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SUSTAINABLE DEVELOPMENT OF WATER RESOURCES, WATER SUPPLY AND ENVIRONMENTAL SANITATION

Piloting Sustainable Sanitation in Nuwara Eliya through Regional Cooperation

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This paper describes how the United States Agency for International Development (USAID) is working to promote sustainable sanitation and wastewater treatment in Sri Lanka through the Environmental Cooperation-Asia (ECO-Asia) Program. A pilot project is being developed in Nuwara Eliya Municipal Council to demonstrate an effective strategy for providing improved sanitation and addressing key constraints in the sanitation sector. Key constraints include lack of understanding of options within municipal councils, lack of awareness of pollution impacts within communities, and inadequate financing strategies and recovery frameworks. The pilot will build on the findings, capabilities and networks of the USAID-funded Transparency, Accountability and Local Governance (TALG) project in Sri Lanka and the experiences of the USAID-funded Local Initiatives for Affordable Wastewater Treatment (LINAW) project which is working with seven local government units in the Philippines. The chief implementing organizations for both projects are Planning and Development Collaborative Inc. (PADCO) and The Asia Foundation (TAF).

Need for urban sanitation

Water pollution due to untreated domestic sewage is seriously affecting the environment, the economy and people's health and quality of life in the developing countries of Asia. In Sri Lanka, diarrheal diseases are the fifth leading cause of hospitalization with 130,000-140,000 admissions annually and are the third leading cause of death among infants. The sewerage network is limited to a small area serving just a quarter of Colombo, and a large section of that is in need of repair. Outside the capital, domestic sewage flows untreated into groundwater, drains, rivers and the sea. About 50 to 78% of the population has access to a water-sealed toilet, which is either connected to a soakage pit or septic tank and the effluent flows into the storm drain. There is no treatment of the polluted effluent and often no treatment of the sludge or septage that is removed from the pit or septic tank if it overflows. The total number of sewer connections in the country was assessed in 2005 to be 79,062, which means that less than 1% of the population has access to sanitation that meets sustainability standards.

Country goals

Sri Lanka is committed to achieving the UN Millennium Development Goals. Goal 7, Target 10 is to cut in half, by 2015, the proportion of people without sustainable access to safe drinking water and basic sanitation. However, this refers to the provision of basic sanitation, which does not include treatment of septic tank effluent or treatment of the septage removed from septic tanks. Nor does it require that septic tanks or pits be watertight. Therefore, basic sanitation

does not meet sustainability standards—eventually, ground water and surface water is becoming contaminated and affecting people's health and the environment. There is a need, therefore, to go beyond basic sanitation and focus on sustainable sanitation that includes treatment.

The government has stated its goals in sanitation are:

- Access to adequate sanitation by 70% of the population of Sri Lanka by 2010 and 100% by 2025.
- Piped sewerage to be provided in major urban areas and selected growth centers.
- Standard on-site sanitation for those not connected to a sewerage system or any sanitation scheme.

To support achievement of these goals, the United States Agency for International Development (USAID) is working to promote sustainable sanitation and wastewater treatment in Sri Lanka through the Environmental Cooperation-Asia (ECO-Asia) Program.

Creating a model for replication

ECO-Asia is developing a sanitation pilot in Nuwara Eliya Municipal Council to demonstrate an effective strategy for providing improved sanitation and addressing key constraints in the sanitation sector. Key constraints include lack of understanding of options within municipal councils, lack of awareness of pollution impacts within communities, and inadequate financing strategies and recovery frameworks.

This pilot will demonstrate a model for addressing priority sanitation challenges in Nuwara Eliya for replication in other cities and towns in Sri Lanka and in other countries in Asia. Like most of the country, Nuwara Eliya relies on

individual septic tanks and soakpits, and the low income areas have very inadequate or no sanitation facilities at all. The problem is particularly pronounced in the hilly parts of the city, where soakpits overflow and contaminate groundwater. This situation is common to all urban and semi-urban areas in Sri Lanka and other developing countries in Asia, except the small sewered area of Colombo and other large cities in the region. Therefore, the solutions and approaches demonstrated during the pilot will be applicable throughout Sri Lanka and the region.

