

Fall 2017

# Understanding Sanitation Preferences: An Exploratory Study in the Sirohi District of Rajasthan

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*SIT Study Abroad*

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UNDERSTANDING SANITATION PREFERENCES: AN EXPLORATORY STUDY IN THE  
SIROHI DISTRICT OF RAJASTHAN

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Fall 2017

## Acknowledgements

During the beginning of my semester-long study abroad program in India, I read the book *Where India Goes*, which introduced me to the challenge of sanitation in India. In the book's introduction, the authors write that they wrote the book because they have been humbled by a problem that they do not know how to solve.<sup>1</sup>

I too have been humbled. Throughout the course of the semester and this project, I have seen the enormity of this challenge and its immense connections to human health, the environment, and the economy. I am so grateful for having been able to explore a glimpse of it through this independent study project.

That being said, I have many people to thank for their help in making this effort possible. First of all, I would like to thank the SIT staff: Trilochan Pandey, Murari Goswami, Tara Dhakal, Manoj Sain, and Awadhesh Aadhar for their constant willingness to help. My thesis advisors Dr. Keith Warner, OFM and Dr. Michele Parker also supported me with this work from many many miles away back in the States, and I would like to thank them for their patient support and words of wisdom. I would also like to thank my host organization, Jan Chetna Sansthan and Richa Audichya for their kindness in hosting me and supporting my research endeavors. I am in awe of the steadfast work that they are doing at JCS. Finally, I would like to thank Itika Goyal and her team at Tata Trust / Centre for Microfinance, as well as Rushabh Hemani, and Zahir Abbas of UNICEF Jaipur for constantly facilitating connections for my research. Without them, this work would not have been made possible.

Finally, I want to acknowledge the many people who were willing to talk to me, an outsider, on their thoughts and beliefs on sanitation. I am humbled to be able to share some of their voices with you.

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<sup>1</sup> Diane Coffey and Dean Spears, *Where India Goes* (India, HarpersCollins: 2017), 22.

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## Glossary of Abbreviations and Non-English terms

Below-poverty-line (BPL) = economic benchmark used by the government of India to identify households in need of government assistance

Biodigester = toilet that digests organic waste matter through bacteria

Centre for Microfinance (CMF)

Community resource person = community worker employed by the Centre for Microfinance to educate people about health topics like sanitation, early initiation of breastfeeding, and maternal nutrition

Dalit caste = member of lowest caste grouping in India; also known as the “untouchables”

Hamlet = small settlement of houses, generally smaller than villages

Jan Chetna Sansthan (JCS)

Kaccha/i = a term used to describe housing structures made of less permanent materials, like mud or earth

Gram panchayat = administrative unit classification in India; areas are defined by state, district, block, panchayat, ward, and village

Mahatma Gandhi National Rural Employment Guarantee Act (MGNREGA) = an Indian labour law providing at least 100 days of wage employment per year for households in rural areas

Swachh Bharat Mission (SBM) = a campaign aiming to end open defecation in India by 2019

Pakka/i = a term used to describe housing structures made of more permanent materials, like cement or wood

Pradhan = village leader

Rupee (Rs) = the Indian currency; at the time of writing, 1 US Dollar equaled 64.48 rupees

Sarpanch = head of the panchayat

Secretary = non-elected representative appointed to oversee panchayat/block/ward activities

Self-help group = informal groups of people who gather to improve their living conditions, typically through collecting and pooling savings from each member in the group

Superstructure = the outside walls of a toilet

Sub-structure = the inside components of a toilet, including the pit, pipes, and pan

Toilet pan = the bowl of the toilet for squatting on

Vermicompost = term used to describe composting using worms

Ward panch = elected ward representative

Water, sanitation, and hygiene (WaSH)

## Abstract

*Of all the countries in the world, India has the highest number of people practicing open defecation, causing adverse health outcomes from the unconfined spread of faecal matter. The Government of India is ambitiously aiming to end this practice through the construction of 12 million toilets by 2019, but historically, many toilets across India have gone unused. This study focused on understanding: (1) the reasons why people continue to openly defecate despite having toilets and (2) the requirements of a toilet that rural households would be willing to use. Along with 36 observations of household toilets, semi-structured group (n=8) and individual interviews (n=40) were conducted with community members, government officials, and NGO workers in a tribal and water-scarce area of Rajasthan, India where the government had built toilets that were mostly being unused. Through analysis of descriptive statistics and common themes raised through interviews, findings showed that these government toilets were often poorly constructed and inconvenient to use. Participants expressed the desire for an odor-free latrine that required little water, was large enough to comfortably sit in, and wouldn't fill up quickly. At the same time, misconceptions regarding latrine usage also persisted. There thus exists a need for an affordable toilet design addressing these specifications, along with educational awareness campaigns to correct these misconceptions.*

## Introduction/Background

Open defecation is the practice of going out to defecate in open fields, railway tracks, garbage dumps, parks, and roadside ditches rather than using a toilet. According to the World Health Organization, approximately 892 million people worldwide defecate in the open, with 564 million of these people living in India.<sup>2</sup>

The practice of open defecation is a cause for concern because it spreads bacterial, viral, and parasitic infections like diarrhea, polio, cholera, and hookworm. Particularly, diarrheal-related diseases are of note because they are the third leading cause of death in India.<sup>3</sup> Furthermore, children weakened by frequent episodes of diarrhea are also more vulnerable to malnutrition, stunting, and other diseases due to a weakened immune system and an inability to absorb adequate nutrients.<sup>4</sup> This leads to child stunting, which has been associated with reduced learning in schools and adult economy productivity.<sup>5</sup> Combating the practice of open defecation is therefore imperative to improving short-term and long-term health outcomes for both children and adults.

The burden of open defecation is particularly enormous in India. Over half the population continues this practice; additionally, as the world's second most populated country, India has a population size of over 1.3 billion people. The high population density of the country creates an added burden for adverse health effects due to open defecation, as germs from fecal matter are more easily transmitted in highly dense environments.<sup>5</sup>

With the immense health, environmental, and economic burdens that poor sanitation poses, the Government of India has undertaken a long history of efforts to reduce open

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<sup>2</sup> World Health Organization, "Sanitation," last modified July 2017, <http://www.who.int/mediacentre/factsheets/fs392/en/>.

<sup>3</sup> Institute for Health Metrics and Evaluation, "India," last modified 2016, <http://www.healthdata.org/india>.

<sup>4</sup> Diane Coffey et al, "Understanding Open Defecation in Rural India: Untouchability, Pollution, and Latrine Pits," *Review of Rural Affairs* 11, no. 1 (January 2017).

<sup>5</sup> Coffey and Spears, *Where India Goes*, 128-155.



defecation. These include the Central Rural Sanitation Programme (1986), the Total Sanitation Campaign (1999), the Nirmal Gram Puraskar (2003), the Nirmal Bharat Abhiyan (2012), and the current Swachh Bharat Abhiyan, or “Clean India” Mission (2014).<sup>6</sup> This initiative aims to create a cleaner India by improving hygiene, sanitation, and waste management practices and infrastructure, “improving India’s dignity” by ensuring that public spaces are not littered with garbage and homes have access to a toilet. By the 150th anniversary of Mahatma Gandhi’s birthday in 2019, Prime Minister Narendra Modi has boldly pledged to eliminate open defecation through the construction of 12 million toilets.<sup>7</sup>

### *The issue of unused toilets*

At the same time, large numbers of toilets across India have been constructed but remain unused. In 2013-2014, researchers at the Research Institute for Compassionate Economics (r.i.c.e) conducted an independent survey of Sanitation Quality, Use, Access, and Trends (SQUAT) in 3,235 households in rural areas of the Indian states of Bihar, Madhya Pradesh, Rajasthan, Uttar Pradesh, and Haryana.<sup>8</sup> Through their survey, they found that over 40% of the households they sampled had working latrines but nevertheless had at least one family member defecating in the open.<sup>9</sup>

To better illustrate this issue, r.i.c.e. researchers Diane Coffey and Dean Spears detail the case of Sohni Devi, a resident in western Uttar Pradesh who had a working latrine in her household but didn’t use it. Out of all her household members, including her husband and mother-in-law, no one but her two small children, aged five and seven, used the toilet and were using it temporarily until they were old enough to go out and defecate on their own. When asked

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<sup>6</sup> Somenath Kar and Biswaranjan Mistri, “Availability of Toilet Facility and its Use and Misuse in Bikrampur Gram Panchayat, Simlapal C.D. Block, Bankura, West Bengal,” *International Journal of Innovative Research and Advanced Studies* 4, no. 5 (May 2017).

<sup>7</sup> *Guidelines for Swachh Bharat Mission*, Report, Ministry of Housing and Urban Affairs, Government of India, last updated August 2017, accessed October 2, 2017, [http://www.swachhbharaturban.in:8080/sbm/content/writereaddata/SBM\\_Guideline.pdf](http://www.swachhbharaturban.in:8080/sbm/content/writereaddata/SBM_Guideline.pdf)

<sup>8</sup> Diane Coffey, et al., “Revealed Preference for Open Defecation: Evidence from a New Survey in Rural North India,” *Economic & Political Weekly* 49, no. 38 (September 2014): 43-59.

<sup>9</sup> Coffey and Spears, *Where India Goes*, 43.

why, she did not use the latrine, she commented, “The pradhan (village leader) made this [latrine]. If we’d made it, we’d have made it the way we wanted.”<sup>10</sup>

Sohni Devi’s statement begs the question: what kind of toilet would Indian households be willing to use? In a guide on designing effective sanitation programs, the World Bank writes that toilet adoption comes from providing the right kinds of toilet designs.<sup>11</sup> To ensure that the Swachh Bharat Mission’s efforts are not wasted on building toilets that people do not use, it is imperative to consider individual preferences and beliefs when trying to promote safe sanitation. However, in the current pool of literature, no studies have specifically looked at the toilet design preferences of rural Indian households. Given this current gap in knowledge, this study aims to explore the design specifications of a minimally usable toilet for households in the Sirohi district of Rajasthan.

## Literature Review

### *Motivators and Barriers to Toilet Usage*

As mentioned previously, no studies have specifically focused on looking at the toilet design preferences of rural households. However, several studies have examined various motivators and constraints to toilet usage, which is an important gateway to understanding the preference for certain toilet designs. In 2014, O’Reilly and Louis interviewed 600 households in rural West Bengal and Himachal Pradesh to understand the political, economic, and environmental factors influencing toilet adoption. They found that individual motivations to build and use toilets had more to do with comfort, convenience, status, privacy, and dignity rather than perceived public health benefits.<sup>12</sup> Similarly, when Routray et al. conducted 12 focus

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<sup>10</sup> Coffey and Spears, *Where India Goes*, 65-66.

