research institute for compassionate economics

Accelerating the reduction of open defecation in rural India begins by admitting the problem

r.i.c.e. policy memo[1]

Summary

Why does rural India have uniquely high rates of open defecation?

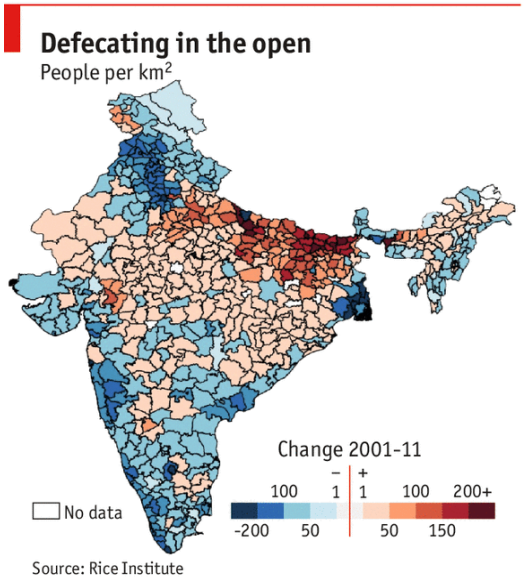
In rural India, 70% of households do not own a toilet or latrine. Indian rates of open defecation are uniquely high, much higher than in many poorer countries. This note asks *why* rural India has uniquely high rates of open defecation. It first explains that the "usual suspects" – GDP, poverty, education, water access – are not to blame for widespread open defecation in rural India. Second, it discusses how the sanitation technology used in rural India differs from the rest of the developing world – in short, very few rural Indian households use latrines with inexpensive underground soak pits. Third, it presents qualitative and quantitative evidence that Hindu practices of purity and pollution, as well as India's unique history and renegotiation of untouchability, complicate the adoption of the kinds of simple, inexpensive latrines that have been used to reduce open defecation and improve health in rich countries before they were rich and in other developing countries. Finally, it ends with a brief comment on implications for Indian government policy. Although the evidence is overwhelmingly clear that the reduction of open defecation in rural India will not be importantly accelerated by the large investments in government latrines proposed by the Swachh Bharat Mission, it is unclear what kinds of interventions will help. It is almost certainly the case that accelerating the reduction of open defecation in rural India will require frank and uncomfortable conversations about what purity, pollution and the continuing practice of untouchability have to do with rural India's open defecation crisis.

Background

60% of people worldwide who defecate in the open live in India. In rural India, 70% of households do not own a toilet (Census, 2011). Because many people who own latrines do not use them, an even higher fraction of *people* defecate in the open. 90% of households in India that lack a toilet or latrine live in rural areas. Widespread open defecation is killing hundreds of thousands of children per year, and stunting the physical and cognitive development of those who survive.

[1] r.i.c.e. is a research institute for compassionate economics (www.riceinsitute.org). Research presented here was conducted by Dian Coffey, Aashish Gupta, Payal Hathi, Nikhil Srivastav, Dean Spears and Sangita Vyas.

