Topical Paper

Leading Factors of Success and Failure in Asian Development Bank Urban Sanitation Projects

Independent Evaluation ADB

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Topical Paper
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NOTE

In this report, "$" refers to United States dollars.

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Abbreviations

ADB	–	Asian Development Bank
BMGF	–	Bill & Melinda Gates Foundation
CoP	–	community of practice
DBO	–	design-build-operate
DMC	–	developing member country
GAP	–	gender action plan
IED	–	Independent Evaluation Department
JFPR	–	Japan Fund for Poverty Reduction
MDG	–	Millennium Development Goal
MFF	–	multitranche financing facility
O&M	–	operation and maintenance
PCR	–	project completion report
PPP	–	public–private partnership
PRC	–	People's Republic of China
PSOD	–	Private Sector Operations Department
PSP	–	Private Sector Participation
RRP	–	report and recommendation of the President
SDCC	–	Sustainable Development and Climate Change Department
SDG	–	Sustainable Development Goal
SFPTF	–	Sanitation Financing Partnership Trust Fund
TA	–	technical assistance
TBC	–	Toilet Board Coalition
WFP	–	Water Financing Program
WFPF	–	Water Financing Partnership Facility
WOPs	–	Water Operators Partnerships

Contents

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THE EVALUATION IN BRIEF

LEADING FACTORS OF SUCCESS AND FAILURE IN ASIAN DEVELOPMENT BANK URBAN SANITATION PROJECTS

The **topical paper** aims to contribute to the stock of knowledge on the factors affecting the success or failure of Asian Development Bank urban sanitation projects. It identifies six factors for success and six factors for failure from 63 completed and evaluated projects implemented between 2003 and 2016. Some or all of the observations presented here can be included in the project design and implementation of future Asian Development Bank urban sanitation sector operations.

Sanitation is lagging in our rapidly urbanizing world. In 2015, 2.3 billion people worldwide lacked access to basic sanitation. Of these, a large number lived in the urban areas of Asian Development Bank's (ADB) developing member countries. The provision of adequate and equitable urban sanitation has not kept up with the rapid urbanization in Asia-Pacific. The sanitation targets of the Sustainable Development Goals (SDGs) are very ambitious; which include achieving access to adequate and equitable sanitation and hygiene for all and eradicating open defecation by 2030. To achieve the SDGs' water supply and sanitation targets, the World Bank Water and Sanitation Program has estimated that $130 billion in capital investment will be needed globally until 2030. Improving access to sanitation and safely managing waste streams lead to better health outcomes and positive economic impacts.

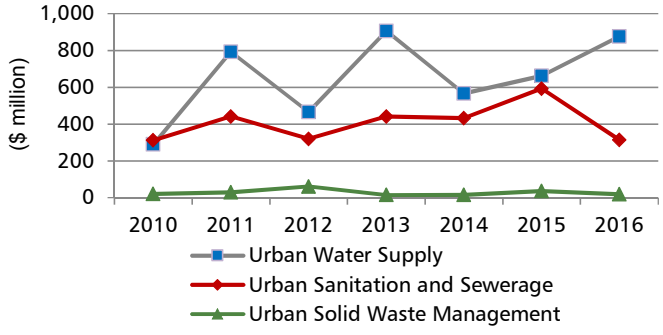
ADB's sanitation investments have only slightly risen since 2010, with dips in 2012 and 2016.

ADB has increased its access to external funding sources for its sanitation operations, including trust funds such as the Sanitation Financing Partnership Trust Fund under the Water Financing Partnership Facility, funded by the Bill & Melinda Gates Foundation. These funds have enabled ADB to deepen its engagement in policy dialogue and have led to more projects in recent years.

The conventional concept of sanitation is a piped sewer network connected to a centralized wastewater treatment facility (off-site treatment system). Centralized systems require very large capital investments, typically three or more times per connection than for piped water supply. The coverage of centralized sanitation systems is generally low in Asia. Business as usual in urban sanitation means centralized conventional infrastructure, which benefits only a small percentage of the population. This approach is at the mercy of political priorities; funding allocations; institutional coordination; and the planning, design, and management practices needed to achieve adequate sanitation services for all.

On-site sanitation options such as pit latrines and septic tanks predominate in Asia. In big cities such as Manila, it is estimated that there are 2.2 million septic tanks built and paid for by households. The technical design and construction quality is often poor, septic tanks are not regularly emptied, with effluent typically flowing into open drains and water bodies. Septage management is not well-regulated and septage treatment facilities are inadequate.

ADB Urban Water and Sanitation Subsector Investments



Source: ADB (Sustainable Development and Climate Change Department), Water Sector Lending Database, 2003–2016.

Given the massive investments needed to achieve the SDGs' sanitation targets, developing countries and their development partners are adopting new approaches. On-site and sewerage solutions are combined in either centralized or decentralized systems so they can respond to the realities in cities in developing countries. If cities are to employ citywide inclusive sanitation, they need to develop comprehensive approaches to improving sanitation that encompass long-term planning, technical innovation, institutional reforms, and financial mobilization from a range of sources.

Success and failure factors in ADB urban sanitation interventions.

The paper identifies six factors of success and six factors of failure from 63 completed and evaluated projects implemented between 2003 to 2016. The success factors are: (i) long-term relationships for policy dialogue, (ii) policy regulatory system and rules for private sector investment in sanitation, (iii) national campaigns for investment in sanitation, (iv) combining water supply and sanitation institutions and cost-recovery mechanisms, (v) encouraging partnerships with other utilities in member countries, and (vi) encouraging demonstration effects of pilot fecal sludge management at municipality level for a wider effect. The failure factors are: (i) no targets for the poor in inclusive planning, (ii) lack of a thorough capacity assessment of local implementing agencies, (iii) not supporting small-scale independent sanitation providers for fecal sludge management, (iv) not monitoring of environment and health impact indicators, (v) not incorporating gender analysis and actions, and (vi) slow uptake and disbursement of initiatives under the Sanitation Financing Partnership Trust Fund (SFPTF).

Lessons for Future Operations.

This paper offers lessons for ADB future operations in urban sanitation, based on leading factors identified for successes and/or failures:

(i) Thorough and continuous engagement with implementing agencies from the project preparation stage is essential to avoid or mitigate implementation bottlenecks.
(ii) Policy dialogue throughout the project cycle is an essential component to laying out groundwork for private sector participation.
(iii) Integrated sanitation solutions in cities and other urban areas need to be built on a long-term vision, taking note of local needs for sanitation interventions, as this is the key determinant for success.
(iv) To ensure inclusiveness, it is key to target the poor and vulnerable through a full accounting of beneficiaries.

Factors of Success and Failure in Asian Development Bank Urban Sanitation Projects, 2003–2016

	Factors of Success	Factors of Failure
Project Identification, Design, and Preparation	• Long-term relationships for policy dialogue (e.g., Cambodia, Viet Nam) • Policy regulatory system and rules for private sector investment in sanitation (e.g., People's Republic of China) • National campaigns for investment in sanitation (e.g., India)	• No targets for the poor in inclusive planning • Lack of thorough capacity assessment of local implementing agencies (e.g., municipalities in decentralized government system)
Delivering Results During Implementation	• Combining water supply and sanitation institutions and cost recovery mechanism (e.g., Colombo, Sri Lanka)	• Not supporting small-scale independent sanitation providers for fecal sludge management
Process and Impact Monitoring		• Not monitoring environment and health impacts indicators • Not incorporating gender analysis and actions
Knowledge Management to Improve Results	• Encouraging partnerships with other utilities in member countries (e.g., Water Operators Partnership) • Encouraging demonstration effects of pilot fecal sludge management at municipality level for a wider effect (e.g., Nepal)	• Slow uptake and disbursement of initiatives under Sanitation Financing Partnership Trust Fund

Source: Asian Development Bank (Independent Evaluation Department).

Executive Summary

The targets of the Sustainable Development Goals (SDGs) include access to adequate and equitable sanitation and hygiene for all, and an end to open defecation, by 2030. Their achievement will require significant new financing. For urban Asia, an estimated $130 billion over 10 years in capital investment will be needed until 2030 if countries are to meet the SDGs' water supply and sanitation targets.

The Strategy 2020 of the Asian Development Bank (ADB) did not have special emphasis on improving the sanitation as one of priority areas, but the Water Operational Plan highlights the institution's strong commitment to increasing investment in sanitation. Citywide inclusive sanitation is a new concept that aims to ensure that everyone benefits from adequate sanitation and that human waste is safely managed along the whole sanitation service chain. To achieve this, a mix of incremental approaches that combines on-site and off-site solutions will be needed.

The purpose of this paper is to contribute to the stock of knowledge on the factors affecting the success or failure of ADB urban sanitation projects. It identifies six factors of success and six factors of failure from 63 completed and evaluated projects implemented between 2003 to 2016. The success factors are: (i) long-term relationships for policy dialogue, (ii) policy regulatory system and rules for private sector investment in sanitation, (iii) national campaigns for investment in sanitation, (iv) combining water supply and sanitation institutions and cost-recovery mechanisms, (v) encouraging partnerships with other utilities in member countries, and (vi) encouraging demonstration effects of pilot fecal sludge management at municipality level for a wider effect. The failure factors are: (i) no targets for the poor in inclusive planning, (ii) lack of a thorough capacity assessment of local implementing agencies, (iii) not supporting small-scale independent sanitation providers for fecal sludge management, (iv) not monitoring of environment and health impact indicators, (v) not incorporating gender analysis and actions, and (vi) slow uptake and disbursement of initiatives under the Sanitation Financing Partnership Trust Fund (SFPTF). These are illustrative, as country contexts and other factors may come into play.

Lessons for future operations include: (i) thorough and continuous engagement with implementing agencies from the project preparation stage is essential to avoid or mitigate implementation bottlenecks, (ii) policy dialogue throughout the project cycle is an essential component to laying out groundwork for private sector participation, (iii) integrated sanitation solutions in cities and other urban areas need to be built on a long-term vision, taking note of local needs for sanitation interventions, as this is the key determinant for success, and (iv) to ensure inclusiveness, it is key to target the poor and vulnerable through a full accounting of beneficiaries.

The paper identifies the main factors that have resulted in the success or failure of Asian Development Bank (ADB) urban sanitation operations. It highlights projects where there was success or a breakthrough that accelerated progress in the sanitation sector. In the case of failures, it identifies where ADB did not adequately adopt global best practices or was not able to fully implement some of its initiatives. The focus is on urban sanitation, defined here as sewer network systems, including wastewater treatment plants, and on-site options. Urbanization is rapidly accelerating in Asia and the Pacific, and there are many areas where multilateral development banks, can extend policy, regulatory, and financial support.

The provision of adequate and equitable urban sanitation has not kept up with the rapid urbanization that has taken place in Asia and the Pacific. Water supply and roads tend to be far higher on the infrastructure agenda of elected officials than sanitation, which is often the responsibility of financially strained municipalities rather than of specialized public or private corporations. A feature of Asia's densely

populated cities is that the poor and other groups often live close to each other, and bad sanitation in one area can affect nearby communities where there is adequate sanitation. Because of this, urban sanitation interventions must address the needs of both the poor and other groups to ensure that health, environmental, and socioeconomic gains are achieved.

The sanitation targets of the Sustainable Development Goals (SDGs) are very ambitious. They include achieving access to adequate and equitable sanitation and hygiene for all, and eradicating open defecation, by 2030. Meeting these targets will require huge financial resources. To achieve the SDGs' water supply and sanitation targets, the World Bank's Water and Sanitation Program has estimated that capital investment $130 billion over 10 years will be needed until 2030. This estimate does not include crucial investments in operation and maintenance, or building the capacity of institutions to improve urban sanitation services.

Increasing investments in urban sanitation makes economic sense. The World Health Organization (WHO) estimates that every $1 spent on water supply and sanitation provides a return of $8. On the plus side, governments across the region are increasingly recognizing the benefits of better urban sanitation, and are producing investment strategies and policies to expand the coverage of wastewater treatment. That said, implementation has been slow in many countries. The long list of reasons for this includes competing political priorities, tariff rates that do not ensure the financial sustainability of sanitation services, and lack of attractive projects for private sector investment.

To overcome these obstacles, governments and their development partners are looking at new approaches to urban sanitation. These will require a shift away from traditional approaches that focused on centralized and conventional urban sanitation infrastructure, since these tended to benefit only a small percentage of the urban population. A more equitable approach is needed that mobilizes political priorities, funding, planning, management, and design to provide decent urban sanitation services for all.

Citywide inclusive sanitation is designed to ensure that everyone benefits from adequate sanitation service delivery outcomes. Ideally, human waste is safely managed along the whole sanitation service chain, and effective resource recovery and reuse are included. On-site (septic tanks and latrines) and off-site (sewerage) solutions are combined using either a centralized or decentralized approach. Comprehensive approaches to improving sanitation are needed, encompassing long-term planning, technical innovation, institutional reforms, and financial mobilization from a range of sources.

Livable cities are one of the three pillars of ADB's agenda for promoting environmentally sustainable growth under its long-term Strategy 2020. The strategy says: "ADB will assist developing countries and their municipalities in addressing a range of environmental problems resulting from rapid urbanization." However, sanitation and sewerage was not one of the three focus areas of livable cities. This significant omission needs to be carefully reconsidered in ADB's new 2030 Corporate Strategy.

Sanitation is one of the seven priorities in ADB's Water Operational Plan, 2011–2020. Under the plan, which makes clear that sanitation is an urgent priority for many governments in the region, a target was set for ADB to increase its investments in sanitation to at least 25% of total overall water sector lending by 2020 (from 14% in 2011). ADB is on track to meet this target, with investments reaching 22% at the end of 2016.

The People's Republic of China (PRC) was the leading recipient of ADB financing for the 63 completed projects evaluated from 2003 to 2016. ADB invested $681.14 million in the PRC, followed by India ($153.70 million), Indonesia ($56.64 million), Fiji ($37.09 million), and Viet Nam ($34.96 million). These investments typically formed one or more components of larger projects, many of which were concerned with sewerage networks. Of the 63 projects, only 7 had both off-site (sewers) and on-site (septic tanks and latrines) wastewater treatment components.

Since 2015, sector and thematic groups have replaced ADB's water and urban communities of practice to improve the delivery of "Finance++"

and the use of the "One ADB" approach to sanitation knowledge solutions. About 70% of total urban investment is in water supply and sanitation. To some extent, an overlap in reporting is unavoidable, although the water group may be better positioned to report on overall water investments regardless of location (urban, rural, or basin). ADB needs to consider how it can achieve the optimum configuration and terms of reference for each sector group. Both groups need to work together closely on their overlapping responsibilities.

This topical paper is not an evaluation, but a knowledge product. The Independent Evaluation Department (IED) has compiled the leading factors for the success and failure of ADB's sanitation operations. The paper reviews completed urban sanitation projects and approved sovereign and nonsovereign loans in this sector from 2003 to 2016 across all ADB regions. The analysis consisted of: (i) a desk review of ADB policies and projects, particularly the 63 completed and evaluated projects; (ii) portfolio and trend analysis; (iii) interviews with ADB staff in the five regional departments, the Private Sector Operations Department (PSOD), the Sustainable Development and Climate Change Department, and the secretariats of the urban and water sector groups, focusing on recent and ongoing initiatives; and (iv) global sector knowledge and trends gleaned from the World Bank's global practice management and staff of the former Water and Sanitation Program.

Each country has different contexts affecting sanitation services including the legal framework, institutional arrangements and responsibilities, population density and urban sprawl, water availability, land use patterns, and tariff regulatory system. Some or all the observations presented here can be included in the project design and implementation checklists. The factors for success or failure are described and aligned with the main stages of ADB's project cycle wherein they might be expected to feature most prominently. All factors are significant throughout the project cycle but this alignment indicates where addressing them might bring the most gains.

Leading Factors for Success and Failure

Project Identification, Design, and Preparation

This section identifies three leading factors for success at the start of the project cycle: (i) long-term ADB sector staff presence, (ii) a policy regulatory system that provides incentives and rules for private sector investment in sanitation, and (iii) national campaigns for investment in sanitation. These three factors have contributed to capacity building of central and local government staff.

Long-term staff presence, leading to long-term relationships with governments and other development agencies. Some of ADB's most successful urban sanitation programs have been built on a sustained, long-term presence in the country by sector specialists, ideally through postings to resident missions. In Cambodia and Viet Nam, for example, ADB staff were able to build ties with decision-makers in government over 10 to 20 years which is an important reason for successful operations in these countries. A long-term presence can also result in partnerships with other donors working in the same sector, leading to more effective interventions. Such long-term relationships between ADB and its partners need to be replicated in other countries.

Policy regulatory systems that provide incentives and rules for private sector investment in sanitation. A good example of a supportive policy regulatory system can be found in the PRC, which energetically supports private sector participation (PSP) in urban services. At the beginning, in 1990s, ADB supported the PRC in developing the national guideline policy for municipalities to set sanitation tariff; which paved the way for public–private partnership engagement. This then led to PSOD's robust portfolio of nonsovereign lending for water and wastewater services in the country. Explicit sector goals in national development policies (e.g., pollution abatement in the PRC) enabled ADB to provide the required financing and technical assistance.

National campaigns for investment in sanitation. Countries often conduct national campaigns to raise the awareness of public hygiene and its impact on health and the environment. This helps

create the conditions for successful investments. ADB has been effective in supporting interventions in India linked to national policies, such as the campaign to end open defecation, in states with capable institutions and favorable sector policies. The sanitation-related national campaign in India has provided an opportunity for ADB to carry out a focused engagement with partner governments. ADB can further deepen its engagement in policy reforms and capacity building in countries that currently lack such campaigns. Both India and PRC cases show ADB's involvement with national government on policies and campaigns paved the way for PSOD to seek opportunity in the water supply and sanitation sector for further investment.

In this part of the project cycle, the two leading factors for failure are: (i) no targets for the poor in inclusive planning during the design, and (ii) lack of a thorough capacity assessment of local implementing agencies to deliver results.

No targets for the poor in inclusive planning. Reducing poverty in Asia and the Pacific has been ADB's overarching goal since 1999. Ultimately, the poor are expected to benefit from ADB's investments in wastewater treatment and centralized sewerage as these networks are extended to poor communities. However, the uncertain legal status and complex land tenure of many low-income communities can make it difficult for them to benefit from conventional sewerage. ADB's record of providing the urban poor with access to sanitation improvements is mixed–only 10 out of the 63 completed projects had the poor as the key beneficiary.

Lack of a thorough capacity assessment of local implementing agencies to deliver results. This is important before and during project preparation. It is vital for ADB to understand the challenges these agencies face, and to incorporate features into project designs that support local institutional development. Understanding the legal and social risks that may arise, and mitigating them in projects where necessary are key. Project preparatory technical assistance (or now called transaction TA) is intended to address such preparatory issues, but it is also important for ADB staff to know who they should deal with in implementing agencies, and to be well informed about projects so they can assure the quality of the work of project preparatory technical assistance consultants. In the two ADB projects in Indonesia, for example, there has been a disconnect between central and local governments due to differing levels of institutional capacity. This led to poor performance and non-achievement of goals for the decentralization of sanitation systems to the local level.

Delivering Results during Implementation

This section highlights a factor each for success and a factor for failure during implementation phase of projects.

On success: combining water supply and sanitation institutions to improve cost recovery mechanism. Charging for sanitation (unlike water) is a hard sell, making it essential to integrate water and sanitation operations. Since most urban households already have some form of sanitation (latrine or septic tank), the benefits of being connected to a sewerage system or another decentralized sanitation service may not be easily understood. In Sri Lanka, ADB has been supporting efforts to integrate water and sanitation institutions and tariffs during the evaluation period. This process is progressing slowly, but steadily.

On failure: not supporting small-scale independent sanitation providers for fecal sludge management. Small-scale independent firms who provide decentralized sanitation services fill an important service gap, but many are poorly supported in South and Southeast Asia. ADB and other lenders for urban sanitation could play an important role in strengthening this sector by providing firms with greater access to finance through concessionary loans, grants, guarantees, and equity investments. There has been some marginal progress in ADB operation in India, but in most countries, there has been little progress in promoting PSP in small-scale sanitation services by ADB.

Process and Impact Monitoring

This section highlights two factors for failure in project monitoring:

Not monitoring environment and health impact indicators. The rationale for investments in

improving sanitation conditions needs to be anchored on data. However, in many countries, data are only collected at the national level and are difficult to disaggregate by project locality. At the subsector level, only 10 out of 63 completed ADB projects had good monitoring of various necessary indicators for environmental health.

Not incorporating gender analysis and actions. More projects should have monitored the gender-specific socioeconomic impacts of ADB's support for urban sanitation. Only 7 of the 63 completed ADB projects had gender-specific targets for the sanitation components. Performance indicators on the environment, health, and gender need to be incorporated and traced during project implementation. This will facilitate sound project monitoring and eventual evaluation of project performance.

Knowledge Management to Improve Results

With respect to knowledge management, two factors for success and a factor for failure are presented. Two leading factors for failure are: (i) encouraging partnerships with other utilities in member countries, and (ii) encouraging demonstration effects of pilot fecal sludge management at municipality level for a wider effect.

Encouraging partnerships with other utilities in member countries. ADB has supported several technical assistance initiatives; and one of which underpinned continued success is through twinning utilities in different countries under the Water Operators Partnerships (WOPs) Program. This program has been effective in engaging developing countries and in sparking interest in sanitation. During the evaluation period, the following partnerships were initiated or completed as part of the WOPs program on sanitation: one each in Fiji, Mongolia, Myanmar, Sri Lanka, Viet Nam; two in Indonesia; three in Bangladesh; and four in Nepal. Countries' utilities and agencies formed partnerships with their counterparts in countries like Australia, Korea, Malaysia, the Netherlands, the Philippines, and Spain.

Encouraging demonstration effects of pilot fecal sludge management (FSM) at municipality level for a wider effect. Some of the recently approved (2014 onwards) and currently ongoing small town-level projects are showing successes with demonstrative pilot FSM components that are expected to be replicated widely, or have led to policy framework at the national level. A small towns water supply and sanitation project in Nepal showed successful support, where pilot fecal sludge management services led to broader policy changes and service improvements. It finances demonstration of innovative septage management solutions in four towns, catering to about 15,500 households. The project supported drafting and institutionalizing policies for FSM, two pilot FSM treatment plants, as well as the formulation of FSM business and operational plans. Other initiatives are also planned and beginning to take shapes in India and Mongolia. A project case in India is supporting demonstration of innovative FSM solutions to capture best practices, generate replicable sanitation models, engage private sector providers. Another project in Mongolia is addressing management and reuse of sludge from on-site sanitation facilities and decentralized wastewater treatment plants with pilot demonstration.

One leading factor for failure is slow uptake and disbursement of initiatives under the Sanitation Financing Partnership Trust Fund (SFPTF).

Slow uptake and disbursement of initiatives under the Sanitation Financing Partnership Trust Fund (SFPTF). The Bill & Melinda Gates Foundation (BMGF) contributed $15 million to the WFPF in 2013. The grant was to set up the SFPTF, under the trust fund component of the WFPF, to identify, test, and pilot innovative sanitation solutions for non-sewered sanitation and septage management. Use of the SFPTF has been slow. Although the intention and plan are good, the disbursement since 2013 has been $2.7 million only as of December 2017. BMGF has provided an additional $1 million to support a senior expert on fecal sludge management in ADB to form the nucleus of a small sanitation innovations team that will stimulate more scaled-up investment in citywide sanitation approaches. Stakeholders' consultations and preparations for sub-activities financed by SFPTF can be initiated well in advance of the approval of loans and grant projects, which will enable faster disbursement. BMGF is working with consortium of universities on fecal sludge management, including Asia and elsewhere. ADB

can find ways to adopt city-wide, strategic perspectives that include investment in the full spectrum of technical options; on-site, simplified sewerage, decentralized treatment, as well as conventional sewerage with large-scale treatment plants.

Lessons for ADB Operations

It is key that support for urban sanitation is revived, and adapted regularly as sector dynamics are rapidly changing. Based on the leading factors for success and failure identified above, this paper offers some lessons for future operations in the sector.

Thorough and continuous engagement with implementing agencies from the project preparation stage is essential to avoid or mitigate implementation bottlenecks. It is key for ADB to work with implementing agencies early on during project preparation so any legal provisions and institutional development features are understood and appropriate measures could be taken as soon as possible. The key is to understand the source of funding for the agency responsible for sanitation so it can expand, improve, and maintain facilities and strengthen its operational relationship with water supply agencies. ADB would appreciate whether the legal framework allows the agencies to explore ways to involve the private sector.

Policy dialogue throughout the project cycle is an essential component to laying out groundwork for private sector participation. Conducive national sanitation policies in the PRC and India helped create the conditions for successful private investments in sanitation. An enabling environment was a clear contributing factor for this participation. More work needs to be done in other countries on promoting a market environment conducive to private investment in sanitation. ADB does not always participate in building incentive schemes for PSP in sanitation projects or policy dialogue; PSOD only comes in when sanitation systems are in place. In a "One ADB" approach, other ADB departments can learn from the East Asia Department's experience in supporting governments to introduce mechanisms to foster private investment in the sanitation business. PSOD can be part of this dialogue.

Integrated sanitation solutions in cities and other urban areas need to be built on a long-term vision, taking note of local needs for sanitation interventions, as this is the key determinant for success. Most ADB sanitation projects with on- and off-site treatment components had no strategies for interfacing the two. On-site interventions were mostly targeted at households in slums, and the two treatment components have often been treated in isolation. It would add value to ADB's sanitation operations if strategies and assessment of the prospects for the expansion of on-site treatment could articulate how these interventions can link with off-site sewerage systems in the long term. An integrated approach to sanitation interventions is essential. It is important for cities to have long-term business strategies for utility services to sustain integrated sanitation coverage. Working on city fecal flow diagram may be a useful tool for cities where ADB has operations.

Targeting the poor and vulnerable to ensure inclusiveness requires a full accounting of beneficiaries. Baselines need to be established before the project to enable monitoring and assessment of impacts, and subsequently to inform policy makers and attract their support for such interventions. During the decision stage, sanitation outreach, education and advocacy at community level is important and be sustained during the project implementation. Citywide inclusive strategies will require urban sanitation projects to be designed specifically to reach poor communities. To evaluate the outcomes of ADB's sector support to poor communities, both the number of poor beneficiaries and their share as a percentage of total beneficiaries should be indicated in the project documents, such as reports and recommendations of the President and project completion reports. If ADB can demonstrate these impacts to client governments, there is a greater chance that they will continue to invest in on- and off-site treatment of wastewater.

1

INTRODUCTION

1. The main objective of this topical paper is to identify lessons for urban sanitation from the lending and technical assistance (TA) operations of the Asian Development Bank (ADB).[1] It examines the key factors for project success and failure. The paper is not an evaluation study, but a knowledge product. It reviews 63 completed sanitation projects implemented during 2003–2016 across all ADB regional departments and the Private Sector Operations Department (PSOD).[2]

2. The paper was prepared by ADB's Independent Evaluation Department (IED). It identifies projects with success in accelerating progress in urban sanitation, and projects where there were none. Projects that were not successful included instances where ADB had not learned from mistakes or where it underestimated the challenges it faced. In some projects, inadequate preparation meant that ADB was unable to gauge the capacity of implementing agencies. There were also cases where assumptions made in the design and implementation of projects turned out to be unfounded.