The population of Nuwara Eliya is currently about 35,000 but is expected to grow given the increasing importance of tourism. The municipal council recognizes the need to urgently address the growing pollution problem and has embarked on several efforts to improve environmental services. They recently completed construction of a sanitary landfill, complete with leachate collection, medical waste and septage treatment facility, with funding from the Japan Bank for International Cooperation (JBIC). They decided to address water pollution stemming from poor sanitation as their next step.

The pilot will build on the findings, capabilities and networks of the USAID-funded Transparency, Accountability and Local Governance (TALG) project, implemented by the Asia Foundation. TALG is a reform and capacity-building project working with 33 local authorities in Sri Lanka on institutional strengthening, sustaining and replicating good practices at provincial and national levels and building political will for local governance reform. TALG has trained local government staff on Technology of Participation (TOP) and support for public consultation, provided technical assistance for improved solid waste management, and oriented newly elected council members.

The pilot will also benefit from the experiences of the USAID-funded Local Initiatives for Affordable Wastewater Treatment (LINA) project being implemented in the Philippines by Planning and Development Collaborative, Inc. (PADCO), which is also implementing the ECO-Asia Program. The LINA project has been working with seven local governments to promote low-cost, appropriate technologies for sanitation and wastewater treatment. One city has built a treatment facility for its public market and another will soon begin a program in which all septic tanks are emptied every three to five years and the septage is treated properly. The LINA approach is being employed in developing the Nuwara Eliya pilot.

Approach

ECO-Asia's approach to working with the Nuwara Eliya Municipal Council utilizes a stakeholder-driven, participatory approach to project planning. This includes identifying priority sanitation challenges, preparing an action plan, identifying appropriate technology and financing solutions, and designing and constructing new facilities that have effective maintenance systems and financial recovery mechanisms in place. See the box below for a list of steps used in this ap-

proach. In addition to these steps, it is important to address the following overarching tasks:

- Consider sanitation and wastewater solutions as part of and linked to other urban environmental services, such as water supply and waste management.
- Understand the existing legal framework, including standards and regulations, and institutional structures to implement and manage the project.
- Ensure women play a central role in planning, implementation and operations.

To begin learning about sanitation options, Municipal Council officials and elected members participated in the Philippine Sanitation Summit in Manila in July 2006 and follow-on site visits to cities that are building low-cost treatment facilities. Organized by ECO-Asia, this observational program also included delegates from Indonesia and Vietnam who shared their experience and lessons learned from building sanitation infrastructure and working with local communities to raise awareness and make improvements.

Following the visit to the Philippines, the Municipal Council and ECO-Asia organized a Stakeholders' Consultation Workshop on Sanitation and Wastewater Management on July 18-19, 2006. The objectives of the workshop were to:

- Build understanding and support among the various sectors in Nuwara Eliya for the sanitation pilot.
- Create a sense of ownership and involvement in the pilot project by soliciting the participants' ideas using participatory methods.
- Develop a preliminary action plan of prioritized activities over the short, medium and long term.

Box 1. Approach for Developing Projects

- Create a technical working group with team leader in the city.
- Organize a participatory stakeholder workshop to assess the problem within the city (e.g., major sources of water pollution), identify and prioritize the objectives of the city, and develop draft action plan of interventions.
- Learn about available technology options to address the identified sanitation and wastewater problems, and conduct site visits to model systems.
- Refine the action plan to include selected technologies and detailed steps to develop highest priority project.
- Identify possible sources of financing and recovery mechanisms for first project.
- Develop an effective information campaign with community consultations and city ordinance as appropriate.
- Prepare prefeasibility study and engineering design for first project.
- Develop a sound operation and maintenance (O&M) plan.
- Finalize engineering design and financing, construction, O&M plans.
- Build and maintain the facility and share with other cities for replication.

The participants included central and local government officials, private sector business leaders, nongovernmental organization (NGO) representatives, community leaders and the general public. They brainstormed on sanitation issues and pollution sources in the city and produced action plans through group discussions. They arrived at a consensus on potential pilot project locations and activities and developed a draft action plan covering: capacity building, institutional strengthening, awareness raising, and options for managing domestic sewage and wastewater from the public market. These outputs were made possible by the effective facilitation techniques employed by TALG staff and a Municipal Council official who had been trained in facilitation techniques by TALG in a previous workshop.

