ADB Asian Development Bank

Smart Water Solutions in Small Packages

Stories from Pilot and Demonstration Activities

Water Financing Partnership Facility
Cooperation Fund for the Water Sector

WATER for ALL

Photo: ADB Photo Library

Contents

Acknowledgments

Like a pilot and demonstration activity, this publication is the result of a short, but dynamic, process.

The Asian Development Bank (ADB) staff Hubert Jenny, Ian Makin, Kenichi Yokoyama, Ma. Theresa Villareal, Rudolf Frauendorfer, Sri Wening Handayani, and Wouter Lincklaen Arriens, as activity officers of pilot and demonstration activities (PDAs) featured in this publication, provided the initial working materials.

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Note: In this publication, "$" refers to US dollars.

Foreword

Development solutions come in large and small forms, depending on situations and the nature of problems. The Facility for Pilot and Demonstration Activity (PDA) of the Asian Development Bank (ADB) is a small-grant program that has become a source of innovation and inspiration for many countries and communities in Asia and the Pacific to improve the delivery of water service or the management of water resources. By offering rapid response, working out local solutions, and focusing on tangible results on the ground, the facility also becomes an integral part of the ADB Water Financing Program.

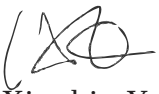
This publication puts together impact stories on the water pilot projects funded by the PDA Facility.

The stories show that a small amount of financing can go a long way. It can help enhance policy for tariff setting; bring various groups of stakeholders to the negotiation table and resolve conflicts; mobilize communities for sanitation, hygiene, and river cleanups; assess technology options and test their applications; and empower women and disadvantaged farmers through better access to improved irrigation services.

The stories also reveal that innovative ideas can be low cost and readily available. Proposals for funding from the PDA Facility have been increasing every year since the facility was introduced in 2002. Many of these proposals, from national and local governments and agencies, nongovernment organizations, and research and academic institutions rise up to the challenge of bringing innovation to the table.

It has been almost a decade since the PDA Facility was first launched. To date, a total of 60 pilot projects have been implemented. We hope to continue with this facility in the years to come.

We humbly dedicate this impact story publication to the many pilot communities that hosted a PDA. We are grateful to the donors of the Water Financing Partnership Facility and the Cooperation Fund for the Water Sector for supporting the PDA Facility. With this publication, we invite donor agencies, financing institutions, and other development partners to see the value and usefulness of the small grants program not only in water, but in the energy, transport, health, education, and other sectors as well. Ultimately, we hope that this publication provides inspiration to development work in Asia and the Pacific.



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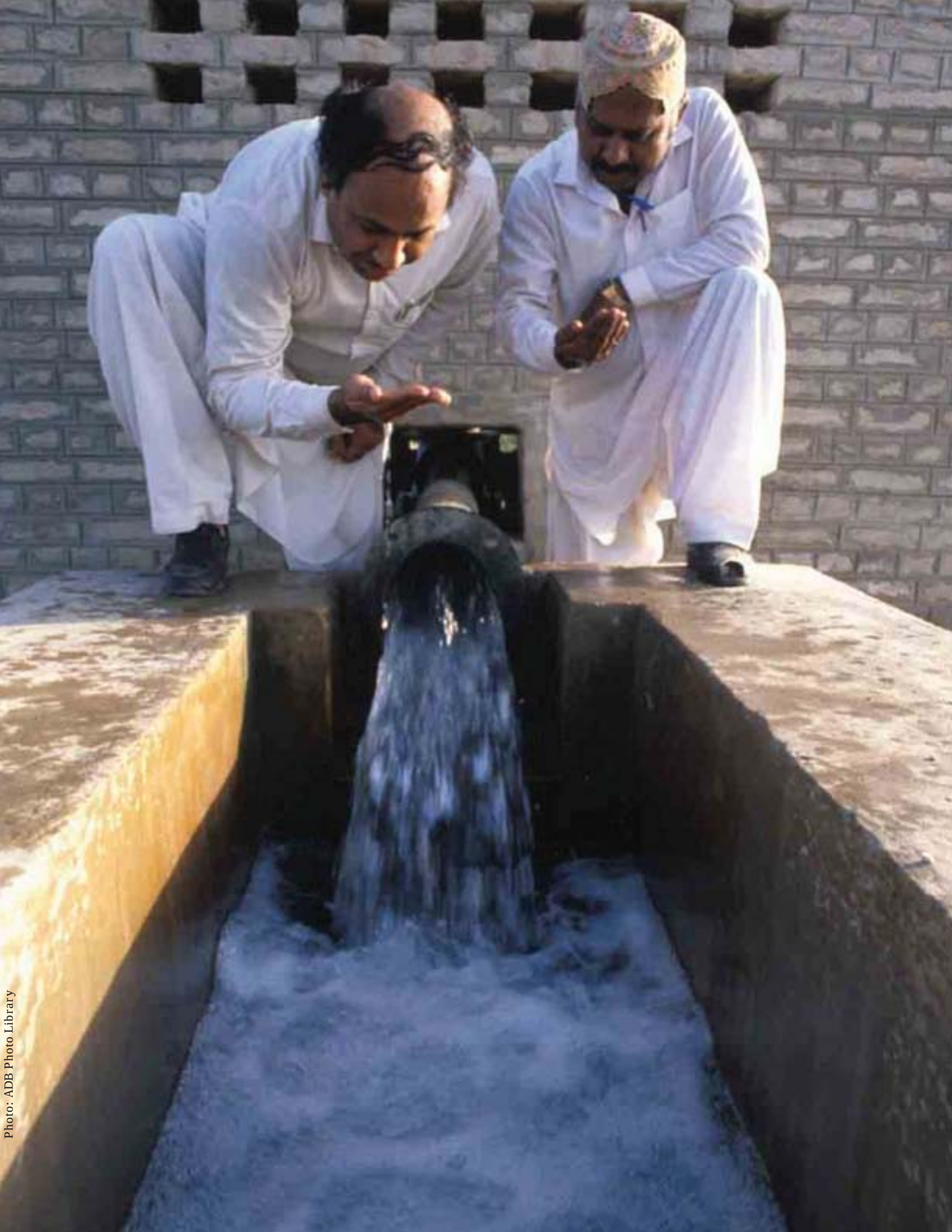


Photo: ADB Photo Library

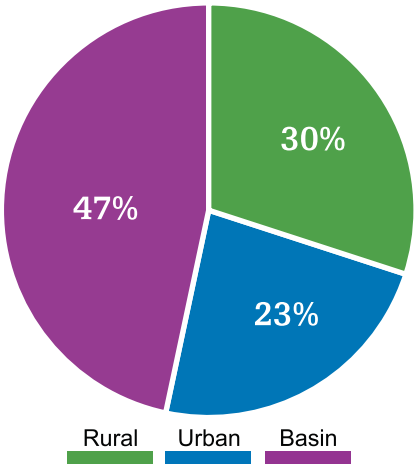
THE FACILITY FOR PILOT AND DEMONSTRATION ACTIVITY

Every day, Asia's water sector faces serious problems—the quality of surface and groundwater is deteriorating; irrigation systems are failing; water supply and sanitation services are inefficient; wastewater treatment and disposal systems are inadequate if not nonexistent, etc. Expanding urban populations, rapid urbanization, greater industrial activity, and increasing climate variability make managing Asia's water more challenging to governments, civil society, the private sector, development institutions, and other stakeholders. Often, solutions to these big water problems come in the form of large-scale, long-term, and capital-intensive development projects that involve a great deal of time for planning and implementation.

