

Research Paper

When the pits fill up: (In)visible flows of waste in urban India

C. S. Sharada Prasad and Isha Ray

ABSTRACT

India's flagship program on sanitation and hygiene – the *Swachh Bharat Mission* – aims to eliminate open defecation and to manage urban waste for a 'Clean India'. The emptying of toilet pits and the transport of waste are as critical as more toilets are for sustainable sanitation. In unsewered cities of the global South, these services are mainly provided by privately run cleaning trucks. We find that the physical and social mechanisms through which these services are organized are virtually invisible in national fecal sludge and waste management policies. Based on a rich ethnography of cleaning trucks in Bangalore, India, we show that trucking operations dispose of sludge in ways that harm both public health and the environment, and that the caste composition of sanitation work helps to keep it invisible from officials and the public. We draw on the concept of the social role of disgust to explain the seen-and-unseen nature of these trucks. 'Seeing' sludge management as it is practiced is essential for understanding how the sanitary city is being produced and for the success of future sanitation reforms.

Key words | caste, disgust, fecal sludge management, on-site sanitation, Sustainable Development Goal 6

C. S. Sharada Prasad
School of Development,
Azim Premji University,
Pixel Park, B Block, Electronics City, Hosur Road
(Beside NICE Road), Bengaluru 560100,
India

Isha Ray (corresponding author)
Energy & Resources Group,
310 Barrows Hall, UC Berkeley, Berkeley, CA
94720,
USA
E-mail: isharay@berkeley.edu

INTRODUCTION

In India, as in the rest of the world, a flush toilet has become a symbol of modern urban life. More than 80% of India's urban population has access to a toilet (GoI 2011), either single-family or multi-household. Most of these toilets are pour-flush, and are connected to a pit or a septic tank rather than to a sewer system. As of the last Census (GoI 2011), only 32.7% of urban India was serviced by sewers, which means that most residents use some form of on-site sanitation (or OSS) (GoI 2011). This trend is likely to continue with the construction boom in large cities and small towns, and the much slower expansion of their sewage systems (Narain & Srinivasan 2012).

Where there are no sewers, fecal waste must be removed from pits and tanks by non-waterborne forms of transport.

Until the early 2000s, pit emptying work was mostly done manually. Manual 'scavenging' is a caste-based practice in which a worker scoops waste from dry (unsewered) latrines and dumps it at some distance from households. The continued deaths of sanitation workers, the degrading nature of manual scavenging, and the relentless work of activists eventually pushed the Government of India into passing the Prohibition of Employment as Manual Scavengers and their Rehabilitation Act in 2013. The Act created the impetus to use non-manual means for emptying pits, i.e., trucks fitted with vacuum pumps and suction hoses. Waste can now be emptied mechanically and transported by trucks, euphemistically called 'honey-suckers', far away from residential areas. Sanitary work is still dangerous: ~22,000 sanitation workers reportedly die every year

servicing India's sewers, sewage treatment plants, and septic tanks (Tyagi 2017).

Most of the sewage and almost all of the septage generated by an average Indian city is disposed of untreated into open drains and peri-urban fields. Safe fecal management is an urgent need, not only in India but for an estimated 1.8 billion people in low- and middle-income countries (Berendes *et al.* 2017). State and national policies have responded to this need, promoting safe handling guidelines and innovative business models for fecal sludge management (FSM). We argue that these guidelines appear to be untethered to the realities of current fecal sludge 'management' in the urban South (see also Peal *et al.* 2014a). India's flagship program on sanitation and hygiene – the *Swachh Bharat Mission* (Clean India Campaign, henceforth SBM) – is mainly focused on the front-end of sanitation, i.e., increasing access to, and the use of, toilets. This is a necessity for a country in which over 500 million people still defecate in the open (WHO/UNICEF JMP 2017), but the emptying of pits and the handling of waste, also a necessity, remain largely undiscussed in policy documents.

