



FENITA ROSARIA, ECO-ASIA

Although Indonesia has 150 septage treatment plants, 90 percent are no longer in operation and only four percent of collected septage is treated at a facility. As the Government of Indonesia strives to rehabilitate the country's STPs, the country will need greater emphasis on policy development, agency coordination, local capacity building, and private sector engagement.

COUNTRY ASSESSMENT

INDONESIA

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| Country Population (in millions) | 228 ¹ | Nominal GDP (in billions) | \$512 ² |
| Urban Population (in millions) | 112 ¹ | Nominal Income per cap | \$2,246 ² |
| Urban Population (% of total) | 49% ¹ | Annual Water Budget per cap | \$3.35 ³ |
| Access to Improved Water (urban) | 89% ¹ | Annual Sanitation Budget per cap | \$0.37 ³ |
| Access to Improved Sanitation (urban) | 67% ¹ | Fee to Desludge (per m ³) | \$2-9 |
| Access to Sewerage (urban) | 2.3% ⁴ | Surface Water Pollution (% of samples, Jakarta) | 84% ⁵ |
| Use of Onsite Sanitation (urban) | 62% ⁶ | Economic Cost of Poor Sanitation (in billions) | \$6.3 ⁷ |
| Treatment of Collected Septage (urban) | 4% ⁶ | Terms for Septage in Indonesia: septage, fecal sludge | |

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| <p>Key Challenges</p> <ul style="list-style-type: none"> • Lack of national policy and standard setting to guide local implementation • Low public awareness of importance of septage management in wastewater treatment • Lack of technical assistance, management support, and private participation leave 90% of existing STPs closed or barely operational • National under investment in infrastructure, especially for wastewater | <p>Key Strengths</p> <ul style="list-style-type: none"> • Treatment infrastructure exists but is underutilized • Public and private operators provide mechanize septage collection in most cities • Decentralized system allows local governments to customize wastewater treatment solutions • Several national forums and working groups provide expertise, policy formation, and information dissemination on community-based sanitation |
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I.0 SUMMARY

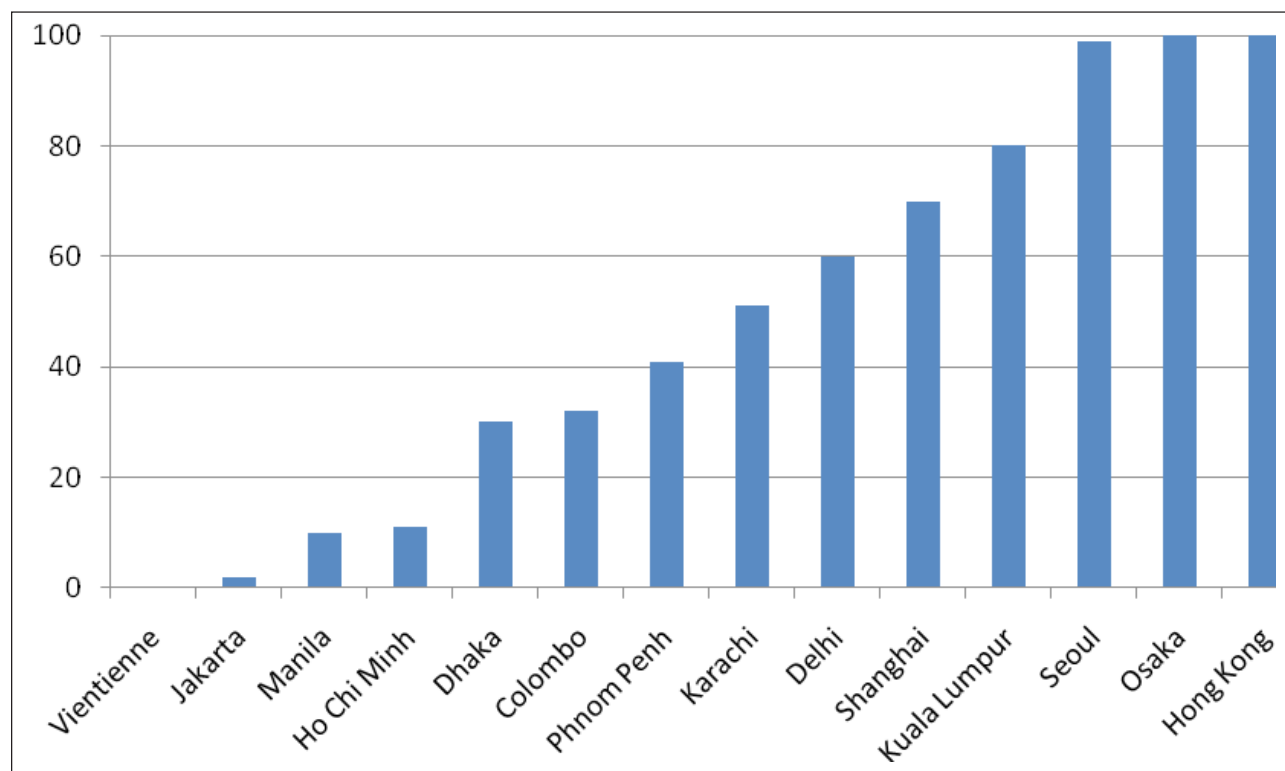
With two-thirds of its urban residents relying on onsite sanitation systems (OSS) for wastewater disposal, Indonesia produces a tremendous volume of septage in its cities each year. Since one in six of these OSS leaks or has an open bottom, and 40 percent are located within 10 meters of a well or pump, which are major sources of water for urban residents, OSS cause as much as 70 percent of groundwater contamination in Indonesia.⁸ Recognizing the importance of septage management, the national government constructed 150 septage treatment plants (STPs) in large- and medium-sized cities during the 1990s. This is a significant investment, considering that only 11 cities currently have wastewater treatment plants. However, these top-down projects lacked local support and corresponding local policies, monitoring and enforcement, operations training, and public outreach to make them sustainable. Importantly, the decentralization policy of 2001 transferred management responsibilities to local agencies without adequate training and ongoing technical assistance. As of 2009, 90 percent of STPs are closed or minimally operational, and those that are operational often charge private collection companies a dumping fee.