Smart, sustainable solutions, however, can also come in small packages.

In 2002, the Asian Development Bank (ADB) launched the PDA Facility, its first ever small-grant facility for the water sector, which introduced a quick way of getting small, but adequate, amounts of money to ADB staff, government clients, and development partners to fund innovative small-scale water projects. Specifically, the PDA Facility was designed to test and validate new and/or innovative approaches, strategies, technologies, and methodologies for improved water resources management and water services delivery, on a small scale, with the intention of replicating and scaling up such successful innovative practices across the region.

Chart 1: PDA Distribution According to Water Investment Areas
(as of 31 December 2011)



A PDA is a small-scale project that directly supports either an ADB project or sector work in one of ADB's developing member countries (DMCs). PDAs are meant to be fast-moving, quick-disbursing activities. They provide support for reforms and developments in ADB's three water investment areas: (i) Rural Water, which covers rural water supply and sanitation, and irrigation and drainage; (ii) Urban Water, which covers urban water supply, sanitation, and wastewater management; and (iii) Basin Water, which covers water resources development and management, flood management, and watershed and wetlands protection, including hydropower. Each project should cost at most $50,000 and be completed within 1 year.

PDAs were introduced as a program offered by the Cooperation Fund for the Water Sector through a series of regional technical assistance (RETA) on "Promoting Effective Water Management Policies and Practices." The Fund financed 39 PDAs between 2002 and 2008. In 2009, the Water Financing Partnership Facility (a follow-up to the Cooperation Fund) continued the PDA program. It has since funded another 21 PDAs, now in varying stages of implementation.

After supporting more than 50 small pilot projects, the PDA Facility has tested new ideas and validated their applicability covering five themes: (i) policy, legislation, and regulatory reforms; (ii) institutional arrangements; (iii) public awareness and water education; (iv) appropriate technology; and (v) participation, inclusive approaches, and multi-stakeholder representation.

The PDA Facility has helped ADB's water operations in various ways, such as (i) trying out design options during project preparation; (ii) finding solution to a problem and exploring such solution during fact-finding missions; (iii) improving quality of engagement with government counterparts and with stakeholders in the field, including project beneficiaries; and (iv) triggering the development of new investments. Furthermore, it has helped in advancing wider sector work, such as in pushing reform measures and in improving institutional arrangements. The PDA Facility has been refined by lessons learned during its execution. Its effectiveness has also been validated, as well as improved upon, by an internal review.

This publication tells stories on how the PDA Facility works as a complementary financing mechanism for small-scale water pilot projects. Five case studies covering each of the PDA themes illustrate some of the PDA Facility's success. The publication concludes with some ideas on how the PDA Facility may be replicated to provide small solutions to Asia's big water problems and to the challenges other sectors face as well. ■

Photo: ADB Photo Library

how the PDA FACILITY WORKS

Low Financial Risk

The amount involved is $50,000 or less per project and is normally released in four tranches (mobilization, inception, midterm, and final). A letter of agreement between ADB and implementing agency adequately governs how funds are transferred, spent, and liquidated.

Fast Approval

The entire evaluation and approval process in ADB is typically completed in 1 month. An additional month is alloted for securing government concurrence.

Fast Disbursement

The maximum implementation period allowed for PDAs is 12 months, but they have been typically implemented between 6 and 8 months. Major expenses are typically required upfront, with 50%–70% of funds normally disbursed within the first half of the implementation period

Modest Administrative Costs and Efforts

Administering a PDA typically requires:

- 10 days for first stage—evaluation, preparing letters of agreement, and other follow-ups;
- One hour from PDA Advisory Panel members to evaluate each qualified proposal;
- 3 days total from ADB staff acting as PDA activity officer to review the inception, midterm, and completion reports, and in some cases, a review visit when it can be scheduled during a regular mission; and
- 5 hours total from Controllers Department to process the four transactions of a PDA—mobilization, inception, midterm, and final payment.

Based on the estimated time value of those inputs, the cost of administering this facility is about 5% of the value of each PDA transaction.

Flexibility to suit different users

Support for PDAs is on a demand-driven basis. The PDA facility is open to:

- ADB staff in the regional departments,
- Government agencies (national and subregional levels) and local governments in ADB DMCs,
- international and national nongovernment organizations (NGOs),
- academic institutions, and
- research organizations.

3-Step PDA Application Approval Process

The three stops a PDA application makes on its way to approval are:

1st. PDA manager reviews applications

A member of the "Water Team" in the Regional and Sustainable Development Department who acts as the PDA manager reviews the application for compliance with the PDA criteria

2nd. An ADB staff is designated as PDA activity officer

An ADB staff from the regional department is designated as a PDA activity officer to oversee the implementation of the PDA

3rd. Interdepartmental advisory panel decides

Final approval of a PDA proposal is by an interdepartmental "PDA Advisory Panel" composed of select members of the ADB Water Committee

Philippines: The PDA Facility helped the National Water Resources Board's develop a new tariff-setting methodology for its private water utilities.

Photo: ADB Photo Library

RATIONALIZING WATER TARIFFS

A new tariff-setting methodology was developed for the Philippines' National Water Resources Board to improve the economic regulation of private water utilities.

In 2003, the Philippines' National Water Resources Board (NWRB) was seeking some funding for long overdue organizational restructuring and reforms. Specifically, NWRB needed help in improving the economic regulation of private water utilities under its jurisdiction, with the intention of setting tariffs that reflect the economic value of water. NWRB found the necessary funding in ADB's PDA Facility.

Outdated Practices

NWRB is the national regulatory body for water resources and water services in the Philippines. It also oversees policy and program coordination of water resource development plans and projects. As economic regulator of water services, NWRB supervises all private water operators—their franchises and other properties, and sets and regulates the water rates to be charged by water operators under its jurisdiction. It grants Certificates of Public Convenience (CPCs) to water operators, which permit them to operate and maintain water supply services and impose penalties for violations of rules and regulations.

With such an extensive mandate, it was not surprising that NWRB's limitations affected its performance as a regulatory body. Granting of CPCs took a long time, pushing some water operators to continue operating even without certification. NWRB also lacked important field equipment and staff knowledgeable about water utility operations. Moreover, the regulatory body lacked focus, needed continuity in leadership, and operated on an inadequate budget.

