Sustainability of Urban Water Supply and Sanitation Operations
Findings and Lessons
Sustainability of Urban Water Supply and Sanitation Operations: Findings and Lessons
NOTE

In this report, “$” refers to US dollars.

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### Abbreviations

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Full Form</th>
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<tr>
<td>ADB</td>
<td>Asian Development Bank</td>
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<tr>
<td>EIRR</td>
<td>economic internal rate of return</td>
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<td>IED</td>
<td>Independent Evaluation Department</td>
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<td>IEG</td>
<td>World Bank Independent Evaluation Group</td>
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<td>IWRM</td>
<td>integrated water resources management</td>
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<td>Lao PDR</td>
<td>Lao People’s Democratic Republic</td>
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<td>MFF</td>
<td>multitranche financing facility</td>
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<td>NRW</td>
<td>nonrevenue water</td>
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<td>O&amp;M</td>
<td>operation and maintenance</td>
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<tr>
<td>PPER</td>
<td>project performance evaluation report</td>
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<td>PPP</td>
<td>public-private partnership</td>
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<td>PPTA</td>
<td>project preparatory technical assistance</td>
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<td>PRC</td>
<td>People’s Republic of China</td>
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<td>PVR</td>
<td>project completion report validation report</td>
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<td>RRP</td>
<td>report and recommendation of the President</td>
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<td>SEAWUN</td>
<td>South East Asian Water Utilities Network</td>
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<td>TA</td>
<td>technical assistance</td>
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<td>WSS</td>
<td>water supply and sanitation</td>
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<td>WTP</td>
<td>willingness to pay</td>
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<td>WUSC</td>
<td>water users and sanitation committee</td>
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Acknowledgements

This paper grew out of a chapter on the sustainability of urban water supply and sanitation operations in the 2015 Annual Evaluation Review. The paper is prepared by Michael Fortin, Tomoo Ueda, Principal Evaluation Specialist, Mary Grace Agapito, and Myrna Fortu, Division 1 of the Independent Evaluation Department, together with consultants Carmencita Balbosa and Lizandro Racoma. Overall guidance was provided by Vinod Thomas, Director General Independent Evaluation, and Walter Kolkma, Director, Division 1 of the Independent Evaluation Department.

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Executive Summary

This paper is part of a series of sustainability studies on specific sector operations featured in recent annual evaluation reviews. A chapter of the 2015 Annual Evaluation Review assessed the experience of the Asian Development Bank (ADB) operations program for urban water supply and sanitation (WSS) from the perspective of sustainability. This paper expands on that assessment.

Based on Independent Evaluation Department (IED) guidelines for the evaluation of public sector operations, the sustainability criterion looks at the probability that human, institutional, financial, and natural resources are sufficient to maintain the outcome achieved over the economic lifetime of the project and that any risks need to be or can be managed.

Twenty of the most recent IED evaluations of urban WSS projects were reviewed: 13 of the projects were rated less than likely sustainable or lower, most noted the lack of financial sustainability as a predominant consideration for the low rating. The 2015 Annual Evaluation Review reports that WSS operations had among the lowest sustainability rates of all sector operations. To examine the reasons for low sustainability, project officers were consulted. They provided the following additional perspectives: (i) a strategic approach to tariffs and cost recovery is needed; (ii) water resource issues, such as nonrevenue water (NRW) and effective wastewater management, must be addressed; (iii) institutional reform covenants and assurances are too ambitious given the short span of project implementation; and (iv) adequate capacity of institutions, i.e., decision-makers and staff, is a necessary condition for sustainable WSS operations. On the other hand, some thought the evaluation methodology could benefit from some modifications.

The sustainability of urban WSS operations can be improved by learning from recent developments and changing attitudes across the region. Successful reduction of NRW, such as occurred in Manila and Phnom Penh, as well as successful reforms and innovation in other cases in the People’s Republic of China, Bangkok, and Jakarta should be promoted and widely publicized. Lessons from these success stories can be simplified and delivered to the public and politicians to influence change. Reforms also take shape through response to crises. Water shortage in Pakistan and a possible water crisis in the whole of Asia can possibly motivate preemptive change in some situations, but in others might lead to calamities that will hopefully lead to belated reforms. Economic growth, rapid urbanization, and globalization will hopefully increase demands on the quality of WSS, increase acceptance of the need to pay for water services, and lead to improved sustainability.

The evolution of ADB policy from the 2001 Water Policy to the 2011 Water Operational Plan has made ADB more pragmatic, more observant of local conditions and needs, and more concerned about robust technical design. More attention is given to the control of NRW, a more strategic and long-term approach to tariffs and cost recovery, water sector information and experience, governance, and capacity building. This paper recommends that ADB should consider promoting a tariff reform policy that supports ongoing budgetary transfers to WSS operators if the transfers comply with a
rational national policy framework and are justified by local conditions such as widespread poverty.

Collaboration has been improving through partnerships to leverage financial resources and to provide opportunities for learning and technology transfer, both within ADB and among clients. In 2007, ADB began the Water Operators Partnership Program to facilitate peer-to-peer learning and capacity building.

Significant innovations in lending modalities introduced by ADB, like the program cluster approach, multitranche financing facility, and results-based lending, introduced the importance of performance-based disbursements to program and project interventions. They are expected to enhance the sustainability of projects in the sector.

Good quality preparatory work for projects is also key to project sustainability. Close to $1.0 million plus considerable staff time are spent to complete project preparatory technical assistance, which aims to advise whether a project should proceed. Other types of analysis to help determine if a project component should proceed, such as technical feasibility and cost-benefit analysis, should occur at inception or earlier so that decisions can be made before significant resources are committed to project preparatory technical assistance projects.

While several measures within ADB and across the region are already being taken to improve WSS project sustainability, future work can still benefit from additional measures to improve project outcomes. Based on the case studies reviewed, project design and implementation can be improved through careful evaluation of demand and estimation of project costs, more attention to system interdependencies, proper planning for operation and maintenance, and long-term engagement with clients. Setting appropriate tariffs and cost recovery remains essential to the long-term sustainability of WSS operations. Tariffs can be coupled with budgetary transfers provided a policy reform framework exists. Community participation in WSS operations in selected cases in Bangladesh, Indonesia, Nepal, and the Philippines contributed to project sustainability. Efficiency measures such as addressing NRW and assessing human resource capacity can also improve project sustainability.

Institutional reform is another key element and a foundation for long-term sustainability. While institutional reform takes time, it is critical for WSS development. Asian countries have been pushed to implement institutional reforms very quickly, much more quickly than the pace of reform that occurred in advanced countries. While some Asian success stories involve relatively quick reform of organizations, in most cases expecting full implementation of aggressive reforms under single project loans is not realistic. Moving forward, improved project outcomes can be expected if the ambitions to catalyze reform are tempered by a deep understanding of the particular political context of projects and by an appreciation that, even in the best of circumstances, substantial reforms take time to implement. From this perspective, institutional reform has not failed in Asia; it may just be starting if one thinks of the last 25 years as a period of gestation. The decision to remain engaged should rest on policies that acknowledge the crucial relation of WSS investments to inclusive and environmentally sustainable growth, and the complex and slow-moving nature of the sector.
CHAPTER 1

Introduction

1. **Background.** Recent annual evaluation reviews (AERs) prepared by the Independent Evaluation Department (IED) featured evaluative assessments of the sustainability of transport investments in 2013 and energy investments in 2014. Aiming to develop such assessments into a series, the 2015 AER assessed the experience of the Asian Development Bank (ADB) with a particular program of operations in the urban water supply and sanitation (WSS) portfolio. The timing of the assessment, with its emphasis on a learning perspective, is very relevant to the evaluation of the Millennium Development Goals and the operationalization of the Sustainable Development Goals. Preparation of this paper involved interviews with 16 ADB staff working in WSS; a case study analysis of completed sustainability assessments for all 20 sovereign projects approved during 2000–2008, with a project performance evaluation report (PPER) or project completion report validation report (PVR); analysis of IED databases on success rates; and a review of relevant IED and ADB evaluations and studies. Approaches of other development partners were also reviewed. Drawing from these investigations, lessons from successful and unsuccessful project experiences are documented and project design factors that bear on sustainability identified. Recommendations to improve project sustainability are based on the analysis.

2. **Development context.** Progress in improving access to clean water in Asia and the Pacific has been significant, increasing from 73% of the population in 1990 to 92% in 2012. However, serious gaps, particularly in providing people with access to basic sanitation, continue. In 2012, about 41% of the population still lacked access to basic sanitation, most prominently in South and East Asia. Improvements in infant, child, and maternal health are progressing too slowly to achieve targets, partly due to lack of clean water and sanitation. Disparities in access to basic infrastructure have partly influenced underperformance of regional outcomes. Inequality and access to basic services are gaps that need to be addressed not only within the region but globally as well, especially given continuing population growth and fast urbanization.

3. **ADB’s role in water supply and sanitation.** ADB has guided efforts to expand WSS operations, and improve their efficiency and sustainability through its 2001 Water Policy, and later its 2011 Water Operational Plan. The Water Policy focused on efficiency, and financial and environmental sustainability: (i) promoting a national focus on water sector reform; (ii) fostering the integrated management of water resources, particularly in river basins; (iii) improving and expanding the delivery of water services; (iv) fostering the conservation of water and increasing system efficiencies; (v) promoting regional cooperation and increasing the mutual beneficial use of shared

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1 The case study analysis is provided as a supplementary appendix.
water resources within and between countries; (vi) facilitating the exchange of water sector information and experiences, including partnerships between public, private, community, and nongovernment organizations; and (vii) improving governance and promoting decentralization.

4. The policy saw potential for improvements in (i) increasing irrigation efficiency; (ii) aligning urban drinking water and sanitation service efficiencies with urban growth; (iii) reversing the degradation of water resources by agricultural, industrial, and municipal effluents; and (iv) improving the overall allocation and management of available resources in river basins. All of these areas stress financial and environmental sustainability, indicating ADB’s long-standing concern for sustainability. In fact, financial sustainability was deemed such a concern for WSS that the Water Policy placed significant stress on full cost recovery of investments (both capital and operations costs) made by the executing agency toward the end of the project investment period.5

5. The 2011 Water Operational Plan expanded on the Water Policy, and focused on three key areas: (i) expanding and deepening knowledge to determine best measures to improve water use practice; (ii) advancing inclusive policy reforms; and (iii) supporting programs and projects in priority areas that ensure water use efficiency; scale up investments in wastewater management, use, and sanitation; and mobilize private sector participation. The plan’s priority areas for support to programs and projects are in line with the principles of financial and environmental sustainability: (i) mainstreaming efficiencies in water use in project design; (ii) supporting increased investments in wastewater management and reuse, including sanitation; and (iii) stimulating private sector participation.

6. In ADB’s portfolio, the priority to increase support for wastewater treatment and sanitation became quite evident after 2011 (Figure 1): annual sanitation and sewerage financing was greater than that for water supply. In practice, the 2011 plan somewhat reduced the stress on full cost recovery for WSS at project completion, in favor of an emphasis on intermediate and efficiency-oriented measures.

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Note: From 2006 onward, water supply includes multitranche financing facility while the designs of some sanitation and sewerage projects include a solid waste component.

Source: Data from the Asian Development Bank water team as sourced from the report and recommendation of the President cost estimates.

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7. **Issues in ADB’s water supply and sanitation operations.** Sustainability of WSS operations has become a special concern for ADB. The 2013 Development Effectiveness Review notes that successful water supply operations continued to have sustainability issues, in particular due to insufficient funding from government budgets for operation and maintenance (O&M), and insufficient cost recovery due to problems with tariff setting. It notes that among all types of operations, those in the water sector had the lowest sustainability—with only 47% of completed water sector operations rated *likely sustainable* or higher.