<sup>11</sup> Jacqueline Devine, “Introducing SaniFOAM: A Framework to Analyze Sanitation Behaviors to Design Effective Sanitation Programs,” Working Paper, Water and Sanitation Program, 2009.

<sup>12</sup> Kathleen O’Reilly and Elizabeth Louis, “The toilet tripod: understanding successful sanitation in rural India,” *Health and Place* 29 (2014): 43-51.

groups in rural Odisha villages, they also found that common reasons for choosing to own a latrine also included convenience and privacy, dignity and status, disgust at seeing feces, and safety for women.<sup>13</sup> This suggests that toilets are built for convenience or security purposes rather than for purposes of promoting good health.

Other studies provide a deeper understanding of the value of a toilet in rural households. In 2017, Banerjee, Banik, and Dalma measured the preference for toilets over 20 other household items, including electric fans, televisions, refrigerators, and mobile phones by using data from the last National Family and Health Survey (NFHS-3).<sup>14</sup> They found that toilets only ranked 12th in priority, signifying that toilets are not yet seen as an essential household item. However, toilets do appear to signal status and wealth. In O'Reilly's study of a German-funded, Indian-operated drinking water supply project in northern Rajasthan, she noted that latrines were often proudly spoken of by villagers as something made available to guests, though fieldworkers would remind families with toilets that they should be used by all household members.<sup>15</sup> Therefore, toilets appear to serve as a symbol of status and pride rather than a basic household necessity.

If latrines therefore convey upward social mobility, there may be certain characteristics that a latrine must have in order to convey status in a community. This hypothesis has been hinted in past studies, as it has been proposed that rural Indians have a unique concept of the minimal requirements of an acceptable latrine. In the SQUAT survey undertaken by researchers from the Research Institute for Compassionate Economics (r.i.c.e), over 78% of respondents who did not have a latrine cited cost as an important factor for why they still practiced open defecation, despite the Rs 12,000 incentive. In their survey, they asked respondents to describe

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<sup>13</sup> Parimita Routray et al., "Sociocultural and behavioral factors constraining latrine adoption in rural coastal Odisha: an exploratory qualitative study," *BMC Public Health* 880 (2015).

<sup>14</sup> Anurag N. Banerjee, Nilanjan Banik, and Ashvika Dalmia, "Demand for household sanitation in India using NFHS-3 data," *Empire Econ* 53(2017): 307-327.

<sup>15</sup> Kathleen O'Reilly, "Combining sanitation and women's participation in water supply: example from Rajasthan," *Development in Practice* 20, no.1 (2010).

the features of a usable latrine, and the amount of money each of those components might cost. On average, the latrines described cost more than Rs 21,000, far more than the Rs 12,000 incentive amount allotted through the Swachh Bharat Mission. Comparatively, a similar survey conducted in Indonesia showed that an acceptable latrine only cost around Rs 4,492.<sup>16</sup> Similarly, other studies by O'Reilly and Louis, Routray et al., and Pattanayak et al. found that common constraints for toilet adoption included cost and lack of available credit, despite the availability of affordable toilet models.<sup>17,18,19</sup> The need to better examine what exactly constitutes a desirable and acceptable toilet in rural India emerges out of these studies.

### *Toilet Design*

To determine the characteristics of toilets preferred by rural Indian households, it is necessary to understand the types of technologies currently available and the current messaging regarding the merits of each toilet design. In a technical brief, the Ministry of Drinking Water and Sanitation outlines four main types of toilets in India: (1) dry pit latrines, (2) pour flush latrines, (3) septic tank toilets, and (4) ecotoilets. A dry pit latrine is the simplest sanitation solution, which consists of a squatting platform where waste travels down into a pit. A pour-flush latrine is similar to a dry pit latrine, but uses around two liters of water for flushing per use. In non-water scarce settings, this toilet design is optimal since it incorporates a plastic u-bend pan which creates a water seal, preventing bad odor and flies. This design can contain a twin-pit model, where two pits are used alternately. Once one pit fills up, typically in about 3 years, it is blocked at the junction chamber and the second pit is put into use. Inside the pit, the watery component of human waste percolates into the soil through the unique “honeycomb” shape of the

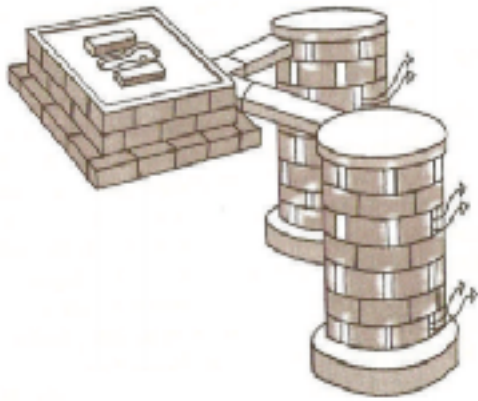
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<sup>16</sup> Coffey et al, “Revealed Preference for Open Defecation,” 48.

<sup>17</sup> O'Reilly and Louis, “The toilet tripod,” 43-51.

<sup>18</sup> Routray et al., “Sociocultural and behavioral factors.”

<sup>19</sup> Subhrendu K Pattanayak et al., “Shame or subsidy revisited: social mobilization for sanitation in Orissa, India,” *Bull World Health Organ* 87 (2009): 580-587.



**Figure 1: Diagram of a twin-pit toilet<sup>21</sup>**

pit. By the end of two years, or by the time that the second pit is full, the waste inside the first pit is semi-solid, free from odor and pathogens, and can be safely removed and used for fertilizing purposes (Figure 1). Finally, a septic tank toilet diverts waste into a septic tank or water closet, where it is treated through a central sewer system.<sup>20</sup> However, this type of design may not be recommended for low-resource settings, as only

232 out of 5000 towns in India were connected to a central sewer system in 2007, and sludge from a septic tank can pose large environmental and health concerns if treated inadequately.<sup>21</sup> Lastly, an ecotoilet performs the anaerobic biodigestion typically done by septic tanks within each singular toilet unit. Rather than transporting waste to an alternate location for proper treatment, these activities are performed internally through the help of various bacteria or worms and the resultant product can be sold to farmers as manure.<sup>22</sup> However, these technologies are typically more costly than traditional toilets.<sup>23, 24</sup> Currently, the Swachh Bharat Mission is recommending a twin-pit pour flush latrine model due to its affordability and practicality for safe waste removal, and other experts agree with their recommendations.<sup>25, 26</sup>

However, an independent survey undertaken by r.i.c.e. has shown that only 2.5% of households are actually using this design.<sup>27</sup> In the households that they surveyed, the researchers

<sup>20</sup> *Handbook on Technical Options for On-Site Sanitation*, Report, Ministry of Drinking Water and Sanitation, Government of India, May 2012.

<sup>21</sup> Niall Boot, "Types of Toilet and Their Sustainability," Technical Brief, Practical Action, 2008.

<sup>22</sup> *Handbook on Technical Options for On-Site Sanitation*, Ministry of Drinking Water and Sanitation.

<sup>23</sup> Sanjay Banka, Phone Interview, 26 Sept 2017.

<sup>24</sup> *Banka BioLoo - Sustainable Sanitation*, Report, accessed 10 Nov 2017.

<sup>25</sup> *FAQ on Twin Pit Toilet*, Report, Ministry of Drinking Water and Sanitation, Government of India.

<sup>26</sup> Coffey and Spears, *Where India Goes*.

<sup>27</sup> Coffey, et al., "Revealed Preference for Open Defecation," 43-59.

found two major design factors: pit size and method of waste removal, which majorly differed from the guidelines promoted by the Government of India. In their study, the median size of a privately constructed latrine pit was around 23 cubic feet, nearly seven times deeper than the government's recommendations for a family of five. The researchers hypothesized that the large ideal size of latrine pits has to do with miseducation regarding the length of time it takes for the pits to fill up, as well as an overlying fear of having to dispose of the waste inside the pits. In India, waste removal has long been associated with untouchability and manual scavenging (the removal of human feces by hand) since it is an activity that has been historically attributed to the Dalit caste. Technically, manual scavenging has been banned since 1993 in certain states of India, and in all of India since 2013, but a large degree of stigma still persists regarding the activity of feces removal.<sup>28</sup> Thus, the r.i.c.e. researchers uncovered some critical toilet design factors that this study sought to further understand.

### *Study Site*

The Indian state of Rajasthan was initially chosen as this study's focus due to its historical lag in toilet adoption compared to other regions of India. In 2012, the government commissioned a comprehensive baseline survey (BLS 2012) which showed that access to sanitation in rural Rajasthan was 27.2% compared to 38.7% in the rest of rural India. In 2012, UNICEF also conducted a validation exercise over seven districts of Rajasthan, finding that 27.3% of households had access to household latrines, with 85% of them actually being used for their intended purpose. As of March 2017, 55% of the gram panchayats in Rajasthan had become considered open-defecation free, but the state faces challenges with water scarcity in the northern desert areas and predominately tribal southern semi-desert districts.<sup>29</sup>

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<sup>28</sup> Coffey and Spears, *Where India Goes*, 68-77.

<sup>29</sup> *Rajasthan Sanitation Journey 2011-2017*, Report, UNICEF, 2017.

