

The Past, Present, and Future of Sanitation, with a Case Study of India

*Where and Why We Should Give a Sh*t*

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List of Abbreviations

<u>APIPs</u> - Annual Project Implementation Plans	<u>NBA</u> – Nirmal Bharat Abhiyan
<u>APL</u> - Above the poverty level	<u>NFHS</u> – National Family Health Survey
<u>ARWSP</u> - Accelerated Rural Water Supply Program	<u>NGO</u> – Non-governmental organization
<u>BCC</u> - Behavioral Change Communication Campaign	<u>NGP</u> – Nirmal Gram Puraskar
<u>BJP</u> - Bharatiya Janata Party	<u>NSDP</u> – National Slum Development Program
<u>BPL</u> - Below the poverty level	<u>NSS</u> – National Sample Survey
<u>BRC</u> - Block Resource Centers	<u>NUSP</u> – National Urban Sanitation Policy
<u>BSL-2012</u> - Baseline Survey of 2012	<u>OBCs</u> – Other Backward Classes
<u>CCDU</u> - Communication and Capacity Development Unit	<u>ODF</u> – Open-defecation-free
<u>CLTS</u> - Community-led total sanitation	<u>ODNF</u> – Open-defecation-not-free
<u>CRSP</u> - Central Rural Sanitation Program	<u>OLS</u> – Ordinary least squares
<u>CSCs</u> - Community sanitary complexes	<u>PAC</u> – Plan Approval Committee
<u>DDWS</u> - Department of Drinking Water and Sanitation	<u>PAF</u> – Public Affairs Foundation
<u>DINEPA</u> - National Directorate for Potable Water and Sanitation	<u>PEO</u> – Program Evaluation Foundation
<u>DLHS-III</u> - District Level Household Survey	<u>PRIs</u> – Panchayati Raj Institutions
<u>DoH</u> – Department of Health	<u>RAY</u> – Rajib Awas Yojana
<u>DWSM</u> – District Water and Sanitation Mission	<u>RGNDWM</u> – Rajiv Gandhi National Drinking Water Mission
<u>FLTs</u> – Fresh Life Toilets	<u>RKMLP</u> – Ramakrishna Mission Lokshiksha Parishad
<u>GDP</u> – Gross domestic product	<u>RSC</u> – Rockefeller Sanitation Commission
<u>GP</u> – Gram Panchayat	<u>RSM</u> – Rural sanitary marts
<u>IEC</u> – Information, Education and Communication	<u>SBA</u> – Swachh Bharat Abhiyan
<u>IHDS</u> – India Human Development Survey	<u>SCs</u> – Scheduled Castes
<u>IHHL</u> – Individual household latrine	<u>SPV</u> – Special Purpose Vehicles
<u>ISP</u> – Intensive Sanitation Project	<u>STs</u> – Scheduled Tribes
<u>JnNURM</u> - Jawaharlal Nehru National Urban Mission	<u>SIAR</u> – Rural Water Information System
<u>KAPs</u> – Knowledge, Aptitude and Practices Survey	<u>SQUAT</u> – Sanitation Quality Use Access and Trends
<u>LNG</u> – Liquefied Natural Gas	<u>SWSM</u> – State Water and Sanitation Mission
<u>LPG</u> – Liquefied Petroleum Gas	<u>TSC</u> – Total Sanitation Campaign
<u>MDGs</u> – Millennium Development Goals	<u>TTC</u> – Thermotolerant coliform
<u>MGNREGA</u> - Mahatma Gandhi National Rural Employment Guarantee Act	<u>UIDSSMIT</u> – Urban Infrastructure Development Scheme for Small & Medium Towns
<u>MoDWS</u> – Ministry of Drinking Water and Sanitation	<u>ULBs</u> – Urban Local Bodies
<u>MoUD</u> – Ministry of Urban Development	<u>UN</u> – United Nations
<u>MPCE</u> – Monthly Per Capita Expenditure	<u>UNICEF</u> – United Nations Children’s Emergency Fund
<u>mSBA</u> – Mobile-based application of Swachh Bharat Mission	<u>VAMBAY</u> – Valmiki Ambedkar Awas Yojana
	<u>VIPs</u> – Ventilated Improved Pit Latrines
	<u>VWSC</u> – Village Water Sanitation Committee
	<u>WASH</u> – Water, Sanitation, and Hygiene
	<u>WHO</u> – World Health Organization

Abstract

“First thing in the morning, what do I see? A pile of shit staring at me.”
-UNICEF’s Poo2Loo: Poo Party video (2014b)

In 2014, UNICEF asked citizens of India to take a “poo party” in an attempt to reduce open defecation levels. The highly comedic approach—incorporating Facebook, Twitter, and YouTube videos—is an example of one public health campaign that is trying to encourage individuals to construct and use toilets.

UNICEF is not alone in its quest to improve sanitation. Other organizations—from the big names of World Vision, WaterAid, WASH Advocates, and the Bill and Melinda Gates Foundation, to smaller start-up companies like Sanergy, BlueEnergy, and SeeSaw—have initiated projects around the world to provide individuals with this basic amenity. And besides non-governmental organizations, governments themselves have taken action both nationally and globally to ensure their own constituents—and the global population—have safe and reliable sanitation amenities. The Millennium Development Goals, signed by the 191 member states of the United Nations, intend to “halve, by 2015, the proportion of people without sustainable access to safe drinking water and basic sanitation” (UNICEF, 2014a).

The following thesis looks at the issue of sanitation, particularly given its political relevance both nationally and globally, and the overwhelming increase in the number of individuals without proper sanitation facilities. Moreover, this thesis seeks to better understand whether investigating the topic of sanitation from an economic, political, cultural, or historical framework, among others, can provide a clearer understanding of

the origins of this environmental and public health problem, and potentially provide a plausible solution.

Chapter 1 conceptualizes the extent of the sanitation issue, as well as investigates both the demand and supply factors that influence toilet adoption. Specifically, I utilize an economic model of human behavior in order to understand the factors that can increase or decrease an individual's demand for toilet construction, as well as explore various political and/or social limitations and constraints that might hamper toilet adoption.

Chapters 2 through 5 provide an examination of the sanitation movement in India. Chapter 2 uses a political ecology approach to better understand the origins of the sanitation movement, looking at the country's environmental movement as a whole, with a particular emphasis on the influence of Great Britain, as well as India's relationship with the caste system. Chapter 3 attempts to quantify India's sanitation coverage, by investigating the various data sources that provide different and often contradicting statistics on coverage. Additionally, Chapter 3 attempts to tease out various factors—geographical, financial, religious, etc.—that might help predict presence or absence of an individual household toilet, as well as the various governmental barriers or complications in India that might prevent demand for toilets from being actualized. Using insights regarding the importance of demand-side campaigns and the cultural or socioeconomic factors that can influence toilet construction from the previous chapters, Chapter 4 provides a case study of the Behavioral Change Communication (BCC) Campaign in the Davangere District of Bangalore. This chapter combines information both from Arghyam, an Indian charitable organization who initiated the BCC Campaign, as well as

from my own personal experiences visiting villages that had undergone the BCC Campaign. Chapter 5 concludes, looking at and evaluating the Prime Minister's new Clean India Campaign, and its potential for improving the future of sanitation in India.

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A Note from the Author:

Every summer, I try to read a few books—most are beach reads, but scattered in every once in a while is a more “sophisticated” read. One of those books was entitled, “Public Restrooms and Politics of Sharing: Toilet,” edited by Harvey Molotch and Laura Noren. After becoming intrigued by the title of the book, let alone the chapter names—“Living in the Loo” or “Pissing without Pity”—I soon became captivated by its contents. This book made me aware of the hidden complexities of toilets, and what ultimately made me realize—and perhaps convince me—that I could (and I would) write a thesis about toilets—yes, toilets! And this is coming from the girl who always has a bottle of hand-sanitizer with her.