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CHAPTER 2

Sustainability of Water Supply and Sanitation Projects

8. The idea of sustainable development predates the famous 1987 Brundtland Commission by almost three centuries. In 1713, Hans Carl von Carlowitz, concerned about deforestation, proposed that the pace of logging in Germany be limited to the capacity of existing forests to grow trees. The Brundtland Commission adapted and interpreted this idea to produce its widely received definition: “ensure that humanity meets the needs of the present generation without compromising the ability of future generations to meet their own needs.” This definition enjoins us to act in a way that assures the well-being of future generations by strengthening their capacity to adapt to changing economic, social, and environmental conditions.7

9. Around the same time, the World Bank’s Operations Evaluation Department was considering project sustainability. In its first assessment of project sustainability in 1985, the department compared the economic internal rate of return (EIRR) estimated at project completion with the re-estimated EIRR after 5 years of operation. A satisfactory EIRR was taken as evidence that the project would deliver acceptable benefits over its economic life. In subsequent deliberations, the Operations Evaluation Department concluded that an assessment based on the EIRR was reasonable if a project’s sustainability depends primarily on financial and physical capital, but not when factors such as access to natural resources, institutional reform, and human or cultural capital have a significant role.8

10. The concept of project sustainability has been refined. The need for adequate financing of ongoing project services and facilities is recognized as key to assure project sustainability. Since assurances about tariffs and subsidy funding can be unreliable, financial sustainability assessments focus on constraints to reliable finance, the financial autonomy of operating authorities, and the fiscal independence of local governments. To achieve financial autonomy, development agencies pursue approaches ranging from public–private partnerships and corporatization, to institutional capacity building and empowered community-based organizations. Such measures usually entail institutional reforms that can only happen when there is political will, usually at multiple levels of government. Policy and organizational reform is now a common and challenging feature of project and program designs.

11. Project sustainability is now understood to be multifaceted. Moreover, a sustainable project does not automatically mean that it also promotes sustainable development. A project can achieve its specific objectives while making no contribution to sector development, or even having a negative long-term effect (footnote 8). Key questions relating to sustainable development can be easily overlooked: Are project achievements replicable? Does the project exclude the poor? How are greenhouse gas emissions affected? Do project reforms support broader sector reforms or will they die with the next change of government? Has the project changed the perception and knowledge of stakeholders? Requiring project design efforts to account for many of these broader sustainability concerns may be unfair and unreasonable since the task of designing a project that is sustainable in its own right is already a considerable challenge. However, at inception and design, and once completed and operating, projects within the broader context of sustainable development should be evaluated.

12. ADB’s sustainability ratings for projects are based on criterion found in IED guidelines for preparing performance evaluation reports for public sector operations:9 “The sustainability criterion looks at the probability that the human, institutional, financial, and natural resources are sufficient to maintain the outcome achieved over the economic lifetime of the project and that any risks need to be or can be managed.”

13. Project sustainability ratings use the following scale: most likely sustainable, likely sustainable, less than likely sustainable, and unlikely to be sustainable. The guidelines note the following:

(i) “Sustainability is an integral part of operational performance and is affected by project design and implementation.”
(ii) “Sustainability of outputs alone might not be sufficient to ensure sustainability of outcome…”
(iii) “Important factors affecting sustainability are the project’s financial arrangements…” (examples: tariffs, other cost-recovery arrangements, performance of operators, profitability of beneficiary enterprises).

14. The guidelines identify specific determinants of sustainability:

(i) adequate and effective demand for output;
(ii) pricing of outputs;
(iii) financial viability of operating entities;
(iv) policies and procedures to fund O&M;
(v) policies to ensure the maintenance of human resources;
(vi) policies, institutions, markets, and regulatory conditions;
(vii) political will to ensure government ownership of the project;
(viii) adequacy of incentives for continued stakeholder participation; and
(ix) environmental, social, technological, and natural resource risks.

15. While some of these items might imply a broader view of sustainability, the overall thrust of the rating approach seems to deal either directly or indirectly with financial sustainability. This is understandable as financial sustainability is a prerequisite for the achievement of project outcomes. However, environmental sustainability is just as important and should be centrally concerned with all consequences beyond the project lifetime, for instance if the project has long-term consequences for biodiversity or climate change.

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16. Environmental sustainability, in a broader context, and as an additional criterion to financial sustainability, is central to ADB’s 2011 Water Operational Plan, as is clear from the elevation of this concern to one of the three central agendas of Strategy 2020, and the dominant role that the Water Operational Plan attaches to accessible freshwater in the sustainable development of the region’s poor and emerging economies (footnote 4).¹⁰

17. The Water Operational Plan asserts a broad focus on sustainable development. On the other hand, project sustainability, focusing on financial elements (i.e., full cost recovery), is more strongly emphasized in the project evaluation guidelines (footnote 9). The guidelines state that "Important factors affecting sustainability are the project's financial arrangements, such as tariffs and other cost-recovery arrangements or budget allocations for maintenance...." However, among the nine sustainability determinants listed in the guidelines, only three relate to financial or price elements (items ii, iii, and iv) (footnote 9, para. 66). Sustainability and its interrelationship with other criteria recur as a point of discussion in other parts of the guidelines (footnote 9, para. 31). In fact, the themes addressed in the section on project impacts—namely social and environmental impacts and institutional reform—mirror major nonfinancial themes considered important to sustainability and its achievement. The guidelines, therefore, also address the broader issue of sustainability or sustainable development.

18. Considering how the World Bank currently evaluates projects is informative. The implementation completion reports and validations by the Independent Evaluation Group (IEG) no longer apply a distinct sustainability criterion for project performance.¹¹ Instead, the IEG evaluation guidelines consider the “risk to development outcome” defined as “the risk, at the time of evaluation, that development outcomes (or expected outcomes) will not be maintained (or realized).” The risk rating is two dimensional, accounting for (i) the likelihood of detrimental changes that may impair achievement of outcomes, and (ii) the impact on outcomes if these changes materialize. Individual sources of risk to be considered in the evaluation include

(i) technical (e.g., were innovative technologies used),
(ii) financial (robustness of financial flows, financial viability),
(iii) economic (country and global),
(iv) social (strength of stakeholder support, mitigation of negative impacts),
(v) political volatility,
(vi) environmental impacts,
(vii) government ownership and commitment,
(viii) other stakeholder ownership,
(ix) institutional support (project entities, legal framework),
(x) governance, and
(xi) exposure to natural disasters.

19. The IEG analysis of risks to outcomes is essentially equivalent to the ADB sustainability rating, but by emphasizing risks they address project sustainability and sustainable development more explicitly and separately.¹² On the other hand, projects

¹¹ World Bank Independent Evaluation Group. *Harmonized Evaluation Criteria For ICR and OED Evaluations.* Washington, DC. Note that project sustainability was previously addressed in World Bank project evaluations (footnote 8).
¹² The World Bank sustainable development objectives are expressed in environmental, social, and legal safeguard policies. The International Finance Corporation and the Multilateral Investment Guarantee Agency have replaced these safeguard policies with a single policy on social and environmental sustainability and eight related performance standards (World Bank Independent Evaluation Group. 2010.)
in the IEG system can be rated somewhat paradoxically as having a satisfactory outcome with a substantial risk to that outcome. In the ADB rating system, the two ratings (effectiveness and sustainability) are weighed alongside two other ratings (relevance and efficiency). The IEG guidelines have additional sustainability indicators, such as economic sustainability, expanding the scope of the evaluation to encompass, in principle, a wider range of risk factors than are usually considered in ADB evaluations.
CHAPTER 3

Rating the Sustainability of Projects

20. In this paper, WSS sustainability considers (i) financial, (ii) socioeconomic, and (iii) environmental factors. The first presupposes regular and adequate cost recovery and tariff adjustments, and good financial monitoring. The second supposes well-maintained utility service standards, affordability, and adequate public consultation. The third supposes the presence of satisfactory water resources management, and the application of environmental and operating regulations (metering and nonrevenue water [NRW] reduction).

A. Sustainability of ADB-Supported Operations

21. Twenty of the most recent IED evaluations of urban WSS operations were analyzed: 3 project performance evaluation reports (PPERs) and 17 project completion report validation reports (PVRs) (Appendix 1). To draw out lessons, IED limited the sample to projects approved during 2000–2008 that had PVRs or PPERs. The projects had to be classified under the WSS, waste management, and urban sector development subsectors. To focus the discussion on urban WSS cases, rural water supply and wastewater projects and urban multisubsector projects that had minimal water and sanitation components were not included. Two-thirds of the projects were rated less than likely sustainable or unlikely sustainable (Table 1).

Table 1: Reviewed Urban Water Supply and Sanitation Projects, Approved 2000–2008

<table>
<thead>
<tr>
<th>Category</th>
<th>Breakdown by Rating</th>
<th>Breakdown by Operation</th>
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<tr>
<td></td>
<td>MLS+LS</td>
<td>LLS+US</td>
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<tr>
<td>Number of Projects</td>
<td>7</td>
<td>13</td>
</tr>
<tr>
<td>Percentage</td>
<td>35%</td>
<td>65%</td>
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</table>

LLS = less than likely sustainable, LS = likely sustainable, MLS = most likely sustainable, US = unlikely sustainable.

Note: Project selection was based on projects approved from 2000 to 2008 with a project completion report validation report, and project performance evaluation report. Projects cover the following subsectors: urban sector development, water supply and sanitation, and waste management.

Source: Asian Development Bank database.

22. Analysis of the narratives supporting sustainability assessments in PVRs and PPERs indicates that financial sustainability was a predominant consideration underlying ratings for 11 of the 13 case studies rated less than likely sustainable or unlikely sustainable. For the remaining two, it appears to be the only consideration.

13 Sustainability ratings assigned in the project completion reports (PCRs) were not changed by the IED rating in 15 (75%) of the case studies. Ratings for 2 of the case studies were lowered by one level and for one case study by 2 levels on the rating scale. One case study was not rated for sustainability in the PCR, and was rated as unlikely sustainable by the PVR. PVRs and PPERs are both produced by IED. PPERs are more in-depth, and involve field visits to project sites and interviews with relevant stakeholders well after project completion. PVRs, on the other hand, are validations of PCRs and are based mainly on document analysis. A PVR is usually completed soon after circulation of the PCR.
This should not entirely surprise, as ADB’s 2001 Water Policy, to which several of the projects were subject, stressed the need for full cost recovery at project completion. Many projects also have strict covenants on cost recovery, even tariff reform. Other factors were (i) inability to deliver essential target outputs at completion; (ii) poor quality of infrastructure; (iii) lack of government ownership or project support; (iv) weak institutional and staff capacity; (v) insufficient beneficiary consultation on preferences; (vi) beneficiaries’ unwillingness to pay; and, especially, (vi) local authorities’ unwillingness to charge.

23. Projects for wastewater, sanitation, and sewerage encountered similar sustainability issues, but they fared somewhat better than water supply projects and projects with water supply components, perhaps because more of them were in middle-income countries or better-off municipalities. However, delivery of targeted outputs is still a problem for many, as are low tariffs and weak capacity.

24. A core set of sustainability attributes—cost recovery, institutional reform, and financial management—influenced most sustainability assessments in the validated projects (Figure 2). Although not a direct attribute, the manner of implementation also had an influence, that is, poor construction quality entailed higher O&M costs.

25. Most sustainability assessments centered on cost recovery. This was the only consideration in two projects, while for most of the other operations cost recovery was the context within which other attributes were discussed. Financial management was cited, for example, because of its impact on cost recovery, weak public participation

![Figure 2: Sustainability Attributes Cited in Evaluations and Validations of Water Supply and Sanitation Projects Approved from 2000 to 2008](chart)

O&M = operation and maintenance, PPER = project performance evaluation report, PVR = project completion report validation report, WSS = water supply and sanitation.

Note: The review is based on 20 PVRs or PPERs of WSS projects approved from 2000 to 2008. The sample excludes PVRs or PPERs of projects with big rural components, urban multisector projects with minimal WSS components, and those without sustainability ratings.

Source: Independent Evaluation Department.

14 Sustainability attributes, or those identified as reasons for rating sustainability, were drawn from a review of PVRs and PPERs of the 20 projects.
because of its impact on willingness to pay, and institutional reform because of failures to follow through on corporatization of the operating authority.

26. For the operations rated satisfactory, guaranteed O&M financing was a result of tariff increases, either supported by surveys that assured policy makers of users’ willingness to pay or by staggered tariff increases. Government commitments to provide subsidies also bolstered cost recovery, and included direct budgetary allocations to electricity and debt service payment offsets. For operations assessed less than likely sustainable or unlikely sustainable, low revenues led to uncertainty of the O&M financing, often because of an inability to raise and collect WSS tariffs or enhance revenues from other sources. In one project, inadequate O&M funds led to poor maintenance of the distribution network and an increase in NRW, fueling further revenue losses. Several countries still impose flat water tariffs, which is postponing the shift to a volumetric system until after metering is completed (footnote 14).

27. Institutional reform to make operations more sustainable included greater commercial orientation of utilities, private participation in water supply, and corporatization of municipal utilities. These aspects were closely linked to issues of financial autonomy and more cost-effective O&M. Corporatization gives water supply operators more independence in setting tariffs and reduces political interference. Country context remained a factor in the sustainability of water operations. Efforts to devolve and outsource WSS services were less successful in smaller countries with weaker governance and capacity, both public and private.

