

## Urban Water Pricing: *The Metro Manila and Metro Cebu Cases*

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### Water resource management in Metro Manila and Metro Cebu: the story so far

Water resource management in many major urban centers has failed to provide an economically efficient, socially equitable, and environmentally sustainable development, distribution and use of water resources.

In the greater Metro Manila area with more than 11 million people, the Metropolitan Water and Sewerage System's (MWSS) piped water connections reach only about 60 percent of its household coverage while its sewerage system serves a much lower proportion (9%). MWSS' service is generally characterized by low water pressure and intermittent supply, averaging 16 hours per day. Yet, it has one of the highest rates of nonrevenue

water worldwide, amounting to almost 60 percent of water production.

The Metro Cebu Water District (MCWD), meanwhile, which provides piped water connection to the second most populous urban area in the Philippines, serves less than 40 percent of households in its service area at an average of 18 hours per day. Its rate of nonrevenue water is also relatively high (38%) and although part of its mandate, the problem of sewerage disposal has remained largely unattended to.

Inefficiencies in water supply, sewerage and pollution management have already caused serious environmental problems. As a consequence of the inadequate piped water supply and weak regulation of groundwater abstraction, groundwater depletion has become a major problem, causing saline intrusion and land subsidence along coastal and certain inland areas. In Metro Manila, a 1990 estimate of groundwater abstraction (970,000 cubic meters a day or cum/d) far exceeded the natural recharge rate of 533,000 cum/d. In Metro Cebu, ground water abstraction is estimated to be about 234,000

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cum/d, about 60 percent more than the natural rate of recharge.

Inadequate water and sewerage management in these cities has also adversely affected people's health, as water-borne diseases continue to be major causes of illness and death, particularly among the poor segment of the population. Together with the weak regulation of industrial effluents, water pollution problems have intensified sharply, thereby lowering the value of water bodies for fishery, recreation, transportation and water purposes in these urban centers.

There are at least four major sources of failure in water resource management.

First is the failure to adopt an integrated, holistic approach in addressing the inherently interrelated issues of water supply planning and operation, demand management, pollution control, and watershed and groundwater protection. The second stems from the overreliance on "command and control" or administrative/legal mechanisms in allocating scarce water resources and controlling water pollution which have proven to be inadequate. Third is the dominance and direct involvement of the public sector in water supply operations as government operations are typically characterized by faulty incentive structure and lack of effective competition. And fourth and finally, urban water pricing policy has not recognized water as a scarce (and therefore not a free) resource nor accounted for the pervasive externalities involved in the production and consumption of water.

This *Policy Notes* is based on the authors' studies on "Water in Metro Cebu: The Case for Policy and Institutional Reforms" and "Optimal Water Pricing in Metro Manila." It presents a conceptual framework for optimal pricing policy, with Metro Manila and Metro Cebu as case studies. Although the main focus is on pricing policy, the question of what appropriate institutional and regulatory mechanisms will promote an efficient pricing framework in water resource management is also explored.

"...While MWSS' privatization reduced the financial cost of water distribution as evidenced by the significantly lower new water tariff structure, the pricing policy still continues to ignore the importance of full economic cost recovery in water price determination."

## Findings

### On water tariff structure

In general, the government water pricing policy undervalues water because it does not reflect its full economic cost, i.e., the direct supply cost of production and distribution, the opportunity cost of water, and its cost of externalities. Historically, this has led to a) wasteful usage of water by final consumers and of raw water by water utility firms as evidenced by high nonrevenue water; b) intersectoral misallocation of raw water in favor of less valuable uses; c) worsening of water pollution problems; and d) failure to anticipate the necessary investments for water supply expansion in a timely manner.

With the privatization of MWSS, Metro Manila's water tariff structure is now the lowest among major cities in the ASEAN as well as among water districts within the country. However, while privatization reduced the financial cost of water distribution as evidenced by the significantly lower new water tariff structure, the pricing policy still continues to ignore the importance of full economic cost recovery in water price determination. For instance, the bulk of raw water from the Angat Dam, which accounts for 97 percent of MWSS water, is supplied free to the concessionaires despite competing uses of water among urban, irrigation, and hydroelectric purposes. Moreover, the use of groundwater by both MWSS concessionaires and self-supplied firms and households involves only a minimal fee even as groundwater depletion has become a serious problem. In fact, less than 10 percent groundwater users in Metro Manila and elsewhere even bothered to register at the National Water Resources



Board (NWRB) which is mandated to monitor and regulate groundwater abstraction.