One of my favorite parts about the book were the authors’ Rest Stops, “images and brief texts that exhibit the points being made in a sharp, sometimes exuberant way,” and appeared at the end of every chapter. In honor of this book, I’ve decided to do the same for my thesis. Yet, my Rest Stops will be slightly more entertaining—providing brief snippets of stories from my time spent in India—that will provide some comedic relief, or minimally a simple break for this (slightly) long thesis.

Rest Stop 1:

In India, I spent two days traveling with workers of Arghyam—the Indian charitable trust I was interning with—to the Davangere District. In Davangere, we observed the results of the sanitation campaign the company had unleashed in early 2014.

The day had started earlier, at the lovely hour of 5:00am, and as the sun had finally started to rise, we pulled over to have breakfast in what appeared to be a downtown. Downtowns in India are not your Northampton in the United States. First off, “parking” isn’t really part of the country’s language—amidst the chaotic driving and incessant honking, “parking” is more stopping in the middle of the road, and we as passengers, were tasked with trying to safely find our way to the “restaurant.” “Restaurant” also has a broad definition—we were never given a menu, yet everyone seemed to know what the restaurant served, granted nearly every restaurant had the same breakfast, lunch, and dinner. All restaurants served tap water—which you had to decline for pricey bottled water—and all expected you to eat all remnants on your plate. To do otherwise would be an insult. Anyways, I was looking forward to a nice hot meal and afterwards, a trip to the bathroom. Yes, the meal was great; but the bathroom, not so much. As an American, I assume everyone uses Western toilets. So, when I headed to the bathroom of this restaurant, I was excited to finally relieve myself and do so while sitting. Unfortunately, this was not the case. One of the workers from Arghyam had accompanied me to the bathroom. As I went in to the one-stall bathroom, I was faced with a squatting toilet. I had no idea what to do—how does one use this toilet? Do you completely undress? Where’s the toilet paper? Gosh, do I still have my hand-sanitizer with me? I was flustered. It was too early in the morning to figure out how to use this toilet, and so I paced around the bathroom for a little—in an attempt for the worker at Arghyam to think I was using the squatting toilet and embracing Indian culture—and then left. Fortunately, the next stop included two bathrooms—one Western, one squatting.

Although this story might provide you with a little laugh, this incident made me realize that not everybody uses, knows how to use, or is willing to use, all types of toilets. If Amherst College decided to install squatting toilets all throughout the campus, I’m not sure if students would use them, or at least not right away. Similarly, Westernized toilets installed throughout India will most likely induce a similar response. Toilets take many shapes and sizes, and we must be “potty trained” to use the right one—whatever the “right” one might be.

Introduction: Chapter 1: The Past, Present, and Future of Sanitation Reforms

Part 1: Introduction

1a. No Toilet, No Bride

You consult astrologers about rahu-ketu (the alignment of sun and moon) before getting married. You should also look whether there is a toilet in your groom's home before you decide. Don't get married in a house where there is no toilet (Malm, 2012).

--Minister for Rural Development, Jaairam Ramesh

In 2005, local authorities established a massive media campaign to encourage the construction of toilets and to broadcast the importance of respecting the right of women to use latrines in privacy and security in Haryana, India. The campaign used radios, banners, and other advertising channels to disperse information, using phrases, such as, “no toilet, no bride” and “no loo, no I do,” to target families of marriage-age girls to demand that potential suitors' families construct a latrine prior to marriage. The strikingly competitive marriage market in the Punjab region—with an average of 87 women for every 100 males (Stopnitzky, 2012a)—made women scarce commodities and forced men to distinguish themselves amongst the competitive field. The campaign's innovative mechanism effectively changed the cultural and social taboo associated with toilets, and with sanitation more broadly. Toilets became instrumental to the marriage market, and thus prompted a value of and demand for toilets amongst the families of marriage-age boys: “I will have to work hard to afford a toilet. We won't get any bride if we don't have one now. I won't be offended when the woman I like asks for a toilet” (Stopnitzky, 2012a).

The “No Toilet, No Bride” campaign represents an exemplary model for the future of sanitation reforms. This campaign was marked by a strong supply—the local

authorities responsible for implementing the reform—, which effectively mobilized a value of and demand for toilet construction and usage among residents in Haryana, India. The design did not simply provide toilets, but changed the community’s perception of toilets—from unnecessary to essential, and from a social taboo to a social norm.

Sanitation is a worldwide problem, and one with sometimes awkward and highly charged topics and words—from “public defecation” to “feces”—that invoke political, cultural, religious, social, and economic issues. Solutions must be found through a holistic approach of the “politics of shit,” which examines the environmental, social, political, and historical dimensions of toilets, and how a community’s society and culture intersects with the institutions responsible for providing sanitation amenities or who might have contributed to, or exacerbated, the current sanitation crisis. Chapter 1 seeks to understand the interaction between supply and demand for toilets and ultimately forecast the way in which sanitation reforms should proceed in the future. Demand for toilet construction and usage falls within the realm of the user: individuals must decrease the value of “unsanitary” ways of defecation, and subsequently increase the value of and demand for toilets. Supply for toilet construction falls within the hands of institutions—public and private organizations—or within the hands of individuals. Following a holistic framework, I argue that the solution must include not only the construction of toilets, but also the reconstruction of behavioral and cultural norms. Communities must see both the individual and collective value of toilet construction and usage; and nationally, political regimes must reorient their goals to focus less on quantitative, short-term, and “hardware” installation, and more on qualitative, sustainable, and “software” solutions.

Part 1 looks at the sanitation issue as a whole, to better understand the inter- and intra-country inequalities of poor sanitation amenities, as well as the interaction between public defecation and the environment on the quality of sanitation. Part 2 analyzes the role of demand in sanitation reforms. Taking an economic model of human behavior approach, I use Pattanayak et al.'s (2007) model of toilet adoption to obtain an individual's demand for toilet construction through utility maximization. This demand model will help to illuminate ways in which demand for toilet construction and usage can be increased, paying heed to the interactions of culture, religion, and history, among others in toilet adoption. After an understanding of the demand side, Part 3 focuses on supply, and investigates the political and/or social limitations and constraints that can impede toilet adoption. Finally, Part 4 looks at past health reforms after wide-scale health epidemics to provide insights for future implementation of effective sanitation reforms.

1b. Sanitation: A Global Issue

The [Millennium Development Goals] MDGs were never meant to be a one-way street—something that rich countries do for the poor. Quite the contrary: our long-standing work for development in general has always been based on global solidarity—on a shared interest—on a powerful sense of community and linked fates in an interconnected world” (United Nations).

-Secretary-General Ban Ki-moon, in his closing remarks to the MDG Summit, September 22, 2010

In September 2000, members of the United Nations (UN) adopted the United Nations Millennium Declaration. Through the Declaration, committed members agreed to a number of time-bound targets and goals—designed to ameliorate poverty, hunger, and disease—, with a deadline of 2015. These goals have collectively been termed the Millennium Development Goals (MDGs). Beyond financial and physical support, the MDGs calls for a collective, “global partnership,” to “help give voice to the hopes,

aspirations, and vital needs of the world's poorest and most voiceless people" (Sachs, 2005).

One of the goals (#7) of the MDGs is to ensure environmental sustainability. Target 7.C intends to "halve, by 2015, the proportion of people without sustainable access to safe drinking water and basic sanitation," with basic sanitation defined as "the proportion of population using an improved sanitation facility" (UNICEF, 2014a). Poor sanitation and the practice of public defecation can have a series of environmental, health, and economic ramifications on affected communities. The combination of poor sanitation, water, and hygiene leads to about 700,000 premature deaths annually, as well as the loss of approximately 443 million school days as a result of subsequent diseases (The World Bank, 2014). Missed school days can have long-term impacts on future economic productivity of both individuals and society collectively. All in all, economic losses from lack of access to sanitation or increased health system costs are estimated at US\$260 billion annually (The World Bank, 2013). Beyond a physical health concern, public defecation opens the door to sexual harassment and violence when women are forced to utilize open areas (The World Bank, 2014), and hence acts as an inconvenience, threatens privacy, and increases embarrassment, among other discomforts (Mara et al., 2010). Since 51% of the world population did not have access to an improved sanitation facility in 1991, in order to meet the 2015 target, this proportion must be reduced to 25% by 2015 (World Health Organization & UNICEF, 2014). Although 1.9 billion people gained access to a latrine or other improved sanitation facility between 1990 and 2011 (WHO & UNICEF, 2014), if current trends persist, the MDG sanitation target will fall short by over half a billion people (WHO & UNICEF, 2014).