28. For financial management, the computerization of tax and accounting records and a general improvement in billing systems can help to enhance revenues without increasing tariffs. In contrast, certain operations have struggled to use financial and socioeconomic data as part of planning and management tools.

29. Environmental sustainability was factored into only 3 of 20 projects investigated and covered water resources management. Two were in the People’s Republic of China (PRC): one introduced comprehensive water resource protection through tree planting and other pollution control initiatives; and another complemented the construction of a dam with robust environmental management, reducing water contamination and promoting organic farming. This resulted in improved water quality standards and an additional source of potable water for a city. In a third project, in Timor-Leste, inadequate water sources created problems for sustainability, partly because the project was processed as an emergency loan. In most other projects, the adequacy of water sources had not been assessed, most likely due to pressure to prepare the project quickly.

B. Factors Contributing to Poor Sustainability

30. While sustainability issues are multifaceted and ratings sometimes difficult to provide, ADB staff interviewed for this paper identified the following concerns about the rating of sustainability in project completion reports and evaluations.

31. Sustainability evaluations don’t reflect current practice. Operations staff interviewed by IED regarding the sustainability evaluations and ratings assigned to projects expressed concerns. When aggregating these ratings and comparing sustainability issues in various sectors of operations, available project ratings data made several years ago may misrepresent the current status of sector achievements. For instance, ratings data presented in this report relate to projects designed and
completed prior to publication of the Water Operational Plan, which, with its more balanced treatment of the need for full cost recovery and long-term planning, has had a significant impact on WSS project design.

32. Past ratings focused less on nontariff factors, such as staffing and effective asset management. While the failure to meet tariff covenants is a negative development that will almost certainly result in either unsustainable operations or increased government liabilities (affecting the sustainability of government in a larger sense), low tariff revenues do not automatically result in project failure as governments may fill funding gaps with transfers from general revenues.

33. Water resource issues must be addressed. Financial sustainability is a prerequisite for overall sustainability but it is not enough. Broader water resource issues must also be considered, especially NRW. ADB’s Water Operational Plan makes a serious commitment to NRW control, making funding for capacity investments conditional on the addition of this to the project design. Countries may also acknowledge the importance of NRW, but most politicians prefer high profile projects that are visible by the population, such as new treatment plants, to showcase to the public.

34. Effective NRW control requires work on the network, as well as institutional reform and technical capacity development. For example, the availability of financial subsidies is a disincentive to manage systems efficiently to control costs. The indifference to cost control translates into a complacent attitude toward high NRW. Where incentives to control this are created they may be ineffective unless technical capacity is developed. For example, in the Philippines, Manila Water and Maynilad built their NRW teams using newly hired staff because existing staff were not interested in NRW control. These companies were able to successfully reduce NRW from 60% to 30% under a rate-rebasing exercise (even much lower in some parts of Metro Manila).

35. Effective wastewater management, another critical water resource issue, is one of the largest challenges for WSS. Governments and residents give low priority to wastewater management. Consequently, wastewater tariffs, if established, are often a fraction of water supply tariffs even though system capital and operating costs can be just as high. Innovative approaches can overcome the bias against wastewater investments. For example, to overcome cultural biases in Peru, a grassroots campaign involving capacity building, education, and promotion is facilitating a private sector user fee-funded project to install household toilet facilities.15

36. Institutional reform covenants and assurances are too ambitious. Institutional reform encompasses a wide range of initiatives from regulatory mechanisms for tariffs and operations to the organizational structure of WSS service providers. Corporatization is viewed by some as the most important institutional reform that ADB should target. Corporatization can give WSS operators more independence and reduce political interference. The Phnom Penh Water Supply Authority is a good example of a very effective corporatized public water company. The Dhaka Water Supply Sector Development Program is successful in part because the Dhaka Water and Sewer Authority is corporatized and fully independent.16

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16 ADB. 2007. Report and Recommendation of the President to the Board of Directors: Proposed Loans and Technical Assistance Grant to the People’s Republic of Bangladesh for the Dhaka Water Supply Sector
37. Such reforms can be pursued through loan and grant projects provided they are founded on a rational strategic plan developed, for example, during preparation of the country partnership strategy. Government support is also needed. Often, however, institutional reform covenants and assurances are too verbose, too ambitious, or optimistic, especially in the context of the 5-year span of a typical project loan. In such a short period the fulfillment of institutional reform covenants is secondary to timely project implementation (paras. 144–158).

*Development Program.* Manila. One loan was designed to reduce NRW to less than 15% in district-metered areas through performance contracts. Another loan had two tranches with conditions that address financial sustainability (e.g., ring-fenced accounts, 5-year business plan, tariff adjustment mechanism).

17 Often an institutional analysis and road map are not completed during project preparation. No indepth review of the existing tariff structures, the cost-recovery systems, and the institutional situation is completed. Instead the review and suggested changes are pushed to the time of project implementation through the inclusion of covenants and assurances. But during project implementation, the focus is on contract awards and disbursements, while reforms are seen to slow down implementation.
CHAPTER 4

Changing Trends and Attitudes

38. While the paper focuses on factors in completed projects that promoted or detracted from the likelihood of a sustainable WSS project, some contextual developments and attitude changes in Asia and within ADB may have a bearing on the future sustainability of such projects.

A. Emerging Opportunities and Risks in Asia

39. Promote success stories. There is evidence that, with leadership and political will, radical change is possible:

(i) The Phnom Penh Water Supply Authority was completely overhauled by Ek Sonn Chan starting in 1993 when he became its general director. At that time, the authority did not have a customer list, municipal service coverage was 20%, NRW exceeded 70%, and bill collection was only 48%. After diligent efforts to end corruption, reward efficient employees, improve collections, and upgrade services, service coverage with potable water now exceeds 90%, NRW is down to 6%, and everyone pays their water bill.18 Ek Sonn Chan, now secretary of state, at the Cambodian Ministry of Industry and Handicraft, is promoting sector reforms modeled on those undertaken at the Phnom Penh Water Supply Authority. The ministry is the sector regulator and can make independent decisions regarding tariffs, which are being increased. The capacity of the regulator is being improved with the help of an ADB loan.19 Chan visited the provincial water authorities to evaluate conditions and staff capacity, and to develop a reform strategy. Steps are being taken to optimize operations. Public-private partnership (PPP) operators are being accredited and licensed, and government staff trained in construction supervision.

(ii) Under the leadership of Tony Aquino, Manila Water has drastically reformed WSS services in the East Zone of Manila. In the 15 years since concession operations began in 1997, the number of domestic customers increased by 3.1 million, including 1.7 million from poor households, NRW has fallen from 63% to 11%, and service coverage has increased from 26% to 99%. Net income switched from a loss of 38 million pesos in 1997 to a profit of 5 billion pesos in 2012, despite the

The exemplary reforms in Phnom Penh and Manila are well known, but elsewhere reform and innovation is also occurring: consider, for example, the use of PPP models for service provision for more than 300 WSS projects in the PRC; implementation of integrated circuit card water meters in northwest PRC; effective use of a performance contract for NRW control in Bangkok and Selangor; and the use of output-based contracts to improve poor household access to water services in Jakarta. Such experiences are documented in forms that are accessible to the community of development professionals. They should also be widely publicized and promoted to the public and politicians using conventional media, social media, and innovative marketing tools. Perhaps anecdotes such as the story of an army officer pointing a gun at Ek Som Chann’s temple in response to receiving a water bill could provide themes for popular cartoons or soap operas that use drama and humor to convey simple but important messages about paying water bills, reporting water leaks and fighting petty graft.

41. **Can crisis motivate change?** ADB’s *Asian Water Development Outlook 2013* concludes that over three-quarters of assessed countries have low water security. These countries were said to be facing an imminent water crisis in the absence of measures to improve water management. Bindu Lohani, then ADB’s vice-president for knowledge management and sustainable development told reporters that “While the Asia-Pacific region has become an economic powerhouse, it is alarming that no developing country in the region can be considered water-secure.”

42. The situation in Pakistan is indicative of this crisis. The minister for water and energy, Khawaja Muhammad Asif warned his countrymen in 2015 that “Under the present situation, in the next six to seven years, Pakistan can be a water-starved country.” The crisis is attributed to factors such as a lack of storage, climate change, waste, and mismanagement. But, at its root, the crisis is one of governance.

43. Poor governance is not unexpected in developing countries, but they are vulnerable to its effects. In Canada, an episode of *E. coli* contamination in the water distribution system of the town of Walkerton in 2000 infected two-thirds of the town’s population and caused seven deaths. The episode of contamination itself was not the crisis, rather it was the tragic outcome of a crisis of governance. To begin with, the two managers running the water supply were not professionals. Poor asset management caused by chronic underfunding resulted in pipes that were so heavily encrusted with...
mineral deposits that they could no longer be disinfected after a cracked well-casing allowed contaminated runoff to enter the distribution system. At the time, poor asset management was endemic throughout the industry due to infrastructure underinvestment. The condition of the infrastructure was the reason for the crisis but it did not lead to change. It was only after the unnecessary deaths in Walkerton that the provincial government passed legislation enforcing, among other things, improved monitoring, source protection, financial management for cost recovery, and asset management. Political leadership in this case came after critical media coverage and a public outcry for change.

44. Change is easier with support from the public but the political economy of water often does not favor reform. Crisis in the sector may fail to motivate change because it is chronic—consider how the public comes to accept and cope with the abysmal service found in many Asian cities, often with only 2 hours of water supply a day. This is not a calamity, just a slow deterioration of service. And when there is a calamity it is often pending, 5 to 10 years away as in the case of Pakistan; this is worthy of sound bites by concerned politicians but not deserving of action, at least not just yet.

45. Financial reforms in WSS have been provoked by fiscal crisis experienced by governments that struggle to fund local services through budgetary transfers. This has been seen in countries as diverse as Argentina, Mexico, Peru, and the PRC in the late 1980s and 1990s. In the PRC, tariff reforms were implemented in the mid-1990s after a long period during which the share of government revenue in gross domestic product fell from 31% in 1978 to 11% in 1996. Perhaps such reforms are facilitated by the involvement of national politicians who are not embroiled in local political arenas where responsibility for WSS service delivery resides.

46. It is true that crisis is often chronic and ignored. But it is also true that the drivers of crisis are cumulative: groundwater levels continue to fall in northern PRC and elsewhere, pipes left untended continue to decay. Climate change promises to exacerbate the water crises in Asia, increasing the frequency of extreme events and diminishing the glacier-fed water supplies that many nations rely on. In some instances, crisis will undoubtedly motivate preemptive change; in others, it will lead to calamities that will hopefully lead to belated reforms.

47. Adapt to changing demographic and economic trends. As populations age throughout Asia, favorable demographic forces will no longer drive economic growth. The rate of this demographic change varies from country to country. The PRC and Thailand are in the middle of an aging process that will result in a decline in the proportion of working age adults and an increase in the dependency ratio. Countries with relatively young populations like Bangladesh, India, Indonesia, Pakistan, and the Philippines now have working-age populations that will grow relative to dependent populations, but their demographic advantage will diminish over time. Population aging can slow economic growth as the number of workers declines relative to the number of consumers. In the PRC and Thailand, this is likely to occur in the next 30

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decade. At the same time, population aging will put a heavy strain on public transfer systems and government budgets.32

48. Rural-urban migration, a second major demographic trend, is the main driver of urbanization in Asia. In many countries, urbanization involves unplanned megacity expansion creating problems such as congestion, growing slums, higher housing costs, and increasing pollution. While urbanization can reduce poverty, it is also leading to greater income inequality in many Asian countries.33

49. The impact of demographic trends on WSS will be mediated by a nation’s policy framework. Generally, however, the following impacts can be expected as populations age and become more urbanized within the context of a growing economy:34

(i) Population growth coupled with rural–urban migration will increase the urban demand for water and the production of wastewater. The increase will not be linear as many other factors will impact water use. Factors that may cause per capita water use in urban areas to increase include improved quality of service, introduction of flush toilets, declining household size, and increasing incomes. The increase may be offset by water efficiency initiatives, but these become less cost-effective with smaller households.

(ii) Rural–urban migration will shift and concentrate the demand for water resources in smaller geographic areas. This will tax infrastructure, sources of supply, and receiving waters for wastewater effluents.