Additionally, tribal populations pose a unique challenge for sanitation. Making up approximately 8.2% of India's total population (2011 Census), these groups are the original inhabitants of the land but have been historically exploited for land, labour, and natural resources. Today, 573 of these communities are recognized by the government as "Scheduled Tribes" that are eligible for special benefits and reserved seats in legislatures and schools, but high levels of poverty, low literacy rates, and poor health indicators still remain.<sup>30</sup> Sanitation promotion in the southern tribal areas of Rajasthan has been difficult due to geographical isolation, making outreach and transport of supplies difficult. Furthermore, open spaces for defecation are common in hilly tribal areas, diminishing the need for a toilet, and water scarcity makes usage of toilets difficult. Invoking conventional motivators like shame and pride for poor sanitation has also been reported to be not as effective with these populations.<sup>31</sup>

This study took place in the Sirohi district of southern Rajasthan, a semi-desert and hilly district in the southwestern part of Rajasthan that is the state's third smallest district after Dungapur and Banswara (Figure 2). Since 4 of the 5 blocks of the district: Abu Road, Pindwara, Sheoganj, and Sirohi had been declared open-defecation free, it was assumed that there would be many households with toilets to interview about their design preferences.<sup>32</sup> Field research was conducted closely with the facilitation of Jan Chetna Sansthan (JCS), a tribal, rural, and women's development NGO that has been working in the area for 22 years. In the Abu Road block where JCS focuses its work, 63.5% of the population is of the Garasia, Bhil or Meena tribes.<sup>33</sup>

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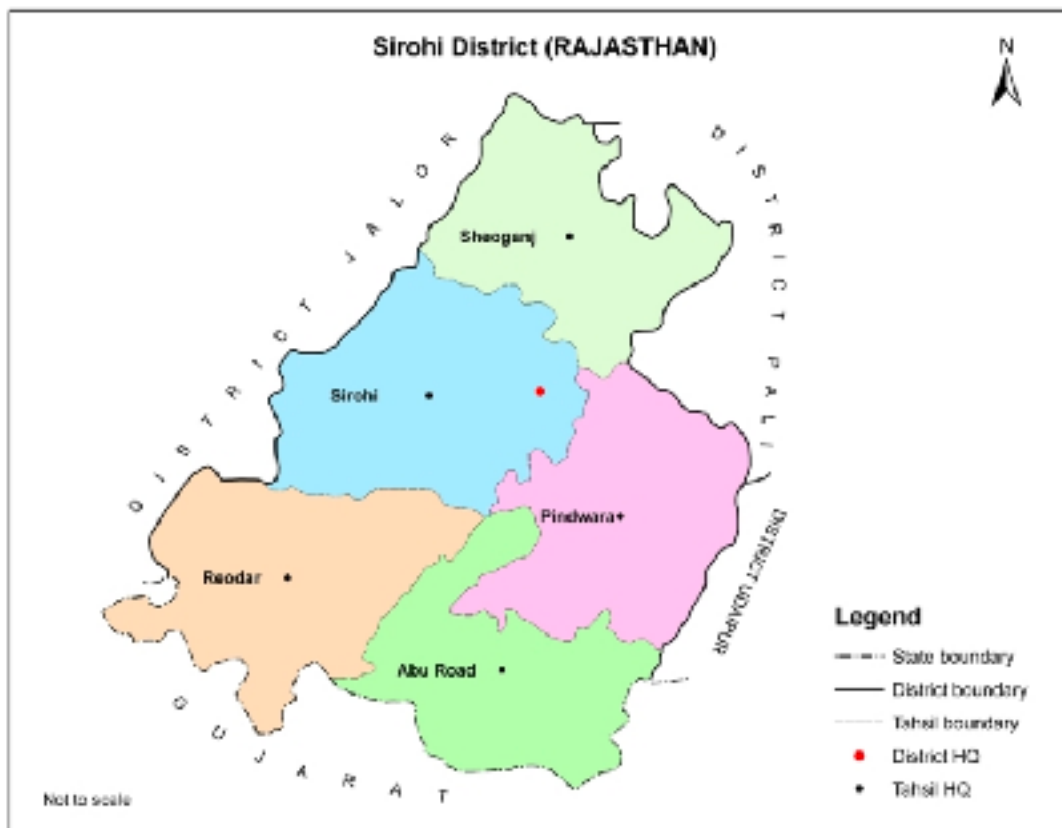
<sup>30</sup> Virginius Xaxa, "Protective Discrimination: Why Scheduled Tribes Lag Behind Scheduled Castes," *Economic and Political Weekly* 36, no. 29 (July 2001), 2765-2772.

<sup>31</sup> *Rajasthan Sanitation Journey 2011-2017*, UNICEF.

<sup>32</sup> *Status of Declared and Verified ODF Villages*, Report, Ministry of Drinking Water and Sanitation, 2017.

<sup>33</sup> *JCS at a Glance*, Jan Chetna Sansthan, accessed Nov 9, 2017.

According to the NGO, many of the villages in these areas still lack basic amenities like safe drinking water, electricity, and health services. Though forestry has historically been the main source of tribal livelihood, agriculture has emerged as the primary source of occupation. However, due to depletion of natural resources, people face livelihood insecurity and often migrate to the cities in search of labour. In response to these issues, Jan Chetna Sansthan believes in educating people about their rights and has been working on building community-level capacity through village groups in 85 villages, elected women representatives, and self-help groups.<sup>34</sup>



**Figure 2: Map of Sirohi district.**<sup>35</sup>

<sup>34</sup> *JCS at a Glance*, Jan Chetna Sansthan.

<sup>35</sup> National Resource Cell for Decentralized District Planning, accessed Nov 9, 2017, [http://www.nrddp.org/District\\_link.aspx?id=Sirohi&state1=Rajasthan](http://www.nrddp.org/District_link.aspx?id=Sirohi&state1=Rajasthan).



Field visits to villages were also aided by the Center for Microfinance (CMF), a subsidiary organization of Tata Trust that has been working on water and sanitation programs in the area. Since the 1990's, CMF began as a resource organization providing livelihood training to self-help groups, but started focusing on health, education, and water, sanitation, and hygiene (WaSH) to further improve the quality of life in the area. CMF has a three-fold model of increasing access to WaSH tools, employing behavioral change tools, and building local entrepreneurial capacity in the area. In the Abu Road and Pindwara blocks of Sirohi, they have worked on increasing safe drinking water supply, holding sanitation and hygiene awareness programs, and creating sanitation financing for households through loans.

With the help of these two NGOs, this study first focused on understanding (1) the current state of sanitation in the community, and then delved further into (2) the reasons why people continue to openly defecate despite having toilets and (3) the requirements of a toilet that rural households would be willing to use.

## Methods

Mixed methods were employed to delve into the research questions presented above, as shown in Table 1. Overall, semi-structured group (n=8) and individual interviews (n=40) were conducted with community members, government officials, and NGO workers over the course of two weeks. To understand the current state of sanitation in the community, individual interviews were conducted with NGO workers and government officials using a semi-structured interview guide to triangulate responses. In group and individual interviews, questions were divided into three major themes: (1) community or individual sanitation practices, (2) sanitation beliefs, and (3) toilet design preferences. Additionally, observation of 28 household toilets was performed using a structured observational guide to understand toilet history, usage, and design type. Finally, visits to an eco-toilet manufacturing facility in Alwar, Rajasthan and a World Bank-sponsored park showcasing different models of toilets in Pali, Rajasthan were undertaken to better understand suitable toilet designs for rural populations in Sirohi. A full listing of interview questions is found in the Appendix.

**Table 1:** Research questions and research methods for collecting data to answer each question.

<b>Research Questions</b>	<b>Methods</b>
What is the current state of sanitation in the community?	Individual interviews with NGO workers, key community leaders, government officials, and group interviews with community members
What are motivations and barriers to toilet usage?	Individual and group interviews with community members
What are the design specifications of a minimally usable toilet?	Individual and group interviews with community members

## *Ethics*

To uphold the decision-making ability of each individual, consent was obtained before each interview and observational visit. Brief background on the study was provided, and participants were informed of their ability to skip any of the questions or discontinue the interview at any time. Participants were also told that there were no rewards for participating or costs of withdrawing for the study; however, several participants still requested help in obtaining improved water or sanitation infrastructure. Though this statement was reiterated, some participants may have skewed answers, believing that there would be special rewards, such as increased sanitation investment in the community, as a result of their responses.

To protect the privacy of all interviewees, names were kept anonymous, especially due to the increased consequences for those practicing open defecation under the current Swachh Bharat Mission (SBM). In certain parts of Rajasthan, extreme penalties such as the disconnection of local power supply and the denial of work under the Mahatma Gandhi Rural Employment Guarantee Act (MNREGA) have been instituted for those not owning toilets.<sup>36</sup> For the purposes of security, all names mentioned in this study do not indicate the real name of the interviewee. Additionally, questions in the interview guide were specifically worded to avoid directly asking a person whether he/she practices open defecation. At the same time, due to the pressure of SBM, it is also fully possible that respondents may have falsely answered questions regarding open defecation practices. To combat this, when interviews were conducted at households, answers regarding toilet usage were triangulated with toilet observation with the permission of the owner. Permission was also requested before taking any photographs, and the full script used to request consent from interviewees is provided in the Appendix.

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<sup>36</sup> “Using Threats, Arrests, and Benefit Cuts, Rajasthan is Pushing Through the Swachh Bharat Mission,” *The Wire*, 7 Sept 2017, <https://thewire.in/174871/rajasthan-swachh-bharat-open-defecation/>

### *Sampling Method*

10 villages in the Abu Road (n=6) and Pindwara (n=4) blocks were visited over the course of two weeks. These villages were selected randomly by accompanying JCS staff on field visits. Additionally, several villages in the Pindwara block were recommended by CMF, and were visited with the assistance of field workers. Within villages, interviewees were recruited through a snowball sampling method, in which interviewees are recommended by other participants or contacts, creating a “snowball effect.” Typically, interviewees were community members known by the NGO or households recommended by community leaders.

This sampling design was largely based on the availability of the two NGOs as well as those present when were in the village. Furthermore, due to the difficulties of finding transportation to villages, areas visited were typically within walking distance (3 km) of town areas, as shown by the map in Figure 3. Ultimately, these methods have distinct limitations, as this is by far not a representative sampling of the 78 villages in Abu Road and 96 villages in Pindwara.<sup>37</sup> However, for the purposes of an exploratory study, these methods were considered most feasible for the limited time frame of conducting this study.

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<sup>37</sup> *Status of Declared and Verified ODF Villages*, Ministry of Drinking Water and Sanitation.



