

# Challenges of Decentralized Wastewater Management and the Johkasou

September 25, 2025

Kazushi HASHIMOTO

ADB I Consultant and Advisor to  
Japan Sanitation Consortium (JSC)

# 1. Challenge of Decentralized Wastewater Management in Developing Countries

# Challenges of the on-site sanitation systems (Households)

## [Case of India]

1. Septic tanks are often dramatically undersized, faultily designed and poorly constructed. Septic tanks are frequently installed underneath homes, driveways or sidewalks due to small lot sizes, thus making access for inspecting or de-sludging difficult.
2. Limited capacities and resources with Local Governments and absence of regulations on maintenance and cleaning of septic tanks and pits are a major challenge.
3. Fecal sludge is dumped on drains and open areas posing considerable health and environmental risks.
4. Sanitary workers work in hazardous conditions manually cleaning on-site pits and tanks without adequate protective gear and equipment.
5. There is a general lack of awareness on septic tanks among the system owners and local governments which results in pollution of the ground and surface water bodies.

(Source) Gov. of Telangana State, India 'Policy on Faecal Sludge & Septage Management' (2018) 1.4 Key Sanitation Issues and Challenges - Telangana

# Challenges of the decentralized wastewater treatment systems (Commercial/Institutional buildings)

## [Case of Jakarta, Indonesia]

In Jakarta, 4,000 commercial/institutional buildings, not connected to the sewerage system, rely on individual treatment plants (ITPs). 58% of them are not managed properly, resulting in non-compliance with the effluent standards. Particularly, sludge management is very poor.

- The reported desludging frequency and de-sludged sludge volume are extremely small compared to assumed sludge generation volume.
- A number of hearing repliers clearly stated that there is such a fact that de-sludged sludge is discharged to rivers and rainwater drainage channels.

(Source) JICA 'The Project for Capacity Development of Wastewater Sector Through Reviewing the Wastewater Management Master Plan in DKI Jakarta' Main Report 'B4.2.3 ITP Built by Others' [https://openjicareport.jica.go.jp/pdf/12078630\\_02.pdf](https://openjicareport.jica.go.jp/pdf/12078630_02.pdf)

# Challenges of the decentralized wastewater treatment systems (Commercial/Institutional buildings)

## [Case of Hyderabad, Telangana State, India]

In Hyderabad, there are 1,200 large commercial and institutional buildings such as IT parks, gated communities, etc.) in the peripheral areas of the city where there is no sewerage system. They are mandated to install high performance Onsite Wastewater Treatment Systems (OWTSs) and to reuse their effluents.

- The results of the Audit (August 2023) indicate that out of the 494 OWTSs surveyed, 253 are functional, 95 are nonfunctional, 46 are under construction, 64 are not installed, and entry is denied for the remaining 36 STPs.

(Source) ADBI Working Paper 'Operation and Maintenance and Performance Monitoring of On-Site Wastewater Treatment Systems in Japan: A Proposal for India' (April 2025) 3.5

<https://doi.org/10.56506/BWTF7138>

# Challenges of the decentralized wastewater treatment systems (Community)

[Case of SANIMAS in Indonesia]

In Indonesia, under the SANIMAS, or 'Community-Based Sanitation' (Sanitasi Berbasis Masyarakat) Program, 21,832 small-scale sanitation system (SSS) were built, serving an estimated 6 million people.

In 2019, Bill & Melinda Gates Foundation (BMGF) and Islamic Development Bank (IsDB) conducted an independent evaluation of SANIMAS Program. The results of this evaluation are as follows;

- the overall system performance is poor at 51%, and of concern at 43%, of the investigated sites. At 48% of the investigated sites, one or more signs of serious management challenges were observed.

(Source) Independent Evaluation of SANIMAS Model as an Approach for Providing Decentralised Sanitation (2019) P.11

[https://www.isdb.org/sites/default/files/media/documents/2021-03/SANIMAS%20Model\\_as%20an%20Approach%20for%20Providing%20Decentralised%20Sanitation\\_March%202021.pdf](https://www.isdb.org/sites/default/files/media/documents/2021-03/SANIMAS%20Model_as%20an%20Approach%20for%20Providing%20Decentralised%20Sanitation_March%202021.pdf)

# (Reference) Preparatory Survey for Improvement of Decentralized Wastewater Management in India

Asian Development Bank Institute (ADBI), Japan Sanitation Consortium (JSC) and Administrative Staff College of India (ASCI) jointly conducted the survey (January 2024) and 4 Working Papers are published, which deal with the challenge and solution in the decentralized sanitation/wastewater management both in India and in Japan.