PDA PROFILE

Rationalizing Tariffs for Private Water Utilities under the National Water Resources Board

Site	Philippines
Cost	$50,000
Completion	June 2004
ADB Officer	Rudolf Frauendorfer
Partner	National Water Resources Board

NWRB's then existing practice of using a 1-year analysis as the basis for setting tariffs was not consistent with the nature of the investment, since water utility assets are long-term and need more than a year to realize the desired returns. Tariffs were not related to service levels, and set based solely on historical asset costs and without regard to projected revenue requirements in order to maintain and upgrade the assets.

Better Methods

The PDA, entitled "Rationalizing Tariffs for Private Water Utilities under the National Water Resources Board," was implemented over a 6-month period. It sought to

- improve NWRB's tariff-setting methodology and regulatory supervision of its clients,
- introduce/identify reforms to strengthen NWRB economic regulation, and
- encourage stakeholder participation in problem analysis and formulation of recommendations to ensure its acceptability.

To develop the tariff-setting methodology, the PDA reviewed current international best practices and held consultations with NWRB and various stakeholders.

Photo: ADB Photo Library

To develop the new methodology for tariff setting, the PDA set out a review of current applicable international best practices on tariff setting and held consultation workshops and several technical working group sessions with NWRB, its clients, and various stakeholders. The PDA's major output is a proposal for using a 5-year Return on Investment (ROI) method for setting water tariffs, where the average annual ROI of a water utility is computed by dividing the total revenue requirements for 5 years by five-year total consumption. The new methodology was implemented for pilot testing in five areas in and around the Greater Manila Area. This method is expected to lessen the impact of price increases that could affect consumers and, at the same time, fully recover water utilities' operating costs, which NWRB's method of tariff calculation at that time could not accomplish. The new method was accepted and approved by NWRB, with immediate positive results.

"We were seeing the same utilities year after year with new tariff proposals. It was an inefficient way for everybody to do business," said Ramon Alikpala, former NWRB executive director. "Through the PDA and the new methodology, the utilities became much more professional. It forced them to look long-term. And now, we only see them every 5 years."

The main features of the revised tariff methodology and process included (i) a 5-year tariff study period, requiring tariff proposals to incorporate a 5-year business plan and service levels; (ii) compulsory tariff reviews to determine disallowances or need for upward adjustment based on the Cost of Service approach to tariff regulation; and (iii) tariff reviews as one of the bases for extension of CPC validity.

Improved Regulatory Body

One of the PDA's more important achievements is the increased involvement of clients and other water sector stakeholders, including water utilities and consumers, in the consultations, several of whom proposed solutions and recommendations to improving NWRB's tariff-setting methodology. This involvement paved the way for making the new tariff system acceptable to all stakeholders and helped in increasing NWRB's client base.

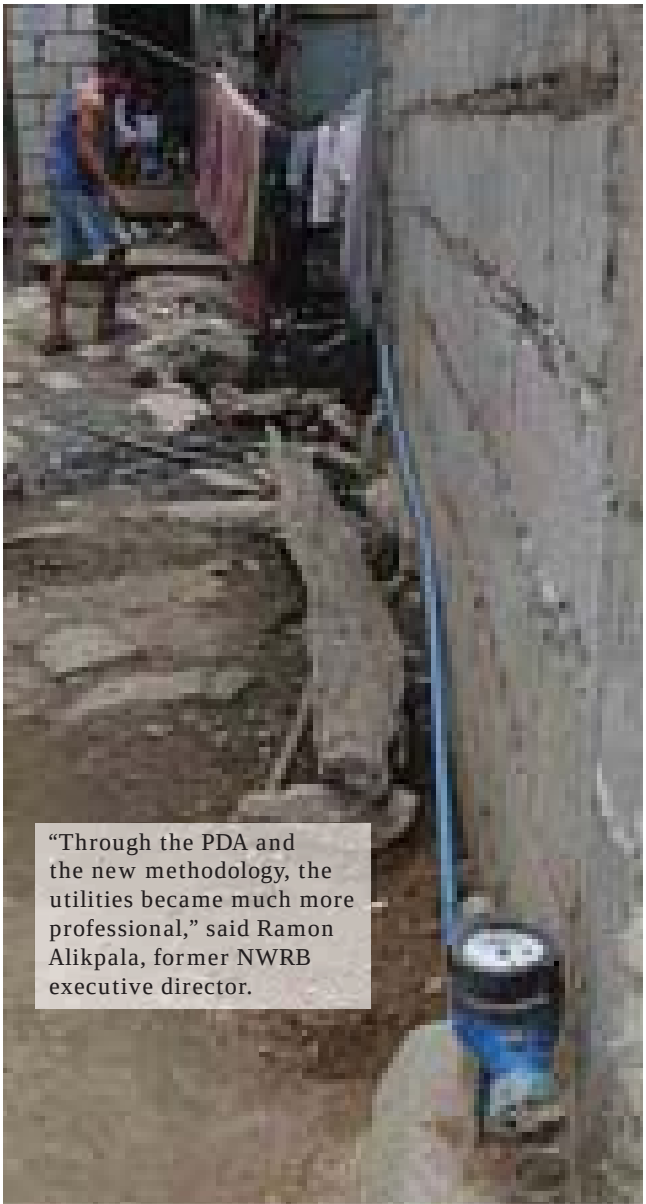
NWRB's clients and stakeholders became more involved in the water sector as a result of the project.

Photo: ADB Photo Library (2x)

The PDA also succeeded with a number of institutional reforms. The new tariff-setting methodology was approved by the government and was followed by a capacity-building program for utilities. Key performance indicators for rating utility performance, developed by the PDA and approved by NWRB, are now being implemented. Also, legal recommendations for improving enforcement of utility regulation became a policy. Lastly, an accreditation process was initiated for financial specialists to assist water utilities in preparing business plans.

"As a government user of the PDA, I think the facility has a lot more potential. It makes ADB more accessible to government and NGOs who have ideas. It wasn't a huge amount of money for us, but it was enough and it removed some red tape," Alikpala said.

Training modules, consultation guidelines, and design methodologies and processes produced by the PDA have been compiled and documented, ready for dissemination and possible replication in other water regulatory bodies in Asia and the Pacific. ■



"Through the PDA and the new methodology, the utilities became much more professional," said Ramon Alikpala, former NWRB executive director.

Thailand: The PDA Facility helped strengthen the Bang Pakong River Basin Committee's capacity to initiate dialogue between conflicting water users.

Photo: ADB Photo Library

TURNING DISPUTE INTO DIALOGUE

A more capable river basin organization initiated a dialogue between conflicting stakeholders and introduced integrated water resources management in Bang Pakong.