(iii) Migration to cities may create opportunities to improve the efficiency of water use in agriculture if farm operations with smaller labor forces become more efficient and profitable.

(iv) Without effective planning of land use and WSS services, the migration to megacities may lead to a decline of WSS service coverage of urban populations.

(v) Economic growth accompanied by increasing per capita incomes will cause an increase in domestic water demand but may also result in improved water use efficiency for industry and commerce due to changes in the structure of the economy and production technologies.

50. Increasing incomes should increase customers’ willingness to pay, provided quality of service improves. This coupled with economic growth, increasing service populations, and improved service coverage should increase WSS tariff revenues and improve financial sustainability.

51. Anticipate climate change impacts. Diverse climate change impacts will have varying implications for WSS services (Table 2).35

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### Table 2: Potential Climate Change Impacts

<table>
<thead>
<tr>
<th>Impact</th>
<th>Potential Outcome</th>
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| Reduced precipitation<sup>a</sup>           | - Impaired quantity and quality of water sources  
- Increased agricultural water demand due to decreased soil moisture                                                                                     |
| Warmer temperatures                         | - Improved biochemical treatment efficiency in cold regions or seasons  
- Impaired biochemical treatment efficiency in warmer areas and seasons  
- Lower runoff and higher evaporation resulting in reduced surface water quality and availability  
- Higher water demands for domestic and industrial uses  
- Increased agricultural water demand due to higher evapotranspiration                                                                                |
| Earlier spring snow melt, retreat of glaciers| - Increased water availability in the spring, decrease in the summer and/or fall  
- Initial increase in glacier-fed water supplies then significant reductions                                                                            |
| More frequent extreme events: floods, drought, temperature extremes | - Damaged water supply and sanitation infrastructure due to floods, and intense heat and cold  
- Increased erosion reduces storage capacity of reservoirs due to sedimentation  
- Contamination of water sources by floodwaters leading to higher treatment costs or abandonment of sources                                            |
| Sea-level rise and storm surges             | - Damaged coastal water supply and sanitation treatment facilities  
- Impaired assimilation of wastewater from marine outfalls  
- Saline intrusion contaminates coastal aquifers and corrodes water distribution pipes                                                                  |

<sup>a</sup> Depending on area, increased precipitation is also possible.


52. While certain outcomes are beneficial, most are detrimental to WSS operations and will result in increased cost of service delivery or reduced quality of service. Higher costs will be caused by remediation and adaptation measures or after-the-fact restoration of damaged assets.

53. The most effective remediation measures will focus on energy use. WSS systems can be the largest electricity consumers in a city due to factors such as pumping costs. The need to control carbon emissions will increase interest in the numerous opportunities to improve the energy efficiency of WSS systems using measures such as variable speed pumps and pressure control in distribution systems. Improved energy efficiency is also a byproduct of good management practices such as demand management, NRW control, and the control of inflow and infiltration into sanitary sewers. These measures contribute to the adaptation of WSS operations to climate change impacts.

54. Whatever the responses to climate change, the resulting increase in costs of service should be minimized to the extent possible. This requires planning at multiple levels: integrated resources management to plan the use and allocation of available water resources, urban planning to assure that growth and land development account for WSS costs and needs, and WSS system master planning to integrate demand and supply-based options for service delivery.
B. Changing Attitudes and Policies within ADB

55. **Evolution of water policy.** ADB’s 2001 Water Policy included emphases on national water sector reform, integrated water resources management (IWRM), improved service delivery, water conservation and efficiency, and improved governance. After the policy was issued, significant improvements in project design were achieved for IWRM, PPPs, autonomy of service providers, pollution prevention, and public participation.

56. An independent review completed in 2006 included recommendations to increase ADB’s technical capacity in the sector; to develop partnerships; to implement IWRM focusing on stakeholder needs; and to use more innovative and nuanced approaches in the sector relating to such things as subsidies, PPP, and alternative financing modalities.

57. A second IED review in 2010 determined that the policy was relevant and consistent with ADB’s Strategy 2020, which emphasizes, as one of three guiding pillars, environmentally sustainable growth. Its relevance is weakened by policy elements that are too ambitious, setting targets and promoting technical solutions that ignore local political and social values and customs. The evaluation concluded that “sustainability is one of the weakest aspects of ADB’s water sector lending,” and identified technical and financial sustainability as factors contributing to this weakness.

58. The management response to the 2010 review was positive expressing agreement with three recommendations proposing (i) development of a framework for operations; (ii) support for developing member countries to achieve water sector targets; and (iii) more effective treatment of thematic, cross-cutting issues. The recommended support for water sector targets identified the need to ensure sustainability of net benefits through country programming and policy dialogue. This emphasis on national dialogue heeds a finding that the “evolution of water institutions and water sector service providers into efficient well-governed entities is possible but takes a long time”.

59. The recommended framework for operations was being developed by the time the 2010 review was released. The resulting Water Operational Plan, 2011–2020 is referenced a number of times in this report, attesting to it’s significant role in guiding WSS investments. With the 2011 plan in place, ADB is focusing more on the technical design of projects, for instance looking more carefully at water supply and wastewater linkages in order to account for the likely impacts of water supply development on wastewater volume. Other changes initiated by the Water Operational Plan include (i) greater commitment to NRW control; (ii) a more strategic approach to tariffs and cost recovery that accounts for political and fiscal constraints; and (iii) increased emphasis on water sector information and experience, governance, and capacity building.

60. Overall, the evolution of ADB water policy since 2001 has made the policy more pragmatic, more observant of local conditions and needs, and more concerned with robust technical design. This bodes well for the sustainability of WSS projects.

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61. **Improved collaboration through partnerships.** The 2001 Water Policy stresses the need for partnerships to achieve water sector targets. Specific objectives and approaches relating to partnerships include (i) development of PPP modalities; (ii) collaboration to promote partnerships between governments, private agencies, nongovernment organizations, and communities to better manage water resources, identify needs and issues, design solutions, and establish monitoring and dispute resolution mechanisms; and (iii) programs that support water activities such as the Cooperation Fund for the Water Sector, the Water Financing Partnership Facility, and the Water Community of Practice.

62. ADB’s efforts to establish and promote partnerships have been noteworthy. The Cooperation Fund for the Water Sector, a multidonor facility, operated from 2001 to 2009, helped implement ADB’s Water Policy in countries by adding value to ADB’s water projects, increasing synergy in its water sector operations, and strengthening regional cooperation. The fund financed a regional technical assistance (TA) project to initiate or strengthen national and regional water partnerships, including Water for the Poor: Partnerships for Action, Water for Asian Cities Program, Gender in Water Partnerships, Network of Asian River Basin Organizations, National Water Sector Apex Bodies, Leadership in Water Governance, Southeast Asia Water Utilities Network (SEAWUN), and other regional partnerships.40

63. The Water Financing Partnership Facility was established in 2006 to help implement ADB’s Water Financing Program by accessing financial and knowledge resources from development partners. The facility’s 2014 annual report indicates that a total of $102 million was committed to the facility, of which $91 million had been allocated. Of the allocated funds, 78% were used for technical assistance and 43% of the approved fund allocations were directed to urban WSS.41

64. ADB has supported the development of utility associations throughout Asia, starting with SEAWUN, which was founded in 2002 by 12 utilities at a regional meeting sponsored by ADB. SEAWUN now has a membership of 100 utilities across 7 countries. Its program activities include benchmarking, twinning, NRW reduction, cost recovery, and operator training.42 In 2007, ADB supported the establishment of the Central Asia and South Caucasus Water Utilities Association (in cooperation with the Global Water Partnership)43 and SEAWUN.44 Eventually, these organizations may fulfill the same pivotal role in training, research, and advocacy played by the American Water Works Association in North America.

65. In 2007, ADB began the Water Operators Partnerships Program to facilitate peer-to-peer learning and capacity building.45 More than 50 partnerships have been established between utility industry mentors and recipients. The program helps utility companies overcome staff capacity constraints that impede project sustainability.

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66. Within ADB, the Community of Practice on water, established in 2006, was key to efforts to inform staff of the Water Policy, and to develop and disseminate knowledge products within ADB and in the developing member countries. It is now called the Water Sector Group, and was judged in the 2010 Water Policy review to be a useful initiative but one that could be strengthened by linkages with related sectors (footnote 4). The scope of the new Water Sector Group now includes ensuring quality of projects on water supply, sanitation, and water resources management; supporting pilot activities and knowledge-sharing events; and enhancing water partnerships toward the provision of water for all in Asia.\textsuperscript{46}

67. This brief and incomplete review of partnership initiatives undertaken by ADB since 2001 clearly demonstrates the use of partnerships to leverage financial resources and provide opportunities both within ADB and among client utilities for learning and technology transfer.

68. **Opportunities by investment modalities created.** Starting with a policy paper shortly before the 2001 Water Policy followed by a 2005 report under the ADB Innovation and Efficiency Initiative, ADB has introduced major innovations in lending modalities: the program cluster approach (2000), the multitranche financing facility (MFF) (2005), and results-based lending (2013).\textsuperscript{47}

69. The program cluster approach comprises logically linked subprograms addressing complex policy issues over an extended time frame. The multitranche structure adapts the program lending modality to situations requiring slower disbursements due to time-consuming, process-oriented approaches to the targeted program reforms. The program cluster can apportion conditionality and disbursements across tranches to encourage timelier and higher-quality program implementation. The overall objectives of program reforms and the predefined and linked subprograms constitute the program cluster.\textsuperscript{48}

70. Implementation of the program cluster approach uses two modalities: the policy-based program loan and the sector development program loan. Both feature program loans disbursed in tranches against fulfilment of agreed conditions to cover policy reform costs. Unlike the policy-based program loan, sector development program lending includes a project loan to finance investment projects. Both modalities involve up-front approval by the ADB Board of Directors of a single loan and both are used only for sovereign lending.\textsuperscript{49}

71. The MFF modality supports medium- to long-term interventions with both program and investment components. ADB's Board of Directors approves the maximum amount for the facility and the financing conditions. Financing terms and conditions can vary across tranches, and the instrument under any tranche can be a loan, grant, guarantee, or ADB-administered cofinancing. Under the approved ceiling for the facility, amounts converted into loans, grants, guarantees, or cofinancing become legal commitments only when individually approved by the Board.\textsuperscript{50}

\textsuperscript{46} ADB. Sector and Thematic Groups. http://www.adb.org/about/knowledge-management/sector-thematic-groups-adb


\textsuperscript{49} ADB. 2008. \textit{Mainstreaming the Multitranche Financing Facility}. Manila.

72. The MFF modality differs from program lending in several key respects. Prerequisites for MFF approval include existence of a road map or sector strategy, as well as a policy framework that summarizes the strategic vision for the sector, and the principles and targets for change. Program loans for sector development provide investment financing like the MFF, however investment subprojects tend to be smaller with sector loans. Availability of subsovereign loans to the public sector is another distinguishing feature of the MFF.  

73. In contrast to the multitranche modalities of program loans, the MFF has seen a greater uptake in the 10 years since its introduction. A search of ADB records for projects using either a sector development or policy-based program lending modality in WSS located 24 projects approved during 2000–2015 for an average of 1.6 projects per year. A similar search for projects using an MFF modality identified 61 projects approved during 2006–2015 for an annual average of 6.8 projects.

74. Results-based lending is a more recent innovation, approved for piloting in 2013. This is a flexible lending modality that introduces the concept of disbursement according to conditional performance-based tranches to project and sector investments. Results-based lending is meant to (i) increase accountability and incentives to deliver and sustain results, (ii) improve the effectiveness and efficiency of government-owned sector programs, (iii) promote institutional development, and (iv) enhance development effectiveness.

75. These innovations in lending modalities have all introduced the important concept of performance-based disbursements to program and project interventions. They also recognize the value of planned interventions that build in a progressive and systematic manner on preceding work. These innovations should enhance the sustainability of WSS projects by (i) creating opportunities to pursue complex policy reforms using a longer time frame; (ii) opening up access to loan and grant funds to provide transitional O&M support for projects that require more time to achieve cost recovery; and (iii) increasing the leverage that ADB has to pursue policy reforms needed to promote sustainable project investments.