In contrast to Metro Manila, the structure of water tariffs of the MCWD is among the highest in the ASEAN region and within the country. This is due in part to the almost total reliance on groundwater which involves a high cost of operation and maintenance of deepwells. The cost of inefficiencies is also likely to be high as may be observed from the relatively high rate of nonrevenue water and number of employees per connection, the failure to operate the new wells long installed in Compostela, and the long delays and design problems of the infiltration infrastructure of the Mananga Phase I project.

Aside from the inherent problems of government-operated utilities, the lack of a clear legal framework for effecting inter-LGU water transfers has also caused the failure to operate the Compostela wells while weaknesses in evaluating project design and feasibility studies and project implementation explain the higher cost incurred in water supply expansion projects. Undoubtedly, the MWSS operations have suffered from the same weaknesses but it has been able to keep water tariffs lower because of greater subsidies from the national government and, more recently, because of the privatization of its operations.

Sometime ago, the MCWD has begun to collect a raw water charge on groundwater used by self-supplied large industrial firms in the amount of P1/cum, presumably for reforestation. While said imposition of a raw water charge for groundwater is clearly called for to reduce groundwater depletion, several questions may be raised with the current approach. These include:

- \* Should the raw water charge not be imposed on all groundwater users, including the MCWD?
- \* What should be the optimal level of groundwater charge?
- \* Should the raw water charge not be collected by the NWRB and should revenues not be allo-

cated for water resource development that will yield the best returns? Aside from reforestation, which would have long-term benefits, the cost of surface water development may be subsidized to supplement groundwater supply within a shorter period of time.

- \* What is the most efficient means of enforcing and collecting groundwater charges?

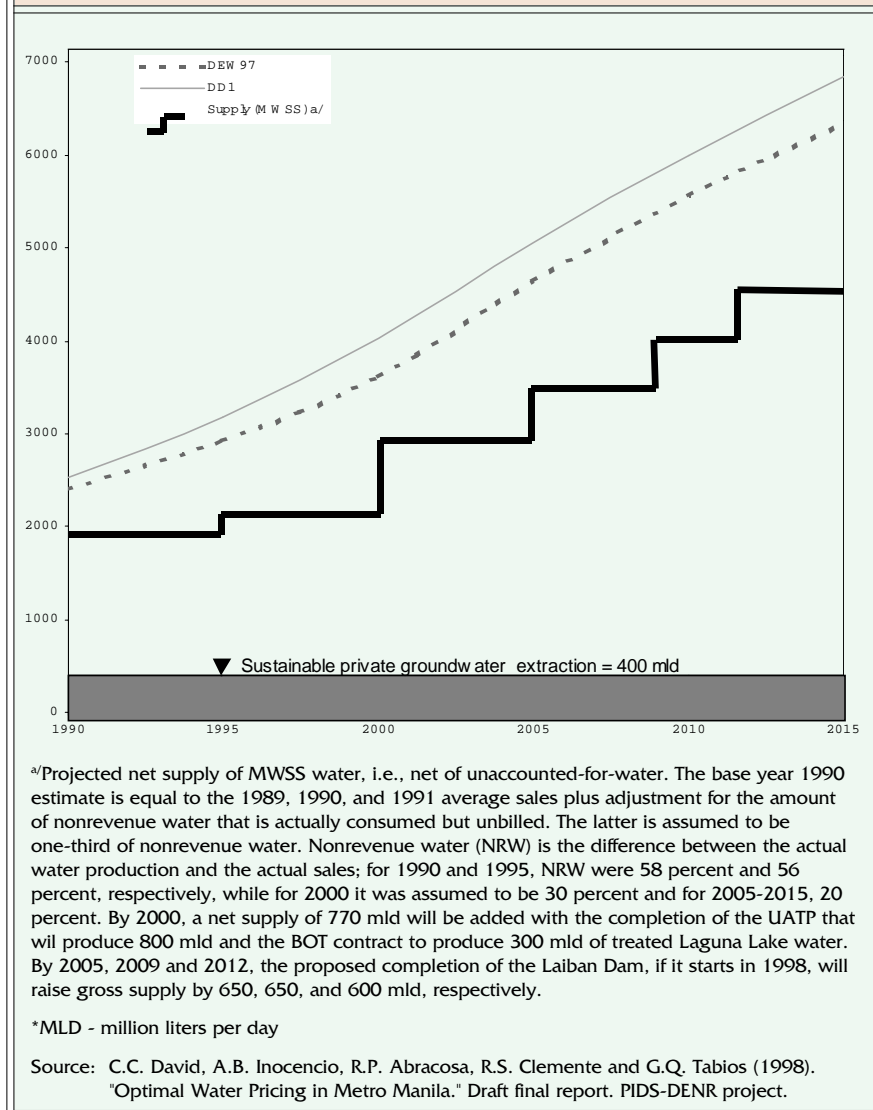
Clearly, an optimal water pricing policy will mean higher average water-related charges (water tariffs, sewerage charge and effluent taxes), particularly for Metro Manila. For the MCWD, privatization may result in some cost savings although recovery of the financial cost alone of developing new sources of surface water supply involves a cost of more than P8 - P12 per cum (at the old exchange rate).