The critical literature on urban infrastructure has recently paid much-needed attention to how water and sanitation policies produce and cement inequalities in the urban fabric. Their work has countered the apolitical, technical 'fix' nature of much of the public policy and public health literature on sanitation, especially for the postcolonial city (McFarlane & Rutherford 2008; Chaplin 2011; Desai *et al.* 2015; Satterthwaite *et al.* 2015). Overall, the focus of this literature has been access, affordability, and the right to the city's resources for the everyday citizen: in other words, the front-end. We argue that the back-end of sanitation, or what happens once the toilet is flushed or the pits fill up, is just as important to the urban fabric and for the production of social inequality.

The specific focus of our study is the cleaning out of pits and septic tanks by trucks fitted with vacuum pumps and the truck-transported removal of the waste material, i.e., the movement of fecal sludge through the city. These services are mainly organized by the private sector, in India and elsewhere (Winkler *et al.* 2015), although municipality-run truck services also exist. If SBM succeeds in eliminating open defecation in urban India, it will add millions of toilets by the end of 2019, pushing the number of people connected

to toilets generating sludge to ~235 million (GoI 2011; MoHUA GOI 2017). More trucks will have to be deployed throughout the country, moving pathogenic waste from the toilet to the disposal site. How flows of feces, labor, and money shape FSM practices is central to how a country's FSM policies will play out on the ground, and to how the world will achieve Sustainable Development Goal 6.2 ('adequate and equitable sanitation ... for all').

Our study aims to make these flows visible in the context of urban India, where about 70% of the sewage and almost all of the septage is unsafely managed at present (CPCB 2015). We approach the sanitation system from the perspective of the truck operators who empty septic tanks and transport the sludge; we argue that a detailed account of what they do and why they do it is essential for understanding what the sanitation system *is*. We draw on the concept of disgust (Miller 1977; Nussbaum 1999) to explain the seen-yet-unseen nature of these trucks in sanitation policy. Top-down policies and bottom-up practices inevitably shape one another. The more invisible current practices are, the more 'good' policies are likely to generate resistance and risks in unintended ways. Sanitation policies, therefore, should be proposed with an awareness of current practices and their regulatory ecosystems (Kennedy-Walker *et al.* 2013; Peal *et al.* 2014a), especially because new policies usually rely on existing supply chains and service providers for their implementation.

FECAL SLUDGE FLOWS IN POLICY DOCUMENTS

In 2008, the Government of India made sanitation a key priority and brought out its National Urban Sanitation Policy (NUSP) (MoUD 2008) 'to transform Urban India into community-driven, totally sanitized, healthy and livable cities and towns' (MoUD 2008, p. 7). Although the NUSP recommended safe disposal of human waste, including septic tank sludge, it envisioned a mainly sewer-based future and paid little attention to truck-based emptying. In 2013, the Ministry of Urban Development (MoUD) issued an advisory note on septage management, which included promoting safe truck-based FSM. With the passage of the Prohibition of Employment as Manual Scavengers and their Rehabilitation Act that year, truck-based emptying really took off.

Nonetheless, Prime Minister Modi's *Swachh Bharat Mission*, launched in 2014, remained focused on the front-end of sanitation. SBM (Urban) Guidelines elaborately describe the construction of toilets, the subsidies available and the processes by which to access them, and protocols for how to declare a town free of open defecation (MoHUA GOI 2017). But the guidelines say almost nothing about how contained sludge is supposed to be collected and transported when the toilets and pits are emptied; the word 'trucks' does not appear in them, although trucks play a central role in urban sanitation.

In 2017, the National Policy on Fecal Sludge and Septage Management (FSSM) was published (GoI 2017) with a section on 'Gaps and issues in urban sanitation'. This document explicitly recognizes truck-based cleaning; it recommends that urban local bodies (ULBs) be provided with trucks, and that truck operations be regularized as part of SBM (Urban). These guidelines, however, barely acknowledge the current truck-based FSM practices upon which they must inevitably build: as we show below, truck operators find ways to reach and empty tanks, they find times and places in which the sludge can be dumped, and they understand that their 'informality' is both a burden to, and useful for, under-resourced ULBs. Furthermore, caste hierarchies and prejudices are tightly intertwined with the tasks of cleaning and transporting human waste (Jewitt 2011; Coffey & Spears 2017; Doron & Jeffrey 2018); this relationship and its policy implications are completely missing from any policy documents. It is as though the Clean India Campaign has been sketched out on a clean slate.