Label	Village	Gram Panchayat	Block	Date(s) Visited
A	Kkharwala	Kacholi	Pindwara	18/Nov
B	Umarni	Kyariya	Abu Road	19/Nov, 20/Nov
C	Santpur	Satpur	Abu Road	17/Nov
D	Chandela	Chandela	Abu Road	21/Nov
E	Talwaron Kanaka	Ganka	Abu Road	24/Nov
F	Ganka	Ganka	Abu Road	25/Nov
G	Kantal	Ajari	Pindwara	1/Dec
H	Dhanga	Varli	Pindwara	1/Dec
I	Bahadurpura	Bahadur	Abu Road	5/Dec
J	Siwera	Siwera	Pindwara	6/Dec

**Figure 3: Map of villages visited in the Abu Road and Pindwara blocks. A legend denoting the names of villages is shown above.**

## *Data Analysis*

Recordings of each interview were taken and analyzed afterwards with the help of a translator. In order to best triangulate responses across all interviewees, answers to questions in the semi-structured interview guide were noted down after interviews. For closed-answer questions (yes/no), descriptive statistics were compiled and can be referenced in the Appendix. Within group interviews, individual responses to closed-answer questions were also included in the statistical analysis. For open-ended questions, common themes across all interviews were grouped and categorized. To provide a fuller understanding of the sanitation context in these villages, qualitative case studies were also compiled to give better voice to certain perspectives.

Not all questions were able to be asked in every interview; interviews varied in length and content depending on the context. Additionally, due to the language barrier and need for a translator, it is possible that questions and responses may have been inaccurately worded. Accordingly, the data represented is neither representative of all the interviewees in this study nor the Sirohi district, but is shown for the purpose of descriptive statistics. Nevertheless, this study gives some voice as to the characteristics of a toilet that would be desirable in rural India.

## Findings

### *Demographic Information*

#### *Individual Interviews*

In total, 40 individual interviews were conducted. These included interviews with community members (n=21), community leaders (n=7), government officials, (n=6) and NGO workers (n=6). Of the 21 community members interviewed, most were farmers (10), manual laborers (6), storeowners (3), masons (1), cattle-owners (1), factory workers (1), or housewives (1). Often, respondents had multiple sources of revenue, such as farming and manual labour,

or farming and owning a small store. A total of 13 females and 8 males from the community were interviewed. In general, questions about caste or tribal affiliation were not asked; however, 6 out of the 10 villages visited were considered scheduled areas.<sup>38</sup> Interviews with community leaders included sarpanches, ward leaders, community resource persons, and secretaries, as well as government officials at the district, block, and panchayat levels. Finally, NGO interviewees included employees at Jan Chetna Sansthan and the Centre for Microfinance. A full list of details regarding interviewees is included in the Appendix.

### *Group Interviews*

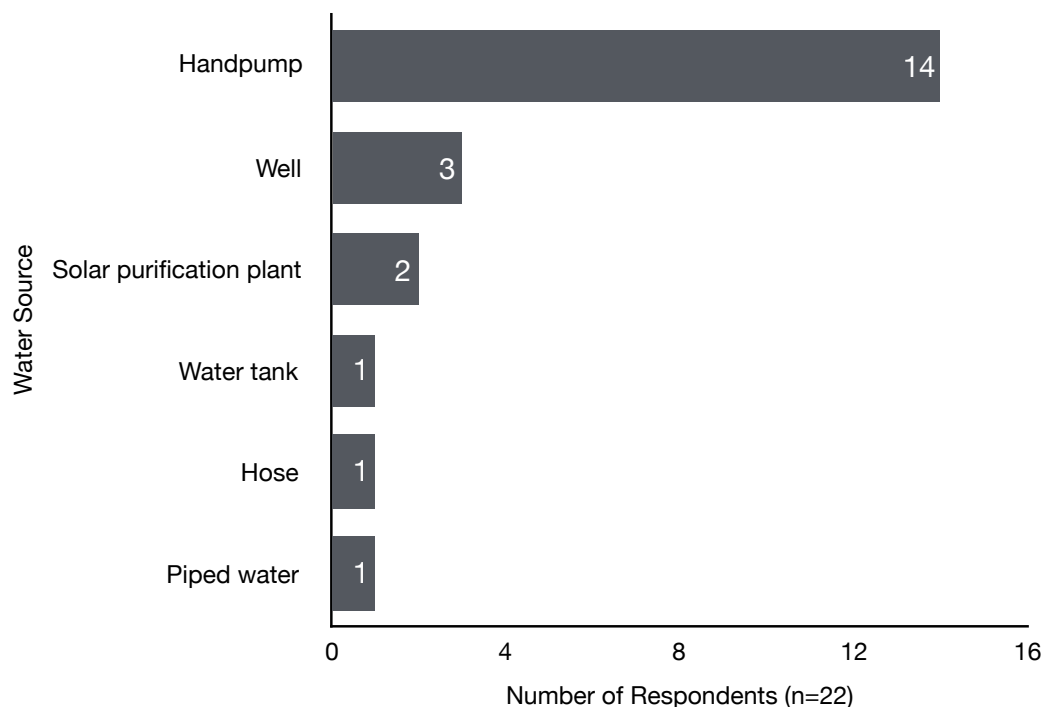
Group interviews were conducted at various events, such as community trainings, self-help group meetings, and government scheme registration sessions, held by Jan Chetna Sansthan. Most of the respondents were women, since Jan Chetna Sansthan focuses on women's empowerment in tribal communities. Though group interviews rarely produced comprehensive responses to all interview questions, they provided greater insight as to the dynamics within a community. When men were present in group interviews, women often remained silent and covered, according to traditional Rajasthani practices. In group interviews of all women, elderly women were allowed the loudest voices in the conversation. Despite these limitations, group interviews typically provided a good launching point for identifying candidates for individual interviews and household observations. A full list of details regarding group interviewees is listed in the Appendix.

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<sup>38</sup> Richa Audichiya, Personal Interview, Jan Chetna Sansthan, Abu Road, 17 Nov 2017.

### *Water and Sanitation Practices*

People generally obtained water from hand-pumps or wells; piped water was uncommon (Figure 4).<sup>39,40,41</sup> Water was generally available in central areas, but harder to obtain in hamlets. In some villages, solar purification plants were available, where water could be obtained at a low cost, typically 1 Rs for 5 liters. Fluoride contamination of water was considered an issue in some areas, such as the Umarni and Sivera villages. In these cases, people would use the hand pumps or wells located nearby their homes for washing clothing or other household tasks, but would walk further to obtain clean drinking water. People would also sometimes walk further to obtain better-tasting water. To reach water sources, respondents generally walked an average of 7 minutes, though walking distances ranged anywhere from 1 to 30 minutes (n=17).



**Figure 4: Common sources of water for interview respondents.**

<sup>39</sup> Richa Audichya, Individual Interview, Jan Chetna Sansthan.

<sup>40</sup> Itika Goyal, Individual Interview, Centre for Microfinance, Sirohi, 21 Nov 2017.

<sup>41</sup> Kailash, Individual Interview, Jan Chetna Sansthan, Pindwara, 18 Nov 2017.



Of those who practiced open defecation (n=20), 5 stated that they went near a river or other water source. When asked about whether this would contaminate water sources, Menu Bai, an elderly woman and former community leader of Talwaron Kanaka Village stated that this wasn't a concern, since the villagers did not use the water from the river, but brought their own water from a nearby well.<sup>42</sup> Children or infants who were too small to walk to areas for open defecation simply defecated anywhere in the house; family members would later pick up the faeces and throw them near the river. For those who quantified the distance that they traveled for open defecation, there was an average of a 13 minute walk, ranging from 1 to 30 minutes (n=9).

### *Sanitation Beliefs*

When asked whether open defecation was good or bad for health, most respondents (6 out of 9) admitted that it was not good for health. Menu Bai of Talwaron Kanaka village stated, “going outside is not good, but the pit [of the toilet] is not deep and there is no water facility so [I] cannot use it.”<sup>45</sup> Due to the lack of “suitable sanitation facilities,” she perceived open defecation as a necessity.

Toilets were seen as important for women, children, or sick or old people. One of the most common reasons for owning a toilet were privacy (n=6), convenience (n=5), safety (n=2), and health (n=1). Often, respondents would talk about the importance of these reasons as being heavily intertwined. For example, in Ganka Village, privacy for open defecation was becoming an issue due to the rising urban developments in the area. Due to the increased number of new roads in the area, Rani, aged 50, expressed fears of concern for her safety, since there were not many private spaces to use the bathroom and she could be seen by others while defecating outside.<sup>43</sup> Similarly, in the Kantal and Siwera Villages, interviewees stated that they chose to

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<sup>42</sup> Community Leader, Individual Interview, Talwaron Kanaka Village, 24 Nov 2017.

<sup>43</sup> Individual Interview 2, Ganka Village, 25 Nov 2017.

build a toilet after marriage because it was unsafe for women and young children to go out to defecate in the forest, especially at night. Seasonal safety concerns were also mentioned, as heavy rains during the monsoon season made open defecation difficult and undesirable.

Toilets were seen as a convenience that could mitigate some of these concerns, but were only seen as important for certain groups. The example of Bavaran, aged 59, from Talwaron Kanaka Village, illustrates this phenomena. Bavaran had one of the five toilets in the village that were built by the government, but didn't use it, because he had a "very good open space for going outside" and didn't want to make it dirty or smelly. However, at the time that we visited, his wife was currently sick and bed-ridden with an unknown infection. He expressed interest in upgrading his toilet to include a larger pit and lighting — though not currently, since money was tight because of his wife's medical bills. If someone was sick or old, he stated that it was good to have an option instead of going outside.<sup>44</sup>

To understand the importance of a toilet compared to other household necessities, respondents (n=13) were asked whether having light, water, a mobile phone, a television, or a toilet was more important. Water (n=6) and light (n=5) were considered the most important concerns over toilets (n=2). However, leisure items like mobile phones and televisions were not considered more useful than toilets. When asked this question, Betti of Chandela Village laughed and said, "If I had a mobile phone, who would I call?"<sup>45</sup>

Interviews also revealed other basic priorities that were deemed more important than sanitation. For example, Suresh, a farmer from Dhanga village had one of the few twin-pit latrines observed in this study, but did not use it. Since the family needed to walk 20 minutes to the nearest hand pump for water, they found it inconvenient to use their toilet, which required

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<sup>44</sup> Individual Interview 3, Talwaron Kanaka Village, 24 Nov 2017.