The next step is for the mayor to appoint a technical working group (TWG) and a team leader, who will play critical roles in the implementation of the project—their enthusiasm, dedication and hard work will be the key to accomplishing real, effective results on the ground. The TWGs for the LINAW project typically consist of members of the city government staff, including the environment and natural resources officer, the planning officer, health officer and engineering staff; an official from the water utility; and representatives from the NGO sector and the city council.

The TWG will work with ECO-Asia staff to expand upon the action plan developed during the workshop to develop a more detailed plan for the city with short, medium and long term priorities. Engineers will evaluate potential sites to initially determine the technical feasibility of the top priority projects. Once the action plan for the city is fairly firm, ECO-Asia and the Municipal Council will prepare a workplan detailing their respective inputs for the project.

Appropriate technologies

To effectively address sanitation and wastewater treatment at the city level, ECO-Asia is promoting appropriate technology options that the city can select from. A decision matrix is being developed for local government decision makers to compare and select options for managing wastewater from households, public sources such as slaughterhouses and public markets, and commercial establishments. It covers septic tanks with effluent treatment (using leach fields, wetlands, onsite systems or piped to a treatment plant) and septage management (removing the septage from septic tanks every three to five years and treating or stabilizing it). Dumaguete City, Philippines, with assistance from LINAW, has designed a series of eight waste stabilization ponds (or lagoons) to treat the septage from the city's 22,000 households and 2,500 businesses (Figure 1). Energy inputs will be minimal and no chemical inputs are required. The construction cost plus the purchase of vacuum trucks is estimated at \$330,000 with O&M costs of \$900 per month for the entire septage management system, including the trucks.

The technology matrix includes centralized versus decentralized collection and treatment systems for households, and simplified sewerage systems, which are less expensive

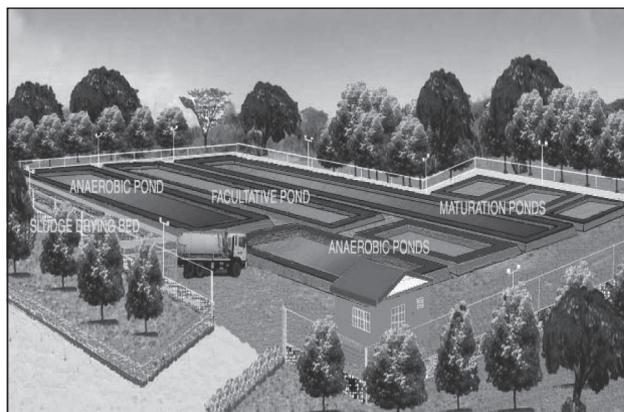


Figure 1. Septage treatment facility design using waste stabilization ponds for Dumaguete City, Philippines

than traditional gravity sewers. For public markets, a hybrid design utilizing an anaerobic baffled reactor is described based on the design used at the Muntinlupa Public Market (Figure 2). The facility began operating in January 2006 and is reducing the biochemical oxygen demand (BOD) of the market effluent from over 600 to less than 30 mg/l. The facility is located below a parking lot and cost 6.7 million pesos (about \$130,000). O&M costs are estimated to be \$525 per month, but the city will save \$155 per month in water pumping costs because some of the treated water will be reused for onsite street cleaning and toilet flushing. For comparison, a conventional wastewater treatment plant would have cost more than \$200,000 in construction costs, about \$1000 in O&M costs per month and would have eliminated the parking lot.

For slaughterhouses, lined ponds or lagoons can be used with minimal or no electricity inputs. Proper O&M techniques can minimize odor from the lagoons. For other establishments such as small and medium sized enterprises, commercial establishments or hospitals, a technology developed by the Bremen Overseas Research and Development Association (BORDA), a German NGO, has been shown to be effective. Called decentralized wastewater treatment (DEWATS), it utilizes septic tanks, anaerobic reactors and wetlands for treatment with low energy consumption and low maintenance requirements.

