat Dam was increased under the ADB. 1978. *Second Manila Water Supply Project*. Manila. (Loan 0351-PHI, for \$49 million, approved on 7 September).

MWSS was created in June 1971 under Republic Act (RA) 6271 as a government-owned and autonomous public utility corporation to provide water supply and sewerage services in its service area, which included the national capital region, the entire province of Rizal, and part of the province of Cavite. By the late 1980s and early 1990s, it was clear that MWSS was failing to maintain and expand its distribution system to meet the increasing water demand from Metro Manila brought about by its industrialization and sustained population growth. By the mid-1990s, water services in Metro Manila had deteriorated to the point where it was among the poorest of major Asian cities with a comparable level of economic development. In particular, MWSS chronically suffered from two operational problems of high levels of (i) nonrevenue water (NRW),⁷ and (ii) accounts receivable (AR). In 1996, the Philippines had the third largest gross domestic product per capita of the 12 Asian cities listed in Table 1, while the water services in Metro Manila ranked 11th out of 12 with respect to NRW (second only to Hanoi) and 10th for AR (after Karachi and Dhaka).

Table 1: Characteristics of Selected Asian Cities and Water Services, 1996

| City | Population (millions) | GDP | | Coverage (%) | NRW (%) | AR (months) | Tariff (\$/m ³) |
|--------------|--------------------------|--------------------|--|-----------------|------------|----------------|--------------------------------|
| | | per Capita (\$) | | | | | |
| Bangkok | 9.0 | 3,815 | | 82 | 38 | 2.0 | 0.31 |
| Beijing | 7.4 | 862 | | 100 | 8 | 0.1 | 0.05 |
| Colombo | 0.6 | 863 | | 58 | 51 | 3.2 | 0.14 |
| Delhi | 8.4 | 544 | | 86 | 44 | 4.5 | 0.03 |
| Dhaka | 3.4 | 320 | | 42 | 51 | 11.0 | 0.09 |
| Hanoi | 3.5 | 328 | | 76 | 71 | 0.1 | 0.11 |
| Hong Kong | 6.4 | 30,809 | | 100 | 36 | 4.0 | 0.56 |
| Jakarta | 9.1 | 575 | | 27 | 53 | 1.0 | 0.61 |
| Karachi | 9.3 | 1,448 | | 70 | 40 | 16.8 | 0.09 |
| Kuala Lumpur | 1.1 | 586 | | 100 | 36 | 0.5 | 0.34 |
| Manila | 11.0 | 5,952 | | 67 | 58 | 6.0 | 0.23 |
| Taipei | 2.6 | 12,709 | | 99 | 37 | 1.7 | 0.39 |

AR = accounts receivable, GDP = gross domestic product, m³ = cubic meter, NRW = nonrevenue water.

Sources: Asian Development Bank Key Indicators, Second Water Utilities Data Book, http://unstats.un.org/unsd/cdb/cdb_series_xrxx.asp?series_code=14720; 1996 UN Demographic Yearbook.

10. The MWSS water distribution system is categorized into (i) the central distribution system (CDS), supplied mainly by surface water; and (ii) local networks, supplied by groundwater from MWSS deepwells and serving fringe areas and other areas in the CDS not connected to the surface supply system. Angat Dam supplies about 98% of water to MWSS.

B. Nonrevenue Water and Accounts Receivable

11. NRW is usually composed of (i) physical losses of water due to leaks in water supply pipes; and (ii) commercial losses caused by theft, illegal connections, measurement errors, and billing inefficiencies. High NRW has always been a major issue in water supply in Metro Manila and a major impediment to MWSS operations and financial performance (Table 2). While ADB has relentlessly urged MWSS to address these issues, MWSS had been unable to make significant progress in NRW reduction. In fact, NRW remained above 55% from 1984, peaked in

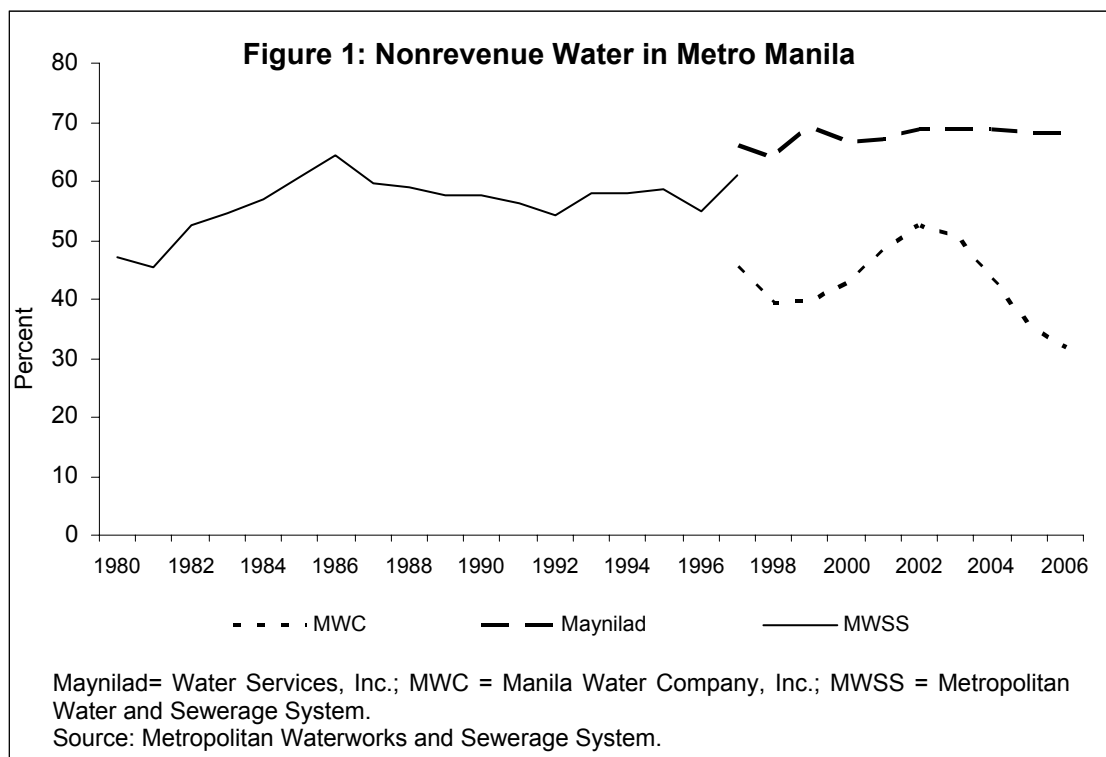
⁷ NRW is composed of (i) physical losses caused by leakage; and (ii) commercial losses resulting from illegal connections, meter under registration, and free use.

1986 at 64%, and was at 61% just prior to PSP. Figure 1 illustrates the evolution of NRW in the MWSS area.

Table 2: Nonrevenue Water in Metro Manila, (%)

| Year | MWC | Maynilad | MWSS |
|-------------|------------|-----------------|-------------|
| 1980 | | | 47.10 |
| 1981 | | | 45.51 |
| 1982 | | | 52.58 |
| 1983 | | | 54.41 |
| 1984 | | | 57.00 |
| 1985 | | | 60.64 |
| 1986 | | | 64.44 |
| 1987 | | | 59.69 |
| 1988 | | | 59.12 |
| 1989 | | | 57.68 |
| 1990 | | | 57.70 |
| 1991 | | | 56.20 |
| 1992 | | | 54.10 |
| 1993 | | | 58.00 |
| 1994 | | | 58.00 |
| 1995 | | | 58.69 |
| 1996 | | | 55.02 |
| 1997 | 45.43 | 66.24 | 61.00 |
| 1998 | 39.21 | 64.04 | |
| 1999 | 39.75 | 69.15 | |
| 2000 | 42.77 | 66.74 | |
| 2001 | 48.29 | 67.01 | |
| 2002 | 52.39 | 68.65 | |
| 2003 | 50.77 | 68.96 | |
| 2004 | 43.38 | 68.98 | |
| 2005 | 35.47 | 68.16 | |
| 2006 | 32.00 | 68.00 | |

Maynilad = Maynilad Water Services, Inc., MWC = Manila Water Company Inc.,
 MWSS = Metropolitan Waterworks and Sewerage System.
 Source: Metropolitan Waterworks and Sewerage System.



12. The feasibility study of the Second Manila Water Supply Rehabilitation Project⁸ reported that the poor performance of MWSS' own NRW reduction program was due to (i) higher water pressure in the system, and (ii) the political and social unrest then that may have degraded operation and maintenance (O&M) activities. It can be argued, however, that NRW remained high even during more politically stable times (after 1986). In reviewing the progress of the first Manila Water Supply Rehabilitation Project⁹ the same study concluded that reducing NRW from leaks was more significant than metering improvements or detection of illegal uses so that MWSS continued to approach NRW reduction with rehabilitation works.

13. Significant improvement in NRW was seen in the East Zone area after PSP and only after a comprehensive search for a suitable solution. The NRW in the MWC service area peaked at 52% in 2002. After the East Zone service area was divided into smaller demand management zones and a pipe replacement program was undertaken as part of the NRW reduction program, NRW started declining, and reached 32% by the end of 2006. MWC reports that by the second quarter of 2007 NRW had further gone down to 25.2%. Pipe rehabilitation and replacement led to these improvements in NRW.

14. The performance of Maynilad in reducing NRW in the West Zone was a disappointment. Maynilad's NRW shot up to levels not seen prior to PSP; was consistently above 68% after 2002; and peaked at 69% in 2004, a year after it terminated its concession. While Maynilad attributes this dismal performance to illegal connections, other causes of NRW included long distribution lines, leakages, metering mistakes, theft, and tampering.

⁸ ADB. 1989. *Second Manila Water Supply Rehabilitation Project*. Manila. (Loan 0947-PHI, for \$26.4 million, approved on 24 January).

⁹ ADB. 1983. *Manila Water Supply Rehabilitation Project*. (Loan 0645-PHI, for \$39.3 million, approved on 27 October).

15. In 1980, the average collection period of MWSS was 6.5 months. In 1988 this improved to 5.9 months. The two biggest debtors of MWSS were government agencies and a group of large, mainly industrial consumers. At the time of the project performance audit report (PPAR) for the Manila Water Supply Project in 1989, MWSS had established a working arrangement with various government agencies and the Budget and Management Office to assure allocation of budgeted funds for utilities, including payment of water bills. At the end of 1993, accounts receivable stood at about 4.9 months' billing, which was an improvement over the 5.7 months' billing in 1988, but was still above the desirable 3 months' billing.

C. Government Policies, Priorities, and Measures

16. The WSS sector has always been accorded high priority by the Philippine Government. The overriding government principles pertaining to the provision of WSS in the Philippines include (i) provision of a favorable environment for the improvement of water supply by local governments, (ii) encouraging private sector participation in the sector, (iii) provision of incentives for contiguous water districts to amalgamate to increase efficiency, and (iv) adoption of a holistic approach to water resources development. The Updates of the Philippine Development Plan, 1990–1992¹⁰ indicated the need for improvement in WSS, especially since it was noted to be the leading cause of morbidity. The Updates had specific targets to reduce NRW in Metro Manila “from 57.6% in 1989 to 50 % in 1992” and to “increase the coverage of the population served with potable water from 73% in 1989 to about 87% by 1992.” In the Medium-Term Philippine Development Plan, 1993–1998¹¹ the coverage target was adjusted downwards. The plan was to have 71% of the population in Metro Manila served with adequate potable water. The Umiray-Angat Project was envisioned to address the growing demand for water in Metro Manila. In the distribution of water supply and sewerage and treatment, the Government’s policy has consistently been to encourage private sector participation. Box 1 presents a summary of the legal provisions for water supply in Metro Manila.

¹⁰ National Economic and Development Authority (NEDA). 1990. *Updates of the Philippine Development Plan*. Manila.

¹¹ NEDA. 1995. *Medium-Term Philippine Development Plan, 1993–1998*. Manila.

Box 1: Legal Provision of Water Services in Metro Manila

Republic Act 6274 (1971)

Republic Act (RA) 6274 of 1971 created the Metropolitan Water and Sewerage System (MWSS) as a government-owned corporation with jurisdiction, supervision, and control over all waterworks and sewerage systems within Metropolitan Manila, the entire province of Rizal, and a portion of the province of Cavite.

RA 6274 is often referred to as the MWSS Charter and commences with a Declaration of Policy: "The proper operation and maintenance of waterworks system to insure an uninterrupted and adequate supply and distribution of potable water for domestic and other purposes and the proper operation and maintenance of sewerage systems are essential public services because they are vital to public health and safety. It is therefore declared a policy of the state that the establishment, operation and maintenance of such systems must be supervised and controlled by the state."

Water Code of the Philippines, Presidential Decree 1067 (1976)

This presidential decree revised and consolidated the laws governing the ownership, appropriation, utilization, exploitation, development, conservation, and protection of water resources, which shall be subject to the control and regulation of the Government through the National Water Resources Council (now the National Water Resources Board). All surface waters, atmospheric water, groundwater, and seawater shall belong to the state. Use of water for domestic and municipal purposes generally has highest priority, unless otherwise decided. Allocation of water rights, including abstraction of water from the Angat Reservoir, is the responsibility of the National Water Resources Board, which also acts as the regulator for water supply in the country, excluding Manila (regulated by the MWSS Regulatory Office).

1987 Constitution of The Philippines, Article XII, National Economy and Patrimony, Section 11

No franchise, certificate, or any other form of authorization for the operation of a public utility shall be granted except to citizens of the Philippines or to corporations or associations organized under the laws of the Philippines, at least 60% of whose capital is owned by such citizens; nor shall such franchise, certificate, or authorization be exclusive in character or for a longer period than 50 years. Neither shall any such franchise or right be granted except under the condition that it shall be subject to amendment, alteration, or repeal by the Congress when the common good so requires. The State shall encourage equity participation in public utilities by the general public. The participation of foreign investors in the governing body of any public utility enterprise shall be limited to their proportionate share in its capital, and all the executive and managing officers of such corporation or association must be citizens of the Philippines.

Build Operate Transfer Law, RA 7718, amending RA 6957 (1992)

This authorizes financing, construction, and operation of infrastructure projects including water supply and sewerage by the private sector. The project proponent undertakes the construction, financing, and operation of a facility, and transfers it to the relevant government agency at the end of a fixed term not exceeding 50 years.

Republic Act 8041 (1995)

On 7 June 1995, Congress passed RA 8041 known as "The Water Crisis Act." This act provided President F.V. Ramos with 1-year period emergency powers to "address issues relevant to the water crisis including, but not limited to, supply, distribution, finance private sector participation of state run facilities..." and to strengthen the government's anti-water pilferage efforts. (Section 2: Declaration of Policy).

Executive Order 286 (1995)

On 6 December 1995, President Ramos issued Executive Order 286, which ordered the reorganization of MWSS to result in "the involvement or participation of the private sector in any or all the segments, operations and/or facilities of the MWSS."

Executive Order 311 (1996)

On 20 March 1996, Executive Order 311 authorized MWSS to enter into arrangements that will result in the involvement of the private sector in any or all segments of the operations of MWSS.

The Philippine Clean Water Act, RA 9275 (2004)

This aims to protect the country's water bodies from pollution from land-based sources (i.e., industry, agriculture, and households). It provides for a comprehensive and integrated strategy to prevent and minimize pollution through a multisectoral and participatory approach involving all the stakeholders. The Department of Environment and Natural Resources is the primary government agency responsible for the implementation and enforcement of this Act.

Source: Operations Evaluation Mission.

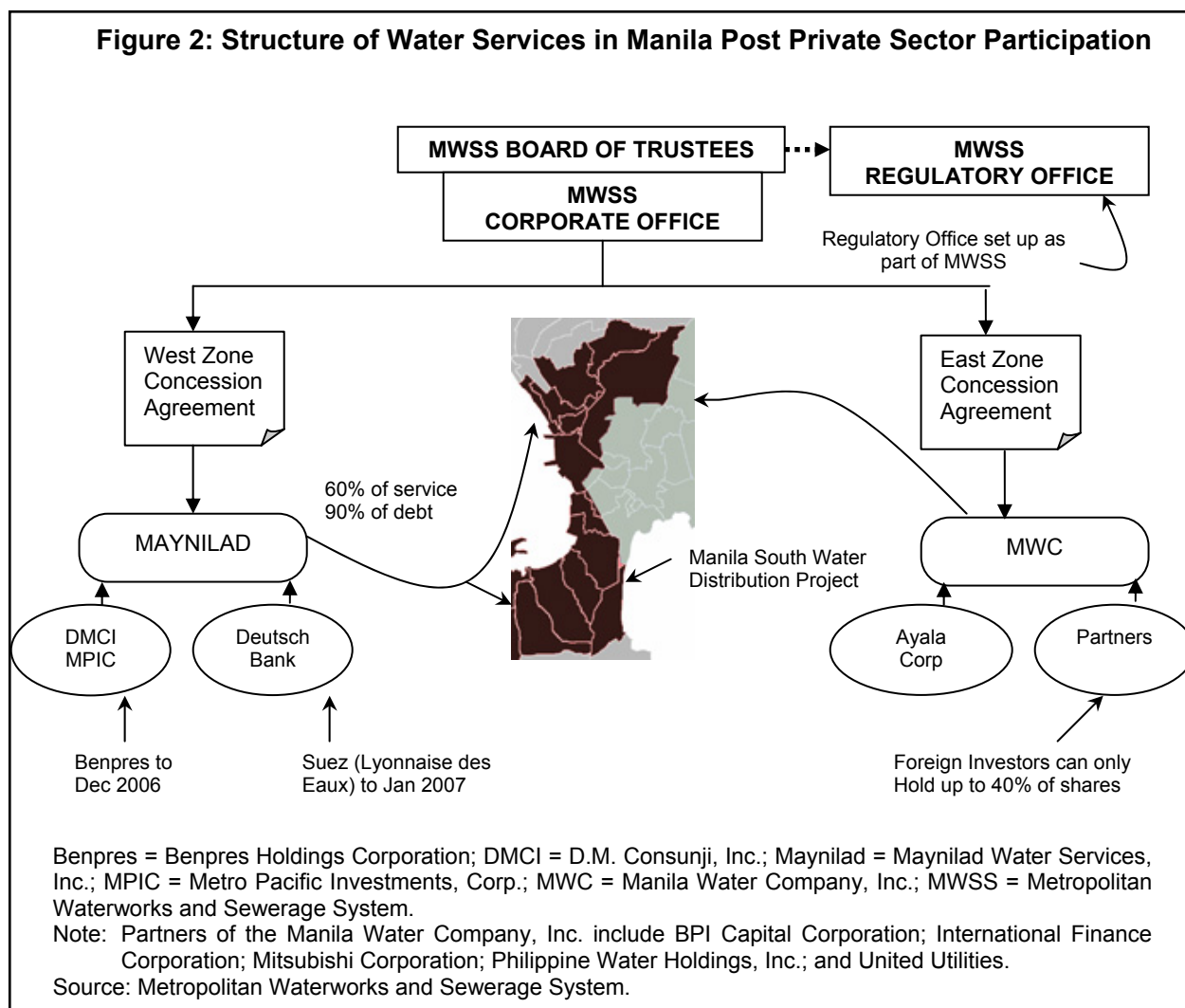
D. MWSS and Private Sector Participation in Water Services

17. In July 1994, President Ramos created the MWSS Privatization Committee. The following year, RA Number (No.) 8041, also known as the National Water Crisis Act of 1995, was enacted. Executive Order Nos. 286 (December 1995) and 311 (March 1996), were issued authorizing MWSS to enter into arrangements that may involve private sector participation in any part of its operations and facilities, and in July of the same year, the Board of MWSS approved the privatization strategy developed with support from the Government of France and IFC of the World Bank Group. The process to allow for private sector participation culminated on 1 August 1997 when the operational and investment functions of MWSS in water and sewerage services were transferred to MWC and Maynilad under two separate concession agreements.

18. Within MWSS, two independent entities were created to perform distinct functions: the MWSS Regulatory Office charged with monitoring the concessionaires' performance; and the MWSS Corporate Office, responsible for administering and managing retained assets, administering existing loans, facilitating provision of bulk water, and facilitating development of new water sources. The policy decision to allow for PSP was motivated by the inability of MWSS to provide adequate WSS services to Metro Manila and the desire to end government subsidies to its operations. To a great degree, PSP was facilitated by IFC, which provided TA for developing the process, organizing the relevant data and analyses, designing the contractual arrangements, and ensuring transparency in the bidding procedures. The key objectives were to improve quality and efficiency, expand services, end inefficient government subsidies, and reduce water tariffs.