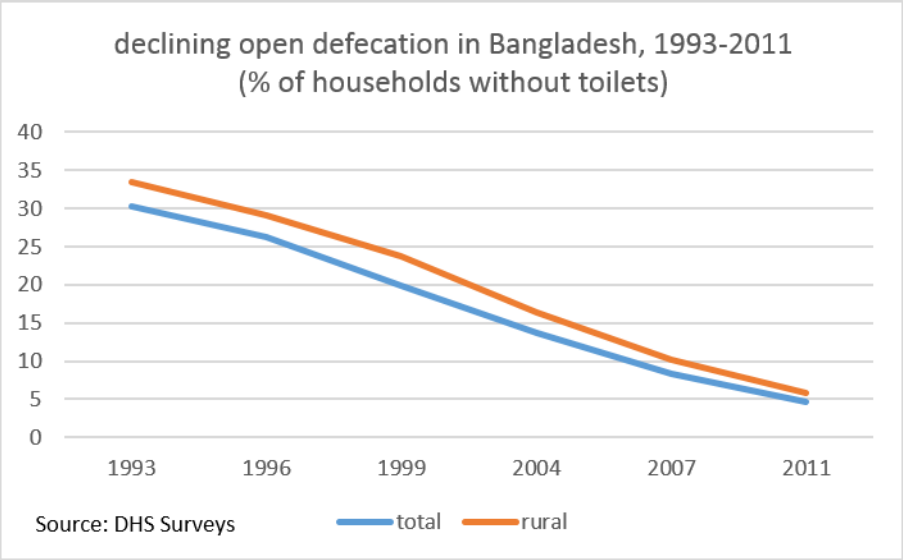
In the long run, economic growth will almost certainly see to it that every rural household can afford a *pacca* house, a large *pacca* septic tank, and the services of a vacuum truck needed to empty that septic tank mechanically. This is how the problem of rural sanitation is solved in most rich countries. However, slow increases in the income of the rural poor and slow rates of urbanization suggest that the long run in which rural open defecation might be eliminated by economic growth alone is quite far off. All available data suggests open defecation in rural India is declining only very slowly; household latrine ownership in rural India increased by only about 1 percentage point per year between 1991 and 2011.



Average exposure to open defecation in rural India may even get worse before it gets better. This map shows district-level changes in estimated density of persons defecating in the open per square kilometer between 2001 and 2011. Districts where open defecation per square kilometer increased are shown in pink and red, while areas where open defecation per square kilometer decreased are shown in blue. In many parts of rural India, population growth among households that do not own latrines is outstripping the increases in toilet ownership, such that, even if we assume that everyone who owns a toilet uses it, in most rural districts, the average child born in 2011 was exposed to *more* open defecation than a child born in that district in 2001 (Spears & Gupta, 2014). These estimates are overly optimistic because they are based on toilet ownership, not individual latrine use; many people in rural India who own toilets do not use them regularly (Coffey et al., 2014).

Outside of India, the rural sanitation picture is actually quite bright. In poor regions like sub-Saharan Africa and South East Asia, households are increasingly investing in latrines. The Unicef-WHO Joint Monitoring Project (JMP) reports that about 35% of people in sub-Saharan Africa and 21% of people in South East Asia defecated in the open in 2012. This means that India is home to a disproportionate and increasing share of people who defecate in the open; about 60% of people worldwide who defecate in the open live in India (JMP, 2012).

In particularly sharp contrast to India's widespread open defecation is the case of Bangladesh, where open defecation has been declining steadily. Even in 1996, open defecation rates in Bangladesh were lower than those in India today. In 2011 in Bangladesh, only about 5% of the rural population defecated in open.



The costs of waiting for economic growth to slowly solve the problem of rural sanitation in India are almost certainly very high – open defecation spreads a myriad of infectious diseases, including cholera, typhoid, parasites, hepatitis, diarrheal diseases and polio. Hundreds of thousands of children die from diseases related to open defecation each year and those who survive are left stunted, both physically and cognitively (Feachem et al., 1983; Humphrey, 2009; Fink et al., 2011; Spears, 2013).

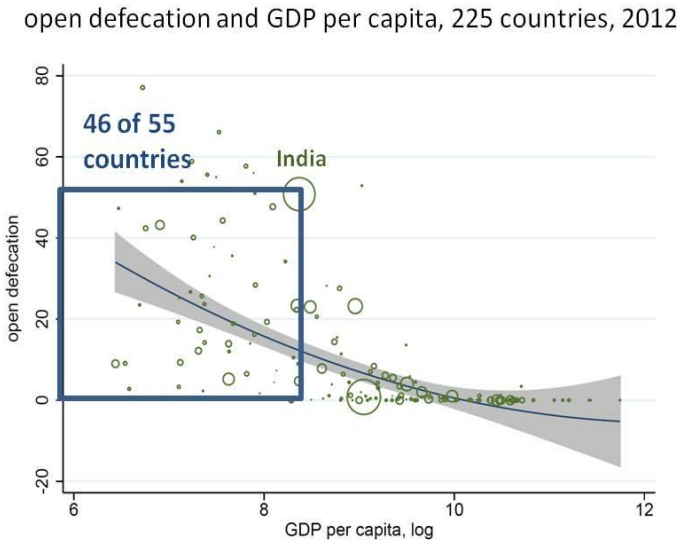
Do we want to wait for rural Indians to become wealthy enough to afford pacca septic tanks like those used in rich countries today? What sanitation options were used in rich countries before they were rich? How have other developing regions reduced rural open defecation? Why has India not done the same?