Not surprisingly, private service providers often dispose of septage in nearby rivers. Lack of adequate sanitation, and septage and wastewater management have caused significant health and environmental impacts. The World Bank estimates that inadequate sanitation costs Indonesia \$6.3 billion in economic losses each year, equal to 2.3 percent of its GDP.⁹

To avoid past problems, sanitation initiatives today stress both top-down and bottom-up actions to develop sustainable, community-based projects. Cities in Indonesia are increasingly interested in the use of communal septic tanks and DEWAT treatment systems, in addition to addressing septage management. The 2008 National Policy and Strategies on Domestic Wastewater Management also highlights the need to address regulations, private sector and community engagement, and infrastructure investment.

In support of these strategies, this report recommends that, in the near-term (within three years), the Ministry of Public Works (MPW) and the National Development Planning Agency (BAPPENAS) integrate septage management into the national dialogue on sanitation, and promote the importance of septage management

FIGURE 7: SEWERAGE ACCESS IN MAJOR ASIAN CITIES, 2001 TO 2002¹⁵



in cities where there are ongoing community-based sanitation projects. These national agencies can help a few cities that already have STPs develop model septage management programs. In the medium-term (three to five years), the national ministries can develop, improve, and disseminate standard guidelines, model local regulations, effluent and septage disposal standards, and training materials for collection and treatment operators. In these efforts, they should engage international organizations' support in providing training and technical assistance. To leverage additional funds for this sector, local governments should collaborate with private companies to develop new models of public-private partnerships for septage collection and treatment. The national government should also increase funding for wastewater infrastructure development and local capacity building, streamline regulations for private sector participation, and create financial incentives for cities to adopt and improve their capacity to manage and treat septage.

2.0 BACKGROUND AND CONTEXT

2.1 National Sanitation Context

As of 2006, 89 percent of urban residents had access to improved water and 67 percent to improved sanitation in Indonesia. Indonesia's wastewater treatment infrastructure, however, ranks third in the world after India and China in terms of the gap between demand and actual connections, and Jakarta ranks second to last in a comparison of major Asian cities (see Figure 7). As of 2009, 11 cities in Indonesia provide an average 14 percent of their residents with a sewerage system that has a total design capacity to treat just 826,000 cubic meters of sewage per day. In the absence of sewerage networks, the majority of urban households build their own septic tanks.

The lack of adequate wastewater infrastructure places a significant burden on water quality, human health, and economic productivity.¹⁰ As an example, Jakarta's Health Agency's 2005 records show that 84 percent of groundwater samples taken from across Jakarta were contaminated with human waste, and the Jakarta Environmental Management Board found that all 13 of the city's rivers are severely polluted.¹¹ Polluted groundwater poses a severe public health hazard since the majority of the population relies on groundwater for their daily needs due to limited access to piped

water supply.¹² Every year, waterborne diseases cause 50,000 premature deaths and 120 million cases of disease. Indonesia has the highest incidence of typhoid fever in Asia, and around 70 percent children have had hookworms and roundworms.¹³ The World Bank estimates that inadequate sanitation costs Indonesia \$6.3 billion in health, environmental, and economic losses each year, equal to 2.3 percent of the GDP.¹⁴

2.2 Onsite Sanitation Prevalence

An estimated 62 to 71 percent of urban residents and 24 to 32 percent of rural residents use septic tanks and other forms of onsite sanitation systems (OSS), although there are large disparities between regions and in the quality of the septic tanks.¹⁶ The use of OSS in urban areas is expected to rise as the population grows and as Indonesia implements land titling policies that will foster homeowner investments.¹⁷ Some of these systems overflow because they are too small or are rarely emptied; others have inlet pipes that do not function; and one out of six has an open bottom or is made from bricks that seep waste out of the tank.¹⁸ As 40 percent of onsite sanitation facilities are within 10 meters of a well, leaks from the collection chambers cause as much as 70 percent of urban groundwater contamination.¹⁹ Some districts, such as Medan and Parapat, now require households to connect their liquid outflow pipes to existing sewers.²⁰