19. MWSS retains certain functions such as administering and managing retained assets, administering existing loans, facilitating the provision of bulk water, and facilitating development of new water sources. The concession agreements transfer to the concessionaires the tenancy to land and operational fixed assets and exclusive rights to (i) produce and treat raw water; (ii) transport, distribute, and market potable water; and (iii) collect, transport, treat, dispose, and eventually reutilize wastewater, including industrial effluent discharged into the sewerage system. Under the concession agreements, whatever is transferred to, acquired by, or built by the two concessionaires remains in the name of MWSS and will revert to MWSS upon termination or expiration of the concession agreements.

20. The MWSS Regulatory Office was established to regulate water services under the framework of the concession agreements. Its major functions include (i) monitoring and adjustment of water tariffs, (ii) monitoring and regulation of service operations, (iii) monitoring and regulation of service infrastructure conditions, and (iv) handling customer complaints. The structure of water services in Metro Manila as of January 2007 is presented in Figure 2.



21. **MWC.** The East Zone encompasses 23 cities and municipalities, including parts of Manila, San Juan, Taguig, Pateros, Marikina, Pasig, Mandaluyong, Makati, and most of Quezon City, and spans approximately 1,400 km². As of the second quarter of 2007, the billed volume¹² of MWC was at 1,054 MLD of water, and as of end-2006 distribution of water was through 562,000 official connections and 909,000 household connections.¹³ MWC also manages and operates the sewerage system that covers a portion of its service area, as well as provides sanitation services (including dislodging of septic tanks) to its customers in the East Zone.

22. MWC was awarded the contract to operate the Manila East concession area. The company was a consortium of Ayala Corporation (Philippines), Bechtel Enterprises (United States), and United Utilities (United Kingdom). To date, the East Zone concession can be considered successful. MWC has steadily increased profitability in recent years and has delivered significant improvements to the East Zone water supply system.

23. **Maynilad.** The West Zone concession was not as successful as the East Zone. Maynilad has incurred substantial losses in all years of its operation. While a number of

¹² Available: <http://www.manilawater.com/investor-relations/investor-resources>

¹³ Manila Water Company, Inc. 2006. *Manila Water 2006 Annual Report*. Manila.

significant water supply improvement projects were commenced in the West Zone, a number have not been completed due to shortage of funds.

24. The West Zone, the larger concession, serves 7.5 million people in 17 cities and municipalities including 11 in Metro Manila and 6 in Cavite. Maynilad, a consortium led by Benpres Holdings (Philippines) and Lyonnaise des Eaux (France), was awarded the rights to operate the distribution network for the West Zone. The weight of debt payments following the 1997 Asian financial crisis led to heavy losses for Maynilad, with Benpres opting to put the water utility in rehabilitation before it exited the concession completely in July 2005. By the end of 2001 Maynilad's audited financial statement showed an excess of expenses over revenues in the amount of ₱1,734.9 million, a marked increase from the previous year's ₱618.2 million. The foreign exchange loss for the year 2000 was reported to be ₱1,063.8 million. In December 2002, Maynilad filed a Notice of Early Contract Termination, claiming that it was no longer financially viable to run the water business in the West Zone.

25. In May 2001, Maynilad stopped paying its concession fees; in 2003, it terminated its 25-year contract; and in 2004, it declared bankruptcy. This resulted in an adverse impact on MWSS's financial situation. In 2005, an agreement on the restructuring of the Maynilad concession had generally been reached, including repayment of outstanding concession fees. As per the agreement, MWSS could take over 84% of Maynilad shares in a debt-for-equity swap. MWSS was forced to take back Maynilad, partly reversing the PSP program. In December 2006, a consortium led by D.M. Consunji Inc. (DMCI), in partnership with Metro Pacific Investments Corporation (MPIC), won the bid for the Government's controlling stake in Maynilad including MWSS' receivables and subscription right under the Debt and Capital Restructuring Agreement dated 29 April 2005. In July 2007, DMCI-MPIC Water Company, 84% owner of Maynilad, was in discussion with Lyonnaise Asia Water Limited, the minority shareholder, to acquire their shares, which would allow DMCI-MPIC to consolidate 100% ownership in Maynilad.

E. Evolution of Tariffs

26. Prior to PSP the MWSS Charter limited the rate of return on book value of assets to 12%. Technically, the decision to adjust tariffs subject to the rate of return cap rested with the MWSS Board. In practice, MWSS tariffs were politically determined, and the final decision for tariff adjustments was made by the President of the country. The tariff structure used by MWSS, which the concessionaires were also committed to implement after PSP, was an increasing block system that distinguished among residential, commercial, and industrial customers. The intention was to provide benefits to the poorest customers on the network on the assumption that poorer consumers consume less water. Purely residential consumers were charged 20% of industrial user rates paid for the first 10 m³, and this difference was lower at higher quantities. The winning bids were (i) ₱2.32/m³ for the East Zone, and (ii) ₱4.97/m³ for the West Zone, both substantially lower than the prevailing average basic tariff of ₱8.78/m³ immediately prior to PSP.

27. The Concession Agreement allowed for a general rate setting or rate rebasing¹⁴ every 5 years. Under the Concession Agreement rate rebasing was optional on the 5th year and mandatory on the 10th year. Amendment No. 1 of the Concession Agreement made the 5th year mandatory, and the first general rate rebasing was conducted by the MWSS Regulatory Office in 2002. Rate adjustments are subject to a limit that takes into account the consumer price index

¹⁴ Rate rebasing is a review, examination, and revalidation of past performance and a projection of future cash flows to set water rates at a level that would allow the concessionaires to recover their expenditures and earn a rate of return referred by the Concession Agreement as the appropriate discount rate.

for the Philippines, extraordinary price adjustment, and rate rebasing. Since rate rebasing is done every 5 years, the consumer price index and the extraordinary price adjustment allow for nominal adjustments in the water rate during the concession period and may be allowed as grounds for price adjustment any time after the first year. In addition to the basic tariff, Amendment 1 allowed for additional mechanisms for price adjustment. The following are also added to derive the all-in tariff:

- (i) fixed currency exchange rate adjustment equivalent a fixed ₱1/m³ surcharge as defined in the Concession Agreement,
- (ii) foreign currency differential adjustment that allows the concessionaires to recover foreign exchange losses including accruals and carrying costs beginning 1 January 2002,
- (iii) special transitory mechanism starting July 2002 to enable the concessionaire to recover foreign exchange losses incurred in 2001 and any other recovery of the accelerated extraordinary price adjustment (AEPA) as of 31 December 2002,
- (iv) environmental charge representing 10% of the water charges, and
- (v) value-added tax.

28. The result of the general rate rebasing exercise in 2002 was approved by the MWSS Regulatory Office and the Board of Trustees on 13 December 2002, with tariff adjustments implemented starting 1 January 2003. Adjustments to the basic tariff since PSP are given in Table 3. These tariffs were far below the market prices at which private water vendors sold water to households in the project areas.

Table 3: Evolution of Basic Tariff (₱/m³)
(effective 1 January)

| | 1997 | 1999 | 2000 | 2001 | 2001 ^a | 2001 ^b | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 |
|----------|------|------|------|------|-------------------|-------------------|-------|-------|-------|-------|-------|-------|
| MWSS | 8.78 | | | | | | | | | | | |
| MWC | 2.32 | 2.61 | 2.76 | 2.95 | 3.22 | 4.22 | 4.51 | 10.06 | 10.40 | 13.95 | 14.94 | 15.90 |
| Maynilad | 4.96 | 5.80 | 6.13 | 6.58 | | 10.79 | 11.39 | 11.39 | 11.39 | 19.72 | 21.12 | 22.47 |

Maynilad = Maynilad Water Services, Inc.; MWC = Manila Water Company, Inc.; MWSS = Metropolitan Waterworks and Sewerage System.

^a Effective 21 April 2001. This is the final award following arbitration.

^b Effective 21 October 2001. This includes the accelerated extraordinary price adjustment.

Source: Metropolitan Waterworks and Sewerage System.

F. External Assistance to the Sector

29. The WSS sector for Metro Manila has received external assistance from a number of multilateral and bilateral agencies. Since 1974, ADB has provided loan financing for nine projects, amounting to a total of \$425.26 million by 2003. They were all executed and implemented by MWSS and guaranteed by the Government. In addition, ADB has provided seven TA grants (\$3.6 million) for project preparation, analytical work and policy advice, and capacity building of MWSS.

30. As Table 4¹⁵ shows, ADB was the lead international financial institution engaged in the WSS in Metro Manila. Other funding agencies included the World Bank, the Japan Bank for International Cooperation, and French Protocol. A \$125 million World Bank loan to help enhance the revenues of Maynilad through network rehabilitation is currently being processed, with project appraisal scheduled in 2008.

31. The processing of a proposed ADB loan under the multitranches financing facility for the Angat Water Utilization and Aqueduct Improvement Project (not shown in the table) was cancelled in January 2007 in favor of possible financing by the People's Republic of China under more favorable terms. The proposed arrangement did not materialize. The outputs of the MWSS New Water Source Development Project, which include feasibility studies for the Wawa Dam and Aqueduct 6, were to serve as the blueprint for the proposed project.

Table 4: External Assistance to Metro Manila's Water Supply

| Funding Agency | Major Projects | Amount (\$ million) | Approval Year |
|-----------------------|---|----------------------------|----------------------|
| ADB | Manila Water Supply | 51.3 | 1974 |
| | Second Manila Water Supply | 49.0 | 1978 |
| | Manila Water Supply Rehabilitation Project I | 39.3 | 1983 |
| | Manila Water Supply Rehabilitation Project II | 26.4 | 1989 |
| | Angat Water Supply Optimization Project | 130.0 | 1989 |
| | Manila South Water Distribution Project | 31.4 | 1991 |
| | Umiray-Angat Transbasin Technical Assistance | 2.6 | 1992 |
| | Umiray-Angat Transbasin Project | 92.0 | 1995 |
| | MWSS New Water Source Development | 3.3 | 2003 |
| ADB Total | | 425.3 | |
| World Bank | Manila Second Sewerage Project | 57.0 | 2005 |
| | Manila Third Sewerage Project | JPY6,592 | 2005 |
| JBIC | Angat Water Supply Optimization Project | With ADB | 1989 |
| French Protocol | Rizal Water Supply Project | FFR54.0 | 1993 |

ADB = Asian Development Bank, FFR = French francs, JBIC = Japan Bank for International Cooperation, JPY = Japanese yen, MWSS = Metropolitan Waterworks and Sewerage System.

Sources: Asian Development Bank, National Economic and Development Authority and World Bank.

III. ADB'S STRATEGY AND ASSISTANCE PROGRAM

A. ADB Country Strategy

32. The first full country operational strategy of ADB for the Philippines in 1988 set out three strategic development objectives: (i) poverty reduction and employment generation, especially in rural areas; (ii) reduction in income disparities and quality of life differentials between regions; and (iii) rehabilitation and improvements in efficiency in existing infrastructure. The three projects (Angat Optimization, Manila South, and Umiray-Angat projects) to support the expansion and improvement in the distribution of water in Metro Manila were largely consistent

¹⁵ The table does not include support for the design and delivery of private sector participation initiative. The total cost of this service, which was provided primarily by IFC, was \$6.2 million (Mark Dumol. 2000. *The Manila Water Concession: A Key Government Official's Diary of the World's Largest Water Privatization*, World Bank, Washington, DC, July). This cost was entirely recovered through a \$10 million commencement fee charged to the successful bidders for the concessions.

with ADB's operational strategy and the Medium-Term Strategic Framework (1992–1995), which underscored the importance of addressing social and environmental concerns. However, in light of the severe power crisis faced by the country in the late 1980s and early 1990s, ADB lending was directed largely to the energy sector, which accounted for 32% of the total amount approved, while WSS received 13%. During the earlier period 1974–1989, ADB had provided four loans for water supply (Table 4).

B. Objectives and Scope of the Assistance Program

33. The underlying objectives of ADB assistance to the water services sector in Metro Manila were the extension of services by expansion of the water and sewerage systems, increasing the availability of water through the provision of new infrastructure and the rehabilitation of infrastructure. The Angat Optimization, Manila South, and Umiray-Angat projects were key projects to support ADB's country operational objective of poverty reduction. Combined, the projects provided 54% of total approved assistance to Metro Manila's water services sector (Table 5) and transcending PSP in MWSS operations. The timing and purpose of the three projects is illustrated in Figure 3.

Table 5: Key Objectives and Components of ADB Financed Projects, 1989–2002

| Project | Loan Period | Objective | Components |
|--|--------------------|--|---|
| Angat Water Supply Optimization Project Loan 0986-PHI for \$130 million | 1989–2002 | <ul style="list-style-type: none"> • Increase raw water available to MWSS by 1,300 MLD (from 1,900 MLD to 3,200 MLD = +70%) • Reduce NRW | <ul style="list-style-type: none"> • Power plant • Tunnel and aqueduct • Treatment plant • Distribution infrastructure • NRW reduction |
| Manila South Water Distribution Project Loan: 1150-PHI for \$31 million (only \$12 million utilized and the rest cancelled); ICDF cofinancing was cancelled. | 1991–2002 | <ul style="list-style-type: none"> • Improve water services in southern Manila. • Benefit 792,000 including 120,000 urban poor | <ul style="list-style-type: none"> • Distribution system infrastructure • 45,700 customer connections and 330 standpipes |
| Umiray-Angat Transbasin Project Loan: 1379-PHI for \$92 million | 1995–2002 | <ul style="list-style-type: none"> • Increase raw water available to MWSS by 780 MLD (from 3,200 MLD to 3,980 MLD = +25%) • Reduce NRW | <ul style="list-style-type: none"> • River intake and tunnel • NRW reduction program |

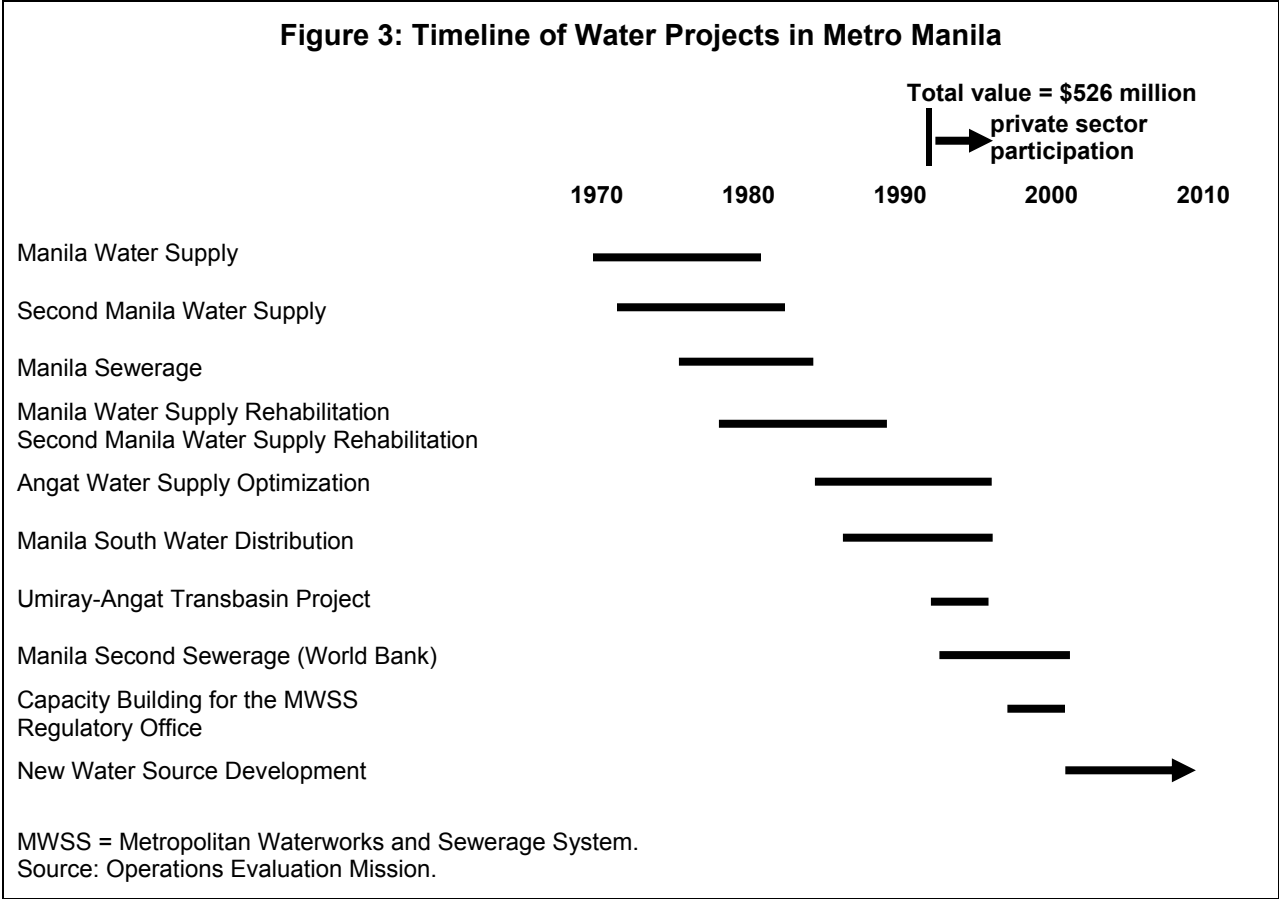
ICDF = International Cooperation and Development Fund, MLD = million liters per day, MWSS = Metropolitan Water and Sewerage System, NRW = nonrevenue water, PHI = Philippines.

Source: Operations Evaluation Mission.

34. The main objective of the Angat Optimization and Umiray-Angat projects was to increase the volume of raw water available to MWSS. At the time of appraisal, the availability of raw water was a constraint on the extension of piped water services in Metro Manila. Another constraint was the high rate of water loss from the MWSS system, and reducing NRW was an objective of the Umiray-Angat Project. The primary objective of the Angat Optimization Project was to improve water supply services in the project area by using the increased water

production provided under the Project. The secondary objective was to reduce the use of groundwater which is the main source of water by those not served by MWSS, and thus to reduce saltwater intrusion and land subsidence. The goal was to benefit about 792,000 people, including 120,000 urban poor. At the time of appraisal of the Angat Optimization and Umiray-Angat projects, ADB's interventions in the water services sector focused on the delivery of infrastructure as an assumed prerequisite for poverty reduction and development. All three projects were consistent with the ADB's sector strategy and positioning at the time of appraisal.

35. The scope of the three projects was limited to the delivery of large infrastructure assets. Even the NRW reduction component of the Umiray-Angat Project was limited to the repair, replacement, and delivery of network assets and did not address the commercial component of NRW. The fact-finding mission for the Angat Optimization Project was fielded in August 1988 even though MWSS had not improved its NRW and AR. The loan received Board approval on 14 November 1989.



36. While the Angat Optimization Project was under discussion, the technical feasibility of the Manila South Project was being presented. Originally, the Project as proposed by MWSS involved using surplus irrigation water from Laguna Lake to supply a water treatment plant of MWSS. Subsequent studies determined that the least-cost option was to supply the proposed project area from MWSS' water treatment plant complex in Quezon City and using the output of the Angat Optimization Project. The fact-finding mission was carried out from June until August 1990, and the loan was approved on 19 December 1991.

37. The Umiray-Angat Project was conceived to utilize the abundant water source in the Umiray River at its high flow during the dry season in the Angat catchment area. A fact-finding mission was fielded in February 1992 and the Project was processed up to the staff review committee (SRC) meeting stage in 1992. Further processing of the Project was deferred before an SRC meeting because of the unsatisfactory operational performance of MWSS with regard to high NRW and AR. A general consensus was formed between MWSS and ADB that the overall efficiency of MWSS, particularly in the areas of NRW and AR, needed to be improved to justify the Umiray-Angat Project, and further processing was deferred until such time when MWSS could demonstrate improvement in these areas.

38. To ensure timely implementation of the Project, ADB provided an engineering loan¹⁶ in 1992 for \$2.6 million to MWSS for detailed engineering work and geotechnical investigation, with the understanding that the Umiray-Angat Project could be considered in 1993. In 1994, it was agreed that ADB would resume processing of the Project and at the same time provide TA that would strengthen institutional and manpower capabilities. Despite the persistent problems regarding NRW and AR, the decision to resume the processing of the Umiray-Angat Project was based on (i) the long time, often years, needed to reduce NRW and AR; and (ii) the amount of preparatory work that had been done regarding project implementation, so that further delay in processing would mean huge loss of economic and social benefits in view of the severe water shortage that Metro Manila was then experiencing. An appraisal mission fielded in March–April 1995 recommended further processing of the Project, and the loan was approved on 21 September 1995.

