Rural FSM

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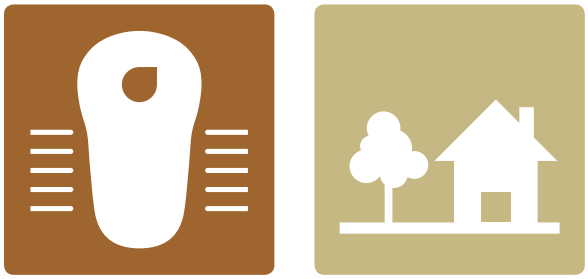

Strategy for Faecal Sludge Management in Rural India

BACKGROUND

Safely managed sanitation highlights the need to go beyond toilets, and look into the sanitation chain, i.e. into containment, emptying, transport, treatment and reuse or disposal of faecal waste.

In rural India, where sewerage systems are practically non-existent, there is a need for focus on safe management of faecal waste generated from on-site containment systems. Some technologies, such as twin leach pits, provide on-site treatment, and if correctly constructed and operated, these can be safely emptied and reused at the household level. Other technologies, such as single pits, septic tanks (and other septic tank-like containment structures), require services for emptying and transportation of the faecal sludge to the treatment facilities for its subsequent reuse or disposal.

THE CASE FOR FAECAL SLUDGE MANAGEMENT IN RURAL AREAS

The indicator for measuring progress against Sustainable Development Goal 6.2 (universal access to sanitation by 2030) is 'percentage of population using safely managed sanitation services'. This emphasizes on the need to look beyond toilets and to ensure that faecal pathogens are prevented from re-entering the environment and posing a health risk. One common pathway for re-entering of faecal pathogens in environment is the contamination of water bodies and groundwater, by means of overflow and seepage from poorly built sanitation systems. This has a strong negative impact on human health.

It is in this context that a strong case for organised faecal sludge management (FSM)

CAPTURE > CONTAINMENT > EMPTYING > TRANSPORT > TREATMENT > SAFE REUSE OR DISPOSAL

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A faulty twin pit toilet structure.

services in rural areas needs to be considered. Critical factors which should be taken into account while planning and implementing FSM services include sanitation technologies deployed, diversity of rural habitations, and a potential risk of increase in caste-based manual scavenging. These are explained in detail below:

Sanitation technologies deployed

Safe management of sanitation is generally considered relatively easy to achieve in rural areas, as there are safe, low-cost and low-management containment technologies such as twin leach pits (or digging a new pit after closing a full pit). However, we need to consider a few facts first.

2011 Census found over 40%[1] of the toilets in rural India had septic tanks (amounting to 38.5 million). A 2017 study by WaterAid India found that despite government's increasing promotion of twin leach pit toilets, there seemed to be a high preference for septic tanks among those aspiring for better toilets. In over 1,000 households covered under the survey, as many as 24% toilets had septic tanks[2]. The community level perceptions on the twin leach pits and septic tanks seem like a classic case of people considering twin leach pits as black and

white television and opting for a septic tank or colour television, as their economic/social status improves. However, WaterAid India study also found that a large number of what people built as 'septic tanks' did not conform to the standards set by Bureau of Indian Standards thus increasing the risk of contamination in the long run[3].

More recently, data[4] from National Annual Rural Sanitation Survey 2018-19 suggests that only 26.6% toilets are twin leach pits. Further, close to 28% toilets are septic tanks, and 6% are tanks without a soak pit. A large number of toilets are also being built with houses constructed under the Pradhan Mantri Awas Yojana. There is no data to authenticate the quality of these toilets and their adherence to standards.

Finally, some of the twin leach pit toilets are constructed in terrains where they are not appropriate, such as flood-prone areas or areas with high water table creating a risk of contamination, and rocky terrains, where leaching may not be feasible. Here, appropriate toilet technologies need to be introduced through retrofitting, wherein such technologies will require safe faecal sludge management.

Diversity of habitations in rural India

With rapid rural-urban transition, various categories of habitations, which are, characterized as rural exhibit characteristics similar to urban areas, due to their proximity to existing urban centres. These urban-like settlements include census towns, which have a population exceeding 5,000 and population density greater than 400 per square kilometre, with at least 75% of main male working population employed outside the agricultural sector- however, these are not statutorily notified and administered as a town. Their number was 1,362 in 2001, and increased almost threefold to 3,894 in 2011. Census towns mostly have septic tanks that require regular emptying, transportation and treatment of faecal sludge. Apart from these, there are large and densely populated villages, which are similar to census towns but do not meet all the criteria of census towns. As per Census 2011, there are 2,80,241 such villages in India, with a total population of over 521 million. In many of these areas, there might be a large enough population and density to allow for economies of scale if FSM services were introduced (including clustering). Close to 25% of these large and densely populated villages are located near national or state highways.