“Lack of improved sanitation,” according to The World Bank, includes defecation in the open—in a bush, field, or forest—or the use of a pit latrine without a slab, bucket toilets, hanging toilets/latrines, or toilets that “flush” untreated into the environment (The World Bank Group). “Proper sanitation,” therefore could consist of the use of a range of toilets: pit latrines with a slab, ecological toilets, or water-flush and pour-flush toilets. For the remainder of this essay, “toilets” will be used to refer to this broad range of “proper sanitation” equipment. Pit latrines, ranging from simple unimproved pit latrines to Ventilated Improved Pit Latrines (VIPs) to alternating twin pit systems, are cheap options usually used when there is no source of water (The World Bank Group). By using two pits, one pit can be used for defecation, while the remnants in the other can degrade and eventually be used as compost (The World Bank Group). Ecological toilets, which also require a minimum amount of water and whose contents can be used as fertilizer, separate feces and urine in different containers (The World Bank Group). The design of this kind of toilet is encouraged to create a “sanitation-and-recycle” or closed-system network between the contents of defecation and its final, usable product of fertilizer (The World Bank Group). Finally, water-flush and pour-flush toilets require water to flush urine and fecal material from the toilet into a pit or in a pit, septic tank, or sewer via a pipe (The World Bank Group). The choice of a particular type of sanitation facility is determined by a number of factors, including cost, availability of water sources, and acceptance by beneficiaries, among others.

Although one billion people are without access to sanitation facilities, this subset of individuals is not evenly dispersed globally. Rather, it is a “rural and poverty-related phenomenon,” and is particularly concentrated in Southern Asia and sub-Saharan Africa

(WHO & UNICEF, 2014). Among other reasons, these particular countries might face higher population concentrations, which put a strain on the availability and maintenance of public sanitation facilities, or contain a larger segment of poor individuals who are unable to afford proper sanitation amenities. In addition to inter-country variation, there is also intra-country variation, with large disparities between rich and poor populations, as well as urban and rural populations. In many instances, the wealthiest 20% receive coverage before the poorest 20%, increasing the wealth gap to access (WHO & UNICEF, 2014). The urban-rural divide is also striking: 70 percent (902 million people) of those without access to an improved sanitation facility reside in rural areas (WHO & UNICEF, 2014). Although the poor-rich and urban-rural divides invoke the most significant disparities, inequalities also exist among gender, ethnicity, language, education, and religion. As will be discussed below, and in more depth in Chapters 2 through 5 in reference to India, a political ecology framework can help explain these differences both within and among countries.

1c. Public Defecation, the Environment, and Sanitation

The combination of poor sanitation facilities and open defecation is a concern for both environmental and human health. Edwin Chadwick first made the link between lack of sanitation and disease in the mid-19th century. Through examination of the poor living conditions, disease, and life expectancy of English and Welsh residents, and using statistics from the General Registration (Chadwick, 1842), Chadwick concluded,

The defective town cleansing fosters habits of the most abject degradation and tends to the demoralization of large numbers of human beings, who subsist by means of what they find amidst the noxious filth accumulated in neglected streets and bye-places (Chadwick, 1843).

Attributing disease to uncleanness, Chadwick advocated for cleaning, draining, and ventilating as means to improve health. John Snow built upon Chadwick's claim by discovering the link between uncleanness and human health. Snow, using the Broad Street Pump incident as an example, showed how sewage—specifically, a baby's diaper polluted with cholera—from a nearby cesspit contaminated the county's water source and thus inflicted anyone who drank the water from the pump (Summers, 1989). Water was identified as the source of transmission, exemplifying the effects of poor sanitation on human health via water-borne diseases.

Similar to the diaper that contaminated the water source in London, human excreta from public defecation can also generate environmental and human health concerns. One gram of fresh feces from an infected person can contain up to 10^6 viral pathogens, 10^6 - 10^8 bacterial pathogens, 10^4 protozoan cysts or oocysts, and 10 - 10^4 helminth eggs (Mara et al., 2010). Public defecation in open fields can lead to human contact with excreta via various water routes: contamination of fingers, field crops, food, flies, etc. (Cairncross & Valdmanis, 2006). This environmental-health link helps explain the environmental, health, and economic ramifications on affected communities noted above. Moreover, the World Health Organization reports about 600 million episodes of diarrhea and 400,000 childhood deaths a year due to contaminated water and lack of sanitation, with an estimated 80% of all diseases and one-third of all deaths in developing countries induced by consumption of contaminated water (Rajgire, 2013).

A relevant example is a study by Rajgire (2013) who looked at the effect of open defecation practices on the chemical and bacteriological quality of water in open-defecation-free (ODF) and open-defecation-not-free (ODNF) villages in the Amravati

District of India. In these villages, individuals used water from various sources, including open well, tube well, hand pump, and water supplied by Gram Panchayat (GP) for drinking and domestic use. Using data from 138 villages, Rajgire's (2013) results show that feces contaminated 17% of the water samples from ODF villages, and 48% of the samples from ODNF villages. Using antibiotic resistance analysis, both the ODF and ODNF villages' water samples were shown to have a poor water quality index, and to contain thermotolerant coliform (TTC) and *E. coli*, both of which are indicators of fecal pollution (Rajgire, 2013). The presence of TTC and *E. coli*, as well as the results of other antibiotic resistance tests, provided evidence that the source of pollution from the various sources of drinking water was from open defecation, as opposed to other potential channels, such as sewage and domestic waste.

Poor health due to inadequate sanitation is a byproduct of a complex human-environment cycle: public defecation in open fields enters and contaminates water sources, and these polluted water sources interact with crops, food, and flies, among others, and eventually transfer their contaminants to humans. This cycle can be broken through installation of adequate sanitation measures, such as latrines or toilets. However, construction is not enough; there must both be a demand for such facilities and the presence of a proper supply, so that the toilets that are installed are actually used and continually maintained.

Part 2: The Demand for Toilets

2a. Framework: A Theoretical Demand for Toilets

Jawaharlal Nehru (1889-1964), India's first prime minister, remarked, "The day every one of us gets a toilet to use, I shall know that our country has reached the pinnacle

of progress” (Aswathy, 2014). Yet the presence of a toilet in of itself is not enough to ameliorate India’s poor sanitation: the value of a toilet must be realized and appreciated so that when a toilet is constructed, it is actually used. Demand for toilets is reliant upon the value individuals place on toilets. To increase this value requires an understanding of the individual and the society—how sanitation is understood historically, culturally, and socially—and thus what mechanisms can be implemented to decrease value for alternative forms of defecation, add value to sanitation and toilets, and thus increase the individual demand for toilet construction and usage.

To better understand what factors increase the construction and usage of toilets, I will take an economic approach by conceptualizing a theoretical demand for toilets. This framework will help elucidate the various factors that encourage toilet adoption and act as constraints, and therefore will shed light on how sanitation reforms can be reconstructed to emphasize the encouraging factors and to help eliminate the constraining ones. I use the model of demand for toilets proposed by Pattanayak et al. (2007); however, I have renamed certain variables in Pattanayak et al.’s (2007) model for clarification by incorporating elements of Zivin and Neidell’s (2013) health capital model.

