State of Knowledge Report on Twin Leach Pit Toilets

Timely inputs to fill knowledge gaps and accelerate implementation of Swachh Bharat Mission Gramin(SBMG)

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ABSTRACT

With the ambitious target of achieving universal sanitation coverage by 2019, Swachh Bharat Mission Gramin (SBM G) has been putting forward a concentrated effort and several States have achieved open defecation free (ODF) status. However, partial usage of latrines and persistent patterns of open defecation particularly among men are a growing concern. The government promoted twin leach pit toilets tend to be perceived as low quality, temporary and undesirable options that do not motivate use. This paper seeks to list some of the barriers and enablers of twin leach pit toilet and presents recommendations for accelerating the implementation efforts of SBM G.

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Introduction and Objective

Despite three decades of programs aimed at improving sanitation, universal sanitation coverage is still a long way to go for India. Some research shows that exposure to a high density of open defecation, which is an important threat to early-life health and human capital accumulation, increased over the past decade (2001-2011).[1] Swachh Bharat Mission Gramin (SBM-G) launched by the Prime Minister on 2nd October 2014, is the largest sanitation programme in the world, covering both rural and urban India. Achieving household and environmental sanitation requires new, sustained hygiene practices on a massive scale, combined with the provision of millions of new facilities. Strong institutional and management arrangements have to be in place to support this transformation[2] Three years hence, SBM G has seen tremendous strides in declaring villages, Panchayats, Blocks, Districts and States[3] into open defecation free living spaces, an accomplishment that is worthy of the times we live in, the urgency of the issue and the concentrated efforts from various sectors. What is crucial at this junction is to take stock of what has been working, what needs improvement and how do we inform knowledge on various themes to promote better practices. One such theme, and the focus of this paper, is to understand the state of knowledge on the twin leach pit toilet.

Methodology

This paper presents a rapid assessment of the state of knowledge on twin leach pit toilet through secondary research, limited primary research and empirical findings of user perceptions and

[1] Dean Spears. "Increasing average exposure to open defecation in India 2001-2011", Rice Institute, 2014. http://riceinstitute.org/research/increasing-average-exposure-to-open-defecation-in-india-2001-2011-download-increasing-average-exposure-to-open-defecation-in-india-2001-2011/ (accessed October 7th, 2017)

[2] WaterAid. Report on India WASH Summit: Solutions for Swacch Bharat, New Delhi, 2015

[3] SBM MIS, Swachh Bharat Mission website, swachhbharatmission.gov.in (accessed October 8th, 2017)

barriers to use these latrines, from three ODF declared and verified Gram Panchayats (GPs) from Telangana. Coordinator, ODF Nellore, SBM from Nellore District in Andhra Pradesh; IEC& HRD Consultant, SWSM from the state of Andhra Pradesh and local leaders from Gram Panchayats in Telangana were interviewed to gather information on the promotion of twin leach pit toilets within SBM G. For the fieldwork, as travel was a constraint, ODF GPs were purposively selected based on proximity and familiarity with the Sarpanch of one of the GPs. This Sarpanch helped gain access to other GPs and enabled a positive environment for discussion on the issue. After initial discussion with Sarpanch, Panchayat secretary and any other GP members on the broad processes within the GP, some of the newly constructed latrines were observed and a family member, (male or female who were present at the house at the time) were primarily asked these questions:

1) Who took the initiative to construct this toilet? (Sarpanch or on their own)
2) Was the toilet being used? If yes, was it being used by all the members?
3) What type of substructure did the toilet have, leach pits or septic tank?
4) If leach pits, were there two pits and did they understand how a junction chamber worked?
5) If septic tank, did it have chambers or was it plastered on all sides?
6) If toilet was constructed for them, did they know the cost of the toilet?

Further, in one of the GPs, a focus group discussion was carried out with members of those households that had a newly constructed toilet (between March and June 2017) on their knowledge of SBM, reasons for constructing toilets, knowledge and perceptions of leach pit toilet technology and septic tanks, and barriers to use these type of toilets. It was made clear to the respondents from all of the GPs that the discussion was merely to gather insights on twin leach pit toilets from a users' perspective and was not a verification exercise.

Limitations

While presenting relevant background information on the knowledge surrounding twin leach pit toilets through secondary research, the recommendations are based on empirical findings from the fieldwork and interviews with few practitioners from Andhra Pradesh and Telangana.