3. For projects that are ongoing or under preparation, the evaluation assessed the degree to which ADB urban sanitation projects and other sector activities are learning lessons from the recent past, as well as from global experience. IED also looked at the value addition of initiatives since 2007 to strengthen the quality of sanitation projects under the Water Financing Partnership Facility (WFPF), specifically under the Sanitation Financing Partnership Trust Fund (SFPTF), and the regional TA on Promoting Innovations in Wastewater Management in Asia and the Pacific.[3]

4. The paper draws on the following sources to identify lessons for ADB's future operations in support of urban sanitation:

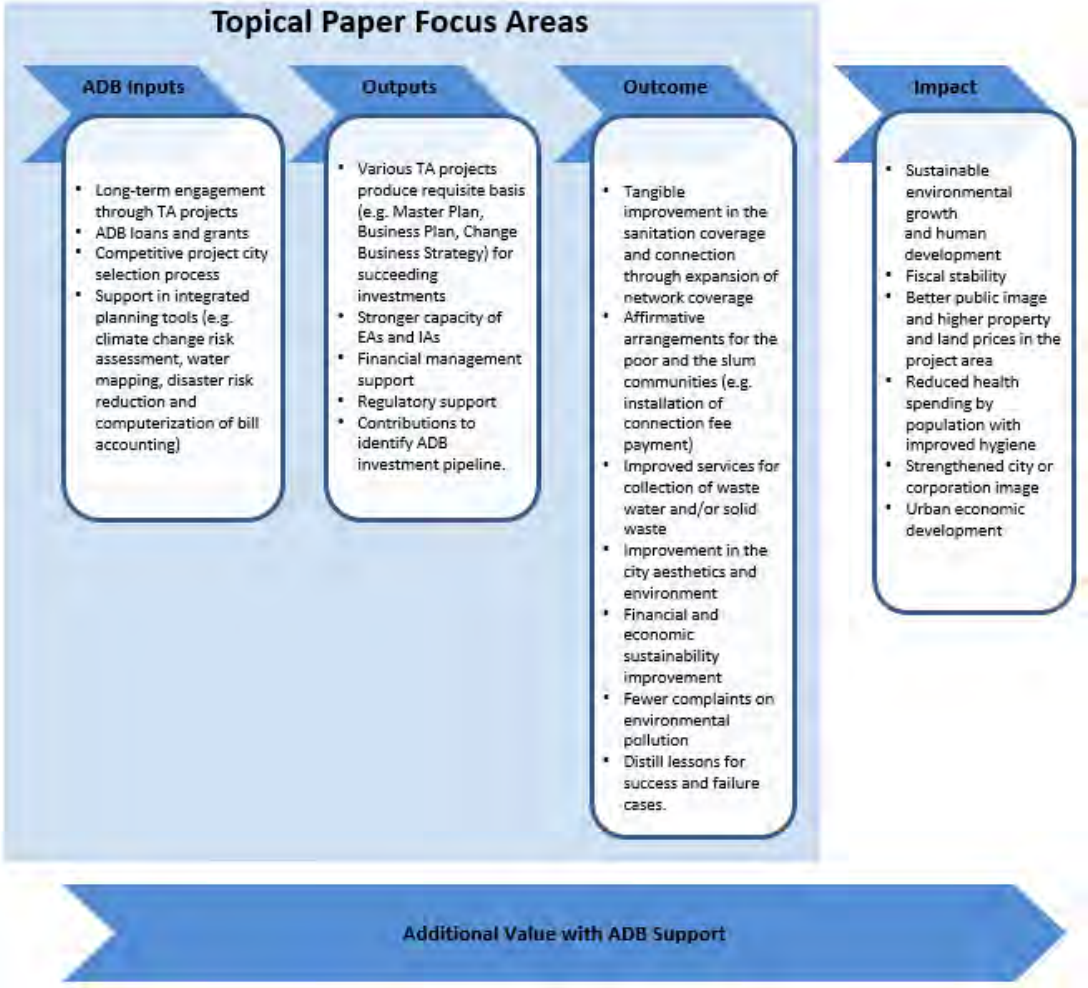
(i) Reviews of ADB-assisted sanitation projects cofinanced by, or with supplementary assistance from, other development partners during the evaluation period, including those funded by the Bill & Melinda Gates Foundation's (BMGF) SFPTF.
(ii) Project documents, including back-to-office reports, project completion reports (PCRs), project performance evaluation reports, PCR validation reports, and ADB publications and data.
(iii) Staff and management interviews on project development and progress, ADB's strategic approach to urban sanitation, and organizational arrangements.
(iv) Interviews with selected development partners to understand external views of ADB's performance in urban sanitation and other ways of operating in the sector.

[1] This paper adopts a narrow definition of "sanitation" as a subsector in ADB operations. This definition is commonly used in the urban sector group and does not include solid waste management, which is treated as another subsector. In this context, sanitation primarily refers to sewer network systems, including wastewater treatment plants and on-site options.

[2] Currently, the Urban and Water Sector Groups maintain a database of recent projects, starting from projects approved in 2003.

[3] ADB. 2012. *Promoting Innovations in Wastewater Management in Asia and the Pacific*. Manila.

Figure 1: Theory of Change



ADB = Asian Development Bank, EA =executing agency, IA = implementing agency, TA = technical assistance.
Source: Asian Development Bank (Independent Evaluation Department).

5. Figure 1 illustrates the theory of change that underlies urban sanitation interventions. Providing adequate urban sanitation is a formidable and expensive development challenge. It requires new ways of doing business for both ADB and its developing member countries (DMCs) if national and regional development targets are to be met. ADB is expected to provide high-quality TA to its DMCs in partnership with other donors. There have been some trials and progress made in global best practices for all aspects of sanitation interventions—policies, financing, technologies, institutional arrangements, and monitoring and evaluation.

6. As set out in IED's evaluation approach paper,[4] this paper examines the successes and failures of ADB's support for urban sanitation under the following project cycle stages: (i) project identification, design, and preparation; (ii) delivering results during implementation, (iii) process and impact monitoring; and (iv) knowledge management to improve results.

[4] IED. 2017. *Evaluation Approach Paper. Topical Paper: Contribution of ADB Sanitation Project.* Manila: ADB.


SLUDGE
CENTRIFUGE FEED PUMP HOUSE

2

URBAN SANITATION: DEMANDS AND NEEDS IN ASIA

Highlights

- Urban sanitation has not kept up with the rapid urbanization in Asia and the Pacific.
- Sanitation targets of the Sustainable Development Goals are very ambitious.
- Increasing investments in urban sanitation makes economic sense.
- Governments and development partners are looking at new approaches to urban sanitation.
- Citywide inclusive sanitation is designed to ensure that everyone benefits from adequate sanitation service delivery outcomes.

A. Current Situation

7. Sanitation is lagging in our rapidly urbanizing world. In 2015, 2.3 billion people worldwide lacked access to basic sanitation. United Nations estimates by 2020, 46% of the population will be urban in Asia and the Pacific.[5] Of these, a large number lived in the urban areas of ADB's DMCs in Asia and the Pacific.[6]

8. In urban Asia, the progress being made to improve access to sanitation and the safe management of wastewater varies widely. The People's Republic of China (PRC) has made substantial gains in providing safely managed sanitation, which has kept up with the very rapid pace of the country's urbanization. In South and Southeast Asia, as well as in the Pacific, progress has been slower. Many cities in Asia have high population densities, often with poor and other areas close to each other. Because of this, inadequate sanitation in one area can have negative impacts on neighboring communities that otherwise have adequate sanitation services. Sanitation solutions, therefore, need to address the needs of both the poor and other groups to ensure targeted health and economic impacts are achieved.

B. Economic Costs

9. Nearly 90% of diarrheal deaths can be attributed to lack of access to sanitation facilities, absence of water for hygiene, and unsafe drinking water. Poor management of wastewater pollutes water supplies, making them unsafe for drinking, and for agricultural and other uses. Improving access to sanitation and safely managing waste streams lead to better health outcomes and positive economic impacts.[7]

10. Asia's urban centers are the primary drivers of economic growth in the region. Yet, urban services especially sanitation, have not kept up with the pace of growth. Untreated wastewater flows through many Asian cities. In 2008, the World Bank estimated that poor sanitation costs economies in Southeast Asia $9.2 billion (2005 price) a year for Cambodia, Indonesia, Lao People's Democratic Republic, the Philippines, and Viet Nam. The annual estimated loss in Indonesia is $6.3 billion, or 2.3% of gross domestic product; while in the Philippines, it is $1.4 billion or 1.5% of gross domestic product.[8] While access to at least basic sanitation is high in these countries, only a very small proportion of collected waste is safely treated, impacting the environment and the national economy in many ways.

C. Millennium Development Goals—Performance in Asia

11. The targets of the Millennium Development Goals (MDGs) for access to improved drinking water were met in almost all countries in Asia. Good progress in meeting the targets was made where the needs were greatest—rural areas. Despite this, Asia fell short of its MDG target for access to improved sanitation (Appendix 1). Target 7C, "halve, by 2015, the proportion of the population without sustainable access to safe drinking water and basic sanitation" was ambitious and achievements were uneven. Only

[5] United Nations. 1999. World Urbanization Prospects, *www.un.org/ga/Istanbul+5/14.pdf*

[6] WHO/UNICEF Joint Monitoring Program for Water Supply, Sanitation and Hygiene (JMP). 2017. *2017 Update and SDG Baselines*. http://washdata.org

[7] World Bank. 2013. *East Asia and the Pacific Region Urban Sanitation Review: A Call for Action*. Washington, D.C.

[8] World Bank Water and Sanitation Program. 2010. *Economics of Sanitation Initiative*. Washington, D.C.

16 of ADB's 40 DMCs with active programs met their MDG targets for sanitation and hygiene. The poor are the most affected by lack of proper sanitation, which is linked to multiple waterborne diseases and high child mortality. Most countries also did not meet the targets for reduced maternal mortality, "reduce by three quarters, between 1990 and 2015, the maternal mortality ratio,"[9] and poor sanitation certainly contributed to this.

12. Appendix 1 summarizes the status of sanitation in ADB DMCs, based on the most recent Joint Monitoring Program data (2017) from World Health Organization (WHO) and United Nations Children's Fund (UNICEF). The percentage of the population lacking basic urban sanitation is still high in Afghanistan (56%), Bangladesh (54%), India (65%), Kiribati (49%), Mongolia (66%), Nepal (52%), Papua New Guinea (55%), and Vanuatu (61%). These statistics clearly show the huge demand and need for basic sanitation in Asia and the Pacific.

D. Sustainable Development Goals

13. In 2015, the United Nations adopted the 2030 Agenda for Sustainable Development. The agenda comprises 17 Sustainable Development Goals (SDGs) and 169 targets addressing social, environmental, and economic aspects of development. Target 6.2 of the SDGs is far more ambitious than the equivalent MDG target and focuses on sanitation: "By 2030, achieve access to adequate and equitable sanitation and hygiene for all and end open defecation, paying special attention to the needs of women and girls and those in vulnerable situations."[10]

14. The SDGs aim to provide universal and equitable access to sanitation for all. They include hygiene targets, and an improved definition of sanitation adequacy. The focus is on sustainability to address the effectiveness of wastewater treatment and access to sanitation. Regarding access, it is not just household facilities that are being measured but also sanitation services. Although access to sanitation has improved markedly in many parts of Asia over the past decade (in many cases from a low base), much less progress has been made in the safe conveyance and treatment of sewage. The SDGs look at the entire supply chain rather than access alone. Figure 2 illustrates the sanitation service chain, and the comparative focus of the MDGs and the SDGs.

15. During the MDG period, global attention and most ADB sanitation investments centered on improving access to facilities in urban areas by extending sewer lines and connecting households to them. In rural areas, the focus was on access to on-site sanitation facilities and ending open defecation. ADB also made investments in conventional forms of wastewater treatment by building plants for sewer systems. The challenge now is to broaden this agenda and look at all the ways that human waste flows in urban environments so that sludge can be safely conveyed from on-site services to safe treatment facilities, and to close the loop by recycling treated waste products.

16. The SDGs have new and very significant financing implications. To achieve the water supply and sanitation targets, an estimated $1.7 trillion will be needed in capital investment globally from 2016 to 2030, or three times the amount that has historically been invested in the sector (Figure 3).[11] Achieving the safely managed sanitation targets for urban Asia, will require about $13 billion per year[12] in capital investment over this period.[13] Corresponding investments in operations, maintenance, and institutional development will raise these costs considerably.

[9] According to the United Nations Development Programme, 24 out of 38 countries in Asia and the Pacific for which data are available are not on track to achieve this target. In South Asia and sub-Saharan Africa, many deaths are attributed to preventable infectious diseases which could be avoided with simple, high-impact, and cost-effective interventions. http://www.asiapacific.undp.org/content/rbap/en/home/mdgoverview/overview/mdg4/

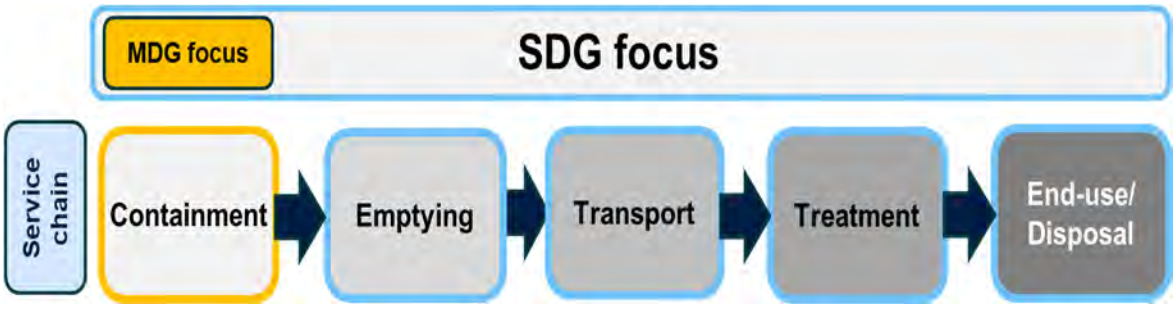
[10] The MDGs aimed to halve the proportion of people without access to water and sanitation by 2015.

[11] World Bank. 2016. *Financing Options for the 2030 Water Agenda*. Washington, D.C.

[12] Based on data for South, East, and Southeast Asia. G. Hutton and M. Varughese. 2016. *The Costs of Meeting the 2030 Sustainable Development Goal Targets on Drinking Water, Sanitation, and Hygiene*. Washington, D.C: World Bank.

[13] Footnote 11.

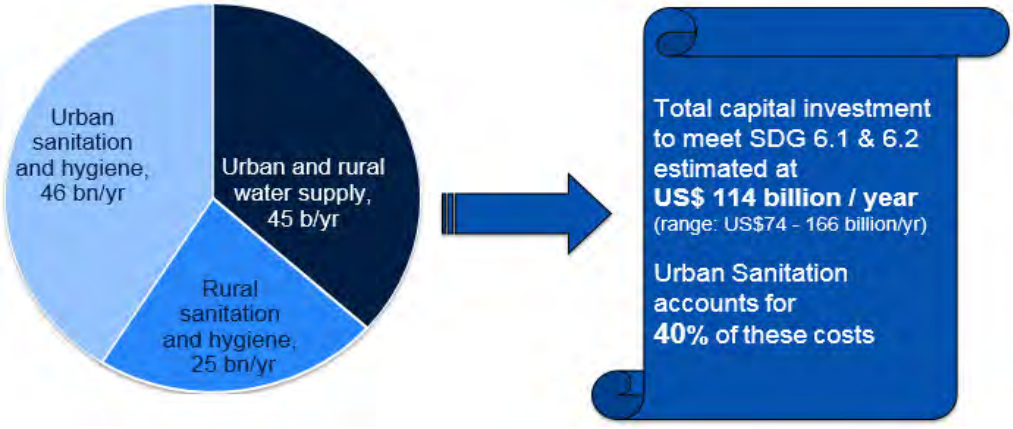
Figure 2: Sustainable Development Goals: Considering the Entire Service Chain for Sanitation



MDG = Millennium Development Goal, SDG = Sustainable Development Goal.
Note: Containment refers to treatment facilities.
Source: M. Gambrill. 2017. Citywide Inclusive Sanitation. Presentation for 2017 Technical Deep Dive on Integrated Urban Water Management. Tokyo. 25-29 September.

Figure 3: Sector Investment Costs to Meet SDG Targets

High estimated annual capital expenditure to meet 2030 SDG safely managed sanitation target



SDG = Sustainable Development Goal.
Source: M. Gambrill. 2017. Citywide Inclusive Sanitation. Presentation for 2017 Technical Deep Dive on Integrated Urban Water Management. Tokyo. 25–29 September.

E. Policies versus Practice

17. WHO estimates that every $1 spent on water and sanitation creates $8 in costs averted and productivity gained.[14] This makes a strong case that the benefit accrued through investing outweighs the cost. Governments increasingly recognize the benefits of improved sanitation and have developed policies and investment strategies to expand coverage through access and

[14] World Water Council. 2010. *Facts and Figures about Water*. Marseille.

treatment. But implementation has been slow in many countries because of competing political priorities, institutional arrangements that are too weak to develop strategic approaches or manage services, inadequate allocations of investment funds, tariff structures that do not ensure the financial sustainability of services, and lack of commercialization of sanitation operations.

18. The operation and maintenance (O&M) of sanitation services requires a strong institutional framework. This is especially true for sewerage and centralized treatment systems with large capital investment costs. Local or city governments are usually responsible for providing these services, but most Asian cities lack dedicated institutions for sanitation, and the full operating costs of city sanitation services are seldom reflected in the tariffs. Although the environmental policies of most Asian countries now require polluters to pay the full costs of treatment, political pressure often prevents tariffs from being set at rates that reflect the real costs of sanitation services. The financing gap is made up through other taxes and underinvestment in maintenance.

F. Centralized Sewerage and Treatment Coverage is Low

19. The conventional concept of sanitation is a piped sewer network connected to a centralized wastewater treatment facility. But centralized systems require very large capital investments, typically three or more times per connection than for the piped water supply. The coverage of centralized sanitation systems is generally low in Asia, although, there is considerable variation among countries. The Commonwealth of Independent States in Central Asia has high sewer coverage, but many systems are old and treatment facilities are inadequate. The PRC is undertaking an ambitious program to install sewerage systems and treatment facilities in all urban areas, and coverage is expanding rapidly.

20. On-site sanitation options such as pit latrines and septic tanks predominate in Asia. In big cities such as Manila, it is estimated that there are 2.2 million septic tanks built and paid for by households. The technical design and construction quality is often poor, septic tanks are not regularly emptied, with effluent typically flowing into open drains and water bodies. Septage management is not well-regulated and septage treatment facilities are inadequate. In Indonesia, 64% of households have septic tanks, but only 4% of septage is treated.

21. The investment needs for sanitation are massive. The estimated cost of achieving the SDGs' sanitation targets (using per capita expenditure of $250) in the Philippines is $23.1 billion, and in Viet Nam, $8.3 billion.[15] The sector has historically relied on public financing, but now a wider mix of financing options, combined with citywide sanitation planning, is needed if the SDG targets are to be achieved.

G. Citywide Inclusive Sanitation: A Call to Action for Much-Needed Investment

22. Given the massive investments needed to achieve the SDGs' sanitation targets, developing countries and their development partners are adopting new approaches.

23. Business as usual in urban sanitation means centralized conventional infrastructure, which benefits only a small percentage of the population. This approach is at the mercy of political priorities; funding allocations; institutional coordination; and the planning, design, and management practices needed to achieve adequate sanitation services for all. It also fails to consider the trade-offs between different sanitation investments, and generally do not employ incremental approaches to cover urban areas in an affordable and equitable way. Only a radical shift in mindsets and practices will make a difference, and common sanitation myths need to be debunked.

24. Under citywide inclusive sanitation,[16] everyone benefits from adequate sanitation service delivery outcomes. Human waste is safely managed along the whole sanitation service chain, and effective resource recovery and reuse is

[15] Footnote 6.

[16] World Bank. 2016. *Citywide Inclusive Sanitation: A Call to Action*. Washington, D.C. http://pubdocs.worldbank.org/en/589771503512867370/Citywide-Inclusive-Sanitation.pdf

practiced. Under this model, a variety of technical solutions are employed, including adaptive, mixed, and incremental approaches. On-site and sewerage solutions are combined in either centralized or decentralized systems so they can respond to the realities in cities in developing countries. If cities are to employ citywide inclusive sanitation, they need to develop comprehensive approaches to improving sanitation that encompass long-term planning, technical innovation, institutional reforms, and financial mobilization from a range of sources.

25. This radical shift will also require the engagement of all stakeholders in sanitation—formal and informal—and the political accountability of rich and poor citizens alike. ADB staff working on sanitation projects need city leaders to use their political capital to drive citywide strategies that deliver on sanitation as a human right. The consequences of inadequate sanitation affect everyone, as pathogens that derive from human waste can spread freely across urban areas.

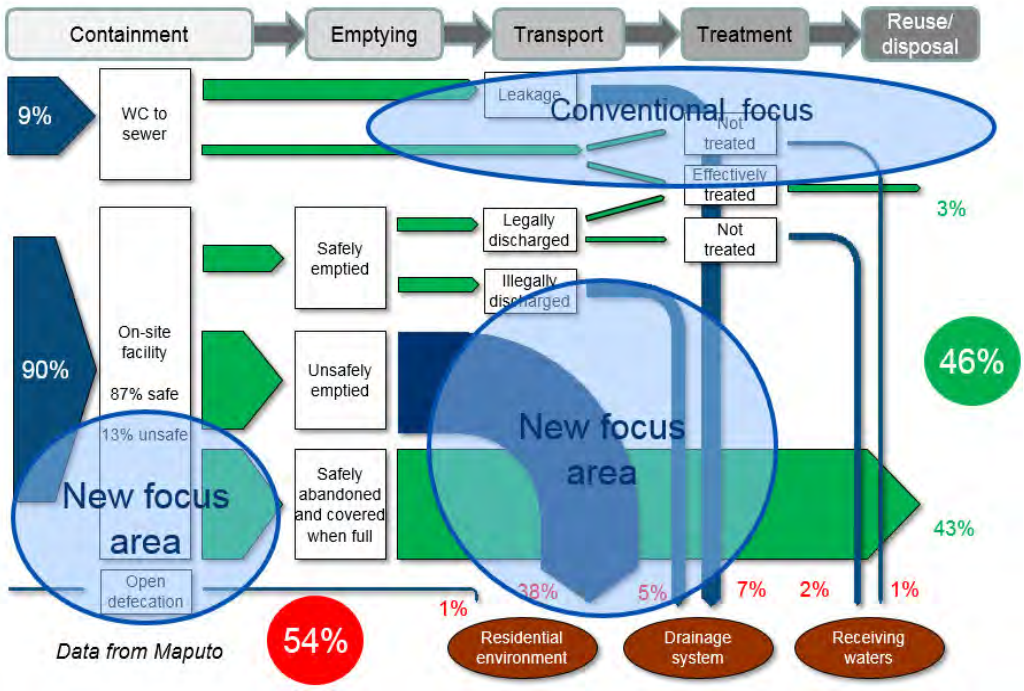
26. Professionals working in urban development need to coordinate their mandates more effectively. To achieve the sustainable and safe management of human waste, sanitation professionals (covering sanitation, land use planning, and housing, for example) must blend conventional and new solutions in ways that consider the needs and resources of their clients and solutions that link to wider urban development.

27. A range of useful analytical and planning tools have been developed to support citywide inclusive sanitation. One of these is the city fecal flow diagram for the city of Maputo, Mozambique (Figure 4). This shows how a city can quantify total wastewater flows from different sources and estimate how it is managed. The flow diagram makes it relatively easy to see at which points in the flow investments will be most effective. It is important to note that the availability of overall water drives what can and cannot be done technically in the whole aqua system. This World Bank tool maps out where and how wastewater is treated, where sludge ends up, and how much sludge is dumped rather than reused.

H. Summary

28. Sanitation often falls behind in the list of priority investment needs, compared to roads, electricity, and drinking water supply. In urban Asia, the progress in the effort to improve access to sanitation and the safe management of wastewater. On MDG achievement, almost all the countries in Asia have met the target on improved drinking water, but on improved sanitation, only 16 of ADB's 40 DMCs met the target. WHO estimates that every $1 spent on water and sanitation creates $8 in costs averted and productivity gained. ADB sanitation investments have traditionally focused on dealing with building plants for sewer systems. Business as usual in urban sanitation means only a small percentage, who are connected with the sewer gets the service and benefit. On-site sanitation options (e.g. pit latrines and septic tanks) predominate in the region. There is a need for shift in the mindset to engage formal and informal stakeholders, to drive citywide inclusive sanitation concept, where everyone benefits from adequate sanitation service delivery.

Figure 4: Where does a City's Fecal Waste go? Getting Priorities Straight



Source: World Bank Group and WSP. 2016. The Water Blog, A tale of two cities: how cities can improve fecal sludge management. *http://blogs.worldbank.org*

3

ADB'S RESPONSE TO SANITATION CHALLENGES

Highlights

- Livable cities are one of the three pillars of ADB's agenda for promoting environmentally sustainable growth under its long-term Strategy 2020.
- Sanitation is one of the seven priorities in ADB's Water Operational Plan, 2011–2020.
- Urban sanitation investments typically formed one or more components of larger projects, many of which were concerned with sewerage networks.
- Since 2015, sector and thematic groups have replaced ADB's water and urban communities of practice to improve the delivery of "Finance++" and the use of the "One ADB" approach to sanitation knowledge solutions.

A. ADB's Strategic Priorities

28. ADB's Strategy 2020, launched in 2008, emphasizes not only the pace of economic growth but also its pattern. The ability to achieve and sustain poverty reduction depends on economic growth taking place alongside a well-managed natural environment. The strategy says that ADB should focus its support on three distinct but complementary development agendas: inclusive economic growth, environmentally sustainable growth, and regional integration.

29. Environmentally sustainable growth has three sub-pillars: climate change, livable cities, and complementary actions, that mainstream environmental considerations. For livable cities, Strategy 2020 states that "ADB will assist developing countries and their municipalities in addressing a range of environmental problems resulting from rapid urbanization." These include reducing air pollution, supporting cleaner modes of transport, improving systems for solid waste management, and reducing urban waste. It should be noted that sanitation and sewerage was not one of the three focus areas under livable cities. Strategy 2020's failure to recognize that poor sanitation is a fundamental constraint on making cities livable was an omission that needs to be corrected in subsequent strategy documents.

30. **Sanitation is one of the seven priorities in ADB's Water Operational Plan, 2011–2020.**[17] The plan argues that sanitation must remain an urgent priority for governments in Asia and the Pacific. ADB is committed to supporting the achievement of the SDGs, including access to sustainable wastewater management (from toilets to treatment). There is a clear link between expanding sanitation services and poverty reduction. The Water Operational Plan states that the high coping costs of illness caused by poor sanitation services particularly affect the poor, the marginalized, and the vulnerable.

31. The importance given to sanitation in the Water Operational Plan underscores the need for sanitation to remain an urgent priority for governments in Asia and the Pacific. The plan's results framework contained a target of increasing the share of sanitation in total water lending to at least 25% (from 14% in 2011). The WFPF Annual Report, 2016, says ADB is on track in meeting this target. At the end of 2016, the share was 22%.

32. **ADB's Urban Operational Plan envisions transforming urban Asia into competitive, equitable, and environmentally sustainable centers.**[18] Getting there will require integrated planning, which implies a need for multisector projects. Central to this transformation will be a reinvigorated emphasis on the need for a revised integrated planning approach to the provision of infrastructure and services, and other public goods. ADB's urban operations should adopt a comprehensive, integrated, and sequenced approach for its interventions for livable cities.

B. ADB's Urban Sanitation Focus

1. Community of Practice

33. In 2006, the Water Community of Practice (CoP) replaced the water sector committee, which was established in 2002. The Water CoP composed of water sector specialists from all departments

[17] ADB. 2011. *Water Operational Plan, 2011–2020*. Manila.

[18] ADB. 2013. *Urban Operational Plan 2012–2020*. Manila.

was established to serve as a think tank, and to provide advice on the direction of ADB's water operations. The WFPF was also established in 2006.

34. The Water Financing Program (WFP) was also launched in 2006, with the main investment areas for water grouped as follows:

(i) **Rural water service projects to improve health and livelihoods in rural communities.** Projects can include investments in rural water supply and sanitation, irrigation and drainage, and multiple uses of water in rural communities.
(ii) **Urban water service projects to support sustained economic growth in cities**. Projects can include investments in urban water supply, sanitation, and wastewater management, and environmental improvement.
(iii) **Water management projects in river basins to promote the integrated management of water resources and healthy rivers**. Projects can include investments in infrastructure; management of multifunctional water regulations; hydropower facilities developed in basin contexts; flood management; and the conservation of watersheds, wetlands, and ecosystems.

35. Under the Water CoP, water was addressed in its entirety, covering all locations (rural, urban, and basin), and subsectors: (i) water supply, sanitation, and wastewater management; (ii) irrigation and drainage; (iii) flood management; (iv) water resources management, wetlands and watershed protection and conservation; and (v) hydropower generation. Water for All campaign was also launched in early 2001 by the Water COP to provide potable water in the region; which complemented efforts on MDG and strengthened by the demand to prioritize drinking water in many DMCs. [19]

2. From Water Community of Practice to the Water Sector Group

36. ADB's CoPs were replaced by sector and thematic groups in 2015. The aim was to sharpen the ability of CoPs to serve as conduits for delivering on "Finance++" and to operationalize the "One ADB" approach to delivering knowledge solutions. The sector groups are mandated to provide strategic and knowledge leadership support to operations departments by providing technical advice, peer reviews, operations support for country partnership strategies, sector assessments, project preparation and implementation, and knowledge sharing. The water and urban sector groups were to be separate. A technical advisor was appointed to oversee both, but it wasn't until September 2017 that the water group received its own technical advisor, known as the chief of water sector. Because urban water projects account for almost 70% of ADB's urban portfolio, the water sector group, which lacked a sizeable number of experts, has drawn on the expertise of the urban sector group secretariat to support its work on sanitation and utilities. The water sector group remains responsible for the management of the water sector in its entirety, which was reinforced by the engagement of the dedicated technical advisor (or chief) for water.

37. Reporting on the water sector covers all water subsectors, although, the water sector group has now stopped reporting based on rural, urban, and basin trichotomies. ADB's rural water operations are overseen by the Environment and Natural Resources Division and the Urban and Water Division in the regional departments. As indicated in the Water Operational Plan, stand-alone rural water supply and sanitation projects are difficult to implement and are best packaged as an extension of the water supply projects for small and provincial towns, which fall under the Urban and Water Division.