Financing

The Nuwara Eliya Municipal Council and the Philippine cities involved in the LINAW project are funding the capital costs of projects themselves. USAID is providing the cities with advice and technical assistance in designing the projects and on developing a business model that includes accessing financing to build their projects and creating user fees or other fund recovery mechanisms to sustain the operation and maintenance of the facilities and cover part or all of the debt service. For low-cost projects, full cost recovery can be achieved. For more expensive projects, the overall strategy is for the cities and the private sector to finance the

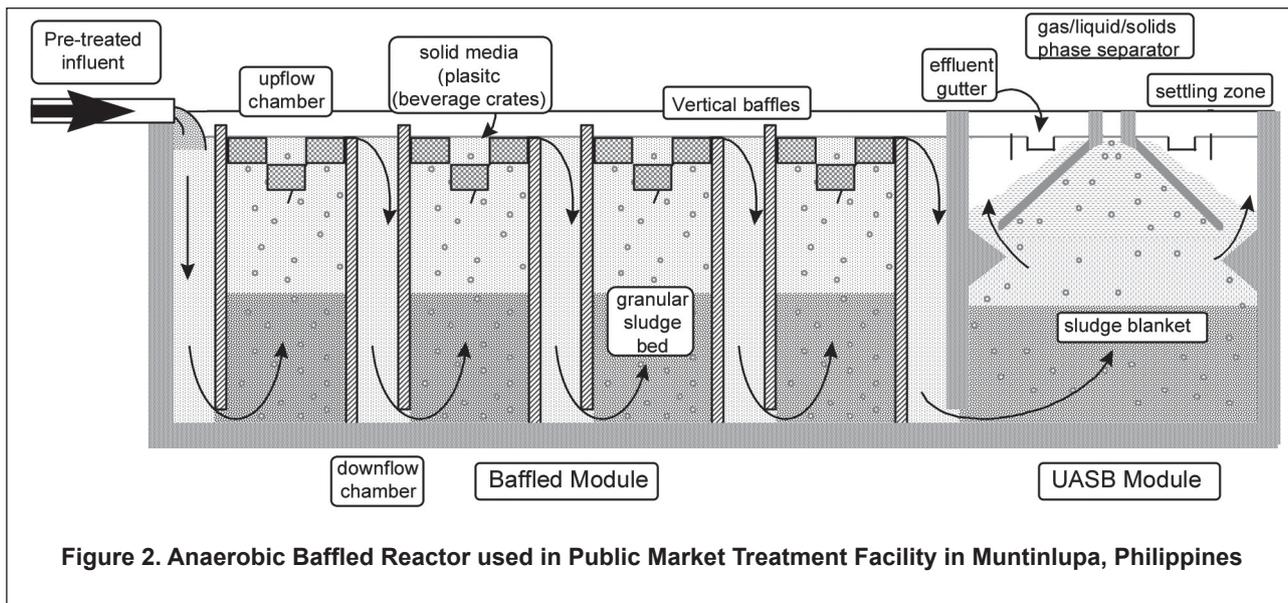


Figure 2. Anaerobic Baffled Reactor used in Public Market Treatment Facility in Muntinlupa, Philippines

capital expenditures and to cover the O&M costs through user fees.

Multi-sourcing of funds can be used to effectively reduce the funding requirements of local governments by encouraging project investment and operation and maintenance counterparts from other stakeholders. Funds can also be raised by selling by-products, such as treated water and sludge as soil enhancers. Re-use of treated water for irrigation, flushing, and washing can reduce water bills or electricity costs from reduced pumping from a well.

User fees are critical to developing a sustainable business model and to fund operations and maintenance. However, user fees will not be accepted by the public without a creative, effective social marketing campaign to raise awareness and increase people's willingness to pay.

Social marketing campaigns

Awareness of sanitation and wastewater treatment issues is very low and must be elevated to build support for the cities' pilot projects and willingness to pay required user's fees. Builders, homeowners and business owners also need an improved understanding of the proper design and maintenance of septic tanks. Social marketing uses commercial marketing and advertising techniques to get people's attention, communicate a set of discreet, easily understood messages and to take a specific action or change a behavior, such as urging people to take action by having their septic tanks desludged.

The primary focus of ECO-Asia's information campaign assistance is on the quality and effectiveness of the materials and the proper use of the social marketing approach. Nuwara Eliya Municipal Council, with assistance from local media and NGO groups, will develop a communication plan with positioning strategies to motivate specific target audiences to take a specific action or change a behavior. The plan will begin with an awareness and knowledge generation phase followed by promotion of the desired practices. Continu-

ing education will be done through out the duration of the campaign.

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