Demand for toilets cannot be conceptualized in the exact same structure as other goods and services, which typically display diminishing marginal productivity: the first units generally have a significantly greater impact than the last few units. In contrast, in a community where the vast majority of individuals defecate publicly, an individual who constructs and uses a toilet will not experience a drastic increase in his/her health. Because public defecation impacts health via water, the individual that constructs and

uses a toilet in the high-density public defecation community will still experience poor health through contaminated water, or by flies that transmit fecal matter to food and drinking water sources via his/her neighbor's public defecation practices (Pattanayak et al., 2007). Theoretically, there must be some threshold level at which the percentage of community members using toilets has a substantial effect on health. Once this threshold is reached and bypassed, all individuals—whether or not one owns and uses a toilet—will experience health improvements, with improvements continuously increasing in the number of adopters. Shuval et al. (1981) propose such a theory: in comparison to the straight-line relationship—each incremental sanitation improvement (such as the installation and usage of sanitation facilities) creates the same improvement in health status—or the hyperbolic relationship—each sanitation improvement increases health status at a diminishing rate—Shuval et al. (1981) propose the “S” curve for the threshold-saturation theory—sanitation improvements have a drastic effect on health after a certain threshold, with health improvements negligible below the threshold and increasing at a diminishing rate above the threshold. Thus, construction and usage of sanitation facilities must be a collective action decision in order for the health benefits to be realized. In fact, Geruso and Spears (2014) in their study, “Sanitation and Health Externalities: Resolving the Muslim Mortality Paradox,” show that it is latrine use by neighbors, rather than the household's own use of latrines, that is associated with the largest mortality gradient. Consequently, when deciding whether or not to construct and use a toilet, an (rational) individual will also consider the decisions of, or social pressure to install from others, such as the number of sanitation facilities already in use in the community, or the communal pressures from others to also install a facility.

The transition away from public defecation towards the usage of latrines or toilets produces value through a series of physical and mental health benefits. It is these all-inclusive health benefits that subsequently increase individual value, utility, and happiness. Jenkins and Curtis (2005) use qualitative data from interviews with 40 heads of households in rural Benin to help elucidate these motives and reasons for latrine adoption. Their analysis reveals 11 distinct drives for latrine adoption, which they divide into three categories: prestige-related, well-being, and situational. Broadly, I will classify these three categories as health benefits, using the World Health Organization's loose definition of health as "a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity" (World Health Organization, 2003).

According to the economic model of human behavior, an individual has a limited amount of time and resources, and within these constraints, an individual must determine his/her bundle of goods and services by making trade-offs between various goods and services. Assuming individuals take actions to maximize happiness (or utility), an individual will choose, and have a higher demand for, one particular good or service over another based on which one provides him/her with the most value. In order for there to be a demand for toilets, individuals must not only have a value for toilets, but also a relative preference to pay and use toilets in comparison to other means of defecating and to other ways in which that money could have been spent.

In a typical health model, an individual makes a series of trade-offs in order to maximize his/her own utility, with utility depending upon consumption of other goods and services (X), leisure (L), and health (H): $U(X, L, H)$. Under this simplified model, health decreases the number of days an individual is sick, and thus increases the number

of days an individual can spend in leisure or spend in work—and receive a wage to produce consumption goods. The effect of improved health in the labor and leisure market should encourage individuals to construct and use toilets, and thus increase the demand for such a good. Pattanayak et al.’s (2007) model additionally expands the role of toilets on human health beyond the labor market. Toilets themselves also directly contribute to utility. Pattanayak et al. (2007) refer to the utility derived from the toilet itself as a function of the averting behavior (a): $U(X, L, H, a)$. As mentioned above, construction and usage of toilets can indirectly improve physical health via improved environmental quality, and thus increase the number of days an individual can work and receive a wage; but the very construction itself can also directly contribute to utility through improved “emotional” health. This “emotional” health can be classified in two categories: general mental health, such as feelings of comfort, convenience or privacy; and socially induced mental health. The second classification deserves greater clarification. Some individuals might pressure others to stop defecating publicly through mocking, social “walks of shame,” or social pressure. Therefore, the toilet itself—and its construction and subsequent use—can contribute directly to individual utility by reducing feelings of shame or guilt, and increasing health through social inclusion. This utility is a component an individual gives value to and a component an individual might consider when making trade-offs among other goods and services. This indirect, “emotional” health utility derived from the construction and usage of toilets must be incorporated within the model of individual utility.

For clarity, I am going to walk through the derivation of Pattanayak et al. (2007), which incorporates an individual’s utility maximization function to derive an individual’s

willingness to construct and use a toilet. An individual's health (H) will depend upon the community's environmental quality (Q) and the individual's averting behavior (a). Environmental quality (Q) might include both quality and quantity of water, among other factors. The extent of environmental quality (Q) relies upon public policies (G)—which might include subsidies for latrine construction, or educational campaigns to elicit the benefits of toilet usage—as well as averting behavior by other community members (A)—the extent to which other members of the community construct and use toilets, which might be either a cost or benefit to an individual's utility. The inclusion of averting behaviors by other community members (A) allows Pattanayak et al. (2007) to incorporate the externality public defecation exerts on other community members who are both using and not using toilets. Besides health (H) depending upon environmental quality (Q), health (H) also depends upon an individual's averting behavior (a): the actions he/she takes towards the construction of toilets. Equation 1 expresses an individual's utility function:

$$(1) \text{ Individual's Utility Function: } U[X, L, H(a, Q\{G, A\}), a]$$

As noted above, Pattanayak et al.'s (2007) model uses the economic model of human behavior, concluding that an individual will try to maximize his/her utility, measured by consumption of other goods (X), time spent in leisure (L), physical health (H), and the result (individual household toilet) of averting behavior (a). In order to determine which trade-offs to make as to maximize individual utility, an individual must take into considerations two constraints. The first is the health production function, which determines how “health inputs” (an individual household toilet) increases individual health and thus utility. The health production function is determined by the “health” obtained through the construction of the toilet itself (a), how much time an individual

invests in averting behavior through construction of the individual household toilet (C), and how much he/she spends on material inputs (M), which is based upon his/her knowledge (K) of which inputs to purchase or use (Equation 2):

$$(2) \text{ Individual's Health Production Function: } f(a, C, M; K) = 0$$

The second constraint is an individual's budget constraint. This shows how much money an individual has that he/she can spend to increase utility. The amount of money is determined by how an individual allocates his/her time: an individual has a certain amount of time (T) that he/she can allocate to leisure (L), to time spent constructing an individual household toilet via individual averting behavior (C), and to sick days (H) which are determined by health. Thus, the total amount of money an individual can spend as to maximize his/her utility is the sum of exogenous income (E), earned income (a function of time spent working multiplied by wage, w), money spent on consumption of other goods (X), and materials invested in averting behavior through construction of an individual household toilet (p*M). This is shown in Equation 3:

$$(3) \text{ Budget Constraint: } E + w(T - L - C - H) - X + p * M = 0$$

The budget constraint will help determine how an individual should spend his/her time—whether in the labor market or in leisure—as to maximize his/her utility. Equations 1 – 3 are combined below to display an individual's utility maximization problem (Equation 4):

$$\text{Maximize } U[X, L, H(a, Q\{G, A\}), a]$$

$$(4) \text{ Subject to Constraints: Health Production Function: } f(a, C, M; K) = 0$$

$$\text{Budget Constraint: } E + w(T - L - C - H) - X + p * M = 0$$

The variable of interest is individual averting behavior (a), which will determine an individual's demand for toilet construction and usage. To find the optimal

consumption of individual averting behavior (a), Pattanayak et al. (2007) uses the above utility maximization and constraints to create a Lagrange Multiplier (Equation 5):

$$(5) \mathcal{L}_{L,X,a,M,C,\lambda,\mu} = U[X, L, H(a, Q\{G, A\}), a] - \lambda f(a, C, M; K) + \mu [E + w(T - L - C - H) - X - p * M]$$