39. The MWSS New Water Source Development Project¹⁷ approved for \$3.26 million, is a TA loan designed to provide (i) consultancy services for the preparation of feasibility studies for the Wawa River, Angat Water Utilization and Aqueduct Improvement, and Laiban Dam projects; and (ii) capacity building to strengthen financial management of MWSS. At the time of reporting the Project is still active, but all activities have been completed except for the preparation of the Laiban Dam Project, which had been cancelled at the request of the executing agency.

C. Technical Assistance for Project Preparation and Implementation

40. A total of four project preparatory (PPTA) grants have been extended to MWSS in support of Metro Manila's water supply (Table 6). The first PPTA¹⁸ was to carry out the feasibility study for the Manila Water Supply Project. The PPTA was implemented by MWSS, which also provided the counterpart staff, and ADB was the executing agency. Project preparation for the Angat Optimization Project was carried out under TA 1039-PHI: *Angat Water Supply Optimization*¹⁹ by consulting firms from Australia; Taipei, China; and the United States, while the project feasibility for the Umiray-Angat Project was undertaken under TA 1270-PHI: *Umiray-Angat Transbasin Study*²⁰ by the same consulting firm from Taipei, China that was engaged for the PPTA of the Angat Optimization Project. In 1995, a PPTA was approved to formulate a project that would help MWSS reduce its NRW by improving its primary distribution

¹⁶ ADB. 1992. *Umiray-Angat Transbasin Technical Assistance*. Manila. (Loan 1217-PHI, for \$2.6 million, approved on 22 December).

¹⁷ ADB. 2003. *MWSS New Water Source Development*. Manila. (Loan 2012-PHI, for \$3.26 million, approved on 14 October).

¹⁸ ADB. 1973. *Technical Assistance to the Philippines for Manila Water Supply*. Manila. (TA 0087-PHI, for \$49,200, approved on 5 May).

¹⁹ ADB. 1988. *Technical Assistance to the Philippines for the Angat Water Supply Optimization*. Manila. (TA 1039-PHI, for \$100,000, approved on 21 September).

²⁰ ADB. 1990. *Technical Assistance to the Philippines for the Umiray-Angat Transbasin Study*. Manila. (TA 1270-PHI, for \$1.267 million, approved on 19 February).

network.²¹ The TA consultants recommended replacement and/or relining of distribution pipes and valves as the primary measure to reduce NRW. The consultants' final report for the PPTA, submitted in July 1996, assessed MWSS' primary distribution network and identified the improvements and rehabilitation required. The PPTA did not result in a project, but the recommendations were overtaken by PSP in MWSS' operation that transferred the responsibility of expanding, rehabilitating, and maintaining the distribution network to the concessionaires.

41. In addition to the PPTAs, three advisory TA (ADTA) grants were approved and implemented before PSP in MWSS, and one ADTA was approved 4 years after PSP. The first three were directed at strengthening the management and institutional capacity of MWSS and supporting MWSS initiatives to introduce PSP in its operation and management (Table 6). The Angat Water Supply Optimization TA²² (TA 1219-PHI) was attached to the Angat Optimization Project. Training programs were carried out under this TA, but the specific training programs could not be verified by the SES mission, since files related to this TA were no longer available except for the consultant's report on the training on surveys and mapping for MWSS personnel.

Table 6: Technical Assistance Grants to MWSS

| TA No. | TA Name | Amount (\$'000) | Date Approved |
|----------------------------|--|------------------------|----------------------|
| Project Preparatory | | | |
| 0087 | Manila Water Supply | 49.2 | 5 May 1973 |
| 1039 | Angat Water Supply Optimization | 100.0 | 21 Sep 1988 |
| 1270 | Umiray-Angat Transbasin Study | 1,267.0 | 19 Feb 1990 |
| 2263 | MWSS Water Supply Improvement Study | 582.0 | 27 Dec 1994 |
| Advisory | | | |
| 1219 | Angat Water Supply Optimization | 300.0 | 10 Nov 1989 |
| 2254 | MWSS Operational Strengthening Study | 600.0 | 24 Dec 1994 |
| 2401 | MWSS Privatization Support | cancelled | |
| 3703 | Capacity Building for the Regulatory Office of MWSS ^a | 800.0 | 8 Aug 2001 |
| Total Amount | | 3,698.2 | |

MWSS = Metropolitan Waterworks and Sewerage System, No. = number, TA = technical assistance.

^a Executing agency is the Regulatory Office of the Metropolitan Waterworks and Sewerage System.

Source: Asian Development Bank database.

42. The activities under the MWSS Operational Strengthening TA (2254-PHI)²³ were completed in June 1996. These activities included key informant interviews, a socioeconomic survey, an operational review of MWSS, and workshops participated in by senior MWSS management. The MWSS Operational Strengthening TA provided detailed recommendations, including organizational changes and improvements in business processes, to improve the operational performance of MWSS. The recommendations were not implemented because of PSP of MWSS, which was ongoing at the time of TA completion.

²¹ ADB. 1994. *Technical Assistance to the Philippines for the MWSS Water Supply Improvement Study*. Manila. (TA 2263-PHI, for \$582,000, approved on 27 December).

²² ADB. 1989. *Technical Assistance to the Philippines for the Angat Water Supply Optimization*. Manila. (TA 1219-PHI, for \$300,000, approved on 10 November).

²³ ADB. 1994. *Technical Assistance to the Philippines for the MWSS Operational Strengthening Study*. Manila. (TA 2254-PHI, for \$600,000, approved on 24 December).

43. The TA on MWSS Privatization Support²⁴ was attached to the Umiray-Angat Project but was cancelled in September 1997 when PSP in MWSS operations was completed.

44. The Capacity Building of the Regulatory Office of MWSS TA (3703-PHI)²⁵ was approved on 8 August 2001 for \$800,000 to (i) strengthen the regulatory office's capabilities to efficiently execute the concession agreements, and (ii) identify good practices for regulatory work in specific functional areas. The TA completion report (TCR) gave the TA a rating of "successful." The ADTA produced guidelines on economic regulation, and training manuals, and carried out training programs.

45. Although the Water Crisis Act, which established the legal basis for PSP in MWSS, was passed in late 1995, the decision to allow for PSP was evident in July 1994 when President Ramos created the MWSS Privatization Committee. The TA operations on MWSS Water Supply Improvement and Operational Strengthening were both approved in December 1994, several months after it became clear that the political will to privatize was present. This raises the question of relevance for these two TA activities, which produced recommendations to strengthen functions that were subsequently privatized (Box 2).

Box 2: Recommendations of MWSS Operational Strengthening Study

TA 2254-PHI: MWSS Operational Strengthening Study was approved on 24 December 1994 for \$600,000. The objective of the technical assistance (TA) was to review the overall operational areas of Metropolitan Waterworks and Sewerage System (MWSS) and prepare strategic proposals for strengthening its managerial and institutional capability to improve MWSS' operational efficiency. As part of its scope, the TA was to look at the options that would allow for private sector participation (PSP) in MWSS. The consultants for the TA were fielded on 13 September 1995. In December 1995, the Government published Executive Order No. 286, which laid the foundation for the reorganization of MWSS and the entry of the private sector in the management of the water industry. By the time the TA consultants were concluding their report, the International Finance Corporation was also preparing the design for PSP in MWSS operations. In June 1996, the TA was completed with the submission of the consultants' final report, which had a full set of recommendations to improve the efficiency of MWSS and also a contingency approach in the event that a program of PSP and institutional change was to be implemented. Major recommendations of the TA included the following:

- (i) Provision of management accountability by delegating more responsibility to managers. This was intended as a short-term measure to prepare the managers for the proposed institutional change.
- (ii) Establishment of a Central Planning Unit that would determine and set corporate service and commercial targets.
- (iii) Prioritize the operationalization of the NRW Reduction Plan.
- (iv) MWSS should adopt the same machinery and staff support team during the process that would allow for PSP to ensure full coordination and empathy between the operational strengthening measures and the additional actions required.
- (v) A minimum of two concession companies to provide water treatment and customer network services to different sectors of the city.
- (vi) There should be open and independent regulation of the water services standards, customer interests, and commercial return to the companies.

The TA completion report states that the implementation of recommendations made under the TA had to be delayed because of the PSP process. Although some recommendations would have been useful even after PSP, none was implemented.

Source: ADB. 1996. *Technical Assistance Completion Report for TA 2254-PHI: MWSS Operational Strengthening Study*. Manila.

²⁴ ADB. 1995. *Technical Assistance to the Philippines for the MWSS Privatization Support* (TA 2401-PHI, for \$582,000, approved on 21 September). This TA was cancelled on 2 September 1997.

²⁵ ADB. 2001. *Technical Assistance to the Philippines for the Capacity Building for the Regulatory Office of the Metropolitan Waterworks and Sewerage System*. Manila. (TA 3703-PHI, for \$800,000, approved on 8 August).

D. Project Design, Implementation, and Operation

46. This chapter examines the process that went into the formulation of the Angat Optimization, Manila South Water Distribution, and Umiray-Angat projects; implementation arrangements; and problems and physical achievements of the three projects approved during 1989–1995.

1. Design

a. Reflection of Views of Principal Stakeholders in Project Designs

47. A review of project documentation indicates that the views of senior MWSS officials were reflected in project design. However, there is no evidence that there was consultation with existing providers, such as vendors and small-scale water providers, of water services in the area targeted by the Manila South Project. Neither was there any credible evidence of a detailed market analysis of water supply and an analysis of alternative sources. This is a significant weakness in project design. The community and small-scale service providers could have been a useful part of the solution, as has subsequently been demonstrated by the “Bayan Tubig”²⁶ initiative of Maynilad and the “Tubig para sa Barangay” initiative of MWC (para. 118).²⁷ Also, by failing to take into account the manner in which incumbent local service providers met the needs of the community, the benefits provided by piped water supply were different and probably lower than those set out in the project documents.

b. Building on Existing Knowledge

48. The inability of MWSS to reduce the high level of NRW was documented and known prior to formulation of the three projects. At appraisal of the Angat Optimization Project, two ADB-funded projects directed at reduction of NRW were under way. Nevertheless, at appraisal of the Manila South Project, it was assumed that NRW would decrease from 58% in 1990 to about 35% by 1997, and to stay constant thereafter. This assumption was clearly optimistic and its achievement unlikely. There is no explanation as to why this unrealistic assumption was used. NRW rose to 61% (66% in the Manila South Project target area) by 1997, which was one of the main factors behind the poor performance of the Manila South Water Distribution Project.

c. Adequacy of Needs Assessment

49. At the time of formulation of the Angat Optimization, Umiray-Angat, and Manila South projects, there was a pressing general need to increase coverage and improve water services in Manila. This need both predated the projects and continues today. The projects were aligned with the Government’s development priorities and ADB’s country strategy and programs for the Philippines. However, this does not necessarily imply that the needs assessment of MWSS was correct and that formulation led to the best projects.

²⁶ The *Bayan Tubig* (loosely translated meaning water for the nation) and *Tubig para sa Barangay* (loosely translated meaning water for the community) are initiatives of Maynilad and MWC, respectively, to provide water connection to urban poor households.

²⁷ Under ADB. 2005. *Implementing Pilot Projects for Small Piped Water Networks (SPWN)*. Manila. (TA 6265-REG, for \$400,000, approved on 26 October), the “Bayan Tubig” and “Tubig para sa Barangay” programs were enhanced. Selected pilot sites in areas of responsibility of MWC and Maynilad were quickly connected to piped water supply. A SPWN toolkit was developed that can be used to design similar SPWN projects.

50. MWSS received support from ADB as well as from other development partners to develop new water sources. In the early 1980s, the Philippine Government initiated studies for a dam in the Sierra Madre mountain range at Tanay, Rizal. The Laiban Dam was intended to supply 1,830 MLD of water to Metro Manila as well as to generate 25 megawatts of hydropower. MWSS completed the feasibility study and detailed engineering design by 1984. Land had been acquired, and some families who were to be relocated had already been compensated. World Bank support of the Laiban Dam Project also resulted in some components being constructed. In 1989, the Project was deferred in favor of the Angat Optimization and Umiray-Angat projects. These two projects offered a far cheaper way of augmenting raw water supply than the Laiban Dam.²⁸ The support to look for other sources of water continued even while the Angat Optimization and Umiray-Angat projects were already being implemented. The Angat Water Utilization Project proposed to secure existing and develop new water sources under a multitranchise financing facility (para. 31). In 2003, the Japan International Cooperation Agency also financed a master plan to study new long-term water sources, including Laiban Dam.

51. However, it is not clear that the Angat Optimization and Umiray-Angat projects were the most cost-effective way of increasing water available for supply. The economic evaluations in the PCRs (Umiray-Angat and Manila South projects) estimate the economic cost of raw water provided through the Umiray-Angat Project at ₱1.05 per m³. This is significantly higher than the estimated economic cost of ₱0.45 per m³ of obtaining raw water through diversion from irrigation usage. There is no indication that this alternative, although politically more challenging, had been seriously considered.

52. The Umiray-Angat Project further increased the water available to MWSS by about 30%, which is less than the losses due to leakage. As such, part, if not all, of the extra water could have been obtained through leakage reduction projects. There is no mention or comparison of the economic cost of the Umiray-Angat Project with that of increasing water available to customers by leakage reduction or demand management. This may indicate tacit recognition of the lessons learned from previous projects that MWSS as an institution could never be expected to seriously address the issues that lead to high NRW. A similar conclusion led the administration of President Ramos to outsource operations to the private sector.

53. The economic evaluation in the PCRs for the Umiray-Angat and Manila South projects concludes that “The added cost of the Umiray-Angat Project, ₱0.60/m³, is only 4% of the total cost of water, so using the higher cost source has little if any impact on the economic basis for expanding water supply.” This refers to the extra cost of using the Umiray-Angat Project as opposed to diverting water from irrigation and expressing this as a percentage of the average incremental economic cost of providing water to customers, including taking away wastewater. For this approach to justify the project, the average incremental economic cost must be lower than incremental revenue from new customers. Overall, needs were identified but alternative solutions were not adequately considered.

d. Engineering Design

54. On 29 November 2004 the intake works of the Umiray-Angat tunnel were severely damaged by floodwater due to heavy rainfall. This caused large boulders and other debris to enter the tunnel, which had to be removed from service. The Government intervened to

²⁸ In June 2007, the Arroyo administration announced that the Laiban Dam project would be resurrected at a cost of US\$1 billion (Philippine President Revives Stalled Dam Project, <http://au.news.yahoo.com//070611/3/13ptu.html>, Monday 11 June, 05:52 pm).

expedite rectification works to avoid a water shortage in Manila, but the tunnel remained out of service for 2 months. The works were supposedly designed to withstand flood with a 1,000-year return period,²⁹ but aerial photographs provided by MWSS indicate that the design of the intake had failed to take into account an obvious floodwater route for Ravitaan Creek, a tributary entering the Umiray River next to the intake works. The same monsoon heavy rainfall and flood also resulted in the loss of a bridge and the power station at the Macua River outlet of the tunnel. Discussions with MWSS indicate that the flood was unlikely to have been larger than the 1,000-year design flood, indicating a flaw in the design.

2. Implementation

55. The three projects were executed by MWSS, all with cost savings resulting from the devaluation of the peso and cancellation of some project components. The Manila South Project was approved in December 1991, but major civil works started only in 1999. The SES confirms the PCR findings that both the Angat Optimization and Manila South Water Distribution projects suffered from major delays in implementation due to the legal dispute over the use of fiberglass pipe and the effects of PSP on MWSS operations, which required redesign (i.e., splitting) of the network. To a certain extent, delays were also caused by the time taken for approval of excavation permits, particularly in the case of the Manila South Project, which could have been greatly mitigated. Concessions for water distribution were awarded while the Umiray-Angat Project was being implemented, and the winning bidders were reluctant to take over project implementation (para. 105). MWSS continued to implement the Umiray-Angat Project until its completion, 5 years after the start of PSP.

3. Achievement of Objectives

56. The three projects did not fully achieve their immediate purposes. While the Angat Optimization Project achieved its immediate objective of providing facilities for supply, treatment, and distribution based on additional water supplied from the Angat Reservoir, there were substantial shortfalls in achieving connections (by 19%), amount of water sold (39%), and contributing to NRW reduction at completion (55% against 30% of water production) compared with the targets set at appraisal. The Angat Optimization Project resulted in about 238,500 new connections, serving 295,682 households or about 2.2 million people. This fell short of the target of 345,000 connections or 3.1 million people served. Targets were achieved only after PSP. In 2003, the concessionaires, Maynilad and MWC, had installed 611,833³⁰ and 515,237,³¹ connections, respectively.

57. By 2004, the Manila South Water Distribution Project had resulted in 18,000 new connections, water consumption had increased from 45 MLD at appraisal to 61 MLD. This compares with the target of serving 1.34 million people through 179,000 connections and 237,000 people through about 800 public standpipes; and the total water supply in the project area to reach from 100 MLD (1999) to 450 MLD by 2004. The achievement of immediate purposes was far too low, and the expected benefits did not happen because (i) the incremental volume from the Angat Optimization and Umiray-Angat projects were used to meet the increasing consumption north of Metro Manila (MWC service area), and (ii) NRW increased. The Manila South Project closed in November 2002 with a very low level of project output

²⁹ A flood of a magnitude expected to be equaled or exceeded once in 1,000 years.

³⁰ Official records indicate 585,953 new connections were Maynilad's sole responsibility.

³¹ Official records indicate 396,778 new connections were MWC's sole responsibility.

achievements. Furthermore, there was no water distribution due to delays in completion of ongoing projects (Angat Optimization and Umiray-Angat projects) and the El Niño phenomenon.

58. The Umiray-Angat Project aimed to reduce NRW to below 40% for the entire MWSS service area by the year 2000. The Umiray-Angat Project was able to (i) augment the treated water supply of MWSS by about 9 m³ per second (equivalent to 780 MLD by 1999), and (ii) improve the operational efficiency and revenue generation of MWSS through the implementation of a program that would reduce NRW from 55% to about 40% by 2000 through leak detection and repair. While the project was successful in increasing water supply to 780 MLD, it was not successful in contributing to NRW reduction, which stood at about 43% for the MWC service area and 69% for the Maynilad service area in 2004.

IV. PERFORMANCE ASSESSMENT OF ADB ASSISTANCE

59. Only three out of seven loan projects to MWSS over the last 3 decades have been rated “successful” by PCRs and project performance evaluations. Of the last three projects, approved during 1989–1995, only one project was rated “successful” (Table 7). This chapter assesses the performance of the last three projects: the Angat Optimization, Manila South, and Umiray-Angat projects.

Table 7: Water Supply Services in Metro Manila: Project Success Rate

| Projects | Amount (\$ million) | Approval Year | PCR Rating | PPER Rating | Latest Rating |
|--|------------------------|------------------|-----------------------------|----------------|------------------|
| Manila Water Supply | 51.30 | 1974 | NR | GS | GS |
| Second Manila Water Supply | 49.00 | 1978 | NR | GS | GS |
| Manila Water Supply Rehabilitation Project | 39.30 | 1983 | US | US | US |
| Second Manila Water Supply Rehabilitation Project | 26.40 | 1989 | US | US | US |
| Angat Water Supply Optimization Project | 130.00 | 1989 | PS | | PS |
| Manila South Water Distribution Project | 31.40 | 1991 | US | | US |
| Umiray-Angat Transbasin Technical Assistance | 2.60 | 1992 | | | |
| Umiray-Angat Transbasin Project | 92.00 | 1995 | S | | S |
| MWSS New Water Source Development | 3.26 | 2003 | PCR not available yet | | |

GS = generally successful, MWSS = Metropolitan Waterworks and Sewerage System, NR = no rating, PCR = project completion report, PPER = project performance evaluation report, PS= partly successful, S=successful, US = unsuccessful.

Source: Operations Evaluation Department database and Operations Evaluation Mission.

A. Development Effectiveness of ADB Assistance

60. This bottom-up assessment of the performance of water supply services in Metro Manila is based on the evaluation of the same three projects following the five criteria of relevance, effectiveness, efficiency, sustainability, and impact.

1. Relevance

61. The relevance of ADB-financed projects is assessed looking at strategic consistency, design, stakeholder consultation, and aid coordination. All the three projects (Angat Optimization, Manila South, and Umiray-Angat) were relevant, as they were consistent in terms of their goals (long-term development impact), purposes (immediate outcomes), and outputs with (i) key water supply-related issues in Metro Manila, (ii) the Government's strategy for the development of water supply sector, and (iii) ADB's country assistance strategy for the Philippines.