2.3 Septage Collection and Treatment Capacity

Since the 1980s, when the Government of Indonesia first addressed the issue of sanitation in the Five-Year Development Plans (RPJP), urban residents have increasingly used individual latrines, public toilets, and toilets connected to septic tanks. Over time, as these systems began to fill and overflow, and demand for desludging rose, a number of private companies began to appear in the 1990s to desludge OSS. While many cities now have public and private desludging service providers, some communities still desludge by hand. To operate, these companies must obtain business and nuisance permits, although these permits usually do not regulate health, safety or disposal. During the 1980s and early 1990s, since there were no STPs in Indonesia, desludging companies would dump their waste into the nearest waterway.

In Medan, where there are over one million septic tanks, waterways are highly contaminated with human waste. New sanitation initiatives in Indonesia focus on community-based sanitation to foster ownership and understanding of wastewater treatment systems.



ALEX ZVINAKIS, ECO-ASIA

In response to this situation, the Ministry of Public Works began building STPs in 1991, and has now built around 150 STPs throughout the country. In these projects, the central agencies led the development of these facilities, and required local governments to provide the necessary land. As a result, cities put forth their cheapest land, often in peri-urban areas that make transportation costs prohibitive for collection companies. After the Government of Indonesia handed over the facilities to local authorities in 2001, 90 percent of these facilities closed or run on very low volumes due to the lack of septage disposal at the facility and inadequate operations and maintenance (O&M) funds.²¹ As a result, only four percent of septage in Indonesia is treated at an STP²² In Central Java, for instance, 23 out of 35 districts have an STP, but none of these facilities is functional.²³ Instead, as seen in Surakarta and Cirebon, most cities send septage to WWTPs; depending on the facility's design, the addition of septage can reduce its operational efficiency. Or, as seen in Bandung, collection companies dispose of septage in the sewer, which reduces their transport costs, but impedes the sewer's hydraulic performance. In addition, while households pay operators \$5 to \$27 at the collection site, municipal or district governments levy a tipping fee of \$0.27 to \$0.54 per cubic meter to dispose the septage at public treatment facilities. Although this fee is a fraction of the collection charge, collectors avoid it and the complications of proper disposal by discharging the waste directly into a river.²⁴

3.0 LEGAL FRAMEWORK

In Indonesia, sanitation is fragmented across the ministries of health, infrastructure, planning, and the environment, each of which has developed laws that impact sanitation practices. In the absence of an overarching framework, Indonesia faces challenges in strategically planning for and providing adequate flows of financial resources to the sector at both the national and local levels of government. Throughout the country, however, there is a growing recognition of the importance of managing OSS. In 2008, the Ministry of Public Works issued the National Policy and Strategies on Domestic Wastewater Management, which provides direction and guidance for national and local governments, as well as the private sector and communities, in formulating policies and programs for domestic wastewater management.²⁸ While this policy does not specifically mention septage, it notes that key challenges to domestic wastewater management include the following:

- Low community awareness and participation;
- Lack of laws, regulations, operating manuals and standards, and policy enforcement;
- Lack of separation between regulators and operators;
- Lack of coordination among related agencies in policy formation; and
- Low national and local funding, low wastewater tariff setting, and reluctant private sector participation.

Case Study of Surabaya: Model Septage Treatment Plant

In Surabaya, the capital of East Java Province and Indonesia's second-largest city with three million residents, 87 percent of households have access to improved sanitation, including 60 percent from OSS.²⁵ The city has constructed an STP and developed permitting standards for collection companies. Private companies began working in 1983 and now collect most of the septage in the city. With growing community demand, the number of companies has increased from 10 to 27 in the last 15 years, demonstrating the profitability of septage collection.²⁶ Companies must obtain a business license, a nuisance permit, and a disposal permit that requires private companies to dispose of septage at the STP. However, the local sanitation agency lacks the resources to enforce the requirements of the disposal permits. Fines for non-compliance are too small to prevent repeat offenses.

Surabaya's STP, considered one of the best in Indonesia, uses a modified form of the activated sludge process. The STP has a design capacity to treat 400 cubic meters per day and is open at all hours of the day. It is currently running at capacity and can accommodate all of the septage it receives, although its capacity would be overwhelmed if all households regularly desludged their tanks.²⁷ Dried septage is used as fertilizer for city gardens in Surabaya.