The variables of “ λ ” and “ μ ” represent the marginal utility gain from the health production function and the budget constraint respectively. To find the optimal amount of consumption of individual averting behavior (a), Pattanayak et al. (2007) take the first-order conditions for L, X, a, M, C, λ , and μ , and rearrange the equations as shown below:

$$\begin{pmatrix} \mathcal{L}_L \\ \mathcal{L}_X \\ \mathcal{L}_a \\ \mathcal{L}_M \\ \mathcal{L}_C \\ \mathcal{L}_\lambda \\ \mathcal{L}_\mu \end{pmatrix} = \begin{bmatrix} 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \end{bmatrix} = \begin{bmatrix} U_L - \mu * w \\ U_X - \mu \\ U_a + U_H * H_a - \lambda * f_a \\ -\lambda * f_M - \mu * p \\ -\lambda * f_C - \mu * w \\ f(a, C, M) \\ E + w(T - L - C - H) - X - p * M \end{bmatrix} \begin{bmatrix} a \\ b \\ c \\ d \\ e \\ f \\ g \end{bmatrix}$$

In order to understand the trade-offs (cost and benefits) of averting behavior (toilet construction), Pattanayak et al. (2007) re-write and recombine a number of the first-order condition equations. I will work through the steps Pattanayak et al. (2007) take. First, the authors re-write equation (c):

$$\mathcal{L}_a = 0 = U_a + U_H * H_a - \lambda * f_a$$

$$(6) U_a + U_H * H_a = \lambda * f_a$$

The left-hand side of the Equation 6 represents the marginal benefits of toilet construction and usage: U_a represents the utility (emotional health) one receives from the individual averting behavior itself (the individual household toilet), and $U_H * H_a$ represents the utility one receives from physical health. The right-hand side of the equation represents the cost of averting behavior (toilet construction). To better understand the right-hand side of the equation, Pattanayak et al. (2007) look at the factors which

influence the averting behavior, namely the health production function—material inputs (M) and the time spent on averting behavior or construction of the toilet (C). Pattanayak et al. (2007), therefore re-write equations (d)—material inputs—and (e)—time spent constructing the toilet—and take the derivative of equation (f)—the health production function—with respect to individual averting behavior (a). This is shown in Equations 7 – 9 below:

$$(7) f_M = \frac{-\mu * p}{\lambda}$$

$$(8) f_C = \frac{-\mu * w}{\lambda}$$

$$\frac{d\mathcal{L}_\lambda}{da} = 0 = f_a + f_C * a_C + f_M * a_M$$

$$(9) -f_a = f_C * a_C + f_M * a_M$$

Combining equations (7), (8), and (9) with equation (6), creates the optimal trade-off: an individual will demand a toilet up until the marginal benefits equal the marginal costs of toilet construction and usage.

$$-f_a = f_C * a_C + f_M * a_M$$

$$\text{Replace } f_a = \frac{U_a + U_H * H_a}{\lambda}$$

$$\text{Replace } f_M = \frac{-\mu * p}{\lambda} \text{ and } f_C = \frac{-\mu * w}{\lambda}$$

$$(10) \frac{U_a + U_H * H_a}{\mu} = w * a_C + p * a_M$$

Equation 10 shows that an individual will invest time and money to build and use a toilet when the marginal benefits of toilet construction and usage through the physical and emotional health benefits in monetary terms (the left-hand-side of Equation 10) equals the foregone wage one could have earned (time spent on construction of a toilet that could have been spent in the labor market, “w*a_C”) and the cost of the materials for

construction ($p \cdot a_M$) which could have been spent elsewhere, such as on consumption goods (X) (the right-hand-side of Equation 10).

This optimal trade-off allows us to assess the various components involved in an individual's demand for toilets. Moreover, this trade-off underscores the necessity of both demand-side and supply-side forces. For instance, if an individual does not recognize the benefits of toilet construction and usage, the individual's left-hand side of Equation 10 ($[U_a + U_H \cdot H_a] / \mu$) will be negligible. Consequently, even if toilets are supplied, the individual will be unlikely to use the toilet. However, supply-side actions beyond the physical construction and availability of the toilets—such as making toilets more easily available or cheaper (the right-hand-side of the equation)—are also necessary for increasing individual demand. By understanding the relationship of these components, we can implement policy changes to try to alter individual demand, by increasing the benefits of toilet construction and usage—making individuals aware of the physical ($U_H \cdot H_a$) and emotional health (U_a) advantages of toilets, and the importance of collective-action in increasing the environmental and health benefits of toilet construction and usage (changing demand)—and/or by altering demand through changing supply—decreasing the costs of construction ($w \cdot a_C + p \cdot a_M$), by making toilets more easily available or cheaper through governmental programs or other welfare-improving interventions. However, to figure out which mechanisms will be the most influential for increasing demand will require an understanding of the specific traits of the community, such as the community's values, religion or culture.

2b. The Final Trade-Off: Culture and the Value of Toilets

In order to increase the left-hand side components of Pattanayak et al.'s (2007) optimal trade-off, sanitation reforms should focus on education campaigns aimed at elucidating the various “health” benefits of toilet construction, both physical health ($U_H * H_a$)—such as increased labor productivity—and “emotional” health (U_a)—such as privacy and security, or even as innovative as the “No Toilet, No Bride” campaign’s benefit of marriage. However, emphasizing some benefits over others will be more effective in influencing and encouraging demand. Before understanding the direction of educational campaigns, we must first acknowledge that notions of sanitation, and thus of dirt and impurity, are entangled with culture, religion, and social norms: “building toilets without addressing common norms, attitudes and beliefs around latrine use is unlikely to reduce open defecation in rural India” (Diane Coffey; cited in Qadri, 2014). For instance, if Haryana—the location of the “No Toilet, No Bride” campaign—did not have a competitive marriage market or certain societal norms, the campaign would not have been effective in increasing toilet construction and usage. Therefore, it is of the utmost importance to understand the target population and the drives behind that population’s idiosyncratic demand for toilets. To figure out which techniques to employ and which drivers of demand to emphasize, one must understand the target population from a variety of standpoints: historical, cultural, religious, social, and political, among others.

Our understanding of human excreta is fundamentally understood and influenced within the realm of social science—social interactions among people determine what is contextually considered right and wrong (Warner): “There are no human societies where the act of excretion and its products are not subject to public and private arrangements, to

expectations involving time and space, regularity and appropriateness” (Drangert & Nawab, 2011). Douglas (1966) analyzes the role of uncleanliness in primitive religion, by asserting that the “fear, terror or dread in which [primitive religion] adherents live” can be “traced to beliefs in horrible disasters which overtake those who inadvertently cross some forbidden line or develop some impure condition” (Douglas, 1966). Consequently, notions of dirt are simply notions of disorder—disorder that “exists” and is created by “the eye of the beholder” (Douglas, 1966). Each community will therefore experience a unique notion of dirt and have a different stigma and understanding of sanitation. This will necessitate different tactics to increase demand for toilet construction and usage in each community.

In fact, Diane Coffey (2014) attributes culture to be the main explanation for differences in public defecation practices. She uses evidence from a quantitative Sanitation Quality Use Access and Trends (SQUAT) survey, in which she, in conjunction with the Rice Institute, interviewed over 3,200 households in six north Indian states and the plains of Nepal. Coffey (2014) argues that poverty does not “force” people to defecate in the open due to the inability to access latrines or toilets. Specifically, she finds no correlation between gross domestic capital (GDP) per capita and the fraction of the population defecating in the open among 156 developing countries. In addition, 40% of households in the 13 districts of the SQUAT study who could afford a working latrine had at least one person who defecates in the open. Besides financial reasons, Coffey (2014) also dismisses lack of water as a factor contributing to public defecation, for only 3% of the surveyed individuals who defecate in the open mentioned lack of water as a reason for not using a latrine. In fact, 90% of Indians have “an improved water source,”

as defined by the WHO-UNICEF Joint Monitoring Report (Coffey, 2014). Consequently, there must be a series of cultural factors that both encourage open defecation and discourage the use of affordable latrines. Coffey (2014) believes latrines are socially unacceptable in certain subpopulations of India due to religious reasons: latrines close to the home are considered ritually polluting, or individuals are reluctant to empty the pit (and its contents), and thus require unreasonably large (and expensive) pit sizes. As will be discussed further in Chapter 2, India's relationship to sanitation and the environmental movement more broadly, is a function of India's colonial past and influence by Great Britain, as well as the Hindu caste system. Such cultural factors have, and continue to have, a role in shaping access to and willingness to construct sanitation facilities in India.

