

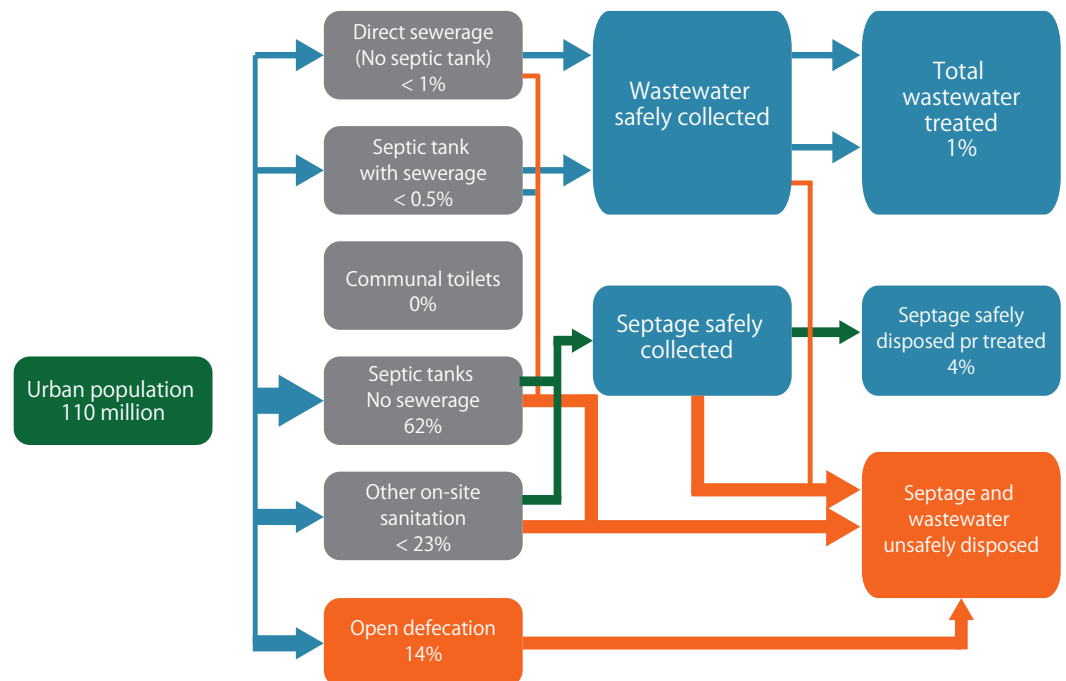
COMMUNITY - BASED SANITATION LESSONS LEARNED FROM SANIMAS PROGRAMME IN INDONESIA

1. Introduction

With a population of 242.3 million as of 2013, Indonesia has become the fourth most populous country in the world, with over half (51%) living in urban areas (World Bank, 2013). As with other Southeast Asian countries, however, Indonesia is still facing many sanitation problems due to its rapid population and urban growth. One of the critical problems is poor domestic wastewater and septage management, especially in urban areas, many of which lack adequate sewerage and drainage systems due to lack of capital. Conventional centralised approaches to wastewater management have generally failed to address the needs of poor communities in urban, peri-urban and rural areas of Indonesia. Access to piped sewerage in Indonesia is one of the lowest

in the region. According to World Bank & Australia AID (2013), only about 1% of the urban wastewater, or approximately 115 million litres per day, is treated in Indonesia and 14% of the population defecates in the open (Fig. 1). The cost to improve sanitation in Indonesia is estimated at 384 trillion IDR (42.7 billion USD) at minimum. Inadequate sanitation and poor hygiene have led to more than 120 million disease episodes and 50,000 premature deaths annually. Consequently, the direct economic impact is more than 3.3 billion USD per year, and the overall adverse economic impact was estimated at 6.3 billion USD per year, or around 2.3% of its gross domestic product (GDP) (WSP-EAP, 2008). Meanwhile, on-site sanitation, mainly septic tanks, is often inappropriate to address the problem, thus necessitating intermediary and complementary solutions.