#### On impact of optimal water pricing

It should be emphasized that optimal water pricing may be expected to improve the quality of water service and the environment, without necessarily reducing the welfare of poor households and competitiveness of industrial and commercial firms. This is so because even if the water demand-supply gap will continue to be substantial despite of the ongoing and proposed surface water supply expansion projects as indicated in our projections for both Metro Manila and Metro Cebu (Figures 1 and 2), demand function estimates for households and industrial and commercial firms nonetheless show significant price responsiveness. What this means is that there is a large scope for eliminating the water demand-supply gap by water demand management instruments such as raising water tariffs and imposing sewerage charges and effluent taxes. In fact, there is widespread evidence in developed countries that higher water tariffs and effluent taxes have reduced water consumption without impairing industrial growth. Firms responded by modifying technological processes and adopting water reusing and recycling practices. Potentials for water conservation and use of water-saving technologies for households also proved to be strong.



**Figure 1. Projections of water demand and supply in the MWSS service area, 1990-2015**



The effect of the increase in the cost of piped water to consumers should not be equated to the increase in water-related charges of water utilities. In the first place, the former will lead to improved water service which will save consumers the costs of booster pumps, storage equipment, waiting time, and inconvenience associated with water rationing. Furthermore, it will not necessarily increase the actual cost of water to the majority of poor households.

the *actual* water cost structure despite the *progressive character* of the MWSS and MCWD *pricing schemes*. Families earning less than P30,000 monthly use about 8-9 percent of their income for water while those with monthly income above P250,000 allocate less than 1 percent for their water supply.

With a more rational pricing policy, water rationing will be minimized. The poor households will then be able to gain more access to the central distribution system.

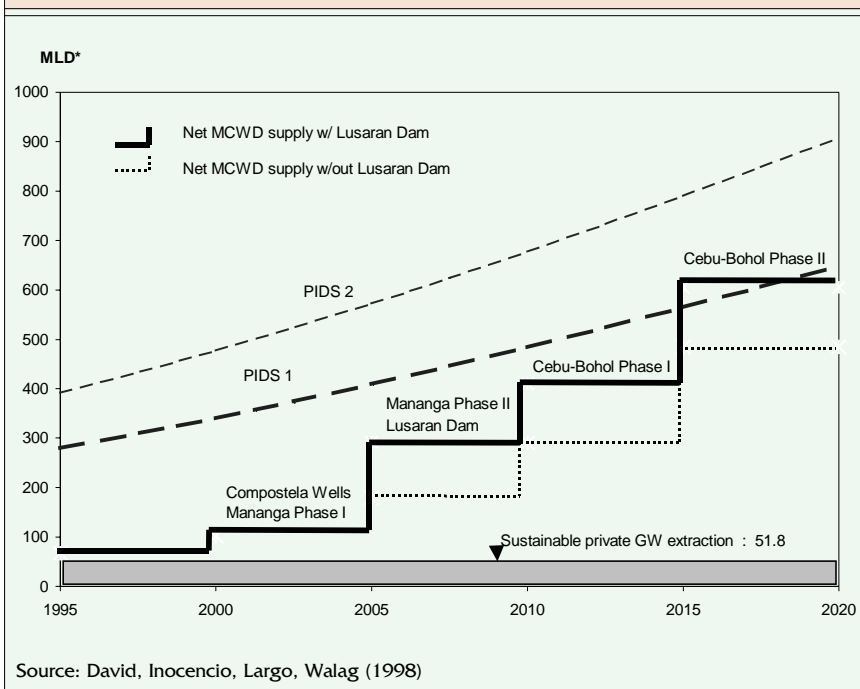
Consequently, the cost of water to poor households may be expected to decline despite an increase in the official water tariff structure.