38. It is important to recognize that overlaps in reporting between the two groups cannot be avoided. Water as a sector will have to report on the overall water investments regardless of location (urban, rural, or basin). By contrast, the World Bank has a water sector group that covers all water-related projects irrespective of location and is separate from the urban group. The urban group in the World Bank focuses more on integrated and innovative solutions and projects related to climate change, disaster risk management, and tackling complex urbanization

[19] Water for All had seven key elements, which are mainly on sector reform, integrated water resource management, private sector participation, water efficiency, CSO and governance; but not on Sanitation focus.

issues. Appendix 2 provides an illustration of an alternative organizational structure at the World Bank to manage and focus on the water supply and sanitation operation.

C. ADB's Sanitation Portfolio

39. To increase the awareness of DMCs on wastewater issues and the options available to scale up investments in wastewater projects, ADB's Sustainable Development and Climate Change Department (SDCC) began a regional TA project in 2012, financed by the Japan Fund for Poverty Reduction (JFPR).[20] This closed in 2016 and combined knowledge sharing with capacity development to assist DMCs and cities to identify viable wastewater business opportunities and develop pre-feasibility studies.

40. **Encouraging sanitation investments has been difficult.** Since the early 2000s, sanitation projects have fallen behind drinking water projects in terms of disbursement and subsector delivery targets. Even before Strategy 2020 was launched in 2008, ADB recognized the need to advance the sanitation agenda. In 2007,[21] ADB issued a position paper, Dignity, Disease, and Dollars: Asia's Urgent Sanitation Challenge, in advance of the United Nations International Year of Sanitation.[22] ADB recognized the need for an open and forward-looking dialogue with its DMCs to ensure they understood the need for sanitation initiatives and investment. Equally important was ADB's Asian Sanitation Data Book 2008, which compiled sanitation profiles of major Asian cities, and called for more accurate data collection and management to support decision-making on sanitation. In 2014, ADB's Urban Water Supply and Sanitation in Southeast Asia: A Guide to Good Practice also recognized the lack of action on sanitation compared to water supply in Southeast Asia.[23]

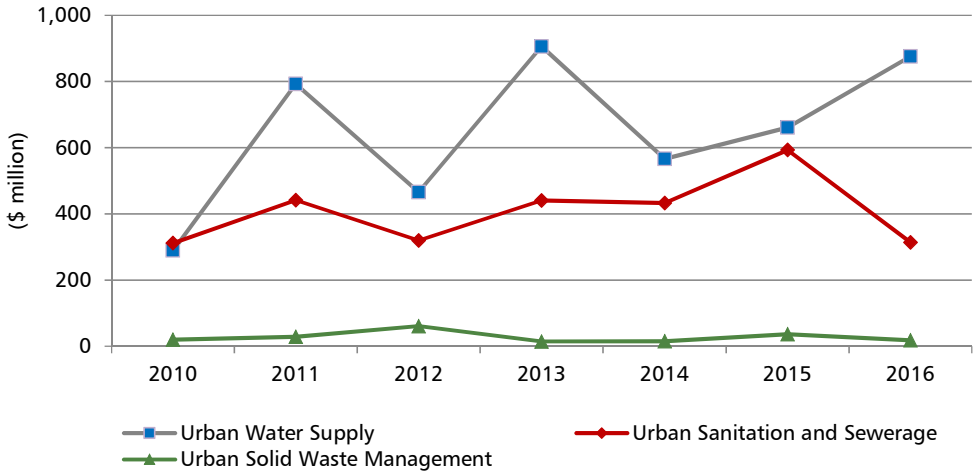
41. The reasons for the low investment in sanitation, gleaned from discussions with staff in SDCC, PSOD, and the regional departments are:

(i) the demand for sewer networks is usually lower than the demand for a water supply network, as households can resort to basic on-site treatment options, such as septic tanks (although these need to be maintained and dislodged regularly to avoid clogging);
(ii) water supply or roads are higher priorities for elected officials, because these projects are more visible and are regarded as having a greater impact on the voting public;
(iii) wastewater treatment plants may face opposition because of their perceived smell and aesthetic issues;
(iv) sanitation and water supply are usually serviced by different entities;[24]
(v) sanitation and sewer network operations are often the responsibility of municipalities rather than specialized public or private corporations;
(vi) urban sanitation projects require some level of community action (e.g., water can be delivered to households and metered, and treated like a private good but sanitation cannot be metered and is more of a public good) and the benefits of good sanitation are often not well communicated effectively or well understood by the public; and
(vii) most countries lack regulators for sanitation services, especially for private septage management service providers, which tend to be more business-oriented than under-resourced municipalities in DMCs.

42. **ADB's sanitation investments have only slightly risen since 2010 (Figure 5), with dips in 2012 and 2016.** In addition to its own resources, ADB has also increased its access to external funding sources for its sanitation operations, including through trust funds, such as SFPTF under the WFPF, funded by the BMGF.[25] These funds

[20] ADB. 2012. *Promoting Innovations in Wastewater Management in Asia and the Pacific*. Manila.
[21] Operations staff commented that the establishment of the sanitation action group in 2007 as a sub-group under the water committee was instrumental in expanding ADB's sanitation advocacy.
[22] ADB. 2007. *Dignity, Disease, and Dollars: Asia's Urgent Sanitation Challenge*. Manila.
[23] ADB, Citynet, UN Habitat, and Veolia Environment. 2009. *Asian Sanitation Data Book 2008: Achieving Sanitation for All*. Manila.
[24] Integrated and overlapping mandates are also an issue in other infrastructure sectors such as urban transport.
[25] The SFPTF aims to catalyze investments in fecal sludge management, focusing on non-networked sanitation options. Its current portfolio covers South Asia, Southeast Asia, and East Asia.

Figure 5: Asian Development Bank Urban Water and Sanitation Subsector Investments



ADB = Asian Development Bank.
Source: ADB (Sustainable Development and Climate Change Department), Water Sector Lending Database, 2003–2016.

have enabled ADB to deepen its engagement in policy dialogue, and have led to more projects in recent years. According to latest ADB data, the 2017 combined investment for water supply and sanitation is $1.26 billion, although, the breakdown of sanitation investment was not available. The accumulated investment for water supply and sanitation during 2006–2017 (provided by Water Sector Group) is $12.7 billion, of which $12.2 billion is urban and $0.5 billion is rural.

D. Urban Sanitation: Investments and Assistance

43. When the MDGs were launched in 2000, ADB began to address the historically low priority assigned to sanitation in its lending portfolio. In response to international calls for a doubling of water and sanitation investments in 2006, ADB launched the WFP which aimed to double ADB's annual investment to over $2 billion. It established targets which included 500 million people provided with access to safe drinking water supply and improved sanitation. The WFPF was set up in the same year to support implementation of the WFP. A target was set that at least 20% of WFPF resources should be used to support sanitation-related projects. In 2007, the ADB paper Dignity, Disease and Dollars, outlined a new approach that focused on providing better sanitation facilities for individuals and communities, disease prevention, improved environmental outcomes, and the financial viability of sanitation services.

44. As well as the regional TA on Promoting Innovations in Wastewater Management in Asia and the Pacific (para. 39), two other regional TAs have supported the Water Operators Partnerships (WOPs) in Asia and the Pacific.[26] Working in 15 DMCs, the WOPs program helps improve the capacities of water and wastewater operators through twinning partnerships between utilities in developed and developing utilities. Peer-to-peer learning and experience-based twinning arrangements bring together experienced utility operators to mentor less-advanced utilities on specific aspects of their operations, including sanitation.

45. In 2013, ADB received $15 million from the BMGF to establish the SFPTF under the WFPF. The SFPTF promotes fecal sludge management and provides grant financing to identify, test, and pilot sanitation solutions for non-sewered sanitation and septage management. While priority has been given to Bangladesh, India, Indonesia, Philippines and Viet Nam, more countries have been added to

[26] ADB. 2007. *Regional Technical Assistance on Supporting Water Operators' Partnerships in Asia.* Manila; and ADB. 2011. *Regional Technical Assistance on Supporting Water Operators' Partnerships in Asia and the Pacific.* Manila.

the portfolio to include Cambodia, Mongolia, Nepal, Papua New Guinea, the PRC and Vanuatu. Countries can be added as needs to complement ongoing or pipelined investments are identified.

1. Completed Projects

46. An assessment of ADB's financing of urban sanitation interventions during 2003–2016 revealed that the PRC was the leading recipient of ADB financing for sanitation and sewerage among the 63 completed ADB projects during the period (Appendix 3, Table A3.1). The projects summarized in Table 1 below had investments or components in urban sanitation in the evaluation period. All these loans had disbursement ratios that were high in the range of 84% to 99%.

Table 1: Top Five Countries in Terms of Asian Development Bank Sanitation and Sewerage Investments, 2003–2016

Developing Member Country	Sanitation and Sewerage ($ million)	Loan Amount ($ million)	Final Disbursement ($ million)	Utilization Rate (%)
People's Republic of China	681.14	1,353.80	1,320.05	98
India	153.70	1,117.00	934.39	84
Indonesia	56.64	555.00	550.55	99
Fiji	37.09	94.00	92.86	99
Viet Nam	34.96	107.38	103.78	97

Source: Asian Development Bank (Independent Evaluation Department).

47. Figure 6 shows ADB's urban sanitation investments (projects, which are completed) in its urban water sector portfolio by regional department, in terms of amount and as a percentage of total water-related investment. The percentage of urban sanitation investments by the East Asia Department (43%) and the Pacific Department (35%) are much higher than those for the other 3 regional departments, which are all less than 8.6%.

48. The top 10 projects in ADB's urban and water sector portfolio by financing amount totaled $1.42 billion in the evaluation period, with financing for sanitation and sewerage at $650.96 million (46% of the total loan financing provided). The combined final disbursement figure for the 10 projects totaled $1.25 billion, for a utilization rate of 88%. The PRC accounted for 7 of the top 10 projects, India for 2, and Indonesia for 1 (Appendix 3, Table A3.2). Nine of these projects used off-site sanitation, and one had on-site facilities as the sanitation intervention. Lending volume including active loans are discussed later in the chapter.

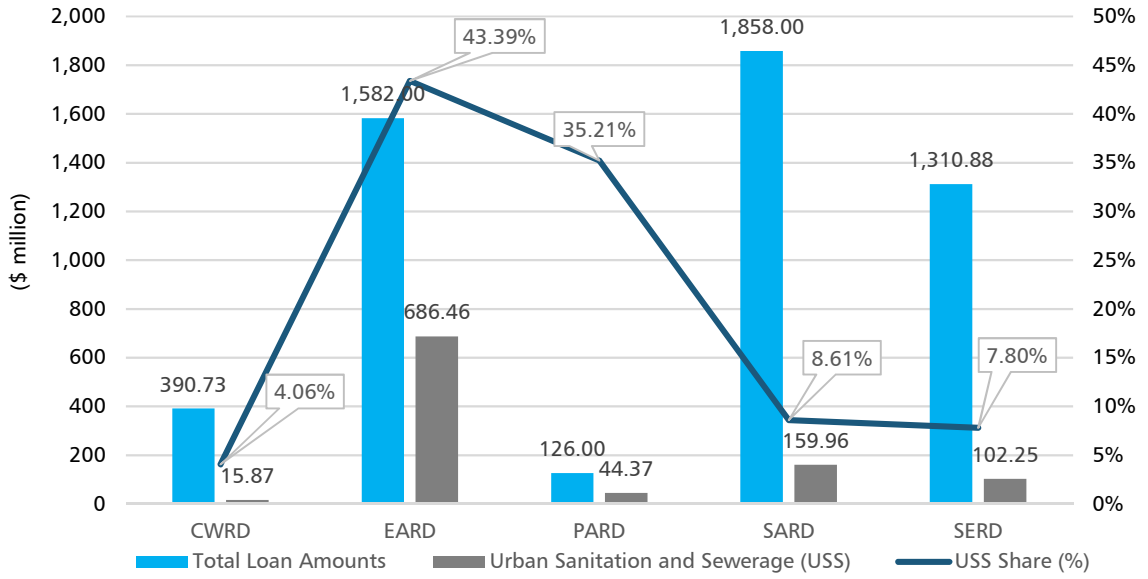
2. Projects with Both Off- and On-Site Components

49. Of the 63 completed sanitation projects, only 7 (11%) had both off-site treatment infrastructure and on-site (septic tanks) or latrines and/or public toilet components (Appendix 6). Despite a handful of achievements in the seven projects, none demonstrated a long-term plan on how to integrate or link on-site treatment options with the sewer system, or articulated whether the septic tanks in the project were there to stay in the foreseeable future. The projects had no plans on how off- and on-site components would be managed, sustained financially and technically through maintenance, or how sludge would be treated by local governments.

50. Of the seven projects, the Sanitation and Drainage Management Project in Samoa, approved in 2003,[27] delivered only 100 septic tanks, rather than the original target of 400 septic tanks for on-site sanitation for 8,000 households. The shortfall was due to funding constraints after a proposed revolving fund for septic tank maintenance and replacement was shelved because it was not aligned with Samoa's National Sanitation Policy, approved in 2010.

[27] ADB. 2003. *Report and Recommendation of the President to the Board of Directors: Proposed Loan and Technical Assistance Grant for the Sanitation and Drainage Project in Samoa*. Manila.

Figure 6: Completed Urban Water Sector Investment by Region, 2003–2016
($ million and percentage of urban sanitation)



CWRD = Central and West Asia Department, EARD = East Asia Department, PARD = Pacific Department, SARD = South Asia Department, SERD = Southeast Asia Department.
Source: Asian Development Bank (Independent Evaluation Department).

51. India's Kolkata Environmental Improvement Project (Supplementary Loan) had a slum-improvement component.[28] Under the project, 565 standposts, 700 community toilets, and 280 bathing spaces were built. This project's success is detailed in Chapter 4. In the PRC, the Xinjiang Municipal Infrastructure and Environmental Improvement Project[29] delivered 108 environmentally-friendly public toilets in three project locations.

52. Two Pakistan projects, Rawalpindi Environmental Improvement and Balochistan Devolved Social Services Program, failed to achieve their initial targets because of numerous problems, including delays in the design of sanitation facilities and lack of local government capacity.[30]

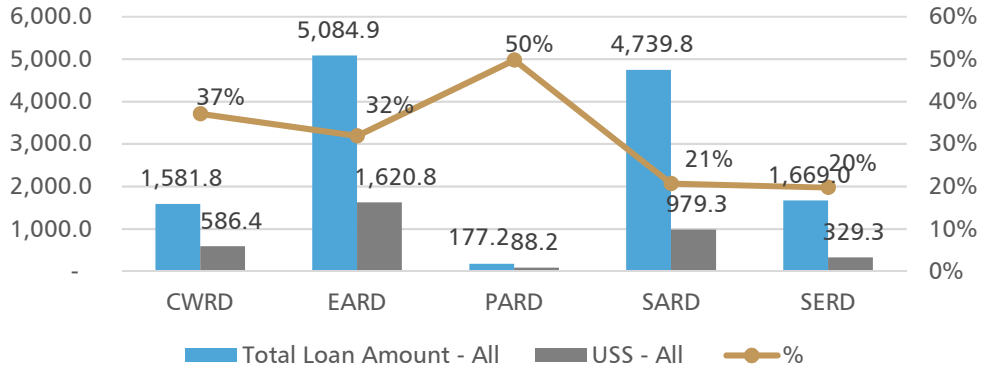
3. Active Projects

53. Of ADB's 87 active urban water-related projects from 2010 to 2016 (Figure 7 and Appendix 4, Table A4.1), 10 projects contain sanitation and sewerage as number one component with the biggest share of loan financing had an aggregate of $1.32 billion total in loan financing. In these projects, financing for sanitation and sewerage totaled $997.83 million, or 75% of total project financing. The share of sanitation and sewerage in individual projects ranged from 58% to 100% of total loan amounts. Azerbaijan had the largest loan financing of $300 million (for one loan). The PRC had the most number of approvals with five approvals, with an aggregate loan amount of $615 million or 47% of

[28] ADB. 2006. *Report and Recommendation of the President to the Board of Directors: Proposed Supplementary Loan for Kolkata Environmental Improvement Project in India*. Manila.
[29] ADB. 2008. *Report and Recommendation of the President to the Board of Directors: Xinjiang Municipal Infrastructure and Environmental Improvement Project in the People's Republic of China*. Manila.
[30] Central and West Asia and Pacific Departments are specifically placing importance on engaging grass-root level consultation or at community-level during the design and implementation of urban sanitation projects.

the total $1.32 billion financing of the top 10 projects. Off-site sanitation interventions are featured in all 10 projects. Figure 7 below shows the ADB investment, including both completed and active between 2003 and 2016, with urban sewerage and sanitation ratio highest in Pacific department with 50%. Table A4.2 in Appendix 4 shows that countries in the Central and West Asia region have featured in more recent active projects, indicating an increase in activity in the sector for that region.

Figure 7: ADB Investment in the Urban Sewerage and Sanitation Sector, 2003–2016



CWRD = Central and West Asia Department, EARD = East Asia Department, PARD = Pacific Department, SARD = South Asia Department, SERD = Southeast Asia Department.
Source: Asian Development Bank (Independent Evaluation Department).

4. Sanitation Financing Partnership Trust Fund

54. Traditionally, large centralized sewerage and wastewater collection and treatment systems have been considered the most cost-effective sanitation method in urban areas. However, they are expensive for developing countries. Such wastewater investments usually have to be phased over decades, yet they often soon fall into disrepair because of poor O&M. Fecal sludge management, therefore, meets the collection and treatment requirements of most countries in the region.

55. The SFPTF supports:

(i) pilot demonstrations of innovations, including new technologies, project delivery mechanisms, financing and O&M for septage management and disposal in urban and peri-urban areas, and sludge treatment;
(ii) project preparation to support the mainstreaming of fecal sludge management in project design;
(iii) grant funds to pilot innovations in ADB's investment projects; and
(iv) septage management and sludge treatment policies, including policy and business innovations that improve the quality and coverage of septage management.

56. As of September 2017, about $12 million of the $15 million in the SFPTF had been allocated to projects (Table 2).

Table 2: Bill & Melinda Gates Foundation Grant for Sanitation Financing Partnership Trust Fund

Items	Approved ($)
Grant Components of Loans	6,400,000
Technical Assistance Attached to Loans	1,272,000
Stand-Alone Technical Assistance Projects	2,967,106
Direct Charges	658,932
Service Fees and Other Charges	531,955
Total	**11,829,993**

Sources: Asian Development Bank (Independent Evaluation Department); Sanitation Financing Partnership Trust Fund database.

E. Summary

57. Sanitation is not featured as priority in the Strategy 2020, but is placed as one of seven priorities in Water Operational Plan, 2011–2020 for ADB. The Water Operational Plan states that the high coping costs of illness caused by poor sanitation services particularly affect the poor, the marginalized, and the vulnerable. In 2007, ADB recognized the need to advance the sanitation agenda, with a position paper, Dignity, Disease, and Dollars: Asia's Urgent Sanitation Challenge. ADB sanitation investments have only slightly risen since 2010, with dips in 2012 and 2106 (2017 breakdown data on sanitation is not yet available). ADB has also increased its access to external funding sources for sanitation operations, including through trust funds, such as SFPTF under the WFPF. An assessment of ADB's financing of urban sanitation interventions during 2013–2016 revealed that the PRC was the leading recipient (with about $680 million) for sanitation and sewerage among the 63 completed ADB projects. Of ADB's 87 active urban water-related projects, 10 contained sanitation and sewerage as the biggest share, with an aggregate of $1.3 billion total loan financing in the evaluation period (2003–2016).

4

FACTORS OF SUCCESS AND FAILURE

Highlights

- **Illustrative analysis of success and failure factors for urban sanitation operation**.
- **IED looked at 63 completed and evaluated projects implemented between 2003 to 2016.**
- **Six success factors** are: (i) long-term relationships for policy dialogue, (ii) policy regulatory system and rules for private sector investment in sanitation, (iii) national campaigns for investment in sanitation, (iv) combining water supply and sanitation institutions and cost-recovery mechanisms, (v) encouraging partnerships with other utilities in member countries, and (vi) encouraging demonstration effects of pilot fecal sludge management at municipality level for a wider effect.
- **Six failure factors** are: (i) no targets for the poor in inclusive planning, (ii) lack of a thorough capacity assessment of local implementing agencies, (iii) not supporting small-scale independent sanitation providers for fecal sludge management, (iv) not monitoring of environment and health impact indicators, (v) not incorporating gender analysis and actions, and (vi) slow uptake and disbursement of initiatives under the Sanitation Financing Partnership Trust Fund.

58. **Methodology used to identify leading factors for success and failure.** To arrive at illustrative cases of success and failure, the analysis used an iterative process that drew on four sources of information: (i) a desk review of ADB policies and projects, particularly the 63 completed and evaluated projects; (ii) portfolio and trend analysis; (iii) interviews with ADB staff in the five regional departments, the PSOD, the Sustainable Development and Climate Change Department, and the secretariats of the urban and water sector groups, focusing on recent and ongoing initiatives; and (iv) global sector knowledge and trends gleaned from the World Bank's global practice management and staff of the former Water and Sanitation Program. IED also held discussions with the World Bank's global practice management and staff of the former Water and Sanitation Program, as well as with a selection of staff from other partners.

59. **Background.** The success and failure analysis is bound to be illustrative; each country has different contexts for developing and improving sanitation services. Country-specific factors influencing strategic choices and program designs include: (i) a country's legal and regulatory framework, institutional arrangements and responsibilities; (ii) the extent of urbanization and population density; (iii) water availability; (iv) land use patterns; (v) cultural norms; and (vi) financing options. Some or all these factors can be addressed in the project design and implementation checklist. These country-specific factors also affect the formulation of sanitation policies and strategies, and the priority that sanitation receives in planning and budgeting processes at local and national levels. In this section, the key factors for success or failure in the projects and programs that were reviewed are described and aligned with the main stages of ADB's project cycle, wherein, they might feature most prominently. The stages are the following: A) project identification, design and preparation, B) delivering results during implementation, C) process and impact monitoring, and D) knowledge management to improve results. It should be noted that all the factors are significant throughout the project cycle, but an attempt has been made to present each of them at the stage where addressing them might bring the biggest gains.

A. Project Identification, Design, and Preparation

1. Leading Factors of Success

a. Establishing Long-Term Relationships for Policy Dialogue

60. **Leading factors.** Some of ADB's most successful urban sanitation programs resulted from a sustained, long-term presence in the country by sector specialists, who engaged regularly in sanitation policy dialogue with

governments and development partners. A sustained presence, ideally through assignments at resident missions but also achievable through regular visits, allows for the development of professional relationships that can be used to drive or influence sector policies and investment planning. It is essential to know the right partners and to have technically qualified ADB staff leading the dialogue. Developing such relationships can take time, and policy discussions, even at their most efficient, can take years to reach consensus. Patience is required for both.

61. Cambodia is a good example of this process. The main ADB staff member for water and sanitation has a relationship going back 20 years with senior sector decision-makers in government, as well as with local nongovernment organizations. Through these ties, ADB was able to influence policy dialogue on sanitation issues and specifically encourage the government to move toward consolidating institutional responsibilities for sanitation. A combined water and sanitation tariff covering the operating costs of both water and sanitation services has been introduced. In Cambodia, ADB has also leveraged impacts in sanitation through its partnerships with Agence Française de Développement and Japan to finance sewer connections for households in Sihanoukville, and to introduce expanded sludge management. In both cases, the continued presence of government counterpart staff who share the same vision and goals has been vital.

62. The long and well-established relationships between ADB staff and senior officials in the government allowed ADB initiatives to support important sector policy changes, and substantial infrastructure and sanitation coverage improvements.

63. In Viet Nam, ADB operations staff led consultations between the government and donor partners for a national urban sanitation investment program based on citywide sanitation strategies. A $2 million JFPR grant was provided for research and pilot projects to help national and municipal governments develop the investment program. These projects paved the way for city strategies with a mix of investments in conventional sewerage and waste treatment for core city areas along with decentralized waste treatment, and on-site sanitation options. The aim is to achieve 100% sanitation coverage and waste treatment in 5 cities and 50 smaller urban areas by 2020, with total investments in the range of $1 billion a year.

64. **Lessons.** ADB regarded the integrated sanitation projects recommended by the citywide sanitation strategies as too complex, with consequent high implementation risks. ADB, therefore, decided not to finance investments under the strategies that were developed with its support, and other donor partners took on those projects. A lesson from the Viet Nam and other country experience is that it is important to seek the right balance between the huge sector investment needs in DMCs, extended policy dialogue and technical analysis, and taking implementation risks to respond to credible DMC development strategies that have been assessed by technical experts and/or staff. Where there are huge investment needs, best-phased approach is needed by mixing types of ADB support (e.g., policy dialogue, technical diagnostic assessment and civil work investment) depending on capacity of concerned executing or implementing agencies. These support have and will contribute to capacity building of central and local government staff in the water supply and sanitation sector.

b. Using the Policy Regulatory System and Rules as an Incentive for Private Sector Participation in Urban Sanitation

65. **Leading factors**. Every country has a unique set of characteristics that drive political priorities for sanitation and all other investments. ADB's projects and programs need to adapt to these circumstances and, where possible, take advantage of them to design effective investments. Role of government in leading discussions and investment decisions in sanitation is equally important.

66. The PRC, for instance, is tackling sanitation from the entry point of controlling pollution, as it grapples with polluted air and water resources. The country has set ambitious targets backed by strong regulations to achieve high-quality public water supply and sanitation services, made possible by its rising affluence and tax revenues. In India, a national sanitation campaign is promoting public latrines and basic household sanitation

facilities to promote public hygiene. The goal is to make India free from open defecation. Indonesia's decentralized governance structures require a more complex approach to sanitation, with individual states and provincial governments and municipalities are taking the lead, although these may have widely varying institutional capacities.

67. Policies and strategies to curb pollution can be effective in encouraging private sector participation (PSP) in sanitation projects, as they will provide clear targets to be achieved and strong enforcement of rules governing effluent discharge and treatment. Financially strained municipal governments require private sector investment in infrastructure development as in many countries, local authorities do not have enough capacity to build or implement sanitation services. At the national level, governments should set rules and establish systems to encourage and allow public–private partnerships (PPPs) to build this infrastructure and to allow municipalities to contract individually with qualified private sector providers. Having conducive regulatory environment is key, especially in the case of application of new technologies.

68. The concession agreements for wastewater treatment issued by the PRC's Ministry of Housing and Urban–Rural Development in 2006 are a good example of a national government providing such a framework.

69. Since the late 1990s, the PRC has undertaken what may be the largest effort—to construct wastewater treatment plants and sewer networks—in history. ADB has been a major investor in this initiative.[31] At the beginning, in 1990s, ADB supported the PRC in developing the national guideline policy for municipalities to set sanitation tariff; which paved the way for public–private partnership engagement. In 2013, a Central Committee Resolution Concerning Major Issues in Comprehensively Deepening Reform called for integrated urban and rural development. This included a comprehensive plan for the construction of urban and rural infrastructure, and the provision of basic public services in urban and rural areas. The Ministry of Environmental Protection published a Guideline on Project Construction and Investment for Rural Sewage Treatment to encourage development in less-developed areas. Targets for national urban wastewater treatment and reuse infrastructure construction under the PRC's Twelfth Five-Year Plan, 2011–2015 aimed to increase the rate of wastewater treatment in major cities to 100%, and in smaller towns to at least 30% by 2015 (from less than 20% in 2010).[32]

70. To achieve these targets, the PRC actively supports PSP in urban services, and it has developed standardized concession agreements to expedite contractual arrangements between municipalities and qualified firms. ADB's PSOD has a robust portfolio of nonsovereign lending operations for water and wastewater services in the PRC (Appendix 5, Table A5.1). From 2006 to 2014, seven loans were approved for clean water projects, totaling $1.5 billion. Of these projects, four valued at approximately $800 million are for wastewater management. In line with the goal of increasing PSP, the Beijing Enterprises Water Group Ltd. and BEWG Environmental Group Company Ltd. launched a Wastewater Treatment and Reuse Project, a $408 million ADB nonsovereign project, which aims to upgrade wastewater treatment plants through PPPs. The project adopts on-site small-scale sanitation based on Japanese "Jokaso" technologies.[33] PSOD's active portfolio builds on the East Asia Department's TA promoting reuse of treated wastewater. Appendix 6 describes a few project country cases from India, Maldives, Pakistan, Samoa, Sri Lanka, and the PRC.

c. National Campaigns for Investment in Sanitation

71. **Leading factors.** National campaigns to raise awareness of the links between investments in urban sanitation and public hygiene to benefit health and the environment create conditions for

[31] It is worth adding that ADB was also involved in the government's program in introducing smart water metering technologies and skill of managing water tariff at provincial levels, which contributed to the effectiveness of project implementation activities in the PRC.

[32] ADB. 2015. *Report and Recommendations of the President to the Board of Directors: Western Counties Water and Wastewater Management Project in the People's Republic of China*. Manila.

[33] Jokaso (meaning "cleansing tank") is a Japanese decentralized wastewater treatment technology using the properties of micro-organisms to degrade organic contaminants.

successful investments. Where there is a strong national policy and targets to measure achievement (for example, to eradicate open defecation), ADB was able to take a strategic approach and focus resources on those provinces or states with the most capable institutions and favorable sector policies. However, some governments have asked ADB to invest more in less-developed provinces or states, where the needs are greatest. Much more attention needs to be given to policy reforms and capacity building in these areas, where the record of achievement is mixed.