Figure 1



Urban wastewater and septage flow in Indonesia
Source: World Bank & Australia AID, 2013

Since 2006, thanks to the strong commitment and extensive efforts of the government of Indonesia via multi-stakeholder partnerships with the Australian Government, NGOs as well as international donor agencies such as the World Bank, JICA and ADB, a number of decentralised wastewater treatment plants through community-based sanitation programmes called SANIMAS have been constructed focusing on poor and densely populated urban areas, which can help to close the gap between on-site and centralised systems. These programmes have helped to reduce 60% of hygiene- and sanitation-related diseases in intervention areas during the period 2000–2010 (BORDA, 2011). In 2010, the Government of Indonesia started a new SANIMAS programme which will run until 2014 and aims to implement 1,000 units per year. As stated in the National Mid-term Development Plan 2010–2014, 70 million inhabitants lacking basic sanitation are to have access to sanitation facilities through centralised systems (5%), communal or decentralised systems (5%) and on-site sewage systems (90%) by 2014.

2. Background information on domestic wastewater management in Indonesia

a. Demographic, socio-economic and environmental conditions

Indonesia is economically a middle-income country, the largest in Southeast Asia, and is a highly developed and decentralised state. Since 2005, its economic growth has averaged 5% per annum (WSP, 2009). Gross Domestic Product (GDP) growth was 6.5% during 2010–2011. Decentralisation of service delivery to local governments has begun since 2001 and its impact varies across the country.

Along with economic growth is the challenge of developing essential basic infrastructure and services, especially urban sanitation infrastructure, to meet the demands of rapid urbanisation and population growth. However, the Government of Indonesia previously handled sanitation as basically a private matter, with households responsible for initial construction investment and operation. Most of the sanitation infrastructure has been provided by households and small operators in the form of on-site water-borne toilets such as septic tanks. It is reported that about 73% of the urban population and 44% of the

The government of Indonesia sees these community-based sanitation programmes as the best way to eradicate open defecation and improve sanitation, especially in poor dense urban settlements, until full municipal sewerage and wastewater treatment becomes a feasible option.

The main objective of this policy brief is to review Indonesia's experience in managing urban wastewater in the context of low sewer coverage, with a special focus on community-based sanitation programmes, namely SANIMAS. Based on this experience, positive outcomes will be identified and shared among policymakers and water professionals of local and national governments, potential international donor agencies, as well as entities from other countries planning to mainstream community-based sanitation as a sustainable sanitation solution for the urban poor in other densely populated areas of Asia.

rural population have access to improved toilet facilities (World Health Organisation and UNICEF, 2013) and that about 65% of households in urban areas have septic tanks (WEPA Commission Report, 2013). However, most of these septic tanks are poorly constructed and rarely emptied, which allows untreated or partially treated wastewater to infiltrate into groundwater. Meanwhile, public investments in sanitation infrastructure and services have been neglected. Consequently, wastewater from households is usually discharged untreated or only partially treated into open water bodies such as rivers, ponds, canals and drains. Indonesia is one of the countries that has the lowest sewerage and sanitation coverage rates in Asia, which has caused widespread fecal contamination of urban water sources, both surface and groundwater. According to the Environment Monitor 2003 report (World Bank, 2003), Indonesia has experienced repeated local epidemics of gastrointestinal infections and had the highest incidence of typhoid in Asia, and around 70% children had hookworm and roundworms. Mursito (2013) reported that 75% of rivers and 70% of groundwater in Indonesia are already heavily polluted. About 140,000 tonnes of feces per day were polluting the country's water bodies.