In Thailand, conflicts between and among the different users of the Bang Pakong River have been common, complex, and expected, since the river's resources have been heavily exploited for productive use in agriculture, industry, and tourism. Thailand's Department of Water Resources tapped into ADB's PDA Facility to help the Bang Pakong River Basin Committee initiate a dialogue between the river's users and help them find equitable solutions.

Complex Conflicts

The Bang Pakong River discharges into the Gulf of Thailand, with saltwater reaching 170 kilometers upstream during the dry season, when freshwater runoff is minimal. The basin supports communities involved in agroforestry, irrigated crops, livestock, and fisheries. However, the river basin is also home to a government-supported industrial zone that hosts tanneries, breweries, distilleries, and paper factories. Many companies discharged wastewater into the river, prompting some communities along the Bang Pakong to complain. But these same communities dump garbage and untreated sewage into the river as well and no one was monitoring the source of pollution.

In areas near the ocean where saltwater and freshwater meet, shrimp farmers who need saltwater, and agricultural farmers who need freshwater have been fighting over water use for years. In 1999, a barrage was built to keep out saltwater from the crops, but the construction has eroded the riverbanks and caused heavy siltation. About 60 kilometers upstream from the barrage, a canal slide gate that keeps water for rice fields was being blamed for polluting water downstream and damaging aquaculture.

PDA PROFILE

Bang Pakong Dialogue Initiative

Site	Bang Pakong, Thailand
Cost	$50,000
Completion	July 2006
ADB Officers	Wouter Lincklaen Arriens and Ian Makin
Partners	Department of Water Resources, Ministry of Natural Resources and Environment

"The situation in the river basin is extraordinarily complex," says Chamroon Suaydee, chairperson of the Bang Pakong River Basin Committee. "There are many groups involved, and everyone shares some of the blame for the problems of the river. The different users of the river have to come together and find a solution."

Gathering Stakeholders

The PDA on the "Bang Pakong Dialogue Initiative" was designed to strengthen the Bang Pakong River Basin Committee's capacity to reduce conflicts, introduce a water allocation framework, and promote integrated water resources management in the basin. Established in 2001, the Committee is composed of local administrative body representatives, government officials, water users, and representatives from local nongovernment organizations (NGOs) and the private sector, all with varying knowledge

and attitudes and each with different interests and goals. It was the only one of 29 river basin organizations in Thailand chaired by a representative of the private sector, Chamroon Suaydee, restaurant owner and president of the Pranchinburi Province Tourist Club.

Through the PDA, the Committee organized the Bang Pakong Dialogue Initiative, a series of multi-stakeholder meetings that seeks to help the parties involved find solutions to the river's problems. Committee members from the government, however, were not accustomed to ceding their authority, and initially refused to participate in the dialogues. Other stakeholders were simply not articulate enough to air their views. But the Committee chair was persistent. Suaydee mobilized his contacts in the private sector and civil society networks to get the dialogues started, and then brought the results to the government agencies, prompting them to take action.

Eventually, the Bang Pakong dialogue involved all the different users of the river—government agencies, businesses and industries, NGOs, and community groups, such as fishers and farmers. Today, committee members from the private sector are active custodians of the basin, often working side by side with community groups to serve as watchdogs of large companies and industries perceived as potential polluters of the river.

More than 20 workshops and consultations have been convened since the start of the project. Many of these helped stakeholders understand the Committee's mandate and learn integrated water resources management, its principles, and practices. Majority of the sessions, however, focused on understanding specific conflicts in the river basin and finding solutions. For such sessions, the Committee deliberately leaves the agenda open so that the stakeholders can raise the issues paramount to them. This bottom-up approach has earned the trust of local stakeholders and has given

Photo: ADB Photo Library

The Bang Pakong River's resources are heavily exploited for agriculture, industry, and tourism resulting in conflicts between different water users.

the Committee much-needed inputs in terms of data and solutions.

“Rivers are still being managed top–down in some parts of the country,” says Suaydee. “But things are changing. People who live near the rivers are having a greater say in river management. The Bang Pakong is an opportunity to show it can work.”

Driving Change

Besides support for the Committee in conducting the dialogues, the PDA also helped introduce the Water Evaluation and Allocation Program to the Committee and its network of stakeholders as appropriate software for simulating different water supply and demand scenarios, and finding fair allocation solutions in Bang Pakong.

The Committee also pilot-tested water use surveys in selected basin subdistricts. Not only did this strengthen its ability to undertake research about the people in the basin, but it also gave a voice to individual stakeholders. Data revealed a widespread misunderstanding over water issues at the community level. Because of this, the Committee now has a better understanding of what really drives water demand in the basin, and what development initiatives will be most useful in the coming years.

Today, the Committee continues to pursue constant dialogue with stakeholders and is also gearing up for work beyond conflict resolution. In 2009, the Department of Water Resources once more sought funding from the PDA Facility to demonstrate participatory water allocation processes to inform the formulation of corresponding policies and guidelines. In this “after-care” PDA, the Committee is taking the lead in stimulating stakeholders’ participation in formulating a detailed policy, plan, and manual for effective water allocation in Bang Pakong. ■

Photo: ADB Photo Library

The Bang Pakong Dialogue Initiative involved all the different users of the river in finding solutions to the river’s problems.

People's Republic of China: The PDA Facility helped raise sanitation awareness among communities in Nantai Island to clean up inland rivers.

Photo: ADB Photo Library

CLEAN RIVER PROGRAM

Environmentally enlightened communities in Nantai Island took charge of cleaning heavily polluted inland rivers to improve community sanitation and hygiene.

In 2005, ADB and the Fuzhou Municipal Government launched the Fuzhou Environmental Improvement Project to rehabilitate the city's water supply, sanitation, and wastewater management systems, including Nantai Island's inland rivers. To support the project, the municipal government sought financing from ADB's PDA Facility to implement a sanitation awareness campaign and river cleanup program involving Nantai Island's communities.

Rivers of Trash

Located at the Min River Delta in the southeastern coastal area of the People's Republic of China, Fuzhou City is the provincial capital, as well as the political, economic, and cultural center of Fujian Province. The Fuzhou Environmental Improvement Project aimed to improve the living conditions and public health of about 1.4 million people in Fuzhou City through the construction of sewer networks in Yanglai and Lianban districts, the rehabilitation of Nantai Island's inland rivers, and empowerment of communities to oversee project-related activities. About 12 interconnected inland rivers, with a combined length of about 48 kilometers, were rehabilitated. This involved dredging and excavating 2.2 million tons of earthworks and constructing stone-lined rectangular channels. Eight existing floodgates were also repaired.

Nantai Island, located at the heart of Fuzhou City, has a population of 480,000 packed in only 142 square kilometers of land, and with no centralized wastewater treatment facilities. Its inland river system, consisting of more than 40 inland rivers, became the dumping site of all domestic and industrial wastewaters, and households' solid waste. People simply just dumped their trash in the rivers, unmindful of their practice's harmful effects. The rivers that ran through Nantai's urban communities naturally carried urban waste along before emptying into the Min River that surrounds the island—until the rivers got clogged, became putrid, and turned black.