## Recommendations

To promote a more efficient, equitable, and sustainable urban water resource management, the study recommends the following:

1. Adopt a water (and its related components) pricing policy that covers the full economic cost of urban water use, i.e., direct supply or financial cost of water production and distribution; opportunity cost of water where there are competing users; and cost of externalities or negative environmental impacts. Specifically, this will involve the –

**Figure 2. Projections of water demand and net MCWD supply in Metro Cebu, 1995-2000**



**Table 1. Average cost of water and distribution of households by source of water, Metro Manila, 1995**

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

Source: David and Inocencio (1996). Based on survey of about 500 households in Metro Manila.

**Table 2. Average cost of water and distribution of households by source of water, Metro Cebu, 1997**

Source	% of household	Average cost (P/cum)	Monthly income (P/capita)	% of water bill to income
MCWD	33.9	12.0	2503	3.6
Private waterworks	4.1	12.6	7646	2.0
Self-supplied				
Deepwell	15.9	56.5	1371	4.1
Artesian well	2.4	0.0	1293	0.0
Public faucets	9.7	14.1	1427	1.0
Water vendors				
MCWD water				
Pick-up	9.2	76.3	1189	7.3
Hose (container)	1.1	59.8	1697	4.4
Hose (fixed charge)	*	53.2	1200	5.6
Delivered	*	106.4	750	6.3
Pick-up (fixed)	*	66.5	4000	1.0
Deepwell				
Pick-up	2.1	76.3	1189	4.8
Hose (container)	-	-	-	-
Hose (fixed charge)	-	-	-	-
Delivered	*	132.9	1025	3.8
Pick-up (fixed)	0	3.4	1100	0.5
Multi-sources	21.6			

Source: Largo et al. (1996). Based on survey of about 500 households in Metro Cebu.



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

Income class	Average cost* (P/cum)	% of water bill to income
Under P30,000	36.4	8.2
P30,000-39,999	15.9	4.4
P40,000-59,999	15.9	4.2
P60,000-99,999	15.9	2.9
P100,000-149,999	13.9	2.2
P150,000-199,999	9.2	1.6
P200,000-249,999	5.9	1.4
P250,000-499,999	8.0	0.8
P500,000-749,999	6.0	0.8
P750,000-999,999	9.3	0.8
P1,000,000 and over	7.1	0.6

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

Source: David and Inocencio (1996)

- \* imposition of a raw water charge on water utility firms and self-supplied water users that is equal to the opportunity cost of water and/or environmental cost of water extraction from surface or groundwater sources. In the case of Metro Manila, a bulk water charge (i.e., raw water price plus a share of the costs of operation and maintenance and any additional investments) should be levied on the private concessionaires for the Angat water and eventually for water derived from the proposed Laguna Lake and Laiban Dam projects. A raw water charge must also simultaneously be imposed on utility firms and self-supplied users in Metro Manila and Metro Cebu for groundwater extraction to prevent further depletion of their aquifers. Further studies must likewise be conducted to determine the cost-effective ways of collecting abstraction fees because of inherent difficulties in enforcement;
- \* introduction of sewerage fees among customers of MCWD and among self-supplied water users in Metro Manila and Metro Cebu to cover the cost of an effective regulatory and sewerage disposal system; and

- \* expansion of the taxation of effluents to firms in Metro Cebu and parts of the MWSS service area outside the area of responsibility of the Laguna Lake Development Authority.

2. Consider a system of peak load pricing (i.e., higher water tariffs during summer months when water demand is higher and supply lower) to further improve water supply and demand management. The progressive character of the water tariff structure should be maintained for purposes of cross-subsidizing the poor and encouraging water conservation. However, the wide differences (2 to 3 times) in water tariffs between households and industry/commercial users may be narrowed to reduce incentives for groundwater pumping by commercial and industrial firms.

