

Customizing a Decentralized Sanitation Solution for Viet Nam's Peri-urban Areas

By Hubert Jenny and Maria Christina Dueñas

- **Design considerations for sanitation approaches in peri-urban areas cover a wide ground, from topography to climate to behaviors and more.**
- **Decentralized sanitation approaches reduce the need for complex design engineering and keep investment costs to a minimum, thus enabling communities to participate in their management and operations.**
- **People will invest in sanitation services when they understand the benefits they will gain.**

Challenges

Kieu Ky is a crafts commune located 18 kilometers downstream of Ha Noi's city center. As a typical peri-urban area, it

- retains its rural traditions but enjoys the more dynamic economy of its more urbanized neighbor;
- experiences problems related to urbanization, e.g., rapid population growth, environmental degradation; and
- is largely left to fend for itself since infrastructure and services are cornered by the city center.

Sanitation is a service sorely deficient in Kieu Ky. Crafts—from production of religious ornaments to leather, plastic, and metal goods—claim the time and resources of at least 60% of Kieu Ky's population. But crafts wastewater 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 housing dead fish, and skin allergies among residents.

This problem is compounded by heavy effluents from the urban center flowing downstream to Kieu Ky. 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 500,000m³ of wastewater generated daily. Of these, only 5% are effectively treated by the now old and centralized wastewater treatment facility; the balance is directly discharged into the environment.

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.

Approach

In 2007, ADB financed a pilot and demonstration activity¹ aimed at designing a sanitation solution for Kieu Ky. A team comprising ADB and its partners—the Ha Noi People Committee² and two nongovernment organizations, East Vietnam and



Construction of the wastewater treatment facility; consultation with the commune residents

Bremen Overseas Research and Development Association—managed the pilot project.

Design considerations. Fast diminishing land and rising population significantly impact projects in any peri-urban area. Beyond these, the project team looked at the quality and quantity of wastewater generated and the availability of funds and expertise to design and manage the sanitation facility to be proposed.

The team agreed that:

- The facility must be low maintenance and low energy. As such, the drainage must be driven by gravity and dependent on the commune's natural topography.
- Since Kieu Ky comprises several village clusters located at a distance from each other, a decentralized approach, which treats the wastewater as close to the source as possible, would be more feasible than a centralized approach.

Final design. 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 facility has the following components:

- **Baffle anaerobic septic tank** – an upgrade of the septic tank, it uses baffles (static devices that regulate the flow of liquids) to force the flow of wastewater from the inlet to the outlet of the tank.
- **Anaerobic filters** – as wastewater flows through the filters, particles are trapped and organic matter is degraded by the biomass that is attached to the filter materials.
- **Constructed wetlands** – an artificial swamp that copies the self-purification abilities of natural wetlands.

Implementation arrangements. The facility and piped network were constructed in November 2008 and turned over to the commune in February 2009 for their management.

The commune leaders hired the facility operator and collected fees. Each household pays a fixed monthly fee of \$0.30. This covers the operator's wages as well as short- and mid-term maintenance fees (sludge removal, filter replacement, etc.). Additional funds will have to be raised, however, to finance major contingencies such as equipment damage.

Results

Initial monitoring results indicate that the facility successfully removed up to 98% of biochemical oxygen demand and 96% of chemical oxygen demand.

The pilot project still recognizes some limitations, among them the following:

- technical difficulties in connecting households to the piped network, and
- need for bigger resources to increase the number of households covered by the decentralized facility.

Nonetheless, Kieu Ky's experience shows 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. It also showed that people are willing to pay for collective sanitation services when they understand the ultimate benefits they will gain from them.

Way Forward

Viet Nam's National Rural Water Supply and Sanitation Strategy is pushing for 100% access to improved sanitation facilities by 2020. Following regional and in-country sanitation dialogues organized by ADB in line with the International Year of Sanitation, ADB and Viet Nam are now pursuing sanitation projects for industrial wastewater and coastal city sanitation. The Kieu Ky experience provides a solid example of decentralized off-site sanitation solutions for peri-urban areas and small towns. This pilot project promises to have practical application in two upcoming ADB projects—the Provincial Water Supply and Sanitation project for Thua Thien Hue Province, currently being processed, and the Central Region Rural Water Supply and Sanitation project, scheduled for approval in 2010.

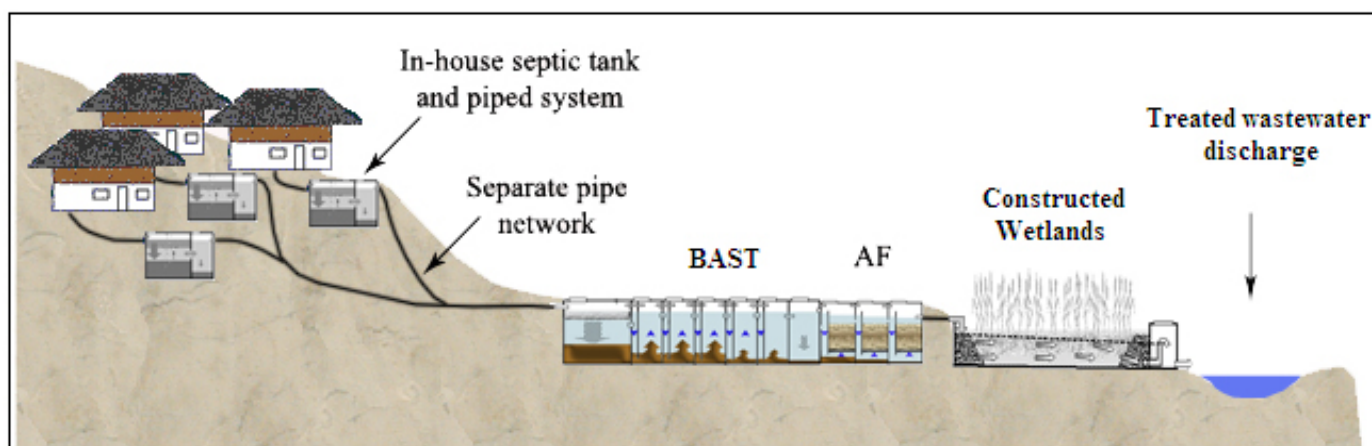


Diagram of the wastewater treatment facility scheme

¹ Pilot and demonstration activities are short-term projects funded by the Asian Development Bank's Water Financing Partnership Facility to test innovative approaches and strategies for improving water services and resources.

² The People's Committee is the executive arm of the provincial government and is responsible for formulating and implementing policy.

References

- Final Report on Pilot and Demonstration Activity for Viet Nam: Developing Appropriate Sanitation Solutions for Peri-Urban Areas in Viet Nam, February 2009.
- Decentralized Wastewater Treatment: New Concepts and Technologies for Vietnamese Conditions, September 2002.

For further information, contact

Hubert Jenny, Senior Urban Development Specialist, Viet Nam Resident Mission (hjenny@adb.org), and Maria Christina Dueñas, Knowledge Management Officer (cduenas@adb.org).

The **Asian Development Bank** is dedicated to reducing poverty in Asia and the Pacific.

www.adb.org/knowledgeshowcases

The **Knowledge Showcases** highlight innovative ideas from ADB technical assistance and other knowledge products to promote further discussion and research.

The views expressed in this publication are those of the author(s) and do not necessarily reflect the views and policies of ADB or its Board of Governors or the governments they represent. By making any designation of or reference to a particular territory or geographic area, or by using the term "country" in this document, ADB does not intend to make any judgments as to the legal or other status of any territory or area.