<sup>45</sup> Individual Interview 2, Chandela Village, 21 Nov 2017.

water for flushing. When asked about the importance of a toilet compared to the household necessities listed above, he commented, “money is important, not toilet, because you use money to buy food.”<sup>46</sup> Similar higher-ranking priorities over sanitation were mentioned in other interviews. As we talked, Menu Bai of Talwaron Kanaka village motioned over to her one-room mud house. If she had enough money, she stated that she would build a better house — not a toilet.<sup>47</sup>

### *Toilet Preferences*

To understand the type of toilet that households would be willing to use, interviewees were asked about the characteristics of a desirable toilet. A toilet was typically preferred to be located outside the home. Respondents preferred not having the smell of the toilet contaminate spaces inside the house, such as the kitchen. In an group interview with a women’s self-help group, the women commented, “A toilet should be outside. Cities put it inside because there is no space.”<sup>48</sup> However, NGO workers and community leaders commented on the importance of having toilets inside the house due to the patriarchal practices of Rajasthani society.<sup>49,50</sup> Since traditional practices mandate that women remain covered in the presence of men, it was difficult for women to use latrines outside of the house since they could be exposing themselves to men and elders, who typically sat outside.

When asked about the features of a desirable toilet, respondents commented that the most important requirement was a water connection. In many villages, toilets were not considered usable due to water scarcity. Toilets were perceived to require between 10 to 15 liters of water for flushing (n=11), and people found it inconvenient and unrealistic to fetch this amount of water

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<sup>46</sup> Individual Interview, Dhanga Village, 1 Dec 2017.

<sup>47</sup> Community Leader, Individual Interview, Talwaron Kanaka Village, 24 Nov 2017.

<sup>48</sup> Group Interview 2, Umarni Village, 19 Nov 2017.

<sup>49</sup> Richa Audichya, Individual Interview, Jan Chetna Sansthan.

<sup>50</sup> Community Leader, Individual Interview, Santpur Village, 17 Nov 2017.

for toilets. In Chandela Village, Shabulah Ram stated that it was faster to walk outside with a jug of water and openly defecate, rather than walking to the nearest water source, filling up buckets of water, and then using the latrine, especially during emergency bathroom situations.<sup>51</sup> To eliminate these inconveniences, people expressed a desire for overhead water tanks, which required electricity, or piped water supply in toilets.

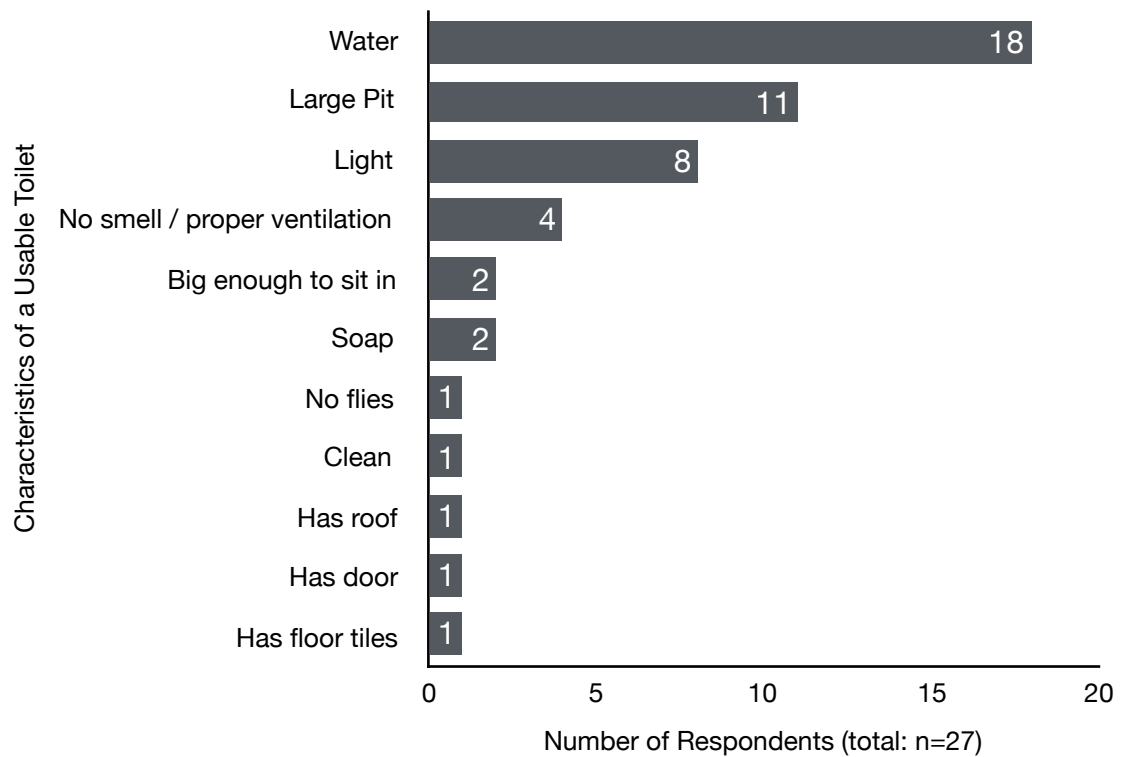
Secondly, the next most important characteristic of a toilet was a “large pit.” When asked how deep a pit should be, respondents (n=4) answered anywhere from 6 to 15 feet. According to Rekha of Umarni Village, a toilet with a 10 feet pit was good since it would never fill up and the waste wouldn’t need to be removed. Toilets with small pits were also considered unsuitable for use. In Chandela Village, Betti Bai, a mother of 7 children, had a toilet with a pit that was 3 feet deep. When asked why she didn’t use her toilet, she commented, “How can we use our toilet? We have 9 people living in this house. It will fill up in a month!”<sup>52</sup>

Other common features of a desirable toilet included adequate lighting and proper ventilation to reduce bad odors and flies. A desired toilet was estimated to cost 31,750 Rs (n=6), and a full listing of all the toilet features described in interviews is shown in Figure 5.

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<sup>51</sup> Individual Interview 1, Chandela Village, 21 Nov 2017.

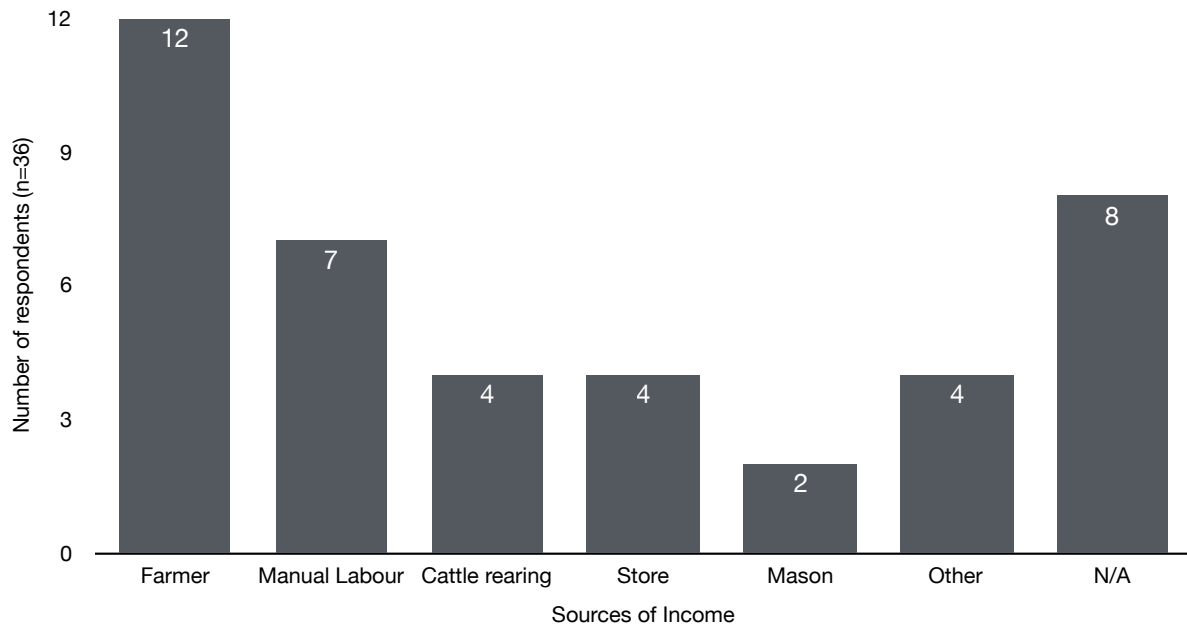
<sup>52</sup> Individual Interview 2, Chandela Village, 21 Nov 2017.



**Figure 5: Characteristics of a Usable Toilet.**

### *Latrine Observations*

To understand what kinds of toilets existed in comparison to villagers' conception of a desirable toilet, 36 latrine observations were conducted. Of the 36 households visited in 10 different villages, most of the inhabitants practiced farming or manual labour as their primary occupation (Figure 6). Houses were typically *pakka*, with *kaccha* (dirt) floors. Of the 36 latrines observed, nearly half (52%) were constructed by the government, with the remainder being constructed by individual households. It was determined that 56% of the 36 toilets were not being used by seeing whether toilets looked dusty, full of spiderwebs, or very dry and triangulating these observations with the owner's responses. However, in nearly all of the cases (94%) in which the toilet was constructed by the household, toilets appeared to be used.



**Figure 6: Sources of income for owners of latrines.** Other professions included working in schools (2), health centers (1), or serving as community workers (1). Missing responses are listed as N/A (not applicable).



**Figure 7: A government-constructed latrine in Umarni Village with a makeshift roof.**

Latrines were typically located nearby the house (less than 10m away), with concrete or brick superstructures. Nearly all latrines had roofs (97%), but many of these were makeshift roofs of scrap metal sheeting or non-sturdy concrete slabs, such as the one shown in Figure 7. Few latrines had a piped water source, though 44% of toilets had a water tank attached, as mandated under the Swachh Bharat Mission. However, in several cases, owners removed the water tank attached to the toilet and used it for other

household purposes; only 28% of these water tanks were still seen, attached to the toilets. Many owners did not know the size of their latrine pits, but reported pit sizes ranged from 3 to 13 feet.

There was often a sizable difference in the quality of toilets constructed by the government and those constructed by individual households. In several cases, government-constructed latrines were broken or unusable. In the three household latrine observations performed in Umarni Village, toilets simply consisted of brick superstructures without pits, such as the one shown in Figure 8. Individual and group interviews confirmed that most of the households in this village possessed these types of “fake toilets.”