- Wastewater Management and Reuse in Hyderabad, India: Comparison of the Related Regulations Between Japan and India <https://doi.org/10.56506/TJRY1633>
- Progress of Fecal Sludge Management for On-Site Sanitation and Wastewater Treatment Systems in Warangal City and Hyderabad Metropolitan Region, Telangana State, India <https://doi.org/10.56506/AVPO8023>
- Operation and Maintenance and Performance Monitoring of On-Site Wastewater Treatment Systems in Japan: A Proposal for India <https://doi.org/10.56506/BWTF7138>
- Regulation and Monitoring of the Design and Installation of On-Site Wastewater Treatment Systems in India <https://doi.org/10.56506/GNRJ3042>

# Challenges of Decentralized Wastewater Management (not limited to developing countries)

Improper design of the on-site facilities
Lack of monitoring of compliance with the building standards of the on- site facilities
Poor installation of the on-site facilities
Improper management of the sludge generated by the on-site facilities by their owners or users
Unregulated De-sludging Operators working in the difficult conditions
Improper treatment/disposal of the on-site sludge
Improper operation and maintenance of the decentralized wastewater treatment systems
Lack of human resources for the maintenance work
Lack of awareness on the on-site sanitation management system
Lack of accountability

## 2. Japan's response to these challenges of Decentralized Wastewater Management

# Japan's response to the challenge of Decentralized Wastewater Management (1)

Challenges	Japan's Response
Improper design of the on-site systems	<ul style="list-style-type: none"><li>• Structural Standards for the on-site systems.</li><li>• Government approval of the design of the manufactured on-site systems.</li><li>• Performance testing of the manufactured non-standard on-site system.</li></ul>
Lack of monitoring of compliance with the building standards of the on-site systems	Building confirmation system by the qualified building officials.
Poor installation of the on-site systems	<ul style="list-style-type: none"><li>• Registration system of the construction business.</li><li>• Certification system of the installation workers (national examination/completion certificate of the training course by the designated training institution).</li></ul>

# Japan's response to the challenge of Decentralized Wastewater Management (2)

Challenges	Japan's Response
Improper management of on-site system sludge by owners or users	Legal responsibility of the owner/user of the on-site system to de-sludge it regularly, at least once a year.
Unregulated de-sludging workers working in the difficult conditions	Mayor's permission of the de-sludging business, with periodic renewal of the approval.
Improper treatment/disposal of the on-site systems generated sludge	Municipalities' legal responsibility to ensure the safe treatment and disposal of sludge from on-site systems.