A quick look at the existing FSM services around the range of habitations mentioned above tells us that need and opportunities for developing FSM services may vary across different categories of habitations. Rural areas adjacent to urban centres represent a landscape operated by a mix of private and government service providers- while the government services may be linked to treatment plants, the private services appear to be limited to emptying, transporting and disposal, without adhering to proper standards and with no regulatory arrangements. In census towns, FSM services are mostly managed by an informal, motley group of private service providers, again limited to emptying and disposal, wherein lack of regulations, non-adherence to safety standards and contamination of water bodies are challenges to be addressed. Further, in large villages with high population density, we find that there is a gaping hole around emptying

and treatment systems and services for faecal sludge. In the villages located close to state and national highways, feasibility of setting up FSM services would be high due to good road connectivity.

Another possible classification of rural habitations could be on the basis of population size and density, and nature of habitations. For the purpose of this policy brief, we have tried to classify villages into three categories based on these criteria. Dense rural settlements are villages with medium population size (between 2000 and 5000), high population density and closely located habitations. Villages with medium population size (between 1000 and 2000) and density, and closely located habitations can be classified as compact rural settlements. Villages with low population size (less than 1000) and density- such as forest villages and those with scattered habitations are termed as sparse rural settlements. According to Census 2011, the number of villages classified as dense, compact and sparse rural settlements are close to 3.38 lakhs, 1.39 lakhs, and 96,428 respectively. While these settlements may exhibit a mix of containment structures requiring context-appropriate FSM solutions, clustering of villages would be a feasible option for dense rural settlements. Table 1 provides a summary of these diverse rural habitations.

TABLE 1 Various categories of rural settlements in India

Basis of classification	Category	Description
Urban-like settlements, including villages near national or state highways	Census towns	Population exceeding 5,000 and population density greater than 400 per square kilometre, with at least 75% of main male working population employed outside the agricultural sector.
	Large, densely populated villages	Similar to census towns, but don't meet all criteria above
Population size and density	Dense rural settlements	Villages with medium population size (between 2000 and 5000), high population density and closely located habitations.
	Compact rural settlements	Villages with medium population size (between 1000 and 2000) and density, and closely located habitations.
	Sparse rural settlements	Villages with low population size (less than 1000) and density- such as forest villages and those with scattered habitations.

Risk of rise in Manual Scavenging

The absence of appropriate facilities for safe management of faecal sludge poses a high risk of increase in manual scavenging, steeped in caste based oppression and stigma. Despite a legal ban on such practices, an inter-ministerial task force counted up to 53,236 people involved in manual scavenging in India (covering 121 districts in 12 states), a four-fold rise from the 13,000-odd such workers in 2017. Another report, the Socio-Economic Caste Census (SECC) 2011 lists 1,82,505 manual scavengers in rural areas[5]. An increase in the number of septic tanks, single pits and other toilet containment structures in areas lacking formal FSM service providers, may in turn lead to a rise in instances of manual scavenging.

MOVING TOWARDS SAFELY MANAGED SANITATION IN RURAL INDIA

All of the above factors clearly establish the need to institutionalize coherent FSM solutions, as part of a strategy for safely managed sanitation in rural areas. Going forward, the rural FSM strategy in India should target two related but distinct areas: 1) improving containment systems; and 2) setting up rural FSM services that include emptying, transportation, treatment and safe disposal/ reuse of the faecal sludge.

Rural FSM strategy: Key objectives

1. Improving containment systems

- Sensitization of all actors on containment systems
- Ensuring retrofitting/ improvement/ upgradation of poorly built containment systems such as single pits, structures wrongly called septic tanks, etc.
- Ensuring compliance with technical standards of the containment systems in the construction of new toilets and operation of existing toilets

2. Setting up rural FSM services

- Creating a robust regulatory framework and necessary institutional architecture and basic systems to enable the systematic development and management of rural FSM services
- Ensuring adequate and incremental financing to adequately support safe FSM services without human contact, including FSM systems and processes in case of septic tanks and containment tanks and emptying services in case of twin pit pour flush toilets
- Ensuring availability of adequately trained human resources