What is the Twin Leach Pit Toilet?[4]

Twin leach pit toilets are WHO approved on-site sanitation measure that cuts across socio-cultural aspects, health and economy, technical function and environment - all factors that determine a sustainable sanitation technology.[5] On one hand it fulfills all sanitary requirements of a toilet and on the other, provides continuous use with minimal maintenance and decomposed waste may be valuable as a fertilizer.

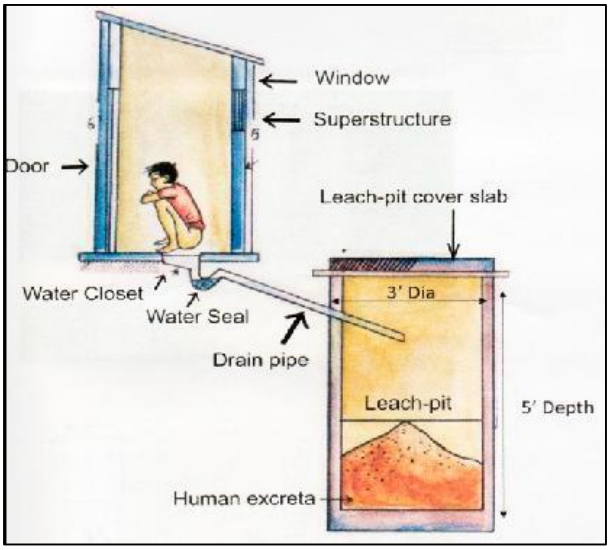

Figure 1 Diagram of a leach pit latrine. Source: Gramalaya toilet models and cost estimates, 2015

It is a low cost, efficient and long-term solution in rural areas when constructed properly and appropriately to local conditions. This type of toilet can be suitable for most areas and can be built with various locally available materials like bricks, rough stones, cement and concrete rings with holes around it. It can be located at any portion of the house and the leach pits can also be placed in any direction of the toilet to accommodate in space available. The toilet pan is connected to the leach pits through a diversion chamber known as a junction box with a facility to divert fecal matter to the pits alternatively. The leach pits may be situated 10-15 meters away from water source to avoid contamination. However, the pits should not be situated in drainage lines, the paths of storm water drains or in depressions where water is likely to collect in order to prevent water from entering the pit which can cause groundwater pollution or destabilize the construction. The pits are either constructed with a porous material, in open-joint brick lines (like a honeycomb, to facilitate the liquid to flow out) or with perforated concrete tubes. It is recommended that the twin pits be constructed 1m apart from each other to minimize cross contamination between the maturing pit and the one in use. If the spacing between the two pits has to be reduced, an impervious barrier should be provided between them. It is also recommended that the pits be constructed over 1m from any structural foundation as leachate can negatively

[4] Gramalaya Individual Household Toilet Type Designs, Engineering Drawings and Cost Estimates", 2015, p. 9. http://www.gramalaya.in/pdf/gramalaya-toilet-models-and-cost-estimates.pdf (accessed on October 4th, 2017)

[5] Ministry of Drinking Water and Sanitation, Government of India "Handbook on Technical Options for on-site Sanitation", 2012

impact structural supports. The full depth of the pit walls should be lined to prevent collapse and the top 30cm should be fully mortared to prevent direct infiltration and to support the superstructure. Moreover, the pits should be covered with a wooden or concrete slab.

As liquid leaches from the pit and migrates through the unsaturated soil matrix, pathogen germs are absorbed into the soil surface. In this way, pathogens can be removed prior to contact with ground water. The degree of removal varies with soil type, distance travelled, moisture and other environmental factors. The bottom of the pit is not plastered and is earthen. Capacity of each pit is normally kept for three years. First pit, after it gets filled up in about three years, is blocked at the junction chamber and second pit is put in operation. The watery part of excreta percolates in soil through the honeycomb or leaching structure. After two years of blockage of the first pit, its contents degrade completely and turn to solid, odorless, pathogen free manure. It can be dug out by beneficiaries and used for agriculture and horticulture purposes. After the second pit is filled, it is similarly blocked and the first pit is put in use again. Thus, alternate use of both the pits provides a long-term solution.

Twin leach pit toilets as a part of a Holistic Sanitation Campaign

Jenkins and Curtis (2005) found in rural Benin that the lack of desire for a toilet, not constraints alone, was the primary reason people chose not to build.[6] Demand generation for a toilet has been a challenge across the country and across several sanitation campaigns. Impact analysis of TSC on Latrine coverage and use through a cross-sectional study in Orissa three years post programme implementation shows that although 88% of toilets constructed were pour-flush latrines, 62% reported that at least one member of the household was using the latrine however less than half (47%) of individuals at these households reported using them all of the time, with 37% of householders reported always practicing open defecation (Barnard et al, 2013). The SQUAT survey (2014) showed that 40% of all households with a latrine provided by the government preferred to defecate in the open.