Household septic tanks are still the preferred and common choice for residential wastewater treatment in Indonesia. Thus, it is estimated that the amount of generated septage will steadily increase. Indonesia has in total about 150 septage treatment plants in large and medium-sized cities, which were constructed over the past 20 years, but 90% of these facilities have closed down or run on very low volumes due chiefly to institutional problems, low loading inputs due to low quality septic tanks, difficulties with vehicular access and illegal direct desludging to water bodies (Sudjimah, 2013). As a result only 4%

of generated septage is treated (World Bank & Australia AID, 2013). In addition, limited budget allocation from local government (LG) makes it difficult for responsible institutions to operate, undertake maintenance activities and monitor the effluent.

b. Key issues, challenges and constraints in wastewater and septage management

There are a number of issues and challenges related to sanitation management at different governmental levels in Indonesia. A summary of these challenges is presented in figure 2.

Figure 2



Issues and challenges of urban sanitation at different administrative levels
 Source: Modifications based on WSP, 2009; World Bank & Australia AID, 2013

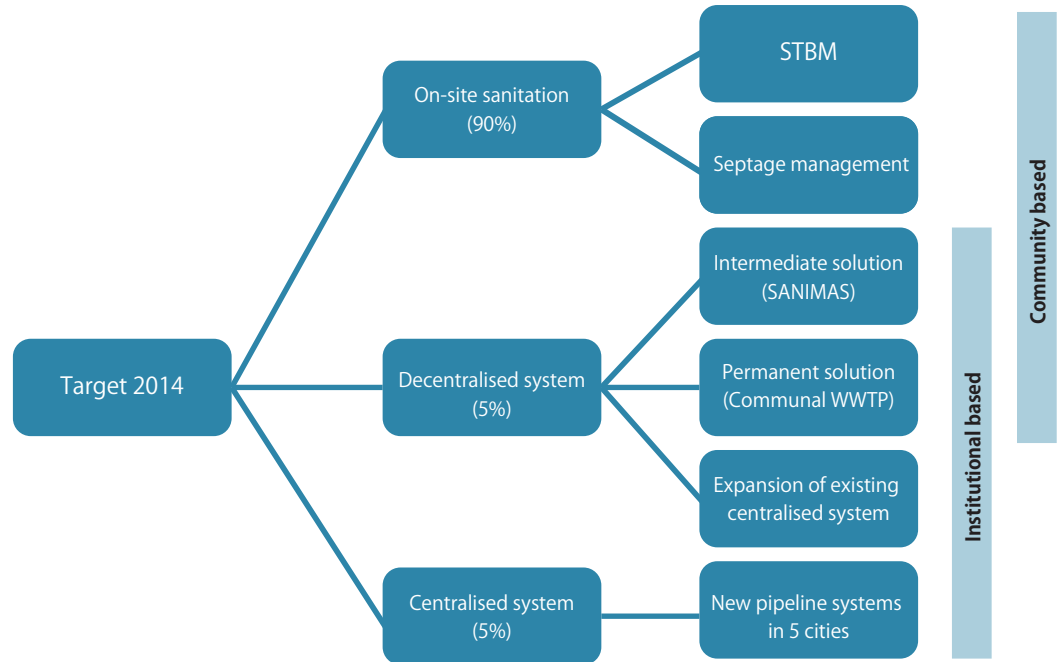
3. Policies and regulations on wastewater and sanitation management

In Indonesia, both on-site and off-site sanitation systems are managed by the Cipta Karya or Directorate General of Human Settlement at the Ministry of Public Works, thus the policies and strategies for on-site and off-site systems are not separated. Indonesia has sanitation policies and strategies which cover both on-site and off-site systems, the main ones of which are discussed below:

- National Policy Development of Community-Based Water Supply and Environmental Sanitation released in 2003, recognized the community members as the key decision makers for all planning, design, implementation, operations and management of water supply and sanitation facilities and services.