Given the influence of culture on sanitation, Pattanayak et al.'s (2007) optimal trade-off shows two pathways that can increase the health benefits of toilet construction—physical health ($U_H * H_a$) and “emotional” health (U_a). Below are a few studies that try to tease out the health benefits of toilet construction. It should be noted, nonetheless, that these benefits are not necessarily universal or applicable to all populations.

Although John Snow made the link between public defecation and water-borne diseases in the mid-19th century, this classic fecal-oral transmission of disease is not always well known or considered to be a benefit to toilet usage by all individuals (Jenkins & Curtis, 2005). Jenkins and Curtis (2005), using interviews collected from 40 head-of-households in rural Benin, did find concerns of disease mentioned, such as intestinal worms, foot worms, diarrhea, cholera, and tuberculosis; however, respondents believed they were spread by smelling or seeing feces, rather than by fecal-oral transmission

(Jenkins & Curtis, 2005). Usage of toilets, consequently, would not eliminate contact with feces' contaminants, and thus could not be seen as benefiting health within this population. Given the present public perception regarding physical health benefits ($U_H * H_a$) associated with toilet installation, Jenkins and Curtis (2005) found more emphasis on the “emotional” health benefits (U_a).

One “emotional” health benefit found in multiple studies is related to prestige. To many individuals, toilet construction and usage was seen as a gateway for “achieving a good life” (Jenkins & Curtis, 2005). Travel to urban areas and exposure to urban, or Western, lifestyles—through government jobs, education and marketing of commercial produce—transformed one's perception of public defecation. Awareness of other lifestyles that did not involve public defecation forced individuals to question their current practices and ultimately see public defecation as a symbol of embarrassment and a barrier towards an elevated lifestyle and status. Defecating in the open became seen as a backwards ideal, and usage of toilets was seen as a modern or luxurious activity. A study conducted by O'Reilly and Louis (2014) drew upon interviews with members in India and found similar results regarding the influences of urban lifestyles. Employment in the public sector introduced rural residents to urban areas: “When we went to Shimla or Rampur, we saw toilets. This influenced people to build toilets” (male interviewee; cited in O'Reilly & Louis, 2014). Or, after children were sent to study in Shimla and exposed to modern toilets, they instilled in their family a drive to transition away from public defecation, and to rather construct toilets to be at an equal standard with the Shimla environment: “Since my children are studying in Shimla, we also think it's nice to have a

dry pit toilet when I have people coming over to my house” (interviewee; cited in O’Rielly & Louis, 2014).

Similar reports were detailed in interviews in rural Benin. After men left the village, either for work or to obtain money for marriage, their outlook on public defecation changed. Having become accustomed to defecating in latrines, defecating in the open became seen as an impediment to feeling “good,” “settled,” or “complete” or as a hindrance from achieving the “good life” (Jenkins & Curtis, 2005). Interviewees began to see their practices, in comparison to others’, as improper and undesirable. Additionally, the use of latrines, over public defecation, became equated with the royal status: avoidance of public defecation and emulation of latrine use was an attempt to aspire towards a royal status of the local Fon ethnic group:

It was explained that a Fon king, his sons, and sometimes his wives, should never be seen outside the walls of the palace except for very special occasions. The royal family never defecated in the open, using pits covered with wood boards dug in discreet parts of the palace compound (Jenkins & Curtis, 2005).

Such exposure to the benefits of toilets had ripple effects within communities: individuals began to pressure others in the community to transition away from public defecation and construct toilets. This is shown in Equation 10 through the emotional health benefits obtained via toilet construction (the left-hand-side of the equation), through social pressure’s influence on increasing toilet construction and hence feelings of social inclusion. A daughter-in-law from West Bengal noted the pressure she felt to be “civilized” and thereby build a toilet: “When everyone started to be clean, the environment started to be clean and civilized. Then we built a toilet. When everyone started building toilets we felt embarrassed [because we did not have one]” (O’Rielly & Louis, 2014). Increased demand for toilets came from the outside and the inside, with

both influences having similar effects by decreasing the desire to defecate publicly, and increasing the value of and demand for toilets.

However, prestige-related drives might not be an effective mobilization technique to increase demand for toilets among the entire population. Jenkins and Curtis (2005) found that all 24 interviewees that noted prestige drives were males. Females' drives for toilets, in contrast, were centered on well-being, specifically for convenience, comfort, and privacy: "People were defecating in the bushes or hidden places. We explained that you have women in your family. If someone suddenly appears while the women are shitting, what will happen then?" (Male interviewee; cited in O'Rielly & Louis, 2014). In fact, the value of privacy that toilets bestow is becoming ever more prevalent, as more violence against women during open defecation is broadcasted in public news. In May 2014, two girls from Uttar Pradesh, India were raped and hung from a tree while walking to a field to defecate. "When we step out of the house we are scared. And we have to go in the mornings, in the evenings, and when we cannot stop ourselves, at times we go in the afternoons as well...And there are no bathrooms. We don't have any kind of facility. We have to go out" (Guddo Devi, cousin of the two killed girls; cited in Qadri, 2014). Many studies have cited similar findings: women must wait until nightfall to defecate in the open in order to protect their modesty (Jenkins & Curtis, 2005; Hueso & Bell, 2013; Coffey et al., 2014). In comparison to public defecation, toilets ensure that a woman would be able to keep her modesty and privacy during defecation (increasing the left-hand-side of Equation 10), thus decreasing demand for public defecation and increasing demand for toilets.

Nevertheless, the different health benefits of toilet construction and usage might differ on a number of dimensions—gender, age, geographic location, religion, and societal norms, among others. Thus, there is not one universal or correct way to increase the emotional and physical health benefits of Pattanayak et al.’s (2007) demand for toilets model. Rather, solutions will vary at the country, state, community, and even individual level.

Part 3: Supply of Toilets

3a. It’s Not All About Demand

Demand for toilets among individuals is not the whole part of the story. Supply and demand are both necessary. Figure 1 is a simplified supply and demand model.

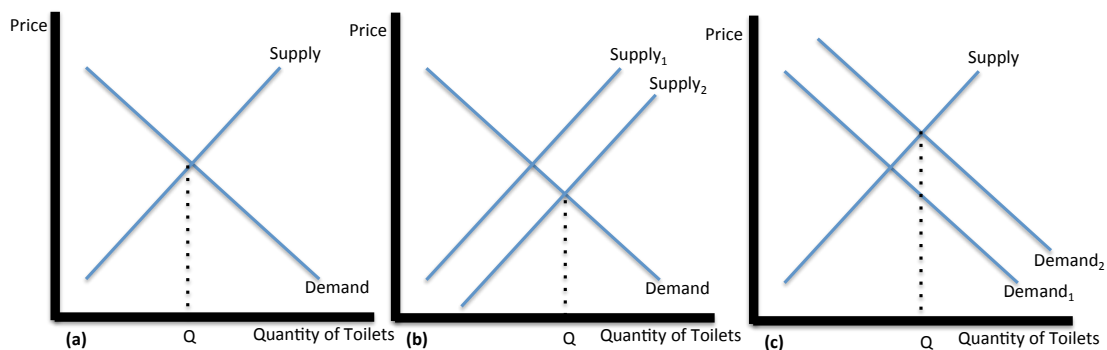


Figure 1: Supply and demand model; (a) Simplified supply and demand model; (b) increase in supply; and (c) increase in demand.