76. Project preparation and due diligence. ADB provides project and program preparatory technical assistance (PPTA) to help clients identify and prepare projects. PPTA projects serve several functions, including (i) assistance with and technical review of project and program design to assure feasibility; (ii) sector analysis to assess the social, political, and economic context; (iii) least-cost analysis to assure technical efficiency; (iv) identification of people who may be beneficially or adversely affected and benefit-cost analysis to evaluate economic efficiency; (v) safeguard assessments addressing issues such as the resettlement of people or adverse impacts on the environment, or indigenous peoples; and (vi) evaluations to examine financial sustainability and the financial management capacity of the proponent. The PPTA analysis is largely a due diligence exercise that examines the program's or project's technical, financial, economic, environmental, marketing, and management aspects and potential social impact.

52 ADB. 2013. Piloting Results-Based Lending for Programs. Manila.
53 Sometimes cross-division coordination is needed: the water supply division to work with the public management and finance divisions. Work with officials from other government agencies (e.g., agencies responsible for state-owned enterprise reforms or subsidiary loan repayments) may also be needed.
77. A recent water sector evaluation concludes that resource allocations for PPTA “have not kept pace with the requirements for the increased workload required by these studies.” Several ADB sector specialists interviewed concur. This is despite the fact that the cost of individual PPTA projects averages $600,000.

78. The increased PPTA workload reflects an increased emphasis on financial, institutional, economic, and social aspects of project design. The risk arising from the increasing workload is that the resulting analysis is largely standardized, lacking the rigor required to adequately evaluate critical aspects such as project sustainability. That so many approved projects are judged to be unsustainable may simply reflect a failure during the PPTA evaluations to evaluate sustainability rigorously.

79. At issue here is the quality of work completed for PPTA projects; something that has not been systematically evaluated outside of the peer review process conducted during the internal ADB review of program and project proposals. ADB should perhaps commission such a review to an independent party (IED’s work program is committed up to 2018). This would allow a dispassionate assessment, removed from the pressures to secure Board approval, and would help determine the quality of work on PPTA projects.

80. Also at issue is the utility of the various types of analysis conducted at the PPTA stage. Consider that ADB commits up to $1.0 million plus considerable staff time for project preparation work (on average $0.7 million). Such resource allocations are helpful when they result in more beneficial and sustainable projects. For example, the least-cost analysis helps to identify cheaper ways of achieving project outcomes, and the financial management assessment can improve management of project implementation. Other types of analysis help determine if a project component should proceed; examples include the analysis of technical feasibility and the cost-benefit analysis. Ideally, decisions on whether to proceed with a component are made before significant funds are committed to the PPTA. To be useful—and impartial—this type of analysis should occur at inception or even earlier, for example, when a country partnership strategy is being prepared. The analysis during the PPTA should be limited to studies that are meant to improve overall project design and implementation.\footnote{Among the projects approved during 2013–2015, two had water safety plans in the project document. One of the two had a guidance note for mainstreaming the water safety plan.}
Lessons for Project Preparation

81. Good project design is central to project sustainability and success. Past experience with WSS projects offers many lessons, particularly for project design and implementation, tariffs and cost recovery, and the role of community participation.

A. Improved Project Design and Implementation

82. **ADB needs to evaluate WSS demand more carefully.** This should be a straightforward exercise in urban areas with reasonable information on the water resources available, service populations, customer water usage, and forecasts of population growth and service coverage. Unfortunately, circumstances are usually more challenging as, for instance, project design consultants in Palau’s Majuro Water Supply and Sanitation Project discovered. They 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 because of, for example, (i) significant unmet demand due to intermittent supplies, (ii) significant unmeasured demand due to self-supply or vendor supply that is not monitored, (iii) systematic changes over time in unit demands, or (iv) shifts in demand motivated by the introduction of meters or significant tariff increases.

83. **WSS design needs to attend to system interdependencies.** New water supply projects usually increase wastewater flows. In densely populated urban areas, this creates or exacerbates problems of drainage and solid waste management. Ideally, all of these interdependent problems are tackled jointly.

84. **Cost estimates for WSS projects need to be realistic.** Facility costing should generally be conservative since costing at the feasibility stage of planning can easily be out by ±20% or more. Funds for physical contingencies should account for cost estimation risks.

85. More attention is needed for proper planning for O&M. This is so obvious that one would think it hardly merits mention. But it does, again and again, in light of 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

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56 This existed in the PRC in the late 1990s and is an ongoing phenomena in North America where per capita demands are falling at an annual rate of about 0.5 liters/capita/day due to the natural uptake of low flush toilets and other water-saving technologies that are mandated by plumbing codes.


Sustainability of Urban Water Supply and Sanitation Operations: Findings and Lessons

various domestic programs without provisions for O&M. Consider the innovative implementation of a piped saltwater system to flush toilets and conserve treated water in the Marshall Islands. Unfortunately, consultants did not account for the corrosive effect of saltwater on meters, so the system ended up without metering.

86. **Complexity is endemic in WSS projects and needs to be confronted directly** (footnote 57). Projects vary in complexity due to the number and sectors covered by project subcomponents and the local jurisdictions involved. This complexity makes a difference. Water supply service investments are made with focused single-sector loans and multisector loans. A multisector approach works well for medium-sized cities (100,000 to 500,000 population), which are large enough to handle complex projects but small enough to allow the integrated approach sometimes required. Single-sector loans work better in smaller and very large cities. The intersector dynamics are not so prominent in smaller cities, while the size of megacities complicates the task of creating synergies between project components. Projects located in just one city are more likely to succeed than multicities projects. The cities are usually larger, and the projects have simpler designs and institutional arrangements.

87. **WSS implementation arrangements need to be very detailed with attention to future transitions.** Lessons identified about the structure of implementation arrangements include (i) increasing reliance on local agencies may create more sustainable results as local implementation offices usually use staff who will later operate and maintain the project components (footnote 59); and (ii) making a single government agency the executing agency responsible for all project activities poses a risk to implementation as an individual agency will not usually have the range of capabilities and resources needed for implementation. For sustainability, implementation arrangements need to address exit plans for the project implementation and management units at an early stage if these units are relied upon.

88. **Long-term engagement with WSS clients is preferable.** ADB has many examples of where ongoing engagement with a client and/or a client country led to improved project outcomes. This occurs because ADB staff have the opportunity to cultivate trusting relationships with their counterpart government staff, and the government staff are in a better position to convey information about their needs and to learn from repeated exposure to new ideas. The interviews for this paper established that the staff who had conceptualized or processed the loans were mostly not or no longer implementing the project. More continuity in project preparation and supervision would be beneficial. The role of staff in resident missions should also not be overlooked, as they are able to closely monitor relevant developments in the country and adjust the project if necessary.

89. An example of this type of engagement occurred in the PRC starting in the mid-1990s. An initial advisory TA project was launched in 1997 at the request of the government to help develop national water tariff guidelines. The government requested a second study in 1999 to help implement findings following the formulation of national guidelines on water tariffs in 1998. Subsequent TA studies

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addressed wastewater and solid waste tariffs. ADB’s continued support resulted in improved sector knowledge, and mutual trust between ADB and the government.

B. Appropriate Tariffs and Cost Recovery

90. The staff interviews and case study analysis highlight the importance of tariffs and cost recovery to project sustainability.

91. A strategic approach to WSS tariffs and cost recovery is needed. A focus in project design on tariffs is a challenge since many countries in Asia and the Pacific are not usually keen on cost recovery through tariffs due to a reluctance to charge users for political reasons and the often low willingness of beneficiaries to pay for public WSS services. This low willingness to pay (WTP) may reflect a cultural value; but where public services are already in place it can also reflect widespread dissatisfaction with the quality of those services, and thus have some justification. Households that must rely on private water vendors are more likely to accept increased tariffs since piped water is invariably cheaper than vendor-supplied water.

92. From the perspective of the utility operator, the key issue is securing funding no matter what the source. Whether funds come from tariffs or general taxes is immaterial. Corporatization of municipal utilities can help position water supply operations independent of political debates among various participants (para 10). Projects can be sustainable at some basic level despite low tariff revenues, provided governments are able and committed to fill water supply funding gaps from general revenues. From ADB’s perspective, however, the source of funding is a concern since funding from general government revenues diminishes the economic incentive to control water use; and it is not as secure as tariff-based funding.

93. Cost-recovery issues should be addressed in a strategic manner accounting for political and fiscal constraints and government budget priorities. Such an approach is evident in the 2001 Water Policy and the 2011 Water Operational Plan, which advocates for tariffs that cover at least O&M costs and subsidies that are phased out over time as tariffs are gradually adjusted upward (footnote 4). The current policy on tariffs as indicated in the Water Operational Plan, already a looser version of the 2001 Water Policy, is a response to strong government resistance to the hard targets in tariff covenants commonly imposed on projects in the 1990s.

94. Movement on tariff reform can benefit from ADB encouragement but really requires government commitment to succeed. A case in point is Viet Nam, where the government has mandated water supply tariff reform across the country. While implementation of the policy is still not complete, many utilities have implemented full cost-recovery tariffs. Similar policies were introduced in the PRC in 1998 and more recently in Palau.

95. Unwillingness to charge for WSS services needs to be addressed over the long term. Discussion starts with all-important politicians. 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 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 dialogue between local officials and ADB

and other development partners failed to foster local understanding that revenues were too low to fund the required O&M costs. Pending elections also shaped attitudes of officials toward tariff adjustment. In India the situation was the same: political sensitivities overshadowed implementation of fiscal management and tariff covenants for loan projects.

96. Elsewhere tariff reform was or is being pursued successfully. Reforms in the PRC are a case in point (para 89). They were motivated by fiscal constraints that constrained the government’s capacity to sustain transfers to local governments (footnote 37). Other examples include the Lao People’s Democratic Republic (Lao PDR), Papua New Guinea, and Viet Nam where tariff reforms are ongoing. These cases show that political attitudes can change and that they must be considered when promoting cost recovery and tariff reform.

97. WSS willingness-to-pay analysis needs to distinguish between “happy to pay” and “absolutely must pay.” Customers’ WTP is probably understood differently by economists and noneconomists. The economic interpretation of WTP is the maximum amount a customer will pay rather than go without a service. Economists assume that customers start seeking substitutes or simply reduce use when the price exceeds the WTP; for water supply this might mean collecting rainwater or buying water from a vendor. Customers are not happy to pay a price equal to the WTP, in fact it is probably the exact opposite, 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. Fortunately, WTP analysis is used by economists, not to set prices, but rather to determine how much something is valued by people.

98. In political discourse, WTP is conceived as a more prosaic, and lower, measure of what people will be “OK” paying for something. For WSS it is often seen as a measure of the publicly acceptable tariff taking into account cultural values, traditions, attitudes about government, and other factors.

99. The economic interpretation of WTP is important in cost–benefit studies and is considered to be relatively constant. The political interpretation is important in the public debate about tariffs and can change over time. It is in fact very important that it can change over time otherwise overcoming the “unwillingness to charge” constraint to full-cost tariffs might be impossible. In political discourse, factors that can influence WTP include the following.

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66 Interviews with staff found that an overall understanding is needed of the government budget allocation process. This will help to develop more realistic cost recovery targets for areas such as WSS.
69 According to World Bank. Water and Sanitation Program: Economics of Sanitation Initiative. http://www.wsp.org/content/east-asia-economic-impacts-sanitation (which looked at six country cases, they performed studies in South and Southeast Asia, under the Economics of Sanitation Impact [ESI]. The countries are Cambodia, India, Indonesia, the Lao PDR, the Philippines, and Viet Nam).
70 From an economic perspective, WTP is said to be biased downward by factors such as government distrust.
71 Unless otherwise noted: IED. 2010. Special Evaluation Study: Indonesia: Has the Multi-Subsector Approach been Effective for Urban Services Assistance? Manila: ADB.
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(i) **Fairness**: For example, tariffs may differentiate between long-time customers who have paid into a system and new customers benefiting from system expansions and lifeline tariffs.

(ii) **Trust**: WTP increases when politicians become more accountable and their decisions more transparent (footnote 59).

(iii) **Coping costs**: WTP is high if beneficiaries pay water vendors much more for water than the cost for those who have access to piped water.

(iv) **Options**: In areas where more groundwater is available, beneficiaries may choose not to connect to the available water network.

(v) **Control**: Beneficiary participation during project design, implementation, and maintenance is essential for future maintenance and expansion of project benefits.

100. The WTP analysis in project preparation studies should evaluate both the economic WTP needed for the cost–benefit analysis, and WTP as it is understood in a policy dialogue.

101. **WSS cost recovery must be differentiated from full-cost tariffs.** These are related but distinct issues. Many WSS projects in Asia are plagued by revenue streams that do not cover O&M costs, depreciation, and returns on invested capital. Over time this leads to system deterioration and declines in service standards.