To answer these questions, this note draws on a multi-year statistical and field-based research by a team of r.i.c.e. researchers. We have written several research papers on the links between open defecation and health and human capital; conducted the SQUAT survey, a 3,200 household survey of sanitation attitudes, beliefs and behaviors in rural Haryana, UP, MP, Rajasthan, and Bihar (see Coffey et al., 2014); and carried out a qualitative study of latrine adoption and non-adoption in 100 households in Haryana, UP, Gujarat, and the Nepali terai (see Coffey et al., 2015). We have also interacted with government officials and sanitation professionals in Delhi, Rajasthan, UP, Bihar, Nepal, Bangladesh, and sub-Saharan Africa, and conducted semi-structured interviews on latrines and untouchability in UP, Bihar and Rajasthan.

International & domestic comparisons

Common development indicators do not explain widespread Indian open defecation

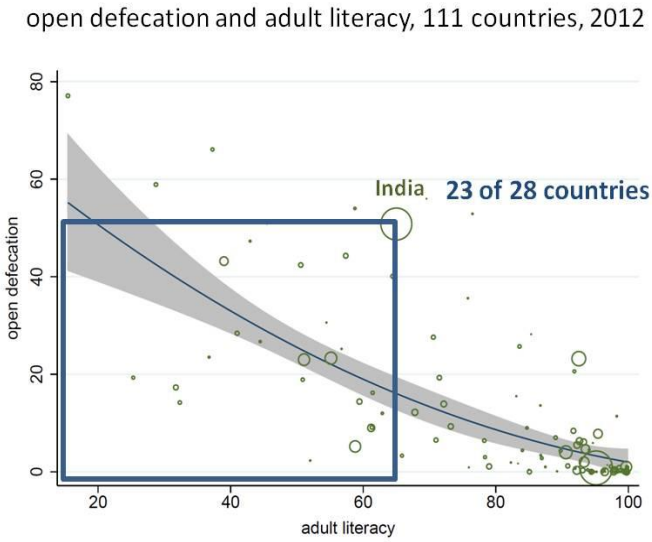
Not GDP, nor poverty. This graph plots the log of per capita GDP against the proportion of population practicing open defecation for countries in the UNICEF-WHO Joint Monitoring Report (WHO JMP, 2012). India is a clear outlier: 55 countries have per capita GDP less than that of India, but 46 of them have lower open defecation than India.



source: UNICEF-WHO JMP for open defecation; World Bank WDI for ICP GDP per capita

Similarly, poverty cannot explain higher open defecation in India. 21 countries in the JMP data have a higher proportion of population living below $1.25 a day, but 19 of those countries have lower open defecation than India.

Not illiteracy. Although within India, more educated people are more likely to use latrines than less educated people, illiteracy cannot explain India's high rate of open defecation in the international comparison. As the graph shows, 28 countries have adult literacy rates that are lower than that of India. Despite this, 23 of them have lower open defecation than India.