Many sanitation practitioners and researchers acknowledge that toilet interventions must move beyond building toilets, and instead focus on engaging the social and economic factors that will lead to toilet adoption. Scholars have highlighted that toilet adoption comes from providing the right kinds of toilet designs (Devine, 2009), community involvement (Kar and Chambers, 2008), involvement of the state (Black and Fawcett, 2008), finding locally specific

[6] O'Reilly, K and Louis, E. "The toilet tripod: Understanding successful sanitation in rural India", *Health and Place 29*, (2014): p 44.

solutions (Waterkeyn and Cairncross, 2005) and understanding people's ideas and values around sanitation (Rheinlander et al.,2010; Drangert and Bahadar, 2011). Rheinlander et al (2010) underscored the importance of understanding what sanitation means for the targeted populations, so that interventions may be crafted that are culturally acceptable and positively reinforcing. [7]

State level sanitation campaigns that have been successful under SBM G have been based on evidence that there are specific motivators for toilet adoption. Research shows that, if one or more of eleven toilet- acquiring drives were present, individuals became toilet adopters. These drives related to:(1) prestige;(2) well-being; and (3) restrictions on mobility (e.g. Illness) and (4) desire to increase rental income. Gender, life stage, education, occupation, experience of travel, wealth, and physical and social geography of the village environment were recognized as important influences on/conditions for underlying drives (Reilly, 2014). In well performing states, [8] there has been a confluence of different actors and a holistic approach has been taken up where a statewide action plan is developed to build awareness and knowledge on the importance of safe disposal of waste. West Bengal, Himachal Pradesh, Sikkim, Rajasthan and Chhattisgarh are some of the prominent examples. The campaigns have been centered on dignity, pride, self-respect, and cleanliness and a desire to achieve a unique status for their districts and state in the country.

Community mobilization strategies employed by these states included the use of community led total sanitation tools such as triggering, social mapping, formation of functional committees such as the Nigrani Samithi (monitoring committee) and procurement committees for materials and construction and the good governance aspects such as construction of model toilets highlighting the technology and cost effectiveness of various designs and materials, proactive disclosure of costs and estimates and collective ownership by different actors within the community, have all been successful in helping users construct and use twin leach pit toilets.

[7] O'Reilly, K and Louis, E. "The toilet tripod: Understanding successful sanitation in rural India" p. 44

[8] SBM MIS, Swachh Bharat Mission website, swachhbharatmission.gov.in (accessed October 8th, 2017

Issues related to the use of Twin Pit Toilets

The latrines built under the Total Sanitation Campaign, the Nirmal Bharat Abhiyan, and the Swachh Bharat Mission Gramin (SBM-G) are largely pit latrines, spanning over fifteen years, however, the 2011 census showed that over 70% rural households did not have a toilet.[4] NFHS 4 (2014-2015) data showed that over 63% rural households did not have access to an improved sanitation facility[5]. Although the latrines that are promoted and built by the Indian government are expensive by the standards of other developing countries (SBM subsidizes latrines at Rs. 12,000, a Bangladeshi pit latrine costs around Rs. 3,000), people refer to these latrines as "temporary," "fake," or "kaccha". Very often, people who receive government latrines do not use them for defecation at all; they may repurpose the materials or use the latrine superstructure to bathe or wash clothes.[6]

New research[7] shows that over half of all the toilets constructed under SBM G are twin leach pit toilets, with majority of these toilets being constructed for the economically and socially backward groups. However, the consistent usage of toilets has been a major and growing problem. Some members of a household with a toilet do not use it at all, while others use it only some of the time. This can start as soon as a toilet has been constructed, or may develop over time together with second and third generation problems. This prevents or ends open defecation free (ODF) status. Toilet quality, maintenance and accessibility can be factors, but recent evidence points to mind-sets, social norms and cultural preferences also playing a significant role.[8]

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[4] Coffey et al. "Understanding Open Defecation in Rural India: Untouchability, Pollution, and Latrine Pits", *Economic and Political Weekly Volume 52*, (01.07.2016): p 61.