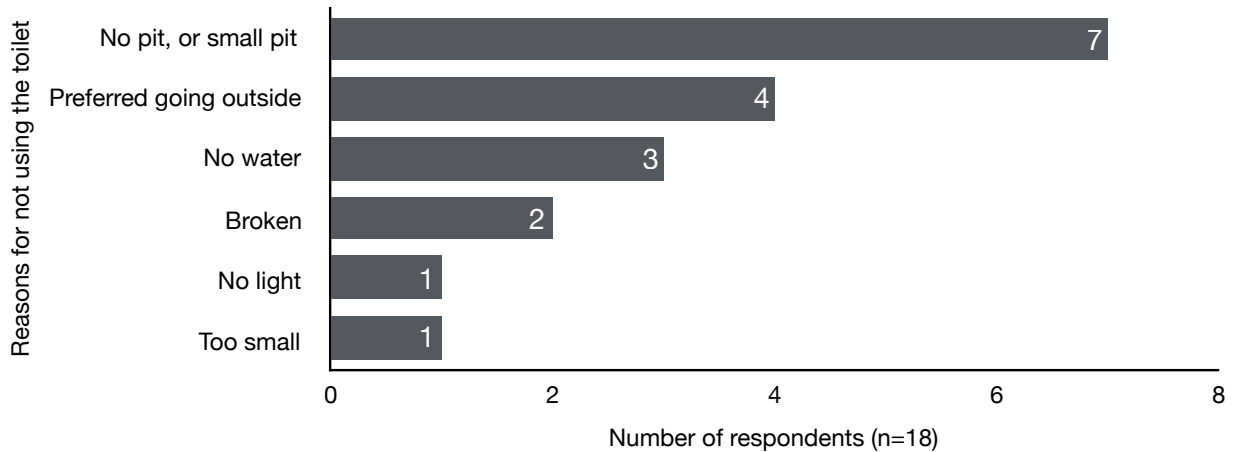
A year ago, government masons had come and built ten of these toilets per day.<sup>53,54,55</sup> In other cases, government-built latrines were not considered suitable for use. Figure 9 displays the various reasons for non-usage of latrines. In particular, government-built latrines typically had pits that were considered too small for daily usage, or owners found it inconvenient to fetch water for the toilets. Some latrine owners also simply preferred going outside to defecate.

**Figure 8: A government-constructed latrine in Umarni Village with no pit.**

<sup>53</sup> Individual Interview 2, Umarni Village, 19 Nov 2017.

<sup>54</sup> Individual Interview 3, Umarni Village, 19 Nov 2017.

<sup>55</sup> Group Interview 2, Umarni Village, 19 Nov 2017.



**Figure 9: Reasons for not using a household latrine.**

Instead, latrines were often used as storage for firewood or other materials (Figure 10). Some owners also enjoyed using the latrines for showering, as they preferred not to stink up the latrines by urinating and defecating in them. A toilet owner from Talwaron Kanaka Village commented, “[I] don’t like the smell. [I] don’t want to make it dirty. [I] have a very good open space for toilet so it’s better to go outside.”<sup>56</sup> Owners would often cover the hole of the latrine with a concrete slab and use the latrines for other purposes, as seen in the photo in Figure 11.

In comparison to government-built latrines, household-built latrines had more deluxe features such as floor tiles, painted walls, and proper ventilation to reduce bad odors. Instead of being located outside the house, several of these toilets were also located inside the house or attached to the house. The average cost of household-built toilets was 44,250 Rs (n=14, ranging from 9,000 to 100,000 Rs). For the purpose of descriptive statistical purposes, differences between government-built and homeowner-built toilets are highlighted in Figure 12; however, statistical significance tests were not performed due to the small sample size and non-randomized sampling.

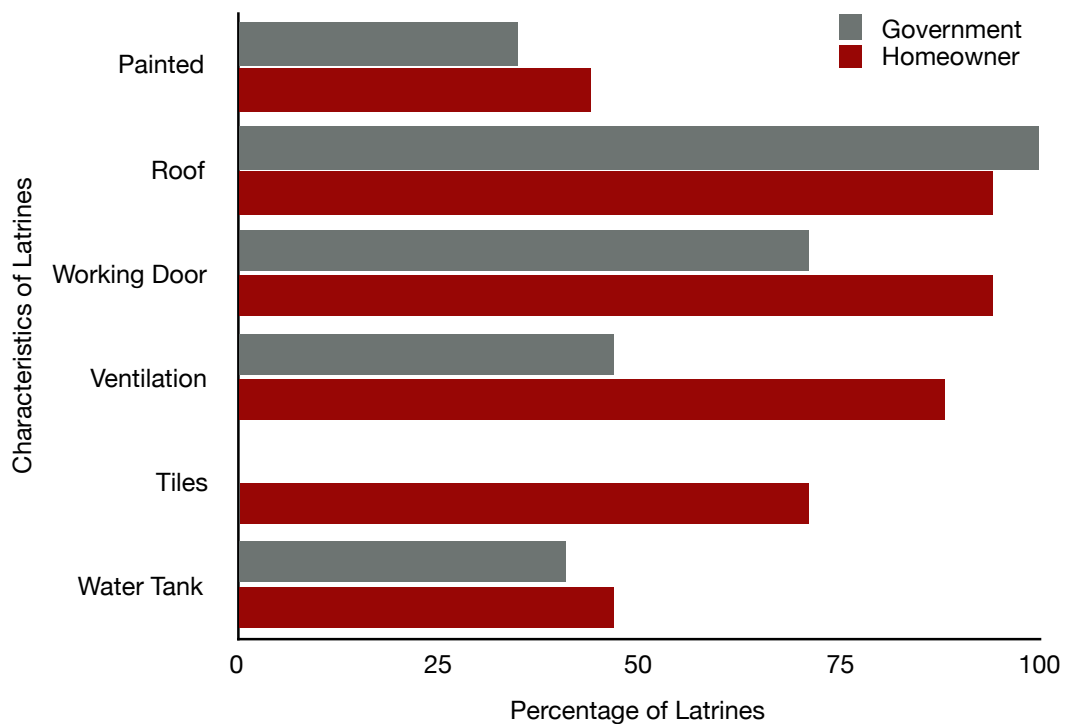
<sup>56</sup> Individual Interview 3, Talwaron Kanaka Village, 24 Nov 2017.





**Figure 10 (left):** Photo of government-built latrine in Umarni Village being used for storage purposes.

**Figure 11 (right):** Photo of government-built latrine in Talwaron Kanaka Village being used as a shower, with a concrete slab placed over the pit.



**Figure 12: Differences between Government-Constructed and Household-Built Latrines.**

### *Possible Solutions*

At a World Bank-sponsored toilet park in Pali, Rajasthan showcasing different models of toilets, one of the toilet models recommended for water-scarce regions like Sirohi was a toilet with a rural pan, where a reduced amount of water is needed for flushing due to the slanted angle of the pan.<sup>57</sup> However, these were not observed in the villages visited due to concerns of status. An employee of CMF commented, “If a Rajasthani uses a rural pan, people think that they are BPL [below-poverty-line].”<sup>58</sup> Another suggested solution to issues of water connectivity were water tanks that could be constructed on the side of toilets and filled manually, in comparison to overhead water tanks which required electricity for pumping water. Though these were observed in some of the government-constructed latrines visited through the course of this study, many of these tanks were removed and used for other household purposes, as mentioned previously.

In terms of combatting issues of odor and large pit size, Tiger Toilets were recommended. These are vermicompost toilets containing special worms that break down 90% of waste within 2 hours. At the time of this study, this intervention was being piloted in the Apri Khera Village of Pindwara Block through the Centre for Microfinance, but due to the remote location of the village, a field visit was unable to be conducted. Since many of the government-built toilets in the area lacked pits, CMF was outfitting toilet superstructures with tanks containing these tiger worms, making them usable. Additionally, the cost of the tank was only 4,000 Rs, making this an affordable solution for this village. However, usage of these toilets was important, as the worms in the pit would die if the toilet went unused; additionally, the toilets couldn't be installed in rocky areas, which were present in many parts of Sirohi district.<sup>59</sup>

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<sup>57</sup> Anonymous, Individual Interview, Centre for Microfinance, Pindwara, 1 Dec 2017.

<sup>59</sup> Itika Goyal, Individual Interview, Centre for Microfinance.

For such rocky areas, government officials at the toilet park in Pali recommended biodigester toilets.<sup>60</sup> Banka BioLoo, a social enterprise, is one company installing such toilets in schools and railways, and their manufacturing facility in Alwar, Rajasthan was visited over the course of this study. The toilets contain special bacteria which digest waste, producing a gas and water that is safe for gardening purposes. Because of the bacteria, the toilets remained odorless and did not need to be emptied. However, because the toilets cost on average 30,000 to 35,000 Rs per toilet, they were not currently being sold at the household level.<sup>61</sup>

## Discussion

### *Current State of Sanitation*

In many of the villages visited in this study, open defecation was still common. Of the 36 latrines observed in this study, 56% were not being used. Unused latrines were typically government-constructed; often, these toilets were considered low-quality and unusable. In Umarni Village, observed government-built latrines simply consisted of 2 brick walls without a pit. Across all ten villages visited, only 56% of all toilets visited possessed water facilities. Many toilet superstructures were considered incomplete, lacking roofs and doors. This contradicts the requirements of the Swachh Bharat Mission, which mandates that all household latrines should contain water facilities, hand-washing units, sub-structures, and super-structures acceptable to beneficiaries.<sup>62</sup>

Additionally, the question of why toilet construction was being performed by the government remains. The Swachh Bharat Mission is meant to be different than previous sanitation programs in India due to its demand-driven approach, where communities are

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<sup>60</sup> Government Official, Individual Interview 2, District Headquarters, Pali, 24 Nov 2017.

<sup>61</sup> Sanjay Banka, Individual Interview, 12 Nov 2017.

<sup>62</sup> *Handbook on Technical Options for On-Site Sanitation*, Ministry of Drinking Water and Sanitation.

activated to develop their own demand for toilets. This is in contrast to a supply-side approach, which consists of supplying communities with toilets or giving subsidies for toilet construction.<sup>63</sup> In the development world, such subsidy programs have been considered unsustainable due to low usage and maintenance rates of toilets following their construction.<sup>64</sup> Ownership of toilets is considered a critical factor in ensuring that toilets are used for their intended purpose.<sup>65</sup> Under the Swachh Bharat Mission, rural households can apply to receive an individual household cash incentive of 12,000 Rs after the construction of a toilet, but are meant to build their own toilets.<sup>66</sup> However, this strategy was not followed in many of the villages visited over the course of this study.

Lastly, four of the five blocks of Sirohi district, including Abu Road and Pindwara block, have been declared open-defecation free.<sup>67</sup> An area that is considered “open-defecation free” is defined as having (a) no visible faeces found in the village and (b) every household and public institution using safe technology for the disposal of faeces.<sup>68</sup> However, as shown by this study, many villages were still practicing open defecation despite being considered open-defecation free.

