

LESSONS FROM WATER SUPPLY AND SANITATION PROJECTS

A. Lessons on Financial Sustainability

1. **Project teams should evaluate demand carefully.** Calculating demand is usually a straightforward exercise in urban areas with reasonable information on service populations, levels of customer water use, and forecasts of population growth and service coverage. Unfortunately circumstances are usually more challenging, as the project design consultants in a Marshall Islands project discovered.¹ The project failed to account for household rainwater storage tanks which reduced the incentive to connect to a piped supply system. Projections using fixed per capita consumption parameters can also be problematic if existing demands are not representative of future conditions due to (i) unmet demand from intermittent supplies, (ii) unmeasured demand due to self-supply, (iii) changes over time in unit demands, or (iv) shifts in demand motivated by introduction of meters.²
2. **Project teams should make realistic cost estimates and plan for operation and maintenance (O&M).** Facility costing should generally be conservative since costing at the feasibility stage of planning can easily be out by $\pm 20\%$ or more. Funds for physical contingencies should account for cost estimation risks. This is so obvious that one would think it hardly merits mention. But this issue appears, again and again, in past failures. Latrines and septic systems once built must occasionally be emptied and the sludge disposed of. In Bangladesh, tens of thousands of latrines have been built under various domestic programs without provisions for O&M.³
3. **Project teams should be aware of the unwillingness to charge.** The discussion starts with political economy, as water supply is usually the responsibility of local governments, and priorities are determined by elected bodies. Their reluctance to increase tariffs was identified as a significant impediment to project sustainability by most of the staff interviewed for this study. The political reluctance to charge for water supply and sanitation (WSS) services reflects a lack of understanding as well as a concern with public reaction. There are many examples of this. In Bhutan, extensive policy dialogues between local officials and ADB and its development partners all failed to foster local understanding that revenues were too low to fund required O&M costs. Pending elections were also shaped attitudes of officials towards tariff adjustments.⁴ In India it was the same story; political sensitivities overshadowed implementation of fiscal management and tariff covenants for loan projects.⁵
4. **Project teams should uniformly understand the concept of willingness-to-pay.** The economic interpretation of customer willingness to pay (WTP) is the maximum amount a customer will pay rather than go without a service. It is not "happy to pay," in fact it is probably the exact opposite, it is more like "very unhappy to pay," as anyone will understand who has been faced with the need to purchase something that they needed despite a price that seemed exorbitant. WTP analysis is used by economists, not to set prices, but rather to determine how much something is valued by people. In other circles, WTP is conceived as a more prosaic, and lower, measure of what people will be "OK" paying for something. In the WSS sector it is seen as a measure of the publicly acceptable tariff taking into account cultural values, traditions, attitudes about government, and other factors. The first interpretation of WTP is important in benefit cost studies and is considered to be relatively constant;

¹ ADB. 2004. *PCR: Majuro Water Supply and Sanitation* (Loan1389-RMI[SF]). Manila.

² Change in unit demand over time existed in the PRC in the late 1990s and is an ongoing phenomenon in North America where per capita demands are falling at an annual rate of about 0.5 lpcd due to the natural uptake of low flush toilets and other water saving technologies.

³ IED. 2009. *Sector Assistance Program Evaluation for Urban Sector and Water Supply and Sanitation in Bangladesh an Exploratory Evaluation of the Programs of ADB and Other Aid Agencies*. Manila: ADB.

⁴ IED. 2010. *Country Assistance Program Evaluation for Bhutan*. Manila: ADB.

⁵ IED. 2007. *Country Assistance Program Evaluation for India*. Manila: ADB.

the second interpretation is important in the public debate about tariffs and it can change over time,⁶ in fact it is very important that this view can change over time otherwise the “unwillingness to charge constraint on full cost tariffs would probably never be overcome. The WTP analysis in project preparation studies should evaluate both the interpretation of WTP needed for the cost–benefit analysis, and the more general interpretation to inform the tariff dialogue.

5. **Project teams must understand cost recovery and cash flow.** Cost recovery must be differentiated from full-cost tariffs; they are related but distinct issues. Many WSS projects in Asia are plagued by revenue streams that do not cover O&M costs, depreciation, or returns on invested capital. Over time this leads to system deterioration and declines in service standards. Efforts to improve cost recovery for WSS projects often focus on increasing revenues ignoring whether reported costs are either insufficient to support sustainable O&M or too high due to inefficiencies.⁷ In the long run, getting costs right, not too high or low, is important, but in the short run—such as those first years after project implementation—concerns with cash flow take priority since poor cash flow can cripple even profitable enterprises. Funding agencies should consider developing mechanisms to support O&M expenditures in situations where governments are not in a position to fill O&M funding gaps from general budgets. Such support should only be provided for time bound periods and only where a clear political commitment to tariff reform exists.