102. Efforts to improve cost recovery for WSS projects often focus on increasing revenues, ignoring whether reported costs are either short of supporting sustainable O&M or too high due to inefficiencies (footnote 60). In the long term, getting costs right, not too high or low, is important, but in the short term—such as those first years after project implementation—concerns with cash flow have priority as poor cash flow can cripple even profitable enterprises. When tariff revenues are insufficient due to low tariffs, inefficient collections, or nonpayment, recourse to alternative funding sources is needed to sustain operations. Typically this support comes from local or national government budgets.

103. Utility services have in fact survived for decades on external budgetary support. This approach can be relied upon to assure financial sustainability provided governments are well informed about utility costs and disciplined about providing support. The risk, however, is that utilities lose out in the competition between contending public services for tax dollars. WSS utility services in most developing countries are challenged by fiscal burdens associated with the need to address deterioration of physical infrastructure caused by long-term neglect of asset management. That neglect is due in part to reliance on budgetary transfers rather than own-source revenues.

104. Promoting tariff reform and full-cost tariffs during the preparation of WSS projects is appropriate and necessary, since a self-financing utility is financially more sustainable than utilities that rely on budgetary transfers. But budgetary transfers can be structured to assure financial sustainability, at least in the medium term. Where

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74 Asset management problems are also faced by utilities that used tariffs for cost recovery because budgeted costs omitted asset management costs or because politicians failed to approve the needed tariff adjustments.
strong opposition to tariffs exists for whatever reason, project investments can still be funded provided that budgetary support is shown to be feasible and dependable.

105. 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 (footnote 59). Typical project loans cannot support this type of funding, however an MFF might be a suitable funding mechanism since facilities constructed in one tranche could be operated with funding support in the following tranche.

106. One example of a project seeking to address the funding gap is the Sindh Cities Improvement Investment Program in Pakistan. The first tranche of this MFF aimed to establish and operationalize urban service corporations. WSS services were delegated to these corporations and the ADB project helped them develop 3-year business plans with annual budget planning. While tranche 1 provided only for critical infrastructure and an institutional framework, the following tranches are to provide funding for infrastructure linked to reforms. Tariffs are to be established after 3 years and only after initial investments are made and service improvements are realized by customers. These tariffs are to increase over time to reach full recovery of O&M costs at the minimum. The loan meanwhile provides shortfall financing to cover the corporations’s operating costs until adequate tariff revenue is available. The provincial government approves gap financing based on projected efficiencies and revenue shortfalls for a year.

107. The Sindh Cities Project and the Karachi Mega City Development Project provide examples of problems. Preparation of the Sindh Cities Project was slow and as was progress on institutional reform in tranche one. The slow pace was due to extensive efforts to communicate with stakeholders. The Karachi Mega City Project was canceled before implementation because of political disagreements between the municipal and provincial governments. While Karachi has had prior investments in basic WSS infrastructure, the issue was the frustration of residents with poor service delivery. The project areas in the secondary towns of the Sindh Cities Project had been without WSS services prior to the project, so expectations could be more easily managed, although it still took time.

108. WSS tariffs can be coupled with budgetary transfers provided a policy reform framework exists. A variety of tariff structures are used in developed and developing countries. In Asia, there seems to be a convergence to 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 tenants of apartments 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 tariffs.75

109. The choice of a tariff structure may arise as an issue in the policy dialogue for a project. This choice should be based on local circumstances and strike a balance between competing tariff-setting objectives, including cost recovery, demand management, equitable allocation of the cost of service, affordability to poor households, and ease of administration.

110. Lifeline tariffs are used at times to make water supply affordable to poor households. The lifeline tariff is a low charge applied to the first block of supply used by all 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 to avoid providing a significant subsidy to middle- and high-income households, and avoid erosion of the demand management incentive provided by the tariff. This is accomplished by making sure that the monthly lifeline allowance of water is sufficient for basic household needs but no more than that. Monthly consumption allowances for lifeline tariffs in Sri Lanka at 15 cubic meters (footnote 58) and Fiji at 16.7 cubic meters are probably too high considering that typical monthly household consumption in Ontario (Canada) is only 17 cubic meters. The use of a lifeline tariff may have an unintended but easily anticipated impact in communities where customers have access to alternative supplies such as preexisting tube wells or rainwater harvesting systems. Customers may watch their meter closely and consume up to the limit allowed by the lifeline tariff, and then revert to their alternative supply for excess demand.

111. WSS service providers in developed countries typically use a number of fees and charges in addition to the tariff. The connection fee is used in developed and developing countries. In Asia, it is used to recover the cost of the pipe and related accruements for the customer connection from the street main to the customer’s property line. The connection fee can be large relative to household income, and may discourage connection (footnote 71). Viet Nam provides free connections to prevent this; the cost of connection is recovered through the tariff. In Cambodia, qualifying poor households receive subsidies of 30%–100% of the connection fee. In the Lao PDR, an innovative program is providing free water supply connections to households that have good quality latrines. 76

112. IED’s 2010 Water Policy Review investigated the use of tariff and cost-recovery covenants in 44 WSS projects. Fourteen projects had no covenants on tariffs. Of the 30 with covenants, 3 did not comply, 14 partly complied, and 13 fully complied. Reasons for noncompliance included (i) public protest, (ii) anticipation of future institutional reforms, and (iii) inconsistency with regulations issued by water supply authorities. Attributes of projects that successfully implemented tariff reforms included (i) effective stakeholder communication and consultations, (ii) early identification of winners and losers, (iii) tariff structures that were perceived to be fair and affordable, (iv) reforms accompanied by service improvements, (v) metered rates allowing customers to manage their water bill by controlling consumption, (vi) gradual tariff adjustments, (vii) crisis conditions that legitimized higher tariff reforms, and (viii) credibility of the service provider.

113. Most loan agreements include financial covenants intended to encourage progress toward full cost recovery and the financial independence of service providers, but covenants do not address local circumstances that impede tariff adjustments and efforts to achieve full cost recovery. Cost-recovery covenants for ADB loans have changed over time, from prescribing explicit schedules for adjustment to full cost to more general prescriptions for full-cost coverage emphasizing tariff coverage of O&M in the near term with a gradual transition to full-cost tariffs. The gradual nonquantitative format of tariff covenants is a reasonable response to poor compliance with tariff covenants and is consistent with a more conciliatory, and probably more effective approach to tariff reform.

76 For more details see ADB. 2014. Together We Deliver. 10 Stories from ADB-Supported Projects with Clear Development Impacts. Manila.
114. The 2001 Water Policy was rather strict on cost recovery (footnote 4). It stressed that ADB would consistently advise governments of the need to adopt cost-recovery principles and that “consumers will be expected to meet the full operation and maintenance costs of water facilities and service provision in urban and rural water supply and sanitation schemes subject to subsidy considerations.” By 2011, the wording of the Water Operational Plan had become less dogmatic (footnote 4): “A key objective will be to determine the best mix of measures to enable a country to close its water demand and supply gap at costs it can afford, and thereafter sustain the water balance.” Country water assessments were to consider relative cost-benefit analyses of alternative tariff regimes. Nevertheless, “ADB will continue to work with governments in advancing tariff reform measures, seeking to avoid marginalizing the poor and vulnerable.”

115. Hence, the 2011 plan no longer gave the strict guidance on cost recovery provided by the Water Policy. Consequently, no advice was given on whether projects should aim for full capital cost recovery, or for at least recovery of O&M costs, with or without depreciation costs. This change in approach may underlie the changes in the design of more recent projects and, as such, projects now seem to give less emphasis than before to cost recovery within the time of project implementation.

116. This topical paper extends the argument: ADB should consider promoting a tariff reform policy that supports ongoing budgetary transfers to WSS operators if these comply with a rational national policy framework and are justified by local conditions such as widespread poverty.

C. Community Participation and Project Sustainability

117. Many effective community participation programs have contributed to project sustainability, and hence community participation in WSS operations should generally be promoted:

(i) **Bangladesh: Urban Governance and Infrastructure Improvement Project.**

   Involvement of the urban population in the selection of new infrastructure, and planning and management exercises was facilitated by creating local coordination committees in each project town. The mayor nominated members to represent various stakeholders. Discussions regarding budgets, tax collection, and local government expenditures have made the mayor more accountable and decision making more transparent. As a result, WTP has increased (footnote 77).

(ii) **The Philippines: Manila Water service extension into peri-urban slums.**

   Historically, governments and water utilities have been reluctant to extend services into peri-urban slums for fear of low WTP and poor cost recovery. Under the ADB Small Piped Water Networks Project, Manila Water provided bulk metered services at main street junctions and local residents extended the services down the streets making metered household connections. Works were completed to Manila Water design standards. Manila Water bills the community living on the street as a whole, based on bulk meter readings. One community individual collects from each serviced resident on that street to meet the payment obligations.

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obligations of the bulk meter. Collection efficiency is close to 99%. WTP was high as the piped water was 9 times cheaper than water from vendors.

(iii) **Nepal: Small Towns Water Supply and Sanitation Project.**

This project builds water supply systems in unserviced towns with 20,000–40,000 residents. Systems are managed by water users and sanitation committees (WUSCs), which hire required staff, manage finances, set tariffs, and collect revenues. WTP has not been a problem because the tariff is decided locally, management is transparent and monitored by the WUSCs, and general assemblies are held annually to review operations. The central government finances 50% of the subproject cost as a grant, the WUSC borrows 30% from a national municipal development fund (later increased to 35%–40% in successor projects), and the WUSC provides 20% in kind and in cash (reduced to 5%–15% in successor projects). ADB coordinated with UN-Habitat to provide training for the WUSCs. All connections are metered and the tariff is set by the WUSC and approved by the General Assembly. Some water tariffs are progressive, some are uniform. The policy dialogue initiated through this project has led to a demand-responsive development process wherein water users have full decision-making power at every stage of project formulation, implementation, and operation.

(iv) **Indonesia: Neighborhood Upgrading and Shelter Sector Project.**

The civil works component was based on the Neighborhood Upgrading Plan prepared with assistance from local facilitators. The plan addressed subsectors such as water supply, small-scale sanitation, drainage, village roads, street lighting, and communal toilets. While the project target was 300 communities, the component reached 900 communities because it met the expectations of the beneficiaries (footnote 71).

118. **Community participation needs to be preceded by or coupled with public awareness campaigns.** In some cases, participatory efforts were less effective, mainly because insufficient attention was paid to public awareness campaigns, or because certain sections of the population were not involved:

(i) **Fiji: Corporatization of the Water and Sewerage Section of the Ministry of Public Works.** Corporatization had no political support because the public associated it with privatization and increases in water tariffs. The public expects a low-cost water supply service and is unaware of the true cost of water supply and its burden on taxpayers. Greater public awareness and greater transparency of water resource management issues, and the implications for finances and operations of the current status of water utilities are a prerequisite for sector reform (footnote 67).

(ii) **India: Karnataka Urban Development and Coastal Environmental Management Project.** The establishment of social development units

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was effective in informing the local community about project objectives, but these efforts did not always change user behavior of the local community and their WTP for services. This undermined sustainability. The lack of local community representation in the decision-making process was cited as the reason for lack of community ownership (footnote 65).

119. These examples suggest that ADB knows how to use participatory approaches to improve project sustainability at least in smaller communities. Effective application requires the commitment and engagement of local implementing agencies and ADB’s commitment of resources and time. Accommodating beneficiary participation within the 5-year implementation of a typical loan project is difficult. Community stakeholder engagement must be sought during the project design stage or a longer implementation period planned to accommodate participation (footnote 71).

120. A review of projects in Indonesia revealed that participation initiatives in larger projects were sometimes the responsibility of consultants with few government officials or ADB staff involved. This is unfortunate. Participation is difficult to sustain in larger infrastructure projects (footnote 80). The fact that infrastructure projects in large cities are often cheaper on a per capita basis due to the economies of scale, the high densities and the opportunity to spread costs over large service populations may help reduce the need for extensive community participation. Intensive participatory efforts are still called for where local neighborhoods are severely impacted by project works.
CHAPTER 6

Water as a Key Resource

121. Evaluating the source of supply and determining whether available supplies are suitable in terms of quality and quantity are two essential steps, along with calculating demand calculations. But these basic engineering requirements are not always fulfilled. Poor assessment of water resources in Kupang, Indonesia resulted in reservoirs being too large and used far below capacity because aquifer yields were overestimated and new wells produced much less water than projected (footnote 72).