72. Unlike the PRC, India is decentralized, and state governments and institutions are the focus of policy dialogue and lending. In 2008, the national government launched a national urban sanitation policy to create "totally sanitized cities." Such cities would aim to be free from open defecation, safely collect and treat all wastewater, eliminate manual scavenging, and collect and dispose of solid waste safely. As of 2010, 12 states had either completed or were in the process of completing their state sanitation strategies on the basis of the national urban sanitation policy, 120 cities were preparing city sanitation plans, and 436 cities had rated their achievements and processes on sanitation in an effort supported by the Ministry of Urban Development and several donors. About 40% of these cities rated themselves in the "red" category (in need of immediate remedial action) and more than 50% in the "black" category (needing considerable improvement). Only a handful were in the "blue" category (recovering). Not one rated itself in the "green" category (a healthy and clean city). The rating serves as a baseline to measure improvements in future and to prioritize actions. The government intends to award a prize to the best sanitation performers.

73. In connection with the urban sanitation policy, India inaugurated the "Clean India Mission," supported by ADB through state-level investment programs and integrated urban development lending. The "Clean India Mission" has been effective in states and cities which have capable wastewater management utilities and other local government institutions, leading to new financing for infrastructure.

74. IED's country assistance program evaluation for India, 2007–2015 included a sector assessment on urban water. This found that, compared with other subsectors, it took longer for urban water projects to be implemented and to reach the beneficiaries, reflecting technical issues and local capacity constraints. Nevertheless, once they were completed, the benefits of urban water projects were significant. Sector capacity constraints are being addressed through initiatives such as the Capacity Development Resource Centre by the ADB resident mission in India, which runs training courses for executing agency staff in trenchless technologies, decentralized wastewater systems, and other related areas.

75. In 2016, Rajasthan became the first state in India to approve a state-wide sewage and wastewater policy. It is compulsory for every house in the state to connect to the sewage system in cities with 100% sewerage coverage over the next 5 years. Rajasthan's wastewater policy also endorses the principle of PPPs for constructing and managing wastewater services. The state policy will be implemented over 30 years in all district headquarters and in cities with populations of over 100,000.

76. ADB has supported Rajasthan's wastewater policy and has invested in sanitation infrastructure in the context of integrated urban development through India's Urban Sector Development Program. Since 2007, ADB has provided $200 million in lending to support Rajasthan's sewerage and wastewater treatment infrastructure development, along with $23 million for policy development and capacity building. ADB's lending has helped accelerate improvements to sanitation in Rajasthan's cities, focusing on services for built-up areas in line with municipal development plans. However, sanitation services for the poor were not a specific focus of ADB interventions in Rajasthan state. To address this, the Sanitation Financing Partnership Facility provided a $2 million grant for sanitation improvements, including septage management and decentralized wastewater treatment, in non-sewered areas for low-income households.

77. **Lessons.** ADB needs to work within the political and governance structures in its DMCs, and to align itself strategically with national campaigns when there are opportunities to do so.

In India, the focus on state-level institutions was highly appropriate. In the PRC, with its strong central government, ADB was able to capitalize on national pollution abatement policies and to use the national program to support private sector engagement to develop PSOD investments. Both India and the PRC cases show ADB's involvement with national government on policies and campaigns paved the way for PSOD to seek opportunity in the water supply and sanitation sector for further investment.

2. Leading Factors of Failure

a. Not Targeting the Poor in Inclusive Planning

78. **Leading factors.** Many low-income communities have an uncertain legal status and complex land tenure arrangements and face other issues that hamper their access to conventional sewerage. ADB's record in reaching the poor with sanitation improvements is mixed. Reducing poverty in Asia and the Pacific has been ADB's overarching goal since 1999, and its Water Operational Plan explicitly aims to address equity issues by, among other things, providing infrastructure solutions, including sanitation for poor and vulnerable communities.

79. ADB has tended to invest mainly in conventional sewage citywide sanitation networks and wastewater treatment, instead of projects that directly address sanitation issues in low-income areas. This is partly because of institutional and policy complexities in its DMCs. As a result, the poor have been given a low priority by governments in ADB sanitation projects, according to interviews with ADB staff. There is clearly a disconnect between the desire for expedient lending and achieving ADB's goal of supporting poverty alleviation in Asia and the Pacific. The poor are expected to ultimately benefit from ADB's investments in wastewater treatment and centralized sewerage as networks are extended to these communities. The positive environmental impacts from safe wastewater management are expected to have positive health and economic impacts on society at large, including the poor. As a result, it is difficult to directly assess the poverty impacts of most urban sanitation operations.

80. Citywide inclusive sanitation strategies that integrate centralized sewerage and wastewater treatment with decentralized systems such as package treatment plants, shallow sewers, and communal septic tanks can be more effective than the conventional approach. They can provide inclusive service improvements and other benefits to both the poor and other groups. ADB needs to deepen its engagement in broader urban development policy dialogues with DMC governments to meet the sanitation needs of poor communities, and to address the complex legal issues that are often associated with informal settlements. This would enable it to develop viable investment opportunities. In some cases, ADB is unfamiliar with initiatives led by national governments to address sanitation in cities. It makes sense to place sanitation for the poor within the framework of broader urban development initiatives that can address solid waste management and storm water drainage along with sanitation.

81. **Sector highlights.** IED carried out a desk review of the PCRs of ADB's sanitation-related project loans with approval dates from 2003 to 2016. Of the 63 completed sanitation projects in the database, the poor were major beneficiaries in only 10 projects. Of these 10 projects, India and the PRC accounted for 2 projects each while Bangladesh, Fiji, Georgia, Samoa, Sri Lanka, and Viet Nam accounted for 1 project each (Table 3).

Table 3: Sanitation Projects with Poverty Targeting

Loan Number	Country	Project Name	Poverty Targeting
2055	FIJ	Suva Nausori Water Supply and Sewerage	The number or percentage of target poor beneficiaries was not specified.
2046	IND	Urban Water Supply and Environmental Improvement in Madhya Pradesh	The improved access to sewerage and sanitation services component benefited 0.8 million people, against an initial target of 1.6 million, as the scope of work was reduced in Bhopal and the Indore component was dropped. However, the number or percentage of target poor beneficiaries was not specified. The situation in the project towns and cities was poor, with 40% of households receiving water only on alternate days. One in eight households practiced open defecation.
2034	VIE	Central Region Urban Environmental Improvement Project	The number or percentage of target poor beneficiaries was not specified.
2026	SAM	Sanitation and Drainage Management	The beneficiaries included poor households in the low-lying and flood-prone urban zones. However, the number or percentage of target poor household beneficiaries was not specified.
1993	SRI	Secondary Towns and Rural Community-Based Water Supply and Sanitation	The project was designed to extend basic safe water and sanitation services in urban and rural areas, with a focus on alleviating poverty and benefiting women. The project aimed to provide pipe-borne safe water to 946,000 people and safe sanitation to 171,500 people in the project areas.
2117	BAN	Secondary Towns Integrated Flood Protection (Phase 2)	The number or percentage of target poor beneficiaries was not specified.
2207	PRC	Henan Wastewater Management and Water Supply Sector Project	Henan has a population of 94 million. There were about 775,110 poor people in both rural and urban areas in the project counties in 2004. This region was heavily polluted by domestic and industrial wastewater.
2293	IND	Kolkata Environmental Improvement Project (Supplementary)	Of the five million expected beneficiaries, 50% lived in slum settlements, with 4% below the poverty line. Project interventions in slum communities were designed to provide better access to such basic facilities as clean water supply and sanitation.
2487	PRC	Songhua River Basin Water Pollution Control and Management	In the Jilin subproject, the actual number of project beneficiaries reached 3.35 million, 15.5% more than estimated during the PPTA. All urban residents benefit from wastewater treatment and solid waste management. About 378,000 people, or about 11.3% of total beneficiaries, were poor. In the Heilongjiang component, the actual beneficiary population was 9.85 million, of whom 1.74% were poor.
2441	GEO	Municipal Services Development	About 45% of the targeted population was considered poor.

BAN = Bangladesh, FIJ = Fiji, GEO = Georgia, IND = India, PPTA = project preparatory technical assistance, PRC = People's Republic of China, SAM = Samoa, SRI = Sri Lanka, VIE = Viet Nam.
Source: Asian Development Bank (Independent Evaluation Department).

82. At least 10 ADB urban sanitation projects during the evaluation period had the explicit aim of supporting poverty alleviation through sanitation improvements, but only 4 of them clearly specified the number and percentage of the poor communities that were expected to benefit from these projects. Of those four projects, the Kolkata Environmental Improvement Project had the highest percentage (50%) of the beneficiary population living in slums, followed by Georgia's Municipal Services Development project, at 45%. For a better picture of the magnitude of ADB's urban sanitation support to poor communities, the number and percentage of poor beneficiaries in sanitation projects should be indicated in project documents, such as report and recommendation of the President (RRP). These data would allow baselines to be established and progress to be recorded in PCRs. The types of support to poor communities by project should also be specified in the project documents.

83. **Some limited success in targeting the poor.** ADB has typically used grant financing to reach lower-income areas with non-conventional sanitation services and has had some notable successes with this approach. In Apia, Samoa, the Sanitation and Drainage Project was financed by an $8 million loan, supplemented by another $2.8 million loan and a $2.2 million grant. This improved wastewater treatment and sewer installations for Apia's commercial area, although most of the population live in lower-density settlements on the outskirts of the city. A $2 million grant from the JFPR is being used to finance decentralized sewerage for these areas.

84. The Central Region Urban Environmental Improvement Project in Viet Nam established a sanitation credit scheme in project towns for poor and low-income households to maximize septic tank coverage. Community management committees administered the credit schemes as revolving funds, and provided health awareness and technical information to borrowers. As of April 2011, the scheme had provided 3,739 septic tanks, exceeding its target of 3,500. The revolving credit scheme continues to function as a financing mechanism to expand sanitation services in low-income areas.

85. The Kolkata Environmental Improvement Project exceeded the target number of beneficiaries of its slum improvement component, reaching 300,000 beneficiaries, compared with the 200,000 that were planned for. According to the PCR, the project introduced innovative practices, including the use of electronic measurement books, [34] advanced trenchless technologies for laying sewers through congested areas to minimize disruptions, and hydrodynamic models and canal network designs. The project ensured that the Kolkata Municipal Corporation underwent regular external audits and issued audited financial statements. These measures enhanced the project's effectiveness in achieving its intended outcome targets. This project was also one of several cases where, within one project, there were different components for off-site network treatment and on-site treatment. Such projects took place in five countries: India, Pakistan, Samoa, Sri Lanka, and the PRC.

86. **Lessons.** To ensure that ADB's urban sanitation investments are responding to the institution's overarching poverty alleviation goal, more urban sanitation projects should include specific poverty targeting where practical, and all projects should monitor the extent to which they are reaching poor beneficiaries. Encouraging DMCs to adopt citywide inclusive sanitation strategies and using tools such as fecal flow diagrams and other instruments that are being developed by the BMGF and partner agencies can be very helpful in ensuring that poor communities are treated equitably in ADB projects. ADB's partnership with BMGF through the SFPTF should provide ample opportunities to expand poverty-focused sanitation work.

b. Lack of Thorough Capacity Assessment of Local Implementing Agencies to Deliver Results

87. **Leading factors.** It is important for ADB to engage with local implementing agencies before and during project preparation so it can fully understand the challenges they face, and therefore incorporate local institutional development features into the project design. Project preparatory TA[35] is typically intended to

[34] Electric measurement books were tools used to enable online approval by engineers of the measurement of works of contractors and online preparation of vouchers.

[35] Project preparatory TA was renamed transaction TA (TRTA), effective 13 March 2017 (Staff Instruction on Business

analyze and address implementing agency capacities, limitations, and resource needs, but it is also important for ADB staff to know their project counterparts in local implementing agencies, and the project issues, so they can assure the quality of the project preparatory TA consultants' work. It is already recommended practice for project preparation teams to assess and address implementing agency capacity issues, but the analysis conducted in the course of this study suggests that greater efforts can be made, in particular to ensure that key ADB project staff have a good understanding of implementing agency capacities, incentives, and constraints, and are able to monitor them effectively.

88. In 2008, Indonesia established a Roadmap for the Acceleration of Urban Sanitation, an ambitious national program based on citywide sanitation strategies developed by municipalities, with some central government support. Under the roadmap, a mix of local government investments in decentralized wastewater management and on-site sanitation solutions were to be complemented by central government financing for sewerage and wastewater treatment plants. The target was to achieve full coverage in all urban areas by around 2020, with centralized sewerage in 16 cities, and 256 municipalities being served with decentralized sanitation or septic tanks along with fecal sludge management services.

89. ADB worked within this framework with the Ministry of Public Works and donor partners to prepare and implement projects to improve and expand sewerage and wastewater treatment under the Metropolitan Sanitation Management and Health Project, which supported sewerage expansion in the cities of Medan and Yogyakarta, and the subsequent Metropolitan Sanitation Management Investment Project. Both projects suffered from slow disbursement, partly because of ADB's inadequate engagement with municipal government planning and implementing agencies during project design. For the project in Medan and Yogyakarta, land acquisition issues seriously affected project implementation in Medan. Both cities had weak local institutions that required strengthening before sustainable sanitation services could be provided. Greater attention to institutional capacity and land acquisition issues during project design (complicated by field condition related to sandy soil with a higher groundwater) might have improved the implementation of this project. Metropolitan Sanitation Management and Health Project loan was originally designed to be completed by 2015; but now extended twice to December 2019.

90. The Metropolitan Sanitation Management Investment Project was initially designed to build or expand wastewater treatment and sewerage in five cities, but like the project in Medan and Yogyakarta, it suffered from institutional capacity and land acquisition issues, which seriously affected its implementation. The project is now working in three (Makassar, Pekanbaru and Jambi) of the original five cities by ADB; with the fourth city Palembang supported by Department of Foreign Affairs and Trade financing. The fifth city Cimahi was cancelled, and in the remaining four cities, the number of connections have been halved from the original scope. Three cities have various challenges, including land preparation for wastewater treatment plant site, local budget allocation with the counterpart funding, compensation with land acquisition.

91. On a more positive note, both projects benefited from ADB working closely with donor partners in aspects of project implementation. The United States Agency for International Development (USAID) funded Indonesia Urban Water, Sanitation, and Hygiene Project 28 (IUWASH) and its successor IUWASH PLUS are coordinating health education, sanitation promotion, and fecal waste management programs with the two ADB projects. The Australia-financed Indonesia–Australia Partnership for Infrastructure [36] is providing infrastructure design support and funding for a performance-based grant program to help the Palembang municipality to finance house connections.

92. Among the completed sanitation projects that had a less than overall satisfactory PCR rating, four (one each from Azerbaijan, India, Sri Lanka and the PRC) were rated less effective and one (from Pakistan) was rated ineffective due its sanitation components. In the Pakistan project,

Processes for Transaction Technical Assistance, based on Operations Manual, Section D12).

[36] Indonesia-Australia Partnership for Infrastructure (Kemitraan Indonesia-Australia untuk Infrastruktur).

one of main reasons for the low rating was the lack of consensus between the various stakeholders at provincial and municipal levels on the scope of the proposed multitranche financing facility (MFF) coverage. The main implementing agency sought comprehensive and large support for various urban services, whereas, the provincial government preferred a more targeted approach of supporting only urban transport. The India project (the MFF for the North Karnataka Urban Sector Investment Program) faced similar challenges as there was lack of capacity in the implementing agencies.

B. Delivering Results during Implementation

1. Leading Factor of Success

a. Combining Water Supply and Sanitation Institutions and Cost Recovery Mechanism

93. **Leading factors.** Linking the institutions that provide water supply and sanitation services makes charging a combined tariff for water and sanitation services much easier. Consumers are typically willing to pay for water supply services where they can see that they are paying for improved access to better quality water. Charging for sanitation is more complex. This is because most urban households already have some form of sanitation (latrine or septic tank), and a connection to a sewer or other improved decentralized sanitation infrastructure does not bring easily perceived direct incremental benefits. Many of the benefits of improved sanitation, such as improved environmental quality and public health, accrue to the general public rather than to individual households. Sanitation is a relatively complex mix of public and private responsibilities and benefits that makes charging for sanitation services more complicated than charging for water supply.

94. In most developing countries, institutional arrangements for urban water supplies are well-established. Municipal, regional, and occasionally national water utilities are responsible for providing and distributing piped water supplies and there is generally a willingness to pay for reliable water services among consumers (but not always a willingness among politicians to charge for them).

95. Institutional arrangements for sanitation are far more varied than those for water and generally less efficient, with sewerage sometimes being the responsibility of a separate utility or ministry, and decentralized sanitation services falling under an environment or health agency.

96. A more efficient arrangement is to view the management of the urban water cycle in an integrated way, with a single agency being responsible for the provision of clean water and the removal and treatment of the resulting wastewater. Areas with conventional sewerage are particularly well-suited for the combined management of water and sanitation services, and integrated agencies can also manage or oversee decentralized services, such as septic tank emptying and fecal sludge management.

97. Combining water and sanitation tariffs will leverage the willingness to pay for water supplies to cover the costs of sanitation services. Combined tariffs that include the cost of house connections are also an effective way to address the reluctance of households with septic tanks to pay for a sewer connection. Municipalities that have tried to charge a separate connection fee for sanitation have invariably been met with resistance unless strong enforcement mechanisms are in place (or there are other factors at play, such as a risk to public health).

98. Combined tariffs should account for the broader public environmental and health costs, and provide the benefits of sanitation. Increasingly, municipalities are charging customers a basic environmental fee regardless of their connection to a sewer system to defray the costs of sanitation improvements that everyone benefits from.

99. **Country case highlights.** The Greater Colombo Water and Wastewater Management Improvement Investment Program, an MFF for Sri Lanka approved in 2012, aims to rehabilitate and expand water supply and wastewater management infrastructure, and to support water and wastewater reforms. The program's wastewater services component rehabilitates and expands sewers, provides sewer connections, and aims to construct two wastewater treatment

plants. Colombo City recently passed a wastewater tariff law to impose a fixed charge for residential and industrial buildings, and a volumetric fee based on water consumption (residential and industrial users are charged 80% of their water usage). So far, neither has been implemented due to political constraints. Notwithstanding, change is slowly underway to eventually get the city's residents to pay for sanitation.

100. In Manila, the Metropolitan Waterworks and Sewerage System, supported by the International Finance Corporation since 1997, contracted two concessionaires to manage both water supply and sewerage services. A combined tariff is charged to all customers covering both water supply and sanitation service costs. In addition to the water tariff, a 20% environmental fee is charged to cover the general costs of wastewater management and environmental impact mitigation. For firms with sewer connections, a 30% fee is charged. No sewerage tariff is levied for residential connections and small businesses. The two concessionaires operate the septage management of Manila, while collection (desludging) is outsourced to a few third-party haulers, about 4. Both concessionaires have their fleet of desludging trucks, septage treatment facilities, and sludge disposal sites and offer regular septic tank desludging services to their customers.

101. In Cambodia, ADB has been influential in developing a unified water and sanitation tariff for utilities, increasing the duration of licenses for operation of water and wastewater plants from 3 years to 20 years, and establishing a target for full financial autonomy for water and wastewater utilities by 2019 (paras. 60 and 61).

102. In Viet Nam, to help the government create a policy environment conducive to financially viable wastewater services, ADB provided a $2 million TA project, funded by the JFPR, to review and assess technology, institutional, and financing options for wastewater management; and to strengthen government capacity for preparing new projects. One result of this initiative has been a national policy for full cost recovery for water supply and sanitation services through tariffs, and a mandatory connection to sewer lines where they are installed. The cost of house connections will be built into tariffs, rather than charged separately to households.

103. **Lessons.** Continued efforts are needed to prioritize sanitation and to address fundamental institutional and financing issues in the urban water and sanitation sector in an integrated manner. ADB's policy dialogues with DMCs already do this, but more can be done, including learning events, utility operator partnerships, and other mechanisms to encourage more efficient institutional arrangements and tariff policies.

2. Leading Factor of Failure:

a. Not Supporting Small-Scale Sanitation Providers for Urban Sanitation

104. **Leading factors.** ADB has not focused effectively on engaging the private sector in urban sanitation, particularly small-scale independent providers. Despite massive investments in sewerage and wastewater treatment, large parts of many cities in South and Southeast Asia remain dependent on decentralized sanitation options for decades. For these systems to function properly, they need to be regularly maintained by pit emptying and sludge treatment. Private firms offer a range of services for decentralized sanitation (septic tank emptying, recycling operations, and latrine construction), but these firms are neither adequately regulated nor supported by government institutions. External support agencies such as ADB can improve small-scale independent providers' access to finance, support firms' efforts to organize themselves more effectively, and encourage regulation of the services that they provide. ADB can use a combination of instruments to transfer finance to these providers, including grants, concessionary loans, guarantees, and equity investments.[37]

105. Conventional wisdom suggests that sanitation services are inherently unappealing for private sector participation because consumers are reluctant to pay for such services. Unlike water supply services, which have "private goods"

[37] Mangalore shows the way on wastewater management in India. *Asian Development Blog*. 8 June 2017.

characteristics that make the sector conducive to tariff-based cost-recovery systems, sanitation has a more complex mix of public and private goods characteristics.

106. Private sector development was identified as a "driver of change" in Strategy 2020. ADB has successfully supported PSP in urban sanitation in larger DMCs with well-established policies to encourage this. In the PRC, PSOD has worked within the country's private sector participation framework for nonsovereign lending to private entities to build and manage wastewater services, as described earlier in this chapter.

107. The Government of India has been promoting PPPs to manage state assets more efficiently and to raise the quality of public services delivery since the early 2000s. In a joint initiative with the government that began in 2006, ADB has been providing comprehensive support to mainstream PPPs through eight TA projects totaling about $17 million.

108. ADB also conducts policy dialogue to foster a more conducive environment for firms to participate in urban sanitation and to promote unified tariffs and regulations that reduce the risks for private investments in urban sanitation.

109. In Viet Nam, ADB and other donors have worked successfully with the government to establish a national policy for the full recovery of O&M costs for urban water supply and sanitation. The national policy is an important basis for attracting private sector participation. Provincial governments are responsible for the planning and budgeting of urban wastewater management programs, but they cannot afford the capital costs of these programs without central government support. Furthermore, households are resisting being connected to new sewer systems because of the connection costs and because they may already have septic tanks.

110. In Cambodia, ADB has supported government efforts to develop a unified water and sanitation tariff for utilities. Under the National Strategic Development Plan (2014–2018), the government set a target for full financial autonomy for public water and wastewater utilities by 2019. ADB is supporting this through the Urban Water Supply Project (approved 2014).[38] ADB's process of engagement with the government was previously described in para. 60.

111. The IUWASH [39] project in Indonesia, financed by USAID along with the World Bank, has been working with wastewater utilities and with small-scale independent sanitation providers (SSIPs)[40] to improve sludge management in several Indonesian cities. ADB has relied on IUWASH to address sludge management in the cities where ADB has invested in wastewater treatment plants and sewerage. ADB's other work with the Toilet Board Coalition (TBC) was a positive step toward broader-based support for medium- and small-scale private sector participation in urban sanitation. The coalition, which is most active in Africa, brings together experts from the business, investment, and the global sanitation communities to catalyze the growth of profitable sanitation businesses that deliver sanitation services. The TBC's "toilet accelerator" program works with promising start-up sanitation businesses for 1 year using large businesses to mentor smaller ones.[41] ADB is a financial supporter of the coalition, and could be more proactive in identifying toilet accelerator and other related activities that the TBC could support in Asia, and to integrate them into its lending operations.

C. Process and Impact Monitoring

1. Leading Factor of Failure

a. Not Monitoring Environment and Health Impact Indicators

112. **Leading factors.** Poor sanitation has profound health, environmental, and socio-economic impacts, which provide the rationale for investments in improving sanitation conditions. It is therefore important to measure the extent to

[38] ADB. 2017. *Report and Recommendation of the President to the Board of Directors: Proposed Loan to the Kingdom of Cambodia for Urban Water Supply Project*. Manila.

[39] The USAID *Penyehatan Lingkungan untuk Semua* (IUWASH PLUS) project.

[40] In Maputo, Mozambique for example, World Bank, it took two to three years to develop viable seven SSIPs, but the investment involved was small (around $100,000) and the staffing input was 3-persons team of experts working on technical, business and marketing aspects.

[41] TBC web site: www.toiletboard.org

which sanitation improvements mitigate those impacts. Environment and health data are effective tools for tracking the direct and indirect effects that sanitation facilities and services have on populations. Collecting these data is not always easy. Implementing agencies may see little value in expending scarce resources on monitoring impacts, especially if there is a risk that the data might be limited due to flaws in project design or implementation. Responsibility for data collection often lies with different ministries (e.g., environment or health), rather than with the agencies responsible for developing or managing sanitation infrastructure or services. In many countries, data are collected only at national or state levels, making it difficult to disaggregate them by project locality or district.

113. IED's review of the PCRs of 63 urban sanitation projects from 2003 to 2016 showed that only 10 projects had good monitoring of indicators for environment and health impacts. Some projects provided support for a monitoring system to track the performance of sanitation facilities regularly (for example, the effluent discharge of treated water and the water quality of water bodies near sanitation facilities). Seven of the 10 projects with good monitoring were in the PRC, where most sanitation projects are designed to combat pollution in rivers or lakes near cities, which the central government requires to be closely monitored.

114. Table 4 shows which indicators were monitored in the 10 sanitation projects with good monitoring. Environment indicators included effluent quality, surface water quality and/or turbidity, and ground water quality. Health indicators included incidence of diarrhea or typhoid. Appendix 7 gives full details of environment and health indicators in these 10 projects.

Table 4: Selected Environment and Health Indicators Monitored in Sanitation Projects

Country	Project	Environment Indicator	Health Indicator
FIJ	Suva Nausori Water Supply and Sewerage	Total coliforms	Diarrhea, Typhoid
PRC	Anhui Hefei Urban Environment Improvement	Effluent quality, odorous gases, surface water quality, ground water and soil quality (at closed landfill site) and ambient air quality	
PRC	Henan Wastewater Management and Water Supply	COD, NH3-N, BOD	
MLD	Regional Development, Phase II	Turbidity of water	Typhoid
INO	Urban Sanitation and Rural Infrastructure Support to PNPM Mandiri	Effluent monitoring against national and provincial standards in 418 locations	
PRC	Songhua River Basin Water Pollution Control and Management	Ph (acidity), COD, BOD, SS, NH3-N, TP (ammoniacal nitrogen)	
PRC	Fuzhou Environmental Improvement Project	COD, BOD, and SS	
PRC	Nanjing Qinhuai River Environmental Improvement Project	COD, BOD, SS, NH3-N	
PRC	Guangxi Nanning Urban Environmental Upgrading	COD, DO, BOD_5, NH3-N, TP, and TN	
PRC	Shandong Hai River Basin Pollution Control	COD, BOD and NH3-N	

BOD = biochemical oxygen demand, BOD_5 = 5-day biochemical oxygen demand, COD = chemical oxygen demand, DO = dissolved oxygen, FIJ =Fiji, INO =Indonesia, MLD = Maldives, NH3-N = ammoniacal nitrogen, PRC = People's Republic of China, SS = suspended solids, TN = total nitrogen, TP = total phosphorus.
Source: Asian Development Bank (Independent Evaluation Department).

115. All these projects had environment and health indicators monitored before, during, and after the construction of the urban sanitation facilities. Some gauged the contribution made to reducing hazardous substances in water bodies by wastewater treatment. For example, the PCR for the PRC's Henan Wastewater Management project reported that, on average, wastewater facilities contributed to over 95% of the total reduction of pollutants in wastewater in project cities and counties, such as chemical oxygen demand (COD), ammoniacal nitrogen (NH3-N), and biochemical oxygen demand (BOD). In the Fiji project, the incidence of diarrhea in infants and children aged up to 4 years in the Suva–Nausouri corridor peaked at 300 to 400 cases a year in 2009 to 2011, before declining to fewer than 60 cases a year in 2013 to 2014. However, the incidence of typhoid increased. Many factors may have contributed to the fluctuating incidence, including the quality of data collection, the effects of natural disasters on the infrastructure, and economic conditions.

116. **Lessons**. To track the benefits of ADB sanitation projects, more effort needs to go into data collection so this information can be used by governments and external support agencies to guide future investments in sanitation. Awareness and attention on long-term economic cost and benefit associated with capital investment in the urban sanitation are essential with various branches of the government; particularly with the national planning, finance and public works. Even in projects with SFPTF support, it is difficult to track the number of households that have been (or will be) connected to on-site treatment facilities.[42] One problem IED found was that the number of beneficiaries in SFPTF project briefs and in RRPs are often mixed with the number of beneficiaries of other project components (for example, larger water supply schemes). Thus, it is often not clear how many households in completed ADB-supported sanitation projects have been connected with on-site treatment, or will be connected in the ongoing projects.

b. Not Incorporating Gender Analysis and Actions Effectively

117. **Leading factors.** ADB needs to monitor gender disaggregated data on the impact of sanitation improvement interventions to ensure that both men and women are equitably involved in decision-making and in project benefits. The project-specific gender action plan (GAP), a tool used by ADB to ensure "gender mainstreaming,"[43] is visible in the project design and during implementation. The project GAP is not a separate component, but mirrors project outputs and is an integral part of project design (Appendix 8).