### *Motivations and Barriers to Toilet Usage*

Mostly, toilets were built for the purpose of convenience, privacy, or safety. This corresponds with existing studies, which document how toilets are built for convenience or security purposes rather than for the purposes of promoting good health.<sup>69,70</sup> While these reasons sometimes motivated respondents to build toilets, especially for women, young children, or the

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<sup>63</sup> Kamal Kar and Katherine Pasteur, “Subsidy or self-respect? Community led total sanitation. An update on recent developments,” IDS Working Paper 257, Nov 2005.

<sup>64</sup> O’Reilly and Louis, “The toilet tripod.”

<sup>65</sup> Coffey et al, “Revealed preference for open defecation,” 15.

<sup>66</sup> *Guidelines for Swachh Bharat Mission*, Ministry of Housing and Urban Affairs.

<sup>67</sup> *Status of Declared and Verified ODF Villages*, Ministry of Drinking Water and Sanitation.

<sup>68</sup> *Guidelines for Swachh Bharat Mission*, Ministry of Housing and Urban Affairs.

<sup>69</sup> O’Reilly and Louis, “The toilet tripod.”

<sup>70</sup> Routray et al, “Sociocultural and behavioral factors constraining latrine adoption in rural coastal Odisha.”

sick and elderly, there was a low awareness of the connection between sanitation and disease. Health was rarely noted in interviewees' responses regarding the importance of a toilet, and contamination of drinking water from defecating near open water bodies was not seen as a concern. This has been observed in other parts of India, such as rural Odisha, where vacant areas around local surface water bodies were considered preferred defecation places due to the availability of water for anal cleansing, bathing, and washing of clothes.<sup>70</sup> However, these types of unhygienic practices threaten community health through the contamination of local water sources.

Additionally, in comparison to other studies, which discuss how status and pride motivate toilet construction, pride was rarely mentioned in the course of this study.<sup>71</sup> This may be because 6 of the 10 villages visited were scheduled tribal areas, and invoking conventional motivators like shame and pride for poor sanitation has been reported to be not as effective with tribal populations.<sup>72</sup>

On the positive side, toilets were considered more important than mobile phones or televisions, contradicting findings from Banerjee, Banik, and Dalma's 2017 study, where respondents preferred these luxury items over toilets. However, other priorities, such as water, light, money, and better housing were considered more important than toilets. When many families still lacked basic amenities like accessible water sources and electricity, sanitation was not considered a priority, which begs the question of whether sanitation is really the most important issue to focus on for these households.

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<sup>71</sup> O'Reilly, "Combining sanitation and women's participation in water supply."

<sup>72</sup> *Rajasthan Sanitation Journey 2011-2017*, UNICEF.

### *Toilet Preferences*

A desirable toilet had a water connection, large pit, lighting, proper ventilation, and other characteristics for comfort like a roof, door, and floor tiles. The estimated average cost of this kind of toilet was 31,750 Rs, nearly three times the amount of the 12,000 Rs incentive awarded post-toilet construction. These estimates match the cost of latrines described in Coffey and Spears' study and support the hypothesis that rural Indians have an expensive concept of a minimally acceptable latrine.<sup>73</sup>

What made the described toilets so expensive? Large pits were amongst the desirable features of a usable latrine, matching findings in previous studies.<sup>74</sup> Respondents believed that a toilet should have a pit anywhere from 6 to 15 feet deep and were worried about government-built toilets with pit sizes of 3 feet filling up within a month. This suggests miseducation regarding the length of time it takes for the pits to fill, as it generally takes up to five years for a toilet of 3 feet to fill up for a family of five.<sup>75</sup> Additionally, few villagers were informed about twin pit toilets, and only two of the 36 latrines observed in this study were twin pit toilets.

The preference for latrines with large pits is potentially harmful, as the depth of large pits can contaminate groundwater sources.<sup>76</sup> Additionally, the amount of labour required to dig such large pits, especially in rocky areas, adds high costs to toilets.<sup>77</sup> There thus exists a need for a toilet design which addresses villagers' fear of pits filling up quickly, in conjunction with an education campaign that correctly informs villagers about the length of time it takes pits to fill.

Water is also another area to focus on in terms of designing acceptable toilets. In this study, water connectivity was considered the most important characteristic of a desirable latrine.

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<sup>73</sup> Coffey et al., "Revealed Preference for Open Defecation," 48.

<sup>74</sup> Coffey and Spears, *Where India Goes*, 72.

<sup>75</sup> "Handbook on Technical Options for On-Site Sanitation," Government of India.

<sup>76</sup> A Guide to the Development of On-Site Sanitation, *World Health Organization*, 1992.

<sup>77</sup> Coffey and Spears, *Where India Goes*, 72.

This makes sense. In this study, the most common reason for owning a toilet was convenience. If toilets are to be used, they must therefore be convenient for users; toilets that required water to be transported from long distances were not convenient to use. At the same time, miseducation regarding the amount of water that a toilet required was observed. Though a basic pour-flush latrine only requires 1.5 to 2 liters of water per use, respondents believed that a toilet required between 10 to 15 liters of water for flushing.<sup>78</sup>

### *Possible Solutions*

Toilet technologies that are affordable, odor-less, and appropriate for water-scarce and rocky areas have been suggested in the findings section above. However, none of these solutions has been tried and tested, and none necessarily meet all the characteristics of a desired toilet listed above. Additionally, without proper behavioral change communications, acceptable toilets might still go unused. As Itika Goyal of the Centre for Microfinance commented, “If someone asked me to use a machine that I have never used — one that I don’t know how to use, why would I use it?”<sup>79</sup> Educational awareness campaigns, along with appropriate toilet designs, are thus necessary for promoting widespread toilet adoption in these villages.

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<sup>78</sup> *Handbook on Technical Options for On-Site Sanitation*, Ministry of Drinking Water and Sanitation.

<sup>79</sup> Itika Goyal, Individual Interview, Centre for Microfinance.

## Conclusion

There are thus three areas to focus on in terms of ensuring sustainable sanitation promotion in rural India. It is imperative to consider individual preferences and beliefs when trying to promote safe sanitation. Because many of the government-constructed latrines did not meet household expectations of an acceptable latrine, they went unused. This study demonstrates that there is a need for an affordable toilet design that meets the requirements of rural Indian households. In this study, participants expressed the desire for an odor-free latrine that requires little water, is large enough to comfortably sit in, and does not fill up quickly.

However, at the same time, appropriate toilet designs must be combined with education to spread awareness around the importance of safe sanitation. Some of the misconceptions documented in this study included a lack of understanding around the connection between poor sanitation and health, the amount of time it took for a latrine pit to fill, and the amount of water required to operate a latrine. If toilets are to be used, these misunderstandings must be addressed.

Finally, basic living conditions within villages must be improved. When so many villages visited lacked basic amenities like an accessible water supply and electricity, I wondered whether sanitation should even be a priority for these areas. However, this study has made it clear that a multi-pronged approach is required to raise the quality of living in these areas. Clean water supplies are endangered by unsafe sanitation practices, and safe sanitation practices do not occur without basic necessities like water and electricity. Additionally, as Rajasthan's population continues expanding, the adverse effects of open defecation becomes more pronounced, as germs from fecal matter are more easily transmitted in highly dense environments.<sup>80</sup> Sanitation is thus vitally important, but all of the above-mentioned areas are important too.

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<sup>80</sup> Coffey and Spears, *Where India Goes*, 128-155.



### Recommendations for future study

This study was a small exploratory study which brought to light some voices regarding individual preferences for toilet design. Previously, no studies reviewed in the literature had specifically focused on looking at the toilet preferences of rural households. However, this topic merits a more robust research design and longer field research period to ensure that findings are generalizable and representative. Since selection of villages for field visits was based on the partner NGO's availability, sampling was non-randomized. Additionally, a majority of interviewees were women, since the partner NGO focused on tribal, rural, and women's empowerment. A more comprehensive study would contain randomized, representative sampling of respondents of different demographic groups. Particularly, it would be interesting to explore whether men's preferences for toilets differed from women's preferences, as this could affect usage of toilets. Additionally, caste and tribal affiliation was not asked about in this study, but it could be interesting to compare sanitation practices and beliefs across these groups.

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Individual Interview 2. Talwaron Kanaka Village, 24 Nov 2017.

Individual Interview 3. Talwaron Kanaka Village, 24 Nov 2017.

Individual Interview 1. Ganka Village, 25 Nov 2017.

Individual Interview 2. Ganka Village, 25 Nov 2017.

Individual Interview 1. Kantal Village, 1 Dec 2017.

Individual Interview 2. Kantal Village, 1 Dec 2017.

Individual Interview. Dhanga Village, 1 Dec 2017.

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Individual Interview 2. Bahadurpura Village, 5 Dec 2017.

Individual Interview 3. Bahadurpura Village, 5 Dec 2017.

Individual Interview 1. Siwera Village, 6 Dec 2017.

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## Appendix

### *Appendix I: Interview Worksheet*

*Here is the sample worksheet format that was used to track information about interviewees.*

Date		Time		Location	
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Attendees of Meeting:	
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Consent obtained:		Recording No.:	
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### *Appendix II: Introduction and Obtaining of Consent*

*All questions were translated into Hindi through the help of a translator.*

Hello, my name is Karen. I am from America. I am a student and I study in Jaipur.

I want to learn about sanitation here. Can I ask you a few questions? I am writing a paper for my studies.

It is completely your choice whether or not to talk with me, and you can choose not to continue our conversation at any time or skip a question. There will not be any rewards for participating or costs for withdrawing. For the purpose of my studies, do you mind if I record our conversation? I will not use the recording for any purposes other than simply remembering the details of our conversation. Do you wish to answer a few questions?

Appendix III: Semi-Structured Questions for Individual and Group Interviews

*Sanitation Practices:*

1. Where do you (or people in this village) use the bathroom?
2. How many minutes does it take you to walk there?<sup>a</sup>
3. How many times a day? What time of the day?
2. Where do you get water from?
3. How many minutes does it take you to walk there?<sup>a</sup>
4. How many times per day?

*Beliefs and Motivators*

1. Do you think open defecation is good for health or bad for health?
2. Do you think having a toilet is important? Why or why not?
3. Out of having a mobile phone, refrigerator, TV, or toilet, which is most important?