62. The Manila South Water Distribution Project was expected to address the need to serve the south of Metro Manila with piped water, which was a relevant objective. The 1999 redesign proposing 103,000 connections, compared with 45,700 at appraisal, would have enhanced project benefits. However, (i) the assumption regarding NRW was unrealistic; (ii) there were major delays in implementation, which could have been minimized; and (iii) only about one third of the approved loan amount was disbursed, and the remainder was eventually cancelled.

63. The design of the Umiray-Angat Project was "relevant" as it provided for an extra 780 MLD of treated water into the MWSS service area at a time when less than 50% of the population was served with piped water. However, only about 40% of the treated water benefited consumers due to high NRW, which persisted even with the project. The inclusion of the NRW reduction component was therefore very relevant to address the problem; however, the target was too ambitious.

64. At the design stage, (i) there was limited consultation with private sector water suppliers, key beneficiaries, and other development partners; (ii) alternative sources of raw water were not fully analyzed; and (iii) the need for support to strengthen the institutional capabilities of the newly constituted Regulatory Office was not fully addressed. Given the experience of damage to the tunnel and bridge in 2004 (para. 54), it may be said that the engineering design could have been better so that engineering works could withstand monsoon floods. The assumptions for NRW were not realistic.

65. The TA on MWSS Operational Strengthening is rated "partly relevant." It was consistent with the Government's and ADB's development strategies. However, in view of PSP it was no longer relevant as far as MWSS operations and focus were concerned. While capacity development is still needed to regulate and manage the concessionaires more efficiently, this function now rests on the MWSS Regulatory Office. A TA grant (3703-PHI) was approved in August 2001 for this purpose.

2. Effectiveness

66. The effectiveness of ADB-financed projects is assessed by looking at the extent of achieving the immediate project objectives stated in the project documents. ADB-financed projects for Metro Manila water supply contributed to the construction of water supply infrastructure from the Angat Reservoir and provided additional supply of treated water at a time when piped water was inaccessible to more than 50% of the population. The projects, however, fell short in their objective of serving and benefiting the target number of beneficiaries mainly due to high NRW.

67. The Angat Optimization Project provided an extra 800 MLD of treated water at a time when less than 50% of the population was served with piped water. While the Project achieved

its immediate objective of providing facilities for supply, treatment, and distribution based on additional water supplied from Angat Reservoir, it is rated “less effective” in achieving its purpose of serving and benefiting 3.1 million people, as only about 2.2 million people benefited from the project, due mainly to the high NRW. The Angat Optimization Project was also not explicit on its targeted beneficiaries for new connections (345,000); about 30% of the connected water supply went to the urban poor, 50% to subdivisions, and 20% to other consumers.

68. For a number of reasons, the Manila South Project did not achieve its outcomes with respect to increased water supply coverage. Households that did receive connections benefited, but these benefits were not necessarily as envisaged at appraisal. The Manila South Project was ineffective in achieving its immediate objectives of (i) improvement in water supply services in four municipalities (Parañaque, Las Piñas, Muntinlupa, and Bacoor) by utilizing the increased production of water from the Angat Optimization Project; and (ii) reduction in groundwater use in those areas.

69. The Umiray-Angat Project augmented the treated water supply of MWSS, but the number of beneficiaries fell short of the target because the secondary objective of reducing NRW was not met.

3. Efficiency

70. The efficiency criterion examines the projects in terms of efficient use of ADB resources.

71. The financial rates of return (FIRR) estimated in 2004 indicated that the Angat Optimization Project had a low FIRR of 1.7% (compared with 16.9% at appraisal), and the Manila South Project a negative FIRR (-8.2%), showing financial losses. The main factors contributing to the low FIRRs were (i) low actual tariffs, (ii) low incremental volume of water sold because of the higher level of actual NRW, and (iii) lower incremental production generated by the project as compared with the assumptions at appraisal. The Umiray-Angat Project appears to have performed better than the other two projects. Its estimated FIRR (in 2004) amounted to 7.7%, which was higher than the estimated weighted average cost of capital (WACC)³² of 4.5%. The difference between the FIRR at appraisal and actual FIRR (i.e., after completion) was primarily due to the lower volume of water sold, high NRW, and low tariffs.

72. The SES examined the FIRRs of these projects further. Since the Angat Optimization and Umiray-Angat projects shared a common goal of enhancing the water supply volume and coverage in the MWSS service area, the consolidated FIRR for the two projects was reestimated by comparing revenues and costs during the estimated 40-year economic life (Appendix 1). The actual tariff rates were adjusted for inflation and are expected to remain at the 2006 level for the life of the projects. Costs include capital and incremental O&M costs. Given these assumptions, the FIRR is estimated at 12.6%, an improvement over the 1.7% (Angat Optimization Project) and 7.7% (Umiray-Angat Project) estimated at project completion. This improvement was realized from the significant increases in tariff in 2005 and 2006 (e.g., nominal tariff increased in 2005 from the previous year by 52% for Maynilad and by 33% for MWC from 2004) and improvements in NRW reduction, primarily in the East Zone (dropping to 35% from a high of 52% in 2002 for MWC). Sensitivity analysis (Appendix 1) shows that, if tariffs were kept

³² The estimate of the WACC uses the 2006 interest rate for the 182-day treasury bill of 6.15% and inflation rate of 6%.

at the 2004 levels, the FIRR would have been 6.11%, still above the WACC³³ estimated at 4.5%. An improvement in NRW to an average of 30% by year 2015 would generate a higher FIRR of 15.6%.

73. Using the same basic assumptions, the FIRR for the Manila South Project was estimated at 0%, confirming the estimate of a negative FIRR at project completion, although indicating an improvement somewhat because of the tariff increases in 2005 and 2006. Payments for interest started in 1992, and in 1999 for civil works. There is hardly any benefit in the project area, because water did not flow in from the Angat Optimization and Umiray-Angat projects due to, among others, El Niño and the increasing consumption north of Manila. Improving NRW to 35% by 2015 or even a more drastic improvement to 20% would not generate any improvement in the FIRR.

74. The economic justification for the Angat Optimization Project followed a least-cost approach, whereby the economic cost of raw water obtained from the project (₱0.30/m³) was lower than the economic cost through diversion from irrigation usage (₱0.45/m³). The incremental economic cost of water connection, estimated by the PCR in 2004, was ₱16.60/m³. Economic analysis of the Manila South Project showed that new connections could have a major welfare impact on the poor, as the price of the water from a piped connection is only 10% of the price of vended water,³⁴ thus giving a potential saving (consumer surplus) of about ₱2,554 per month or about 20% of household income of households that have connections.

75. Economic analysis of the Umiray-Angat Project indicates that the cost of raw water (₱1.22/m³) is higher than the next best source of raw water (₱0.45/m³). The added cost of the Umiray-Angat Project (₱0.77/m³) is only 5% of the total cost of water; hence its impact on the economic basis for expanding water supply was considered low at appraisal and also at completion. The estimated average incremental cost of treated water supplied by the Project is ₱15.95/m³, which is comparable to that of the Angat Optimization Project. Nevertheless, little effort was apparently made to find a lower-cost source of raw water, and the source of water was already given at the time of the project design. The estimated economic internal rate of return (EIRR) for the two projects combined (Angat Optimization Project and Umiray-Angat Project), using the same assumptions and latest cost data, is 15.3% for the life of the project. The EIRR is higher than the economic discount rate of 12%, implying that the projects can be efficient in resource use. As in the case of the FIRR, this improvement in EIRR was due to improvement in NRW reduction in the East Zone. At loan closing the Manila South Project failed to achieve the level of outputs expected at appraisal. Service connections were less than 15% of the target because there was insufficient water supply. For reasons given in para. 57 expected benefits from the Manila South Project did not materialize. The Project was inefficient in terms of both financial and economic returns due to low revenues, and zero or negligible economic benefit (lack of delivery of economic benefits).

4. Sustainability

76. For any city, long-term sustainability of water services depends to a large extent on the success of appropriate tariff policy and tariff revenue collection to cover O&M costs, debt service (payment of interest and principal), and new development to meet new demands. The

³³ The estimate of the WACC uses the 2006 interest rate for the 182-day treasury bill of 6.15% and inflation rate of 6%.

³⁴ This relative price of vended water is confirmed by recent studies carried out by the Regional and Sustainable Development Department including studies under ADB. 2005. *Implementing Pilot Projects for Small Piped Water Networks*. Manila. (TA 6265-REG for \$200,000 approved on 26 October).

extent of NRW affects revenue collection, as it can reduce net revenue and undermine project sustainability. Other factors that affect sustainability include the role of the regulatory office; maintenance of water production; financing of additional supply; timely tariff adjustments; concessionaires, which are responsible and accountable for distribution of water; and other sources of water supply. The sustainability of the Metro Manila water project hinges on the effectiveness of the MWSS Regulatory Office to manage and regulate the concessionaires, the concessionaires' management of water distribution assets and efforts to meet existing and new demands, and MWSS maintenance of water sources and capability and preparedness to develop new water sources.

77. As discussed above, there were problems related to supply of treated water, rising NRW, and related low or negative financial returns. Efforts of MWSS to maintain existing water sources and augment them with new supply will continue. Project sustainability is rated as likely for the Angat Optimization and Umiray-Angat projects combined due to the reevaluated FIRR (12.6%), and unlikely for the Manila South Project. Finding a sustainable solution for the concession of the West Zone, expediting NRW reduction, and agreeing on timely tariff adjustments would determine the sustainability of the Manila South Project. In addition, technical panels should be engaged in the future to avoid issues like the fiberglass pipe dispute and the leaking Aqueduct no. 5. Certainly a new aqueduct will be needed before Aqueduct no. 5 can be repaired. For the Umiray-Angat Project, given a well-engineered diversion tunnel and works, and given the dependence of the National Irrigation Authority and National Power Corporation on this source of water, its main component in terms of providing water to Metro Manila is likely sustainable.

78. MWC was successful in reducing NRW to 32% from about 45% in 1997 in the East Zone. The performance of the East Zone concessionaire underscores the benefits that can be realized from PSP. A new concession arrangement has been put in place in the West Zone. These recent developments may increase the likelihood of project sustainability of the three projects discussed above.

5. Socioeconomic Impact

79. In Metro Manila the delivery of water to households was the responsibility of MWSS prior to August 1997. After PSP it became the responsibility of the two concessionaires. A recent survey³⁵ carried out by ADB in Manila found that 28% of households without piped water sourced their water supply from water vendors, common faucets or standpipes, private wells, kiosks, or other water sources. Vended water is delivered in containers by cars, tricycles, jeepneys, or in huge water tankers, and is usually paid for on a container basis. David and Inocencio³⁶ reported that some vended water actually came from MWSS, sometimes illegally. Other sources of vended water are private wells, open dug wells, and communal faucets.

80. In 2000, the target area of the Manila South Project included 335,195 urban households, which, assuming 5 members per household, equates to a population of about 1,676,000. Based on an MWSS study,³⁷ 175,805 households were connected in 2003. Around 31% (54,499 households or 272,497 residents) were in the lower income groups. This represents the total number of urban poor benefiting from the Project. The perception of the urban poor is that they

³⁵ Available: <http://www.adb.org/Water-Briefs/pdf/water-brief-delivering-piped-water.pdf>

³⁶ Cristina C. David and Arlene B. Inocencio. *Understanding Household Demand for Water: The Metro Manila Case*. Available: http://www.idrc.ca/en/ev-8441-201-1-DO_TOPIC.html

³⁷ MWSS. 2003. *Strengthening of the Planning Capability of MWSS*. Manila.

reaped various socioeconomic benefits from the Manila South Project. The SES carried out a socioeconomic survey (Appendix 2) to collect information from the local residents on socioeconomic benefits from water connections under the Project. The results are summarized in Table 8.

Table 8: Connected Households in the Manila South Project Area

| Project Area | Number of Households (2000 Census) | Connected Households As of 2003 | | Target Connection ^a Rate, As of 2005 (%) |
|--------------|---------------------------------------|------------------------------------|----------------|---|
| | | % | Number | |
| Las Piñas | 97,962 | 38 | 37,225 | 60 |
| Parañaque | 95,150 | 100 | 95,150 | 100 |
| Muntinlupa | 78,016 | 22 | 17,163 | 47 |
| Bacoor | 64,067 | 41 | 26,267 | 62 |
| Total | 335,195 | 59 | 175,805 | |

^a The Project Appraisal Report for the Manila South Project (November 1991) envisaged that, at project completion in 1995 (original target completion date of the project), the Project would have brought benefits to around 792,000 people, 120,000 of whom would be in the low income group (about 9.2 % of the total population in the project area).

Source: Operations Evaluation Mission.

81. **Time and Convenience.** Many respondents (49.4%) said that they benefited from time saved from fetching and treating water, giving them extra time for family and leisure activities. In particular, children and the youth involved in fetching water had more time for their studies, helping around the house, and leisure. Forty-four percent of housewives, who bear the burden of most household chores, said they have significantly benefited, as the time saved from collecting, storing, and treating water has allowed more time for other household activities.

82. **Livelihood and Income.** Some housewives interviewed (29%) stated that they can now engage in microenterprises such as the selling of ice, ice candies, commercial car-washing, and bottled water stations. For the 25 surveyed households engaged in micro business such as selling ice candies and ice, connection to the pipe network allowed an increase in monthly income by about ₱100 to ₱300, with four households citing an increase in income of ₱500 to ₱1,000 per month. Small eateries also generated additional income through decreased water expenses (about 30%), because they no longer have to buy bottled water for drinking purposes. For 11 households, the resale of water also generated additional income averaging ₱200 to ₱300 per month. Other additional income resulting from connections to the piped network came from the ability to increase rents for rooms.

83. However, increases in income averaged over all households was less than the savings resulting from access to lower cost piped water. Savings of the cost of water is the main benefit to the people from the projects. Average total household savings were reported to range from ₱850 to ₱1,000 per month, with lower income households saving ₱250 to ₱500 per month.

84. Other socioeconomic benefits include:

- (i) **Increase in Property Value.** Respondents perceive that the value of property increased with the introduction of piped water supply. Renters are also prepared to pay higher rents, and dormitory fees rose by 5% to 10%.
- (ii) **Health and Sanitation.** Few people observed improvements in sanitation infrastructure such as new sewer lines. Many households continue to dispose of their wastewater into individual septic tanks, with others discharging directly into

canals or creeks. There were no reported changes in the number of cases of waterborne illnesses.

- (iii) **Community Safety.** Those interviewed during the survey also cited an increase in safety afforded by a functioning piped water supply available for fire-fighting. Cleaner surroundings brought about by the increased availability of water for cleaning was perceived as decreasing the risk of disease (as mentioned above, the survey did not provide any evidence to support this perception).

85. Generally, there was a marked improvement in economic and social welfare as a result of water connections to households. However, the expected benefits have not yet been fully realized, as about 65% of connected households interviewed still use other sources of water such as boreholes, private vendors, and mineral or purified water. This is partly a result of choice but primarily due to the intermittent supply of water through the network and the associated problems of water quality in the survey area of Manila South.

86. The average water consumption of connected households increased from 10 m³/month to 20 m³/month. The corresponding household expenditure reduced substantially from ₱1,000–₱2,400 per month prior to connection, to ₱200–₱300 per month.

87. The increase in the consumption following connection of water among the connected households has resulted in a significant increase in convenience and safety through (i) increased use of water for cleaning the house and surroundings; (ii) increased use of water for personal needs (bathing, cooking, etc.); (iii) increased use of water for gardening and, improving aesthetics in the household environment; and (iv) increased availability of water for fire-fighting. Additional water supply also facilitated water-based economic activities, mainly microenterprises (para. 82).

88. The intent of the Project was to reach the lowest income group or those unable to afford connections but who would benefit most from access to piped water. Although not envisaged at project design, this objective is being furthered through the “Bayan Tubig” initiative of Maynilad. This initiative encourages 10–20 poor households to group together to share the cost of a connection to the piped system. This spreads the burden of the connection charge among participating households, as a result of which access to piped water supply is further increased.

89. The majority of the respondents to the survey thought that water services can be further improved by accelerating the laying of pipes and the installation of metered connections. Some respondents were emphatic about wanting to be connected even if the water bills they would receive would stretch their income to the limit. Interviewed households appreciated the availability of piped water but wanted to see further improvement of services by ensuring a continuous, 24-hour supply; increased pressure; timely repair of broken water meters; and lower billing rates. The overall rating on socioeconomic impact is “modest.”

6. Environment Impact

90. The environmental impact assessment, includes a social acceptability assessment. The Manila South Project was partially implemented, but it was understood that consultation with the communities complied with requirements.

91. The actual extent of groundwater extraction before and after the projects was not reported in the project documents. It was however stated that the overabstraction of groundwater and the falling water table were causing ground subsidence and increasing

flooding in low-lying areas of Metro Manila. As such, one of the objectives of the Manila South Project was to reduce groundwater abstraction by providing a piped supply as a substitute.

92. The socioeconomic survey undertaken by the operations evaluation mission did not specifically seek to explore this issue; however, the following observations were made from the survey: First, private wells and boreholes were not registered or monitored by any agency, national or local, so quantification of the issue and benefits brought by the Manila South Project is difficult. Second, a significant number of those supplied with connections to the pipe network continue to use borehole water for two reasons (i) the piped water supply is intermittent; and (ii) the piped water quality is often of low aesthetic quality (color, taste, and odor) and is perceived as a health risk. Consequently, even for the limited number of households who were connected as a result of the Manila South Project, the reduction in borehole water was not as high as expected. The rating on the three projects for positive environmental impact is considered “modest.”

7. Assessment of Institutional Arrangements–MWSS

93. MWSS was the executing agency. Its performance is rated modest based on the fact that key covenants such as tariff adjustments, project benefit monitoring and evaluation (BME), and NRW reduction were not complied with. There were major delays in implementation.

94. In the case of the Angat Optimization Project, of a total of 36 loan covenants, 28 were either complied with or subsumed by PSP, six were partly complied with, and two were not complied with. One of the covenants not complied with was related to tariffs and the other was the BME requirement. Loan closing was extended three times, and actual closing came 7 years after the original schedule.

95. As in the Angat Optimization Project, the covenants of the Manila South Project not complied with were those related to tariffs, BME, and NRW. Of the 45 loan covenants, 31 were complied with or subsumed by PSP, 11 were partly complied with, and three were not complied with. The Project’s closing date was extended three times, and it finally closed more than 6 years after the anticipated closing date with only about a third of the Project being implemented. Implementation start-up was delayed by 7 years due to the dispute over the use of fiberglass pipe in the Angat Optimization Project, Manila South Project, and Umiray-Angat Project. At one point in 1998, ADB considered cancelling the loan because of implementation delays and major design changes. It was only after the PSP that ADB decided to accept the redesign and continue with the Project.

96. For the Umiray-Angat Project, of the 37 loan covenants, 26 were complied with or subsumed by PSP, seven were partly complied with, and four were not complied with. Covenants that were not complied with were related to tariffs, NRW, project BME, and watershed management.

8. Assessment of Overall Project Performance

97. It appears that a rigorous evaluation of alternative sources was lacking in the case of the Angat Optimization and Umiray-Angat projects. A cheaper source of water and alternative means of serving the urban poor may have been overlooked at the concept stage. Lessons from the poor performance of previous NRW initiatives do not seem to have been taken into account in the design of NRW components. A summary of the project ratings is given in Table 9.

98. The overall rating of the Angat Optimization Project is “partly successful” in terms of strategic consistency and demand for piped water, and it is considered “highly relevant.” The project is rated “less efficient,” and sustainability is “less likely.” NRW stayed consistently above 55%. Other assumptions made at appraisal regarding incremental water production, incremental water sold, and level of tariffs did not materialize. These translated to an FIRR of 1.7% at the PCR, although some reduction in groundwater consumption and some benefits accruing to the urban poor were reported. A survey conducted by the PCR mission showed that the Project significantly improved the situation of families with low income.

99. The Manila South Water Distribution Project is rated “unsuccessful” because (i) it was unable to improve the water supply services in the project area and reduce groundwater abstraction; (ii) it was found to have been inefficient in its achievement of outputs and purpose, given the negative FIRR rating, long implementation period, and cancellation of two thirds of the approved loan; (iii) its sustainability is unlikely; and (iv) social impacts, although positive, have been much lower than expected. To some extent this Project was a victim of the failure of the first Maynilad concession, and that counterpart funds needed for project implementation were no longer available following the Asian financial crisis.