118. In Mongolia's Urban Development Sector project, it achieved more than what was designed in the project's original GAP. The project's intention to benefit female students in schools, provide loans for women and low-income households in the design and monitoring framework were not reflected in the original GAP. These features were subsequently added to the modified GAP to ensure consistency. Providing potable water and other basic infrastructure directly benefits women and children, and reduces the time poverty of women and their labor inputs. Under the project, six schools were connected to the water supply and sewerage systems, benefiting 7,805 school students (47% of whom were girls). Of the 481 households that received small loans, 222 (46%) were women, well exceeding the GAP target of 30%. An estimated 57 households headed by women (11%) and 59 poor and low-income households (12%) benefited from the small loans under the project as well.

119. Most gender targets in Indonesia's Urban Sanitation and Rural Infrastructure Support to the *Program Nasional Pemberdayaan Masyarakat* (PNPM) Mandiri Project were met, except for those related to the provision of civil works to women, and the participation of women in capacity development activities. The project target was that at least 30% of employment opportunities would go to women, and that 30% of capacity building activities would be attended by women. At project

[42] With an exception of one loan in Bangladesh on coastal management.

[43] The process of thoroughly integrating a gender perspective in institutions and operations is called gender mainstreaming. According to the United Nations Economic and Social Council (ECOSOC) definition, gender mainstreaming is: "the process of assessing the implications for women and men of any planned action, including legislation, policies or program, in any area and at all levels." (ECOSOC 1997). http://www.sswm.info/content/water-sanitation-and-gender

completion, about 16% of employment opportunities were undertaken by women, and 25% of capacity building activities were attended by women. Of the total 3.6 million beneficiaries, 1.9 million were women. The GAP was integral to the project, given that women were intended to be significant beneficiaries. It also contributed to achieving the overall outcome.

120. **Lessons.** Only 7 of 11 projects that specifically addressed gender equality or other gender issues related to sanitation had GAPs (Appendix 8). Overall, ADB sanitation investments require GAPs that have been prepared more rigorously, and they need to use them to monitor gender impacts whenever explicit gender outputs are identified in project design.

D. Knowledge Management to Improve Results

1. Learning from Global Practice

121. ADB's 2007 sanitation position paper (footnote 22) and the awareness that most Asian countries were unlikely to achieve MDG targets for sanitation drew attention to the need for significant new investment and alternative ways of doing business in the sector. For ADB, working with its DMCs to promote investment in sanitation and to develop more effective approaches has become increasingly important. ADB has therefore embarked on new initiatives to respond to these challenges by developing a structured learning environment within investment projects and partnership programs.

122. Since 2008, ADB has been successful in securing grant resources from several sources that can be used for institutional capacity building, policy reform, and related activities to maximize the potential for sustainable services. Funds have also been obtained from the BMGF to develop and test technology and institutional options in addition to conventional sewerage and treatment.

123. It should be noted, however, that for the most part ADB has followed rather than led the learning agenda to discover and develop new ways of doing business to achieve the institution's internal goals as well as the broader SDG agenda. The following three initiatives can, to varying degrees, be considered knowledge management success stories.

2. Leading Factor of Success

a. Encouraging Partnerships between Water Supply and Sanitation Agencies or Utilities among Member Countries

124. For ADB to strengthen the institutional capacity in DMCs for planning and managing both water and sanitation services in a more enduring way beyond the scope of lending operations, a regional TA, Supporting Water Operators Partnerships (WOPs) in Asia and the Pacific, was approved in 2011 (footnote 24). The WOPs program focuses on building the capacity of operators to run and maintain sanitation services, complementing infrastructure improvements and the adoption of new technologies. Since the program was launched in 2007, about 69 partnerships have been established, supporting $2.3 billion in investments in water and sanitation services. [44] Support to utilities will continue through a new WOPs program, where funds from other sources are being mobilized (as of April 2017).

125. Six WOPs initiatives to improve wastewater management services in Bangladesh, Fiji, Indonesia, Myanmar, Nepal, and Papua New Guinea were undertaken during the evaluation period.[45] Most focused on improving fecal sludge management to complement other ADB investments in sewerage and wastewater treatment.

126. Several advisory and capacity development TA projects during the evaluation period covered the technical designs of sanitation interventions (Table 5 and Appendix 9). One TA

[44] ADB. 2017. *Forging Partnerships among Water and Wastewater Operators*. Manila.

[45] Some of these were North–South partnerships (e.g., between Republic of Korea or Singapore and a DMC), but there were cases of South–South partnerships (e.g., between Bangladesh and Maldives).

Table 5: Notable Advisory and Capacity Development Technical Assistance Projects Focused on Sanitation

Project Title	TA No.	TA Type	Approval Year	Country
Greater Colombo Wastewater Management Sector Review	4184	ADTA	2003	SRI
Institutional Strengthening for Rural Water Supply and Sanitation Services	4186	ADTA	2003	KAZ
Safe Drinking Water and Sanitation for the Rural Poor	4215	ADTA	2003	PRC
Capacity Building in Water and Sewerage Services	4270	ADTA	2003	FIJ
Institutional Strengthening of Water Supply and Sanitation Sector in Secondary Towns	4465	ADTA	2004	AZE
Strengthening Urban Project Management in Jammu and Kashmir	4888	ADTA	2006	IND
Urban Wastewater and Solid Waste Management for Small Cities and Towns	7002	ADTA	2007	PRC
Urban Wastewater Reuse and Sludge Utilization Policy Study	7083	ADTA	2008	PRC
Capacity Development for Metropolitan Sanitation Management and Health	7562	CDTA	2010	INO
Supporting Water Operators' Partnerships	7739	CDTA	2010	INO
Improving the Delivery of Urban Services in Madhya Pradesh	7748	CDTA	2010	IND
Capacity Development for Water Supply and Sanitation Service Delivery	7676	CDTA	2010	SRI
Supporting Water Operators' Partnerships (Supplementary)	7739	CDTA	2011	INO
Support to Central and Local Governments to Implement Urban Environmental Improvement Programs	7885	CDTA	2011	VIE
Supporting Water Operators' Partnerships in Asia and the Pacific	7920	CDTA	2011	REG
Introducing Best Practices for Septage Management	7947	CDTA	2011	IND
Strengthening Sanitation Planning and Efficiency Improvement	7843	CDTA	2011	INO
Promoting Innovations in Wastewater Management in Asia and the Pacific	8060	CDTA	2012	REG
Wastewater Treatment and Reuse	8457	CDTA	2013	PRC
Water Supply and Sanitation Strategy	8375	CDTA	2013	KGZ
Water and Sanitation Sector Management	9020	CDTA	2015	PAL
Water Supply and Sanitation Strategy (Supplementary)	8375	CDTA	2016	KGZ
Management and Reuse of Sewage Sludge from On-Site Sanitation Facilities and Decentralized Wastewater Treatment Plants	9100	CDTA	2016	MON

ADTA =advisory technical assistance, AZE = Azerbaijan, CDTA = capacity development technical assistance, FIJ = Fiji, IND = India, INO = Indonesia, KAZ = Kazakhstan, KGZ = Kyrgyz Republic, MON = Mongolia, PAL = Palau, PRC = People's Republic of China, REG = Regional, SRI = Sri Lanka, VIE = Viet Nam.
Source: Asian Development Bank (Independent Evaluation Department).

project in the PRC[46] produced a policy note on urban wastewater treatment, financing and tariff setting for small cities and towns, taking account international and national good practices. The TA made recommendations on the planning and design of wastewater treatment systems in small cities and towns. Another TA in the Kyrgyz Republic[47] envisaged a design approach to water supply and sanitation as part of the framework for infrastructure development and system maintenance development. The TA completion report recorded that a "framework for infrastructure development and system maintenance" was partially achieved, but that targeted improvement of the system management of the sector was not achieved. Overall, the TA was rated less than successful.

127. **Lesson.** ADB has launched several TA initiatives to respond to slow progress in mainstreaming sanitation investments. It is developing a dedicated learning system that allows executing agency staff and utility operators in ADB projects to learn from the expertise of more experienced utilities in the region under the WOPs. Meanwhile, some sanitation initiatives, financed through the regional TA, which closed in 2016—e.g., the Wastewater Management Expert or "WaMEx" website and PSOD policy dialogues outside the PRC—have not been able to continue for various reasons (including conflicting priorities). When the SFPTF was put in place, it focused on non-networked sanitation. By contrast, WaMEx focused on support for managing sanitation projects (particularly sewer networks and treatment plants).

[46] ADB. 2007. *Urban Wastewater and Solid Waste Management for Small Cities and Towns in the People's Republic of China.* Manila.

[47] ADB. 2013. *Technical Assistance for Water Supply and Sanitation Strategy in Kyrgyz Republic.* Manila.

b. Encouraging Demonstration Effects of Pilot Fecal Sludge Management at Municipality Level for a Wider Effect

128. **Leading factors.** Some of the recently approved (2014 onwards) and currently ongoing small town-level projects are showing successes with demonstrative pilot fecal sludge management (FSM) components that are expected to be replicated widely, or have led to policy framework at the national level.

129. **Case highlights.** Third Small Towns Water Supply and Sanitation Sector Project [48] showed successful support in Nepal, where pilot fecal sludge management services led to broader policy changes and service improvements. The project (with $1.3 million SFPTF grant) had a component that planned to design and construct pilot fecal sludge management facilities in four towns: Chandrauta, Charali, Kakarvitta, and Mahendranagar. The demonstration of innovative septage management solutions in four towns are catering to about 15,500 households or 83,000 population. The project supported drafting and institutionalizing policies for FSM, and the design and construction of two pilot FSM treatment plants in two of the four towns, as well as the formulation of FSM business and operational plans.

130. Other initiatives are also planned and beginning to take shapes in India and Mongolia. In India, the Rajasthan Urban Sector Development Program (with SFPTF's $2.0 million grant) [49] is supporting demonstration of innovative FSM solutions to capture best practices, generate replicable sanitation models, engage private sector providers, develop a conducive institutional framework, and build capacity. In Mongolia, the Southeast Gobi Urban and Border Town Development Project[50] (Additional Financing with SFPTF's $1.0 million grant) is designed to address management and reuse of sludge from on-site sanitation facilities and decentralized wastewater treatment plants, including pilot demonstration for providing proper sanitation facilities for areas not connected to the water supply and sanitation grid in four provinces. The component plans to: (i) analyze and design sludge management facilities, (ii) develop fecal sludge from non-core areas by providing 80 improved toilets with sealed septic tanks, and (iii) draft national FSM policy and regulation. These examples show the demonstration effect pilots can have on policy reform in FSM.

3. Leading Factors of Failure

a. Slow Uptake and Disbursement under the Sanitation Financing Partnership Trust Fund

131. **Leading factors.** The SFPTF described in Chapter 3, was established in 2013 with a $15 million contribution from the BMGF to promote innovations for fecal sludge management and non-networked sanitation in ADB investments. Use of the SFPTF has been slow (Appendix 10). Although the intention and plan are good, the disbursement since 2013 has been $2.7 million only as of December 2017.

132. **Case highlights.** BMGF has provided an additional $1 million to support a senior expert on fecal sludge management in ADB to form the nucleus of a small sanitation innovations team that will stimulate more scaled-up investment in citywide sanitation approaches.

133. **Lessons.** Stakeholders' consultations and preparations for sub-activities financed by SFPTF can be initiated well in advance of the approval of loans and grant projects, which will enable faster disbursement. Discussions with staff from the BMGF reflected that greater awareness on non-conventional sanitation strategies and technologies, and standardized approaches for incorporating them in projects, such as applying special technical solutions would further advance implementation of these on-site solution

[48] ADB. 2014. *Report and Recommendation of the President to the Board of Directors: Proposed Loan and Grant for Third Small Towns Water Supply and Sanitation Sector Project in Nepal*. Manila. ($60 million, approved in September 2014).

[49] ADB. 2014. *Report and Recommendation of the President to the Board of Directors: Proposed Loans and Technical Assistance Grant and Administration of Grant for Rajasthan Urban Sector Development Program in India.* Manila. ($500 million, approved in October 2014).

[50] ADB. 2016. *Report and Recommendation of the President to the Board of Directors: Proposed Loan for Additional Financing and Administration of Technical Assistance Grant for Southeast Gobi Urban and Border Town Development Project in Mongolia.* Manila. (Additional Financing: $19 million 2016).

expansion. BMGF is working with consortium of universities on fecal sludge management, including Asia and elsewhere. There is dozen or so involved, including Asian Institute of Technology and several institutions in countries, e.g. India and Kenya. There are already good examples of integrating on-site and off-site sanitation at scale in a number of countries. For example, BMGF are supporting such initiatives,[51] including (i) Reinvent the Toilet Challenge in India and China; (ii) public toilet stands in the slums of Kenya, with entrepreneurs who collect the waste for use in generating electricity and producing fertilizer; and (iii) promoting incremental shifts in making it social norms to promote household toilet in India. ADB can look into these cases, and find ways to adopt city-wide, strategic perspectives that include investment in the full spectrum of technical options; on-site, simplified sewerage, decentralized treatment, as well as conventional sewerage with large-scale treatment plants.[52]

E. Summary

134. Illustrative analysis of success and failure factors for urban sanitation operation. Each country has different contexts affecting sanitation services including the legal framework, institutional arrangements and responsibilities, population density and urban sprawl, water availability, land use patterns, and tariff regulatory system. Some observations can be included in the project design and implementation checklists. IED looked at 63 completed and evaluated projects implemented between 2003 to 2016. Six success factors are: (i) long-term relationships for policy dialogue, (ii) policy regulatory system and rules for private sector investment in sanitation, (iii) national campaigns for investment in sanitation, (iv) combining water supply and sanitation institutions and cost-recovery mechanisms, (v) encouraging partnerships with other utilities in member countries, and (vi) encouraging demonstration effects of pilot fecal sludge management at municipality level for a wider effect. Six failure factors are: (i) no targets for the poor in inclusive planning, (ii) lack of a thorough capacity assessment of local implementing agencies, (iii) not supporting small-scale independent sanitation providers for fecal sludge management, (iv) not monitoring of environment and health impact indicators, (v) not incorporating gender analysis and actions, and (vi) slow uptake and disbursement of initiatives under the Sanitation Financing Partnership Trust Fund.

[51] These cases are showcased at BMGF website: *gatesfoundation.org*

[52] In addition, FSM is now major part of World Bank sanitation projects in Lusaka, Zambia and Dar es Salaam in Tanzania.

5

LESSONS FOR FUTURE OPERATIONS

135. Before 2007, ADB's approach to urban sanitation was conservative and limited in scale, focusing almost exclusively on wastewater treatment and conventional sewerage infrastructure investments. These systems require investment in more than just infrastructure to ensure their sustainability. Management and institutional capacity need to be developed, tariff policies must be reformed to ensure systems are financially viable, and regulations need to be in place to maximize connections to sanitation services. Furthermore, most urban residents not served by these services—a disproportionate number of whom are poor—live in areas where conventional sewerage may not be a viable option because of low housing densities, terrain considerations, and other factors. ADB has tended to avoid projects that address sanitation issues in these areas due to technical, institutional, and policy complexities.

A. Summary of Leading Factors

136. ADB needs to continually adapt its urban sanitation strategy to the changing dynamics in Asia and the Pacific. To do this, it needs to move from concentrating on major sanitation operations and adopt a more comprehensive approach to sanitation financing to meet the widespread need for small-scale sanitation solutions in most of its DMCs. Most of the focus of ADB's water projects with sanitation components in the evaluation period was on traditional networked sanitation solutions. These projects are more in line with ADB's traditional way of doing business, according to interviews with ADB sector staff, yet such projects may be missing out on the actual sanitation needs of most DMCs, where interventions in low-income and poor communities are greatly needed. To serve the sanitation needs of these groups, it is imperative for ADB to look at small sanitation schemes targeting the poor, including small-scale independent providers of sanitation services such as fecal sludge management. Getting involved at this level will quickly provide the building blocks for the bigger schemes that ADB has traditionally invested in.

137. Policy dialogues, ADB-managed sanitation financing facilities such as the WFPF, and twinning arrangements have all added value and contributed to successes in urban sanitation. Initiatives funded by grants and trust funds have provided a sound foundation for ADB sanitation operations and have catalyzed global sanitation good practices within ADB and its DMCs. ADB will add further value to its sanitation operations by continuing to work with stakeholders in sanitation, such as the BMGF and the TBC, and by leveraging the additional assistance they may provide to address basic sanitation.

138. To bridge future sovereign and nonsovereign operations in sanitation, sovereign financing can be used to build basic infrastructure and support conducive legal and regulatory systems, which can then be expanded through PSOD financing when the need for bigger facilities can no longer be covered by public financing.

139. Successes and failures in urban sanitation are not project-specific; they are influenced by a confluence of various success factors (Table 6). These include (i) incentives to promote private sector participation; (ii) clear long-term plans on mixing on- and off-site wastewater treatment investments; (iii) combined tariff collections for water and sanitation; (iv) sustained ADB staff presence on the field for sector policy dialogue; (v) engaging small-scale independent providers for fecal sludge management; (vi) special attention to the poor and vulnerable, and to gender issues; and (vii) interagency coordination on environment and health indicators to justify investing in sanitation. Importantly, the lack of any one of these factors may lead to challenges and difficulties in achieving overall sanitation objectives.

Table 6: Factors of Success and Failure in Asian Development Bank Sanitation Projects, 2003–2016

Item	Factors of Success	Factors of Failure
Project Identification, Design, and Preparation	• Long-term relationships for policy dialogue (e.g., Cambodia, Viet Nam) • Policy regulatory system and rules for private sector investment in sanitation (e.g., People's Republic of China) • National campaigns for investment in sanitation (e.g., India)	• No targets for the poor in inclusive planning • Lack of thorough capacity assessment of local implementing agencies (e.g., municipalities in decentralized government system)
Delivering Results During Implementation	• Combining water supply and sanitation institutions and cost recovery (e.g., Colombo, Sri Lanka)	• Not supporting small-scale independent sanitation providers for fecal sludge management
Project Monitoring (these are sector-wide issues, not on any particular project)		• Not monitoring environment and health impact indicators • Not incorporating gender analysis and actions
Knowledge Management to Improve Results	• Encouraging partnering with other utilities in member countries (e.g., Water Operators' Partnership) • Encouraging demonstration effects of pilot fecal sludge management at municipality level for a wider effect (e.g., Nepal)	• Slow uptake and disbursement of initiatives under Sanitation Financing Partnership Trust Fund

Source: Asian Development Bank. (Independent Evaluation Department).

B. Lessons for Future Operations

140. Based on leading factors for success and failures, this paper offers some lessons for ADB future operations in urban sanitation.

(i) **Thorough and continuous engagement with implementing agencies from the project preparation stage is essential to avoid or mitigate implementation bottlenecks.** It is key for ADB to work thoroughly with implementing agencies before and during project preparation so it fully understands the challenges, and so it can incorporate local institutional development features in the project design. It is important to understand the source of funding for the agency responsible for sanitation so it can expand, improve, and maintain facilities, and its operational relationship with water supply agencies. Legal frameworks assessment to allow these agencies to explore ways to invite the private sector to participate in sanitation projects can be a good step.

(ii) **Policy dialogue throughout the project cycle is an essential component to laying out groundwork for private sector participation.** An enabling environment is a clear contributing factor for sector success. Conducive national sanitation policies in India and the PRC helped create the conditions for a series of successful ADB investments. This enabling environment—created by setting rules and a system enabling private sector participation—was a clear contributing factor for attracting private sector investment in urban sanitation in these two countries. In the PRC, PSOD processed multiple sanitation investment projects, and the East Asia Department has supported the PRC in its water policy, particularly on tariffs. PSOD does not involve itself in building incentives schemes or in policy dialogues, but enters when these systems are already in place. Other regional departments can learn from the East Asia Department's experience of supporting the government in introducing these mechanisms to enable private investment in sanitation business. PSOD can also be part of these discussions to nurture future investment opportunities.

(iii) **Integrated sanitation solutions in cities and other urban areas need to be built on a long-term vision, taking note of local needs for sanitation interventions, as this is the key determinant for success.** Most ADB projects that had both on- and off-site treatment components had no strategy to interface the two. On-site interventions mostly targeted slum households, and the two interventions have operated very much in isolation. Value would be added if the strategies for the expansion of the on-site treatment could be made clear in the targeted cities, with a long-term plan for eventually connecting areas with on-site interventions to the network in future. It will also be important to clarify how these two operations will contribute to the overall livelihood improvement for cities, and to have long-term business strategies for utility services to sustain integrated sanitation coverage. For example, city fecal flow diagrams (Chapter 2, Figure 4) may be produced for the cities where ADB has operations, e.g., for specific targeted interventions in slums.

(iv) **Targeting the poor to ensure inclusiveness needs carrying out of full accounting of poor and vulnerable beneficiaries.** This will lead to better monitoring and assessment of impacts, and will subsequently inform policy makers and elicit buy-in for interventions that focus on marginalized populations. Projects should be designed specifically to reach poor communities as well as better-off populations through citywide inclusive sanitation strategies. To get a better picture of the magnitude of the outcome of ADB's support to the poor communities, the number and percentage of poor beneficiaries of the projects must be indicated in such project documents as RRPs and PCRs. Likewise, the type of project support to poor communities should be clearly specified in project documents. If ADB can demonstrate these impacts to client governments, there is a greater chance they will continue to invest in on- and off-site treatment of wastewater.

APPENDIXES

APPENDIX 1: URBAN SANITATION STATUS OF ADB DEVELOPING MEMBER COUNTRIES

Country	2015 Total Population ('000)	Urban Population		At least basic urban sanitation		Open Defecation	Safely Managed Sanitation	Sewer Connection: Urban Population Served	
		Population	% of total	Population	% of total	%	%	Population	% of total
Central West Asia Region									
Afghanistan	32,527	8,782	27	4,918	56	0	…	615	7
Armenia	3,018	1,901	63	1,825	96	0	…	1,787	94
Azerbaijan	9,754	5,365	55	4,936	92	0	73	3,272	61
Georgia	4,000	2,160	54	2,052	95	0	17	1,663	77
Kazakhstan	17,625	9,341	53	9,061	97	0	67	5,792	62
Kyrgyz Republic	5,940	2,138	36	1,989	93	0	…	748	35
Pakistan	188,925	73,681	39	54,524	74	0	…	39,788	54
Tajikistan	8,482	2,290	27	2,153	94	0	…	1,237	54
Turkmenistan	5,374	2,687	50	2,526	94	0	…	1,344	50
Uzbekistan	29,893	10,761	36	10,761	100	0	…	4,843	45
Regional Summary:	*305,538*	*119,106*	*39%*	*94,745*	*80%*			*61,089*	*51%*
East Asia Region									
People's Republic of China	1,376,049	770,587	56	662,705	86	1	73	570,235	74
Mongolia	2,959	2,130	72	1,406	66	1	…	383	18
Regional Summary:	*1,379,008*	*772,717*	*56%*	*664,111*	*86%*			*570,618*	*74%*
Pacific region									
Cook Islands	21	16	76	15	94	.	…	-	
Fiji	892	482	54	462	96	0	…	173	36
Kiribati	112	49	44	24	49	15	…	8	16
Marshall Islands	53	39	73	37	95	0	…	23	59
Micronesia, Federated States of	104	23	22		.		…	-	0
Nauru	10	7	70	4	57	3	…	1	14
Palau	21	18	86	18	100	0	16	12	67
Papua New Guinea	7,619	990	13	545	55	4	…	198	20
Samoa	193	37	19	36	98	0	25	9	25
Solomon Islands	584	128	22	98	76	9	…	-	0
Timor-Leste	1,185	391	33	285	73	5	…	59	15
Tonga	106	25	24	25	100	0	…	-	0
Tuvalu	10	6	60	6	100	6	6	5	83
Vanuatu	265	69	26	42	61	1	…	6	9
Regional Summary:	*11,175*	*2,280*	*20%*	*1,597*	*70%*			*494*	*22%*
South Asia Region									
Bangladesh	160,996	54,739	34	29,559	54	0	…	4,926	9
Bhutan	775	302	39	218	72	0	…	30	10
India	1,311,051	432,647	33	281,220	65	7	…	108,162	25
Maldives	364	167	46	156	93	0	…	154	92
Nepal	28,514	5,418	19	2,817	52	6	…	813	15
Sri Lanka	20,715	3,729	18	3,319	89	2	…	336	9
Regional Summary:	*1,522,415*	*497,002*	*33%*	*317,288*	*64%*			*114,421*	*23%*
Southeast Asia Region									
Cambodia	15,578	3,271	21	2,879	88	3	…	1,439	44
Indonesia	257,564	139,085	54	107,095	77	5	…	4,173	3
Lao People's Democratic Republic	6,802	2,653	39	2,467	93	2	…	80	3
Malaysia	30,331	22,748	75	22,748	100	0	…	9,554	42
Myanmar	53,897	18,325	34	13,927	76	0	…	-	0
Philippines	100,699	44,308	44	35,003	79	3	…	886	2
Thailand	67,959	33,980	50	31,941	94	0	…	3,058	9
Vietnam	93,448	31,772	34	28,913	91	2	…	635	2
Regional Summary:	*626,278*	*296,142*	*47%*	*244,973*	*83%*			*19,825*	*7%*
ADB DMC Summary:	3,844,414	1,687,247	44%	1,322,715	78%			766,447	45%

ADB = Asian Development Bank, DMC = developing member country.
Source: Joint Monitoring Program: Progress on Drinking Water, Sanitation and Hygiene, 2017.

APPENDIX 2: ALTERNATIVE WAY TO MANAGE PRIORITIES OF WATER SUPPLY AND SANITATION: EXAMPLE OF WORLD BANK

1. **Background.** Before 2013, the World Bank was organized along regional lines, with regional vice presidencies managing its lending operations. Each region had technical departments, with arrangements for sanitation and water supply varying among the regions, depending in part on the long-term business trends in each region.

2. Knowledge management and technical quality assurance was the responsibility of the Sustainable Development Vice Presidency (SDVP). Within the SDVP, there were several technical "anchors." The water anchor comprised a range of subsector programs supported primarily by trust funds with financing from bilateral partners and a few development-focused nongovernment organizations (NGOs) such as the Bill & Melinda Gates Foundation (BMGF). The Water and Sanitation Program (WSP) and the Water Partnership Program (WPP) were the primary vehicles providing technical support and quality assurance services to World Bank operations as well as knowledge generation and management. WSP in particular, was a large program with five regional offices and country programs in about 40 countries. The intention was that SDVP technical assistance activities, in particular those of WSP, would be integrated with lending operations, with pilot projects embedded within larger, loan- and credit-financed projects. The degree to which this integration was successful varied widely between regions.

3. **Water sector.** The regional organization of the World Bank was perceived to have fostered geographic isolation, with insufficient cross-fertilization of knowledge and skills between regions. To address this, a reorganization along technical lines was initiated in 2013. Under this arrangement, the Global Water Practice (GWP) now has broad responsibility for the World Bank's portfolio of activities in the entire water sector, including urban and rural sanitation, water supply, irrigation, drainage, water resources management (including disaster risk management), and hydropower.

4. The GWP addresses five broad thematic areas: sustainability, institutions, inclusion, financing, and resilience. To leverage implementation experience and knowledge for clients, the GWP is organized in a matrix structure with nine regional practice managers, responsible for a portfolio of lending and technical assistance activities for their clients, and two global practice managers responsible for knowledge management and practice administration.

5. To facilitate knowledge sharing across regions, lending and technical assistance is also organized along business lines, based on sub-sectors within water. These knowledge activities are coordinated by a set of global solutions groups (GSGs), one for each of the following business lines.[53]

(i) water supply and sanitation;
(ii) water security and integrated resource management;
(iii) water for agriculture;
(iv) water, poverty, and the economy;
(v) inclusion; and
(vi) hydropower and dams

6. The GSGs ensure that knowledge is applied in project design and implementation, support knowledge initiatives, and manage a network of partnerships with other leading organizations working to address water challenges. More specifically, they carry out technical analytical work; lead quality assurance activities, such as quality enhancement reviews during preparation of lending and technical assistance operations and "safe space" concept reviews; and represent the World Bank at international conferences. There are global leads for each of the business lines who function as advisors and report directly to the GWP senior director. An organization chart for the GWP can be found in Figure A2.1.

7. Much of the work of the GSGs is supported by a $200 million multi-donor trust

[53] World Bank. 2016. *A Water Secure World for All*. Washington, DC.

fund, the Global Water Security and Sanitation Partnership, financed by a wide range of bilateral partners, nongovernment organizations (NGOs), and some private sector institutions. This is the successor mechanism to the Water and Sanitation Program and the Water Partnership Program within the World Bank. It supports knowledge management work led by the GSGs under the five overall thematic areas of sustainability, institutions, inclusion, financing, and resilience. It also finances the activities of a number of key focal areas such as financing efforts to achieve the Sustainable Development Goals, urban and rural sanitation, utilities performance, institutions, regulations, and incentives.