Many international FSM guidelines emphasize capacity building, technological innovation, and treatment plants for safe disposal in unsewered cities (e.g., Strande *et al.* 2014; WHO 2015). The current model in India, however, is more 'Pit-to-Ditch' than 'Tank-to-Plant', as clearly shown in shit flow diagrams that 'guesstimate' how much fecal sludge is safely versus unsafely managed (Peal *et al.* 2014a). In the next sections, we outline our research methods and illustrate the flows of feces, labor, and money that characterize the fecal sludge service chain in Indian cities. To our knowledge, this is one of the first papers to investigate the details of what is arguably the most understudied urban infrastructure: the system of moving human feces.

RESEARCH DESIGN AND METHODS

We chose Bangalore, Karnataka (a city of >10 million people; ~5,000 USD per capita annual income) as our primary study site. Over a fieldwork period of 18 months, through open-ended interviews, informal conversations, and participant observation, we collected sanitation information from 51 households, 22 sanitation workers, and 32 truck operators who emptied the fecal sludge and drove it across town to dispose of it. Whenever possible, the first author accompanied truck operators and sanitation workers in the act of emptying pits, and transporting and disposing of the sludge. Thirty-three dumping trips were observed overall, mainly from middle-class neighborhoods or hotel complexes along the outer edges of the city. The observation method adhered closely to the spirit of ethnographic 'tracking strategies' (Marcus 1995), in which the researcher follows several respondents over long periods across multiple sites. In addition, we spoke with managerial staff at the Bangalore Water Supply and Sewerage Board (BWSSB), seven architects who designed homes and the sanitary systems attached to them, and 11 contractors who oversaw construction of the latrines, pipes, and pits. Given the nature of sanitation work, and the tenuous legality of some of the activities carried out by sanitation workers and truck operators, our sample was performed a convenience one.

All respondents gave verbal informed consent to being interviewed and quoted. The interviews were not recorded, as neither truck operators nor sanitation workers consented to speak with a tape running. We translated the interview transcripts from Kannada to English, and coded them for key themes and latent themes (following Coffey & Atkinson 1996). Our research protocol was approved by the Office for the Protection of Human Subjects, University of California, Berkeley (Protocol ID 2014-06-6473).

FECAL SLUDGE FLOWS IN PRACTICE

Containment and storage

To understand how pits are emptied, it is necessary to first understand how they are constructed. A well-designed septic tank with leak-proof reinforcements for a family of

four could cost between 600 and 2,500 USD (in 2016 dollars), depending on the construction material and the size of the tank, and would need emptying at least once in two to three years. Such a tank reduces the chances of contaminated water seeping out and allows for at least partial anaerobic digestion of the waste. A simple soak pit constructed with an unlined bottom costs 150–250 USD and takes four to six years to fill up; some may last longer, depending on the underlying soils. The chances of seepage from an unlined pit contaminating the surrounding soil or groundwater are high. Households often believe, with varying degrees of justification, that sewers will arrive in their neighborhoods within a four to six years' timeframe. City governments, too, treat septic tanks as stop-gap arrangements, although sewer networks are expanding at a much slower pace than the pace at which urban boundaries are expanding.

The Urban Local Body (ULB) in every city approves the construction plan for a new home but usually does not monitor the construction according to the approved plan. In the words of a local building contractor: *'As long as we are paying mamul (i.e., bribe money), they do not care ... no officer from the municipality comes to verify if the building is constructed as per the plan submitted for approval. We include a standard septic tank design for all our houses, naturally. But the owner wants to save money, build a pit and use the savings towards better quality floor tiles or an additional room.'* Therefore, how the pits or septic tanks are built is based entirely on the decision of the homeowner. The architects we spoke to said that only wealthier homeowners employ them; these homeowners are more concerned about the convenience of emptying the pits than about the cost of construction. Middle-to-lower-middle class homeowners work without architects, and want their toilets to be connected to a container that costs as little as possible and takes the longest possible time to fill up. Their go-to option is a pit lined with bricks that functions as a soak pit rather than as a septic tank. Homeowners whose plot sizes are small also want to save the money and space for more rooms. Nine of the eleven contractors we interviewed did not even know how to build a septic tank; all were familiar with the soak pit model.

