Improving On-site Sanitation and Connections to Sewers in Southeast Asia – Insights from Indonesia and Vietnam

Regional Report

wsp water and sanitation program

The Water and Sanitation Program is a multi-donor partnership, part of the World Bank Group's Water Global Practice, supporting poor people in obtaining affordable, safe, and sustainable access to water and sanitation services.

WORLD BANK GROUP

Acknowledgment
Isabel Blackett – Task Team Leader (Regional Study)
Penny Dutton – Social Research and Community Development Consultant

Vietnam Study Team
Vinh Quang Nguyen – Co-Task Team Leader (Vietnam)
Dr Martin O'Dell – Lead Researcher – Water and Institutional Consultant
Tran Minh Gioi – Social Research Consultant
Nguyen Phu Van – Water and Sanitation Consultant
Nguyen Thi Hong Sam – Finance and Institutional Consultant
Hoang Hoa – Social Research Assistant

Indonesia Study Team
Maraita Listyasari - Co-Task Team Leader (Indonesia)
Freya Mills – Lead Researcher – Sanitation Consultant
Inni Arsyini – Water and Sanitation Consultant
Evi Febriani – Social Research Consultant
Putu Widhiantara – Social Research Assistant
Sri Widyaningsih – Social Research Assistant
Reini Siregar - Fecal Sludge Management Consultant
Budi Darmawan - Fecal Sludge Management Consultant

The Study Team would also like to acknowledge the significant assistance and cooperation of:

In Vietnam: The Ministry of Construction; the city authorities and their agencies in Bac Ninh, Tien Lang, Da Nang, Da Lat, Thu Dau Mot, and Phan Thiet; the Vietnam Water and Sewerage Association (VWSA); development partners including Japan International Cooperation Agency (JICA), the Asian Development Bank (ADB), Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ), Danish International Development Assistance (DANIDA), the Embassy of Finland, Belgian Technical Cooperation (BTC); the Lahmeyer Consulting Group and GFA Consulting Group.

In Indonesia: The Ministry of Public Works, the city authorities and their agencies in Banjarmasin, Jakarta, Bandung, Yogyakarta, Surakarta and Denpasar; development partners including Australian Government Department of Foreign Affairs and Trade (DFAT), Asian Development Bank (ADB), Japan International Cooperation Agency (JICA) and the Indonesia Urban Water, Sanitation and Hygiene Project (IUWASH) funded by USAID.

We also thank all the participants at the national and regional consultation workshops in November 2014 and the report peer reviewers who made thoughtful comments and contributions to the study recommendations.

Currency Equivalents - In this report, "$" refers to US dollars

Currency Unit		
$1.00	=	VND21,000
$1.00	=	IDR12,700

Contact Us
For more information please visit www.wsp.org or email wspeap@worldbank.org.

The World Bank
1818 H Street NW
Washington DC 20433
Telephone: 202-473-1000
Internet: www.worldbank.org

Contents

Improving On-site Sanitation and Connections to Sewers in Southeast Asia – Insights from Indonesia and Vietnam

Regional Report

A Public Toilet in Poor Condition in Sangkrah, Solo, Indonesia

CONTEXT

The World Bank's Urban Sanitation Review and other studies of the sanitation sector in East Asia and the Pacific Region have identified a significant number of policy and technical issues that need to be addressed in future sewerage and sanitation initiatives.[1] These reviews and studies presented a number of key messages for national policy makers and for local governments, proposed follow-on studies, documented lessons learned and made recommendations for action. An important finding that both the governments of Vietnam and Indonesia wished to address was that inadequate wastewater systems and poorly designed and maintained septic tanks result in wastewater and septic tank sludge being vectors for disease. A previous World Bank Global Water Practice Water and Sanitation Program (WSP) study found the economic cost of poor sanitation and hygiene in urban areas was estimated at $2.9 billion and $780 million per annum respectively in Indonesia and Vietnam.[2] Improvements in sanitation have lagged behind improvements to water supply, with household piped water in urban areas at 32% in Indonesia and 61% in Vietnam, compared with sewerage connections at only 2% and 10% respectively.[3]

Approximately 85% to 90% of urban citizens in Indonesia and Vietnam rely on septic tanks and latrine pits for human waste disposal, and this is similar to the Philippines and other countries in the region. However, less than 10% of generated wastewater is collected and conveyed to centralized treatment plants and the volume of sludge from septic tanks collected and safely disposed is very low. Both governments considered that undertaking detailed investigations into improving on-site sanitation systems and the currently low sewerage connection rates were priorities for action.