8. **Urban sector.** Urban development falls under the Social, Urban, Rural and Resilience Global Practice. It has three core pillars:

(i) strengthening city finances, planning, and governance systems;
(ii) improving different dimensions of living conditions for people–infrastructure services, tenure, housing, and neighborhoods; and
(iii) supporting urban transformation through improved urban and land-use planning, management, and implementation of integrated investments in infrastructure and service delivery in a manner that can improve urban space and impact city form over the long run, through reducing sprawl and enhancing livability, resilience, and productivity.

9. The three core pillars are translated into six business lines:

(i) cities and economic growth;
(ii) urban poverty and inclusion;
(iii) municipal infrastructure and services;
(iv) affordable housing and land;
(v) urban management, finance, and governance; and
(vi) cities and urban environment.

10. These business lines are delivered through (i) technical assistance, knowledge, and analytical services; (ii) convening; and (iii) financing. Like the GWP, the Social, Urban, Rural and Resilience Global Practice is organized in a matrix structure, with regional practice managers who are responsible for delivering the business line portfolios, along with global solutions groups focusing on the three core pillars.

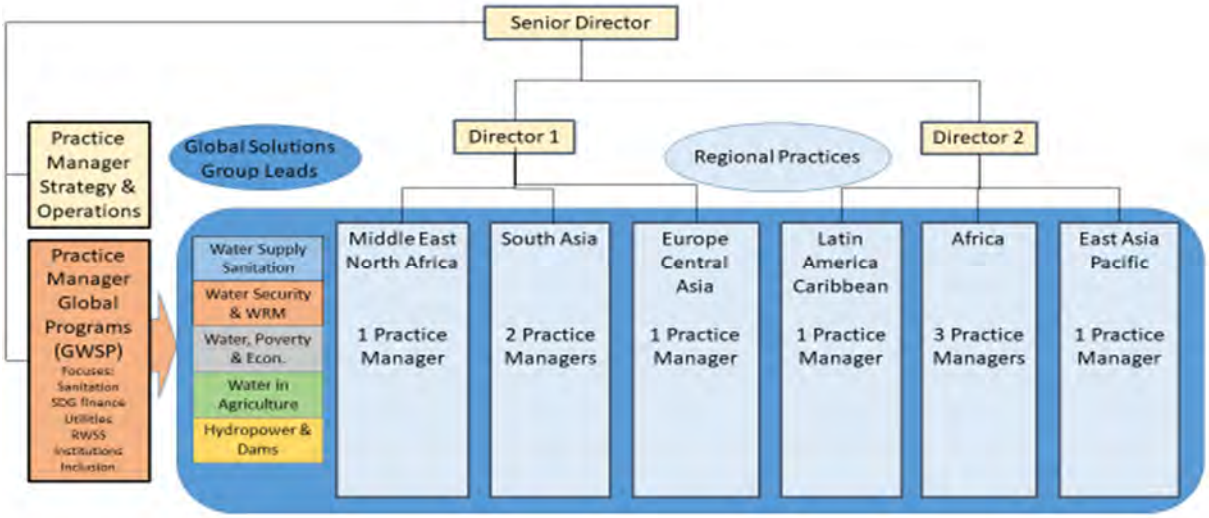
11. In addition, the World Bank is increasingly working on the response to climate change in cities. It focuses on risk and resilience including disaster risk mitigation, before and after disasters; low-carbon planning and investment; and access to financing for climate-smart infrastructure.

12. **How the global practices function.** At the senior management level in the World Bank, collaboration within and between global practices is seen as critical to the success of the reorganized structure of the institution. Collaboration is strongly promoted and mechanisms are being put in place to monitor it, measure impacts, and provide incentives for staff.

13. In practice, with global practices dependent on budgets based on unit costs for components of the lending cycle combined with a lack of clearly delineated boundaries between global practices, there is significant competition between global practices for lending operations. In part as a result of this competition, as well as the comparative advantage in terms of staffing presence that particular global practices may have in specific regions, the World Bank's lending for the water sector is managed by global practices other than GWP in some regions. For example, the Social, Urban, Rural and Resilience Global Practice has a part of the urban sanitation portfolio in West Africa, where the urban development team has a more significant field presence. However, the GWP retains responsibility for quality assurance and technical support for the entire global water portfolio, regardless of which global practice is managing the lending. Mechanisms for streamlining budget allocations in this collaborative environment are evolving.

14. Within the GWP, the current view is that the reorganization by technical practices and the consolidation of the water practice is bringing significant benefits. It is leading to more cohesive and interlinked water sector programs in countries, and to some extent has facilitated better cross-fertilization of knowledge, skills, and experience among staff and teams.

Figure A2.1: The World Bank's Global Water Practice: Organization Chart



GWSP = Global Water Security & Sanitation Partnership, RWSS = Rural Water Supply and Sanitation, SDG = Sustainable Development Goal, WRM = Water Resources Management.
Source: World Bank.

APPENDIX 3: APPROVED AND COMPLETED SANITATION PROJECTS, 2003–2016

Table A3.1: List of Approved and Completed Sanitation Projects, 2003–2016
($ million)

No.	Approval Year	DMC	Project Name	Loan/ Grant amount	Urban Water Supply	Urban Sanitation and Sewerage	Urban Flood Protection	Urban Solid Waste	Urban Policy, I & C Dev	PCR Rating	PVR/ XVR Rating
Central and West Asia Department											
1	2004	AZE	Urban Water Supply and Sanitation	20.00	12.00	6.00			2.00	PS	LS
2	2004	AZE	Urban Water Supply and Sanitation	10.00	6.00	3.00			1.00	PS	LS
3	2005	PAK	Rawalpindi Environmental Improvement	40.00					40.00	US	
4	2005	PAK	Rawalpindi Environmental Improvement	20.00					20.00	US	
5	2005	PAK	Balochistan Devolved Social Services Program	65.00					21.50	US	
6	2005	PAK	Balochistan Devolved Social Services Program	130.00					40.00	US	
7	2006	PAK	TA Loan for Megacity Development	10.00	0.33	0.80		0.48	0.77	US	US
8	2007	ARM	Water Supply and Sanitation Sector Project (formerly Municipal Services and Infrastructure Development)	36.00	32.40	3.60					
9	2008	PAK	Sindh Cities Improvement Investment Program (Project 1)	38.00	14.51	2.43		6.47	6.37		
10	2008	UZB	Surkhandarya Water Supply and Sanitation	30.00	27.51	0.84		1.65		S	
11	2008	GEO	Municipal Services Development	40.00					40.00	S	S
12	2010	KGZ	Emergency Assistance for	100.00	23.56						

No.	Approval Year	DMC	Project Name	Loan/ Grant amount	Urban Water Supply	Urban Sanitation and Sewerage	Urban Flood Protection	Urban Solid Waste	Urban Policy, I & C Dev	PCR Rating	PVR/ XVR Rating
			Recovery and Reconstruction								
13	2014	ARM	Infrastructure Sustainability Support Program (Roads and Water)	49.00	2.00				10.00		
East Asia Department											
14	2003	PRC	Wuhan Wastewater Management	83.00		83.00				S	S
15	2005	PRC	Henan Wastewater Management and Water Supply	100.00	10.44	38.89			1.56	S	
16	2005	PRC	Fuzhou Environmental Improvement Project	55.80	17.15	37.00			1.65	PS	
17	2005	PRC	Jilin Water Supply and Sewerage Development	100.00	55.30	44.70				S	S
18	2006	MON	Urban Development and Housing Project	28.20	5.32	5.32		2.66	2.60	S	
19	2006	PRC	Nanjing Qinhuai River Environmental Improvement Project	100.00		79.48	4.18		0.79	S	
20	2006	PRC	Wuhan Wastewater and Stormwater Management (formerly Wuhan Wastewater and Stormworks Management)	100.00		44.28	55.14		0.58	PS	LS
21	2006	PRC	Guangxi Nanning Urban Environmental Upgrading (formerly Guangxi Nanning Urban Infrastructure Development)	100.00		54.95	27.48	1.50	9.36	S	S

No.	Approval Year	DMC	Project Name	Loan/ Grant amount	Urban Water Supply	Urban Sanitation and Sewerage	Urban Flood Protection	Urban Solid Waste	Urban Policy, I & C Dev	PCR Rating	PVR/ XVR Rating
22	2006	PRC	Shandong Hai River Basin Pollution Control	80.00	8.07	25.96		12.04	7.99	S	
23	2007	PRC	Kunming Qingshuihai Water Supply Project (formerly Kunming Qingshuihai Water Supply, Water Source and Environment Management Project)	80.00	70.20				9.80	S	
24	2007	PRC	Jilin Urban Environmental Improvement Project	100.00	65.00	15.00		20.00		S	S
25	2007	PRC	Anhui Hefei Urban Environment Improvement Project	150.00		66.16	78.60		1.80	S	
26	2008	PRC	Songhua River Basin Water Pollution Control and Management	200.00	12.48	137.26		48.52	1.74	HS	
27	2008	PRC	Xinjiang Municipal Infrastructure and Environmental Improvement	105.00	6.94	7.77		6.53		S	
28	2009	PRC	Hebei Small Cities and Towns Development Demonstration Sector	100.00	14.70	37.16		26.32	1.42		
29	2009	PRC	Liaoning Small Cities and Towns Development Demonstration Sector Project	100.00		9.53		9.33	1.19		

No.	Approval Year	DMC	Project Name	Loan/ Grant amount	Urban Water Supply	Urban Sanitation and Sewerage	Urban Flood Protection	Urban Solid Waste	Urban Policy, I & C Dev	PCR Rating	PVR/ XVR Rating
South Asia Department											
30	2003	NEP	Kathmandu Valley Water Services Sector Development Program	10.00					10.00	No PCR	
31	2003	NEP	Kathmandu Valley Water Services Sector Development Program	5.00					5.00	No PCR	
32	2003	IND	Urban Water Supply and Environmental Improvement in Madhya Pradesh	200.00	130.20	49.70	6.00	7.70		S	
33	2003	SRI	Secondary Towns and Rural Community-Based Water Supply and Sanitation	60.30	40.80	4.50			1.50	S	
34	2004	IND	Multisector Projects for Infrastructure Rehabilitation in Jammu and Kashmir	250.00	65.00		27.50			LS	
35	2004	BAN	Secondary Towns Integrated Flood Protection (Phase 2)	80.00		1.48	71.22	3.66		LS	S
36	2005	IND	Kerala Sustainable Urban Development	221.20	35.70	78.90	23.48	9.30	23.20		
37	2005	SRI	Local Government Infrastructure Improvement	50.00	9.90		4.08	8.12	9.82	S	
38	2005	MLD	Regional Development Project Phase II	6.00					6.00	S	S
39	2006	IND	Kolkata Environmental Improvement	80.00					80.00	S	

No.	Approval Year	DMC	Project Name	Loan/ Grant amount	Urban Water Supply	Urban Sanitation and Sewerage	Urban Flood Protection	Urban Solid Waste	Urban Policy, I & C Dev	PCR Rating	PVR/ XVR Rating
			Project (Supplementary Loan)								
40	2006	SRI	Secondary Towns and Rural Community-Based Water Supply and Sanitation (Supplementary Loans)	60.00	62.31					LS	
41	2006	BAN	Secondary Towns Water Supply and Sanitation	41.00	34.44	5.33			1.23	S	
42	2006	BHU	Urban Infrastructure Development	24.60	4.63	4.63		0.76	3.70		
43	2007	IND	MFF: Rajasthan Urban Sector Development Investment Program (Subproject 1)	60.00	24.30	5.20	1.60	3.80	20.50		
44	2007	IND	MFF: North Karnataka Urban Sector Investment Program (Subproject 1)	33.00	13.10	10.90			1.20	LS	LS
45	2008	BAN	Second Urban Governance and Infrastructure Improvement (Sector)	87.00			24.03				
46	2008	IND	Urban Water Supply and Environmental Improvement in Madhya Pradesh (Supplementary Loan)	71.00	44.50	9.00	10.20	2.30		S	
47	2010	IND	MFF: National Capital Region Urban Infrastructure Financing Facility (Tranche 1)	103.00	14.80						

No.	Approval Year	DMC	Project Name	Loan/ Grant amount	Urban Water Supply	Urban Sanitation and Sewerage	Urban Flood Protection	Urban Solid Waste	Urban Policy, I & C Dev	PCR Rating	PVR/ XVR Rating
48	2011	SRI	Secondary Towns and Rural Community-Based Water Supply and Sanitation Project (Additional Financing)	4.30	4.30					LS	
49	2011	SRI	Secondary Towns and Rural Community-Based Water Supply and Sanitation Project (Additional Financing)	13.30	13.30					LS	
Southeast Asia Department											
50	2003	VIE	Central Region Urban Environmental Improvement	44.00					44.00	S	LS
51	2006	INO	Infrastructure Project Development Facility	26.50					8.83	-	
52	2006	VIE	Central Region Small and Medium Towns Development	53.22	9.70	34.96		1.63	6.93	S	LS
53	2008	INO	Infrastructure Reform Sector Development Program (Subprogram 2)	280.00					70.00		
54	2010	LAO	Northern and Central Regions Water Supply and Sanitation Sector Project (Supplementary Loan)	6.60	5.49	0.17	0.25		0.26	S	S
55	2011	INO	Urban Sanitation and Rural Infrastructure Support to PNPM	100.00		56.64				S	

No.	Approval Year	DMC	Project Name	Loan/ Grant amount	Urban Water Supply	Urban Sanitation and Sewerage	Urban Flood Protection	Urban Solid Waste	Urban Policy, I & C Dev	PCR Rating	PVR/ XVR Rating
			Mandiri Project								
Pacific Department											
56	2003	FIJ	Suva Nausori Water Supply and Sewerage	47.00	28.00	19.00				S	
57	2003	SAM	Sanitation and Drainage Management	8.00		4.50	2.50		1.00	S	
58	2008	SAM	Sanitation and Drainage (Supplementary Loan)	2.78		2.78				S	
59	2009	FIJ	Suva-Nausori Water Supply and Sewerage Development (Supplementary Loan)	23.00		18.09			4.91	S	
60	2010	PAL	Water Sector Improvement Program (formerly Public Sector Reform Program)	12.60					12.60	S	
61	2010	PAL	Water Sector Improvement Program (formerly Public Sector Reform Program)	3.40					3.40	S	
Private Sector Operations Department											
62	2007	INO	West Jakarta Water Supply Development	50.00	50.00					S	S
63	2010	REG	Asia Water Fund	20.00	20.00					U	U

ANR = agriculture and natural resources, ARM = Armenia, AZE = Azerbaijan, BHU = Bhutan, CAM = Cambodia, COO = Cook Islands, DMC = developing member country, ESG = environmentally sustainable growth, FIJ = Fiji, GEO = Georgia, HS = highly successful, I & C Dev= institution and capacity development, IND = India, INO = Indonesia, KGZ = Kyrgyz Republic, LAO = Lao People's Democratic Republic, LS = less than successful, MLD = Maldives, MON = Mongolia, MUL = multisector, NEP = Nepal, PAK = Pakistan, PAL = Palau, PCR = project completion report, PRC = People's Republic of China, PS = partly successful, PVR = project or program completion report validation report, REG = regional, S = successful, SAM = Samoa, SRI = Sri Lanka, SWM = solid waste management, TAJ = Tajikistan, US = unsuccessful, UZB = Uzbekistan, VIE = Viet Nam, WSS = water supply and sanitation, XVR = validation of extended annual review report.
Source: Asian Development Bank (Sustainable Development and Climate Change Department: water sector database).

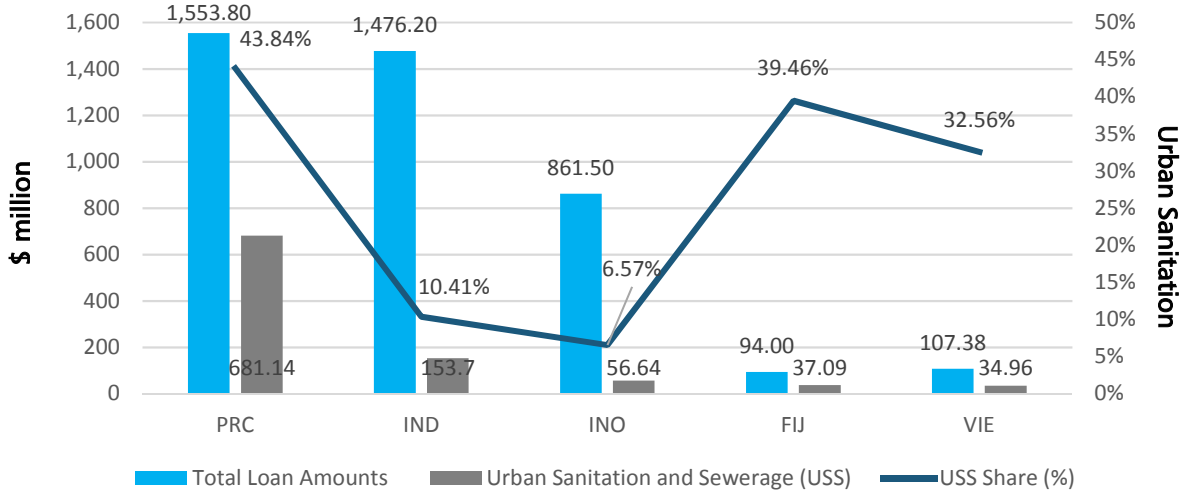
Table A3.2: Top 10 Projects in Terms of Magnitude of Assistance (Sanitation and Sewerage)

DMC	Project	Sanitation and Sewerage ($ million)	Original Loan Amount ($ million)	Final Disbursement ($ million)	Utilization Rate (%)
PRC	Songhua River Basin Water Pollution Control and Management	137.26	200.00	195.42	98
PRC	Nanjing Qinhuai River Environmental Improvement Project	79.48	100.00	100.00	100
IND	Kerala Sustainable Urban Development	78.90	221.20	113.88	51
PRC	Anhui Hefei Urban Environment Improvement Project	66.16	150.00	150.00	100
INO	Urban Sanitation and Rural Infrastructure Support to PNPM Mandiri Project	56.64	100.00	95.55	96
PRC	Guangxi Nanning Urban Environmental Upgrading (formerly Guangxi Nanning Urban Infrastructure Development)	54.95	100.00	96.23	96
IND	Urban Water Supply and Environmental Improvement in Madhya Pradesh	49.70	252.00	209.60	83
PRC	Jilin Water Supply and Sewerage Development	44.70	100.00	92.72	93
PRC	Wuhan Wastewater and Stormwater Management (formerly Wuhan Wastewater and Stormworks Management)	44.28	100.00	97.84	98
PRC	Henan Wastewater Management and Water Supply	38.89	100.00	100.00	100
	Total	**650.96**	**1,423.20**	**1,251.24**	**88**

DMC = developing member country, IND = India, INO = Indonesia, PRC = the People's republic of China.
Source: Asian Development Bank (independent Evaluation Department).

1. Figure A3.1 shows the share of the sanitation components within approved urban and water supply projects. The PRC and Fiji have the highest percentages, whereas in India and Indonesia the percentage is considerably smaller.

Figure A3.1: Sanitation as a Percentage of Total Investment of Urban and Water Supply Projects in Top Five Developing Member Countries
($ Million and percentage sanitation)



FIJ = Fiji, IND = India, INO = Indonesia, PRC = People's Republic of China, VIE = Viet Nam.
Source: Asian Development Bank (Independent Evaluation Department).

APPENDIX 4: ACTIVE SANITATION PROJECTS, 2010–2016

Table A4.1: Active Sanitation Projects, 2010–2016

No.	Approval Year	DMC	Project Name	Loan/ Grant amount	Urban Water Supply	Urban Sanitation and Sewerage	Urban Flood Protection	Urban Solid Waste	Urban Policy, I & C Dev
Central and West Asia Department									
1	2010	UZB	Water Supply and Sanitation Services Investment Program (Tranche 2)	140.00	84.13	53.35			2.52
2	2011	AZE	Water Supply and Sanitation Investment Program (Tranche 2)	300.00	103.50	186.30			10.20
3	2011	GEO	Urban Services Improvement Investment Program (Tranche 2)	40.00	9.15	30.85			
4	2011	UZB	Water Supply and Sanitation Services Investment Program (Tranche 3)	58.00	34.86	22.10			1.04
5	2012	PAK	Sindh Cities Improvement Investment Program (Tranche 2)	25.10	9.54	1.51		4.27	4.27
6	2012	PAK	Sindh Cities Improvement Investment Program (Tranche 2)	74.00	28.11	4.44		12.58	12.58
7	2013	AZE	Water Supply and Sanitation Investment Program (Tranche 3)	150.00	128.38	21.62			
8	2013	GEO	Urban Services Improvement Investment Program (Tranche 3)	98.00	78.43	19.57			
9	2013	UZB	Water Supply and Sanitation Services Investment Program (Tranche 4)	42.00	25.24	16.01			0.75
10	2014	GEO	Urban Services Improvement Investment Program (Tranche 4)	108.00	50.00	58.00			
11	2015	GEO	Urban Services Improvement Investment Program (Tranche 5)	43.00		43.00			
12	2015	GEO	Urban Services Improvement Investment Program	32.00		32.00			

No.	Approval Year	DMC	Project Name	Loan/ Grant amount	Urban Water Supply	Urban Sanitation and Sewerage	Urban Flood Protection	Urban Solid Waste	Urban Policy, I & C Dev
			(Tranche 5) — Supplementary Financing						
13	2015	UZB	Djizzak Sanitation System Development Project— Supplementary Financing	81.00		81.00			
East Asia Department									
14	2010	MON	Southeast Gobi Urban and Border Town Development Project	15.00	3.40	3.40		0.90	2.30
15	2010	PRC	Wuhan Urban Environment Improvement	100.00	12.00	10.00			3.00
16	2011	PRC	Xinjiang Altay Urban Infrastructure and Environment Improvement Project	100.00	15.84	13.86		13.86	1.05
17	2011	PRC	Guangxi Beibu Gulf Cities Development	200.00		9.09			
18	2011	PRC	Hai River Estuary Pollution Control and Ecosystem Rehabilitation Project	100.00		52.87	39.81		7.32
19	2012	PRC	Integrated Development of Key Townships in Central Liaoning	150.00		3.00			2.00
20	2012	PRC	Hubei Huangshi Urban Pollution Control and Environment Management Project	100.00		25.41		10.88	1.55
21	2012	PRC	Anhui Chao Lake Environmental Rehabilitation Project	250.00		58.93			
22	2013	PRC	Gansu Jiuquan Integrated Urban Environment Improvement Project	100.00		18.64			1.24
23	2013	PRC	Xinjiang Integrated Urban Development	200.00	42.25	39.40	60.90		1.67
24	2013	PRC	Anhui Huainan Urban Water Systems Integrated Rehabilitation Project	150.00		40.14	56.20		

No.	Approval Year	DMC	Project Name	Loan/ Grant amount	Urban Water Supply	Urban Sanitation and Sewerage	Urban Flood Protection	Urban Solid Waste	Urban Policy, I & C Dev
25	2014	MON	Darkhan Wastewater Management Project	9.50		8.60			0.85
26	2014	MON	Darkhan Wastewater Management Project	9.10		8.26			0.79
27	2014	PRC	Yunnan Chuxiong Urban Environment Improvement Project	150.00		4.13		8.18	
28	2014	PRC	Gansu Baiyin Integrated Urban Development	100.00	47.61	23.43			
29	2015	PRC	Hubei Enshi Qing River Upstream Environment Rehabilitation	100.00		24.00	24.00		
30	2015	PRC	Jiangxi Pingxiang Integrated Rural-Urban Infrastructure Development	150.00		23.71	100.79		
31	2015	PRC	Hunan Dongjiang Lake Integrated Environmental Protection and Management	130.00	20.00	18.10			
32	2016	MON	Southeast Gobi Urban and Border Town Development Project (additional financing)	19.43		19.43			
South Asia Department									
33	2010	BAN	City Region Development (formerly Megacities Development Project)	120.00	26.53	2.95	19.64	14.75	12.57
34	2010	IND	North Karnataka Urban Sector Investment Program (Tranche 2)	123.00	43.12	71.33			2.12
35	2010	IND	Rajasthan Urban Sector Development Investment Program (Tranche 3)	63.00	13.66	33.22			2.71
36	2010	NEP	Secondary Towns Integrated Urban Environmental Improvement Project	60.00	8.40	32.97		4.75	2.89
37	2010	SRI	Jaffna and Kilinochchi Water	20.00	12.07	7.93			

No.	Approval Year	DMC	Project Name	Loan/ Grant amount	Urban Water Supply	Urban Sanitation and Sewerage	Urban Flood Protection	Urban Solid Waste	Urban Policy, I & C Dev
			Supply and Sanitation Project						
38	2010	SRI	Jaffna and Kilinochchi Water Supply and Sanitation Project	70.00	42.24	27.76			
39	2011	BHU	Urban Infrastructure Project	19.90	0.95	15.35			2.22
40	2011	IND	Uttarakhand Urban Sector Development Investment Program (Tranche 2)	100.00	79.20	20.80			
41	2011	IND	North Eastern Region Capital Cities Development Investment Program (Tranche 2)	69.50	48.28	12.55		6.37	2.32
42	2011	SRI	Local Government Enhancement Sector Project	59.00	3.12	2.24		2.05	10.04
43	2012	IND	Bihar Urban Development Investment Program (Tranche 1)	65.00		48.92			16.08
44	2012	IND	North Karnataka Urban Sector Investment Program (Tranche 3)	60.00	23.30	27.60			5.70
45	2012	IND	Jammu and Kashmir Urban Sector Development Investment Program (Tranche 2)	110.00	18.00	16.50		1.50	22.00
46	2012	SRI	Dry Zone Urban Water Sanitation Project (Additional Financing)	40.00	38.80	1.20			
47	2013	IND	Kolkata Environmental Improvement Investment Program (Tranche 1)	100.00	50.00	50.00			
48	2013	IND	North Karnataka Urban Sector Investment Program (Tranche 4)	63.30	46.90	15.00			
49	2013	NEP	Kathmandu Valley Wastewater Management Project	80.00		67.50			12.50
50	2014	BAN	Coastal Towns Environmental Infrastructure Project	52.00	9.50	1.70	13.50	0.02	2.20

No.	Approval Year	DMC	Project Name	Loan/ Grant amount	Urban Water Supply	Urban Sanitation and Sewerage	Urban Flood Protection	Urban Solid Waste	Urban Policy, I & C Dev
51	2014	BAN	Third Urban Governance and Infrastructure Improvement (Sector) Project	125.00	15.00	5.00	35.00	7.50	15.00
52	2014	IND	Jammu and Kashmir Urban Sector Development Investment Program (Tranche 3)	60.00	36.00	24.00			
53	2014	IND	Karnataka Integrated Urban Water Management Investment Program (Tranche 1)	75.00	36.75	30.75			7.50
54	2014	IND	Rajasthan Urban Sector Development Program (SDP)	250.00	87.50	81.25			81.25
55	2014	IND	Rajasthan Urban Sector Development Program (SDP)	250.00	87.50	81.25			81.25
56	2014	NEP	Third Small Towns Water Supply and Sanitation Sector	60.00	44.20	3.90			11.90
57	2015	IND	North Eastern Region Capital Cities Development Investment Program (Tranche 3)	80.00	56.00	8.00		8.00	8.00
58	2015	SRI	Greater Colombo Water and Wastewater Management Improvement Program (Tranche 3)	123.00	36.90	86.10			
59	2015	SRI	Greater Colombo Water and Wastewater Management Improvement Program (Tranche 3) —Supplementary Financing	5.00	1.10	3.90			
60	2016	IND	Kolkata Environmental Improvement Investment Program - Tranche 2	200.00	79.98	30.01	90.01		
Southeast Asia Department									
60	2010	INO	Metropolitan Sanitation Management and Health	35.00		31.96			3.04
61	2011	VIE	Comprehensive Socioeconomic	70.00		9.55	4.01	1.06	4.21

No.	Approval Year	DMC	Project Name	Loan/ Grant amount	Urban Water Supply	Urban Sanitation and Sewerage	Urban Flood Protection	Urban Solid Waste	Urban Policy, I & C Dev
			Development Project in Viet Tri, Hung Yen and Dong Dang						
63	2012	CAM	GMS Southern Economic Corridor Towns Development	37.00		18.42	5.24	3.80	2.60
64	2012	LAO	Pakse Urban Environment Improvement Project	27.50		1.06	10.84	10.28	5.32
65	2012	LAO	GMS East-West Economic Corridor Towns Development	40.80		6.67	6.33	2.68	3.56
66	2012	VIE	GMS Corridor Towns Development	130.00	7.20	9.16	9.31	6.50	7.40
67	2013	LAO	Water Supply and Sanitation Sector Project	35.00	27.91	4.23			2.86
68	2014	CAM	Greater Mekong Subregion Tourism Infrastructure for Inclusive Growth: Cambodia	18.00		3.00			
69	2014	INO	Metropolitan Sanitation Management Investment Program	80.00		79.80			
70	2014	VIE	Greater Mekong Subregion Tourism Infrastructure for Inclusive Growth: Viet Nam	50.00		20.00			
71	2015	CAM	Integrated Urban Environmental Management in the Tonle Sap Basin—Supplementary Financing	37.00		6.07	19.33	5.55	6.05
72	2015	CAM	Second Greater Mekong Subregion Corridor Towns Development Project SF	33.00		10.50	15.00	7.50	
73	2015	VIE	Second Greater Mekong Subregion Corridor Towns Development Project SF	100.00		36.80	28.25		
Pacific Department									
74	2011	KIR	South Tarawa Sanitation Improvement Sector Project	7.60		7.56			

No.	Approval Year	DMC	Project Name	Loan/ Grant amount	Urban Water Supply	Urban Sanitation and Sewerage	Urban Flood Protection	Urban Solid Waste	Urban Policy, I & C Dev
75	2011	TIM	District Capitals Water Supply Project	11.00	8.98	0.35			1.10
76	2011	VAN	Port Vila Urban Development Project	5.00		1.11			
77	2012	SAM	Community Sanitation Project	2.00		2.00			
78	2013	PAL	Koroi-Arai Sanitation Project	26.90		26.90			
79	2013	PAL	Koroi-Arai Sanitation Project	1.90		1.90			
80	2015	RMI	Ebeye Water Supply and Sanitation Project	5.00	2.96	1.56			
81	2016	KIR	South Tarawa Sanitation Sector Improvement Project - Additional Financing	2.80		2.80			
Private Sector Operations Department									
82	2010	PRC	Songhua River Basin Water Pollution Control and Management Project Private Sector Facility	36.62		36.62			
83	2012	PRC	Songhua River Basin Water Pollution Control and Management Project Private Sector Facility, Phase 2	95.00		95.00			
84	2013	PRC	Wastewater Treatment and Reuse Project	120.00		120.00			
85	2015	PRC	Western Counties Water and Wastewater Management Project	150.00	61.70	88.30			
86	2015	PRC	Small and Medium-Sized Enterprise Industrial Wastewater and Sludge Treatment Project	100.00	10.00	90.00			
87	2016	PRC	Integrated Wastewater Management Project	150.00		100.00			

AZE = Azerbaijan, BAN = Bangladesh, BHU = Bhutan, CAM = Cambodia, DMC = developing member country, GEO = Georgia, IND = India, INO = Indonesia, I & C Dev= institution and capacity development, KIR = Kiribati, LAO = Lao People's Democratic Republic, MON = Mongolia, NA = Not applicable, NEP = Nepal, PAK = Pakistan, PAL = Palau, PCR = project completion report, PRC = People's

Republic of China, PVR= project/program completion report validation report, SAM = Samoa, SDP = sector development program, SRI = Sri Lanka, TIM = Timor-Leste, UZB = Uzbekistan, VAN = Vanuatu, VIE = Viet Nam.
Source: Asian Development Bank (Sustainable Development and Climate Change Department: water sector database).