Truck operators who empty the pits and carry the waste away confirmed that almost 95% of the households they

serviced used soak pits. Pit management can be tricky, they said. The time it takes for a pit to fill up depends on its size, lining type, soil type, rainfall, and groundwater level. It could take three months or ten years, but eventually all pits fill up. A homeowner notices a full pit when a normal flush results in a backflow. At this point, the toilet is unusable, and it is time to call the truck operator.

Emptying pits and collecting fecal sludge

When a pit fills up, homeowners either get a new pit dug or get the existing one emptied. It takes 25–80 USD (in 2016) to empty a full pit. If homeowners have large yards or enough money, they opt to get a new pit dug. A new pit can cost from 2.5 to 10 times more than emptying an existing one.

If space or money are in short supply, homeowners get the pit emptied. They can either seek manual help or call a truck; the second is only an option if the truck can reach the house, or get close enough to run its suction hose to the pit. The city-run trucks use more advanced technology than is possible for small private operators, but they are frequently busy cleaning out sewers and government buildings, and can be slow to respond to individual calls. Thus, homeowners call the swift and responsive private truck operators. Since the passage of the 2013 Act, and media coverage of the dangers faced by sanitation workers, homeowners have become wary of the manual option.

Truck operators can be reached by phone, mainly through the Yellow Pages but also by looking online. Ever since suction-hose sludge removal started in Bangalore (almost two decades ago), truck owners have actively marketed their services. They paint the name and number of the service in large font and bright colors on the holding tanks; the drivers always carry business cards; they park at busy intersections where they can easily be seen while waiting for a service call; and printed fliers are distributed with the daily newspapers. Owners do not usually get involved in the actual cleaning work, however. They come from diverse castes, and some may even be Dalits (Doron & Jeffrey 2018). The truck operators (i.e., the drivers) are usually not from a Dalit sub-caste; the cleaners themselves are, with few exceptions, Dalits.

In smaller cities and towns, e.g., Dharwad, the municipality has the phone numbers of all the private operators,

who are expected to obtain (verbal) permission to operate. Larger cities such as Bangalore allow for a measure of invisibility with respect to the state; our truck operator respondents estimated that Bangalore had 150–180 unregistered trucks providing emptying services in different neighborhoods, and an additional 60 officially registered with BWSSB. Only registered sludge-emptiers are legally allowed to service certain industrial and commercial enterprises, and large apartment complexes.

The charges for sludge removal services are semi-fluid. If the homeowner is charged based on the number of trips the truck has to make to empty the pit, each trip costs between USD 25 and USD 35. Most residential septic tanks can be emptied in two trips. Discounts are negotiable. Alternatively, as most tanks are simply cesspits with concrete rings laid on top of each other, truck operators can charge by the ring. Every ring emptied costs about USD 8, and most pits have six or seven rings. Some truck operators exploit their customers' desperation: they get multiple phone numbers listed in the Yellow Pages and reject every call to the first set of numbers ('we are overbooked today'). The customer becomes anxious and does not negotiate the price when hiring the same service provider on a different phone number.

Once a truck owner agrees to service a pit, operators reach a house within 4–6 hours of receiving the phone call. Operators try to reach the site as fast as possible, mostly because they fear that the customer will get impatient and call another provider. There are several exceptions to the quick-response rule. If the toilet to be serviced is still operational, working families prefer the emptying to happen during the evenings or weekends. Truck operators prefer to do any pre-scheduled emptying – such as for hotels and schools – during the night because they do not want to miss urgent calls during the day. Elite hotels prefer their septic tanks emptied at night because they do not want their clients to see or smell the operation. The night is also convenient for the indiscriminate dumping of waste.

If the toilet is not operational, people want their houses to be serviced immediately. The first task of the sanitation workers is to locate the opening of the pit, which is usually covered by a granite or concrete slab (Figure A1). Once the slab is located, it is pried open to create a hole large enough

for the hose to be inserted. If the sludge is thick, water has to be added to make it thinner. The other end of the hose is attached to the truck's pumping mechanism. In rare cases, the sludge will have solidified completely. A man has to get into the pit and start breaking up the dried sludge before it can be diluted; these workers are invariably Dalits (the lowest rung on India's illegal-but-entrenched caste ladder), and frequently use alcohol or opioids to numb their senses (Doron & Jeffrey 2018).