3. Preventing caste-based manual scavenging

- Systemic efforts to eliminate caste and descent based discrimination and manual scavenging in rural India

Rural FSM strategy: Key objectives

1. Improving containment systems

(a) Building awareness on appropriate containment systems

There is a continuing need for a large-scale sensitisation campaign for households, masons and local government officers on containment technologies, their characteristics, benefits and operation mechanisms. This could be led by the government, building on existing structures, processes and funds of the Swachh Bharat Mission-Gramin (SBM-G). Ideally, these sensitization efforts should be planned based on an in-depth study to understand the drivers of current technology choices. Possible questions for this could be: What drives the preference for septic tanks? Who is shaping that decision? Why are well-constructed twin leach pits not the default designs of choice? What leads to the faulty construction of pit latrines and septic tanks?

(b) Upgrading containment systems

A nation-wide containment technology upgradation drive is needed for:

i. Converting single pit latrines to twin pit, by adding an additional pit
ii. Correcting defective septic tanks (e.g. adding soak pit for discharge, adding the chamber separation wall, sealing the bottom, etc.)
iii. Improving twin pits (e.g. ensuring functional junction chamber, honeycombing or perforations in pit wall, adequate distance between pits, safe distance from water sources, etc.)
iv. Installation/retrofitting of alternative twin pit diversion mechanisms which are easy and safe to install and use, for example SATO V-trap connection system which makes switching between the twin pits easy and safe (as it does not require any physical contact with the outlet pipe for diverting flow into the other pit, and is thus aseptically operated)
v. Improving technologies and replacing leach-pit latrines with appropriate technologies in challenging geographies such as high water table, rocky areas, etc. (example bio toilets, composting toilets, raised toilets, etc.)

Some possible strategies for implementing a drive led by the government for improving containment systems could include:

i. Providing incentives for Gram Panchayat functionaries' involvement and leadership, as part of open defecation free - sustainability efforts
ii. Enabling access to funds, with special provisions for the needy and vulnerable households (banks/self-help groups providing micro loans, self-help groups)
iii. Ensuring availability of service providers and service delivery mechanisms, such as specialised masons, entrepreneurs, efficient supply chains

It is also advisable to include some kind of certification/standards for masons to ensure that they have adequate knowledge/information to construct adequate sub-structures.

(c) Regulation and monitoring

There is a further need for creating and enforcing regulations for faecal containment structures, including aspects such as technical standards- especially ensuring they do not discharge sludge in drains or in open environment, and periodic desludging. There is also a need to initiate and institutionalise monitoring and verification systems linked to Swachh Bharat Mission for:

WaterAid/ Prashanth Vishwanathan

A bio-toilet under construction in rocky terrain of Hahaladdi village, Kanker, Chhattisgarh.

- Including sub-structure details and picture for any toilets under construction
- Including data on sub-structure technology and emptying practices as part of the ODF verification and ODF-sustainability surveys
- Explore monitoring indicators for groundwater contamination , especially in high risk areas, such as high water table and/ or flood prone areas, where groundwater is used for drinking purposes

2. Setting up rural FSM services

(a) Financing options

One of the key elements in developing an organised FSM service framework would be to develop a pathway for financing rural FSM efforts, with provisions for additional support for poor and vulnerable households. Ministry of Drinking Water & Sanitation (MDWS), now known as Jal Shakti Ministry, Government of India, Standing Committee on Rural Development (2017-2018) reports that under provisions of SBM-G fund for Solid Liquid Waste Management (SLWM) – a cap of INR 7 lakh, INR 12 lakh, INR 15 lakh and INR 20 lakh is applicable for Gram Panchayats having up to 150, 300, 500 and more than 500 households respectively, on a Centre and State Governments sharing ratio of 60:40. MDWS has prioritized putting in place SLWM infrastructure in villages as one of the top priorities for the next one-year period. Rural FSM may be prioritized under this scheme.

TABLE 2 Potential sources for financing FSM services in rural areas	
Central Finance Commission (CFC)	Funding for FSM can be drawn from CFC grants to Gram Panchayats[6]
State Finance Commission (SFC)	Funding for FSM can be drawn from SFC grants to Gram Panchayats
MPLAD Scheme Funds	As per the MPLAD scheme, each Member of Parliament can recommend INR 5 crore per annum for development activities in their constituency
RuRBAN	Since sanitation is a key focus area in the National Rurban Mission, funds can be channelized for FSM related interventions
Corporate Social Responsibility (CSR)	As per law, companies with a turnover of INR 1000 crore /INR 500 crore net worth/INR 50 lakh net profit, should spend at least 2% of their three year average annual net profit on CSR related activities

In the meantime, more long-term funding structures should be devised, for setting up and sustaining public FSM services, or supporting and incentivising private delivery of those services, including public-private partnerships. User fees can be levied to offset some of the costs. For instance, this is already happening in many areas for emptying services. However most parts of the chain do not provide enough revenue (let alone in rural contexts) for markets to deliver, so public funding will be necessary, which is also justified by public health externalities.