Table A4.2: Top 10 Projects with Sanitation and Sewerage as the Leading Component[a]

DMC	Project	Loan or Grant Amount ($ million)	Sanitation and Sewerage Share ($ million)	Sanitation and Sewerage Share (%)
AZE	Water Supply and Sanitation Investment Program (Tranche 2)	300.00	186.30	62%
PRC	Wastewater Treatment and Reuse Project/PRC	120.00	120.00	100%
PRC	Integrated Wastewater Management Project	150.00	100.00	67%
PRC	Songhua River Basin Water Pollution Control and Management Project Private Sector Facility, Phase 2	95.00	95.00	100%
PRC	Small and Medium-Sized Enterprise Industrial Wastewater and Sludge Treatment Project	100.00	90.00	90%
PRC	Western Counties Water and Wastewater Management Project	150.00	88.30	59%
SRI	Greater Colombo Water and Wastewater Management Improvement Program (Tranche 3)	123.00	86.10	70%
UZB	Djizzak Sanitation System Development Project—Supplementary Financing	81.00	81.00	100%
INO	Metropolitan Sanitation Management Investment Program	80.00	79.80	99.75%
IND	North Karnataka Urban Sector Investment Program (Tranche 2)	123.00	71.33	58%
Total		**1,322.00**	**997.83**	**75%**

AZE = Azerbaijan, DMC = developing member country, IND = India, INO = Indonesia, PRC = People's Republic of China, SRI = Sri Lanka, UZB = Uzbekistan.
[a] Sanitation has the largest share in the total loan amount.
Source: Asian Development Bank (Independent Evaluation Department).

APPENDIX 5: NONSOVEREIGN OPERATIONS PORTFOLIO FOR WATER AND WASTEWATER SERVICES

Table: A5.1: Active Nonsovereign Approvals in the Water and Other Urban Services Sector (with Sanitation and Sewerage Components)

Investment No.	Country	Company and Project	Combined Amount ($ million) [a]	Date Approved	Major Indicators Based on RRP
7310	PRC	Company: Tongfang (Harbin) Water Engineering Co., Ltd. Project: Songhua River Basin Water Pollution Control and Management Project Private Sector Facility	146.62	16 April 2010	At least 2 million m^3/day additional capacity of WWTPs in Heilongjiang and Jilin provinces by 2013
7318	REG	Asia Water Fund	20.00	16 November 2010	Private sector investments in water and sanitation
7375	PRC	Company: Longjiang Environmental Protection Group Share Co. Ltd. Project: Songhua River Basin Water Pollution Control and Management Project	95.00	8 November 2012	At least 200,000 tons/day of WWTP capacity meeting class 1 effluent standards upgraded by 2016 in Heilongjiang
7392	PRC	Company: Beijing Enterprises Water Group Ltd. and BEWG Environmental Group Company Ltd. Project: Wastewater Treatment and Reuse Project	408.00	20 September 2013	600 million tons of wastewater treated annually to grade 1A standard by 2019
7455	PRC	Company: Beijing Capital Co., Ltd. Project: Western Counties Water and Wastewater Management)	300.00	8 October 2015	10 municipal wastewater subprojects with a total capacity of 480,000 tons/day constructed by 2019
7472	PRC	Company: CT Environmental Group Ltd. Project: Small and Medium-Sized Enterprise Industrial Wastewater and Sludge Treatment	250.00	10 December 2015	450,000 tons per day of industrial wastewater treatment capacity constructed and installed by 2019
7491	PRC	Company: China Water Environment Group Investment and Xinkai Water Environment Investment Project: Integrated Wastewater Management	250.00	18 November 2016	Subprojects with a total installed wastewater treatment capacity of 2.3 million m^3 per day constructed by 2024

PRC= People's Republic of China, REG = regional, RRP = report and recommendation of the President, WWTP = wastewater treatment plant.

[a] Includes equity, ordinary capital resources loan, and B-loans.

Source: Asian Development Bank (Independent Evaluation Department).

Table A5.2: Water Operators' Partnership Program on Sanitation during Evaluation Period, 2003–2016

	Recipient		Mentor		Theme		
No.	Country	Operator	Country	Operator	WS or WW	Main Topic	Focus
1	INO	PDAM Jambi	SPA	EMASESA (Seville)	WW	Sanitation	Septage management
2	INO	PDAM Pekan Baru	SPA	EMASESA (Seville)	WW	Sanitation	Septage management
3	BAN	Chuadanga Pourashava	PHI	Maynilad Water Services, Inc	WW	Sanitation	Fecal sludge management
4	BAN	Magura Pourashava	PHI	Maynilad Water Services, Inc	WW	Sanitation	Fecal sludge management
5	BAN	Jessore Pourashava	PHI	Maynilad Water Services, Inc	WW	Sanitation	Fecal sludge management
6	NEP	Charali Water Users Committee	VIE	Haiphong Sewerage and Drainage Co. Ltd. (SADCO)	WW	Sanitation	Fecal sludge management
7	NEP	Chandrutta Water Users Committee	VIE	Haiphong Sewerage and Drainage Co. Ltd. (SADCO)	WW	Sanitation	Fecal sludge management
8	NEP	Mahendranagar Water Users Committee	VIE	Haiphong Sewerage and Drainage Co. Ltd. (SADCO)	WW	Sanitation	Fecal sludge management
9	NEP	Kakarvitta Water Users Committee	VIE	Haiphong Sewerage and Drainage Co. Ltd. (SADCO)	WW	Sanitation	Fecal sludge management
10	FIJ	Water Authority of Fiji	AUS	Sydney Water Corporation	WW	Operational efficiency	WWM
11	SRI	Colombo Municipal Council (CMC)	AUS	City West Water (CWW)	WS/WW	Asset management	Asset Management
12	MON	Darkhan Us Suvag Joint Stock Co. Ltd.	USA	Golden Heart Utility (Fairbanks)	WW	Sanitation	Septage management
13	MYA	Yangon CDC	AUS	Hunter Water Australia (HWA)	WW	Sanitation	WWTP Optimization

AUS = Australia, BAN =Bangladesh, FIJ = Fiji, INO = Indonesia, MYA = Myanmar, MON = Mongolia, NEP = Nepal, PHI = Philippines, SPA =Spain, SRI = Sri Lanka, USA = United States of America, VIE = Viet Nam, WS = water supply, WW = wastewater, WWM = wastewater management.
Source: Asian Development Bank (Independent Evaluation Department).

APPENDIX 6: COMPLETED PROJECTS WITH COMBINED ON-SITE AND OFF-SITE SANITATION

1. **Sanitation and Drainage Management (Samoa).** The Wastewater treatment plant (WWTP) delivered as planned. Provision of septic tanks to peri-urban premises fell short of targets. No envisioned strategy to bridge on-site and off-site sanitation.

(i) Envisaged providing on-site sanitation to 8,000 premises with 400 septic tanks per year, on 2-year cycles. The project was able to construct only 100 septic tanks due to funding constraints, as the proposed revolving fund for septic tank maintenance and replacement was shelved as the scheme was not aligned with Samoa's National Sanitation Policy, approved in 2010.

(ii) Able to deliver the WWTP, with a capacity of 1.4 million liters (ml)/day, as planned. Septage collection and treatment program was not considered feasible within the project budget, but the EU-funded Water Sector Support Project financed the development of a sludge lagoon and drying beds at the existing Tafaigata landfill site, into which the treated sludge from the WWTP is deposited after dewatering. There are 77 connections to the system, including 28 grease traps. The estimated length of the pressure sewers at appraisal was 8,450 m, while the actual installed total was 9,141 m.

2. **Secondary Towns and Rural Community-Based Water Supply and Sanitation (Sri Lanka).** The WWTP constructed as planned. Coverage for urban and rural sanitation fell short of project targets at appraisal. No articulated strategy to transition from on-site to off-site containment.

(i) As envisaged, the WWTP was installed for a hospital and prison, with capacity of 350 m^3/day, benefiting 3,500 people (15%) and reducing environmental damage to a lagoon. Completed in the first quarter of 2010, discharge meets government standards.

(ii) A total of 4,212 latrines were constructed, cofinanced by the beneficiary households. These were completed ahead of schedule and benefited 16,848 people. The project achieved 84% of the target of 5,000 households with access to safe sanitation and on-site facilities. Census data from 2012 indicate that more than 90% of urban households have access to safe sanitation.

(iii) The rural sanitation subcomponent envisaged a 50% contribution by beneficiaries to construction costs (mainly as labor). An available water supply was a precondition for inclusion in the project. Targets were the provision of 27,000 low-cost latrines for individual, poorer households, with 85% of the population in the project areas having access to safe sanitation by 2010. It was intended that the project would benefit 108,000 people. A total of 18,302 low-cost latrines were constructed, achieving 66% of the target, and benefiting 73,208 people (Batticaloa, 293 latrines, benefiting 1,172 people; Polonnaruwa, 9,022 latrines benefiting 36,088 people; and Anuradhapura, 8,987 latrines, benefiting 35,948 people). By 2012, 98% of the population in Anuradhapura and Polonnaruwa districts had access to safe sanitation but Batticaloa lagged, with access at 87%.

3. **Rawalpindi Environmental Improvement (Pakistan).** This project faced a range of issues, including weak coordination (alignment confusion with similar government sewerage projects and poor performance of the implementing agencies). As a result, outputs were incomplete: only 11 kilometers (km) of sewer were laid versus the 160 km target. No sewage treatment plant (STP) was constructed due to confusion within the implementing agency, including design gaps and delayed land acquisition. No major effort was made to realign the project during implementation to address the design gaps, mainly because of lack of ownership of the project by key stakeholders, internal friction between the key implementing agencies, and diminishing political commitment to local government and urban reforms proposed under the project.

(i) The expected impact of the project was an improvement in the living conditions, quality of life, and health of the people of

Rawalpindi by improving water supply and sanitation facilities, solid waste management, wastewater treatment, and slaughterhouses.

(ii) The planned sewerage included installing major sewerage networks, which included (a) laying about 160 kilometers (km) of sewerage network (trunk and area sewers) within the boundary limits of Rawal Town over 384 hectares (ha), and secondary and lateral sewers in the catchments of existing trunk sewers; (b) construction of a transfer and outfall sewer to the STP; (c) replacement of undersized sewers in identified areas; (d) environmental mitigation works upstream of Rawal Lake filtration plant; and (e) procurement of sewer cleaning equipment and machinery. The performance of this subcomponent was unsatisfactory. At completion, the project had managed to lay only 11 km of sewerage network. Similarly, undersized sewers were replaced for a length of 5 km only. No work was undertaken on the secondary and lateral sewers in the catchment of existing sewers, a transfer/outfall sewer to the STP, or environmental mitigation.

(iii) The STP was to be constructed so it could treat projected flows of 199,000 m^3/day. The performance of this subcomponent was unsatisfactory as no physical work could be undertaken except for the acquisition of land for the STP. Initially this was due to a major delay in land acquisition. This was followed by indecision on the alignment and size of the outfall sewer and the STP. The outfall sewer passed through the domain of other agencies, including the Defence Housing Authority, Baharia Town, and the Cantonment Board; and there was no formal agreement with these agencies on the alignment of the outfall sewer or inclusion of these agencies (conveyance and treatment of their sewerage) in the scope of the outfall sewer and STP. This resulted in extensive negotiations with these agencies in 2007 that did not conclude until project closure in 2009. The absence of an STP is expected to cause substantial downstream health and water pollution issues.

(iv) Under the slaughterhouse and public toilets component, the project was supposed to build (a) hygienic and environmentally acceptable slaughterhouse facilities on the premises of the existing Sihala slaughterhouse, and (b) about 15 public toilets. The operation and maintenance of the public toilets had to be outsourced to the private sector and revenues collected through user fees. The performance of this subcomponent was unsatisfactory. No work was undertaken for rehabilitation of the slaughterhouse because of a delay in the design of the facility by the consultant and lack of capacity of the City District Government in operating this facility. Against a target of 15 public toilets, the project constructed only 11. Of these, seven were outsourced to the private sector and four remained in the public domain (in public schools and parks).

4. **Balochistan Devolved Social Services Program (Pakistan).** The outputs were mainly in policy and institutional strengthening. The performance grants system did not achieve a great deal due to a lack of absorptive capacity of local governments, indicating poor design and project quality at entry.

(i) The program aimed to accelerate the province's progress toward the Millennium Development Goals (MDGs) and the social sector targets of the government of Balochistan's poverty reduction strategy by utilizing opportunities to enhance the role of local governments in social service delivery provided by the Balochistan Local Government Ordinance, 2001.

(ii) The envisaged outputs were approved sector strategies for health, education, and water supply and sanitation—complete with approved expenditure-allocation norms in line with minimum standards for social sectors. These were only partly achieved for health and sanitation. Sector strategies for education and water supply were not finalized, and the expenditure allocation norms remained under revision. The envisaged improvement in the quality of social services was therefore unsuccessful.

(iii) According to the project's design and monitoring framework (DMF), the project impacts included an increase in access to improved sanitation from 67% in the Pakistan social and living standards

measurement survey (PSLM) 2004–2005 to 80% in PSLM 2008–2009. Another target in the design and monitoring framework was: access to excreta disposal increased from 40% in 2004 to 56% in 2009. Outputs for the sanitation component were not articulated in the project completion report (PCR) and therefore it is not clear whether the project was on-site, off-site, or combined.

5. **Kolkata Environmental Improvement Project—Supplementary Financing (India).** This project featured both off-site and on-site containment but there was no mention of a strategy to interface the two in future. On-site intervention was mostly targeted at the low-income households in the slums.

(i) **Sewerage and drainage.** An assessment of sewerage and drainage targets revealed the following: (a) 378 km of the sewerage and drainage network was constructed, covering the entire project area (100% of the revised target set in 2008); (b) 218 km of existing sewerage and drainage conduits were renovated and desilted as per the actual requirements, against the estimated target of 364 km; (c) the target of improving three existing sewage treatment facilities was fully achieved; (d) 20 new pumping stations were constructed and 22 existing pumping stations rehabilitated with increased efficiencies and capacities (100% achievement of the revised target set in 2008); (e) 14 water bodies were rehabilitated; and (f) 46,145 sewerage connections were provided, achieving full coverage in project areas.

(ii) **Slum improvement**. Construction of 565 standposts, 700 community toilets, 280 bathing spaces, 28 km of drains and 178,000 square meters of public space work ensured full achievement of the appraisal targets.

6. **Xinjiang Municipal Infrastructure and Environmental Improvement (PRC)**. The project mostly featured off-site interventions. Although public toilets featured as an on-site intervention, the PCR is silent on any strategy to transition from on-site to off-site. Project targets for citizen satisfaction with the environment and improvement in tourist numbers because of better facilities, including sanitation, were achieved. Other achievements included:

(i) 21,000 m^3/day wastewater treatment plant, effluent storage tank, and 10.52 km of sewer network operational in 2010;

(ii) one sewage treatment system of 200 m^3/day for Tiereketi village, wastewater collection pipeline of 8.2 km, and household connection pipelines of 5.2 km operational; and

(iii) 108 environmentally-friendly public toilets constructed in 3 project locations.

7. **Regional Development Project Phase II (Maldives).** This project featured off-site interventions. Septic tanks were decommissioned after sewerage connections were completed.

(i) A total of 571 households were connected, resulting in 100% of registered households connected to sewerage system on two islands; and

(ii) a full sewerage system was established instead of septic tanks. The capacity of the sewage treatment plant on Mahibadhoo is 305 m^3/day and that of the plant on Fonadhoo is 290 m^3/day.

APPENDIX 7: ENVIRONMENTAL MONITORING AND HEALTH INDICATORS

A. Suva Nausori Water Supply and Sewerage (FIJ Loan 2055)

1. Environmental Monitoring

1. The environment parameter monitored was total coliforms.

2. The project was classified as category B for environment. An initial environmental examination was prepared under the 1998 feasibility study, and reassessed during the appraisal mission in accordance with ADB's Environment Policy, 2002. During supplementary financing, ADB noted that environmental monitoring and management plans were being incorporated in contracts and monitored. An environment monitoring closing report was prepared in 2013. The project included several activities to improve the environmental performance of the Public Works Department, including (i) introducing an appropriate environmental management framework and promulgating a code of environmental practice, (ii) establishing an in-house environmental section, and (iii) upgrading the National Water Quality Laboratory. Water Authority of Fiji provided environmental water quality monitoring records for Laucala Bay from 2001 to 2015. A review of these records indicates that the average concentration of total coliforms has dropped substantially; by 2015 most monitoring sites consistently reported fewer than 1,000 most probable number (MPN) per 100 milliliters.

2. Health Indicator

3. Deaths from intestinal infectious disease (gastroenteritis) make up just over 10% of the total infant deaths in Fiji. Health data obtained from the Ministry of Health in May 2016 showed that the incidence of diarrhea in 0–4-year-olds in the Suva–Nausori corridor peaked at 300 to 400 cases per year in 2009–2011 before declining to fewer than 60 cases per year in 2013–2014. However, the total number of reported cases of typhoid in Fiji increased in the Northern Division and Suva urban area from 2004 to 2009, probably due to (i) increasing population density, (ii) poor sanitation, (iii) poor personal hygiene, and (iv) contamination of non-piped water supplies. The number of cases reached a peak in 2010 and declined until 2014, when it peaked again slightly. Many factors may have contributed to the fluctuating incidence, including better data collection and increased reporting.

B. Anhui Hefei Urban Environment Improvement Project (PRC Loan 2328)

1. Environmental Monitoring

4. The environment parameters monitored were: ph, chemical oxygen demand (COD), biochemical oxygen demand (BOD), suspended solids (SS), ammoniacal nitrogen (NH3-N), total phosphorous (TP), and total nitrogen (TN).

5. The Hefei Municipal Research Institute of Environmental Protection has been conducting external environmental monitoring semiannually in compliance with the monitoring plan defined in the environmental monitoring plan, and covered the following: (i) during construction—surface water quality, ambient air quality, odorous gases, construction noise, soil quality, groundwater quality, and construction wastewater quality; and (ii) during operation (wastewater treatment plant [WWTP] performance)—effluent quality, odorous gases, surface water quality, groundwater and soil quality (at closed landfill site), and ambient air quality. All results are included in semiannual reports submitted to ADB. Table 1 shows effluent quality data for both the Wangtang and Shiwuli River WWTPs.

6. An external monitor assessed the WWTPs' effluent quality. Results from July 2011 to September 2013 confirm that both WWTPs were generally compliant with class 1A municipal wastewater discharge standards (Table A7.1).

Table A7.1: Results of Effluent Tests at Wastewater Treatment Plants

Monitoring Location	Sample Date	Ph	COD (mg/l)	BOD_5 (mg/l)	Suspended Solids (mg/l)	NH3-N (mg/l)	TP (mg/l)	TN (mg/l)
Shiwuli River WWTP effluent	December 2010	7.16	26.20	7.00	8.80	2.16	0.41	13.60
Shiwuli River WWTP effluent	July 2011	7.22	21.10	7.50	6.20	1.28	0.31	13.15
Wangtang WWTP (phase II) effluent	July 2011	7.15	24.50	6.30	2.20	1.20	0.35	8.72
Shiwuli River WWTP effluent	January 2012	7.23	32.80	7.90	4.50	4.02	0.25	14.4
Wangtang WWTP (phase II) effluent	January 2012	7.19	24.90	6.70	3.30	1.72	0.33	9.01
Shiwuli River WWTP effluent	September 2013	7.65	22.40	8.10	3.70	2.80	0.29	8.7
Wangtang WWTP (phase II) effluent	September 2013	7.22	30.10	5.10	3.90	2.12	0.31	8.9
Class 1A Standards GB18918-2002)		*6.00~ 9.00*	*50.00*	*10.00*	*10.00*	*5.00 (8)*	*0.50*	*15.00*
Maximum multiple exceeding the standard		NA	NA	NA	NA	NA	NA	NA

BOD_5 = biochemical oxygen demand, COD = chemical oxygen demand, mg/l = milligrams per liter, NA = not applicable, NH3-N = ammoniacal nitrogen, pH = pH value, TN = total nitrogen, TP = total phosphorus, WWTP = wastewater treatment plant.
Source: Hefei Wastewater Treatment Administrative Department

7. Water quality monitoring was carried out during project construction and the results were included in semiannual reports, including water quality data for the Banqiao and Ershibu rivers from 2008 to 2014, for Sili River from 2008 to 2014, and for Nanfei River from 2008 to 2010.

8. While the water quality of the Banqiao, Nanfei, and Sili rivers is still Class V (mainly applicable to the water bodies for agricultural use and landscape requirement), overall water quality had significantly improved. The COD concentration in Ershibu River was 44% lower in 2014 than in 2009 in various sections of the river, but other nutrient levels were still above class V. The COD concentration declined by 41% in Banqiao River and by 38% in Sili River, and nitrogen by 65% (Banqiao) and 83% (Sili).

C. Henan Wastewater Management and Water Supply (PRC Loan 2207)

1. Environmental Monitoring

9. The environment parameters monitored were: COD, NH3-N, and BOD. During construction, the environmental management plans (EMPs) for each subproject were implemented well and mitigation measures were undertaken effectively. No major adverse environmental effects were caused by project-related construction. Each water company has sound environmental management systems in accordance with the subproject EMP and their environmental performance has been good. All WWTPs met water quality standards for effluent discharge. The sludge they produced has been reused or disposed of after dewatering in compliance with government regulations. Real-time monitoring facilities are installed at inlets and outlets to record and report water quality to the provincial wastewater monitoring system.

10. The project produced significant environmental benefits in terms of reductions in COD, NH3-N, and BOD. Government surveys and reports in 2011 reported reductions of 36,774 tons of COD, 3,667 tons of NH3-N, and 11,364 tons of BOD. The COD reduction represents 110% of the annual reduction target set by the summary environmental impact assessment. On average, wastewater facilities built under the project have contributed over 95% of the total reduction amount in the project cities and counties. The project has ensured an uninterrupted supply of potable water to about 600,000 urban residents and contributed to a significant reduction in the incidence of serious waterborne diseases in the project cities and counties.

D. Regional Development Project, Phase II—Environmental Infrastructure and Management (MLD Loan 2170)

11. The environment parameter monitored was turbidity and the health indicator was typhoid incidence (see the extract from the DMF below).

12. Project implementation was delayed by two and a half years, mainly because of the limited capacity of the implementing agency, the Ministry of Atoll Development (MOAD), and scope changes made necessary by the major reconstruction effort after the Indian Ocean tsunami in 2004. Despite the delays, the project exceeded its sanitation targets, including water quality and health improvements as shown in the portion of DMF shown below.

Table A7.2: Performance Indicators and Actual Achievement

Outputs	Performance Indicators/Target	Actual Achievement
Environmental infrastructure in the Central Regions improved (4Q 2005–3Q 2010)	95% of households with links to small bore sewerage in focus islands	A total of 571 households were connected, resulting in 100% of registered households connected to the sewerage system on two focus islands
	95% of households with individual septic tanks in focus islands	Full sewerage system established instead of septic tanks. Capacity of the STP on Mahibadhoo is 305 m^3/day and that of the Fonadhoo STP is 290 m^3/day
	Introduction of graywater in housing lots (achieve more than 75% coverage)	Full sewerage networks for collecting gray and black water from households were Established
	50% reduction in monitored groundwater pollution	Reduction in turbidity levels was 100% (Baseline data: 5 NTUs (2007); post commissioning data: 0 NTUs 2014)
	Decrease in number of visits to health center in focus islands for diarrheal and waterborne related diseases by 50%	Health data from local hospital show no cases of typhoid since 2011.

NTU = nephelometric turbidity unit, STP = sewage treatment plant.
Source: Asian Development Bank (Independent Evaluation Department).

E. Urban Sanitation and Rural Infrastructure Support to PNPM Mandiri Project (INO Loan 2768)

13. Environmental monitoring was carried out but the results were not presented in the PCR.

14. Effluent tests carried out in November 2015 in 418 locations in Central Java and 142 locations in East Java indicated that about 20% of the facilities did not comply with national or provincial standards. This could be because of design deficiencies or excess detergents and disinfectants used for cleaning bathrooms. Levels of grease indicate the absence or poor maintenance of grease traps in property connections. The project's technical guidelines explain the basic features of anaerobic baffled reactors and anaerobic upflow filters, but do not provide details of, for example, the appropriate volume of the units based on expected flow rates and the necessary retention time. Facilitators and consultants therefore resorted to other sources to ensure the designs were appropriate, and it is possible that some designs were flawed as a result. Also, design criteria usually refer to national effluent standards, although provincial standards are often more stringent. Directorate General of Human Settlements and local governments need to follow up on these findings and take remedial action. In many cases, technical expertise and funds for improvements will be required that exceed the capability and resources of the user groups. This underlines the need for local government post-construction support for beneficiary communities.

F. Songhua River Basin Water Pollution Control and Management (PRC Loan 2487)

15. The environment parameters monitored were: ph, COD, BOD, SS, NH3-N, TP, and TN. The PCR contained an environmental management performance analysis.

16. Environmental monitoring included internal and external monitoring. Internal monitoring was undertaken through regular site inspections by the Environmental Management Units and the project management offices (PMOs) and/or implementing agency officers. Daily monitoring and supervision of construction was

also carried out by the construction supervision companies that were under contract with the implementing agencies, as well as by the contractors. External monitoring was conducted by county and/or municipal environmental monitoring stations, contracted by the implementing agencies. During construction, external monitoring covered construction wastewater quality, surface water quality, air quality (including dust), and noise. During trial operation and actual operation, the monitoring stations analyzed WWTP influent and effluent levels as well as sludge quality, air quality (hydrogen sulfide and ammonia), noise, landfill leachate quality and groundwater quality at landfill sites, and surface water quality.

17. Annual environment monitoring reports were prepared separately by the two PMOs in accordance with the project agreement. Routine environmental monitoring data from government departments as well as project-specific external monitoring data were submitted semi-annually by the environmental monitoring stations to the PMOs, and used to assess the project's environmental impacts and compliance with the environmental management plan (EMP). The Henan project management office submitted four annual environmental monitoring reports covering August 2009 to May 2015. Jilin project management office submitted four annual environmental monitoring reports to ADB covering August 2009 to September 2014. ADB reviewed all the reports and found them to be of acceptable quality. All reports were disclosed on the project website in compliance with the ADB Public Communication Policy, 2011. Monitoring of project environmental performance will continue during operations in accordance with national standards, including the treatment efficiency of the WWTPs and landfill leachate treatment facilities.