Homeowners provide a couple of buckets of water for the sanitation workers but usually do not offer them soap. All the work of digging the trenches, locating the opening, breaking open the slab, mixing water, inserting the hose, etc., is done without protective clothing. Our worker respondents expressed no concerns about the health risks related to their job. They said that the gloves and boots in the market were not designed for the kind of job they do, and the available gloves do not provide the right grip for handling the crowbar. Besides, they did not want the public to think that they were touching and carrying away dangerous stuff: *'We don't wear any gloves or masks. Wearing them makes people think that our work and the waste we carry in our truck is dangerous. Though we are disgusted by the waste, we act normal, as if it is harmless. That also makes dumping it a lot easier.'*

Transport and disposal

Dumping the collected waste is a source of stress for the truck operators. As there is usually no designated place to dump the sludge, truck operators seek places that do not attract unnecessary attention. Spots without much foot traffic are best. They work fast, taking 7–10 minutes to dump a 4,000-liter load of sludge.

Truck operators have finely tuned strategies for getting rid of sludge. *'We are always on the lookout for spots to dump'*, our informants said. *'The crucial part of this business is not finding a customer to fill the tanker, but finding a spot to unload it quickly. If we roam around Bangalore with a tanker full of sludge, we lose money on other customer calls.'* They explained the different ways and places – most of them illegal – in which they disposed of waste. Open and dry plots on the periphery of the city are always good; these plots absorb the water quickly and do not hold the

smell for long. Such spots are especially convenient at night. Storm water drains along the side of the main roads also work. These drains usually start and end in nondescript places and have segments with sparse populations where the sludge can be dumped, especially if a spare worker can watch the road for oncoming traffic. The large storm water drains that carry water out of the city – *raja kaluve* – already carry sewage, and can be accessed from bridges and side alleys all over Bangalore's outer edges (Figure A2). Unless there are houses close by, people rarely complain. Late at night or very early in the mornings, truck operators can sometimes open a manhole cover and drain the sludge directly into the city's sewer lines. Finally, there are farm lands – dumping sludge on a fallow farm is a safe option for the operator, but Bangalore has changed dramatically in the last two decades and there are not many farm lands close to residential areas anymore (Figure A3). Despite optimistic reports of treatment followed by re-use as a business model in Bangalore (see Doron & Jeffrey 2018, p. 85), we found only a small portion of the city's collected sludge is re-used in this way, mostly without treatment.

BWSSB, the authority responsible for human waste management in the city, has mandated that the sludge from apartments and commercial complexes in certain neighborhoods should only be dumped in BWSSB's wastewater treatment plants. BWSSB has 14 treatment plants, but sludge from a septic tank was being accepted in only two of these – Kadubeesanahalli and Mailasandra – in 2016. However, truck operators complained that BWSSB's permitting process was full of 'unnecessary' requirements (such as making payments up to six months in advance) and bureaucratic hurdles (such as lab tests of the sludge). Almost no small truck operators could gain access to the treatment plants, therefore. At the same time, some drivers reported that vigilante groups, calling themselves the 'public', took videos of the dumping operations and then blackmailed them or threatened to call the police. Drivers and workers also recounted stories of leaky drain valves that sometimes sprayed sludge on other drivers while in transit, and the resulting abuse of sanitation workers by enraged individuals. Any conspicuous entanglement with 'the public' could lead to the involvement of the police, which would lead to the vehicle being confiscated, delays in the work, bribery, harassment, and other inconveniences.

Little of this was unknown, we found, to municipal officials. The 2013 Act has created an environment in which they have to condone the activities of truck operators, they argued. As one official put it: *'We are helpless. If we ask homeowners not to use trucks, their other option is to employ people, which is illegal. The government does not have the capacity... Even if we buy trucks, where will we dump the waste? Being the government, we can't dump waste here and there as private operators do. So we ignore the wrongdoings of private operators. We just respond to calls by the public if they dump too close to a residential area.'*

DISCUSSION: WHY FLOWS OF WASTE ARE 'INVISIBLE'

The trucks and their practices that we have described so far are visible to everyone, to the public and to the government. The entrepreneurial truck operators, in fact, make every effort to be visible (except when they are offloading the fecal sludge). Why, then, do these trucks and the work they do make no appearance in the raft of policy guidelines on sanitation and FSM in India?