# Japan's response to the challenge of Decentralized Wastewater Management (3)

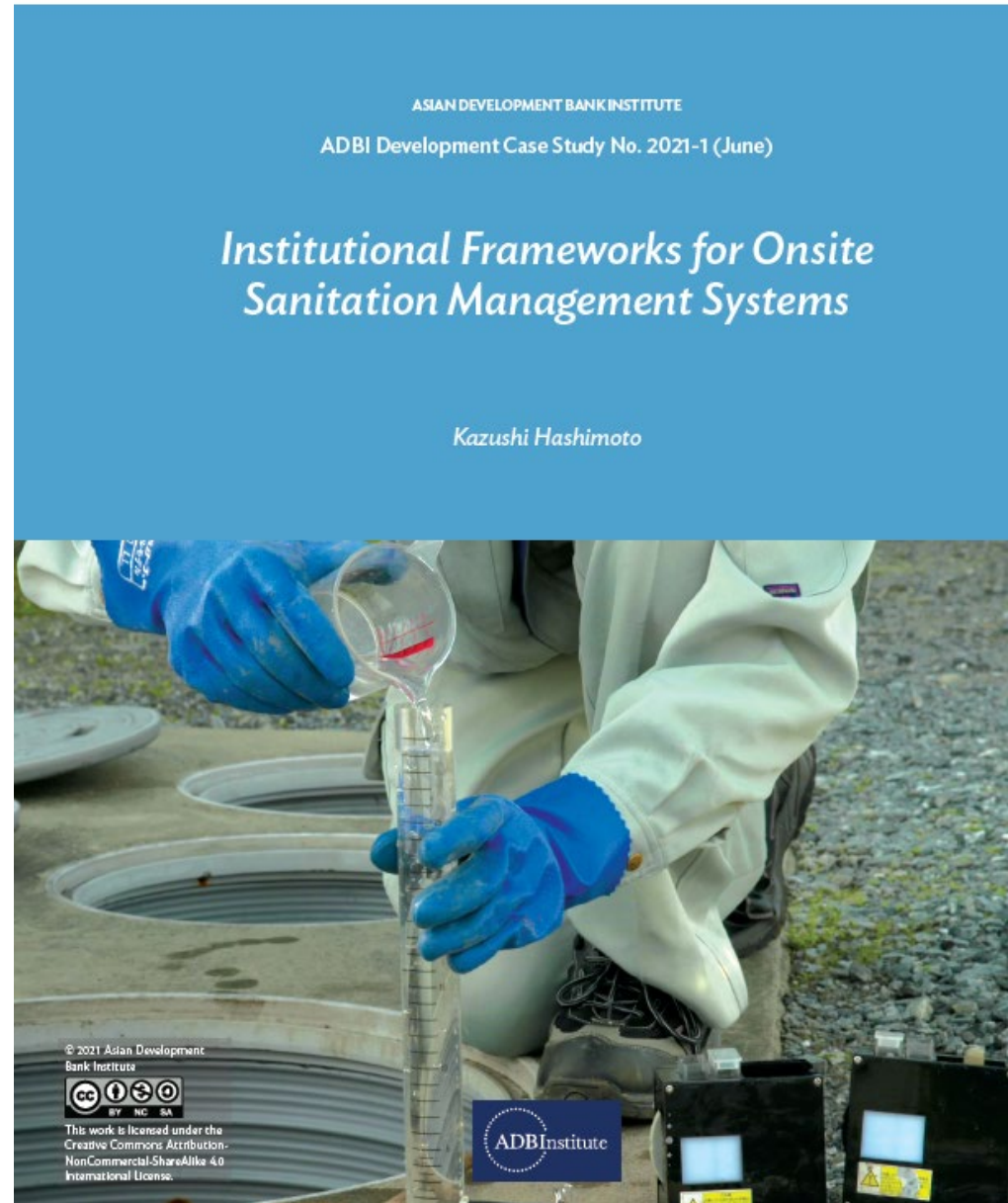
Challenges	Japan's Response
<p>Improper operation and maintenance of the decentralized wastewater treatment systems</p>	<ul style="list-style-type: none"> <li>• The owners/users' legal responsibility to conduct operation and maintenance (O/M) works at the interval specified in the Ordinance.</li> <li>• Registration system of the O/M vendors.</li> <li>• Adopting operator certification system (national examination or completion of a training course conducted by a designated training institution)</li> <li>• Legal responsibility of the owners/users of large systems (<math>\geq 501</math> Population Equivalent) to deploy a qualified Technical Supervisor.</li> </ul>

# Japan's response to the challenge of Decentralized Wastewater Management (4)

Challenges	Japan's Response
Lack of human resources for managing the on-site sanitation system	Training and examination system for installation workers, de-sludging workers, operators and inspectors of the on-site systems.
Lack of accountability	<ul style="list-style-type: none"><li>• Annual inspections of the on-site systems by third-party inspection agencies (for all the on-site systems).</li><li>• Monitoring of compliance with effluent standards by the Prefectural Governor under the Water Pollution Control Law (for large on-site systems (<math>\geq 60</math> m<sup>3</sup>/day)).</li></ul>

For more details;

<https://www.adb.org/sites/default/files/publication/711441/adbi-cs2021-01.pdf>



# Enforcement mechanisms for Decentralized Wastewater Management in Japan

## [Table of Contents of the Johkasou Act (1983)]

More than half of the articles are dedicated to the qualification requirements for the business and the professionals involved in the installation, operation and maintenance, and desludging.