A. Renewable Water Resources and Scarcity

122. A survey by the Food and Agriculture Organization of the United Nations identified country discrepancies on water resources. For example, the South and East Asia region, which comprises 22 countries, shows differences in water resources and management. The resources are distinguished as (i) internal renewable water resources, generated from endogenous precipitation in the country; and total renewable water resources, the sum of the internal renewable water resources and the external flow, which includes the transboundary river basins. The growing population in the region (53% of the world’s population) resulted in a decrease in the average annual internal renewable water resources, with some countries being below the threshold of the internal renewable water resources and total actual renewable water resources, indicating a slow approach to water scarcity.

123. In many areas, water use is unsustainable, withdrawal is larger than the recharge rates and the water bodies are overexploited, which leads to the depletion of water resources and negative impacts on aquatic ecosystems. The situation drives national economies to find alternative ways to meet the demand for water, including fossil groundwater, overexploitation of groundwater, treated wastewater and/or agricultural drainage water returned to the system, and nonconventional sources of water including desalinated water and direct use of treated wastewater and agricultural drainage water.

B. Integrated Water Resources Management

124. Integrated water resources management can be a key issue. Ideally project planning and design can account for long-term water resources issues, but this is usually only feasible when resource management plans are already in place at the time of project preparation, an uncommon occurrence with the exception perhaps of projects in the PRC. Of course, with the poor WSS service frequently encountered, an evaluation of resources that goes beyond basic engineering requirements will often

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84 The countries include Bangladesh, Bhutan, Brunei Darussalam, Cambodia, People’s Republic of China, Democratic People’s Republic of Korea, India, Indonesia, the Lao People’s Democratic Republic, Malaysia, Maldives, Mongolia, Myanmar, Nepal, Pakistan, Papua New Guinea, the Philippines, Republic of Korea, Sri Lanka, Thailand, Timor-Leste, and Viet Nam.
contribute little to project design. For example, a basinwide assessment of water quality management for a heavily polluted river will likely reveal that most point and nonpoint sources must be cleaned up before water quality improvements will be seen due to the impact of limiting nutrients in the aquatic ecosystem. Such information would probably not help with project design.

125. The role of IWRM should be more prominent in water scarce areas. This is the case in the PRC where long-term resource management plans are prepared alongside infrastructure master plans. However, the PRC approach to IWRM, while supporting demand management measures, relies heavily on major infrastructure projects to store and move water.

126. Attitudes in Pacific countries provide a sharp contrast to those in the PRC. An evaluation concluded that none of the reviewed projects or TA projects considered water resources management as a key issue despite acute water supply problems. Corporate plans developed for four WSS authorities in Pacific countries failed to address water resources management (footnote 67).

127. The approach to IWRM in project design should be context driven. Factors like water scarcity, water contamination, saltwater intrusion, or significant overallocation of water resources should trigger the use of more exhaustive resource assessments during project preparation. Otherwise, basic but competent assessments of water availability and salient water quality issues are required.

C. Nonrevenue Water Management

128. Nonrevenue water management is key for efficiency and environmental conservation. Significant savings in financial and water resources can be realized through NRW reduction. However, an effective NRW reduction program involves many challenges:

(i) From a historical institutional perspective, NRW control is usually subservient to higher profile investments in capacity expansion and service extensions.
(ii) NRW control is complex, requiring a combination of technical measures and improvements in managerial and organizational aspects of water service delivery (footnote 58).
(iii) NRW control demands long-term funding and sustained management commitment.

129. For project preparation, more realistic assessments are needed of opportunities for NRW control. Realistic NRW reduction targets should be supported by specific plans with monitoring milestones. More cautious projections of NRW reduction will prevent the overestimation of project benefits (footnote 57).

130. NRW control is usually understood to mean investments in leak detection and control, with the ultimate objective to involve wholesale replacement of failed networks. This is reasonable in many Asian cities where NRW can often reach 70%. However, NRW control also includes measures to control authorized and unauthorized

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85 Some staff have stated that mobilizing the additional resources needed for more detailed strategic water resource assessments gets increasingly difficult.
unbilled water uses, such as the illicit sale of water, apparent losses due to meter inaccuracies, and measures to manage customer demand. This broader scope of NRW control is especially important where water scarcity jeopardizes water supply security, a growing problem in Asia. Water conservation using demand management measures is aggressively pursued in the PRC using measures such as publicity, tariffs, and quotas for industrial water use.88

131. While project designs from the 1990s might include NRW controls as a minor complement to infrastructure investment components, the current treatment of NRW management in loan projects is much more substantial and is promoted by ADB’s Water Operational Plan for projects involving the development of new sources. This attention should continue and deepen. Given the very high levels of NRW found in most project cities, the current focus on physical losses in distribution networks is appropriate and more projects like the Dhaka Water Supply Sector Development Program (footnote 15) with investment components focused primarily on NRW control should be encouraged.

CHAPTER 7

Capacity Building to Enhance Sustainability

132. The focus of this chapter is the training and capacity of persons involved in project planning and delivery.

A. Develop the Capacity of Human Resources

133. Adequate capacity of institutions and staff is a necessary condition for sustainable WSS operations. The corporate culture of WSS services often does not foster technical competence or a professional approach. Often no training or certification programs for operators are provided, while inadequate budgets and reliance on subsidies reinforces operator complacency.

134. The existing low capacity justifies capacity development efforts associated with WSS loan projects, but much of the training is ineffective for various reasons, including being too short in duration and occurring during project preparation and implementation rather than after commissioning of assets when training would be more useful.

135. Low capacity also exists within institutions and among decision makers where a basic understanding of WSS operations is often lacking. Politicians and the public often hold common misconceptions. For example, politicians may be reluctant to invest in a 24-hour water supply thinking it will be too costly, unaware of the long-term cost savings of a reliable 24-hour service over an intermittent service, and of the high household coping costs to deal with intermittent services. An ill-informed concern with costs can scuttle investments in improved wastewater services despite research showing that poor sanitation can reduce gross domestic product by 2%. 89

136. WSS capacity assessments are essential for efficient project implementation and sustainability. ADB has a comparative advantage in delivering physical investments, but not in on-the-ground, time-consuming, capacity-building interventions and human resource staff allocation interventions (footnote 71). However, to assure sustainable projects, experience has shown that capacity building must accompany physical investments. Some projects have included preparation of a human resource development plan or an institutional development plan focusing on such things as water resource mapping, NRW, trenchless technology for civil works, accounting, debt restructuring, and training.

137. WSS projects are technically demanding and require specialized skills for project design, management, and operation. Projects often require dispersed investments and systems in remote places where technical skills are especially scarce. While ADB staff and their consultants are typically required to undertake a variety of tasks during

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Capacity Building to Enhance Sustainability

Project preparation, they at least have the opportunity to learn from in-service training opportunities, from their collaboration with team members, and from their exposure to numerous projects. The staff seconded to executing agencies and project implementation offices are for the most part government bureaucrats working in underresourced agencies. Factors that weaken the capacity of executing agencies include the simple lack of qualified technical staff in often remote locations or small dispersed towns, inappropriate match of staff skills and job requirements, underpayment of staff, failure to fill vacancies, demoralization caused by political interference, corruption, lack of incentives to take field posts, and the short tenure of senior staff (footnote 57). When new projects are implemented, operating agencies may be given additional responsibilities but not additional staff, resources, or powers.  

138. PPTA projects invariably include assessments of the capacity of financial and operations staff and develop recommendations for capacity building. Often these recommendations are included in the assurances and loan covenants, and the costs of training are covered by the loan. However, given resource and time constraints during project preparation, staff capacity assessments can easily be completed in a routine manner or omit important participants. The recent IED evaluation of the role of TA pointed out that PPTA resources available per project have dwindled over the years, and PPTA projects have an increased list of topics to address, leaving less time and resources for institutional, staffing, and training needs analysis. An evaluation of WSS projects in Pacific countries observed that while performance-based management was introduced into utilities, no efforts were made to determine whether directors and managers understood or knew how to use the performance data that was generated. Corporate plans were prepared but no evaluations were made to determine if the necessary financial management capacity existed to implement the plans (footnote 67).

139. Buy-in of politicians with comprehension. As with most other aspects of project design and implementation, the buy-in and active engagement of the project proponent can improve capacity development initiatives. Progressive mayors and councils are more likely to consider and adopt recommendations. The buy-in of political decision makers is more likely when the potential for improvement is appreciated, but this requires a degree of technical insight that does not always exist. A project evaluation in Bhutan revealed a lack of understanding of the need for preventative maintenance and a belief that O&M revenue requirements were limited to the cost of salaries and consumables. This evaluation concluded that city administrators needed to develop an understanding of the importance of data and records for effective administration (footnote 64).

140. Training arrangements can be successful. Training components under ADB TA projects and loans can underperform for a variety of reasons:
   (i) Job rotation leads to the reassignment of trained staff.
   (ii) The wrong people are trained (often senior staff who would not do the work).
   (iii) Short-term training could result in participants having difficulty absorbing the ideas.
   (iv) No on-the-job training opportunities are available.
   (v) Insufficient consulting time is allowed to achieve capacity-building goals (footnote 67).
   (vi) Trained staff leave to work in the private sector (footnote 57).

(vii) Activities related to gender aspects in WSS projects are not strong.  

141. Not all capacity building efforts are ineffective. In Bangladesh, the capacity development component of the Urban Governance and Infrastructure Improvement Project was successful (footnote 78). Mayors deemed capacity building and not the infrastructure investments to be the main project benefit. Participating municipalities greatly increased their tax and water bill collection capacity. One of the greatest successes in the training programs involved computerization and the associated capacity development (footnote 59).

142. New initiatives involving peer-to-peer training also hold promise. Twinning arrangements have been made between staff of the Phnom Penh Water Supply Agency in Cambodia and Bing Duong Water Supply in Vietnam to build capacity to deal with NRW problems.  

143. Recommendations to improve capacity building efforts include (i) rely more on peer-to-peer and on-the-job training, (ii) use the short-term, one-off training efforts that are possible during project preparation for essential and timely topics such as training on 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 (this could benefit from investigations of regional TA focusing on technical and vocational education and training for WSS).  

B. Institutional Reform, a Foundation for Long-Term Sustainability

144. Institutional reform is usually critical for WSS sector development in Asia. Accomplishing it is very difficult. Looking at the weak progress with tariff reform, the easy conclusion is that donor reform efforts have mostly not been successful. But such a conclusion may not really be justified because it draws on a short-term view of the reform process, and perhaps looks too narrowly at overambitious project objectives.

145. Institutional reform takes time and patience. ADB and other development partners 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. The institutional structure of water utilities and their regulation in the United States evolved over a century or more. Water supply companies were first established in the nineteenth century by the private sector operating under the authority of municipal franchises. Problems with corruption and service quality led to authorization of municipal tariff regulation and then to municipal acquisition of private operations starting around 1880. But by the late 1970s, municipalities were turning back to privatization to address problems with system disrepair caused by chronic

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92 Women have an important role in communities as facilitators and motivators, in utilities as staff (financial management, customer service), and in sector ministries. This is especially important as in most projects, operations departments are required to ensure that at least 30% of project management and project implementing unit staff are women. Highlighting equal opportunities for men and women in training and capacity development programs is important; for example a project in the Lao PDR included a grant from the Gender and Development Cooperation Fund to support a scholarships program, a training program, and the inclusion of specific gender actions into corporate plans of the utility.


underinvestment. Many state governments became directly involved in regulating private sector operators through the establishment of state regulatory commissions during 1907–1922.  

146. In Canada in the late 1970s, flat rate and declining block tariffs were the norm for water supply, and budgetary transfers were common (footnote 73). Asset management planning had not yet arrived in the sector, but concern for old and crumbling infrastructure was starting to develop.  

A few municipalities were starting to explore demand management, but supply-side planning was the norm. This was the state of practice in the industry despite research literature full of critiques of existing practice. Almost four decades later, the industry in Canada has changed. Universal metering combined with tariffs using uniform and increasing block structures are now the norm. Financial management regulations are common and asset management planning is aggressively promoted. To renew a water withdrawal permit in Ontario, municipal water supply operators must implement an NRW management program. All this took over 30 years to accomplish, 30 years in which Ontario experienced operating failures causing fatalities and chronic capital funding shortfalls. Thirty years during which several inquiries, commissions, and studies were commissioned to unravel problems in the sector and inform policy and program planning initiatives.  