100. The Umiray-Angat Project is rated “successful” based on its assessment as “highly relevant,” “less effective,” “efficient,” and “likely sustainable.” The PCR reported that the objective to provide 780 MLD of treated water for Manila was successfully achieved, but the Project did not realize the wider development goals of meeting demand for water by increasing coverage with piped water and reducing use of groundwater, and contributing to NRW reduction. The recomputed FIRR was 7.7%; lower than the appraisal estimate of 19% but higher than the WACC.

101. The TA for MWSS Operational Strengthening is rated “partly successful.” It was consistent with the Government’s and ADB’s development strategy. However, in view of PSP it is no longer relevant as far as MWSS operations and focus are concerned. It was “effective” in that it was able to achieve the proposed outcome. It produced the required studies and proposed key recommendations with the given resources with a 2-month slippage and is rated “efficient.” However, the studies and the recommendations were never put to use, and sustainability is rated as “unlikely.” The TA for Capacity Building for the Regulatory Office was timely and highly relevant, its outputs were useful, and immediate outcomes were positive. However, the sustainability of its outcomes is deemed “less likely.”

Table 9: Summary Performance Assessment

| Project | Relevance (20%) | Effectiveness (30%) | Efficiency (30%) | Sustainability (20%) | Total Rating (R)^a | |
|---|----------------------------|--------------------------------|-----------------------------|---------------------------------|---|----|
| Angat Water Supply Optimization Project | 2 | 1 | 1 | 1 | 1.2 | PS |
| Manila South Water Distribution Project | 2 | 0 | 0 | 0 | 0.4 | US |
| Umiray-Angat Transbasin Project | 2 | 1 | 2 | 2 | 1.7 | S |
| Technical Assistance for MWSS Operational Strengthening Study | 1 | 2 | 2 | 0 | 1.4 | PS |
| Technical Assistance Capacity Building for Regulatory Office | 3 | 2 | 2 | 1 | 2.0 | S |

MWSS = Metropolitan Waterworks Sewerage System, PS = partly successful, S = successful, US = unsuccessful.

^a Highly successful if $R > 2.7$; successful if $1.6 \leq R \leq 2.7$; partly successful if $0.8 \leq R \leq 1.6$; and unsuccessful if $R < 0.8$.
Source: Operations Evaluation Mission.

B. Strategic Assessment

1. Strategic Positioning for Supporting Manila Water Supply Services

102. ADB assistance was strategically positioned and was consistent with the strategies and priorities of both ADB and the Government, but it fell short in addressing the fundamental issues related to NRW. Addressing the unacceptably high NRW was one of ADB's loan conditionalities. The focus of its assistance, however, continued to be on the supply of hardware rather than dialogue and assistance to address policy and institutional weaknesses. While policy dialogue and institutional development assistance alone would not have been sufficient, there should have been a balance between hardware and software aspects to address issues holistically and improve water services in Metro Manila, learning from past experience and building upon the acquired knowledge and expertise. The First and Second Manila Water Supply Rehabilitation projects (footnotes 8 and 9) failed to reduce NRW to the target of about 30% after 1992. In fact, NRW increased from 44% in 1979 to a peak of 64% in 1986. The three ADB-financed projects were apparently not influenced by the lessons from the previous projects (Table 7) (para. 48). In 1993, MWSS' level of NRW was 58% of the total water volume distributed, much higher than Bangkok's 31%. In 2000, NRW was still at an unacceptably high level of 43% for the MWC service area and 67% for the Maynilad service area (Table 10).

Table 10: NRW Targets of ADB Projects

| Project Name | NRW Target | Actual NRW |
|---|-------------------|--------------------------|
| Second Manila Water Supply | 25% by 1985 | 61% in 1985 |
| Manila Water Supply Rehabilitation | 30% by 1990 | 58% in 1990 |
| Second Manila Water Supply Rehabilitation | 30% by 1992 | 54% in 1992 |
| Angat Water Supply Optimization | 30% by 1995 | 59% in 1995 |
| Manila South Water Distribution | 42% in 1995 | 59% in 1995 |
| | 35% by 1997 | 61% in 1997 |
| Umiray-Angat Transbasin Project | 50% by 1995 | 59% in 1995 |
| | 48% by 1996 | 55% in 1996 |
| | 40% by 2000 | 43% for MWC in 2000 |
| | | 67% for Maynilad in 2000 |

Maynilad = Maynilad Water Services, Inc.; MWC = Manila Water Company, Inc.; NRW = nonrevenue water.

Source: Operations Evaluation Mission and Metropolitan Waterworks and Sewerage System.

2. ADB's Role in Private Sector Participation in MWSS Operations

103. The private sector's participation in MWSS operations was largely facilitated by IFC, which provided TA for developing the process of PSP, organizing the relevant data and analyses, designing the contractual arrangements, and ensuring transparency in the bidding procedures. IFC continues to play an active role, being one of the shareholders of MWC.

104. ADB's assistance to Metro Manila's water supply supported and promoted activities with private sector participation. The TA on MWSS Operational Strengthening (Table 6) was tasked to look at options to promote PSP for MWSS, among others. While the TA was being implemented, MWSS³⁸ approached IFC to prepare a privatization proposal. It was said that the MWSS official approached IFC because "*IFC was the only financial advisor he knew.*"³⁹ It is not clear why MWSS did not utilize the ongoing TA, but the recommendations of the TA were overtaken by the process led by IFC that allowed for PSP (para. 42 and Box 2). The Umiray-Angat Project was accompanied by TA that aimed to assist MWSS in "introducing private sector participation in the operation and management of MWSS sector activities." The TA was subsequently cancelled when it was sidelined by the awarding of concession agreements to two private entities.

105. PSP in MWSS operations started 19 months after the Umiray-Angat Project became effective. During the negotiations the issue of who would be responsible for the Umiray-Angat Project was raised.⁴⁰ The bidders did not want the responsibility, saying that it carried a great risk. Ultimately, all parties agreed that the responsibility for the Project was to remain with MWSS.

106. Although ADB endeavored to assist MWSS in the pursuit of PSP, the design adopted and the process used were those supported by IFC's technical support. There was little

³⁸ This was reported in the TCR for ADB. 1994. *Technical Assistance to the Philippines for the MWSS Operational Strengthening Study*. Manila. (TA 2254-PHI, for \$600,000, approved on 24 December).

³⁹ The World Bank. 2000. *The Manila Water Concession*. Washington, DC (page 27).

⁴⁰ Dumol. 2000. *The Manila Water Concession: A Key Government Official's Diary of the World's Largest Water Privatization*. Washington, DC.

evidence, if any, of coordination between ADB and other aid agencies in this area. ADB could have benefited from such coordination leading to better use of TA funds earmarked for PSP.

3. Value Addition of ADB Assistance

107. The value addition of ADB assistance to Manila water services was generally limited to augmenting raw water supply to the MWSS water treatment and supply system. Both concessionaires depend on this source of water for distribution. ADB also pilot tested water connections targeting the urban poor and has achieved encouraging results in the majority of the cases. The other area it contributed toward was the preparation of the PSP program through TA, assistance that likely helped MWSS in certain areas (paras. 41 and 127). Socioeconomic impacts are positive with piped water bringing a variety of economic benefits to local people. In the area of environment, such as overextraction of groundwater, the results have so far been mixed.

4. Overall Assessment of ADB Assistance

108. Overall, the SES rates ADB's assistance to improving water supply services in Metro Manila "partly successful." The consistently high NRW remains a sticking point for the West Zone. If NRW had been successfully addressed, water supply available for Metro Manila could have been more than the additional flow from the Umiray-Angat Transbasin. ADB was overly ambitious in its NRW targets, and not mindful of MWSS' shortfalls on achieving earlier targets. On the other hand, without the Angat Optimization and the Umiray-Angat projects, the effects of El Niño in 1997 could have been disastrous and the current state of water services in Metro Manila would have been lamentable.

V. ASSESSMENT OF PRIVATE SECTOR PARTICIPATION IMPACT

109. In the past, the main source of funding for water supply was the central Government, with assistance from bilateral and multilateral loans and grants. With the Government's PSP thrust, private capital is also seen to gradually help finance projects in the sector. Key problems in financing water supply include the (i) inability of the majority of water supply agencies to generate sufficient funds from operations to finance system development and improvement, (ii) inadequate funding and provision for O&M to sustain the current levels and quality of service, and (iii) inadequate assessment of ability and willingness of consumers to pay for WSS services. PSP is also expected to bring about latest technology and management skills to improve water services for the people.

110. Privatization usually refers to the full or substantial transfer of ownership of public assets to the private sector. This is not the case in concession arrangements, which are long-term leases under certain terms and conditions. The involvement of the private sector in the water services in Metro Manila involves the awarding of concessions to the private sector to operate water distribution systems. The events leading to PSP and the restructuring of MWSS are discussed in Chapter II, Section D. This section focuses on key impacts of PSP in water services in Metro Manila.

A. Mobilization of Private Sector Capital

111. Private sector capital has been mobilized efficiently in the East Zone but not so in the West Zone. Since 1997, with support from IFC, the private sector has invested over \$338 million, of which part was used to rehabilitate inherited facilities. To date, MWC has provided

water connections to over a million additional people, nearly half of whom are low income, living in informal settler communities. MWC continues to meet business objectives, showing 47% growth in the past 6 years. It was able to raise \$65 million from its initial public offering in 2005, allowing it to continue investing in water and wastewater infrastructure services. Since 2003, IFC has provided three \$30 million loans to the company and an additional \$15 million in equity prior to its initial public offering. MWC's shareholder base as of end 2007 comprises the Ayala Group (33.5%), United Utilities (11.7%), Mitsubishi Corporation (7.8%), IFC (7.3%), employees (2.7%), and the general public (37%). It reportedly expanded its customer base from 3 million in 1997 to 5 million after 10 years.

112. In contrast, Maynilad in the West Zone ran into financial problems. Under the concession arrangements it assumed 90% of the debt obligation of MWSS. The reason for this distribution of debt was that the West Zone was claimed to have been fully developed, the pipelines were already in place, and it supposedly had the bigger share of the market.⁴¹ The East Zone was supposedly more dispersed and would require more capital to expand the system. Despite the initial higher tariff rate agreed to relative to the East Zone under MWC, the burden of debt payments following the 1997 Asian financial crisis led to heavy losses for Maynilad (opting to put the water utility in rehabilitation before it exited the concession completely in July 2005). By the end of 2001, its audited financial statement showed an excess of expenses over revenues in the amount of ₱1,734.9 million, a marked increase from the previous year's ₱618.2 million (losses). Foreign exchange loss for the year 2000 was reported to be ₱1,063.8 million.

113. As discussed in Chapter II, in May 2001 Maynilad stopped paying its concession fees; in December 2002 it filed a Notice of Early Contract Termination, claiming that it was no longer financially viable to run the water business in the West Zone; in 2003, it terminated its 25-year contract; and in 2004, it declared bankruptcy, exacerbating its financial situation. In 2005, an agreement on the restructuring of Maynilad concession had generally been reached, including repayment of outstanding concession fees, i.e., MWSS took over Maynilad shares in a debt-for-equity swap. Following the new bid administered in December 2006, a 50/50% consortium of DMCI and MPIC, won 83.97% ownership of Maynilad. Minority shareholders were Lyonnaise Asia Water Limited and Metrobank, with 16% and 0.03% shares, respectively. Following the resignation of Lyonnaise Asia from the new Maynilad Board, Deutsche Bank acquired its 16% stake. In December 2006, the West Zone concession was successfully awarded to another private sector entity, a consortium led by DMCI in partnership with MPIC, which won the bid for the Government's controlling stake in Maynilad including MWSS' receivables and subscription right.

114. The West Zone requires substantial investment in replacing pipes. The new Maynilad has a ₱26 billion Capital Expenditure Program (CAPEX) that it hopes will provide 100% 24-hour service coverage in its service area by 2012. The CAPEX will totally replace very old pipelines and facilities to improve water supply and pressure and reduce NRW. There is also need to augment raw water supply from other sources. The performance of Maynilad under the new concessionaire is yet to be seen, although improvements in NRW reduction have been reported in some areas in the West Zone. This offers renewed optimism that NRW reduction under the new Maynilad will be at least as successful as what was achieved in the East Zone.

⁴¹ At the time of bidding there was no way to verify this claim except to dig in the ground to determine the age and status of the pipes.

B. Management Skills and Operational Efficiency

115. Apparently, the success in bringing in management skills through the water concession to the private sector and in improving operational efficiency was limited. MWC lived up to expectation, while Maynilad lagged behind. A change in management approach helped MWC. It adopted a decentralized management system, empowering area business managers to make important decisions and promoted partnerships with communities and local leaders. It tried to address the problem of the black market in water (and resulting NRW) by providing piped water to communities that was 10% to 20% cheaper. Maynilad opted to replace the old pipes with new ones, but it could not accomplish it due to lack of funding. An estimate of operational efficiency, measured in terms of earning per peso asset, shows 30 centavos per peso asset for MWC and 18 centavos per peso asset for Maynilad.⁴²

C. Better Urban Water Services

116. In 1997, only 26% of 325,000 households in Metro Manila had, at best, limited access to clean and affordable piped water. In a decade after taking over the concession, MWC in the East Zone increased the number of households with water connections to over a million, 98% of which have a 24-hour water supply. It has also substantially reduced its revenue losses from leaks and illegal connections and has expanded its service area to include Taguig, Antipolo, San Mateo, and Baras. However, in the West Zone it has been a different experience. The success of Maynilad until the end 2007 was limited.

117. **New Water Connections.** Lately, in the area of water connections, Maynilad seems to have made some progress. Of the estimated 12.8 million inhabitants in the MWSS concession area as of June 2007, 8.1 million or 60% resided in the West Zone, of whom 5.9 million were Maynilad customers. As of June 2007, there were 696,805 water service connections (including private meters), 67,420 sewerage connections, and a workforce of 2,350. At the time of PSP, there were only 464,644 service connections providing water to the West Zone. Maynilad subsequently installed 356,854 new water connections as of June 2007.

118. Maynilad receives 98% of its water from Angat Dam. The remaining 2% is sourced from deepwells. From the Angat Dam, water flows to the La Mesa treatment plants in Novaliches, Quezon City, which at present treat a combined 2,400 MLD. In June 2007, La Mesa Treatment Plant 1 was able to treat an average of 1,355 MLD out of its designed capacity of 1,500 MLD, while La Mesa Treatment Plant 2 was able to treat an average of 872 MLD out of its designed treatment capacity of 900 MLD. In addition, Maynilad sourced an average of 39 MLD from deepwells.

119. The La Mesa treatment plants purify water via a modern and methodical process. Pumping stations throughout the West Zone chlorinate water already treated at the plants in order to clean the network of contaminants. The quality of Maynilad treated water exceeds global and national standards, especially the one prescribed by the Department of Health's Philippine National Standard for Drinking Water. From the treatment plants, the water flows through Maynilad's pipe network, extending approximately 3,710 km from Valenzuela in the north to Cavite City down south. The water flows through Maynilad's network facilities, which include (i) 15 reservoirs in Pasay, Noveleta, Fairview 3, Fairview 4, Algeciras, La Mesa, Bagbag, Binuksuk, Espiritu, Ermita, Novaliches, Sacred Heart, Tondo, D. Tuazon, and Kalookan; (ii) 11 pumping stations in Commonwealth, Noveleta, Pasay, La Mesa, Villamor,

⁴² *The Manila Times*. 27 March 2003.

Kalookan, Ermita, Algeciras, Tondo, D. Tuazon, and Espiritu; and (iii) 7 mini boosters in Mangga, Fairview 3, Fairview 4, Philtrade, Bagbag, Novaliches, and Capitol Bliss.

120. From the pumping stations, water is distributed to customers. As of June 2007, 42% of Maynilad customers has a 24-hour, uninterrupted water supply, while 40% had intermittent water due to low pressure, or no water at all due to the inadequacy of the water supply. The average water pressure along the entire network is 7 pounds per square inch.

121. **Tariffs.** New water tariffs are still cheaper than prices from alternative supply sources. PSP has not only paved the way for the upgrading and rehabilitation of Metro Manila's water network, it has also actually made the price of water cheaper. Presently, Maynilad charges its customers an average of ₱32.99 inclusive of value added tax for unsewered services. This tariff consists of the basic charge, which is ₱22.47/m³ of water plus a ₱1/m³ currency exchange rate adjustment (CERA), a special transitory mechanism to enable it to recover foreign exchange losses incurred in 2001 and any underrecovery of the accelerated extraordinary price adjustment as of 31 December 2002, and an environmental charge of 10% of the water charges. A foreign currency differential adjustment (FCDA) was also collected starting on 1 January 2002. Those with sewer services are charged ₱47.46 on average because of the sewer charge of ₱14.83/m³, which is 50% of the basic, CERA, and FCDA. A fixed maintenance service charge is also levied per connection, depending on the meter size, the amount of which ranges from ₱0.50 to ₱50.

D. Benefits to the Poor

122. Benefits to the poor people emanate from improved services, lower costs, and new connections. After PSP, benefits to the poor have been good in the East Zone and not so good in the West Zone. Upon taking over operations on 1 August 1997, the concessionaires reduced the "average basic" tariff for water and wastewater services from ₱8.78/m³ to ₱2.32/m³ in the East Zone served by MWC and ₱4.96/m³ in the West Zone served by Maynilad (Table 3, para. 28). On average, this reduced the rate consumers paid for water by over 60%.⁴³

123. PSP initiatives specifically targeted at improving access for the poor such as the "Bayan Tubig" initiative of Maynilad in the West Zone and the "Tubig para sa Barangay" of MWC in the East Zone (footnote 24). The "Bayan Tubig" encourages 10–20 poor households to group together to share the cost of a connection to the piped system. This spreads the burden of the otherwise onerous connection charge among participating households, as a result of which access to piped water supply is further increased. To date, MWC has provided water connections to over a million additional people, nearly half of whom are low income and live in informal settler communities.

124. At the aggregate level, benefits to the poor people may be examined by looking at estimated cost savings (or implicit consumer surplus) resulting from the drop in tariffs following introduction of the concession arrangements. The study made an attempt to estimate potential cost savings (Appendix 2). The result shows that the combined savings to customers in Manila from 1 August 1997, when the concessionaires' tariffs were introduced, to the end of 2002 is approximately ₱19 billion or ₱3.5 billion per year.

⁴³ At commencement of the concessions, the average tariff across Manila (weighted by volume sold) was ₱3.3/m³; 38% of the pre-concession rate of ₱8.78/m³.

VI. CONCLUSIONS, LESSONS, AND RECOMMENDATIONS

A. Conclusions

125. ADB-financed projects for Manila's water supply have successfully contributed to the construction of major infrastructure components for water supply from the Angat Reservoir, which are crucial for securing water provision for Metro Manila. However, Metro Manila is still dependent on the single source of raw water; the ADB-MWSS partnership has not been successful in developing any alternative sources of raw water. The partnership in the past did not include the sanitation subsector, although sewerage in Metro Manila has always been primarily supported by the World Bank. ADB's role in assisting MWSS in the design and implementation of water concessions (also called privatization) was limited. However, ADB assistance to MWSS for regulatory capacity building was deemed useful. ADB-financed project components aimed at reducing NRW, which became the responsibility of the concessionaires after PSP, were generally successful with MWC in the East Zone and unsuccessful with Maynilad in the West Zone. Overall, ADB's assistance to improving water supply services in Metro Manila is rated "partly successful."

126. ADB provided loan financing for water supply infrastructure in the MWSS service area for over 30 years. Nine loans with a total value of \$425.26 million were guaranteed by the Government, and MWSS was the executing agency for all of them, allowing ADB to monitor the operational performance of MWSS on a regular basis so that it should have been clear to ADB that MWSS chronically suffered from two operational problems: high levels of NRW and AR. Despite this institutional weakness, ADB-funded projects carried extremely optimistic assumptions, contributing to the poor performance of the Manila South Project.

127. The impact of PSP in water distribution under MWSS on project implementation could not have been foreseen at the appraisal stage; the system, which was originally designed to operate under an integrated system, needed modification, i.e., a split between east and west zones leased to the two concessionaires. Although ADB did not play a major role in the development of the strategy to allow for PSP, the projects included in this SES also benefited the private concessionaires through the provision of infrastructure supporting the growth of their businesses and achievement of the performance targets set out in the concession agreements.

B. Lessons

128. Lessons identified are based on experience with the implementation of water supply projects in Metro Manila and highlight needs to address systemic weaknesses in the sector, more realistic ex-ante analysis, improved readiness for project implementation, transparency and accountability, and the importance of addressing high levels of NRW. Moreover, water utilities were unable to respond to rapidly increasing demand due to inadequate provisions for maintenance of existing water supply networks.