3. Earmark government revenues from raw water charges, effluent taxes and sewerage fees for water resource management-related activities. The allocation of these revenues between national and local governments should be determined on the basis of comparative advantage in the implementation of such activities. Raw water revenues may be used to:

- \* finance direct supply cost of raw water development and wastewater and sewerage treatment (cost of infrastructure and operation and main-

**Table 4. Average cost of water by income class, Metro Cebu, 1997**

Income class	Average cost (P/cum)	% of water bill to income
Under P30,000	34.96	8.78
P30,000-39,999	30.59	4.07
P40,000-59,999	22.37	4.03
P60,000-99,999	24.68	3.22
P100,000-149,999	17.02	2.50
P150,000-199,999	17.50	1.84
P200,000-249,999	10.72	1.67
P250,000-499,999	10.50	0.82
P500,000-749,999	7.06	0.53
P750,000-999,999	8.67	0.34
P1,000,000 and over	11.88	0.78

Source: Largo et al. (1998)



tenance) carried out either by a private or public entity;

- \* compensate farmers for the reallocation of Angat water to urban use, either directly or by developing alternative sources of irrigation water; and
- \* support cross subsidies in favor of the poor (those who may have to rely on higher-cost sources of water supply) and strengthen environmental protection. For example, the cost of water provision to poor households not covered by the water utility distribution network may be subsidized. The water revenues may also be used to contribute to the capital cost of developing new sources of surface water supply in Metro Manila, Metro Cebu and others where groundwater is already being depleted as well as to support part of the cost of watershed protection.
- \* strengthen the government's water resource management capabilities through the improvement of the statistical database required for proper water resource management, the strengthening of the analytical bases for more accurate water demand projections and water supply and sewerage planning, and conduct of long-term research on water resource management issues.

4. Introduce institutional reforms to improve efficiency in water production and delivery, facilitate intersectoral, inter-basin, and inter-LGU water transfers, and strengthen planning, regulatory, and overall public sector water resource management capacity.

- \* Where direct involvement of the government sector has led to inefficiencies in water supply development and operations of water utilities, privatization should be considered and pursued but under a transparent and competitive bidding procedure. Clearly, the privatization of the MCWD should be considered. However, realization of the full potential gains from privatization over the long term depends largely on the abil-


ity of the regulatory office to monitor the attainment of performance targets and at the same time ensure reasonable (not monopolistic) rates of return for the private concessionaires. There is thus an urgent need for the government to strengthen local capability for designing optimal contractual arrangements and performing economic regulatory functions.

- \* The recent surge in unsolicited BOT proposals for the development of water supply projects must be viewed with extreme caution. In fact, a number of these proposals such as the Laiban Dam for Metro Manila and Mananga Phase II for Metro Cebu should have been solicited and chosen through the usual competitive bidding procedure because these have been previously identified and feasibility studies have already been undertaken. Since unsolicited BOT proposals as well as BOT proposals solicited with haste are typically more costly, the public sector must be more vigilant in ensuring competition and invest more resources for water supply project planning, feasibility studies, monitoring of implementation, and *ex post* project evaluations.
- \* As the cost of new water supply expansion projects increasingly becomes prohibitive, reallocation of water resources from competing uses may prove to be more economical. This may be the case for the Angat reservoir or Laguna Lake waters. Yet, the legal framework as well as operational mechanisms are not in place to allow a market-based approach to facilitate appropriate payments by gainers to compensate losers from water reallocation.
- \* With the passage of the Local Government Code, mechanisms for inter-basin or more specifically, inter-LGU transfers of water resources will have to be developed. The lack of legal basis and operational guidelines for effecting such water transfers has proven to be very costly in the case of the ongoing controversy over the operations of the MCWD wells in Compostela.
- \* The complex nature of water resource manage-



ment clearly requires a more integrated and holistic approach in addressing the inherently interrelated issues of water supply planning and operation, demand management, pollution control, and watershed and groundwater protection. Thus, the fragmented and relatively weak institutional structure of the water resource management will have to be addressed to ensure effective coordination of policies and programs.

## Conclusion

Clearly, water is a critical commodity that must be priced appropriately if we are to ensure that it is not wastefully and unsuitably consumed. This *Notes* offers an optimal pricing scheme that should help address this concern. But hand in hand with this proposed scheme is also a set of suggestions on issues affecting overall water resource management which must be equally attended to since they provide the environment by which such pricing scheme can succeed. 

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