

Challenges of Fecal Sludge Management (FSM) in 3 CWIS Model Cases

Experts Dialogue on Challenges in Designing and Implementing
City-Wide Inclusive Sanitation (CWIS) Projects
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Challenges of Fecal Sludge Management (FSM) in 3 CWIS Model Cases (Summary)

Cases	Why called Model Case?	Challenges
Warangal (India) (pop. 800,000)	The first city in India which established the regulation on FSM (2016).	Based on the success of the pilot scheduled desludging in a selected colony, the city-wide scheduled desludging program started in 2025. But only few colonies have joined the program.
Dumaguete (Philippines) (pop. 130,000)	The first city in the Philippines which established the regulation on FSM (2006).	The scheduled desludging had started in 2010 but was abandoned in 2012, due to drop in the participation rate. Since then, the desludging services have been on demand basis. 75% of population is using the services.
Indah Water Konsortium (IWK) (Malaysia) (septic tank pop. 8.6 mil)	IWK was created, in 1994, to provide O/M services for 7,800 sewerage systems and scheduled desludging services for 1.5 mil septic tanks.	IWK is providing O/M services for 7,800 sewerage systems efficiently. But IWK's scheduled desludging service for septic tanks had been abandoned in 2008. It was resumed in 2021, but the acceptance rate remains low (10-20%).

FSM in Warangal, Telangana State, India

Achievement

- Greater Warangal Municipal Corporation issued FSM Operational Guideline in 2016.
- Two pilot FSTPs ($15\text{m}^3/\text{d}$) was built in 2017 by BMGF support.
- Trainings of masons (septic tank builder) and desludging operators were implemented.
- The scheduled desludging was successfully piloted in a selected colony.
- New FSTP ($150\text{m}^3/\text{d}$) was built in 2025.

Challenge

- The citywide scheduled desludging scheme started in 2025. But only 3-4 colony out of 2,000 colonies have joined as of 2026.
- Daily sludge volume ($30\text{-}90\text{m}^3$) is far smaller than the FSTP capacity ($150\text{m}^3/\text{d}$).
- There are still cases of illegal dumping of sludge to the rivers by desludging operators.

The feature of the FSM Program in Warangal

Population	800,000		
Number of septic tanks	160,000 (estimate)		
Desludging cycle	Every 3 years		
Desludging operator	Private desludging companies		
Year	2019	2024	2026
Number of the licensed desludging vendors	10	15	NA
Number of the vacuum tankers	NA	27	30
Payment method of desludging charge	Per service basis → (plan)Integration of desludging charges with property taxes (cross subsidized).		

(Reference)

ADB Working Paper 'Progress of Fecal Sludge Management for On-Site Sanitation and Wastewater Treatment Systems in Warangal City and Hyderabad Metropolitan Region, Telangana State, India' (2025) by Pierre Flamand, Katsuyoshi Sudo, Srinivas Chary Vedala, Kazushi Hashimoto

<https://doi.org/10.56506/AVPO8023>

FSM in Dumaguete, The Philippines

Achievement

- In 2006, Dumaguete City Council adopted a City Ordinance establishing FSM system.
- In 2010, Dumaguete local government (LGU) built a low-cost FSTP (85m³/d).
- In 2010, Dumaguete City Water District (DCWD) started the scheduled desludging program, charging PHP 2.00 (USD 0.05)/m³ of water consumption volume together with the water tariff on monthly installment basis.

Challenge

- In 2012, following a drop in the participation rate, the scheduled desludging was abandoned. Today, the program operates as a demand-based (on-call) service.
- However, it seems that the program is still effective since 75% of the users are using the on-call desludging services. This may be because they are paying the desludging charge in advance and the desludging service is provided within 24 hours.

The feature of the FSM Program in Dumaguete

Population	130,000
Number of septic tanks	20,000
Desludging cycle	Every 5 years
Desludging operator	Water District (water utility)
Sludge treatment	Municipal government
Number of vacuum tankers	8
Payment method of desludging charge	Monthly installment together with the water tariff, regardless whether they use the Water District's desludging service or not.

(Reference)

1. FSM INNOVATION 'City-wide Fecal Sludge Management Programs in the Philippines' by David Robbins published by Gaes Foundation (2017)
https://www.eawag.ch/fileadmin/Domain1/Abteilungen/sandec/schwerpunkte/sesp/ConCad/resource_package_new/08_only_by_type_case_studies/fsm_innovation/09_fsm_innovation_philippines.pdf
2. ADBI Case Study 'Quantifying the Economic Spillover Effect for Citywide Fecal Sludge Management Programs' <https://www.adb.org/publications/quantifying-economic-spillover-effect-citywide-fecal-sludge-management-programs>

FSM by IWK (Malaysia)

Achievement

- In 1994, IWK's scheduled desludging scheme for individual septic tanks had started, collecting monthly desludging fee from all the septic tank users. But IWK had faced a lot of customer complaints.
- In 2008, Water Services Industry Act (2006) (WSIA) become enforceable, and the regular desludging scheme was abandoned. Number of desludging activities declined substantially.

Challenge

- In 2021, new regulation amending WSIA (2006) was established. Under the new regulation, scheduled desludging was made mandatory again. But the payment of desludging fee is on the per service basis (not on the monthly installment basis).
- Despite the regulatory requirement, customer acceptance of scheduled desludging remains a key challenge. Acceptance increased from 6.15% in 2022 to 20.15% in 2023 and remained broadly stable at 19.21% in 2024, before declining to 11.16% in 2025, despite a substantial increase in notices issued.

The feature of the FSM by IWK (Malaysia)

Septic tank population	8,600,000
Number of septic tanks	1,500,000
Desludging cycle	Every 2-3 years
Desludging operator	Private Concessionaire (since 2000, all the shares are held by the Central Government (Treasury))
Number of vacuum tankers	151
Payment method of desludging charge	Monthly installment (but not linked to the water tariff*) → Per service basis. *In Malaysia, sanitation/wastewater service is institutionally separated from water supply service.

What is the take away from these cases?

Establishment of sustainable FSM system, particularly the scheduled desludging system, is not at all easy!

National Water Services Commission (SPAN), regulatory agency in Malaysia established under the Water Services Industry Act (2006) (WSIA) mentions that SPAN has become aware that strengthening onsite sanitation requires an integrated approach combining regulatory oversight, public awareness and engagement, service accessibility, affordability considerations, and effective enforcement.