- Decentralisation Law of 2004 has helped to strengthen the legal framework of the sector. According to this law, district or provincial governments are responsible for providing water and sanitation services to the communities within their authority, including drafting local regulations. District or provincial governments also have the right to establish the local operational framework, including tariffs and sanctions for rural and urban water supply and sanitation. Meanwhile, the central ministries focus on policy development, standard setting and capacity building. However, at the national level, guidance on sanitation and septage management remains unclear and incomplete. Consequently, enforcement of this law is insufficient at all levels, which provides incentive for polluters to reduce their impacts due to the already polluted state of the receiving bodies. Current controls focus more on the obligations of polluters than on the management role of public bodies.
- The 2008 National Policy and Strategy on Domestic Wastewater Management provides direction and guidance to national and local governments, private sector, communities and other stakeholders on how to achieve national and MDGs targets related to wastewater. This policy is the basis of all planning and programmes in domestic wastewater development, and aims at improving access to infrastructure and wastewater through on-site and off-site systems in both urban and rural areas, with a priority on the low-income segment.
- National Medium-term Development Plan (RPJMN) for 2010–2014 sets the targets for wastewater management as follows: (i) Indonesia to be 100% free of open defecation; (ii) 10% of the total population to be using off-site wastewater management systems; and (iii) 90% of the population to have improved on-site or shared facilities (Fig. 3).

Figure 3



Targets for domestic wastewater and septage management by 2014

a. On-site management (small and medium-sized cities, provinces)

Indonesia's "National Standard Code for Planning Septic Tanks with Absorption System" provides guidelines for the design and construction of septic tanks, and for the design, operation and maintenance of septage treatment facilities. However, there is no legal, institutional or financing framework for septage collection, treatment or disposal. Most local government units (LGUs) are unable to provide comprehensive septage management and the enforcement of these codes is insufficient. Consequently, most individual on-site sanitation systems are not built to code (AECOM & Sandec-Eawag, 2010).

b. Off-site management (large cities)

Currently there are no legal arrangements regarding off-site domestic wastewater management in either the centralised or decentralised system. However, the

Indonesian government does have a national policy on off-site sanitation management systems, called the National Programme for Community-Based Total Sanitation (STBM). Initiated by the Ministry of Health in 2006 and integrated into national policy in 2008 as stipulated by Minister of Health Decree Kepmen no. 852/Menkes/SK/IX/2008, STBM aims to prevent and lower the occurrence of sanitation-related diseases through modifying social behavior and eradicating open defecation habits to create a better environment.

The Community-Led Total Sanitation (CLTS) approach is one of the main components in this programme, which aims to stop open defecation through community action. Under this initiative, the Ministry of Public Works has implemented a community-based sanitation programme known as SANIMAS for peri-urban areas, and around 569 locations in 31 provinces had benefited from the programme since its inception in 2004 as of 2012 (WEPA Commission Report, 2013).

4. Institutional arrangements

In 2001, the government embarked on rapid and far-reaching decentralisation which formalized the local government's responsibility for the delivery of urban sanitation services; however, no significant improvements were seen on the ground. A World Bank study of 19 cities and 2 districts in 7 provinces in Indonesia found that 99% of central transfers to the LGUs went to either public works or health departments (WSP-EAP, 2006). A critical failure of this devolvement, however, was in the transfer of responsibility for urban services (including sanitation) to local governments without establishing an operational framework, service delivery standards or measures to develop municipal capacity. This meant that the tasks municipalities were to perform, how to provide accountability, and the means for funding services were not defined. In addition, no specific responsibility was requested to improve sanitary conditions in unsewered areas. Furthermore, the specific roles of provincial governments in municipal sanitation have failed to define clearly. The lack of institutional capacity and expertise among the staffs responsible for sanitation planning thus remain major challenges for domestic wastewater and septage management in Indonesia.

a. On-site management

The individual on-site wastewater management system in Indonesia is still unaffected by any institution, thus no one is responsible for controlling the quality of the effluent from individual septic tanks or the quality of construction. As the average septic tank has limited capacity and can be full at any time, advance treatment is required to treat the sludge from them. In this respect, the Ministry of Public Works (MoPW) takes the initiative to construct sludge treatment plants which can be used to treat the sludge from individual septic tank and then hands them over to local government for operation and maintenance.