In response, the Policy aims to increase the utilization of WWTPs and STPs to 60 percent in accordance with the 2010-14 National Medium-Term Development Plan to develop regulations, strengthen institutional capacity, and increase financing alternatives for infrastructure development. To engage the private sector, the Policy proposes knowledge dissemination, the development of investment schemes, and the provision of incentives, such as tax rebates and business licenses. It will also engage communities in tandem with the 2009 National Action Plan, which commits Indonesia to raise sanitation coverage to 74 percent in urban areas and 65 percent in rural areas. These plans call for information and education campaigns to encourage households to improve their sanitation situation and to increase the use of treatment facilities.²⁹

The decentralization of political and fiscal power in 1999 played an important role in policy formation and implementation of water, wastewater, and septage management in Indonesia. In 1999, the central ministries turned over water and sanitation planning, development, financing, and management responsibilities to local governments. The central ministries now focus on policy development, standard setting, and capacity building. At the national level, however, guidance on sanitation and septage management remains vague and incomplete. While there are national codes for septic tank design and guidelines for the design, operation and maintenance of septage treatment facilities, there are no national

guidelines, technical assistance, or monitoring of septage collection, treatment, and disposal. Local governments that have WWTPs or STPs may regulate septage insofar as this pertains to the plant's operations; few cities have comprehensive septage ordinances. Some local government units (LGUs) that actively manage septage, such as Surabaya, have issued local regulations for nuisance permits, tipping fees at WWTPs and STPs, water quality management, and water pollution control. Most LGUs, however, are unable to provide comprehensive septage management.

3.1 Septic Tank Design

The Indonesian National Standard Code for Planning Septic Tank with Absorption System establishes design standards for constructing septic tanks.³⁰ This code states that materials used for construction must be impermeable, acid proof, strong, and use brick, stone, concrete, polyvinyl chloride, ceramic, cast iron, plastic or iron. It also sets the volumes of septic tanks based on the number of users and expected liquid waste flow rates, and gives specific dimensions for a small, one-family septic tank that should be emptied once every three years. The code specifies the location, slope and materials of the influent and effluent pipes, manholes, control box and tank chambers. However, local governments do not enforce these codes, and most individual OSS are not built to code.

3.2 Septage Collection

There are currently no national or local laws that require frequent or scheduled desludging.³¹ The most relevant national policy is the requirement that all private companies obtain a Nuisance Permit (also known as a Hinder Ordonantie permit) from the local government when conducting potentially hazardous activities, such as septage collection. This permit allows government officers to conduct impromptu inspections to ensure compliance with safety and environmental regulations. At the local level, a few cities and districts have issued regulations on septage transport and disposal. The City of Malang, for example, requires collectors to conduct due diligence to ensure that waste does not leak out of trucks during transport and to discharge waste at a treatment facility. The ordinance also requires the police and sanitation and environmental agencies to monitor and enforce these regulations, and allows them to issue penalties for non-compliance.³²

3.3 Septage Treatment

STPs in Indonesia, called *Instalasi Pengolahan Lumpur Tinja* (IPLT) in Bahasa, use a variety of technologies, such as Upflow Anaerobic Sludge Blanket (UASB), oxidation ditch, Imhoff tank and stabilization tank. The Ministry of Public Works Department has developed guidelines for each system that is used for septage treatment. Some STPs use the dried septage as fertilizer. Given the decentralized nature of management, there is no consolidated information on what each STP is doing in Indonesia.

Several ministries have created technical guidelines for the planning, design, materials, and O&M of wastewater treatment facilities, including STPs. These documents provide guidelines for activated sludge, stabilization ponds, and (UASB) technologies.³³ Despite the availability of these guidelines, however, many facilities do not operate effectively. The WWTP in Jakarta, for instance, produces effluent with 211 milligrams per liter of total suspended solids, more than double the national cap.³⁴ Government Regulation 16/2005 also prohibits dischargers from releasing untreated wastewater directly into water bodies that are designated sources of potable water, and requires operators of centralized treatment plants to monitor liquid effluent and solid waste quality on a regular basis. In practice, however, few cities have implemented these regulations.

3.4 Key Challenges

Challenge: Although 66 percent of urban residents use septic tanks, the national government has not developed a legal, institutional, or financing framework for septage collection, treatment and disposal.

Challenge: Local regulations on septage management are limited to STP operations and maintenance. After decentralization and the withdrawal of national technical and funding support, most local governments have been unable to improve wastewater services.

4.0 INSTITUTIONS AND IMPLEMENTATION CAPACITY

Today, a number of national agencies are involved in developing policies and programs on water and sanitation. In the decentralized system of wastewater management in Indonesia, local governments typically create two to four departments to manage water and sanitation, depending on the district leader or city mayor's objectives. Common departments include: public works, health, environmental sanitation, settlements and environment, and pollution control. A recent study of nineteen cities and two districts in seven provinces of Indonesia found that 99 percent of central transfers to the LGU went to either public works or health departments.³⁵ Since septage management has not been identified as a national priority in wastewater management, most local governments do not allocate staff for this issue beyond STP operations.