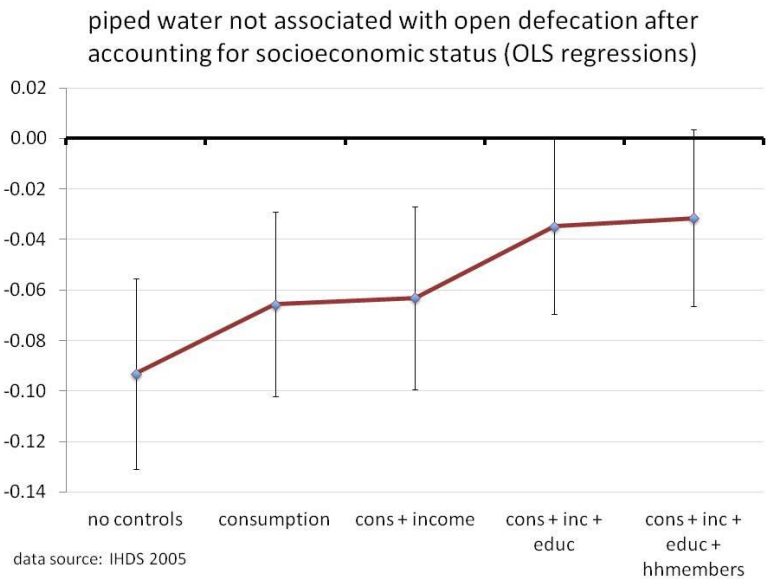
source: JMP, 2012 for open defecation; World Bank for literacy

Further, the SQUAT survey, which collected data on individual defecation behavior in rural Haryana, Uttar Pradesh, Madhya Pradesh, Rajasthan and Bihar, found that about a fifth of

women with at least a BA defecate in the open – this is a higher rate of open defecation than among the general populations of people in Democratic Republic of Congo or Bangladesh.

Not lack of water. Some observers have suggested that people in rural India do not use latrines because of lack of water. Indeed, under former Drinking Water and Sanitation Minister Nitin Gadkari, the government justified an increase in the proposed funding for an individual household latrine from 10,000 rupees to 12,000 rupees by saying that the additional 2,000 rupees would be used for a water storage tank near the latrine. However, in the SQUAT survey, only 3% of people who defecate in the open mentioned lack of water as a reason for not using a latrine.

Indeed, 90% of people in rural India have access to what the WHO-UNICEF JMP calls "an improved water source".[2] In contrast, in sub-Saharan Africa, less than half of people have access to improved sources of water (49%), but far fewer people in rural sub-Saharan Africa (35%) defecate in the open.



Additionally, variation in access to water within India suggests that water is not an important constraint on latrine use. In the 2005 India Human Development Survey, rural households with piped water were only 9 percentage points less likely to defecate in the open than rural households without piped water, a difference which can be completely accounted for by differences in socioeconomic status between households that have piped water and those that do not. The graph shows coefficients from OLS regressions of open defecation on piped water access which successively add controls for consumption, income, household size, the level of education of the most educated man in the household, and the level of education of the most educated woman in the household. Once these controls are added, the coefficient on piped water is not a statistically significant predictor of open defecation.

[2] Improved water sources are tube wells or boreholes, or piped water; surface water and unprotected well are considered "unimproved".

Toilet technology 101

Latrines that prevent the spread of disease are not expensive

The reason why there is little relationship between GDP or poverty and latrine use in the international comparison is because latrines that can prevent the spread of infectious diseases are actually very inexpensive. Many people in Bangladesh build and use latrines that cost only about Rs. 2,000 – 3,000 (approximately US$33 – 50). Most of these latrines use water seal, pour flush technology that uses very little water, and prevents bad smells.

A simple latrine in rural Bangladesh

A simple latrine in rural Kenya.

Latrines in sub-Saharan Africa typically often cost even less than this, although they do not uniformly use water seal technology. These photos show inexpensive latrine superstructures – but the most important part of a rural latrine is the underground pit that collects the feces. The latrines in these pictures have underground pits which are about 50 cubic feet in size.