The biggest problems with this are the lack of management capacity, lack of coordination, and lack of political will from the relevant stakeholders to manage this fecal sludge. Central government, via MoPW, is attempting to rectify this situation by providing technical assistance to rehabilitate and optimise existing sludge treatment plants in several cities using the state budget. However, most crucially, no capacity building takes place for local government staffs.

b. Off-site management

The responsibilities for urban sanitation services among different levels of government are as follows:

National government has the overall responsibility for coordination of the sector such as formulation of sanitation policies and strategies, regulations, minimum standards and monitoring. The National Development Planning Agency (Bappenas), the Ministries of Public Works, Ministry of Health, and Ministry of Home Affairs (the latter being responsible for local government) and the Environment Agency all have roles in urban sanitation, however Bappenas still plays the lead role in decision making. National government is also in charge of the Water and Sanitation Sector Policy Formulation and Action Planning project (WASPOLA), the Indonesia Sanitation Sector Development Programme (ISSDP) and the Acceleration of Sanitation Development Programme (PPSP). Meanwhile, the Ministry of Health is responsible for promoting rural sanitation.

Provincial governments have to date not been involved in urban sanitation services because their roles and responsibilities have

not been clearly defined. Thus, defining the specific roles of provincial government in this area is becoming an urgent task.

Local governments have overall responsibility for the provision of urban sanitation services. However, the assignment of specific roles to municipal departments and other city-based agencies differs greatly from one city to another. For instance, in the case of sewerage, responsibility may belong to the wastewater management utility (PDPAL), the water utility (PDAM), the water resources department or the department of public works.

In order to improve coordination and cooperation among these agencies, a national multi-departmental sanitation working group has been established in 2007, and headed by Bappenas. However, policy development in the sector so far has mainly focused on community-based services, which emphasized more on rural and peri-urban sanitation. Unfortunately, there is no policy for urban sanitation. In other words, the policy framework underlines more on the roles of communities without addressing issues that need institutional attention.

Figure 4

5. Community-Led Total Sanitation: Lessons learnt from SANIMAS programme in Indonesia

a. Programme description

The SANIMAS programme (Sanitation by Community) is based on community-driven development principles, and is tasked with providing wastewater infrastructure for the crowded urban slum populations. Starting in 2005, following the success of the pilot programme in six cities over the years 2003 and 2004 initiated by BORDA, World Bank and Australia Government, the Government of Indonesia via the Ministry of Public Works has committed to increasing resources to support a replication and scale-up approach for community-based decentralised wastewater treatment systems (DEWATS) nationwide through SANIMAS programmes. SANIMAS used the demand-responsive



SANIMAS system in Bekasi city, Indonesia
Source: Bao, 2013

Since 2006 the Ministry of Public Works began to replicate the SANIMAS approach using its own budgets, however, long-term operation and maintenance systems are still underdeveloped. Since 2007 this approach has been considered a success and the central government adopted SANIMAS as a national programme to accelerate sanitation development by replicating it to other cities, in order to achieve the MDG targets. Concurrently, many donors also participate and invest in this programme. The Islamic Development Bank (IDB) and the Asian Development Bank (ADB) are part of efforts to replicate the programme.

SANIMAS used the demand-responsive approach (DRA) principle, in which local government expresses their interest by budgeting on budget plan. Central government will select the participating city/community by several criteria, such having join PPSP programme, had city sanitation strategy, and Mid-term Investment Planning for Wastewater Sector. Participating cities/communities were selected through a transparent, competitive process based on the standard criteria that included technical feasibility, willingness to contribute and experience with other self-help projects.

b. Technological solutions

In the SANIMAS programme, communities are often offered three options for sanitation system improvement:

(i) Communal or shared septic tanks, normally applied for a group of four to five households. In this option, the households have to build their own toilets and connect it to the shared septic tank.

(ii) Enhanced communal bathing, washing and toilet block facilities (also known as MCK facilities) including biogas capture and reuse (this option is sometimes referred as “community sanitation centers”)

(iii) Simplified sewer system with a communal sewage treatment facility (usually a baffled reactor). In this option, the households need to build their own toilets and connect it to the sewer.