[5] NFHS 4, published by International Institute for Population Sciences for Ministry of Health and Family Welfare, Government of India, classifies improved sanitation facility as a flush to piped sewer system, flush to septic tank, flush to pit latrine, ventilated improved pit (VIP)/biogas latrine, pit latrine with slab, twin pit/composting toilet, which is not shared with any other household

[6] Coffey et al. "Understanding Open Defecation in Rural India: Untouchability, Pollution, and Latrine Pits" p. 62

[7] WaterAid India. "The State of India's Toilets Report, 2017: Rapid Assessment of Toilet Technology under Swachh Bharat Mission-Grameen", 2017

[8] Chambers, R. and Myers, J. (2016) 'Norms, Knowledge and Usage', Frontiers of CLTS: Innovations and Insights Issue 7, Brighton: IDS

In several places across the country, the mode of implementing a sanitation program has to this date been confined to only toilet construction. The rationale is that the physical asset of a toilet must first be made available in order to enable its use and any communication; motivation aimed at usage comes after. From data gathered through the Ministry of Drinking Water and Sanitation, it can be seen that spending on toilet construction has steadily grown but the spending on information, education and communication (IEC)—the expenditure head for behavior change campaign activities—is much less. In October 2016-17, spending on IEC constituted just 0.8% of the spending on construction of toilets.[9]

All the resources are engaged in ensuring construction targets are met and the message that is communicated to the users is on the monetary incentive and social pressure for the community to be declared open defecation free. With this approach, demand for a toilet becomes a lesser priority and toilets (mostly leach pit toilets) are constructed for people without people's knowledge, consent, understanding of preferences and perceptions. Ms. Sushmitha, Coordinator for the ODF campaign in Nellore District, Andhra Pradesh shared that it was very difficult to convince people of the cost effectiveness of a leach pit toilet. She shared that, "most users feel that the twin pits are too small and will fill easily within six months to a year if all members of the household use it regularly. They are unable to imagine or comprehend the leaching action and perceive that the water (almost 2 liters per use) and fecal matter are together deposited in these small pits, therefore will fill up very fast. However, after several rounds of communication through the Nigrani Samithi and Natural Leaders and masons training to inform and educate on the leaching action of the technology, users have slowly begun to accept the twin leach pit toilet".

Key Findings from Fieldwork

In the state Of Telangana, several districts have been declared and verified ODF. As mentioned in the methodology section, one such district was purposively selected for a rapid assessment of the processes involved and for user perceptions around the types of toilets constructed. Some of the most common and relevant points observed were:

[9] Will Modi's Swachh Bharat Mission meet its target? (2016) http://www.livemint.com/Politics/pB6aRA9swAv62GqHYyzD7O/Will-Modis-Swachh-Bharat-Mission-meet-its-target.html (accessed on October 8th, 2017)

1. It was a Collector driven agenda where targets were set for all the Sarpanch and Panchayat secretaries across the district to ensure toilet construction for all households that did not have one in two months' time. This in turn led to a massive construction drive by the Sarpanch of hiring private contractors to construct toilets according to the type designs shared by the government of a twin leach pit toilet.
2. The skill and knowledge levels of the Sarpanch and ward members engaged in mobilization were weak and limited to simple messages such as toilets are good for their health and dignity of their household. Training was not provided to them and there were no IEC materials visible except for one or two slogans on the wall.
3. In the three Gram Panchayats (GPs) visited, the toilets were all constructed for the households without their involvement. The household member who was present at the time of the visit did not know the actual cost of the toilet constructed. There was no grama sabha or collective resolution to inform the community of the decision to become ODF. Members in one GP in a focus group discussion said that they had not heard of SBM but knew that there was a drive to construct toilets by the government
4. There was a predominant sense of the latrines constructed being a government push that did not allow for households to have a say in the construction design or quality. The users referred to the incentive amount repeatedly as the cost of toilet during group discussion and during field observations and that Rs. 12000 were not sufficient for the type of toilet they wanted
5. All of the households interviewed said that the male members of the household went in the open but usually young girls, women and elderly used the toilet. Even young boys did not use the toilet and preferred to defecate in the open as it was a habit and said to be convenient.
6. Even though the GP was declared ODF, some toilets were not yet being used by anyone in the household as there were some construction flaws such as the pits not being fully constructed or properly closed, door not properly fixed or because the household wanted to wait until a more auspicious time (after a festival for instance).
7. Respondents shared that they preferred a large single pit with several concrete rings (at least 8-10 which would signify a 6-8Ft pit) or a septic tank which is plastered on all sides without chambers that would take a much longer time to fill and felt it convenient to get emptied if needed by calling in a tanker (numbers were available for those engaged in septic tank emptying painted on several walls within the GP).