The World Health Organization promotes the use of inexpensive latrines with pits of about 50 cubic feet. These latrines interrupt the spread of disease by safely containing feces underground (WHO, 1996). Water seeps out of these pits into the ground, but because the soil acts as a filter, there is little risk of contaminating ground water. The Indian government latrines that were provided under the Nirmal Bharat Abhiyan, and those which are proposed under the Swachh Bharat Mission are a slightly fancier than WHO – recommended latrines because they have brick and mortar superstructures, rather than less expensive superstructures. However, their pits are of similar size to the latrines used in other developing countries, and, if used, they would similarly interrupt the transmission of disease.

Because of the high cost of vacuum extraction and disposal of sludge in small quantities, and because water seeps out of affordable pits into the ground, latrine pits of about 50 cubic feet are emptied manually wherever they are used in other parts of the world. For a family of 6, the WHO estimates that it will take about 5 years for such a pit to fill. Emptying pits manually can be hazardous to the health of the emptier if the feces are not first allowed to decompose for a period of several months before emptying. Despite the fact that proper pit emptying practices are often not followed in developing countries, simple latrines nevertheless improve health considerably relative to open defecation because they reduce the amount of feces in the environment (Hathi et. al., 2014; Kov et. al., 2013).

An Indian government latrine under construction

To protect the health of pit emptiers, and to reduce the risks of disease transmission from fresh sludge, the Indian government recommends the construction of twin pit latrines. This photo shows a twin pit latrine being constructed: the pits are behind the super-structure. Twin-pit latrines reduce the health hazards of manual emptying of latrine pits because the feces in the full pit can be left to decompose for several months while the household channels feces into the second pit. Feces that have been allowed to decompose will not transmit bacterial infections,[3] and manually emptying these pits is not considered manual scavenging under the Indian government's 2013 *Prohibition of Employment as Manual Scavengers and their Rehabilitation Act*. Unfortunately, adoption of the twin pit model is very low in rural north India. In the SQUAT survey, only 2.5% of households with a latrine were using a twin pit model. The SQUAT survey found that where government latrines were in use, they were likely to be single pit latrines that were not used by all family members. They might be used by women, by the infirm, or only for "emergencies."

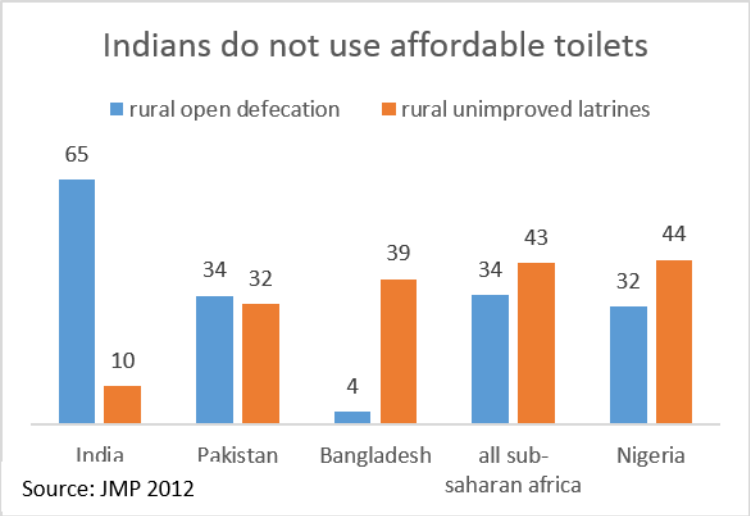
Toilet technology 102

Privately constructed latrines in use in rural India have enormous, expensive pits

Despite the fact that, for decades, in accordance with international guidelines, the Indian government has been promoting and constructing simple, inexpensive latrines with pits that

[3] Feces from these pits may transmit parasites.

can be emptied manually, adoption of such latrines is extremely limited. Households are not likely to build these latrines themselves, nor are they likely to use less expensive sanitation options, such as those the JMP considers to be "unimproved." The figure shows the use of simple unimproved latrines, and rural open defecation for India and selected countries and regions. Among India's neighbors, and in Sub-Saharan Africa, using inexpensive latrines is very common. In India, however, such toilets are very hard to find.