129. **Project designs need to consider both supply and demand issues.** Project designs need to consider demand-side issues and the role of small-scale water suppliers/vendors. Given the systemic problems in the distribution system, small-scale water suppliers targeted unmet demand in the provision of water services in the project area, although at a relatively high but affordable price. Such alternative ways of meeting demand and higher than expected willingness-to-pay for alternative services needs to be considered in feasibility assessments. On the supply-side, attempts to augment the raw water supply in Metro Manila focused only on the

Angat River, the traditional single source of raw water for Metro Manila, and alternative sources were not thoroughly explored.

130. Project designs need to consider NRW lessons from previous projects. Despite implementing a number of NRW reduction programs, Maynilad was not successful in reducing NRW levels in the West Zone. As a result, project effectiveness fell short in achieving the objective of serving and benefiting the number of beneficiaries targeted due mainly to the high NRW. This had a significant impact on the ability of Maynilad to improve water supply coverage in its service area. While MWSS did not reduce NRW and AR as expected, ADB continued to provide new loans with the same NRW and AR conditionalities, which reduced project success. In future project designs, the issue of sequencing investments for enhancing system capacity as against NRW reduction and efficiency improvement needs closer examination. In sequencing investments, the greater emphasis needs to be given to reducing NRW over the investment in new distribution assets. Investment for rehabilitation, where required, should be earmarked for NRW reduction. PSP contracts need to provide incentive-linked performance targets in the concession agreement for NRW reduction. NRW reduction requires a comprehensive approach including provision for an adequate flow of funds to improve raw water supply and water distribution networks, committed management, and high level of cooperation from local governments.

131. Project economic and financial analyses need to be based on realistic assumptions, especially concerning tariffs, NRW, O&M expenditures, and supply. The projects were assessed as inefficient in terms of both financial and economic returns due to low revenues, and zero or negligible economic benefits. Factors contributing to the low project returns were (i) low actual tariffs, (ii) low incremental volume of water sold due to higher NRW, and (iii) low incremental production generated. Low tariffs are a sector issue. To avoid insufficient maintenance of existing water supply networks, it is necessary to confirm the funding source for O&M (revenues or other committed sources), identify the projected financial gap in meeting the operational expenses over time under different tariff regimes, and provide for necessary operational funding support in the project design. This should consider the fact that tariff increases are usually better accepted by consumers after service improvements are realized.

132. Longer-term sustainability of water supply services depends to a large extent on the success of an appropriate tariff policy and tariff revenue collection to cover O&M costs, debt service, as well as new development to meet rising demand. A two-pronged solution is needed to ensure that sufficient finance is available for sector development and operation: (i) a tariff policy that allows an increase, where justified, after the service is improved; and (ii) a support mechanism that covers the interim operational shortfall over the early years to the service provider. The mechanism can be in the form of an upfront fund with an annual contribution based on projected shortfall. Access to the fund should be against committed reform criteria and demonstrated performance improvement (e.g., for NRW or other efficiency improvement measures). The payment from the fund can be repaid as a subdebt in the later years when the consumer base and tariffs increase (best case) or as a grant to the project (subsidy), but taken as a loan to the executing agency to ensure operational sustainability. In the absence of such an operational support mechanism, the economic life of the asset will be shorter and utilization lower, leading to inefficient capital investment, adding to the liability of the borrower without achieving desired outcomes. The design of a project needs more careful examination of investment needs (demand side) and caters to the adequacy of funding for O&M.

133. **Foreign exchange risks need to be factored into the financial analysis and management of water companies, particularly those having foreign debt-service obligations.** The Asian financial crisis of 1997–1998 was a significant issue for both concessionaires. As part of the Concession Agreement, the debts of MWSS to international lending agencies such as ADB and the World Bank were passed on to the concessionaires. Maynilad was required to take on 90% of the MWSS debt. The other 10% was passed on to MWC. The devaluation of the Philippine peso by about 80% in the first few years of the concessions affected the servicing of foreign loans obtained for capital works, as well as the repayment of MWSS debts. While the Concession Agreement allowed for adjustments for foreign exchange fluctuations, recovery of foreign exchange losses was required to occur over the 25-year life of the concessions. This created cash flow problems in the early years of the concessions.

134. **The regulatory arrangements and the concession contracts in Metro Manila needed a better design and more realistic assumptions.** PSP was initiated through a competitive, media-friendly process, but the successful bidders were determined on the basis of financial bids, which had risks. Apparently, there was a set of erroneous assumptions related to Maynilad: (i) there would be no foreign exchange risks, (ii) foreign loans for new investments to improve in distribution systems would be available, (iii) the West Zone had a piped network of 2,500 km as opposed to the actual figure of about 4,000 km, (iv) sufficient water would be available for distribution, and (v) improvement would be realized in operational efficiency and NRW reduction. In addition, it is not clear who regulates small-scale water suppliers/vendors.

135. **The expected regulatory response and management contribution of foreign partners need to be clear at the outset.** The regulatory role of imposing rules or resolving problems needs to be clear at the design stage. The Regulatory Office needs to be fully autonomous to avoid the risk of political pressure. Besides, the concessionaire was new and inexperienced. Foreign partners did not necessarily bring required management skills. Conflicting management styles between foreign and local partners can create new problems leading to inefficient operations. The respective management roles of local and foreign partners need to be clear in concession arrangements involving foreign or local joint ventures.

136. **Private sector participation in MWSS operations has brought benefits where connections were put in place and water supplied but several areas for improvement remain.** Private sector participation in MWSS operations has brought benefits where connections were put in place and water supplied but several areas for improvement remain. The following design lessons for water concession are noted: (i) concession agreements and contracts need to include technical and financial specifications on the concessionaire's performance including NRW reduction, new investments, and tariff flexibility; (ii) mechanisms are needed for holding water concession designers accountable for arrangements; (iii) as concession arrangements were difficult to adjust after the initial agreement, more flexible yet robust terms are needed where justified; (iv) adequate separation of policy, regulation, and operations including independent and effective regulation is essential; (v) strong and consistent political leadership is required for successful water concessions.

C. Recommendations

137. Based on the findings and lessons presented in the foregoing sections, the SES recommends the following for future operations:

- (i) **Given the long partnership with MWSS and the rising demand and widening demand-supply gap for water in Metro Manila, ADB should**

provide further lending assistance to improve Metro Manila's raw water supply by drawing from known but untapped sources and surveying other possible sources. The high population density in urban areas in general and Metro Manila in particular, coupled with high growth rates and a relatively high incidence of poverty, leads to significant challenges in provision of water supply and sanitation services. Provided population in Metro Manila continues to expand, the demand for water will continue to grow. The concessionaires are developing new sources but can do so only on a small scale. Additional raw water on a large scale to meet the pressures of the growing metropolis will require significant investment to develop a significant alternative to the Angat Reservoir.

- (ii) **There is continued potential for an ADB role in developing water distribution services in Metro Manila, particularly in the West Zone.** The Government's Socioeconomic Report 2006⁴⁴ reported that in Metro Manila only 52 waterless⁴⁵ areas were serviced with potable water. The Government plan is to have potable water for the entire country by 2010, with priority given to 210 waterless barangays in Metro Manila and 633 waterless municipalities outside Metro Manila. However, given the possibility of alternative, sometimes lower cost bilateral and multilateral financing sources, ADB will need to package and deliver its assistance more efficiently than before.
- (iii) **Assist in developing new mechanisms for addressing NRW reduction issues.** Reducing NRW has been a difficult task in the past, with little success. To address the NRW issue, project design should take into account both demand- and supply-related factors that contribute to NRW, including new investments, policy and institutional factors, system weaknesses, risks, and the role of small-scale water suppliers/vendors and their regulation.
- (iv) **Consider providing lending assistance for groundwater-related environmental protection and wastewater management.** Assistance in the water supply and sanitation sector has been mostly in water supply. The sector continues to be faced with problems of indiscriminate extraction of groundwater, and pollution from municipal and industrial wastewater. Solid waste management is a serious problem in urban areas, which has led to serious flooding, air pollution, and spread of diseases. There has been only one loan project in this area, the Manila Sewerage Project, which was completed in 1990. Watersheds surrounding Metro Manila have been under threat from deforestation and rapid encroachment of settlements, which is contributing to severe degradation of water resources. Further support for these areas should be assessed.

⁴⁴ National Economic and Development Authority. 2007. *Socioeconomic Report 2006*. Manila.

⁴⁵ The *Medium-Term Philippine Development Plan 2004–2010* defines waterless areas as those with less than 50% water supply coverage.

FINANCIAL AND ECONOMIC ANALYSIS

A. Background and Basic Assumptions

1. The Angat Water Supply Optimization Project (Angat Optimization Project)¹ and the Umiray-Angat Transbasin Project (Umiray Angat Project)² shared a common goal of enhancing the water supply volume and coverage in the Metropolitan Waterworks and Sewerage System (MWSS) service area. Prior to the projects, water abstraction from Angat Reservoir was 22 cubic meters per second (cms). Angat Optimization was envisioned to provide an additional 15 cms to the MWSS Central Distribution System. The project was completed in November 2002 but flow of benefits started in 1993, albeit not at the rate expected.
2. The Umiray-Angat Project was expected to augment the water available from Angat reservoir by an additional 15.7 cms. MWSS would have a lifetime right to use 9 cms, with the balance to be shared by the National Irrigation Administration and the National Power Corporation. The initial disbursement for the Umiray-Angat Project was made in June 1996, water from Umiray became available in mid-June 2000, and the project was completed in November 2002.
3. The Manila South Water Distribution Project (Manila South Project)³ was designed to improve the water supply services in four municipalities south of Manila by utilizing the incremental water production from Angat Reservoir resulting from the Angat Optimization and the Umiray-Angat projects and a major reduction in nonrevenue water (NRW). The expected benefits did not happen because (i) the incremental volume from the Angat Optimization and Umiray-Angat projects used to meet the increasing consumption north of Manila, and (ii) NRW increased. The Manila South Project was approved in December 1991, but major civil works started only in 1999. The loan closed in November 2002 with low levels of project output achievements.
4. Concessionaire agreements were awarded to Manila Water Company, Inc. (MWC) and Maynilad Water Services, Inc. (Maynilad) while the three projects were under implementation.
5. The economic and financial reevaluations of the Angat Optimization and the Umiray-Angat projects were carried as a single exercise, since benefits were difficult to allocate to the two projects. A separate financial reevaluation of the Manila South Project was carried out, but, because the benefit under this project was not delivered, an economic reevaluation was not carried out. All costs and benefits are expressed in 2006 prices, adjusted for inflation and estimated on an incremental basis.
6. Other specific assumptions used in the financial and economic reevaluation follow:
 - (i) As at appraisal, it was assumed that the economic lives of the projects including implementation and operation would be 40 years.
 - (ii) The average annual Angat releases to MWSS were based on actual data available up to 2006 and assumed constant at the 2006 level for the remaining life of the projects.

¹ ADB. 1989. *Angat Water Supply Optimization Project*. Manila. (Loan 986-PHI, for \$130.0 million, approved on 14 November).

² ADB. 1995. *Umiray-Angat Transbasin Project*. Manila. (Loan 1379-PHI, for \$92.0 million, approved on 21 September).

³ ADB. 1991. *Manila South Water Distribution Project*. Manila. (Loan 1150-PHI, for \$31.4 million, approved on 19 December).

- (iii) Actual tariff and NRW were used up to 2006. Actual tariffs were adjusted for inflation, and real tariffs were assumed to remain at 2006 levels for the life of the projects. The all-in tariff was used, representing the weighted average basic tariff of the different consumer groups, i.e., residential, semi-business, commercial, and industrial, plus the following:
- (a) fixed currency exchange rate adjustment equivalent to a fixed ₱1 per cubic meter (m³) surcharge as defined in the Concession Agreement;
 - (b) foreign currency differential adjustment that allows the concessionaires to recover the foreign exchange losses including accruals and carrying costs beginning 1 January 2002;
 - (c) special transitory mechanism starting July 2002 to enable the concessionaire to recover foreign exchange losses incurred in 2001 and any underrecovery of the accelerated extraordinary price adjustment as of 31 December 2002; Maynilad was able to implement the special transitory mechanism starting in 2005;
 - (d) environmental charge representing 10% of the water charges; and
 - (e) value added tax.
- (iv) The all-in historical tariff shown in Table A1.1 was used (₱/m³).

Table A1.1: All-In Historical Tariff

| | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 |
|----------|------|------|------|------|-------|------|------|------|-------|-------|-------|-------|-------|-------|
| MWSS | 8.03 | 8.03 | 8.03 | 8.03 | 11.14 | | | | | | | | | |
| MWC | | | | | 4.02 | 4.02 | 4.37 | 4.55 | 6.32 | 9.37 | 13.88 | 14.01 | 18.64 | 19.96 |
| Maynilad | | | | | 7.21 | 7.21 | 8.23 | 8.63 | 14.27 | 19.92 | 19.92 | 19.92 | 30.19 | 32.34 |

Maynilad = Maynilad Water Services, Inc.; MWC = Manila Water Company, Inc.; MWSS = Metropolitan Waterworks and Sewerage System.

Sources: Manila Water Company, Inc.; Maynilad Water Services, Inc.; and Metropolitan Waterworks and Sewerage System.

- (v) The improvements in NRW shown in Table A1.2 were assumed.

Table A1.2: Improvements in NRW

| Year | MWC (%) | Maynilad (%) |
|---------------|---------|--------------|
| 2006 (Actual) | 32 | 68 |
| 2007 | 30 | 65 |
| 2008 | 30 | 65 |
| 2009 | 28 | 60 |
| 2010 | 28 | 58 |
| 2011 | 25 | 55 |
| 2012 | 25 | 50 |
| 2013 | 25 | 45 |
| 2014 | 25 | 40 |
| 2015 | 25 | 35 |
| up to 2032 | 25 | 35 |

Maynilad = Maynilad Water Services, Inc.; MWC = Manila Water Company, Inc.; NRW = nonrevenue water.

Sources: Metropolitan Waterworks and Sewerage System and Operations Evaluation Mission.

- (vi) Costs include capital costs and incremental operation and maintenance (O&M) costs that include raw water treatment. The actual O&M costs were obtained from MWC and Maynilad. A 1% increase was added to Maynilad's O&M in real terms to cover efforts to reduce NRW, which was assumed to decline to 35% by 2015.
- (vii) All current prices were converted to constant 2006 prices using the gross domestic product deflator for the Philippines.

B. Financial Performance

1. Angat Water Supply Optimization and Umiray Angat Transbasin Projects

7. The consolidated financial internal rate of return (FIRR) for the two projects was evaluated by comparing revenues and costs during their economic life (Table A1.3). The actual tariff rates were adjusted for inflation, and real tariffs are expected to remain at the 2006 level for the life of the projects. Costs include capital costs and incremental O&M costs. Actual NRW of the two concessionaires was used and assumed that MWC would be able to reduce its NRW to 25% by 2015 and Maynilad to 45% in the same year. Given these assumptions, the FIRR is estimated at 12.64%, an improvement over the 7.74% estimated at project completion. This improvement was realized from the significant increases in tariffs in 2005 and 2006. Sensitivity analysis (Table A1.4) shows that if tariffs had been kept at the 2004 levels the FIRR would have been 6.11%, still above the weighted average cost of capital (WACC)⁴ estimated at 4.5%. An improvement in Maynilad's NRW to an average of 30% by year 2015 would generate a higher FIRR of 15.56%.

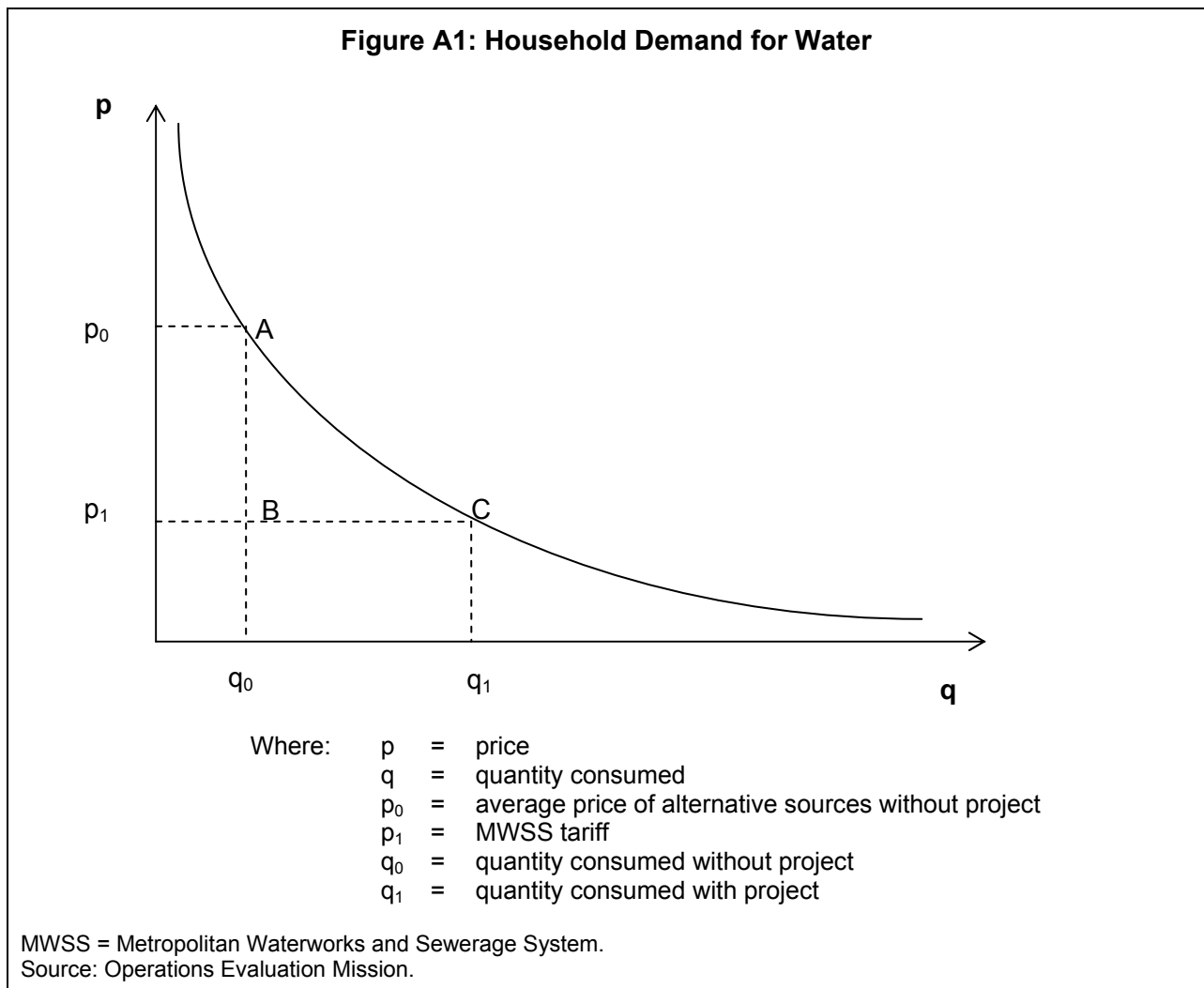
**Table A1.3: Financial Internal Rate of Return of the
Angat Water Supply Optimization and Umiray-Angat Transbasin Projects**
(₱ million)

| Year | Capital Costs | Incremental Operations and Maintenance | Total Costs | Incremental Benefits | Net Benefit |
|------|------------------|---|----------------|-------------------------|----------------|
| 1989 | 52.81 | | 52.81 | | (52.81) |
| 1990 | 112.56 | | 112.56 | | (112.56) |
| 1991 | 382.97 | | 382.97 | | (382.97) |
| 1992 | 368.36 | | 368.36 | | (368.36) |
| 1993 | 306.92 | 110.87 | 417.78 | 89.98 | (327.80) |
| 1994 | 405.62 | 177.01 | 582.63 | 123.42 | (459.21) |
| 1995 | 411.51 | 216.74 | 628.25 | 173.03 | (455.22) |
| 1996 | 519.89 | 295.48 | 815.37 | 367.47 | (447.89) |
| 1997 | 166.34 | 360.60 | 526.94 | 266.82 | (260.13) |
| 1998 | 620.98 | 317.29 | 938.27 | 303.52 | (634.74) |
| 1999 | 715.54 | 502.78 | 1,218.32 | 500.20 | (718.13) |
| 2000 | 902.30 | 614.57 | 1,516.87 | 617.66 | (899.72) |
| 2001 | 1,303.30 | 920.79 | 2,224.09 | 1,106.16 | (1,117.93) |
| 2002 | 902.83 | 1,251.12 | 2,153.95 | 1,548.28 | (605.98) |
| 2003 | 18.01 | 1,012.11 | 1,030.12 | 1,871.79 | 841.67 |
| 2004 | 17.13 | 1,210.84 | 1,227.97 | 2,118.36 | 890.39 |
| 2005 | | 1,843.87 | 1,843.87 | 3,461.43 | 1,617.56 |

⁴ The estimate of the WACC uses the 2006 interest rate for 182-day treasury bills of 6.15% and an inflation rate of 6%.

unskilled labor, and (iii) 1.2 for foreign services. These factors are consistent with those used for Asian Development Bank water supply projects in the Philippines. Taxes and duties, and all financial charges, including interest during construction, were not included in the calculation of the economic internal rate of return (EIRR).