In the households surveyed for the study, 96% in Vietnam and 85% in Indonesia have access to a pour flush or cistern flush toilet. The majority of the toilets discharge into septic tanks or latrine pits, of which 66% in Indonesia and 75% in Vietnam have never been emptied.[4] For 60% of on-site systems surveyed in Vietnam the tank or pit effluent overflows into a drain or river and 17% do the same in Indonesia. The inadequate on-site storage only provides partial treatment and thus highly pathogenic waste enters open drains and water bodies. Other systems such as unsealed pits or sub-standard 'septic tanks' (without an effluent outlet) leach waste into the ground. As over 77% of on-site sanitation systems in Indonesia are less than 10 meters from domestic water wells this presents a considerable water pollution risk.

[1] East Asia and the Pacific region urban sanitation review: Indonesia country study, World Bank, 2013, Lessons in Urban Sanitation Development: Indonesia Sanitation Sector Development Program 2006-2010, WSP, 2011.
[2] Economic Impacts of Sanitation in Indonesia, WSP, 2008.
[3] Progress on sanitation and drinking water - 2014 Update, WHO and UNICEF, 2014.
[4] In Vietnam and Indonesia respectively, 60% and 20% of septic tanks are of a relatively standard design.

Indonesian sewerage systems usually use separate sewers but in Vietnam the systems are typically combined with storm-water. However, with interceptor sewerage being considered for Jakarta in Indonesia and the use of separate sewerage increasing in Vietnam, the challenges of increasing household connections to both systems needs to be better understood. Household connection programs have been effective when they include comprehensive community consultation and the provision of financial support for connections. In Vietnam, the reliance on discharging wastewater through poor quality existing drainage results in poor operation, smells, health risk and low flows reaching treatment plants.

OBJECTIVE AND METHODOLOGY

The objective of this study was to provide an evidence base for improving the quality of on-site sanitation systems and to increase the potential and ease of connecting households to sewers in dense urban areas in Southeast Asia. The specific focus was on dense poor urban communities and areas where: (i) on-site sanitation will continue to be used; (ii) sewerage systems exist but many households have not yet connected; and (iii) sewer systems are planned. It identified the needs of low-income urban households, including the very poor, while also considering the needs and expectations of the communities as a whole.

In six towns and cities in each country the study teams undertook in-depth informant interviews with representatives from local authorities and agencies. They consulted with 40 to 50 people through focus group discussions in each city and included designated poor and social policy households.[5] In each country 1,260 households participated in the household social surveys and over one third of these included a technical site survey to validate the social surveys. The sample size provides 95% confidence of accuracy with ±6% margin of error. The findings and recommendations were reviewed by a wide range of sector stakeholders at national and regional workshops in November 2014.

FINDINGS

Key findings from the Indonesia and Vietnam case studies as well as the interaction with stakeholders from the Philippines center on the regulatory framework, institutional arrangements, the focus of investments, and household and community demand. They can be summarized as follows:

1. **There are significant gaps in decrees, regulations and standards.**

   - **Planning and design standards for sewerage systems are limited** with no standard design for separate sewerage in Vietnam. Design guidelines are often not flexible enough to suit the varied local conditions. The quality of construction is poor due to limited supervision and the absence of clear guidelines. In Vietnam, the separate sewer networks have been designed using drainage design criteria and are not appropriate for conveying sewage solids, thus many household connections are still via the septic tanks.

   - **National standards for the design and construction of septic tanks and other on-site sanitation systems are inadequate, not known or not applied.** Where standards or guidelines exist they are not routinely applied or enforced at the local level. Few local government agencies, and no households or masons, knew about or applied them. Construction of septic tanks for households is left to local contractors and formal supervision and acceptance of facilities in accordance with any local building permit system appears to be limited.

   - **Some cities have wastewater regulations which make it mandatory for households to connect to separate sewer systems but these are not consistently enforced** or only enforced for new or renovated properties. Regulations in cities

[5] In Vietnam an average 6.6% registered poor and 7% social policy households (war heroes, invalids, dioxin victims, orphans, children with HIV, and disabled people) were surveyed, with approximately 13-30% of households' surveyed receiving Government support. The median income in the Indonesian households surveyed was $31/person/month, and slightly above the average poverty line of household expenditure for the six cities of $23/person/month. This is comparable and lower than the World Bank Group's definition of 'extreme' poverty of $1.25/person/day or $37.5/person/month.

with combined drainage systems do not require improvements to the tertiary drainage network or a mandatory requirement for direct household connections to the network.