The lack of institutional capacity and staff expertise in sanitation remains a major challenge for Indonesia. Before decentralization, knowledgeable professionals from the central government sat in local government offices to develop local projects. Since decentralization efforts in 1999, these staff members have returned to the national government, leaving a gap in technical capacity at the local level that has yet to be replaced.³⁶

4.1 Major National Agencies³⁷

National Development Planning Agency (BAPPENAS): BAPPENAS, the national planning agency for all sectors, develops and monitors policies, strategies, and programs to increase access to sanitation. It houses two major water and sanitation programs that provide local governments with the tools to initiate efforts to increase

access and treatment – the Water and Sanitation Policy Formulation and Action Planning Project (WASPOLA) and the Indonesia Sanitation Sector Development Program (ISSDP). For both programs, BAPPENAS leads multi-ministerial working groups that consist of the Ministry of Finance, Ministry of Health, Ministry of Public Works, Ministry of Home Affairs, Ministry of Industry, and Ministry of Environment. BAPPENAS has also developed a national policy for Community-Based Drinking Water Supply and Environmental Sanitation, which sets guiding principles for addressing general sanitation services, but does not specifically address septage management. In Indonesia’s decentralized context, these programs offer local governments guidance documents and tools, but not mandates.

Ministry of Public Works (MPW): Whereas BAPPENAS provides coordination and planning support, MPW’s Directorate General of Human Settlements provides local governments with infrastructure development and rehabilitation, technical assistance, and technical and service performance standards.³⁸ This ministry plays a critical role in the sector and is instrumental in developing the National Action Plan for Wastewater. The MPW guides the development of large-scale, off-site sanitation systems. In the past, the MPW constructed STPs in major cities across the country with central government funding. The MPW then transferred facilities to local governments, many of which could not provide the funding and staff to operate and maintain them. The MPW also collaborates with the Ministry of Finance (MOF) to administer budgets for developing sanitation and wastewater facilities at the national, regional, provincial, local, and project levels.

Ministry of Health (MOH): The Ministry of Health is responsible for providing wastewater facilities, sanitation emergency response systems, and hygiene promotion, especially to low-income communities. This ministry also sets the standards for water quality, and, through the Directorate of Water and Sanitation, monitors water quality.³⁹ In conjunction with the Ministry of Environment and the Ministry of Public Works, MOH administers and enforces regulations for sources of domestic wastewater, including septic tank design, STPs, WWTPs, and community-based systems. Given the size of Indonesia, MOH faces considerable challenges in monitoring and enforcing these standards.⁴⁰

Ministry of Environment (MOE): In the water sector, this ministry is responsible for regulating water quality management and water pollution prevention. The MOE monitors inter-provincial water bodies, while provincial agencies monitor inter-district water bodies, and districts monitor intra-district waters.

Forum Komunikasi Air Limbah (FORKALIM): Established in 2003 by the Indonesian Association of Waterworks and U.S. Asian Environmental Program, FORKALIM is a communication network for wastewater treatment operators, such as water utilities and sanitation agencies. The forum aims to improve members’ performance in the delivery of wastewater services by increasing operating efficiency, achieving financial viability, and advocating for sector reforms.⁴¹ Key partners include donor agencies, central government departments, local parliaments and governments, and nongovernmental organizations. The current organization’s activities include knowledge

Program Highlight: ISSDP

The Indonesia Sanitation Sector Development Program (ISSDP) began as a three-year program in 2006 with funding from the Government of the Netherlands. The program has two components: (1) to conduct pilot projects in which the community provides matching funds to install sanitation systems; and (2) to enable municipal matching contributions for the design and implementation of primary and secondary solutions. In the first phase of the program, which lasted two years, six cities agreed to devise sanitation strategies for their immediate and long-term needs. These cities included: Surakarta and Blitar in Java, Denpasar in Bali, Jambi and Payakumbuh in Sumatra, and Banjarmasin in Kalimantan. In phase two, ISSDP has expanded its work to another eight cities (Bukit Tinggi and Padang in Sumatera; Semarang, Tegal, and Pekalongan in Central Java; and Batu, Kediri, and Malang in East Java). In addition, 18 other cities have also adopted the ISSDP approach under programs funded by international agencies, such as USAID and UNICEF.

sharing, studies, pilot projects, capacity building, and public information campaigns.

4.2 Major Sub-National Agencies

Typically, cities address sanitation concerns through sanitation agencies and working groups or committees formed by relevant local departments. Wastewater treatment facilities, if available, are managed either by the sanitation agency or the local water utility. The availability and capacity of staff at local agencies varies from city to city, and directly impacts the city's ability to maintain functioning programs.⁴² The choice of treatment technology also has a major impact on project outcomes. Simpler technologies, such as rotating biological contactors and aerated ponds, have proven to be more effective than activated sludge due to lower maintenance and staff capacity and training requirements. For example, in Tangerang and Balikpapan, the activated sludge facilities are well-designed to meet treatment standards, but are not maintained because PDAM employees do not know how to operate and maintain the facilities. However, in Banjarmasin and Yogyakarta, where more simple technologies are used, facilities perform much better.