The actual options are selected depending on the specific local conditions such as social and cultural preferences. However, communities are guided in the selection

of their preferred option. According to a recent World Bank (WSP, 2013) report, 77% have been community sanitation centers (CSC) with toilets and washing and laundry facilities, as most members of communities benefiting from SANIMAS had no toilets, and further, because biodigesters can provide gas which can be used for cooking, hot water and lighting for the SANIMAS facilities area. Meanwhile, 16% of cases were for wastewater collected from household toilets by a simplified sewer system (SSS) and gravity-fed to a DEWATS plant. For the remaining 6%, a local sewer network and a communal sanitation facility were combined, making these the most inclusive as they accommodate both household connections and access to sanitation for those unable to connect to the network.

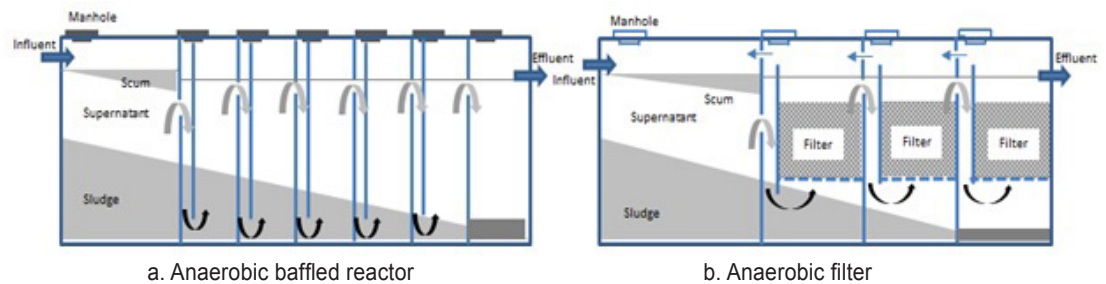
For the treatment facilities, communities are offered three choices of technology, which target both grey water and black water:

(i) Anaerobic Baffled Reactor (ABR): A chamber with multiple compartments to treat wastewater anaerobically. ABRs can be made of concrete and Glass Reinforced Fiber (GRF). To date, this option has been the most commonly used technology in SANIMAS programmes in Indonesia (Fig. 5a).

(ii) Anaerobic Filter: A chamber of multiple compartments equipped with a filter (volcanic rock, bio-ball or any other media) (Fig. 5b).

(iii) Aerobic Reactor: A chamber equipped with oxygen supply.

Figure 5



Treatment facilities
Source: Sudjimah, 2013

The treatment facilities can be equipped with a biodigester, which can produce methane (CH₄) usable as an alternative energy source for household activities such as cooking, lighting or water heating. MCK facilities equipped with a biodigester are known as MCK ++ (MCK plus plus) and can serve 50–150 households depending on the size of land available. If a community chooses a simplified sewer system, it is important to pay attention to the location of treatment facilities, which can be in open areas such as roads, public areas or other open areas, but preferably where easy access to desludging trucks is possible.

Typically, house owners would like to have private facilities connected to a simplified sewer system. Meanwhile, occupants of rental housing often prefer shared toilet blocks. All of the options are suitable for community sizes ranging from 100 to 200 households. Each of these options costs about Rp 3 million (about \$310). For instance, for a community of 100 households, the central government grants Rp 100 million (about \$10,300) or one third of the cost. The local government then invests the balance of 200 million IDR (20,700 USD) and the community invests an equivalent of 2–5% in ‘in kind’ labor or land, food, etc. contribution to build the facilities (WSP, 2009).

c. Funding mechanism of the programme

Block grants are transferred directly to community bank accounts managed by community-based organisations (CBOs). CBOs will develop investment plans with assistance from community facilitators and the LGs. After the community investment plans (including the final technical designs and cost estimates) have been approved at a community assembly and submitted for approval, a contract is executed between the CBO and the local executing agency, which releases the first instalment of the block grant. Communities undertake civil works with technical assistances from the community facilitators and project management consultants. The proposed projects utilise the same funding flow mechanism as for block grants and the first instalment of 40% of the approved block grant is transferred directly into the CBO’s bank account as an advance payment, with the remaining funds disbursed to communities in two further instalments.