10. The non-incremental water usage was calculated by considering two types of sources used by households: 70% from the ground extracted by deep wells, and 30% from private vendors. The projects' economic benefits accrue from resource savings and incremental benefits of additional water supply. Water is available from alternative sources at a price of ₱70 to ₱90 per m³, depending on the source. On average, households not connected to MWSS pay ₱92.8 per m³. On average, households not connected to MWSS pay ₱92.8 per m³. Resource cost savings are the economic benefits of switching from the higher cost alternative sources. Incremental economic benefits of the additional water supply were determined by comparing with- and without-project cases. The economic benefits of the additional demand were valued at willingness to pay, which was measured using an estimate of the demand function for water with data obtained from the socioeconomic survey undertaken by the Operations Evaluation Mission in March 2007. The household demand function assumed is presented in Figure A1. The economic benefit of the incremental quantity ($q_1 - q_0$) is represented by the area of the triangle ABC, and the non-incremental benefit is represented by the area of the rectangle p_0ABp_1 .



11. Other economic benefits from the projects include (i) increased time for other activities such as studying for the schoolchildren, economic activities for the parents, and leisure for the entire family; (ii) convenience; (iii) improved access to commercial activities; and (iv) improved valuation of real properties. The economic valuation did not attempt to quantify these benefits, so the estimate obtained is conservative. The survey did not report any positive impact on health. The EIRR is 15.31% (Table A1.5). This estimate captures mostly the financial savings from having piped water from MWSS.

Table A1.5: Economic Internal Rate of Return of the Angat Water Supply Optimization, Umiray-Angat Transbasin, and Manila South Water Distribution Projects
(₱ million)

| Year | Total Capital Costs | Total Operating Costs | Total Costs | Total Economic Benefits | Net Economic Benefits |
|------|---------------------|-----------------------|-------------|-------------------------|-----------------------|
| 1989 | 67.10 | | 67.10 | | (67.10) |
| 1990 | 95.88 | | 95.88 | | (95.88) |
| 1991 | 344.99 | | 344.99 | | (344.99) |
| 1992 | 392.01 | | 392.01 | | (392.01) |
| 1993 | 264.44 | 23.11 | 287.55 | 59.39 | (228.16) |
| 1994 | 138.59 | 34.08 | 172.68 | 81.46 | (91.22) |
| 1995 | 133.39 | 44.15 | 177.55 | 107.73 | (69.81) |
| 1996 | 480.09 | 62.46 | 542.55 | 242.53 | (300.02) |
| 1997 | 461.59 | 56.11 | 517.70 | 175.62 | (342.08) |
| 1998 | 618.79 | 105.14 | 723.93 | 254.05 | (469.89) |
| 1999 | 946.86 | 143.79 | 1,090.66 | 437.08 | (653.58) |
| 2000 | 1,335.81 | 320.74 | 1,656.55 | 505.97 | (1,150.59) |
| 2001 | 3,282.21 | 309.21 | 3,591.42 | 1,001.96 | (2,589.47) |
| 2002 | 989.77 | 427.87 | 1,417.64 | 1,398.85 | (18.80) |
| 2003 | 17.22 | 478.79 | 496.01 | 1,469.42 | 973.41 |
| 2004 | 16.37 | 411.10 | 427.48 | 1,677.49 | 1,250.01 |
| 2005 | | 724.17 | 724.17 | 2,910.24 | 2,186.07 |
| 2006 | | 714.88 | 714.88 | 3,159.36 | 2,444.48 |
| 2007 | | 715.89 | 715.89 | 3,159.36 | 2,443.47 |
| 2008 | | 716.90 | 716.90 | 3,159.36 | 2,442.46 |
| 2009 | | 717.91 | 717.91 | 3,159.36 | 2,441.45 |
| 2010 | | 718.92 | 718.92 | 3,159.36 | 2,440.44 |
| 2011 | | 719.93 | 719.93 | 3,159.36 | 2,439.43 |
| 2012 | | 720.94 | 720.94 | 3,159.36 | 2,438.42 |
| 2013 | | 721.95 | 721.95 | 3,159.36 | 2,437.41 |
| 2014 | | 722.96 | 722.96 | 3,159.36 | 2,436.40 |
| 2015 | | 723.97 | 723.97 | 3,159.36 | 2,435.39 |
| 2016 | | 723.97 | 723.97 | 3,159.36 | 2,435.39 |
| 2017 | | 723.97 | 723.97 | 3,159.36 | 2,435.39 |
| ↓ | | ↓ | ↓ | ↓ | ↓ |
| 2032 | | 674.15 | 674.15 | 3,159.36 | 2,435.39 |
| | | | | EIRR = | 15.31% |

EIRR = economic internal rate of return.

Source: Operations Evaluation Mission estimates.

SOCIOECONOMIC SURVEY OF MANILA SOUTH

A. Purpose

1. The socioeconomic impact survey described in this report was commissioned as an input to the Special Evaluation Study (SES) of ADB Assistance to Water Supply Services in Metro Manila. The SES focuses on three projects: (i) the Angat Water Supply Optimization Project, (ii) the Manila South Water Distribution Project, and (iii) the Umiray-Angat Transbasin Project. The purpose of the socioeconomic impact survey was to provide

- (i) information and insights that help answer the questions in the evaluation design matrix developed for the SES,
- (ii) information required for the economic evaluation of the three main projects covered by the SES,
- (iii) insights into the socioeconomic and environmental impact of the Asian Development Bank-funded projects and the concurrent private sector participation in Metropolitan Waterworks and Sewerage System (MWSS) operations not brought out through 1 and 2 above.

2. The main objective of both the Angat Water Supply Optimization Project and the Umiray-Angat Transbasin Project was to increase the volume of water available for distribution in the MWSS service area. The main objective of the Manila South Water Distribution Project (Manila South Project) was to draw upon this increased volume of treated water to improve water services in southern Manila. The main thrust of the socioeconomic study was to assess and understand the impact of the Manila South Project on the population in the target area.

B. Approach

3. The study was undertaken during February and March 2007. Over 300 respondents or household representatives were selected randomly in four Manila South Project sites covering the cities of Las Piñas, Muntinlupa, and Parañaque in Metro Manila and Bacoor in Cavite Province. Samples were taken from both connected and nonconnected households to get an idea of before-project and after-project conditions in the households surveyed. Of the survey respondents, 50% were from poor, blighted areas (income classes D and E), 38% fell in the middle class income category, and 22% were higher income residents (A and B income classes).

4. Case studies were developed to highlight affected persons and the impact of water supply improvement in various sectors such as on the household, business and big water associations and haulers. The case studies document experiences and described qualitative responses as well as point to positive and negative impacts on other stakeholders and community services (e.g., water truck deliveries and private water pump suppliers) that have been affected by the Project.

C. Survey Results and Conclusions

5. The body of the survey report contains a large amount of information on the socioeconomic consequences of the water supply situation in southern Manila and the impact of developments over recent years. This executive summary highlights those results and findings that are most relevant to the SES for which the survey was commissioned.

Evaluation Design Matrix

6. The SES was guided by an evaluation design matrix comprising 30 questions in nine categories. Information and insights from the socioeconomic impact survey relevant to these questions (in italics) are summarized below.

a. Was the needs assessment of MWSS correct?

Were the views of principal stakeholders reflected in the projects' designs?

7. No specific needs assessment was articulated for the Manila South Project. However, the presumed needs can be deduced from the expected benefits of the Project as set out in the Report and Recommendation of the President¹ (RRP):

Improvement in the water supply by MWSS in the project area will result in (i) savings in water expenses for consumers who are not served yet by MWSS; (ii) improvement in household hygiene as well as increased household convenience and comfort because of a reliable and potable water supply; and (iii) an increase in the operational capacity of commercial and industrial enterprises through access to a dependable and economic water source.

8. A further need as articulated in the objectives was to reduce the use of groundwater in the project area to reduce saltwater intrusion and land subsidence.

9. The socioeconomic survey provides information and insights into the three needs implied in the RRP.

i. Savings in water expenses for consumers who are not served yet by MWSS

10. The survey results indicate that the needs assessment was partly correct. All households had access to various sources of water prior to the project (boreholes, local piped networks, cart delivery, bottled water, etc.). For households that had a private borehole, the cost savings per unit volume of water resulting from connecting to the piped system were not large, particularly for households that did not pay the full cost of electricity, the main cost for private borehole supplies.

11. For households that had obtained a piped water supply and did not have a good private borehole supply, the total expenditure on water was reduced substantially, but not as much as might have been expected, as consumption also increased. Put another way, purchasing more water was a priority allocation of the money saved through the lower volumetric rates of piped water. The reasons for this include the following:

- (i) Households used more water for cleaning, washing, and personal hygiene (17% of respondents).
- (ii) The lower unit cost and ready availability of piped water led some households to set up water-related small businesses such as laundering, reselling water, selling ice, eateries, hairdressers, etc.

¹ ADB. 1991. *Report and Recommendation of the President on a Proposed Loan to the Philippines for the Manila South Water Distribution Project*. Manila. (Loan 1150-PHI, for \$31.4 million, approved on 19 December).

ii. Improvement in household hygiene as well as increased household convenience and comfort because of a reliable and potable water supply

12. The incidence of water-related illnesses in the target area, even among those not connected, was not high. Water obtained from local boreholes was of reasonable (but deteriorating) quality, and some private vendors provided treatment. Households benefiting from new connections increased the volume of water used for personal hygiene and toilet flushing. Although increased comfort and convenience was cited as the greatest benefit, 21% of respondents believed that increased availability of water for personal hygiene and toilet flushing had led to an improvement in their health. However, the survey did not find any evidence that the introduction of piped water supplies led to a significant improvement in the public health of the community as a whole.

13. According to survey respondents, the potential increase in comfort and convenience was not fully achieved, because the piped water often suffers from taste, odor, and color problems. As a result, 51% of households connected to the piped water supply continued to purchase bottled water or use borehole water for drinking.

iii. Increase in the operational capacity of commercial and industrial enterprises through access to a dependable and economic water source

14. Savings from lower monthly bills provided opportunities for commercial and industrial enterprises to expand their business. Somewhat perversely, the piped water system led to an increase in commercial bottled water stations catering to the growing local demand for bottled drinking water, even from customers connected to the piped water system. The lower cost and more dependable water from the piped system made these businesses more viable than when they were relying on private water vendors.

b. Were the outcomes of the projects, as defined in the appraisal reports/ RRP, achieved or are they expected to be achieved?

Did the project outcomes as achieved lead (or will they lead) to the attainment of project goals?

15. For a number of reasons, the Manila South Project did not achieve its outcomes with respect to increased water supply coverage. For those households that did receive piped water, the resulting benefits were not necessarily as envisaged in the appraisal reports and RRP.

Did the implementation arrangements work well?

16. There were many problems with implementation as described in the SES. Some of these problems have a socioeconomic aspect, for example:

- (i) Some subdivision homeowners/developers who previously had to provide water services did not allow the entry of the water services provider (Maynilad Water Services, Inc. [Maynilad]) for fear of losing their income or of detrimental effects on their businesses. Some say their service is more reliable than the scheduled water supply from Maynilad.
- (ii) There are still areas in Muntinlupa where the quality of water supplied through the piped system is unacceptable. In barangays Sucat, Buli, and Cupang, few

residents are interested in being reconnected to the piped system this year because of ongoing poor water quality.

Was there adequate coordination with nongovernment organizations, community groups, and other funding agencies?

17. There is no evidence that there was consultation with existing providers of water services in the project area. This was a significant weakness in project design and implementation. The community and small-scale service providers could have been a useful part of the solution, as has subsequently been demonstrated by the “Bayan Tubig Program” initiative of Maynilad. Also, by failing to take into account the manner in which incumbent local service providers met the needs of the community, the benefits provided by piped water supply were different and probably lower than those set out in the RRP.

c. Were the projects’ outcomes achieved efficiently and will they likely be sustained?

Are the projects’ facilities and benefits likely to be sustained?

18. The outcomes of the Manila South Project were limited (i) because of the limited number of extra, functioning connections; and (ii) because the benefits of connection were different from and probably lower than those envisaged at project design.

d. Has there been adequate ownership and commitment on the part of the respective governments and the recipient agencies to implement the recommendation?

Was there adequate participation from stakeholders during the implementation of the projects and was there sufficient consultation/collaboration with the stakeholders in determining recommended actions?

19. All infrastructure projects, be they private or governmental, require an environmental impact assessment, which includes a social acceptability assessment. These usually involve consultations with affected communities about the project. As the Manila South Project was implemented, albeit partially, it is assumed that consultation with the communities complied with requirements.

e. Socioeconomic impact

Did the urban poor benefit from the projects? What kind of benefit did they derive from the projects? How many urban poor households benefited? How did the project affect the economic and social welfare of the urban poor in the project areas?

20. In 2000, the target area of the Manila South included 335,195 (Table A1) urban households, which, assuming 5 members per household, equates to a population of about 1,676,000.

21. Based on an MWSS study² a total 175,805 households were connected in 2003. Around 31% (54,499 households or 272,497 residents) were in the lower income groups. This represents the total number of urban poor benefiting from the Project.

Table A2: Connected Households South of Manila

| Project Area | Number Of Households (2000 Census) | Connected Households as of 2003 | | Target Connection ^a Rate, as of 2005 | |
|--------------|------------------------------------|---------------------------------|----------------|---|--|
| | | % | Number | % | |
| Las Piñas | 97,962 | 38 | 37,225 | 60 | |
| Parañaque | 95,150 | 100 | 95,150 | 100 | |
| Muntinlupa | 78,016 | 22 | 17,163 | 47 | |
| Bacoor | 64,067 | 41 | 26,267 | 62 | |
| Total | 335,195 | 59 | 175,805 | | |

^a The Project Appraisal Report for the Manila South Project (November 1991) envisaged that, at project completion in 1995, (original target completion date of the Project) the Project would have brought benefits to around 792,000 people, 120,000 of whom would be in the low-income group (about 9.2 % of the total population in the project area).

Source: Operations Evaluation Mission.

22. The perception of the urban poor is that they reaped various socioeconomic benefits from the Manila South Project:

f. Perceived impact of water connection

- (i) **Time and Convenience** – Half of the respondents (49%) said that they benefited from time saved from fetching and treating water through increased time for family bonding and leisure activities. In particular, children and youth involved in fetching water had more time for their studies, helping around the house, and leisure. Housewives, who bear the burden of most household chores, significantly benefited, as the time saved from collecting, storing, and treating water allowed more time for other activities including house cleaning, gardening, and laundering, with water available at their convenience (43%).
- (ii) **Livelihood and Income** – Some housewives interviewed (29%) stated that they could now engage in microenterprises such as the selling of ice, ice candies, commercial carwashing, and bottled water stations. For the 25 surveyed households engaged in businesses such as selling ice candies and ice, connection to the pipe network allowed an increase monthly income by about ₱100 to ₱300 with four households citing an increase in income of ₱500 to ₱1,000 per month. Small eateries (carinderia) also generated additional income through decreased water expenses (about 30%) because they no longer had to buy bottled water for drinking purposes. For 11 households, the resale of water also generated additional income averaging ₱200 to ₱300 per month. Other additional income resulting from connection to the piped network came from the ability to increase rents for rooms.

² MWSS. 2003. *Strengthening of the Planning Capability of MWSS*. Manila.

23. Overall, however, increases in income, averaged over all households, was less than the savings resulting from access to lower cost piped water. Average total household savings were ₱850 to ₱1,000 per month, with lower income households saving ₱250 to ₱500 per month.

- (i) **Increase in Property Value** – Respondents perceive that the value of property increased with the introduction of piped water supply. Renters were also prepared to pay higher rents, and dormitory fees rose by about 5% to 10%.
- (ii) **Health and Sanitation** – Few people observed improvements in sanitation infrastructure such as new sewer lines. Many households continued to dispose of their wastewater into individual septic tanks, with others discharging directly into canals or creeks. There were no reported increases or decreases in the number of cases of waterborne illnesses.
- (iii) **Community Safety** – Cleaner surroundings brought about by the increased availability of water for cleaning was perceived as decreasing the risk of disease. However, as mentioned above, the survey did not provide any evidence to support this perception. Those interviewed during the survey also cited the increase in safety afforded by a functioning piped water supply available for fire-fighting.

g. Overall economic and social welfare

24. Generally, there was a marked improvement in economic and social welfare as a result of household connections. However, the expected benefits have not yet been fully realized, as about 65% of connected households interviewed still use other sources of water such as boreholes, private vendors, and mineral or purified water. This is partly a result of choice, but primarily due to the intermittent supply of water through the network and the associated problems of water quality.

25. The average water consumption of connected households increased from 10 cubic meters/month to 20 cubic meters/month. The corresponding household expenditure decreased substantially from ₱1,000 to ₱2,400 per month prior to connection, to ₱200 to ₱300 per month afterwards.

26. The increase in the consumption following connection of water among the connected households resulted in a significant increase in convenience and safety through (i) increased use of water for cleaning the house and surroundings; (ii) increased use of water for personal needs (bathing, cooking, etc.); (iii) increased use of water for gardening (flowers and vegetables), improving aesthetics in the household environment; and (iv) increased availability of water for fire-fighting.

27. The intent of the project was to reach the lowest income group or those unable to afford connections but who would benefit most from access to piped water. Although not envisaged at project design, this objective is being furthered through the “Bayan Tubig” initiative of the new private operator, Maynilad. This initiative encourages 10–20 poor households to group together to share the cost of a connection to the piped system. This spreads the burden of the otherwise onerous connection charge among participating households, as a result of which access to piped water supply is further increased.

h. Respondent's suggestions on further improvement of water services

28. The majority of the respondents to the survey thought that water service could be further improved by accelerating the laying of pipes and the installation of metered connections. Some respondents were emphatic about wanting to be connected even if the water bills they would receive would stretch their incomes to the limit.

29. Interviewed households appreciated the availability of piped water but wanted to see further improvement of services by ensuring a continuous, 24-hour supply with increased pressure, timely repair of broken water meters, and lower billing rates.

i. Environmental impact

What was the rate of groundwater extraction before and after the projects?

30. It is claimed that overabstraction of groundwater and the falling water table are causing ground subsidence and increasing flooding in low-lying areas of Manila. As such, one of the objectives of the Manila South Project was to reduce groundwater abstraction by providing a piped supply as a substitute. The socioeconomic survey did not specifically seek to explore this issue; however, the following observations can be made:

- (i) Private wells and boreholes are not registered or monitored by any agency, national or local, so quantification of the issue and benefits brought by the Manila South Project is difficult.
- (ii) The survey indicates that a significant number of those supplied with connections to the pipe network continue to use borehole water for two reasons: (a) the piped water supply is intermittent, and (b) the piped water quality is often of low aesthetic quality (color, taste, and odor) and is perceived as a health risk. Consequently, even for the limited number of households who were connected as a result of the Manila South Project, the reduction in borehole water has not been as high as it ought to have been.

METROPOLITAN MANILA WATER SECTOR ANALYSIS

A. Background

1. The current population of the Philippines is estimated at 85 million. This is based on the Year 2000 census figure of 76.5 million and an annual growth rate of 2.3%. Just over half the population lives on the island of Luzon. The remaining population is distributed almost equally between the islands of Mindanao and the Visayas.
2. Approximately half of the Philippine population lives in urban areas. Metro Manila (Manila), located in the southern Luzon region, is the most densely populated urban center. It is officially known as the National Capital Region and includes the City of Manila as well as 16 other cities and municipalities. Manila has a population of approximately 13 million.
3. The high population density in urban areas, coupled with high growth rates and a relatively high incidence of poverty, leads to significant challenges in provision of water supply and sanitation (WSS) services. The Asian Development Bank (ADB) *Water Supply and Sanitation Sector Plan Study*¹ conducted in 1999–2000 characterized the water supply sector as one with inadequate resource management, poor planning, and insufficient infrastructure provisions, all of which hinder the efficient and equitable distribution and use of a potentially abundant commodity.