In order for the quantity of toilets to increase, supply could increase (Figure 1b), demand could increase (Figure 1c), or there could be a combination of both mechanisms. In the “ideal” situation, all individuals would be supplied with a toilet. As described earlier, if every individual does not have a demand for toilets, despite the presence of supply or amount of toilets available, this “ideal” will not be reached. Since a demand curve is the aggregate of all individual demand curves, if a large portion of individuals does not have a demand for toilets, the aggregate demand curve would decrease (a leftward shift of the

demand curve in Figure 1a). Additionally, demand could increase (a rightward shift of the demand curve; Figure 1c) by altering the components of Equation 10: using educational campaigns to outline the physical and health benefits of toilet construction. In contrast, supply could increase (a rightward shift of the supply curve; Figure 1b) through direct construction of toilets or by reducing the costs of construction through subsidies or other welfare programs.

Consequently both supply and demand factors are required for toilet construction: “the degree to which a target population is prone, resistant, or unable to adopt a new behavior derives from the presence or absence of: self-interest (motivation), opportunity, and ability to voluntarily adopt the new behavior” (Rothschild, 1999; cited in Jenkins & Scott, 2007). Self-interest can be conceptualized within the demand-side factors, which impact the demand curve; whereas opportunity and the ability to voluntarily adopt falls within supply-side factors, which can either impact the demand or supply curve. Without adequate supply and/or demand, the “ideal” scenario of 100% toilet coverage will be infeasible, if not impossible, to accomplish.

The responsibility to provide sanitation usually falls within the hands of the government. The United Nations annual report on water and sanitation examined the policies for WASH programs in 94 countries (WHO, 2012). Although two-thirds of the countries recognized drinking water and sanitation as a universal human right in national legislation, and more than 80% reported national policies in place for drinking water and sanitation, the majority of the programs remained stagnated within written political agreements, with little action taken on the ground (WHO, 2012). For instance, less than one-third of the countries surveyed had national WASH plans that were fully

implemented, funded, and regularly reviewed (WHO, 2012). Such stagnation might be a byproduct of supply side constraints: a particular political structure that either limits the ability of those most effected by poor sanitation to voice their concerns or have political sway; or, one that is plagued by governmental fragmentation and corruption, or a short-term outlook and an exclusive focus upon number of toilets installed. In all instances, there is a disconnect between the individuals involved in the planning process and their engagement with the community, and consequently, supply side constraints either hinder the construction of sanitation facilities (a decrease in the supply curve), or fail to create effective educational campaigns to encourage toilet adoption (a decrease in the demand curve).

The political system, working within the confines of a particular social and cultural framework, controls which individuals' voices are heard, and consequently which programs achieve more funding. Hueso and Bell (2013) assert that the failure of India's Total Sanitation Campaign (TSC) might be in part due to the uneven representation of individuals in the government. Poor sanitation facilities, in comparison to other issues, predominately affect the lower class, a group that receives little sway politically. Many government officials and engineers in charge of TSC projects are consequently more likely to "[neglect] sanitation in favour of more stimulating and costly water projects" (Hueso & Bell, 2013). Because their reelection depends on the quantifiable success of their actions, governmental officials will choose programs that are most popular among the groups that have the greatest political influence. Sanitation—the construction of toilets and the implementation of educational campaigns—receives little attention. Moreover, the persistent neglect of certain segments of the population can

create distrust between the government and its civilians, leaving the population resistant even in the presence of governmental support. In Africa, for example, the lackluster efforts of the government to improve public services diminished trust in governmental institutions and created unresponsiveness among governmental beneficiaries towards community-based programs (Mugumya, 2013; cited in Davis, 2014).

With a profusion of governments not prioritizing sanitation reforms, many are poorly executed due to an understaffed or unqualified government staff, insufficient funding, and poor monitoring. In fact, 80% of the countries reported in the UN's annual survey reported that the government's current levels of financing are insufficient to reach targets for drinking water and sanitation (WHO, 2012). Haiti's National Directorate for Potable Water and Sanitation (DINEPA), for example, although designed to construct sustainable water and sanitation facilities for all citizens, is plagued by governmental inefficiencies. Davis (2014) cites Bliss and Flisher (2013) who ascribe DINEPA's focus on crisis management, as opposed to long-term sustainability, as well as an uncompetitive governmental salary, to have prevented DINEPA from obtaining a strong and skilled managerial workforce. The focus on short-term solutions also disregards efforts for maintenance. Even in municipal schools that have toilets, lack of funding from public institutions for maintenance leaves toilets broken and unusable (a leftward shift of the supply curve in Figure 1): "If the toilet stops working they just lock the door and no one does anything...So basically [things fail because of] lack of municipal support" (US-based interviewee, 2013; cited in Davis, 2014). Similarly, the inability to collect, analyze, or update information of sanitation deficiencies by governmental institutions stymies proper distribution of funds to the most needed areas and inaccurately records the level of

sanitation improvement: “The Rural Water Information System (SIAR) in Honduras, for example, performed reasonably well until external funding stopped and all data rapidly became outdated” (Smits, Uytewaal, & Sturzenegger, 2013; cited in Davis, 2014). As will be discussed in Chapter 3, India has many data sources that report levels of sanitation coverage. However, because the surveys report various—and often contrasting—sanitation levels, it makes it difficult to determine the extent of India’s sanitation problem, as well as how to allocate resources to the states or districts that need the greatest attention.

A hallmark example of the negative impact government corruption can have on a country’s sanitation reform is exemplified in India’s Total Sanitation Campaign (TSC). Although the TSC proclaimed to be a community-led, people-centered, demand-driven, and incentive-based program, Hueso and Bell (2013) call into question the program’s assertion due to its lackluster results. Hueso and Bell (2013) argue that TSC’s main failures are found within its governmental system, which proved unsuccessful at creating a bottom-up approach, or effectively increasing demand (Figure 1c). Similar to DINEPA’s poor leadership, Hueso and Bell (2013) criticize the government’s incompetent staff: government officers leading TSC were over-worked and under-paid, and lacked awareness and understanding of the participatory development methods the TSC was supposed to conduct. Moreover, because this was a government-led program, officers knew they would be evaluated on short-term, quantitative measures. As a result, although focus was directed on distributing funds and installing toilets, thus increasing the supply curve (Figure 1b), supply was not met with an adequate demand for toilets and improper construction prevented long-term sustainability of the toilets (Hueso & Bell,

2013). Consequently, the TSC was characterized by a quick fix approach that was technologically, short-term, and quantitatively based.

Government and other institutions must restructure how sanitation is prioritized and how governmental reforms are implemented. Institutions must not only supply the physical toilets (increase the supply curve), but also implement educational reforms—to highlight the physical and emotional health benefits of toilet usage—and subsidy and welfare programs—to decrease the cost of construction (increase the demand curve). Sanitation reforms must improve data collection, ensure long-term sustainability and maintenance, and shift attention towards results that do not quantify how many toilets are installed, but rather how many toilets are used over time and the measures of health—physical and emotional—such installation brings. Within the government itself, actions must be reoriented to favor all populations—regardless of class, religion, race, gender, etc.—and must work to recreate trust between government and its beneficiaries.

Part 4: The Past and the Future

4a. Lessons from Past Health Reforms

Both supply and demand are crucial for achieving positive and effective sanitation reforms. To achieve Goal 7 of the MDGs, to “halve, by 2015, the proportion of people without sustainable access to safe drinking water and basic sanitation” (United Nations, 2014), two aspects of sanitation reforms must be amended. First, reforms must understand the current values of the target communities, and in particular the historical, cultural, and religious perceptions of sanitation. Reforms must utilize this knowledge to decrease the value of current defecation practices, and activate a new value—new emotional and physical health benefits—for toilets and consequently a demand for toilet

construction and usage. Second, institutions, particularly the government, must prioritize sanitation so that it is delivered efficiently and equally to the public. This change will require a restructuring of the governmental institution itself, in, for example, improving economic conditions and land availability for certain segments of the population, listening to and addressing the needs of all segments of the population, and altering how governmental representatives' accomplishments are recorded and rewarded.