SANIMAS as a national policy programme is funded by three sources, including the state budget (central and local government budget), NGO Grants/CSR and from the community itself (Mursito, 2013). The details of which are given below:

Central Government Budget

- (i) Construction cost
- (ii) Cost of training of local facilitators
- (iii) Salary for local facilitators (2 persons/SANIMAS site)

Local Government Budget

- (i) Empowerment cost such as socialisation cost and rapid participatory assessment (RPA) cost for selection of location
- (ii) Detailed engineering design (DED) and community action plan
- (iii) Training of community-based organizations (CBOs) and construction workers
- (iv) Training for operators and users
- (v) Empowerment for sustainability of SANIMAS

Community

- (i) Cash to open an account and for operational and maintenance costs
- (ii) Fund non-cash (in-kind) such as land, goods, labor, and other contributions.

The implementation of this funding arrangement does not always run smoothly, especially in big cities like Jakarta, where community contribution is a challenge. Although people in the related communities are not always required to contribute financially they are expected to contribute their labour to construct facilities, but projects can still stall at this empowerment stage due to lack of awareness or desire to assist on the part of the citizens. However, Jakarta LG has subsumed the part community contribution should play by paying for the labour required in the construction phase, a practice strongly not recommended as it contradicts the basic ethos of community empowerment.

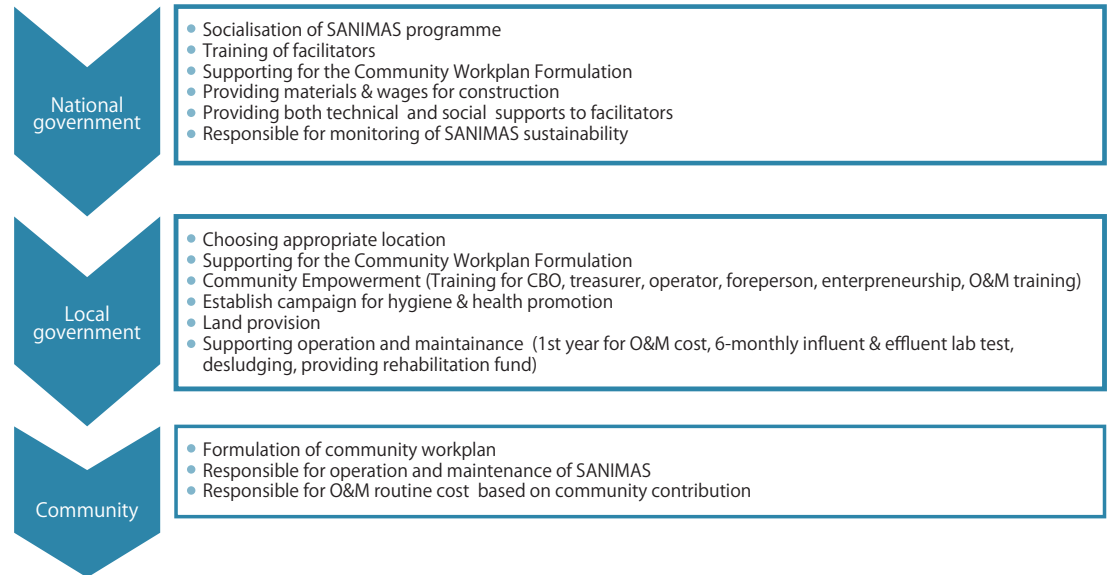
In smaller cities, where there is a higher level of community spirit, projects can run more smoothly and members of communities are usually willing to contribute their labor in the construction phase. In such work communities are often trained and monitored by LG staffs and technical facilitators, as well as in the management of funds and expenses records, to maintain transparency and accountability.

d. Responsibilities of different stakeholder groups in SANIMAS programme

SANIMAS programmes have been implemented and managed by both national

and local government and communities. The roles of different stakeholder groups in the management of SANIMAS programmes are described in Fig. 6.