PDA PROFILE

Clean River Program for the Urban Poor in Nantai Island

Site	Nantai Island, Fuzhou City People's Republic of China
Cost	$50,000
Completion	September 2006
ADB Officers	Sri Wening Handayani and Ma. Theresa Villareal
Partners	Fuzhou Project Management Office, Fuzhou Municipal Government

The deterioration of the inland rivers' water quality and the potential threat to public health prompted the Fuzhou Municipal Government to seek ADB assistance. The PDA Facility provided the much-needed support to raise Nantai Island communities' awareness on how better sanitation and hygienic practices can help them and their rivers reach the pink of health.

Changing Community Mind-sets

Using a Community-Driven Development (CDD) approach developed by the Fuzhou Project Management Office, the PDA on "Clean River Program for the Urban Poor

in Nantai Island" set out to increase public awareness among urban households on the benefits of improved household-level hygiene and sanitation practices and facilitate active participation of all stakeholders in managing and maintaining a clean river program. CDD involves the implementation of complementary community development activities that lead to improvements in people's knowledge, attitudes, and behaviors. It requires the creation of Village Committees that would encourage local communities to implement change action.

The CDD approach implemented in Nantai Island included

- Training workshops for community leaders to become hygiene promoters. About 75 community leaders that led the Village Committees of 29 villages participated in the training programs with the express aim of leading the various awareness-raising and river cleanup activities; and
- Community awareness campaigns through various media, bazaars, household visitations, audiovisual materials, and surveys. The campaign covered 42 villages located along 13 selected inland rivers and also targeted primary and secondary schools.

Through the CDD approach, villagers' attitudes and behavior toward sanitation began to change. They realized that better sanitation and hygienic practices can help them and their rivers become healthier. They have stopped randomly throwing garbage and discharging wastewater into the rivers. Some people even openly criticize those who still carelessly dump trash in the rivers.

With mind-sets changed, Nantai's urban communities launched into a flurry of clean-up activities. They have established a specialized

Photo: ADB Photo Library

cleaning group responsible for each village's cleanliness. Community-based rubbish disposal points have been set up, catering to more than 21,000 households in 30 villages. Solid wastes are now transported regularly to landfills.

Nantai's communities also established a hygiene monitoring group, conducted village sweeping events, and trained more villagers. While the local government provided half the necessary funds for these activities, each village raised the other half of the finances required. Overall, communities have now cultivated better hygiene practices. By partnering with the local government, communities now have concrete roles in maintaining the water quality of Nantai Island's inland rivers.

Driven Communities

The PDA demonstrated that changing community mind-sets is possible with the right approach and the willingness of communities. In Nantai Island, the change in people's mind-sets was remarkable.

The infrastructural changes and communities' new outlook toward their environment can prove to be just the right combination that will save Nantai Island's rivers.

"The Fuzhou experience shows that the benefits from river cleanup can be sustained by making the community an active partner, not just a mere project beneficiary," says Ma. Theresa Villareal, ADB project officer.

The PDA's CDD approach has been replicated in ADB's Shandong Hai River Basin Pollution Control Project and is now being mainstreamed into the Small Cities and Towns Development Demonstration Sector Project in Hebei, Liaoning, and Shanxi provinces. ■

Before the project, Nantai Island's rivers were the dumping site of all domestic and industrial wastewater and households' solid waste.

Viet Nam: The PDA Facility helped design and construct a decentralized wastewater treatment system to stop the pollution coming from local industries and households in Kieu Ky commune.

Photo: EAST Viet Nam

PERI-URBAN SANITATION SOLUTIONS

A decentralized wastewater treatment facility was designed and built to stop the pollution coming from local industries and households in Kieu Ky commune.

In the peri-urban commune of Kieu Ky in Ha Noi, local industries are bustling to keep abreast with the city's dynamic economy, while discharging wastewater directly to the environment, contaminating drinking water, polluting rivers, and threatening public health. Urban sanitation services, unfortunately, do not reach the commune. In 2008, the Hanoi People's Committee tapped ADB's PDA Facility to help Kieu Ky find a solution to pollution.

Peri-Urban Problems

Kieu Ky, in Gia Lam District just 18 kilometers downstream of Ha Noi's city center, is home to about 10,000 people. Typically peri-urban, rural traditions and urbanization clash daily in Kieu Ky, as is evident in people's main choices of livelihoods: agriculture and industry. An active, often household-based craft-making industry, which includes gold beating; cardboard recycling; and bags, plastics, and metals manufacturing, is the main economic driver and claims the time and resources of at least 60% of the population, while some 30% still cultivates paddy fields.

Wastewater from these industries is directly discharged into the rice fields via irrigation canals. This has caused the commune major sanitation-related problems, among them contaminated drinking water, fetid rivers, dead fish, and skin allergies among residents. Meanwhile, heavy effluents from the urban center flowing downstream to Kieu Ky add to the pollution. The Ha Noi Sewerage and Drainage Company, which handles domestic wastewater drainage and treatment in Ha Noi, has resources to cover only 60% of the roughly 500,000 cubic meters of wastewater generated daily. Only 5% is effectively treated by an old and centralized wastewater treatment facility; the balance is directly discharged into the environment. Another contributor is the landfill within the commune, which services the entire Gia Lam District. Roughly 80 tons of waste is buried daily without sufficient safeguards against environmental impacts.

PDA PROFILE

Developing Appropriate Sanitation Solutions for Peri-Urban Areas

Site	Kieu Ky Commune, Ha Noi, Viet Nam
Cost	$50,000
Completion	February 2009
ADB Officer	Hubert Jenny
Partners	Hanoi People's Committee, EAST Viet Nam, and Bremen Overseas Research and Development Association

Without urban sanitation services, Kieu Ky's residents bear the burden of managing their wastewater. They rely mainly on septic tanks and dry latrines but both these systems have proven ineffective in treating wastewater.

Customizing Technology

With funding secured from the PDA Facility, the Hanoi People's Committee partnered with two NGOs—the EAST Viet Nam and the Bremen Overseas Research and Development Association—for the PDA on Developing Appropriate Sanitation Solutions for Peri-Urban Areas to help Kieu Ky find a solution. The project team knew that the solution will depend on the composition of wastewater; availability of land, funds, and expertise; climate; local behavior; and actual and future

wastewater disposals. Their initial assessment surfaced additional design considerations:

- A decentralized approach will reduce the need for complex design engineering and extensive sewerage maintenance. It will also reduce investment costs.
- The facility must be low-maintenance and low-energy. As such, the drainage must be completely gravity-driven and dependent on the commune's natural topography.
- A separate underground piping would prevent residents from being in contact with pathogens, plus promote better development of anaerobic bacteria used for treatment.