Many international sanitation professionals and experts describe a sanitation ladder: ranging from open defecation up to a flush toilet connected to a sewer. Successive rungs on the ladder represent more hygienic and more expensive sanitation options – for example, progressing from open defecation, to open pit latrines (without a water seal), to pour-flush latrines with a water seal, to toilets that connect to a septic tank or to a sewer. However, the sanitation ladder in India appears to be missing its middle rungs, with no intermediate steps on which households climb gradually up from open defecation.

Indeed, the privately constructed latrines in use in rural India are different from those in other developing countries because they have very large underground pits or septic tanks. The

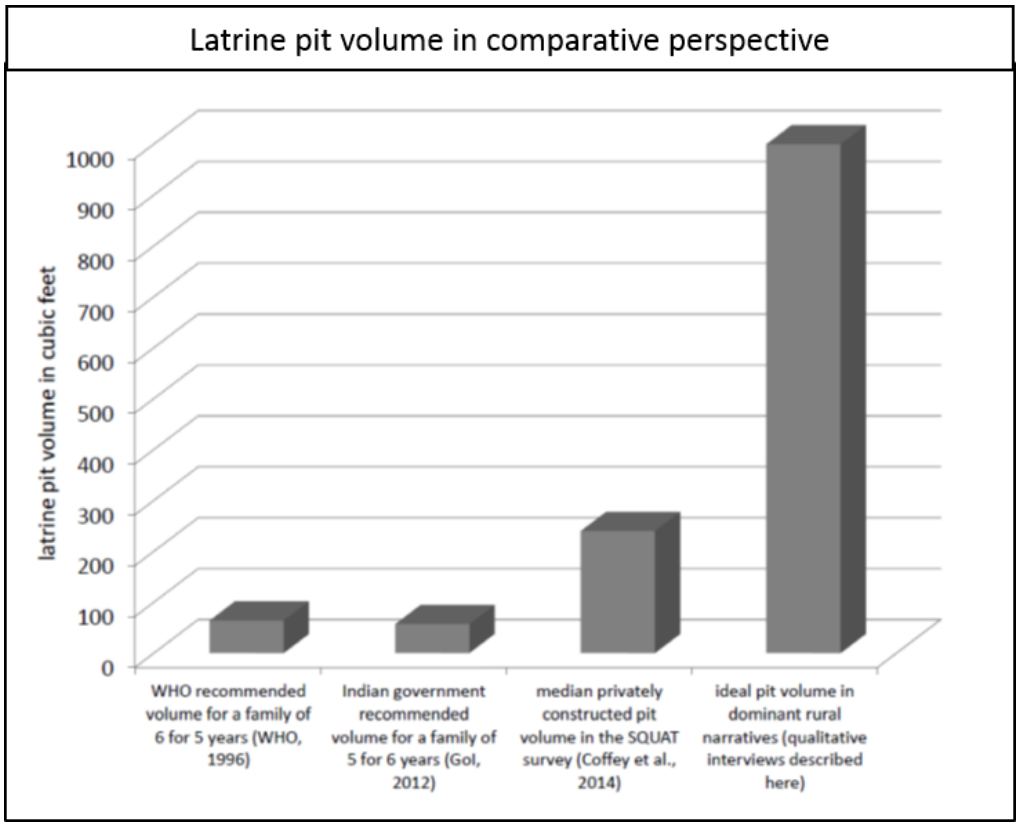
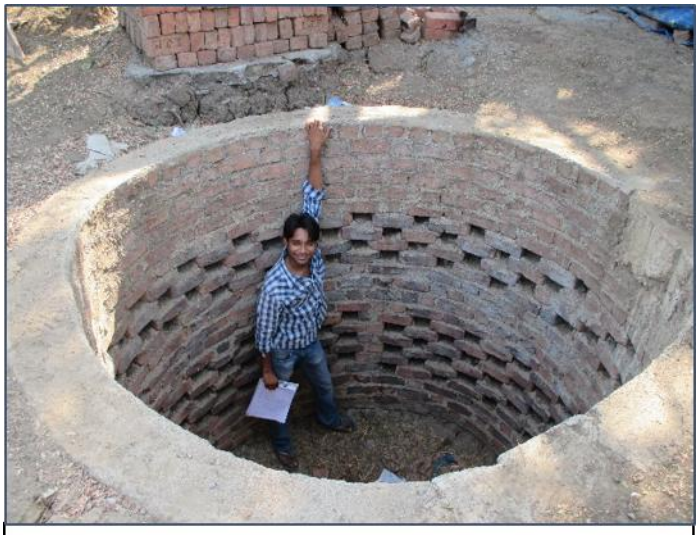