Local Environmental Agency (BLH): As the local extension of the Ministry of Environment, the BLH protects water resources from domestic and industrial pollution by developing policies and regulations, and coordinating efforts in pollution prevention, control

and monitoring. In Surabaya, the BLH operates a city-level committee to consider wastewater infrastructure development, promote cooperation between businesses and the community, and monitor and evaluate the implementation of wastewater infrastructure development.⁴³ It collaborates with the local Public Works and Spatial Planning Agency in managing the design and construction of sanitation facilities such as STPs and establishing technical guidelines related to O&M.⁴⁴

Sanitation Agency (*Dinas Kebersihan dan Pertamanan, DKP*): To manage day-to-day facility operations, local governments usually create a Sanitation Agency that sometimes provides septage collection services, but more often provides wastewater treatment services. The DKP in Surabaya, for example, employs 22 staff who keep the plant operational 24 hours a day. In addition, Surabaya's DKP collects tipping fees from septage collection companies each month at a rate of \$0.30 per cubic meter and tries to ensure that every collection company that disposes septage at the STP has a disposal permit.⁴⁵ In high-density areas where desludging trucks cannot enter, the DKP monitors traditional land disposal methods, such as the use of lime. DKPs typically face challenges in enforcing proper disposal and collecting tipping fees.

Water Utilities (*Perusahaan Daerah Air Minum, PDAM*): Out of the ten central wastewater treatment facilities in Indonesia, six are managed by the local water supply

Program Highlight: SANIMAS

Sanitasi Berbasis Masyarakat (SANIMAS), or Sanitation for Communities, is a countrywide program that implements communal sanitation systems for domestic wastewater treatment. SANIMAS began in 2004 under the AusAID-supported, Water and Sanitation Sector Policy Formation and Action Planning Project (WASPOLA). As part of this program, NGOs work in selected cities to provide technical assistance to participating communities and local agencies. A typical communal sanitation system can treat the waste of 75-200 domestic users in a small area. The system, which costs about \$30,000 to \$36,000, consists of a sewerage network with individual house connections, with an anaerobic treatment system at the receiving end. Generally, the local government contributes the majority of the cost (about 65 percent), the central government contributes 30 percent, and local communities provide five percent.⁵⁷ This cost sharing encourages ownership, sustainability, and shared responsibility for project success.⁵⁸ Between 2004 and 2008, SANIMAS implemented projects in 345 locations in Indonesia.⁵⁹ These projects operate in many communities that have non-operational STPs. Rather than rehabilitate the STPs, these communities are now investing in decentralized treatment systems like SANIMAS or BORDA's decentralized wastewater treatment systems (DEWATS).

agencies (PDAM). Across the country, PDAMs face challenges in wastewater O&M since local governments set wastewater tariffs far below cost recovery. Therefore, when PDAMs must subsidize wastewater services with water supply revenues, they face challenges in improving services and expanding coverage. The case study on page 57 details the experience in Medan, Indonesia's fourth largest city, and highlights the challenges that PDAMs face in implementing wastewater treatment initiatives.

4.3 Other Organizations

Private Service Providers: Private service providers are increasing in number and collect the majority of the septage in most cities due to the limited capacity of most DKPs and PDAMs. In Malang, for instance, the DKP operates only one vacuum tanker for a city with 2.2 million people; the city's residents must therefore depend on private service providers for a quick response. While operators need a permit to operate, no cities require health or safety practices, or enforce desludging regulations where they exist.

International Organizations: These organizations are actively involved in Indonesia's sanitation sector, both in policy development and treatment plant funding and construction. For instance, official development assistance has helped fund the construction of eight out of the ten WWTPs in the country, as well as on-site treatment systems like SANIMAS and policy working

groups like WASPOLA. In general, however, these programs do not address septage management.

Academic Institutions: There are a number of academic institutions involved in the water and sanitation sector, such as Bandung Institute of Technology, Institute of Sepuluh November Surabaya, and the center for environmental studies in some universities. The Indonesian Society of Sanitary and Environmental Engineers also provides technical assistance and training.

4.4 Key Challenges and Strengths

Challenge: Local governments lack the capacity to manage and maintain existing septage treatment facilities, causing these systems to fall into disrepair. National agencies have also not provided sufficient policy guidance or funding for cities to develop the necessary institutional and physical capacity.

Challenge: The fragmentation and overlap of authority among so many agencies makes it difficult to create integrated plans for sewerage and septic tank management and development.

Strength: The national working groups (ISSDP and WASPOLA) can serve as a nodal group for creating septage management policies, guidelines, pilot projects, and knowledge exchange and dissemination.