After a series of public consultations, a decentralized wastewater treatment facility (with a piped system connecting to the septic tanks of 60 pilot households) was finally designed for Kieu Ky. The essence of the decentralized approach is for wastewater to be treated as close to its source as possible, thereby avoiding conventional and costly centralized approaches.

Kieu Ky's wastewater treatment facility has the following components:

- Baffle Anaerobic Septic Tank—an upgrade of the septic tank. It uses a series of baffles to force the wastewater to flow under and over the baffles from the inlet to the outlet of the tank.
- Anaerobic Filters—filter materials with attached biomass. As wastewater flows through these filters, particles are trapped and organic matter is degraded by the biomass.
- Constructed Wetlands—an artificial swamp emulating the self-purification abilities of natural wetlands. Stormwater or wastewater is drained into the wetlands, enabling additional treatments such as reduction of nitrogen compounds and removal of pathogens or heavy metals.

Photo: EAST Viet Nam

The wastewater treatment facility, turned over to the commune in 2009, was customized precisely to treat wastewater from Kieu Ky's booming craft industry.

Construction of the wastewater treatment facility and piped network began in November 2008. In February 2009, the facility was turned over to the commune.

Multiplying Solutions

Chemical tests conducted after the turnover of the facility confirm treatment efficiency. Initial monitoring results indicate that up to 98% of the organic compounds have been removed from water.

The commune leaders hired a facility operator and began collecting fees. More households have likewise indicated their interest to be connected to, and pay for, the treatment service. They pay a fixed monthly fee of $0.30, which covers the operator's wages, as well as short- and medium-term maintenance fees (sludge removal, replacement of filters' media, etc.). However, funds will have to be raised for major contingencies, such as equipment damage. Also, the facility only caters to a limited number of households, and much work still needs to be done to ensure that wastewater from all 10,000 residents is treated.

Nonetheless, the PDA has shown that combining baffled anaerobic septic tanks, anaerobic filters, and constructed wetlands is useful for treating wastewater rich in organic matters, such as those from crafts activities, and that people are willing to pay for collective sanitation services when they understand the ultimate benefits they will gain from the service.

The Kieu Ky experience provides a solid example of decentralized off-site sanitation solutions for peri-urban areas and small towns. The PDA promises to have practical application in two upcoming ADB projects—the Provincial Water Supply and Sanitation project for Thua Thien Hue Province and the Central Region Rural Water Supply and Sanitation project. ■

Photo: EAST Viet Nam

Chemical tests confirm the facility's efficiency. A hired facility operator takes charge of the wastewater treatment system's daily operations and maintenance.

Nepal: The PDA Facility helped women and poor farmers invest in drip irrigation and gain more important roles in agriculture.

Photo: ADB Photo Library

GENDER EQUALITY IN IRRIGATION

Women and other disadvantaged farmers gained more important roles in agriculture through investing in a low-intensity, high-return micro-irrigation system.

In Nepal's water scarce and marginal areas, women and disadvantaged or low-caste farmers have been turning to drip irrigation technologies and transforming their subsistence households into cash crop-producing farm units with increased benefits.

In 2003, ADB sought to test the effectiveness of drip irrigation and its adoption among women and poorer farmers in two communities in Nepal's Kaski District through the PDA Facility.

Marginalized Farming

In Nepal, about 90% of women are engaged in agricultural activities compared to 64% of men. Small and poor quality land with low yields has forced male migration in search of wage labor.

"Rural poverty has a woman's face," said Rajendra Shrestha, project director and senior agricultural and resource economist. "Women's role in irrigated agriculture will assume more importance as increasing numbers of poor men leave their homes to seek employment elsewhere," Shrestha said.

Previous irrigation projects in Nepal were limited to expanding large-scale flood irrigation, and benefited areas that were already economically superior, bypassing the marginalized upland farmers. Flood irrigation is not suitable for sloped hill terraces, such as Kaski's upland farms that typically rely on rainwater and do not have access to surface irrigation from streams. Where irrigation is available, farmers mainly use inefficient traditional methods.

PDA PROFILE

Promoting Gender Equality for Poverty Reduction through Improved Irrigation Management

Site	Nepal
Cost	$45,000
Completion	March 2004
ADB Officer	Kenichi Yokoyama
Partners	Department of Agriculture Development Office, Department of Women Development, and International Development Enterprises

With labor as their primary asset, the poor's only means of reducing poverty is to promote and use more efficient irrigation technology, such as drip irrigation.

Drip irrigation is especially suitable for women. It capitalizes on the traditional role of women and expands vegetable gardening into a sustainable enterprise. Reducing rural poverty, therefore, means increasing women's capacity.

Participatory Agriculture

The PDA on "Promoting Gender Equality for Poverty Reduction through Improved Irrigation Management" was implemented over a 7-month period. Its objectives were to

- document the impact of drip irrigation from a gender perspective,
- analyze the factors promoting and impeding its adoption and diffusion,
- undertake trial innovations with women and disadvantaged farmers, and
- propose large-scale replication of the project for improving gender and poverty outcomes.

Photo: ADB Photo Library

Drip irrigation increased women's self-esteem and confidence and enabled them to earn the respect of their family and the community.

The PDA enlisted the International Development Enterprises (IDE), an international NGO, for technical support. IDE has developed, tested, and modified the conventional low-cost drip irrigation system since 1995 and has been in partnership with both local and international NGOs and private entrepreneurs to promote the system to small and marginal farmers in the hill districts of Nepal.

The PDA offered a 60% subsidy to women and disadvantaged farmers for the purchase of IDE's drip irrigation kit. The remaining 40% could be paid with a loan from the government. The kit included the drip system with a supporting package of seeds of high-yielding vegetable varieties, fertilizer, pesticide, micronutrients, and accessories. To purchase the kit, the women of Kaski organized themselves into groups, registered with the local government office, and took out loans.

In a few months after installing the drip irrigation system, the women's groups reported a two- to threefold increase in income, time and energy savings, improved soil fertility through soil loosening and increased moisture, enhanced quality and productivity of vegetables produced using drip irrigation compared to vegetables produced using traditional irrigation, increased water use efficiency, and improved diets from eating more nutrient-rich vegetables. Before the project, only 20% of farmers grew vegetables. Now, all project farmers grow vegetables. A third of these are consumed, and the rest are sold in the market.

Despite the subsidies, however, Dalit farmers (those of the lowest socioeconomic caste and where poverty is highest) were reluctant to try the system. They needed to see the initial results first. But IDE's Gambar Singh Thapa, who has been training Nepal farmers in drip irrigation since 1998, said, "It is an immediate-result program, so when the results start coming, they believe it is the best thing they have seen."

After installing the drip irrigation system, women's groups reported a two- to threefold increase in income, time, and energy savings.

Photo: ADB Photo Library

Gender-Fair Irrigation

IDE and some Nepal NGOs are promoting drip irrigation to approximately 20,000 farmers in seven districts in the country's West and Midwest regions. Under this program, 3,400 farmers are from the disadvantaged hill districts.