Figure 2: Picture of a toilet with a fully constructed superstructure without a substructure as hard, rocky area was encountered ***Credit: Author's own***

8. While twin pit toilets are suitable for most places, they may not be suitable for rocky surfaces and high water table areas. This aspect was not known or taken into account when constructing these toilets, as they were largely rocky surfaces in this GP particularly for the newly constructed ones. As it was a contractor driven program and the GP leaders had to meet targets, some households had a fully constructed superstructure without a substructure, as it was impossible to construct leach pits. Figure 2 illustrates this.
9. There was no evidence of a community mobilization drive within these GPs to bring about a change in behavior or to generate demand for a toilet. The messages used by the local leaders were not linked to an understanding of the local needs and perceptions
10. When users asked for any changes during construction, they were informed that they would have to make these changes themselves and pay for it as the government was only providing Rs. 12000 (again referred to as the total cost of the toilet) and that this amount was only sufficient for a particular design. These estimates of materials, dimensions and cost were not shared to the users.
11. As these GPs were close to the city, there were several families that were living on rent. The perception among these households was that the owners frowned upon all members (that is the men and women) using the same toilet so men usually defecated in the open. This was because the leach pits were too small and would fill up easily which would mean emptying by the owners and they did not want that burden. In one such instance as seen in Figure 3, the owner had filled a newly constructed latrine pan with sand and covered it up to discourage use by the tenants. The owner was convinced that she wanted a large single pit that would not fill up for a long time and did not want

the twin pit toilet at all. However, as it was decided that the entire GP would have toilets, she let the construction happen.

12. Row toilets as seen in the pictures below, were constructed for households that had no space or were in rocky areas, however these were not being used or maintained. They were also to be shared by two households for each toilet and there was no discussion on this aspect with the households.

Figure 3: Picture of a newly constructed latrine closed by the owner *Credit: Author's own*

Figure 4: Pictures of row toilets that have been constructed for households with rocky areas. *Credit: Author's own*

13. During the focus group discussion in one of the GPs, members were asked if they had seen or experienced any of the leach pit toilets getting filled up. None of them said that they had actually experienced or seen this happening but on further probing said it was only the septic tank type toilets with fully plastered pits that filled up and had to be mechanically emptied. They had mostly heard from different sources that the small pits of a government toilet fill up fast. They also mentioned that they did not know of toilets that have been in use for several years so did not know about them filling up.

These observations were largely in line with the key findings of formative research in Telangana, Gujarat and Jharkhand to develop appropriate participatory approaches towards WASH in rural areas by the India WASH forum in 2016. Particularly, the findings related to the patterns of open defecation by men despite owning a toilet, lack of knowledge on technical aspects of construction, poor skill levels of Sarpanch and GP members to motivate and mobilize support within the community to achieve SBM outcomes, were similar. In addition, the field observations were also in line with the Summary report on State of India's Toilets

Report 2017 brought forward by WaterAid[10] conducted across eight states, including Telangana. These include, problems related to technologies not suited to the local geography, poor adherence to quality and design parameters, lack of knowledge of the cost as toilets were built for them by the Sarpanch and contractors and lack of technical information on toilet designs and function.

Recommendations

- Political will to go beyond construction targets and focus on demand for a toilet among users and collective ownership to stop open defecation is the necessary prerequisite for successful adoption of low cost toilet models such as the twin leach pit toilets.

- The key finding across various studies is that lack of technical knowledge, poor construction quality and design flaws, coupled with lack of relevant IEC/BCC efforts have led to poor adoption and use of twin leach pit toilets. There is a need to develop interactive and easy-to-understand IEC material moving away from the conventional kind, on the leach pit technology, which can be easily disseminated, to educate and convince users of its benefits and dispel misconceptions.

- Rapid assessment and documentation, as shown in this paper, of processes during construction, usage and post ODF declaration to be taken up by States to understand and manage activities on the ground.

- A comprehensive study on effectiveness of leach pit technology across different soil conditions needs to be taken up

- Anecdotal evidence from Nellore district in Andhra Pradesh and Raipur District in Chhattisgarh show the initiative for sale of decomposed human waste as organic manure. While there is research on the potential for reuse of human waste as manure or fertilizer for agricultural purposes, it needs to be documented further as a livelihood opportunity and a means of motivation for twin leach pit toilet use and adoption.

[10] The State of India's Toilets Report, 2017: Rapid Assessment of Toilet Technology under Swachh Bharat Mission-Gramin, WaterAid India, 2017

- Cross learning between long term users of twin leach pit toilets (such as in Tamil Nadu) may be facilitated to dispel misconceptions around the maintenance aspects

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