5.0 FUNDING SOURCES

In the aftermath of Indonesia's 1997 financial crisis, the government accepted austere fiscal and monetary policies as part of the conditions of its IMF loan that cut funding for many infrastructure and social programs. This austerity and Indonesia's low economic growth has caused the national government to significantly underinvest in all sectors of infrastructure. As of 2009, Indonesia spends only 3.4 percent of its GDP on infrastructure; as a comparison, Vietnam spends 10 percent of its GDP on infrastructure.⁴⁷ Despite national sanitation targets and action plans, sanitation is a low priority for both central and local governments. Moreover, the water sector receives the majority of funding. Without national support, many local governments neither feel that sanitation and wastewater treatment are priorities, nor have the funding to develop new initiatives.



LINDA SHI/ECO-ASIA

Representatives of national and local sanitation agencies in Indonesia study the rotary screw press at Indah Water Konsortium's sludge treatment facility in Kuala Lumpur. Although Indonesia has a number of wastewater and septage treatment plants, most facilities face O&M challenges.

5.1 National Funding Sources

There are two major national sources for water and sanitation funds; (1) ministerial funds, and (2) the Special Allocation Fund (DAK). These loans emphasize capital investments, with limited support for technical assistance and human capacity building. The short-term nature of these loans makes it difficult for cities to use them for water and sanitation projects.

The Ministry of Public Works (MPW) and Ministry of Health (MoH) disburse the ministerial loans, which together provide around 20 percent of the funds for the water and sanitation sector.⁴⁸ Of the MPW's \$8.3 million allocation for the sector, two-thirds address capital investments, and one-third is channeled towards technical assistance and awareness raising.⁴⁹ Through its Water Supply for Low Income Communities Project, the MOH provides \$3.3 million in loans and places a greater emphasis on sanitation.⁵⁰ In areas where there are WASPOLA projects, MPW and MOH provide four percent of the total sanitation budget, highlighting the emphasis that cities draw on their own revenue to fund sanitation projects. Ministerial funds are not guaranteed from year to year, making it difficult to utilize them for large, multi-year projects common in the water and sanitation sector.⁵¹

Since 2005, BAPPENAS has also issued Special Allocation Funds (DAK), which are conditional grants for poor districts and cities whose budgets total less than one percent of the average. To use these grants,

LGUs must contribute 10 percent of the grant amount and cover O&M costs. In 2008, DAK allocated \$11 million for the water and sanitation sector, with water projects receiving 75 percent of the funding, and sanitation projects 25 percent. Funding is only provided for one year and extensions are not guaranteed, which again makes these grants less conducive to long-term wastewater and septage management programs.⁵²

5.2 Local Funding Sources

As with the central government, wastewater treatment is one of local governments' lowest priorities. In Surabaya, for example, the local government allocated one percent of its \$360 million budget in 2009 to the environmental sector, which includes both water and sanitation.⁵³ Cities, districts, and provinces allocate on average 85 percent of sector funds to water supply and drainage projects, and 11 percent to sanitation projects.⁵⁴ Ninety percent of local investment in the sector is for capital expenditures, which typically means toilet construction and STP rehabilitation.⁵⁵

Indonesia has not succeeded in attracting private investment to WWTP and STP construction, in part because local governments set tariffs below O&M cost recovery. As a result, government funds for these projects are quickly drained, which in turn prevents proper maintenance and service expansion. Policy ambiguity, corruption, and the high cost of doing business further deter private sector entry.

5.3 Public Awareness and Willingness to Pay

In general, households are not aware of the need to desludge and treat wastewater, which results in low willingness to pay and low demand for desludging. A few cities in Indonesia, however, provide models on raising public willingness to pay and reducing the levels of public subsidy. Jakarta and Banjarmasin achieve high cost recovery by cross-subsidizing domestic wastewater rates with payments from industrial clients.⁵⁶ Medan's PDAM attains a high collection rate of 98 percent by billing wastewater treatment together with the water bill. Those PDAMs that send separate water and wastewater bills have much lower collection rates.



ARIE ISTANDAR, ECO-ASIA

As part of a WASPOLA project, community members in East Java gather to learn about pathogen pathways and how to improve the area's sanitation and hygiene. Projects like this are small in scale, but more effective than earlier, top-down initiatives.

Case Study of Medan: Treating Septage at Wastewater Treatment Plants

Medan, the capital of North Sumatra Province, has a total population of over two million people. Indicative of the political bias in favor of centralized sewage treatment facilities, Medan has a WWTP, although only 11,000 homes, or two percent of Medan's population, are connected to a sewer system. In anticipation of future sewerage connections, the facility is currently operating at less than 27 percent capacity. Meanwhile, even though 50 percent of its residents use septic tanks, Medan lacks an operating septage treatment facility.

The WWTP in Medan uses UASB technology, a difficult technology for the few PDAM staff who operate and maintain the facility. The local sanitation agency and private collection companies also use the WWTP to dispose of septage, which can create problems in a facility not designed to treat partially digested septage. In addition, the local government charges households seven percent of the cost of installing a sewerage connection and subsidizes the remainder.⁴⁶ Given budget limitations, the government and PDAM may face challenges in further expanding and improving wastewater services.