- **Only a few decrees and policies address sludge management from septic tanks and pit latrines** and often no responsible agency is specified. Management of septic tank sludge is left to the householder, property owner and the informal private sector and is essentially not managed, with 75% of the septic tanks in Vietnam and 66% in Indonesia never emptied.

2. **Unclear institutional arrangements and poor coordination causes gaps in management and planning, under-utilized investments, construction delays and difficulties with asset handover.**

    - **Institutional fragmentation and unclear responsibilities for urban sanitation** occur vertically between national and local government and horizontally between city departments and agencies. This leads to gaps in service provision; inadequate communication and coordination of planning, design, implementation and supervision resulting in poor quality construction; delays in construction; incomplete asset and information handover; and unclear division of roles between local government and operators.

    - **Planning does not consider the whole sanitation chain**. The existing plans and master plans are mostly for wastewater treatment plants and mains sewers, and usually do not include house connections and fecal sludge management. Plans are often not coordinated between national and city levels. The lack of holistic planning has created years of delay between the construction of the major infrastructure and the actual connection to the household or development of sludge emptying services to utilize the major infrastructure and this impacts negatively on operation and community engagement.

    - **Mechanisms to connect to sewers are often weak** with some wastewater agencies unable to explain how a customer could connect to the sewer outside of a subsidized program. Often public and community toilets or communal treatment systems are not permitted to connect to the sewer system.

3. **Resources are focused on large-scale municipal infrastructure, often neglecting the 'connecting' infrastructure and household support to connect and improve onsite sanitation.**

    - **Most wastewater strategies and subsequent investments have concentrated on the major infrastructure**, such as wastewater treatment plants and major drains or sewers. They did not adequately consider the smaller infrastructure–tertiary drains and sewers, household connections or the need for on-site household sanitation systems and fecal sludge management well into the future.The lack of finance allocated to the smaller infrastructure has led to the current ineffective wastewater investments in many cities and in some cases the construction of treatment plants that are not yet needed.

Gray Water Discharge to a Shallow Drainage in Jakarta, Indonesia

- **Local governments have been unprepared to develop tertiary sewers and household connections** due to the partial planning noted above. Cities reported that the lack of tertiary sewers or drains is limiting the effectiveness of new investments. They acknowledged that rehabilitation or construction of tertiary sewers (or drains) is essential but cited lack of funding as a major constraint.

- **Sewerage system designs that include tertiary sewers and household connections and financial support are significant drivers for local government.** Designs and planning of the whole system can result in accurate cost estimates and financial support that enables timely connections and effective scheme operation on completion. In Indonesia output-based grants for household sewer connections have successfully increased access to existing sewers while also improving service delivery and leveraging local government investment. However, the handover of assets on private properties has caused some delays. In Vietnam the adoption of a low interest revolving fund mechanism has proved effective in increasing the number of connections.

- **There has been limited funding support for on-site sanitation improvements** and in Indonesia there is a perception that the regulations restrict government from investing in infrastructure on private properties. Most households are willing to contribute to sanitation improvements although not sufficient to cover costs and co-funding is required. For low-income households paying their contribution in monthly instalments is preferred.

4. Households want to connect to sewers and improve **their on-site sanitation for community-wide benefits, but cannot connect or do not receive timely information.**

   - **Most respondents believe that the environment is everyone's responsibility and they are willing to pay to protect it** but they are less willing to pay the full cost of sanitation upgrades. Competing priorities are improved water supply, better solid waste management, dredging channels and improving drainage—these are often seen as more important than improving sanitation. The main reasons given for connecting to a sewer were for environmental protection, health benefits and to have a private toilet.

   - **"Everyone connecting" is the main influencing factor driving household's willingness to connect,** and being able to choose a payment option based on community agreement is important. This is partly peer pressure and partly an understanding that if everyone connects then the environmental improvement and health benefits will be more effective. The availability of a subsidy or financial support arrangement and a regulation requiring a house connection are seen as important factors. However, the imposition of a penalty was not regarded as helpful.

   - **The lack of tertiary sewers and drains is the main reason households were not connected.** However, in areas where a tertiary drain or sewer existed many customers had not been asked to connect; didn't know how to; or had agreed to connect but

after many years were still waiting. In Indonesia, the willingness to connect is highest in the lower income households and in households currently using public and community toilets.

- **Poor standards of construction and poor operation and maintenance of drains and sewers** are a disincentive for households to connect to systems that are likely to smell. Households have concerns about overflowing and clogged pipes, and the damage caused to their house during connection. lack of community confidence ad hence a low interest in connecting to them.