*Toilet Design*

1. What are the characteristics of a minimally usable toilet?
4. Should a toilet be located inside the house or outside the house?
5. How many liters of water do you need to flush a toilet per use?
6. How much would such a toilet cost?<sup>b</sup>
7. How would you remove waste from such a toilet?
8. Do you know what a twin pit toilet is?
9. Do you know what the Swachh Bharat Mission is?



*Appendix IV: Interviewer Observation Guide*

*Below is the structured observation guide that was used when observing household toilets. When possible, questions were asked to toilet owners during this process to understand more about toilet history.*

<b>A Demographic Questions</b>		
A.1	What is your name?	
A.2	How many people live in this house?	
A.3	What is your occupation?	

<b>B Household Wealth</b>		
B.1	Interviewer observation: how are the walls of this house mostly like?	A) Kachhi (built with earth and organic material) B) Somewhat Kacchi, Somewhat Pakki C) Pakki (built with durable materials like brick, stone, timber, and cement) D) No walls
B.2	Interviewer observation: how is the roof of this house mostly like?	A) Kachhi B) Somewhat Kacchi, Somewhat Pakki C) Pakki D) No roof
B.3	Interviewer observation: how is the floor of this house mostly like?	A) Kachha B) Somewhat Kaccha Somewhat Pakka C) Pakka
B.4	Interviewer observation: how many pakka rooms does the house have?	
B.5	Interviewer observation: how many kaccha rooms does the house have?	

<b>C Sanitation Practices</b>		
C.1	Who has toilets in the area?	
C.2	Where do you use the bathroom?	
C.3	How many minutes does it take you to walk there?	
C.4	How many times per day? What time of the day?	
C.5	Where do you get water from?	

C.6	How many minutes does it take you to walk there?	
C.7	How many times per day?	
C.8	Is there a latrine in this house?	

<b>D Latrine History</b>		
D.1	Interviewer observation: Where is the latrine?	A) Inside the house B) Attached to the house C) Near the house (less than ten metres) D) At some distance (more than ten meters)
D.2	Interviewer observation: From seeing the latrine, can you say that the latrine is being used?	A) Yes B) No
D.3	Interviewer observation: What type of toilet is it?	1. crude pit toilet 2. basic pour flush toilet (low cost kaccha) 3. sanitary toilet (pucca toilet) 4. Septic tank toilet
D.4	Interviewer observation: Does the toilet have a super-structure? If yes, approximately how many feet is it? What is it constructed with?	
C.5	How long ago was this latrine constructed?	
C.6	Who made the decision to construct the latrine?	
C.7	How much did it cost to construct the latrine? <sup>b</sup>	
C.8.1	Did you receive any money from the government for the construction of this latrine?	
C.8.2	How much money did the government give for the construction of this latrine?	
C.9	Picture:	

<sup>a</sup>Answers were sometimes given in km or minutes, but km were converted to minutes by estimating an average walking speed of 5 km/hr.<sup>81</sup>

<sup>b</sup>When given a range of numbers, the average was taken for statistical purposes.

<sup>81</sup> Raymond C. Browning, Emily A. Baker, Jessica A. Herron, and Rodger Kram, "Effects of obesity and sex on the energetic cost and preferred speed of walking," *Journal of Applied Physiology* (2006).

*Appendix V: Information regarding Group Interviewees*

<b>Village</b>	<b>Block</b>	<b>Number of people</b>	<b>Description</b>
Umarni	Abu Road	7 women	Meeting for elected women representatives
Kkharwala	Pindwara	5 women	Women's self-help group
Umarni	Abu Road	2 men and 1 woman	Community member discussion
Umarni	Abu Road	7 women	Community member discussion
Umarni	Abu Road	4 women	Training for women to open schools
Santpur	Abu Road	2 men and 1 woman	Meeting with toilet beneficiaries
Chandela	Abu Road	5 women	Community member discussion
Siwera	Pindwara	6 women	Registration for Mahatma Gandhi National Rural Employment Guarantee Act (MNREGA)

*Appendix VI: Statistical Data regarding Sanitation Beliefs and Toilet Preferences*

<b>Sanitation Beliefs</b>				
	<b>Not good for health, but have to</b>	<b>Bad, especially in the rainy season</b>	<b>Not good, especially for women</b>	
<b>Do you think defecating in the open is good or bad for health? (n=9)</b>	6	2	1	
	<b>Convenience</b>	<b>Privacy</b>	<b>Safety</b>	<b>Health</b>
<b>Reasons for having a toilet (n=11)</b>	5	6	2	1
	<b>Water</b>	<b>Light</b>	<b>Toilet</b>	
<b>Do you think that having light, water, a mobile phone, a television, or a toilet is most important? (n=14)</b>	6	5	1	
<b>Toilet Preferences</b>				
	<b>Outside</b>	<b>Inside</b>	<b>Depends</b>	
<b>Should a toilet be located inside or outside the house? (n=11)</b>	8	2	1	
	<b>10 L</b>	<b>15 L</b>	<b>Don't know, have never used a toilet before</b>	<b>At some distance (more than 10m)</b>
<b>How much water do you need to flush a toilet for one use? (n=11)</b>	5	1	5	2

*Appendix VII: Statistical Data from Latrine Observations*

<b>Toilet History</b>				
	<b>Government</b>	<b>Household</b>		
<b>Who made the decision to construct this toilet? (n=36)</b>	19	17		
<b>Toilet Usage</b>				
	<b>Yes</b>	<b>No</b>		
<b>Is this latrine being used? (n=36)</b>	16	20		
	<b>Storage</b>	<b>Shower</b>	<b>No use</b>	
<b>If the latrine is not being used for defecation, what is it being used for? (n=18)</b>	7	2	12	
<b>Location of the toilet</b>				
	<b>Inside the house</b>	<b>Attached to the house</b>	<b>Near the house (less than 10m)</b>	<b>At some distance (more than 10m)</b>
<b>Where is this toilet located? (n=36)</b>	3	1	30	2
<b>Superstructure of toilet</b>				
	<b>2 walls</b>	<b>3 walls</b>	<b>4 walls</b>	<b>None</b>
<b>How many walls does this toilet have? (n=36)</b>	3	20	13	2
	<b>Brick</b>	<b>Concrete</b>	<b>Tile</b>	
<b>What is the superstructure made of? (n=34)</b>	6	26	2	
	<b>Yes</b>	<b>No</b>		
<b>Is the toilet painted? (n=33)</b>	13	20		

<b>Does the toilet have a roof? (n=34)</b>	33	1		Though it was noted that some toilets did not have a proper roof, with extra metal sheeting or a slab of cement
<b>Does the toilet have a working door? (n=34)</b>	28	6		
<b><i>Interior of the toilet</i></b>				
<b>Does the toilet possess a source of ventilation? (n=34)</b>	11	23		
<b>Does the toilet have tiles? (n=36)</b>	12	24		
<b>Does the toilet have a water tank or water connection? (n=32)</b>	14	20		
<b>Is the water tank still attached to the toilet? (n=32)</b>	9	23		

*Appendix VIII: Comparison of Government-Built and Household-Built Latrines*

<b>Toilet History</b>								
	<b>Government</b>				<b>Household</b>			
<b>Who made the decision to construct this toilet? (n=36)</b>	19				17			
<b>Toilet Usage</b>								
	<b>Yes</b>	<b>No</b>			<b>Yes</b>	<b>No</b>		
<b>Is this latrine being used? (n=19, 17)</b>	1	18			15	2		
	<b>Storage</b>	<b>Shower</b>	<b>No Use</b>		<b>Storage</b>	<b>Shower</b>	<b>No use</b>	
<b>If the latrine is not being used for defecation, what is it being used for? (n=18, 2)</b>	6	2	10		1	0		
<b>Location of the toilet</b>								
	<b>Inside the house</b>	<b>Attached to the house</b>	<b>Near the house (less than 10m)</b>	<b>At some distance (more than 10m)</b>	<b>Inside the house</b>	<b>Attached to the house</b>	<b>Near the house (less than 10m)</b>	<b>At some distance (more than 10m)</b>
<b>Where is this toilet located? (n=19, 17)</b>	0	0	17	2	3	1	13	0
<b>Superstructure of toilet</b>								
	<b>2 walls</b>	<b>3 walls</b>	<b>4 walls</b>	<b>None</b>	<b>2 walls</b>	<b>3 walls</b>	<b>4 walls</b>	<b>None</b>
<b>How many walls does this toilet have? (n=19, 17)</b>	3	13	1	2	0	5	12	0
	<b>Brick</b>	<b>Concrete</b>	<b>Tile</b>		<b>Brick</b>	<b>Concrete</b>	<b>Tile</b>	
<b>What is the superstructure made of? (n=17,17)</b>	3	14	0		3	12	2	
	<b>Yes</b>	<b>No</b>			<b>Yes</b>	<b>No</b>		
<b>Is the toilet painted? (n=17, 16)</b>	6	11			7	11		

<b>Does the toilet have a roof? (n=17, 17)</b>	17 <sup>a</sup>	0			16	1		
<b>Does the toilet have a working door? (n=17,17)</b>	12	5			16	1		
<b><i>Interior of the toilet</i></b>								
<b>Does the toilet possess a source of ventilation? (n=17, 16)</b>	8	9			14	2		
<b>Does the toilet have tiles? (n=17, 17)</b>	0	17			12	5		
<b>Does the toilet have a water tank or water connection? (n=17, 15)</b>	7	10			7	8		
<b>Is the water tank still attached to the toilet? (n=17,15)</b>	2	15			7	8		



*Appendix IX: Important Help and Contacts*

<b>Name</b>	<b>Role</b>	<b>Contact Info</b>
Karen Mac	Student, Public Health Science Program, Santa Clara University, Santa Clara, CA, USA	<a href="mailto:karennn.mac@gmail.com">karennn.mac@gmail.com</a>
Trilochan Pandey	SIT Academic Director	<a href="mailto:trilochan.pande@gmail.com">trilochan.pande@gmail.com</a>
Richa Audichya	Head of Jan Chetna Sansthan; ISP Advisor	<a href="mailto:richaaudichya@yahoo.co.in">richaaudichya@yahoo.co.in</a>
Itika Goyal	Tata Trusts; Centre for Microfinance	<a href="mailto:igoyal@tatatrusters.org">igoyal@tatatrusters.org</a>
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