Additionally, there is need to explore financing options for retrofitting- government could provide funds for critical requirements, while additional requirements could be met through micro-enterprises.

(b) Human resources

The other priority will be to devote necessary human resources and invest in their capacity building. Responsibilities would need to be defined at every level of institutional mechanisms, with skilled human resources for collection, transport and treatment of faecal sludge.

(c) Regulatory framework

There also exists an urgent need for developing a comprehensive national framework for regulating rural FSM- utilising existing mandates, with an adequate institutional architecture setting out clearly the roles, responsibilities and powers over FSM at various administrative levels. With sanitation being a state subject, the responsibility for provision of sanitation facilities in the country primarily rests with states. This makes gram panchayats, the local government bodies in rural areas responsible, while the state and central governments act as facilitators.

The national regulatory framework would need to address the crucial aspects of appropriate and adequate legal and regulatory provisions, and examine whether the local governance institutions have the powers and capacities to adequately introduce and manage FSM, or in other words, to integrate FSM into existing sanitation practices as an essential component. This regulatory framework will need to be

linked with existing provisions for protection of water bodies and the environment. Existing Acts such as Water (Prevention and Control of Pollution) Act 1974 and Environment Protection Act 1986 and Prohibition of Employment as Manual Scavengers and their Rehabilitation Act 2013 will need to be brought within the ambit of such a regulatory framework. The entire chain of collection, transportation, disposal and treatment needs to be looked through the lens of this framework. Existing guidelines for managing faecal waste could also be looked at, such as those in states like Tamil Nadu, Maharashtra, Rajasthan and Jammu & Kashmir, though mainly for urban areas. Also, existing Fertiliser (Control) Order, FCO 2009 and FCO 2013 towards prioritisation of compost quality criteria could be referred in case of reuse, and thereby towards an integration of agriculture within the regulatory framework.

It must be emphasised here that while collection and transportation of faecal sludge is important, it would be equally critical to oversee where the waste is emptied and how it is treated. One way could be that user fee or charges for emptying would only be paid to the service provider after ensuring emptying of faecal sludge in a safe/ designated treatment facility.

All of these would require processes of pilots and research on setting up FSM service models in urban-like rural areas and in rural clusters, at scale. Learning from the experiences in urban areas, a selection of census towns and rural clusters could be used for developing whole chain service models which can provide insights for large scale implementation.

3. Preventing manual scavenging

This will mean putting in place regulations and effective monitoring to ensure that persons from castes linked to manual scavenging are not forced (socially or economically) to continue to do sanitation related jobs – and the lowest paid ones (especially women). This can be done by providing alternative non-scavenging livelihood options, or support to become entrepreneurs through facilitation of micro-enterprises. Finally, there is a need for ensuring statutory compliances by companies, authorities, contractors, sub-contractors and individuals that hire sanitation workers, especially for ensuring safety and dignity of these workers. Such regulations can be better supported by developing Standard Operating Procedures (SOPs) for such engagements.

Integrating water and sanitation provisions through rural utilities – a possible way forward

There is a potential for setting up rural water and sanitation utilities in census towns, or at the district level, with extension of services to densely populated villages that may be close by, and those villages close to national and state highways. This model could be run through a centralised management, but could provide decentralised treatment services.

These utilities could provide a range of services including:

a. Sanitation Services – Investment in FSM services, including collection and transportation of faecal matter, treatment of faecal matter and 'grey water'. It could also ensure recycling/ reuse of treated water/recharge of groundwater or safe release of treated water. Also, it may consider sewer networks, including small bore sewers wherever necessary.

b. Provision of safe drinking water through piped water supply where services would include treatment, pumping, distribution and leakage management.

c. Management of consumer interface for all services.

A critical factor for setting up such a rural utility would be financing for capital expenditure. This requirement could be explored through a combination of various options like:

- Tariffs/user charges – to cover operation and maintenance expenses
- Evidence of a cash-flow to inspire confidence to raise capital. This could be raised through bonds/loans/equity etc.