The women's organizations meet monthly and regularly introduce the drip method to newly interested farmers and help erase its perceived risks. In helping other farmers, beneficiary women in Kaski District found power in numbers.

With the adoption of drip irrigation, other changes were also observed. Men and women are taking equal responsibility in cultivating vegetables. They share most of the agricultural activities, from land preparation, planting, and water and fertilizer application to harvesting, packing, and marketing.

Women also reported increased access to cash, enabling them to make small purchases on their own. Some women said that not having to ask for cash from male family members to buy personal items was a very important contribution of the project. The ability to earn cash income, despite the short time frame, has played an important role in empowering women. It has enabled women to earn the respect of their family and the community, and made a tremendous boost toward increasing women's self-esteem and confidence.

Even the Dalit farmers were able to repay the money they loaned to invest in the drip kit. They also reported gaining self-confidence to work because of their participation in the demonstration project.

"It has brought solidarity amongst ourselves," said Prabha Adkikary, one of the project's beneficiaries. "If we do this individually, there is a burden financially and physically. It is easier if we share it. This is our pride now." ■

Photo: ADB Photo Library

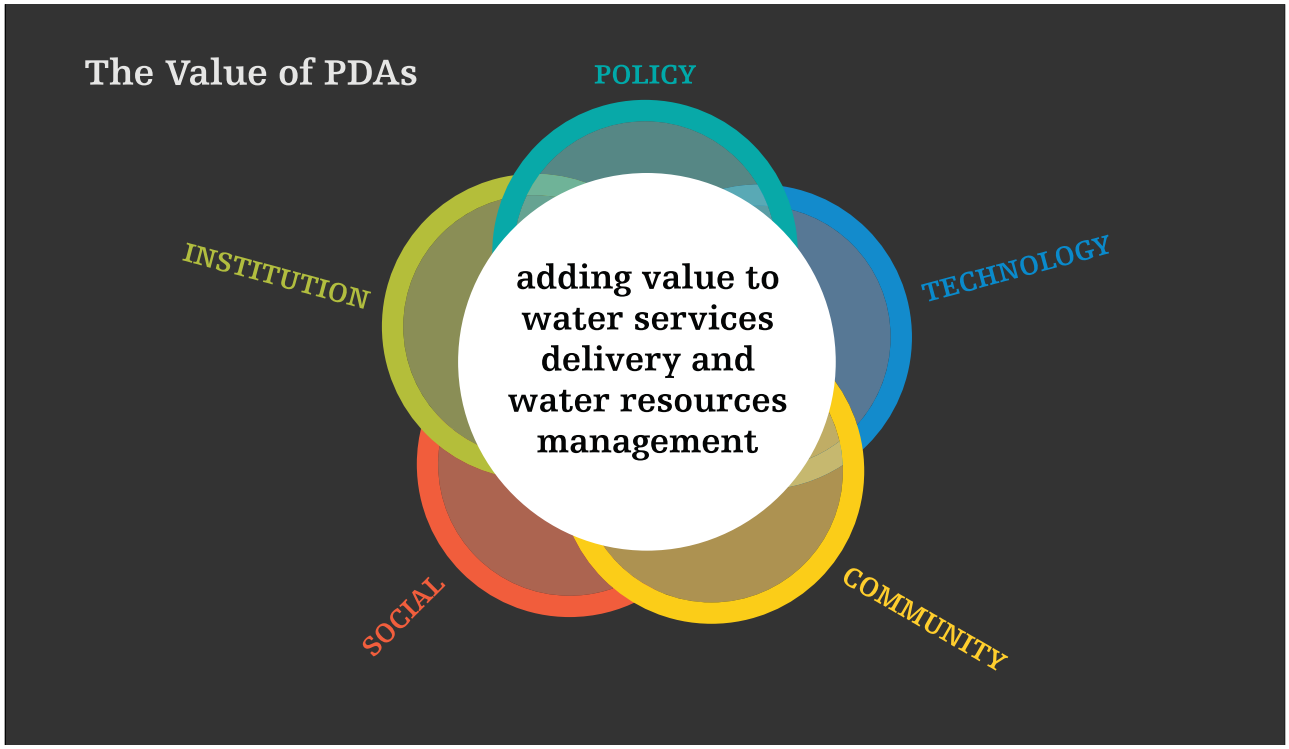
REPLICABILITY OF THE PDA FACILITY

ADB's water PDA Facility assures value for money, and its replication in other sectors may be the key to achieving quicker development results.

The real value of PDAs, as the case studies have illustrated, can only be measured by the development outcomes they deliver. The PDA outcomes, its impacts on ADB's water operations, and Asia's water sector as a whole, have been as cross-cutting as is the water sector itself, indicating the relevance and applicability of the facility to other sectors. PDA results are registering in health, agriculture, energy, disaster management, urban development, the environment, gender equality, and inclusion of civil society and marginalized groups.

What has kept the facility relevant and flexible is that the projects are spread out across the five themes: (i) policy, legislation, and regulatory reforms; (ii) institutional arrangements; (iii) public awareness and water education; (iv) appropriate technology; and (v) participation, inclusive approaches, and multi-stakeholder representation. These specific, but overlapping, themes serve as guideposts to ensure that the PDA Facility does not focus too narrowly on a particular thematic area in the sector or type of project, but is continuously reaching to test and demonstrate the value of new ideas in as many aspects of water operations as possible.

The PDA Facility has supported research and development in the water sector, thereby complementing ADB's regular lending and non-lending assistance, which take much longer to process and implement. PDA funds are value for money, are demand-based, and can be custom-fit for a variety of uses by project officers and development partners. Replicating the PDA Facility for other sectors may be the key to achieving quicker development results. ■



Water Pilot and Demonstration Activities

Bangladesh
2009 Field-Based Research on the Impacts of Climate Change on Rivers
2009 Developing and Pilot Testing a Specialists Course on Riverbank Protection
2008 Greater Women's Involvement in Implementing Arsenic Mitigation Measures in Rural Areas

Cambodia
2011 Action Research Project to Develop a Sanitation Microfinance Program
2008 Adaptation and Verification of Arsenic Mitigation Technology
2007 River Basin Approach to Integrated Water Resources Management
2004 Developing and Testing Environmental Education and Awareness Methodologies

China, People's Republic of
2011 Training Program on Water Tariff Reform and Peer-to-Peer Learning Process for Rural Environmental Health and Sanitation Awareness
2009 Pilot Implementation of School and Community-Based Information and Education Program for Water and Sanitation in Zhengding County
2008 Beneficial Uses of Sludge
2008 Balancing Wetland Conservation and Development in Sanjiang Plains
2005 Participatory Project Evaluation of Community Action in Hygiene Promotion
2005 Preparation and Adoption of a Comprehensive Management Framework for the Hunan Flood Management Sector Project
2004 Clean River Program for Nantai Island