The philosophical and anthropological literatures on invisibility are rich with explanations of how and why the everyday and obviously visible become invisible. These include self-imposed blindness when seeing is inconvenient (McFarlane & Silver 2017); disgust with what is deemed repellent – like bad smells and the things that produce them (Miller 1977; Nussbaum 1999); and contempt of the social classes with which repellent things are associated (Hwang 2013; Doron & Jeffrey 2018). We draw on these insights to make sense of why the brightly colored honey-suckers in our study cities remain seemingly unseen, and to make the case for why it is essential for sanitation policy to see what these vehicles actually *do*.

The uses of invisibility

First, the Indian state – at all levels – is overwhelmed by the scale and complexity of the sanitation problem (Satterthwaite *et al.* 2015). Although agencies at the Government of Karnataka level have instituted new on-site treatment regulations

for larger structures, compliance and enforcement can be imperfect. Blindness is strategic in such situations because the state does not have to regulate that which it does not 'see'. In principle, BWSSB could buy more trucks, regulate them, and provide more sludge emptying services. According to local officials we interviewed, such an operation would be a nightmare as the city lacks the infrastructure to safely dispose of the sludge. If a private operator dumps sludge into the city's lakes, the city can look away, they admitted. Truck operators also never dump sludge close to the homes of politicians or businessmen; they choose drains and gutters whose surrounding areas are inhabited by people who have been marginalized into invisibility already, or they choose a time of night when no one is around.

It is also the case that pits and septic tanks do not fit India's imagined future of a sewer-based urban sanitation system. Globalizing cities such as Bangalore are seeking to model themselves as finance and technology hubs with 'world-class services' (Goldman 2011), a vision in which messy cesspits have no place. Many cities of the global South have better data on, and plans for, sewage systems than they do for FSM, although sewage systems serve only a small part of the population (Peal *et al.* 2014b). Their civil engineers and municipal officials are usually committed to a vision of the networked city, and see septic tanks and on-site systems as interim arrangements en route to full sewerage, even when such a scenario is a distant one. Several Indian cities are upgrading or constructing centralized sewage treatment plants with funding from the Government of India's urban rejuvenation programs, but no fecal sludge treatment plant has yet been funded by these schemes.

Finally, the average citizen does not see the flow of human waste once it has disappeared after a flush or has been carried away from the household pit. It is no longer his or her concern. If citizens see septic cleaning trucks on the road, as long as sanitation workers are not dumping out the sludge in an obvious manner – and sometimes even if they are – they simply move on. Despite periodic exposés in the press of the dangers of waste work for workers and for nearby residents, the very everyday-ness of unsanitary behaviors in generally unsanitary cities renders them invisible. This form of invisibility is not peculiar to India: Nagle in a fine ethnography shows that the

invisibility of sanitation workers in New York is 'a status given to them by the larger culture' (Nagle 2013, p. 23).

The invisibility of the disgusting

Our work suggests that all these reasons are undergirded by the powerful emotion of disgust that is associated with garbage, and fecal matter in particular, compounding the invisibility that we observed in sanitation policy documents and among state representatives. Disgust ran expressed and unexpressed through numerous discussions with contractors, householders, local elected officials, and many sanitation workers themselves. Some scholars have argued that social and political theory cannot afford to neglect the role of contempt and disgust in shaping the social world. Miller (1977) argues that these two emotions effectively structure the social world and our attitudes towards the world. Nussbaum (1999) goes further, to say that disgust is not only key to 'much of the structure of our daily routine' but that 'most societies *teach the avoidance* of certain groups of people as physically disgusting' (Nussbaum 1999, p. 18; our emphasis).