Chapter 1 General Provisions (Article 1~4)

Chapter 2 Johkasou Installation(Article 5~7)

Chapter 3 Operation/Maintenance of Johkasou and Johkasou Desludging (Article 8~12)

Chapter 4 Approval of the Johkasou Type (Article 13~20)

Chapter 5 Registration Pertaining to Johkasou Construction Business (Article 21~34)

Chapter 6 Permission for Johkasou Desludging Business (Article 35~41)

Chapter 7 Johkasou Installation Worker (Article 42~44)

Chapter 8 Johkasou Operator (Article 45~47)

Chapter 9 Registration System of Johkasou Operation and Maintenance Vendors by Regulations (Article 48)

Chapter 10 Miscellaneous Provisions (Article 49~50)

Chapter 11 Penal Provisions (Article 59~68)

(Source) Johkasou Act (Tentative Translation) [www.env.go.jp/recycle/jokaso/en/pdf/johkasou\\_act.pdf](http://www.env.go.jp/recycle/jokaso/en/pdf/johkasou_act.pdf)

3. How much does the Johkasou cost?

# How much does the Johkasou cost? (OPEX)

Breakdown of Annual O&M Cost of **Johkasou** in Japan

	5 PE Type	Note
Maintenance fee	JPY 15,000 (USD 100)	Three times/year
Spare parts and consumables	JPY 6,000 (USD 40)	
Desludging fee	JPY 26,000 (USD 173)	Once a year
Electricity fee	JPY 13,000 (USD 86)	
Inspection fee	JPY 5,000 (USD 33)	Once a year
Total (Annual O&M Cost)	JPY 65,000 (USD 433)	
Monthly O&M Cost	JPY 5,416 (USD 36)	

Annual O&M Cost of Johkasou in Developing Countries

	5 PE Type	60 PE Type
Maintenance fee	USD 14	USD 19
Spare parts and consumables	USD 14	USD 165
Desludging fee	USD 35	USD 417
Electricity fee	USD 18	USD 209
Inspection fee	USD 5	USD 5
Total (Annual O&M Cost)	USD 86	USD 815
Monthly O&M Cost	USD 7	USD 68

**Remark:** The above figure are hypothetical figures based on the assumption that the service frequency is provided as in Japan, while the labour cost in developing countries is one-tenth of that of Japan. The price of spare parts and consumables in developing countries are assumed to be 1/4 of that of Japan. The desludging and electricity fees are those paid in India.

# How much do the MWCI Customers pay for the sewerage service?

			Wastewater Charge (WWC) Total			Payment for wastewater service /household (equivalent) /month
			Water consumption (cu.m. per month)	Water Charge (WC)	Environmental Charge (25% of WC)	
Residential customer (HH)	20	P 433	P 108	-	P 108	P 108 (USD 1.9)
Business Group 1 customer	300 (equivalent to 15 HHs)	P 26,805	P 6,701	P 8,805	P 15,506	P 1,033.7 (USD 18.1)

(Source: NOTICE TO MANILA WATER CUSTOMERS AND THE PUBLIC NEW WATER RATES FOR THE EAST ZONE

<https://mediafiles.manilawater.com/public/pages/671b900c531a3dbe8f0608a2/bill-info/2025-Standard%20Rates-Tariff-Table-Original-Signed.pdf>)

## 4. Conclusion

- Decentralized Wastewater Management in developing countries faces serious challenges. Its improvement is essential not only for households but also for commercial/institutional users.
- These challenges are not limited to the developing countries. Japan had also encountered the similar challenges in 1960s-1970s and overcame them by the establishment of the Johkasou Act (1983).
- For the effective decentralized wastewater management, regulations, penalties or standards are not enough. The most important is to establish the enforcement mechanisms of these regulations and standards. The Johkasou Act in Japan contains a lot of enforcement measures.
- Johkasou would be an affordable option for the commercial and institutional users in the Philippines, as far as the appropriate enforcement mechanisms are established in the Philippines.

Thank you for your attention!

[khashimoto1@adbi.org](mailto:khashimoto1@adbi.org)