India
2006 Demonstrating Sustainable Sanitation Improvement and Management through Community Initiative
2006 Advocacy for Change: Multi Stakeholder Platform (MSP) for reforms of the Gwalior Urban Water Supply, Madhya Pradesh
2004 Facilitating Irrigation Sector Reform in Chhattisgarh

Indonesia
2009 Use of Bamboo for Land Stabilization, Soil Erosion Control, Water Catchment Rehabilitation, and Effluent Treatment in Citarum River Basin
2008 Model for PDAM Collaboration for Improved Raw Water Management
2008 Using Compensation Mechanism for Watershed Protection Services in Citarum
2008 Applying Vetiver System for Slope Stabilization and Erosion Control in Citarum Riparian Community Groups
2007 Geographic Information System for Integrated Water Resources Management in Cimanuk River Basin
2006 Development of a Water Quality Management System for the West Tarum Canal of the Citarum River Basin

Lao People's Democratic Republic
2010 Building Private Sector Participation in River Basin Management: The Case of Nam Ngum River Basin

Nepal
2009 Demonstrating Enhanced Productivity of Irrigated Agriculture System through Multifunctional Water Users Associations
2009 Validating Community-Based Water Resources Management Approaches for Hill and Mountain Ecosystems
2008 Strengthening Capacity to Enhance Sustainability and Accountability of Irrigation Water Users' Association
2007 Community-Based Water Resources Management Approaches for Hill and Mountain Ecosystems
2005 School-led Gender Sensitive Water Supply and Sanitation in Kapilvastu
2003 Promoting Gender Equality for Poverty Reduction Through Improved Irrigation Management
2003 Operational Research on Decentralized Wastewater Management and its Dissemination

Pakistan
2005 Groundwater Aquifer Rejuvenation Demonstration Pilot Project for Balochistan
2004 Sustainable Management of Water Resources in Punjab's Barani Areas

Philippines
2010 Demonstrating Information, Education, and Communication Campaign Using Community-Based and Multimedia Strategies for the Rehabilitation of Pasig River and Its Waterways
2009 Financing Models for Small Scale Water Service Providers
2008 Reducing Mercury and Heavy Metals Contamination in Meycauayan River System
2008 Technology to Cope with Debris Flows in Mountain Regions
2004 Decentralized Wastewater Treatment Facility for the Lilo-an Public Market
2004 Rationalizing Tariff for Private Water Utilities under the National Water Resources Board
2004 Sustainable Water Integrated Management and Governance for Baguio City
2002 Water Management Information Dissemination and Extension for Irrigated Agriculture

Papua New Guinea
2006 Designing a Catchment Management Plan for Lake Kutubu

Samoa
2003 Establishment of Samoa Water Authority Wastewater Division and Associated Private Sector Participation Enabling Conditions

Tajikistan
2007 Creating an Institutional Framework for Improving Water Systems Management in Rural Areas

Thailand
2009 Consolidating Advances in Integrated Water Resources Management in Yom River Basin
2009 Stimulating Participatory Process for Water Allocation in Bang Pakong
2008 Piloting an Adaptive Management Approach to Implementing IWRM in Yom River Basin
2007 Production of Water Filter from Coconut and Palm Oil Shells
2004 Bang Pakong Dialogue Initiative

Timor-Leste
2002 Integrated Water Resources Management and Environmental Impact Study

Vanuatu and Solomon
2003 Education for Sustainable River and Water Conservation

Viet Nam
2010 Developing and Demonstrating a Mechanism for Sustainable Supply of Purified Water in Remote Communities
2009 Adapting Appropriate Sanitation Solutions to Peri-Urban Areas
2009 Strengthening the Benefits Sharing Mechanism for People Adversely Affected by Hydropower Generation Projects
2007 Developing Appropriate Sanitation Solutions for Peri-Urban Areas
2005 Pilot-test the Preparatory Process of Developing a New Subproject Management Model
2005 Initiating Integrated Water Resources Planning in the Vu Gia Basin
2004 Development of Pro-Poor Rural Water Actions in Collaboration with an NGO - CARE
2004 Development of Pro-Poor Rural Water Actions in Collaboration with an NGO - World Vision
2002 The Poverty Impact of Public Irrigation Expenditures in Viet Nam

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Cooperation Fund for the Water Sector

Pilot and Demonstration Activity

Request Form

Activity Title			
Proponent			
Request Date			
Country		Region	
Activity Proposed Start Date		Activity Proposed Duration	
Cost Estimate			
Implementing Organization Contact			

1. Background and Rationale:

2. Objectives:

3. Scope and location of Work / Description of Activities:

4. Implementation Schedule, Institutional Management Arrangements, and Proponent Qualifications:

5. Expected Results (outputs/outcomes/effects/impacts):

6. Measurable Performance Indicators:

7. Stakeholders Participation:

8. Scope for Replication/Use in Other Countries:

9. Cost Estimate:

Inputs / Expenditure category	Total Costs (in US$)
1. Office Equipment and Supplies: Summarize specifications, e.g., communications devices, audiovisual,computing, and other office equipment.	
2. Specialists/Consultants' Services: Summarize specifications, i.e., type of expertise to be engaged (e.g., irrigation expert, water resources engineer, etc.); other consultants-related costs, such as travel, per diems, etc.	
3. Training, workshops, conferences: Summarize specifications, e.g., resource persons, costs of trainers and facilitators, venue rental, travel, food, and accommodation for participants.	
4. Project Management: Summarize specifications, i.e., rental of office space and associated costs.	
5. Contingency (5% max)	
Total PDA grant financed	

Contact:

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Smart Water Solutions in Small Packages:
Stories from Pilot and Demonstration Activities

The Asian Development Bank's Facility for Pilot and Demonstration Activity was designed to validate new approaches, strategies, methodologies, and technologies for improved water resources management and water services delivery. Launched in 2002, it is the first small-grant facility that provides quick funding to government clients and other development partners for water projects, with the intention of replicating and/or scaling up successful innovative practices. This publication outlines how the Facility works as a financing mechanism for small water pilot projects and highlights its achievements through case studies, and how its replication can provide small solutions to Asia's big water problems and to the challenges other sectors face as well.

About the Asian Development Bank

ADB's vision is an Asia and Pacific region free of poverty. Its mission is to help its developing member countries reduce poverty and improve the quality of life of their people. Despite the region's many successes, it remains home to two-thirds of the world's poor: 1.8 billion people who live on less than $2 a day, with 903 million struggling on less than $1.25 a day. ADB is committed to reducing poverty through inclusive economic growth, environmentally sustainable growth, and regional integration.

Based in Manila, ADB is owned by 67 members, including 48 from the region. Its main instruments for helping its developing member countries are policy dialogue, loans, equity investments, guarantees, grants, and technical assistance.

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