6. **Project teams must understand tariffs.** A variety of tariff structures are used in developed and developing countries. In Asia there seems to be a convergence toward uniform and increasing block tariffs. Flat rate tariffs may be used but usually as a transitional measure when customer metering is being implemented or for charging apartment building tenants when the building is metered but not the individual tenants. Any tariff structure can be used to achieve full cost recovery provided that care is taken in setting the charge levels for the tariffs. Lifeline tariffs are used at times to make water supply affordable for poor households. Typically the lifeline consumption block should represent the minimum required by a typical household for basic needs. Care should be exercised in designing the lifeline tariff in order to avoid providing a significant subsidy to middle- and high-income households and to avoid erosion of the demand management incentive provided by the tariff.⁸

7. WSS service providers in developed countries typically use a number of fees and charges in addition to the tariff. The connection fee is one such charge that is found in developed and developing countries. In Asia this is used to recover the cost of the pipe and related amount for the customer connection from the street main to the customer’s property line. The connection fee can be large relative to household incomes and may discourage connection.^{9,10}

8. **A long-term view of cost recovery needs to be taken, and it needs to be embedded in a plan.** Institutional reform is one of the most critical requirements for WSS sector development in Asia and also the most difficult to accomplish. Looking at the weak accomplishments in tariff reform, it is easy to conclude that institutional reform efforts of donors have for the most part not been successful. But such a conclusion is not necessarily always justified because it may draw on a naive view of the reform process and may ignore lessons from the history of WSS reform from developed countries. Donors routinely ask governments in Asia to implement, over the course of the few years of a loan or grant project, complicated reforms that took decades to achieve in developed countries. In the developed world, for example in Canada in the late 1970s, flat rate and declining block tariffs were the norm for water supply and budgetary transfers were common for waste water funding. Universal metering

⁶ Factors that can influence WTP-OK include: Fairness, Trust, Coping costs, Options and Control.

⁷ ADB. 2002. *Impact Evaluation Study on Water Supply and Sanitation Projects in Selected Developing Member Countries*. Manila.

⁸ Monthly consumption allowances for lifeline tariffs in Sri Lanka and Fiji, 15 and 16.7 m³ respectively, are likely too high considering that typical household consumption levels in Ontario are only 17 m³/month.

⁹ IED. 2010. *Indonesia: Has the Multi-subsector Approach been Effective for Urban Services Assistance?* Manila: ADB.

¹⁰ Vietnam provides connections for free to prevent this; the cost of connections is recovered through the tariff. In Cambodia, connection fees for qualifying poor households receive subsidies of 30% to 100%. In Lao PDR, a program is providing free WSS connections to households that have good quality latrines.

combined with full cost tariffs using uniform and increasing block structures are the norm now. Financial management regulations are common and asset management planning is aggressively promoted. Institutional reform has not failed in Asia, it may just be getting started if one thinks of the last 20 years as a period of gestation.

B. Lessons on Socioeconomic Sustainability

9. **Community participation is very important in many cases.** Many examples exist of effective community participation programs that have contributed to project sustainability, at least in smaller communities. Effective application of community participation approaches requires the commitment and engagement of local implementing agencies and a commitment of resources and time by ADB. It is difficult to accommodate beneficiary participation within the 5-year implementation period of a typical loan project. It is essential to seek community engagement during the design stage or to plan for a longer implementation period to accommodate participation.

10. **Effective training arrangements are needed.** In Bangladesh, a recent urban project had a successful capacity development component. Mayors of municipalities deemed capacity building and not the infrastructure investments to be the main benefit of the project. Participating municipalities greatly increased their tax and water bill collection capacity. These successful training programs involved computerization and the associated capacity development. A relatively new initiative involving peer-to-peer training holds promise. Twinning arrangements have been made between Phnom Penh Water Supply Agency and Bing Duong water supply staff in Viet Nam to build capacity to deal with the problem of NRW.¹¹

11. **ADB should emphasize capacity building efforts in WSS projects more than in most other projects.** Some guidance: (i) rely more on peer-to-peer and on the job training; (ii) focus the short term, one-off training efforts that are possible during project preparation on essential and timely topics such as training in ADB procedures and practices; (iii) train the right people at the right time; (iv) train the willing and committed; and (v) where not already done, formalize the training process for key roles such as plant operators.

C. Lessons on Environmental Sustainability

12. **WSS should be based on comprehensive water resource planning.** Project design for capacity development usually includes studies required to evaluate the source of supply and determine whether available supplies are suitable. Demand calculations are also performed. But these basic engineering requirements are not always fulfilled.¹² Ideally, project planning and design can account for long-term water resources issues, but this is usually only feasible when existing resource management plans are already in place at the time of project preparation. With the poor levels of WSS service frequently encountered in developing countries, it is important to check the level of accuracy and coverage of existing resource evaluation beyond basic engineering requirements.

13. **The role of integrated water resources management should be more prominent in water-scarce areas.** This is the case in the People's Republic of China (PRC) where long-term resource management plans are prepared alongside infrastructure master plans. However the PRC approach, while supporting demand management measures, relies heavily on major infrastructure projects to store and move water.

14. **The approach to integrated water resource management in project design should be context driven.** Factors such as water scarcity, water contamination, salt water intrusion or significant water

¹¹ ADB. 2007. Sector Paper, *Sri Lanka Country Assistance Program Evaluation: Water Supply and Sanitation Sector*. Manila.

¹² Poor assessment of water resources in Kupang, Indonesia resulted in reservoirs being oversized and used far below capacity because aquifer yields were overestimated and new wells produced much less water than intended.

resource over allocations should trigger more exhaustive resource assessments during project preparation. Otherwise, basic but competent assessments of water availability and salient water quality issues are required.

15. **Climate change needs to be addressed for sustainable development.** Failure to consider climate change is problematic. Energy use is significant in the sector especially for WSS systems which can often be the single largest energy-using sector in a municipality due to pumping requirements. Moreover energy-efficient technologies such as variable speed pumps and cogeneration are popular cost-cutting measures applied in the sector. But apart from the opportunities for climate change mitigation, there is a compelling need to consider adaptation, something that relates directly to project sustainability although perhaps not within the economic life of project assets.