B. Government Policies and Plans

4. The overriding government principle pertaining to the provision of WSS services is the empowerment of local government units (LGU). The enactment of the Local Government Code of 1991 provides LGUs with a central role in the provision of WSS services. To implement this, national agencies have adopted the following policies and strategies:
 - (i) Provide a favorable environment for LGU activity in the WSS sector through government assistance and by encouraging private sector participation (PSP) in the provision of WSS services.
 - (ii) Privatize water supply facilities in urban areas whenever appropriate.
 - (iii) Develop and provide incentives for contiguous water districts to amalgamate into single business entities to attract private sector investments in water supply development.
 - (iv) Adopt a holistic approach to water resources development through the inclusion of supply, distribution, treatment, and sanitation.

C. Sector Institutions

5. The Government in the Philippines comprises five levels of administration: national, regional, provincial, city or municipal, and local or *barangay*. As noted in the ADB *Water Supply and Sanitation Sector Profile*,² more than 20 government agencies are involved in different aspects of the management of water resources and the provision of WSS services. The number of agencies involved, together with ambiguous or overlapping definitions of responsibilities, has resulted in a fragmented approach to the management of WSS services.
6. The two national institutions with a significant and specific policy mandate in the WSS sector are the Department of the Interior and Local Government (DILG) and the National

¹ ADB. 1997. *Technical Assistance to the Philippines for Water Supply and Sanitation Sector Plan Study*. Manila.

² ADB. 2001. *Water Supply and Sanitation Sector Profile, Philippines*. Manila.

Economic and Development Authority. DILG acts as the highest policy-making body for WSS development, and is responsible for land-use regulation and local planning through approval of local planning zones. It provides overall direction in the implementation of all WSS projects at the LGU level. In association with the LGUs, DILG is tasked with formulating provincial WSS development plans. The National Economic and Development Authority is the general policy-making body for economic and development planning for the country. It concentrates on national, regional, and strategic planning matters; is responsible for the preparation of provincial development framework plans; and takes the lead in the preparation of national and regional physical framework plans.

7. The functions and responsibilities of the principal agencies involved in the WSS sector are as follows:

- (i) **Department of Public Works and Highways.** The Department of Public Works and Highways is the national government line agency which, through its attached agencies (Metropolitan Waterworks and Sewerage System [MWSS] and Local Water Utilities Administration [LWUA]), is responsible for WSS systems in urban centers. It also supplies LGUs with technical assistance through its district offices.
- (ii) **MWSS.** MWSS is the public corporation responsible for providing water and sanitation services to the cities and municipalities of Metro Manila, and to neighboring urbanized areas in the provinces of Rizal and Cavite. The agency has entered into concession agreements with two private operators (Manila Water Company, Inc. [MWC] and Maynilad Water Services, Inc. [Maynilad]) to help carry out its functions.
- (iii) **LWUA.** LWUA is an agency tasked with the promotion, development, and financing of local water utilities or water districts in all urban and rural communities outside the jurisdiction of MWSS. The agency is also mandated to provide engineering, management, and institutional assistance to the water districts.
- (iv) **Water Districts.** Water districts are local water utilities created for the purpose of developing and operating water supply systems in provincial urban centers. There are approximately 560 water districts, which develop and operate their systems out of loans from LWUA and from their own revenues.
- (v) **LGUs.** Under the Local Government Code, LGUs (provinces and municipalities) assume responsibility for construction and financing the operation and maintenance (O&M) of their respective WSS facilities. DILG provides overall direction in the implementation of LGU WSS projects.
- (vi) **Department of Health.** The Department is responsible for setting, monitoring, and maintaining standards for water quality and sanitation practices.
- (vii) **National Water Resources Board (NWRB).** NWRB is responsible for regulating the use of the country's water resources, through the issuance of water rights, regulation of tariffs on private water systems, and collection and management of water resources data. NWRB is also mandated to coordinate and integrate the plans and programs of all water resources agencies.

D. Levels of Service

8. Throughout the Philippines, approximately 1,000 water supply systems are being operated by LGUs. Many provincial water supply schemes are characterized by small, non-integrated facilities that have been planned and implemented in a piecemeal fashion. These systems are often inadequately funded, poorly maintained, and too small to be financially viable.

9. In rural areas, this approach has created gaps in the availability of services. Many of the rural areas within the jurisdiction of the water districts have remained unserved with piped water because of government policy that LWUA should support only viable projects. Efforts at integrated planning and development of water supply programs to improve the situation at the provincial level have, in many cases, not shown significant progress. Sector data that could be used for planning and monitoring have become very scarce.

10. In the Metro Manila area and adjacent cities, water supply continues to be a major concern. Nonrevenue water (NRW) is high, and many areas continue to experience water shortages. Provincial urban centers also experience similar problems. While levels of service have generally improved in terms of expanded coverage, service quality is often inadequate, characterized by low pressure and interrupted supply during peak hours.

11. As reported in the *Medium-Term Philippine Development Plan, 2004–2010*,³ access to public water supply systems increased from about 60% of the total population in 1985 to about 80% at the end of 2004. Existing sewerage and sanitation facilities are inadequate to meet necessary health and environmental standards, with approximately 26% of the population living in conditions without adequate sanitation.⁴ Sanitation projects have received a lower priority than water supply projects. In particular, the number of sanitation projects implemented by LWUA and the water districts is small.

E. Financing

12. In the past, the main source of funding for water supply was the central Government, with assistance from bilateral and multilateral loans and grants. With the Government's thrust in encouraging PSP, private capital is also seen to gradually help finance projects in the sector. Key problems in financing water supply include the

- (i) inability of the majority of water supply agencies to generate sufficient funds from operations to finance system development and improvement,
- (ii) inadequate provision for O&M to sustain the current levels and quality of service, and
- (iii) inadequate assessment of ability and willingness of consumers to pay for WSS services.

F. Private Sector Participation in Manila Waterworks and Sewerage Services

13. In 1971, the National Waterworks and Sewerage Authority was dissolved, and MWSS was formed. MWSS assumed the National Waterworks and Sewerage Authority responsibilities for the provision of WSS services to the National Capital Region, the Province of Rizal, and part of the Province of Cavite. The water supply distribution and sewerage networks managed by MWSS were some of the oldest in Asia and were deteriorating rapidly. By the 1980s, MWSS found that the sustained population growth and increased urbanization of its service area was outstripping its ability to maintain and expand its WSS infrastructure. Significant upgrades were required to keep pace with rapidly rising demands.

14. By virtue of the Water Crisis Act of 1995 it was resolved to privatize MWSS operations, in order to attract international finance and expertise and to fund significant upgrades to the WSS systems. In August 1997, following bidding by international consortia, the operations of MWSS were privatized through two concession contracts. The MWSS service area was divided into

³ NEDA. 2001. *Draft Medium-Term Philippine Development Plan*. Manila.

⁴ ADB. 2001. *Water Supply and Sanitation Sector Profile, Philippines*. Manila.

east and west zones. The East Zone concession was awarded to MWC. The West Zone concession was awarded to Maynilad. MWSS retained responsibility for provision of bulk water to the concessionaires, administrating and managing retained assets and monitoring/enforcing the Concession Agreement.

15. PSP has brought about rapid and significant improvements in the delivery of water supply services in Metro Manila. The serviced population increased from 7 million in 1997 to 10 million in 2003. Water service coverage increased from a level of 67% of the service area population in 1997 prior to PSP to 87% in 2003. In the East Zone, MWC has managed to reduce NRW levels from 65% prior to PSP down to 37% in 2005.

16. Despite the successes, a number of setbacks have also occurred:

- (i) Despite implementing a number of NRW reduction programs, Maynilad has not been successful in reducing NRW levels in the West Zone. NRW in the West Zone remains at about 67% and has had a significant impact on the ability of Maynilad to improve water supply coverage in the zone.
- (ii) The Asian currency crisis of 1997–1998 was a significant issue for both concessionaires. As part of the Concession Agreement, the debts of MWSS to international lending agencies such as ADB and the World Bank were passed on to the concessionaires. Maynilad was required to take on 90% of the MWSS debt. The other 10% was passed on to MWC. The devaluation of the Philippine peso by about 80% in the first few years of the concessions affected the servicing of foreign loans obtained for capital works, as well as the repayment of MWSS debts. While the Concession Agreement allowed for adjustments for foreign exchange fluctuations, recovery of foreign exchange losses was required to occur over the 25-year life of the concessions. This created cash flow problems in the early years of the concessions.
- (iii) The Philippines was subjected to lower than average rainfall during the early years of the concessions, due to the occurrence of the El Niño weather pattern. Water availability during this period was reduced by about 30%, affecting the amount of water supplied to each concessionaire.
- (iv) Several key MWSS bulk water supply projects were either delayed or not implemented, affecting the supply of bulk water to the concessionaires. These projects included a 300 megaliters per day water supply project in Laguna de Bay, the Angat Water Supply Optimization Project, the Manila South Distribution Project, and the Umiray-Angat Transbasin Project.

17. To date, the East Zone concession can be considered successful. MWC has steadily increased profitability in recent years and has delivered significant improvements to the East Zone water supply system. But the West Zone concession cannot be considered successful. Maynilad incurred substantial losses in all years of its operation. While a number of significant water supply improvement projects were commenced in the West Zone, many were not completed due to shortage of funds.

18. Maynilad has failed to pay full concession fees since March 2001, resulting in an adverse impact on MWSS' finance. In 2005, an agreement on the restructuring of the Maynilad concession was generally reached, including repayment of outstanding concession fees. As per the agreement, MWSS can take over 84% of Maynilad shares in a debt-for-equity swap.

Water Supply Coverage and Service Levels

19. The population of the Philippines has grown over the last 25 years from 48 million in 1980 to about 85 million in 2005, at an annual average growth rate of 2.3%. The population is expected to increase at about 2% annually to 125 million by the year 2025. As reported in the Medium-Term Philippine Development Plan, 2004–2010,⁵ access to public water supply systems was about 80% of the total population at the end of 2004. The reach of these systems is still limited, and many people do not have 24-hour access to water that is clean and affordable. A summary of the sector analysis is provided in Appendix 1.

20. In Manila, Cavite, and Rizal, water supply is provided by MWSS and its concessionaires, MWC and Maynilad. The estimated population within the MWSS service area is expected to increase from 13.5 million in 2005 by an average rate of 2.0% per year, reaching about 19 million in 2025. In 2005, MWC and Maynilad served about 75% of the population in the service area. Average water availability in connected areas within Manila is about 20 hours per day. The concessionaires are responsible for water distribution, including investment in improvement, rehabilitation and expansion of the network, and billing and collection of tariffs. MWSS' role is mainly to develop and maintain water sources, and to provide the concessionaires with bulk water for distribution to consumers. MWSS also assumes the role of regulator and monitors the performance of the concessionaires.

G. Analysis of Key Problems and Opportunities

21. A roadmap for Manila water supply outlining sector issues and proposed solutions is in Supplementary Appendix K. Salient points are mentioned here.

1. Water Sources

22. The Manila water supply is entirely dependant upon one source of water, the Angat Reservoir, which provides about 98% of the city's water supply or 4 million cubic meters (m³) water per day. The remaining 2% of water supply is provided by deep wells. The shortfall in water production from the Angat Reservoir, aggravated by water losses in the transmission and distribution system, does not allow adequate coverage of the entire population in Manila, let alone future demand. Only about 75% of the population in the service area is covered by the concessionaires. The Angat Reservoir is a multipurpose dam that combines urban water supply, irrigation, and hydropower generation. The allocation of raw water for urban water supply versus irrigation is regulated through water rights awarded by NWRB. Additional allocation from irrigation to urban water supply is under review. In any event, this would require construction of an alternative source for irrigation to compensate for the reallocation (Sumakbao River Project). It will also mean increasing the transmission system capacity, viz., tunnels and aqueducts.

23. **Aqueduct AQ-5.** Water from the Angat Reservoir is conveyed to the city by a system of tunnels and aqueducts, which, due to age and poor construction standards, show considerable leakage. Aqueduct AQ-5, which carries about 50% of Manila's water supply, has major leaks. The poor condition of AQ-5 is a serious concern, as it may lead to structural failure, resulting in a potential water crisis in the city if 50% of supply would suddenly be lost. Water losses stemming from the aqueducts alone are estimated at about 400,000 m³/day.

24. **Umiray-Angat Transbasin Tunnel.** Other key components of the Angat water source system are also in need of urgent rehabilitation. The Umiray-Angat Transbasin Tunnel, a

⁵ NEDA. 2004. *Medium-Term Philippine Development Plan 2004-2010*. Manila.

tributary to the Angat Reservoir, provides about 20–30% of Manila's water supply. The tunnel was severely damaged by flash floods following a typhoon in November 2004. While emergency repairs, which required closure of the tunnel for 4 months, have been completed, further modification and strengthening of the tunnel and diversion facilities are urgently needed to reduce the risk of similar damage in the future. In addition, the low-level outlet at Angat Dam, which is crucial to secure continued water supply for the city during times of low water level in the reservoir, is damaged and currently out of operation. As long as this low-level outlet cannot be operated, Manila's entire water supply is potentially at risk during prolonged dry weather periods, which have occurred before.

25. Responsibility for providing treated bulk water to the concessionaires, including rehabilitation of existing water sources and development of new water sources, rests with MWSS. MWSS has awarded O&M of the water conveyance system from the Angat Reservoir, including tunnels and aqueducts, to the Common Purpose Facilities, a joint venture of the two concessionaires for the O&M of commonly used infrastructure.

26. The main issues involving raw water supply in Manila include (i) dependence by a megacity of 13 million people on a single water source in need of major repair, the Angat Reservoir; (ii) a mounting shortfall in water production from the Angat Reservoir, which cannot cover current demand; (iii) urgent need for repair of crucial components of the Angat water source system, to reduce transmission losses and to avert potential water crisis due to possible system failure; and (iv) urgent need to develop additional water sources, to reduce dependence on the single source, but also to meet future demand.

2. Water Treatment

27. Water from Angat Reservoir is treated in two large water treatment plants. The treatment plant in Balara serves the MWC area, while the one in La Mesa provides water for the Maynilad area. The treatment plants, which are managed by the respective concessionaires, are operating at full capacity of about 4 million m³/day. While the quality of the water leaving the treatment plants complies with relevant drinking water standards, it often gets contaminated on its way to the consumer by passing through an outdated distribution network. Any future increase in water production will require the construction of additional treatment capacity.

3. Water Distribution and Storage

28. The Manila water distribution system comprises a network of about 2,500 kilometers in the Maynilad area (West Zone), and 2,600 kilometers in the MWC area (East Zone). Responsibility for operation, maintenance, expansion, and financing of the distribution system rests with the concessionaires. The design of the concession contracts required a split of the service into two areas. This resulted in the hydraulic separation of the previously coherent network, leading to redesign of the system.⁶ Storage capacity for treated water consists of eight large reservoirs in the Maynilad area representing about 10% of average daily demand, and five major reservoirs in the MWC area comprising about 20% of average daily demand. Storage capacity in both areas offers limited security of supply under system failure.

29. The high level of NRW, which comprises water produced but not sold because of physical and administrative losses, has been a concern for a long time. Before PSP, in 1997,

⁶ Implementation of the ADB-financed Manila South Water Distribution Project, approved in 1991, was particularly affected by the impact of PSP. Redesign of the network and financial distress of Maynilad resulted in major delays and noncompletion of components. The Project was closed in 2002, and is rated unsuccessful.

NRW averaged about 61% (66% Maynilad area, and 59% MWC area). By the end of 2005 NRW was still about 60% (69% Maynilad area, and 37% MWC area). Since the start of the concessions in 1997, MWC has made significant progress in reducing NRW, and actually exceeded the agreed upon target of 47% in 2005. The failure of the first Maynilad concession meant a continued high level of NRW in the concession area. Overall, major investment will be needed in the future to reduce NRW, and to improve system efficiency. Institutional and operational matters are also at play here. Pipe laying is often delayed by traffic congestion and difficulties in timely obtaining construction permits from local governments. This issue will need to be addressed in order for the concessionaires to expand service coverage, quality, and continuity.

4. Institutional and Financial Structure

30. **Metropolitan Waterworks and Sewerage System.** Prior to the award of the two concessions in 1997, MWSS was a utility with some 7,000 staff. This company was responsible for managing and financing the entire water supply system in Manila, including sources, transmission, treatment, storage, distribution, connecting customers, billing, and collection. Following PSP, MWSS has undergone a major organizational change. This was required to adjust to the new role of bulk water supplier and regulator, employing about 150 staff. MWSS now is organized in two separate entities, the Corporate Office charged with supplying bulk water, and the Regulatory Office which monitors and regulates the concessions. Both entities report to the same Board of Trustees.

31. Finance is another issue, given that basically the entire revenues of MWSS stem from concession fees, which should cover (i) MWSS' operational costs, (ii) counterpart funds for investment projects, and (iii) debt service of previous loans. Maynilad has not paid full concession fees since 2001, forcing MWSS into short-term borrowing to bridge the financing gap. Restructuring of Maynilad burdened MWSS with an extensive arbitration process and lengthy negotiations, which were concluded only in mid-2005 through a court-approved debt and capital restructuring agreement under the debt and capital restructuring agreement which MWSS, besides other provisions, would become the majority shareholder (84% of shares) of Maynilad in a debt-to-equity swap. Rather than to subscribe to the shares, MWSS decided to sell them to a private investor selected through competitive bidding. Assuming this reawarding of the West Zone will be successful, Maynilad would remain a fully privately owned company.

32. Main issues MWSS is facing include the facts that it (i) has multiple mandates, (ii) is burdened with the extensive restructuring process of the Maynilad concession, (iii) has major financing needs for developing new water sources, (iv) is facing financial constraints resulting from failure of the Maynilad concession, and (v) could potentially end up as majority shareholder of a failed concession with major investment needs.

33. **Manila Water Company, Inc.** MWC is the concessionaire responsible for operating the distribution system in the East Zone of Manila, including financing network improvement, extension of service coverage, NRW reduction, ensuring service quality (pressure, continuity of supply, water quality, etc.), billing and collection, and payment of concession fees to MWSS. By the end of 2004, MWC (i) serviced about 425,000 connections; (ii) had a service coverage of 78%; and (iii) had 47% NRW, which was reduced to 37% in 2005. Despite initial start-up difficulties, MWC successfully managed to remarkably reduce NRW, actually exceeding agreed upon targets, expanding service coverage, improving service quality, and connecting the urban poor. Early in 2005, MWC successfully launched an initial public offering, which again confirmed the strong performance of this concessionaire.

34. **Maynilad Water Services, Inc.** Maynilad is the concessionaire responsible for operating the distribution system in the West Zone of Manila. Responsibilities are the same as for MWC. By the end of 2004, Maynilad (i) serviced about 600,000 connections, (ii) had a service coverage of 70%, and (iii) had 69% NRW. Very soon after the start of the concession, Maynilad experienced considerable financial difficulties.⁷ Maynilad never managed to become profitable, and has failed to pay full concession fees to MWSS since March 2001. This was followed by arbitration, which was decided in favor of MWSS, and bankruptcy filing by Maynilad by the end of 2003. A new concession was decided in December in 2006 subsequent to open international bidding. The new consortium of concessionaires—D.M. Consunji Inc and Metro Pacific Investments Corporation—is running Maynilad since then.

5. Regulatory and Governance

35. **Regulatory.** The MWSS Regulatory Office was established in 1997 at the time of award of the two concessions, and is accountable to the same Board of Trustees that also oversees the Corporate Office. The Regulatory Office is mandated with regulating water supply in Manila, including monitoring the performance of the concessionaires, and approval of tariffs. Regulatory rules are based mainly on the provisions of the concession contracts (regulation by contract and absence of legislative backing), which makes its decisions vulnerable to legal disputes.

36. **Governance.** Some of Regulatory Office-retained responsibilities, particularly provision of bulk water supply, directly affect the performance of the concessionaires. As this may be perceived as conflict of interest, it could undermine the credibility and independence of the regulatory process. Both MWSS entities, the Corporate and the Regulatory offices, report to the same Board of Trustees. Consequently, MWSS faces a potential conflict of interest resulting from its multiple mandates, including regulator; bulk water supplier; signatory of the concessions; and, in case the reassignment of concession to Maynilad should fail, potentially major shareholder of the Maynilad concession.

⁷ The Asian currency crisis of 1997 led to a steep devaluation of the peso. Maynilad's responsibility for debt service of 90% of the (foreign currency denominated) loans of MWSS, combined with delays in tariff adjustments, resulted in severe financial constraints. This was compounded by a drought in 1998, which required water rationing and further reduced the concessionaire's revenues, creating management problems and other issues.