Figure 6



Roles of different stakeholder groups in the management of SANIMAS programme

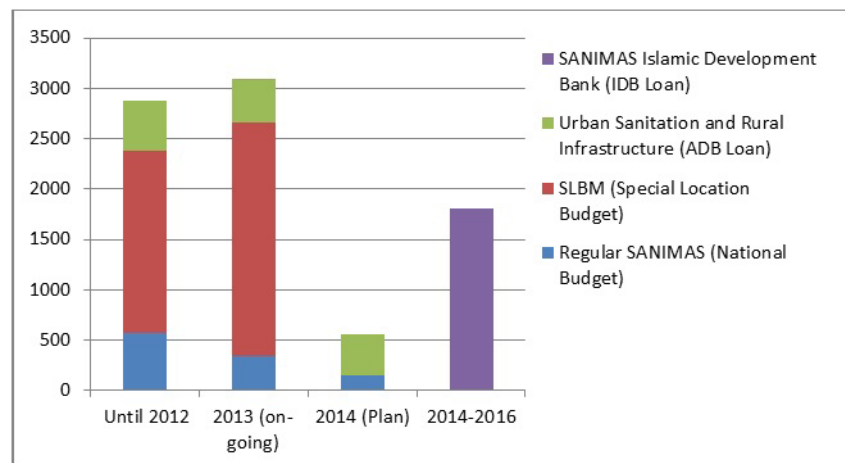
e. Impact of SANIMAS programme on community and lessons learnt

As mentioned earlier, the SANIMAS programme's goal is to encourage community initiatives in an open, participatory and self-reliant approach. In 2012, the Ministry of Environment carried out a research to monitor 400 SANIMAS facilities, in which over 400 effluent samples from SANIMAS facilities were taken for laboratory analysis. Parameters measured were Total Suspended Solids (TSS), Biological Oxygen Demand

(BOD), pH and oil and grease. Results showed that 82% of SANIMAS established were operating well and had good quality of effluent (Mursito, 2013).

Aside from a number of SANIMAS facilities constructed using the national budget through the Ministry of Public Works, many other SANIMAS facilities have been implemented around the country via the Special Location Budget, ADB and IDB loans, as given in Fig. 7, which also gives totals for the various funding sources.

Figure 7



Numbers of implemented SANIMAS facilities by funding source in Indonesia
Source: Mursito, 2013

Lesson learnt from SANIMAS programme in Indonesia and recommendations

Sanitation planning

- Bottom-up planning for community/ neighborhood scales and top-down planning for city-wide/ regional scales need to be combined to accomplish sufficient public access to sanitation infrastructure.
- Community-based DEWATS is an effective and promising approach for poor communities in dense urban settlements.

Capacity building

- Sanitation should not be limited to wastewater management and should also cover septage treatment and management.
- To enable local governments to be aware of the support required to make appropriate and cost-effective technology options, effective promotional campaigns and more financially viable services are needed.

Funding mechanisms

- It is necessary that the funding mechanisms for urban sanitation must be publicized. Funding for urban sanitation improvements is normally available from government sources, but municipalities

lack the knowhow to access such, while provincial governments have funds but do not know how to disburse them. This highlights the need for further improved communication among governmental agencies.

Institutional arrangements

- Indonesia needs to develop a comprehensive national sanitation strategy with defined objectives and clear institutional roles from national to local level, and to provide a framework and guidelines for actions at both national and local level.
- Local governments need to develop septage management programmes through introducing institutional and regulatory arrangements, appropriate financing and charging mechanisms.
- Central government needs to develop both incentives and obligations for municipalities to adopt the comprehensive national sanitation strategy strategies.

Public awareness raising campaign

- Providing only sanitation infrastructure will not solve the problem; public campaigns to raise public awareness of sanitation are also a key task.

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