It has historically been, and it remains, difficult for any society to openly confront and discuss its own waste, especially fecal waste (Black & Fawcett 2008). But understanding the social role of disgust and contempt – particularly in light of India's caste system in which the lowest orders have been consigned to the realms of ritual pollution (Douglas 1966) and 'the disgusting' – helps to understand why managing its feces has been a particular challenge for India (Jewitt 2011; Desai *et al.* 2015; Coffey & Spears 2017). Waste and waste workers are readily conflated with one another (Doron & Jeffrey 2018; Harriss-White 2018), such that even Dalit sub-castes that do not work with feces express contempt for those sub-castes that do. Similar attitudes prevail in rural North India; Coffey & Spears (2017, p. 87) recount the words of a *Pasi* (a Dalit caste) man on toilet cleaning: 'They are *Mehters*, so they clean. We are *Pasi*, so we can't clean'. Social attitudes that are ultimately rooted in disgust and contempt encourage the looking away from fecal sludge transport and disposal; they normalize the imagined city as a networked city in which the disgusting material is, literally, underground (see also Hwang 2013).

Why invisibility matters

The invisibility of fecal flows has significant consequences for implementing and financing sanitation reform in urban India. Sanitation services are being stepped up in low- and middle-income countries because the absence of toilets deprives people of dignity and health. However, the presence of toilets without a hygienic service chain can be equally detrimental to the environment and society. When a pit fills up, a truck transports the risk of disease away from the household; this same truck becomes a mechanism through which flows of labor, money, and feces shift risks to the workers and to the urban environment. The job of working with sludge and without protection is left to a subsection of Dalits; the dumping of sludge into open water bodies allows it to flow into other spaces. Suctioning fecal waste via a hose and pump and driving it to a disposal site represents progress over manual scavenging in which feces are cleaned using hand-held tools and carried away in a cart or on the head. Yet, what Coffey & Spears (2017, p. 9) bluntly call the ‘illiberal forces of caste’ are still shaping the truck-operated sanitation service chain. Or, as one cleaner told us: *‘There is no job security. The only security we have is our caste. People from other castes are not interested in doing this work.’* FSM policies and guidelines currently do not engage with this reality and, instead, offer up a ‘sanitized discourse’ (Gatade 2015) of a caste-neutral Clean India.

All these aspects must be seen and understood if the well-intentioned policies under the Clean India Mission and the NUSP are to be implementable. They must be seen and understood if policies on safe handling of fecal waste and business models for re-using the waste are to make sense in the global South. The success of their visions depends on reforming the waste economy for human health, human dignity, and environmental health. This will require building more treatment facilities, enforcing building regulations from toilet to tank, affordable pricing or subsidies targeted towards safe FS collection, worker protections, and monitoring and enforcement of safe disposal. Evidence from around the world points to the cost-effectiveness of such measures in benefits for both health and the environmental resource base. But it is not possible to regulate a more sustainable FSM system by blindness towards current FSM practices – whether that blindness is deliberate or inadvertent, and whether it is rooted in

disgust, caste prejudice, or visions of urban modernity. We have argued that it is especially necessary to understand the FSM system from the perspective of the truck operators who move feces and its associated risks across town; it is likely that these same truck owners, drivers, and cleaners will be key players – and stakeholders – in any future, more regulated, and SBM-friendly version of waste management.

CONCLUSION

India has embarked on an epic journey to build toilets and provide universal access to sanitation. The focus of the campaign, as we (and others) have found, is heavily tilted towards the front-end. If rural India is grappling with toilet construction and behavior change, then urban India is grappling with what comes later, after the construction of toilets and the established behavior of toilet use. Based on a thorough document review, we show that sanitation reform policies in India make almost no mention of the septic tank cleaning trucks upon which back-end services depend. Yet the truck operations comprise a complex social and financial system atop which any feasible reforms will sit. Based on our ethnographic work in Bangalore, we find that it is rational, under the current conditions, for private trucking operations to offload the costs of urban pollution and caste inequality that are produced and reproduced when they offload fecal waste. It is likely that, in future, rural India with millions of SBM-enabled toilets, will face the same problems of illegal dumping by truck-operated cleaners. Monitoring and enforcement in rural regions is usually lax relative to urban areas, which suggests that the invisibility of waste removal in rural India could be more damaging than it is in urban centers. We conclude that making the Pit-to-Ditch service chain and its constituent practices visible, to both national policy makers and local policy implementers, is a precondition for a Clean India and for the attainment of Sustainable Development Goal 6.

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