figure shows the relative sizes of pits recommended by the WHO; pits built by the Indian government; those pits that are actually in use in rural north India; and those that, according to qualitative survey respondents, are most sought after. The median pit size of a privately constructed latrine in the SQUAT survey was five times as large as the Indian government recommends. Our qualitative research suggests that households aspire to owning pits even larger than that.



a privately-financed latrine pit under construction

The demand for very large pits and septic tanks drives of up the cost of constructing a latrine considerably. When respondents in the SQUAT survey describe a "*minimally acceptable* latrine," it costs, on average 21,000 rupees. Much of the difference in cost between a Bangladeshi latrine, which might cost as little as 2,000 rupees, and an Indian latrine is due to the difference in the size of the underground pit. The photo on the right shows one such large pit under construction.

Purity, pollution & untouchability

Explaining rural India's widespread open defecation

Why are rural Indian latrines so different from the affordable latrines that are found in other parts of the developing world? Why is open defecation so stubbornly widespread, and even socially desirable for many demographic groups? Here, we turn to an examination of how Hindu practices of purity and pollution, as well as India's unique history of untouchability complicate the adoption of affordable latrines.

Although culture and religion are often treated as distinct concepts both among researchers and in people's own accounts of their lives, it is impossible to characterize the culture of most Indian villages without reference to Hinduism and the structure it provides for social and personal life. This applies for understanding defecation-related attitudes and behaviors as well. Coffey et al., 2015 describe in detail those aspects of rural practices of purity and pollution that apply to defecation-related norms, values and behaviors.

Pushes from latrine use. In short, we find that the affordable latrines used in other parts of the developing world are seen not only as physically dirty, which of course they would not be if they were kept clean, but as *ritually* polluting. As such, they are often seen as a socially unacceptable, and even a shameful object to have near one's house or kitchen, particularly among those whose lives are most closely governed by Hindu norms and hierarchies. These qualitative observations are supported by national data as well; general caste Hindu, OBC and SC households are less likely to own latrines at each level of asset wealth than STs and Muslims in the NFHS 2005.

Benefits of open defecation. Open defecation is not only socially acceptable in the parts of rural north India that we visited, it is seen as a wholesome activity that promotes physical health. When performed in conjunction with other daily rituals, it is seen to promote the purity of the body. Positive attitudes about open defecation are reflected in high rates of open defecation despite latrine ownership: the SQUAT survey found that among households that own a latrine, 40% had at least one member who regularly defecates in the open. Latrines are seen as a luxury item for use by weak people – the old, infirm, young women and children. Healthy, strong decision makers typically prefer open defecation.

Untouchability & manual pit emptying. In Indian villages, ritual pollution is transmitted not only by certain spaces and objects, such as latrines or drains, but also sometimes by certain people, and by certain activities. Purity and pollution are also unifying ideas of the Indian caste system; people from the "untouchable" castes, or *dalits*, are seen as permanently polluted and polluting to others. The pollution that *dalits* embody is often used as a justification for their oppression and extreme social exclusion. In rural India, *dalits* have traditionally been expected to do dirty, degrading tasks for higher caste households, such as the disposal of dead animals, and the manual removal of

a dalit woman cleans a dry latrine

human feces from "dry toilets," used by the infirm or by women in *pardah*, often with minimal compensation.