Table A7.3: Wastewater Treatment Plant Effluent Quality Monitoring Results

Component	Capacity/Treatment Standard	Monitoring Date	COD	BOD	TP	NH3-N
Heilongjang Component						
Fangzheng County WWTP	6,000 m^3/d Class 1-B	Daily average for 2015	29.50	/	0.48	0.28
Fujin City WWTP	20,0000 m^3/d Class 1-B	Daily average for 2013–2015	26.26	/	0.31	1.24
Harbin City Xinyigou District WWTP	100,000 m^3/d Class 1-B	Daily Average for Jan–Sep 2014	45.83	/	0.70	1.56
Jiamusi City East District WWTP	40,000 m^3/d	Not yet operational	/	/	/	/
Luobei County WWTP	10, 000 m^3/d	Monthly average for Apr 2014–Apr 2015	51.30	/	0.54	5.10
Nenjiang County WWTP	15, 000 m^3/d Class 1-B	Monthly average for 2014	41.31	/	0.56	6.89
Qiqihar City WWTP	100, 000 m^3/d Class 1-A	Monthly average for 2014	40.16	/	0.48	5.85
Qitaihe City wastewater reclamation plan	40,000 m^3/d	Monthly average for 2014	28.50	/	0.08	2.91
Shuangyashan City WWTP	50, 000 m^3/d	Monthly average for 2014	40.55	/	0.73	2.93
Tangyuan County WWTP	10,000 m^3/d Class 1-B	Monthly average for Jan 2012–Mar 2015	41.78	/	0.31	3.94
Jilin Component						
Dehui City WWTP	30,000 m^3/d Class 1-A	Audit Oct 2012 Nov 2013	38.00 30.00	8.00 8.20	0.36 0.40	2.55 6.00
Gongzhuling City	20,000 m^3/d	Audit (NA)	NA	NA	NA	NA
Fanjiatun Town WWTP	Class 1-B	Nov 2014	44.00	10.00	0.60	5.20
Fusong County WWTP	20,000 m^3/d Class 1-B	Audit Dec 2010 Dec 2013	45.00 23.00	12.00 18.00	0.40 0.40	4.00 7.00
Fuyu County WWTP	30,000 m^3/d Class 1-B	Audit Nov 2010 Dec 2013	52.00 42.40	16.40 11.80	0.60 0.30	7.80 4.50
Jingyu County WWTP	25,000 m^3/d Class 1-B	Audit Dec 2014 March 2015	25.90 42.00	8.20 8.50	0.48 0.45	4.58 4.60
Liuhe County WWTP	10,000 m^3/d Class 1-B	Audit Oct 2010 Dec 2013	52.00 48.0.0	11.00 8.60	1.00 0.40	9.60 5.40
Tonghua County WWTP	15,000 m^3/d Class 1-B	Audit Dec 2012 Nov 2014	32.00 10.38	10.50 7.89	0.50 0.28	2.20 1.46
Yushu City WWTP	30,000 m^3/d Class 1-B	Audit Sep 2010 Dec 2013	43.00 24.00	15.70 18.00	0.70 0.50	6.34 -
Discharge standard of pollutions for municipal wastewater treatment plant (GB18918–2002)	Class 1-A Class 1-B		50 60	10 20	0.5 1.0	8 15

BOD = biochemical oxygen demand, COD = chemical oxygen demand, m^3/d = cubic meter per day, NA = not applicable, NH3-N = ammoniacal nitrogen, TP = total phosphorus, WWTP = wastewater treatment plant.
Source: Asian Development Bank and Heilongjang and Jilin Provincial Governments.

G. Fuzhou Environmental Improvement Project (PRC Loan 2176)

1. Environmental Monitoring

18. The environment parameters monitored were: COD, BOD, and SS.

19. An expansion of the wastewater services coverage led to annual average reductions of 10,930 tons of biochemical oxygen demand and 17,960 tons of suspended solids.

20. Environmental monitoring included internal and external monitoring. The internal monitoring was undertaken by the contractors' environmental staff, PMO officers, and the project implementation consultants through site inspections. External monitoring has been undertaken since 2009 by the Fuzhou Environmental Monitoring Station. Environmental monitoring reports were prepared every 6 months—a total of eight semiannual environmental monitoring reports were submitted to ADB during 2009–2012. ADB reviewed all the reports and found them to be of acceptable

quality. The results of the internal and external monitoring showed that the contractors and the implementing agencies complied with the provisions of the EMP. The eight reports were disclosed on the ADB website.

21. Overall, implementation of the EMP was satisfactory. Adverse environmental impacts during construction were minor and have been mitigated to acceptable levels. During construction, dredging of the inland river rehabilitation component resulted in short-term increases of suspended solids, chemical oxygen demand, and biochemical oxygen demand (BOD) concentrations.

H. Nanjing Qinhuai River Environmental Improvement Project (PRC Loan 2297)

1. Environmental Monitoring

22. The environment parameters monitored were: COD, BOD, SS, and NH3-N.

23. Nanjing Environment Monitoring Center (NEMC) was contracted by the implementing agencies as an external environmental monitoring agency to conduct external environment monitoring.

24. The project's targeted wastewater pollution reduction at project appraisal was 5,000 tons of biochemical oxygen demand (BOD_5); 9,000 tons of chemical oxygen demand (COD); 6,800 tons of suspended solids (SS); 950 tons of ammoniacal nitrogen (NH3-N); and 110 tons of total phosphorous (TP) by 2011.The actual annual pollution load reduction in 2014 was 3,400 tons of BOD5; 8,020 tons of COD; 6,770 tons of SS; 1,500 tons NH3-N; and 145 tons of TP. The actual pollution load reduction rates were therefore slightly lower than targeted.

I. Guangxi Nanning Urban Environmental Upgrading (formerly Guangxi Nanning Urban Infrastructure Development) (PRC Loan 2240)

1. Environmental Monitoring

25. The environment parameters monitored were: COD, DO, BOD5, NH3-N, TP, and TN.

26. Nanning Municipal Environmental Monitoring Station reported that the project avoided significant negative construction impacts on the surrounding environment. External monitoring analyzed surface water, air (including particulate matter 10 micrometers or less in diameter and odor), noise levels, and sediment. Five external environmental monitoring reports (including annual and semi-annual reports) were prepared for the construction and operation phases of the project, submitted to ADB during 2009–2013, and disclosed on the project website in accordance with ADB's Public Communications Policy, 2011. No complaint related to environment safeguards was received during project implementation.

27. **Monitoring and reporting.** Environmental monitoring included internal and external monitoring. The internal monitoring was undertaken through regular site inspections by construction supervision companies under contract with the implementing agencies, as well as by the implementing agency and PMO officers. External environmental monitoring was conducted by the Nanning Municipal Environmental Monitoring Station, contracted by the PMO.

J. Shandong Hai River Basin Pollution Control (PRC Loan 2237)

1. Environmental Monitoring

28. The environment parameters monitored were: COD, BOD, and NH3-N.

29. Internal and external environmental monitoring was conducted regularly according to the environmental monitoring program. Eleven semiannual environmental monitoring reports were prepared, and four were disclosed on ADB's website after supervision of the project was transferred to the PRC resident mission.

30. The project has produced significant environmental benefits by reducing the water pollution in the Hai River Basin. With the project's support, the wastewater treatment rate in the project city and counties has reached over 70%. The total pollution load has been reduced significantly. According to a government survey and environmental monitoring plan

implementation reports, in 2012 there were reductions of 14,678.0 tons of chemical oxygen demand, 722.2 tons of ammonia nitrogen, and 2,980.6 tons of biochemical oxygen demand. These represent 75.0% of the annual chemical oxygen demand reduction and 76.8% of the annual ammonia nitrogen reduction in the Huotahe, Shanzhong, and Xisha rivers. On average, wastewater facilities built under the project have contributed to over 75% of the total reduction in the main wastewater pollutants in the project city and counties.

APPENDIX 8: ACHIEVING GENDER EQUALITY IN SUSTAINABLE SANITATION SERVICES

1. Since it was founded in 1966, ADB has recognized that, to reduce poverty rates, helping women and girls must be a priority in its work. In 1985, ADB adopted its first official policy on the topic, Policy on the Role of Women in Development, which encouraged projects that targeted improving the well-being and empowerment of women. It also advocated for projects to have a gender component to ensure that women share in the benefits of development.

2. In 1998, the policy was expanded to incorporate gender considerations into all aspects of ADB's work, with a focus on health, education, agriculture, natural resource management, and financial services, especially microcredit. This strategy entailed including gender considerations in projects, from initial consultations and design through to final evaluation.

3. ADB's commitment to gender equality was further enhanced in 2008 with the approval of Strategy 2020, which identified gender equity as one of the five "drivers of change" that will be stressed in all ADB operations.

4. One indicator for Sustainable Development Goal 6, Water and Sanitation, is access to adequate and equitable sanitation and hygiene for all and an end to open defecation by 2030, paying special attention to the needs of women and girls and those in vulnerable situations.

5. A desk review of the project completion reports of ADB's completed sanitation-related project loans with approval dates during 2003–2016 was carried out. Among the 63 completed sanitation projects in the database were 11 projects that demonstrated gender equality or addressed gender issues.

Table A8: Projects Demonstrating Gender Equality

No.	Loan	Project Name	Sanitation Component	Gender
4	IND 2046	Urban Water Supply and Environmental Improvement in Madhya Pradesh	Project components for the project cities are: (i) urban water supply, (ii) sewerage and sanitation, (iii) SWD, (iv) SWM, (v) municipal action plans for poverty reduction, and (vi) institutional development.	The project was categorized as effective gender mainstreaming. A comprehensive gender action plan (GAP) was included in the loan design and provided an extensive and detailed comprehensive gender strategy with numerous actions to enhance project benefits for women.
5	VIE 2034	Central Region Urban Environmental Improvement Project	The project consisted of five components: Part A, awareness and pro-poor sanitation; Part B, drainage and flood protection; Part C, wastewater and public sanitation; Part D, solid waste management; and Part E, implementation assistance and institutional strengthening.	Gender equality was well integrated into the project design, which included sound gender analysis and a comprehensive gender action plan (GAP). The development of the GAP, including targets for women's participation, resulted in high levels of participation by women in project activities. The project was successful in achieving high rates of participation by women in construction, O&M of small infrastructure, and decision making and management of community management committees (CMCs).
8	SRI 1993	Secondary Towns and Rural Community-Based Water Supply and Sanitation	Project outputs were categorized under three main components: urban, rural and institutional strengthening of the implementing agency. The first two components include implementing water supply schemes, a wastewater treatment plant, road side drainage and	Two gender action plans (GAPs) were used in the project. The main qualitative differences between them is that the GAP for the 2002 project is more focused on institutional aspects, such as employment provided to women in project activities, whereas the GAP for the 2007 project

No.	Loan	Project Name	Sanitation Component	Gender
			domestic toilets. The third component included awareness campaigns, training programs and formation of operational strategies.	placed more emphasis on community development and field aspects. The project recognized that the participation of women in decision making is important. Women were also considered to be the main beneficiaries of the project.
12	BAN 2117	Secondary Towns Integrated Flood Protection (Phase 2)	The project aimed to (i) provide integrated flood protection through a civil works network of flood control structures; and (ii) improve urban environmental conditions and communication systems through large numbers of civil works such as footpaths, community latrines, community-based water supplies, and drainage and solid waste disposal systems.	Town-specific gender action plans (GAPs) were developed and implemented within the Urban Governance Improvement Action Program framework, and all *pourashavas* carried out gender activities.
16	PRC 2207	Henan Wastewater Management and Water Supply (PRC)	Henan has a population of 94 million. There were about 775,110 poor people in both rural and urban areas in the project counties in 2004. This region was heavily polluted by domestic and industrial wastewater. The project was therefore designed to: (i) increase wastewater collection and treatment; (ii) provide adequate public water supplies, and (iii) improve the quality of surface and groundwater in and downstream of the project cities.	The Henan Provincial Government instructed the Henan project management office to (i) encourage women to participate in project implementation activities; (ii) monitor effects on women during project implementation through the monitoring and evaluation system, in consultation with local governments and local women's federations; and (iii) conduct a gender awareness program on water and sanitation for key stakeholders, particularly staff at the PMO and implementing agencies. About 15,000 laborers were employed in the project construction and operation, 13.1% of whom were women.
23	MON 2301	Urban Development Sector Project	The project had four components: (i) improvement of basic urban services, (ii) improvement of urban roads, (iii) small loans for water connections and on-plot facility improvements, and (iv) institutional development and training.	The project is categorized as "effective gender mainstreaming." Most of the gender action plan (GAP) activities and targets were relevant to the project outcome and outputs.
25	IND 2293	Kolkata Environmental Improvement Project (Supplementary Financing)	The project had six parts: (i) stakeholder consultation process; (ii) sewerage and drainage improvements; (iii) solid waste management; (iv) slum improvements (to improve environmental services in informal and formal low-income settlements, including the areas' water supply, drainage, and sanitation services); (v) canal improvements; and (vi) implementation assistance and capacity building.	The project was not designed to target women beneficiaries specifically, but all of its components were expected to help improve their quality of life. Although ADB did not prepare a gender action plan for the project, the project made a fairly significant contribution to gender mainstreaming activities.
29	BAN 2265	Secondary Towns Water Supply and Sanitation	The expected outcomes of the project were: (ii) improved community awareness of the link between proper hygiene, sanitation, and health, particularly among women and children; (iii) increased sanitation coverage, (iv) improved capacity of secondary towns	The project was categorized as effective gender mainstreaming, and has helped women gain practical gender benefits by improving the quality and quantity of water supply and sanitation systems in their communities.

No.	Loan	Project Name	Sanitation Component	Gender
			to implement, operate, manage and maintain sanitation investments; and (vi) management options consistent with the water and sanitation sector development program.	
40	IND 2312	North Karnataka Urban Sector Investment Program, Tranche 1	As per the approved first periodic financing request, the project's sanitation component involved the development of sewerage infrastructure leading to improved sanitation conditions for 29,500 households.	The project was categorized as effective gender mainstreaming and the gender strategy, participation strategy and activities conducted under the gender action plan with the help of nongovernment organizations created much-needed awareness of hygiene, water, and waste management, and the willingness to pay for house connections (both water supply and sewerage) and volumetric tariffs.
42	PRC 2487	Songhua River Basin Water Pollution Control and Management	The project components were: (i) improved and expanded water supply and wastewater services in 11 counties and cities in Heilongjiang Province (13 counties and cities at completion); (ii) improved and expanded wastewater facilities and solid waste management in 15 counties and cities in Jilin Province; and (iii) management capacity development for all project implementing agencies.	Project construction facilitated the urbanization and industrialization process of project areas, and provided opportunities for rural women to find employment in cities increased. During the project construction period, skills training was provided for women, with 550 women participating. During the project operation, training for specific positions and jobs was also provided (e.g., in accounting, water quality testing, and project management). Improvement of the environment and enhancement of environmental awareness served to enhance women's health.
60	INO 2768	Urban Sanitation and Rural Infrastructure Support to PNPM Mandiri Project	The project impact—access to improved rural infrastructure and adequate sanitation—is rated significant. The project has improved living conditions for about 725,400 households (about 3.6 million residents) in project villages and urban neighborhoods, which will eventually contribute to a reduction in the poverty rate in project areas.	The project was categorized as effective gender mainstreaming. A gender action plan was prepared and gender targets were set.

SWD = storm-water drainage, SWM = solid waste management.
Source: Asian Development Bank (Independent Evaluation Department).

6. The project-specific gender action plan (GAP) is a tool used by ADB to ensure "gender mainstreaming" is tangible and explicitly visible in project design and implementation. The project GAP is not a separate component. It mirrors the project outputs and is an integral part of project design. Only seven out of 11 projects that demonstrated gender equality or addressing gender issues through the project prepared GAPs.

7. Some projects did not produce a GAP, but nevertheless made a fairly significant contribution to gender mainstreaming activities. The Kolkata Environmental Improvement Project was one of these. The self-help groups (mainly consisting of women), that were created with support from the project have been both successful and sustainable. The project documents lessons learned from implementing the main gender mainstreaming activities, which were: (i) promoting women's legal empowerment through the award of titles to apartments, with additional benefits accorded to households headed by women by granting them ground floor residences at resettlement sites; and (ii) supporting the economic and social empowerment of women by providing vocational training and forming self-help groups.

8. In the Bangladesh Secondary Towns Integrated Flood Protection (Phase 2), 195 community development committees were formed in nine secondary towns. Within these committees, primary groups [1] and savings and credit groups were formed, and the members of all of these groups, about 95% of whom were women, met very regularly and worked together. The 1,175 members of savings and credit groups saved weekly installments which they used to carry out income-generating activities, enabling most of them to escape poverty.

9. In Mongolia's Urban Development Sector Project, two activities and one target in the GAP were not particularly linked to the project's output on institutional development and training. A number of important features with direct gender benefits were included in the design and monitoring framework but not in the GAP (e.g., water supply through water kiosks to women and children, and permanent employment opportunities for women beyond the life of the project). These have been added to the modified GAP to ensure consistency. The provision of potable water and other basic infrastructure directly benefits women and children, and reduces women's time poverty and labor inputs. Six local schools were directly connected to the water supply and sewerage systems, benefiting 7,805 school students (47% of whom were girls) and 1,365 children (53.5% girls). Of the 481 households who received small loans, 222 (46.15%) were women, well exceeding the GAP target of 30%. An estimated 57 households headed by women (11.85%) and 59 poor and low-income households (12.27%) benefited from the small loans. A model street in Arvaikheer allowed four households (two of them headed by women) to build new houses with their small loans, creating assets under women's names. With access to credit, women are more empowered at the household level to make decisions on housing and other improvements. The project has contributed to women's economic empowerment, and to better health, hygiene, and safety, resulting in strategic gender benefits. The project created 86 permanent new jobs, 67% of them occupied by women. Overall, 81% of GAP activities were completed, and 80% of gender-related targets in the GAP were achieved.

10. In Indonesia's Urban Sanitation and Rural Infrastructure Support to PNPM Mandiri Project, most gender targets were met, except for those related to the provision of civil works to women, and women's participation in capacity development activities. The project target was that at least 30% of employment opportunities would be provided to women and 30% of capacity building activities would be attended by women. At project completion, about 16% of employment opportunities were undertaken by women, and 25% of capacity building activities were attended by women. Of the total 3.6 million beneficiaries, about 1.9 million were women. The project's efforts to involve women improved the quality of women's participation. Most women indicated that they were actively involved and provided inputs during community decision-making meetings. Women's participation in training improved their capacity to influence decision making, including on how project resources were spent. The GAP was integral to the project, given that women were intended to be significant beneficiaries. It also contributed to achieving the overall outcome. By implementing the GAP, the project made it more likely that women would benefit equally from the project. Based on its achievements, the project is rated successful in terms of its impact on gender equality.

11. The project scope of tranche 1 of the North Karnataka Urban Sector Investment Program changed during the course of implementation, primarily to address budgetary constraints and implementation challenges. The slow progress of construction, especially sewerage works, necessitated a loan extension of 2 years. Despite this extension, the sewerage works could not be delivered under tranche 1 and were transferred to tranche 4 in 2013 at the request of the government. However, the success of mainstreaming gender equality in the project cannot be attributed to the sanitation component, as the sanitation component was transferred to tranche 4.

[1] Community organization starts with the formation of primary groups of 20 families who then form community development committees (CDCs) representing 200-300 families. CDCs are formed into clusters of 6-12 CDCs and in each town CDC Federation is introduced. The project activities are managed by a small central management team in Dhaka and a group of 8-10 staff based in each town.

12. In line with the ADB's commitment to gender equality, as confirmed in Strategy 2020, and given the positive impact of improving sanitation services to women, ADB should effectively mainstream gender equality in all its sanitation-related projects. A project-specific gender action plan should be an integral component of all projects.

APPENDIX 9: TECHNICAL ASSISTANCE

1. The Asian Development Bank (ADB) used advisory technical assistance (ADTA) and capacity development (CDTA), during the evaluation period to delve into the technical designs of sanitation interventions. Such TA adds further value to the usual operational and financial capacity development normally extended to water and sanitation projects dealing with local utilities.

(i) **Promoting Innovations in Wastewater Management in Asia and the Pacific.** This was a notable regional TA project that presented various sanitation technology options, including WaMEx, a decision-support tool for wastewater management planning.

(ii) **Promoting Innovations in Wastewater Management in Asia and the Pacific**. This regional TA project produced a compendium of technology options classified by treatment type and by reuse and/or recycle technology. The TA completion report (TCR) assessed the TA to have been successful. It included a roll-out of the WaMEx decision-support tool.

(iii) **Strengthening Urban Project Management in Jammu and Kashmir**. This TA project in India was designed to improve urban sector planning and project management. Its components included provisions for review and update of master plans on water, sewerage, and drainage. A review of detailed engineering designs was also included. The TCR found the TA to have been highly successful.

(iv) **Urban Wastewater and Solid Waste Management for Small Cities and Towns**. This TA project in the PRC had, as one of its knowledge outputs, production of a policy note on urban wastewater treatment, financing and tariff setting for small cities and towns, based on international and national good practices. The TA made recommendations on the planning and design of wastewater treatment systems in small cities and towns.

(v) **Wastewater Treatment and Reuse**. This TA project in the PRC was attached to the nonsovereign Wastewater Treatment and Reuse Project. The companies involved were the Beijing Enterprises Water Group Ltd. and BEWG Environmental Group Company Ltd. Part of the technical design component was developed from the RRP and included a targeted energy audit and energy management enhancement, which aimed to strengthen the capacity for energy efficiency in wastewater treatment and reuse.

(vi) **Water Supply and Sanitation Strategy** (multi-donor trust fund under the WFPF). This TA project in the Kyrgyz Republic envisaged a design approach to water supply and sanitation as part of a framework for infrastructure development and system maintenance development, one of the project outputs. Based on the TCR, this framework was partially achieved. However, planned changes to the way the government manages the sector were not achieved. Overall, the TA was rated less than successful, despite the close coordination between ADB and the government in project implementation.

APPENDIX 10: WATER FINANCING PARTNERSHIP FACILITY AND SANITATION FINANCING PARTNERSHIP TRUST FUND

1. The Asian Development Bank (ADB) and the Bill & Melinda Gates Foundation have formed a partnership through the establishment of the Sanitation Financing Partnership Thrust Fund to promote fecal sludge management (FSM) focusing on non-networked sanitation and septage management in the Asia and Pacific Region. On 25 July 2013, the Bill & Melinda Gates Foundation signed a channel financing agreement with ADB to contribute $15 million through a Sanitation Financing Partnership Trust Fund under the Water Financing Partnership Facility.

2. Traditional, large, centralized sewerage and wastewater collection and treatment systems are cost-effective in urban areas but they are also an expensive investment for ADB's clients. Wastewater investments usually have to be phased in over decades and soon fall into disrepair due to ineffective operation and maintenance. Fecal sludge management presents a solution to the specific requirements of most countries in the Asia and Pacific region.

3. The trust fund supports the following:

(i) pilot demonstrations of innovations, including new technologies, project delivery mechanisms, financing, and operation and maintenance arrangements for septage management and disposal in urban and peri-urban areas, and sludge treatment;
(ii) project preparation to support mainstreaming of fecal sludge management in project designs;
(iii) provision of grant funds for pilot implementation of innovations in ADB investment projects; and
(iv) septage management and sludge treatment policies, including policy and business innovations that improve the quality and coverage of septage management.

4. The eligible recipients of the fund proceeds are governments of ADB's developing member countries. First priority has been given to Bangladesh and India. The second priority countries are Indonesia, Philippines, and Viet Nam. Other countries may be considered based on need, in consultation with the foundation. To date, the following countries have been added: Cambodia, Mongolia, Nepal, and PRC.

5. As of 15 September 2017, out of the $15 million Bill & Melinda Gates Foundation grant funds, about $12 million has been allocated to projects across the following modalities as shown in Table A10.1.

6. When the ADB President approved the governance structure for financing partnership facilities (FPF) in 2007, a direct charge was included for accessing FPF resources along with TA projects and grant component of loans (see attached copy). The direct charge is used for stand-alone and time-bound activities that serve as a quick response mechanism for activities that were not anticipated or which have to be undertaken immediately and for which processing a TA would be too cumbersome. Activities may include desk study, procurement of incremental expertise during project preparation and implementation, investment dialogue, and workshops. A specific application template was developed for this. Endorsement by the director general of the department is required.

7. For service fees and other charges, the Office of Cofinancing Operations (OCO) guidelines apply.

8. Tables A10.2–A10.4 list the projects and recipients of Sanitation Financing Partnership Trust Fund grants and technical assistance.

9. Tables A10.5 and A10.6 show the list of countries and projects for direct charges and approved project allocations.

10. As priority countries, Bangladesh and India received the highest grant allocations. Although Indonesia, Philippines, and Viet Nam are second priority countries, Cambodia, Mongolia, and Nepal have received more grants so far. Countries can be added as needs to complement ongoing or pipelined investments are identified.

Table A10.1: Sanitation Financing Partnership Trust Fund: Progress Report as of 15 September 2017

Item	Approved
Grant Components of Loans	6,400,000
TA Attached to Loans	1,272,000
Stand-Alone TAs	2,967,106
Direct Charges	658,932
Service Fees and Other Charges	531,955
Total	**11,829,993**

TA =technical assistance.
Source: Sanitation Financing Partnership Facility as of 15 September 2017.

Table A10.2: Sanitation Financing Partnership Trust Fund: Grant Component of Loans

Country	Project Name	Status	Amount ($)
Bangladesh	Loan: Coastal Towns Environmental Infrastructure Project (Pilot Implementation of Innovative Sanitation and Septage Management Solutions)	Ongoing	1,600,000
Cambodia	Loan: Second Rural Water Supply and Sanitation Project Additional Financing	Ongoing	1,500,000
India	Loan: Rajasthan Urban Sector Development Program (Piloting Innovative Sanitation Solutions)	Ongoing	2,000,000
Nepal	Loan: Third Small Towns Water Supply and Sanitation Sector Project (Pilot Implementation of Innovative Sanitation and Septage Management Solution)	Ongoing	1,300,000
	Total		**6,400,000**

Source: Sanitation Financing Partnership Facility as of 15 September 2017.

Table A10.3: Sanitation Financing Partnership Trust Fund: Technical Assistance Attached to Loans

Country	Project Name	Status	Amount ($)
Indonesia	Loan: Metropolitan Sanitation Management Investment Program (TA Attached to Loan: Capacity Development Support for Preparation of Septage Management Plan for the City of Jambi)	Ongoing	272,000
Mongolia	Loan: Additional Financing for Southeast Gobi Urban and Border Town Development Project (TA Attached to Loan: Management and Reuse of Sewage Sludge from On-Site Sanitation)	Ongoing	1,000,000
	Total		**1,272,000**

Source: Sanitation Financing Partnership Facility as of 15 September 2017.

Table A10.4: Sanitation Financing Partnership Trust Fund: Stand-Alone Technical Assistance Projects

Country	Project Name	Status	Amount ($)
Bangladesh	PPTA: Third Urban Governance and Infrastructure Improvement Sector Project	Closed	467,106
Regional	RETA 8568: South Asia Urban Knowledge Hub	Ongoing	500,000
Regional	RETA 6498: Knowledge and Innovation Support for ADB's Water Financing Program	Ongoing	2,000,000
	Total		**2,967,106**

PPTA = project preparation technical assistance, RETA = regional technical assistance
Source: Sanitation Financing Partnership Facility as of 15 September 2017.

Table A10.5: Sanitation Financing Partnership Trust Fund: Direct Charges

Country	Project Name	Status	Amount ($)
Bangladesh, India, Nepal, Sri Lanka	Support to Preparation of Innovative Sanitation Business Plans for Four National Centers under the South Asia Urban Knowledge Hub	Closed	79,751
Indonesia	Development of the Sanitation Code for Makassar Province	On-going	47,000
Mongolia	Improving On-Site Sanitation: Support to Preparation of Managing Soil Pollution and On-Site Sanitation in Ulaanbaatar's Ger Areas	Closed	138,854
Philippines	Development of the Sanitation Code for the City of Manila	On-going	46,200
the People's Republic of China	Market Assessment for PPP Opportunities in Fecal Sludge Management Through Innovative Carbon Storage and Advanced Technologies	On-going	225,000
Regional	Establishment of Sanitation Technical Team	Closed	52,372
Regional	3rd Asian Sanitation Dialogue	Closed	69,755
	Total		**658,932**

Source: Sanitation Financing Partnership Facility as of 15 September 2017.

Table A10.6: Sanitation Financing Partnership Trust Fund: Details of Approved Project Allocations

Country	No. of Projects	Amount Allocated ($)
Bangladesh	3	2,087,044
Cambodia	1	1,500,000
PRC	1	225,000
India	2	2,019,938
Indonesia	2	319,000
Mongolia	2	1,138,854
Nepal	2	1,319,938
Philippines	1	46,200
Sri Lanka	1	19,938
Regional	4	2,622,127
Total		**11,298,038**

Source: Asian Development Bank (Independent Evaluation Department).