5.4 Key Challenges

Challenge: DKPS and PDAMs need to develop and build public acceptance for wastewater billing systems that allow them to improve services, expand treatment capacity, and increase desludging frequency.

Challenge: Local governments face challenges in developing wastewater treatment initiatives because: (1) there is insufficient national funding for local governments to develop comprehensive septage management programs, forcing cities to rely on local revenue sources; and (2) the private sector is not interested in wastewater treatment service provision, in part because local governments typically set tariffs too low to achieve cost recovery.

6.0 RECOMMENDATIONS

With 150 STPs around the country, Indonesia has created a strong infrastructural base for septage management. However, most facilities are out of operation because they are not centrally located and local governments do not prioritize septage management. This report recommends that the national government strengthen its leadership and technical support for local implementation through clear regulations and guidelines, trainings, workshops, and for the rehabilitation of STPs. The national government also needs to take a strong role in issuing guidelines for private sector engagement and increase its funding support for local septage management programs.

6.1 Short-Term Recommendations

Make Septage Management Part of the National Dialogue on Sanitation. As the leading ministry in water supply and sanitation policy development, BAPPENAS should address septage management, demonstrate its support for cities to develop septage management programs, and integrate septage management into ongoing efforts for community sanitation. Since the national government no longer mandates sanitation actions, BAPPENAS should take a lead in promoting awareness of the importance of septage management among local governments and DKPs, and share best practices from Indonesia or other cities in the region through groups such as the Association of Indonesian Municipalities (*Asosiasi Pemerintah Kota Seluruh Indonesia*).

Develop Comprehensive Local Management Programs. Cities and DKPs can improve their public and environmental health by rebuilding septage management programs, especially in areas that already have septage treatment facilities. To do so, they can organize septage management workshops and create working groups that address policy setting, private operator compliance, and public awareness. These groups must address new strategies to build local budgets for wastewater treatment, for instance by raising tariffs, combining wastewater fees with water bills, or cross-subsidizing with the water sector or commercial and industrial customers. Local governments can work with ESP, ISSDP, MPW, and BAPPENAS to help develop and test model regulations and implementation models.

6.2 Medium-Term Recommendations

Develop a National Septage Management Action Agenda. The national government, through BAPPENAS, or project organizations, such as ESP, ISSDP, or WAPSOLA, can help organize a national-level workshop to discuss root causes of challenges in septage management and develop a long-term action plan. This workshop should, at a minimum, address the following issues.

- **Create National Guidelines and Standards.** The Ministry of Public Works (MPW), working in conjunction with BAPPENAS and its local branch offices, should update and disseminate national guidance documents on comprehensive septage management, descriptions of implementation models, sample local regulations, effluent and septage disposal standards, and training materials for septage collection companies.
- **Clarify the Roles for National and Local Governments.** The national government in conjunction with the local governments must work together to identify necessary actions and gaps in responsibility, and delegate roles based on the most appropriate level of implementation.
- **Develop Trainings and Technical Assistance for Local Implementers.** BAPPENAS and MPW should take the lead in developing regional capacity building and training programs for local government agencies and service providers. Trainings and technical assistance should address enabling policies and regulations, as well as infrastructure needs. BAPPENAS and MPW can pilot these capacity building initiatives at a few ESP or ISSDP project sites before scaling up efforts around the country.
- **Develop Incentives for Positive Local Initiatives and Disincentives for Inaction.** The national government should stimulate local initiatives to promote improved sanitation. For example, the national government could tie funding for higher

priority issues, such as health, education, and infrastructure, to local governments' progress in increasing access to improved sanitation and development of sustainable septage management programs.

Increase Funding for Water and Sanitation. The Ministry of Health and Ministry of Public Works need to significantly increase funding for sanitation projects, and provide loans that are more suitable for long-term infrastructure investments. This funding should not only address hard costs, such as STP rehabilitation and the purchase of collection vehicles, but also set aside funds for training and public outreach. These projects can be clearly connected to public health, especially children's health, in order to gain political and public support.

Promote Public-Private Partnerships to Regulate Proper Disposal. To improve monitoring and enforcement of septage disposal among private collection companies, local governments should engage private operators through public-private partnerships. As a first step, local governments can require households to regularly desludge their septic tanks, which builds public demand for services. Tied to this initiative, local governments can then require private collection companies to properly dispose of septage at treatment facilities. The government can enforce this policy by collecting the household payments and paying collection companies after they deliver septage to a treatment facility.

Promote Public Awareness and Willingness to Pay. To foster willingness to pay and willingness to address septage management, local governments need to build local awareness of the value of wastewater treatment among public officials, government staff, and the general public. Governments can promote these ideas through promotional campaigns for water, sanitation, wastewater treatment and hygiene, conducted in conjunction with BAPPENAS' ongoing sanitation strategy development programs, such as WASPOLA and ISSDP. Eventually, local governments need to raise tariffs to a level that recovers O&M costs for sanitation projects.

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