The fact that *dalits* perform "dirty" work is often used as evidence of their permanent ritual pollution, and has been used as justification for excluding them from schools, public water sources, and more dignified employment (see Valmiki, 2003). Today, untouchability and caste-based social exclusion is slowly being renegotiated in rural India. The exclusion of *dalits* from schools and water sources is less common than it once was, but it is still common for caste Hindus to refuse to eat food or take water from the houses of *dalits* and to exclude untouchables from temples (see Shah et al. 2006). An important part of *dalits'* struggle for equality has been through resistance to performing the kinds of degrading tasks that are associated with untouchability.

The continuing existence, and renegotiation of untouchability in rural India helps explain the unique resistance to affordable pit latrines, which are used in other parts of the developing world, where manual emptying is unpleasant, but does not carry the same stigma. In rural India, caste Hindus will not empty their own latrine pits—to do so would be considered extremely degrading. *Dalits* resist doing this work because of the extreme social exclusion associated with it. Even relatively high monetary payments often cannot compensate for extreme social exclusion: in short, the "market" for pit emptying services in rural India is broken. Hence the "missing middle rungs" on rural India's sanitation ladder – people do not invest in a toilet until they can afford one that will have to be emptied only very rarely. Large pits are likely to be emptied mechanically, or simply replaced when they become full after a generation of use.

Accelerating the reduction of open defecation in rural India begins by admitting the problem

In the long run, rural Indians are likely to be able to afford the kinds of toilets with large septic tanks or sewer connections that are used in cities and that sidestep questions of purity, pollution, and untouchability associated with affordable latrines. But do we want to wait that long? What will it take for rural Indians to adopt the kinds of simple pit latrines that prevent disease, save lives, and reduce stunting in the rest of the developing world? What would widespread adoption of such latrines mean for *dalits*?

First, and foremost, the Indian government, international sanitation professionals, and public intellectuals need to admit that the rural sanitation problem in India is different from other countries. We need to admit that continuing to construct the same kind of latrines that rural

Indians have rejected for decades, without changing the attitudes, beliefs, and norms that lead to this rejection, will not reduce rural open defecation.

At present, rural sanitation policy remains focused on constructing latrines that need to be emptied manually every three to five years. The Swachh Bharat Mission (SBM) proposes to spend Rs. 12,000 to build a latrine for each of the 12.3 crore households that lacks one. The SBM is essentially a reincarnation of the Total Sanitation Campaign (TSC), a central scheme for rural sanitation that preceded the SBM. Administrative records for the TSC claim that it built 8.7 crore latrines in rural India between 2001 and 2011. However, the 2011 census shows that only 5.2 crore rural households, or 31 percent of rural households, had toilets in 2011; most of these households had toilets in 2001 as well. NSS and SQUAT survey data on latrines that are being used suggest that the vast majority of latrines that in use are privately constructed. Considering the reasons outlined here for why rural Indians do not use affordable latrines, the currently proposed, construction-focused SBM is bound to fail (see also Vyas, 2015).

There is unlikely to be a silver bullet for ending open defecation in India. Nor is progress towards reducing open defecation likely to follow the same state-wise patterns as other development outcomes: open defecation is almost as common in "high performers" like Tamil Nadu and Gujarat as it is in UP and Bihar, but is at approximately African levels in "backward" northeastern states. We, at r.i.c.e., have a few modest ideas for better rural sanitation policy: more investment in education about how often affordable pit latrines need to be emptied and about how twin-pit latrines works; behavior change campaigns designed to address issues around purity, pollution, and defecation that take seriously the social fragmentation of Indian villages; exploration of whether mechanized pit emptying is feasible in rural India, and who would operate such machines; more pressure on local government officials to own and use latrines. However, the best ideas for reducing open defecation in rural India are likely to emerge only after we start talking about what purity, pollution and the continuing practice of untouchability have to do with rural India's open defecation crisis.

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