- **Some households understood the risk of their current on-site sanitation systems** but many thought that large leaking pits or tanks were adequate and their systems did not require upgrade. Limited land was the next strongest reason why people could not improve; limiting their upgrade options.

- **The preferred method of receiving information was from the community leader** in Indonesia and local authority in Vietnam who are influential in people's decision to improve their on-site sanitation and connect to a sewer. Many households expressed a lack of information and guidance on how to improve on-site sanitation, connect to sewerage systems, and to access financial subsides and technical support. Inadequate communication, planning and coordination between departments exacerbate this lack of information.

- **Community groups recommended that utilities should consult more and raise awareness** about the benefits of sewer systems and provide reasons to connect. Information needed should include accurate cost estimates, financial support mechanisms, how the system works, what service is offered at what tariff, connection mechanisms and community responsibilities. Existing sewer customers had an incomplete understanding of the purpose of the sewer.

- **A unit in the utility dedicated to the promotion of household connections can work well**. In Da Lat, Vietnam, and Yogyakarta and Denpasar in Indonesia the utilities have achieved high connections rates through establishing and resourcing a dedicated team to interact with the community, its customers, and are implementing a proactive plan for increasing connections.

KEY RECOMMENDATIONS

Analysis of the key findings has led to the identification of a number of **drivers** - motivators for change and improvement, and **barriers** - constraints to change and improvement. From these the following recommendations have been developed that apply to both study countries, and many of these will apply more generally in the Southeast Asia region and beyond. More comprehensive recommendations are provided in the full report.

National Level Recommendations

- **Adopt overall national guidance on strategy and planning for development of wastewater systems** – recognizing the potential for longer-term use of on-site sanitation systems in some areas and a practical phased development of wastewater systems, to improve efficiency of investment targets, efficient spending and clear basis for city investment.

- **Develop comprehensive fecal sludge (septage) management systems** for countrywide adoption. This would include single local agency roles and responsibilities, registration of all households, registration and use of private contractors, scheduled emptying of all septic tanks on a regular basis and monitoring of safe sludge disposal and groundwater quality.

- **Ensure an improved balance of investments in planning, design and construction** to ensure that tertiary sewers, drains and household connections are prioritized and given equal emphasis with wastewater mains and treatment facilities to maximize the effectiveness of the investment. For combined drainage systems construction of improved tertiary drains, or preferably tertiary sewers, and direct household connections should be the priority to address urban area wastewater pollution.

- **Promote and ensure that local government** applies national wastewater design and construction standards as regulated.

- **Facilitate capacity building** of local government, agencies and utilities to plan, receive funding, implement investment projects, manage, operate and maintain improved sanitation services.

- **Review legal barriers** to subsidizing improved on-site sanitation and facilitate practical and affordable mechanism for financial support.

- **Develop behavior change communication packages** including picture-based informative community level manuals/options guidelines to improve the understanding of wastewater management and human waste management (including septic tank sludge) at all levels of government and within the community.

Local Level Recommendations

- **Prepare practical phased investment plans that address the full sanitation chain** for on-site and sewerage systems, and institutional roles and responsibilities for wastewater and sanitation service delivery.

- **Collect and collate information to undertake performance assessments of wastewater and on-site systems,** understand tertiary network, rainwater inflow, septic tank conditions, spare capacity and adopt performance contracts with utilities.

- **Establish, enforce and promote wastewater regulations** including for on-site sanitation, sludge management, and mandatory connections.

- **Enforce national standards for design and construction**, improve quality assurance of investment design and construction, and connection implementation and quality control to ensure complete and correct connections.

- **Provide financial assistance to poor** and disadvantaged households, and employ financial mechanisms such as subsidies and/or micro credit funds to help other households to connect to sewers or improve on-site sanitation.

- **Clarify the mechanism to connect to sewers**, with regulations on required household financial contribution and extent of agency technical support. Promote in a systematic way on an area-by-area basis.

- **Facilitate community communication and consultation programs** that are well targeted and well-timed with construction and promoted through community meetings on an area-by-area basis. Provide evidence to communities of the benefits of connecting to sewers and provide confidence in operation of the system and in improving on-site sanitation. Also provide information on improvement options, estimated costs and user tariffs, and on-going services including maintenance and community responsibilities.

- **Improve operations and maintenance** of overall systems and particularly the tertiary network, **establish a customer service approach** for improved complaints response to promote confidence in the wastewater system and customer satisfaction in service provided.

NEXT STEPS

During the study research, dialogues between governments and their development partners have taken place and relevant changes to propose investment scopes and regulations are already being made.


wsp
water and
sanitation program


WORLD BANK GROUP