147. Significant reforms are already being made. Given the experience in advanced countries, judging institutional reform achievements to date in developing Asia and the Pacific is probably premature. While reforms have been slow or even nonexistent in many countries, in others reforms have been significant. Phnom Penh has made significant strides in the reform of service delivery since 1993. From a solid base of engineering competence, and motivated by water shortages and fiscal constraints, the PRC initiated demand management and tariff reform in the 1990s. Even Bangladesh, with a declining water table, has launched significant reforms in Dhaka. The key question for ADB is how to propagate and accelerate reform initiatives.  

148. Understand existing institutional constraints before recommending change. Since the acceptance of policy change takes time in an established bureaucracy, political risks that can inhibit reform deserve careful assessment (footnote 72). Existing institutional arrangements pose significant challenges to the reformer. Sector development is often hampered by systemic and attitudinal constraints. Many service providers lack the means and capacity to properly and efficiently expand, operate, and maintain WSS systems.  

Service providers often operate as government departments that rely on government budgetary transfers. There is no absolute imperative to improve operations or financial performance (footnote 67). Initiatives to privatize or corporatize operations therefore need to foster attitudinal changes and a commercial orientation in government bureaucrats—this takes time (footnote 59). Realizing that corporatization is of limited value without a commercial orientation, which motivates cost cutting and revenue generation, is also important. Commercialization does not follow automatically from changes in corporate structure (footnote 67).  


149. The reform agenda must rely on realistic business models that “recognize that water resources management is intensely political and requires the articulation of prioritized, sequenced, practical, and patient interventions. The interventions should support reformers and pay explicit attention during design and implementation to the political economy of reform” (footnote 35).

150. **The institutional reform process progresses from comprehension to accomplishment.** Government leadership is critical in the policy formulation and consultation process (footnote 72). But government leadership is unlikely if decision makers do not comprehend the benefits of proposed reforms. Cultivating comprehension and then acceptance by national government officials that water supply systems must be self-financing and financially sound was a major achievement of the policy dialogue for a project in the Lao PDR.98 In 2009, the Water Supply Regulatory Committee and its office were established with the help of an ADB grant-funded project.99 The new Water Supply Regulatory Office has received further ADB TA to improve its regulatory functions and duties (footnote 68).

151. Significant success is achieved when a loan project manages to change the outlook of government stakeholders. More often, a new outlook actually precedes and provides the impetus for a project. Consider the following projects that appear to follow this pattern:

(i) Bangladesh’s Urban Governance and Infrastructure Improvement Project applied a demand-driven approach contingent on a performance-based allocation mechanism for investment funds (footnote 77). Participating municipalities (*pourashavas*) must qualify for infrastructure funds under three successive tranches of the MFF project. At the time of the evaluation, action plan implementation was working well (footnote 59).

(ii) India’s Sindh Cities Improvement Investment Program, an MFF loan, requires that participating cities establish urban service corporations during the first tranche. These corporations assume responsibility for WSS and storm-water drainage services, and must develop 3-year business plans and an annual budget planning process. Subsequent tranches provide funding for infrastructure investments. Tariffs will be established only after investments are made and customers realize service improvements. Tariffs are to be gradually increased to achieve full recovery of O&M costs. The loan financing is to cover O&M deficits during the transition. The project took a long time to prepare and progress on institutional reform was slow for tranche 1. The slow pace reflects the extensive efforts taken to communicate with stakeholders.

(iii) Bangladesh’s Dhaka Water Supply Sector Development Program (footnote 16) is an innovative approach involving (i) a project loan to reduce NRW to less than 15% in district metered areas using performance contracts; and (ii) a conditional two tranche program loan that addresses financial sustainability (e.g., ring-fenced accounts, 5-year business plan, and tariff adjustment mechanism). Agreed reforms must be achieved before project loan funds are disbursed.

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99 Prior to the processing of the Small Towns Water Supply and Sanitation Sector Project in 2009, the Water Supply Authority was acting as the regulator; however, it was not fully functional, as the regulatory committee had not been established.
152. **Choice of the best lending modality can facilitate reform.** As these three projects demonstrate, the MFF funding structure appears to be well suited to institutional reform initiatives. It gives the project proponent the time, technical support, and incentive to implement reforms. It also allows a progressive adoption of reforms giving stakeholders an opportunity to become familiar with and understand changes. It should create an opportunity for government staff to learn on the job, while project implementation is ongoing and able to provide more effective training. And it should also create an opportunity to fund new O&M activities in the critical transitional period to more complete cost recovery from tariffs.

153. As ADB gains experience with the MFF lending modality, its actual performance will be evaluated and better understood. Early indications suggest that, where government interest in and motivation for institutional reform exists, the MFF facility should be given serious consideration as the vehicle for loan and grant support.

154. The program loan is an alternative loan product that may also facilitate reform. Used in the Dhaka Water Supply Sector Development Program, disbursements that are contingent on reform actions provide incentives in much the same way as an MFF. With either product, an engaged and motivated client with strong political leadership is key to a sustainable outcome.

155. Expectations for reform in conventional project loans and grants should be context driven. If politicians are not motivated to adopt tariff reforms, there is little merit to imposing firm tariff covenants. It is better to ask for guarantees that O&M and debt financing costs will be covered whether through tariff revenues or budgetary transfers. The reform agenda under these circumstances should ask for feasible and readily agreed changes that will set the foundation for further reform, for example the establishment of separate accounting records for WSS operations.

156. In certain contexts more detailed tariff covenants are justified. This paper discussed the example in Nepal (footnote 79) in which community WUSCs manage new systems, set tariffs, and collect revenues. In this case, institutional reforms are demand-responsive and water users make decisions throughout project formulation, implementation, and operation. The tariff covenant in this circumstance is in effect creating an institutional framework for system management. Since the tariff mechanism meets with community understanding and acceptance, and the approval of government authorities, a tariff covenant is useful and justified (footnote 31).

157. Sustainability assessments place great emphasis on financial sustainability, which in turn depends on sensitive institutional matters such as tariff reform. Countries have been pushed to implement institutional reforms very quickly, much more quickly than the pace of reform that occurred in advanced countries. Some Asian success stories involve relatively quick reform of organizations and institutions. Nevertheless, in most cases, expecting full implementation of aggressive reforms under a single project loan is not realistic. Moving forward, improved project outcomes can be expected if ambitions to catalyze reform are tempered by a deep understanding of the particular political and institutional context of projects and by an appreciation that, even in the best of circumstances, substantial reforms take time to implement, depending on the comprehension and engagement of clients and their capacity to accommodate change. From this perspective, institutional reform has not failed in Asia; it may just be starting if one thinks of the last 25 years as a period of gestation.
Historically, ADB has chosen to continue its engagement in WSS despite the sometimes weak commitment of governments to sustainable operations and the frequently weak performance of past projects. Moving forward a decision to remain engaged, if taken, should rest on policies that acknowledge the crucial relation of WSS investments to inclusive and environmentally sustainable growth, and the complex and slow-moving nature of the sector.
Appendix
## APPENDIX 1: RECENTLY COMPLETED SOVEREIGN WATER SUPPLY AND SANITATION PROJECTS WITH SUSTAINABILITY RATINGS

<table>
<thead>
<tr>
<th>Country</th>
<th>Loan/Grant Numbers</th>
<th>Approval Year</th>
<th>Title</th>
<th>Sustainability</th>
<th>Evaluation Document</th>
<th>Overall Rating</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>TIM</td>
<td>8185/8189</td>
<td>2000</td>
<td>Water Supply and Sanitation Rehabilitation Project, Phase I and Phase II</td>
<td>LLS</td>
<td>PPER</td>
<td>Less than successful</td>
<td></td>
</tr>
<tr>
<td>PHI</td>
<td>1745/1746</td>
<td>2000</td>
<td>Pasig River Environmental Management and Rehabilitation Sector Development Program</td>
<td>LLS</td>
<td>PVR</td>
<td>Unsuccessful</td>
<td></td>
</tr>
<tr>
<td>NEP</td>
<td>1755</td>
<td>2000</td>
<td>Small Towns Water Supply Sanitation Sector Project</td>
<td>LS</td>
<td>PVR</td>
<td>Successful</td>
<td></td>
</tr>
<tr>
<td>PRC</td>
<td>1797</td>
<td>2000</td>
<td>Tianjin Wastewater Treatment and Water Resources</td>
<td>MLS</td>
<td>PPER</td>
<td>Successful</td>
<td></td>
</tr>
<tr>
<td>PNG</td>
<td>1812</td>
<td>2000</td>
<td>Provincial Towns Water Supply and Sanitation Project</td>
<td>LLS</td>
<td>PVR</td>
<td>Less than successful</td>
<td></td>
</tr>
<tr>
<td>UZB</td>
<td>1842</td>
<td>2001</td>
<td>Urban Water Supply Project</td>
<td>LS</td>
<td>PVR</td>
<td>Successful</td>
<td></td>
</tr>
<tr>
<td>PAK</td>
<td>1854</td>
<td>2001</td>
<td>North-West Frontier Province Urban Development Sector</td>
<td>US</td>
<td>PVR</td>
<td>Unsuccessful</td>
<td></td>
</tr>
<tr>
<td>VIE</td>
<td>1880</td>
<td>2001</td>
<td>Third Provincial Towns Water Supply And Sanitation Project</td>
<td>LS</td>
<td>PVR</td>
<td>Successful</td>
<td></td>
</tr>
<tr>
<td>MON</td>
<td>1907</td>
<td>2002</td>
<td>Integrated Development of Basic Urban Services in Provincial Towns Project</td>
<td>US</td>
<td>PVR</td>
<td>Less than successful</td>
<td></td>
</tr>
<tr>
<td>BAN</td>
<td>1947</td>
<td>2002</td>
<td>Urban Governance and Infrastructure Improvement (Sector) Project</td>
<td>MLS</td>
<td>PPER</td>
<td>Successful</td>
<td></td>
</tr>
<tr>
<td>NEP</td>
<td>1966</td>
<td>2002</td>
<td>Urban and Environmental Improvement Project</td>
<td>LLS</td>
<td>PVR</td>
<td>Less than successful</td>
<td></td>
</tr>
<tr>
<td>PRC</td>
<td>1985</td>
<td>2002</td>
<td>Hebei Province Wastewater Management Project</td>
<td>LS</td>
<td>PVR</td>
<td>Successful</td>
<td></td>
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<tr>
<td>PRC</td>
<td>1995</td>
<td>2003</td>
<td>Harbin Water Supply</td>
<td>LLS</td>
<td>PPER</td>
<td>Successful</td>
<td></td>
</tr>
<tr>
<td>PRC</td>
<td>1996</td>
<td>2003</td>
<td>Wuhan Wastewater Management Project</td>
<td>LLS</td>
<td>PVR</td>
<td>Successful</td>
<td></td>
</tr>
<tr>
<td>VIE</td>
<td>2034</td>
<td>2003</td>
<td>Central Region Urban Environmental Improvement Project</td>
<td>LS</td>
<td>PVR</td>
<td>Less than successful</td>
<td></td>
</tr>
<tr>
<td>PAK</td>
<td>2060/2061</td>
<td>2003</td>
<td>Southern Punjab Basic Urban Services Project</td>
<td>LLS</td>
<td>PVR</td>
<td>Less than successful</td>
<td></td>
</tr>
<tr>
<td>AZE</td>
<td>2119/2120</td>
<td>2004</td>
<td>Urban Water Supply Sanitation Project</td>
<td>LLS</td>
<td>PVR</td>
<td>Less than successful</td>
<td></td>
</tr>
<tr>
<td>PRC</td>
<td>2175</td>
<td>2005</td>
<td>Jilin Water Supply and Sewerage Development Project</td>
<td>LS</td>
<td>PVR</td>
<td>Successful</td>
<td></td>
</tr>
<tr>
<td>GEO</td>
<td>2441</td>
<td>2008</td>
<td>Municipal Services Development Project</td>
<td>LLS</td>
<td>PVR</td>
<td>Successful</td>
<td></td>
</tr>
<tr>
<td>KGZ</td>
<td>0122</td>
<td>2008</td>
<td>Community-Based Infrastructure Services Sector Project (Supplementary)</td>
<td>LLS</td>
<td>PVR</td>
<td>Unsuccessful</td>
<td></td>
</tr>
</tbody>
</table>


Note: The sample was derived from listing projects approved from 2000 onward with project completion validation reports and/or project performance evaluation reports, and classified under the subsectors of water supply and sanitation (WSS), waste management, and urban sector development. Rural WSS projects and urban multisubsector projects that had minimal water and sanitation components were removed.

Source: Asian Development Bank database.