Experiences from countries such as Uganda suggest that decentralised private operators may not be viable in habitations with population lesser than 5000, in absence of economies of scale.

In this context, for rural utilities to succeed, following factors need to be looked at:

a. Customer base willing to pay for professional services, and the possibility of a state provided subsidy to ensure safe water and sanitation for all

b. Availability of raw water and sludge, for economies of scale

c. Ability to manage the resource – recognise geographical context of resource ability

d. Legislation would be required for setting tariffs. This would be necessary to prevent self-supply (e.g. private tube wells) and safe management of recycled waste

e. Regulation of utility and services provided – ensuring economic, environment and consumer rights

f. Skills – operational, managerial and financial

g. Financing – linked to tariffs and other financial instruments

WaterAid/ Ronny Sen

A twin leach pit toilet under construction in Padhariya Village, Dindori, Madhya Pradesh

TAILORING FSM STRATEGY TO CONTEXT

The strategies for faecal sludge management services need to be tailored to the specific characteristics, and existing sanitation infrastructure in the rural settlement. The table below gives strategies for FSM services for various categories of rural settlements. We have categorized rural habitations based on proximity to urban areas, and population size and density of habitations. Villages in challenging geographies have also been looked at, though there is a possibility of overlap with the other categories. Apart from these, other criteria for categorization of rural settlements may also be explored. Moreover, the technological options suggested below may need to be further refined based on learnings from additional research on this subject, and experiences from pilots.

Type of rural habitation	Characteristics	Sanitation considerations	Containment	Emptying + Transportation	Treatment + Reuse/Disposal
Urban-like rural settlements	Census towns; or very large and dense villages, including those near state or national highways	Prevalence of septic tanks Twin pits not feasible/ adequate	Enforce septic tank regulations	Mechanical emptying by private sector (regulated), with incentives to reach surrounding villages	Faecal sludge pre-treatment followed by feeding into any existing wastewater treatment plant nearby Bespoke faecal sludge treatment plants (co-composting, fuel production, etc.) Co-treatment with greywater in stabilisation ponds
Dense rural settlements	Villages with medium population size, high population density and closely located habitations	Presence of septic tanks Twin pits possibly not feasible/ adequate	Enforce septic tank regulations Twin pit improvements	Cluster areas and explore public-private partnerships to empty and transport faecal sludge	Bespoke faecal sludge treatment plants or stabilisation ponds (as above) Deep row entrenchment
Compact rural settlements	Villages with low population size and density, and closely located habitations	Mix of containment technology options	Enforce septic tank regulations Improvements in existing twin pit latrines	Scheduled desludging by one honey-sucker per block (public) Safe emptying, without caste underpinnings	Deep row entrenchment Identify safe ways to dispose waste in agricultural fields, in coordination with agriculture sector
Sparse rural settlements	Villages with very low population size and density (forest villages or those with scattered habitations)	Mix of containment technologies. Twin pits ideal	Promotion of twin pit latrines, improvements in existing twin pits	Safe emptying, without caste underpinnings	Identify safe ways to dispose waste in agricultural fields, in coordination with agriculture sector
Rural settlements in challenging geographies	High water table, riverbanks, coastal, flood-prone, rocky, remote areas, etc	High cost of safe sanitation services	Improve technologies adequate for specific geography	Context-dependent solutions with intensive external support	Context-dependent solutions with intensive external support

MOVING AHEAD

The toilet coverage was around 39% in October 2014 and now with intensive efforts in SBM (G), more than 618 districts in India have become ODF with a reported toilet coverage of nearly 99.22 % in rural areas[7]. The government is now capitalising on the momentum and has launched Solid Liquid Resource Management (SLRM) interventions in ODF villages, and has also planned pilot of rural FSM services in 23 districts. It is in this context that a comprehensive strategy for rural faecal sludge management becomes imperative. Going ahead, this will provide a lasting solution to the sustainability of all the gains that Swachh Bharat Mission has made.

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[4] https://www.thehindu.com/news/national/only-26-of-rural-toilets-use-twin-leach-pits-finds-survey/article26562002.ece

[5] http://pib.nic.in/newsite/PrintRelease.aspx?relid=133286

[6] It is also important that the 15th Finance Commission continues to focus on SLWM and FSM

[7] https://sbm.gov.in/SBMReport/Home.aspx (accessed on 16th June 2019)

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