An examination of past health reforms can help to illuminate the challenges of improving public health, assess various methods employed to ameliorate health crises for both the short- and long-term, and act as a platform by which to compare and contrast the current sanitation reform efforts. The Rockefeller Foundation's creation of the Rockefeller Sanitary Commission (RSC) for Eradication of Hookworm Disease highlights the role of awareness, care, and education in eliminating the disease; the New York Health Department during the 1918 Influenza epidemic exemplifies a successful community-involved campaign that drastically reduced mortality rates in New York, compared to other high-density cities in the United States; and the relatively recent Chinese anti-spitting campaign, enacted leading up to the Beijing Olympics, shows the effectiveness of a strategy that more stringently monopolized social pressure. All three examples created successful outcomes, for the programs were executed within a transparent and community-oriented framework that adequately supplied the physical necessities to improve health, and also created an educational or public platform that produced a demand for individual behavioral change.

In 1910, the Rockefeller Sanitary Commission for the Eradication of Hookworm Disease was established to eliminate hookworm throughout the country—a disease that

was estimated to have infected 40% of the population by the beginning of the century (The Rockefeller Foundation, 2014). RSC's success was grounded in its decentralized and community-involved campaign: "if the infection is to be stamped out, the States in which it exists must assume the responsibility" (Elman et al., 2014). RSC used a three-step approach—a survey to map the prevalence of the disease; mobile dispensaries to treat infected patients; and education campaigns that used illustrated lectures and demonstrations. This approach proved "not only [to] dramatically [reduce] the disease, but [to also create] a culture of public health" (The Rockefeller Foundation, 2014). Additionally, the RSC, in conjunction with each state's board of health, formed health networks with local doctors and health boards (The Rockefeller Foundation, 2014). These relationships proved instrumental, especially given the role of state and county schools to encourage public participation in the RSC campaign. Additionally, localized doctors and health boards provided locations for testing and treatment, and in some localities, hookworm screening was mandated as a condition for school attendance (The Rockefeller Foundation, 2014).

However, many communities did not initially welcome RSC's approach. RSC's biggest problem was convincing a skeptical public about the spread of hookworm, especially when its side-effects—weakness, gastric distress, dizziness, headache, coughing, and breathing problems—could be associated with a number of other common diseases (Elman et al., 2014). The RSC Administration saw hookworm as a disease spread by soil pollution, and thus initially focused its campaign on improving unsanitary conditions. However, many Southern residents, unlike the RSC's belief of germ theory, were proponents of miasma theory: the belief that diseases are caused by the presence of

miasma, a form of vapor composed of suspended particles of decaying matter that emit a putrid smell, in the air (London Science Museum). Therefore, these individuals did not see hookworm's symptoms as a "sickness" or open privies and unsanitary conditions as "risks" (Elman et al., 2014). Consequently, the RSC's original program took a germ-theory-oriented approach, centering its prevention solely on hookworm treatment and on surveying the presence and quality of local sanitary facilities (Elman et al., 2014). However, because many physicians and lay public disagreed or misunderstood the RSC's claim to the cause of hookworm, the RSC's attempts remained unsuccessful. In 1910, only 16% of practicing physicians in the nine Southern states participating in the RSC's campaign treated patients for hookworm (Elman et al., 2014). And even when physicians offered treatment, the RSC found that out of the 42,946 positive cases in 1910, only 14,400 were treated, with the remainder of the patients refusing treatment (Elman et al., 2014).

The RSC's initial campaign was not attuned to the general public's concerns and values, and thus its efforts were minimal and ineffective. Rather than focusing on visual inspection of residents and anecdotal reports from local physicians and teachers, the RSC administration restructured its strategy by conducting local prevalence surveys of microscopic examinations through sampling small segments of the community (Elman et al., 2014). In comparison to visual inspections, the RSC found that the public accepted and was receptive to screening, particularly through dispensaries (Elman et al., 2014). These dispensaries were localized—supervised by state directors—and were one-stop shops, incorporating screening and treatment, as well as education about hookworm (Elman et al., 2014). More importantly, focus was given to providing scientific and visual

“proof” of the worms and disease: “the public looked at hookworms in pictures and especially through microscopes” (Elman et al., 2014). As Elman et al. (2014) write, “And so, a highly visible, community-based public health demonstration model, not the medical practice model that encouraged local physicians to provide diagnosis and treatment, elicited community participation motivating behavioral change.” The RSC realized it was the combination of a decentralized system in conjunction with public education that was embraced by the general public. The public saw value in preventing the spread of hookworm and thus demanded such dispensaries. The ability to generate public demand for these health measures would be paramount in the national effort to eradicate hookworm.

The RSC was a nationwide initiative, however such a national campaign is not always implemented during disease outbreaks in the United States. During the 1918 Influenza, various states took different measures to combat the outbreak, with the states that implemented stronger initiatives—especially ones that incorporated effective educational components—achieving lower mortality rates. New York City, in comparison to other large cities, such as Boston and Philadelphia, did not experience as drastic effects of the 1918 Influenza on mortality (Aimone, 2010). While Boston and Philadelphia’s death rates were 6.5 and 7.3 per 1,000 individuals, respectively, following the influenza, New York City’s was only 4.7 per 1,000 (Aimone, 2010). A significant portion of this contrast can be attributed to the NYC’s Department of Health (DoH), which helped to contain the epidemic, through both regulations and educational campaigns.

New York's regulations, although mandated centrally, were characterized by a system of transparency and decentralization. Before rules and regulations were centrally sanctioned, the DoH attempted to hear the concerns of the lay public, and particularly the impacted stakeholders. For example, in an attempt to decrease public transit congestion during the morning and afternoon commute, the DoH proposed to amend the Sanitary Code to create a mandatory timetable, which would regulate the opening and closing hours of business. However, before the rule was sanctioned, the DoH met with individuals that would be affected by the mandate, namely representatives of NYC's business community, to explain the logistics of the rule and justify the necessity for such mandate. Communication with stakeholders did not cease there: Health Commissioner Royal S. Copeland responded to complaints from businesses and manufacturers, and negotiated new opening and closing hours (Aimone, 2010). The Board of Health, the official body that took over regulation of the 1918 epidemic from the Department of Health, also made considerable efforts to spread administrative responsibilities in a decentralized fashion. Each borough's sanitary superintendents and assistant superintendents were given the responsibility and "the power to regulate, order and '...remove, abate, suspend, alter or otherwise improve' places that sell, store, or serve food and drink with the same authority as if their orders were issued by the Board of Health" (Aimone, 2010). New York's reform efforts eliminated a top-down approach by incorporating both the needs and diversity of opinions of New York residents into public health regulations.

Beyond regulation, the large portion of the Board of Health's funds and energies went towards health education materials. The educational campaign tried to educate the

public on the effects of the influenza by attempting to curb the spread of the disease through changing social norms, by picturing behaviors that contributed to the influenza's spread as "filthy habits." By September 24, a minimum of 10,000 posters had been placed around NYC in railway stations, elevated train platforms, streetcars, store windows, police precincts, hotels, and other public areas (Aimone, 2010). Educational material pictured the practices that would negatively impact health as disgusting and uncivilized. As noted by Peal et al. (2010), "[enabling] a change in behavior" is a vital component of "software" techniques. In an attempt to prevent the spread of influenza, and with the germ theory belief that spitting was the main route for transmission, the Department of Health issued an anti-spitting campaign. Similar to the anti-spitting campaign initiated 20 years earlier by former Health Commissioner Herman Biggs, the 1918 campaign was also based on education, moral persuasion, and police enforcement (Aimone, 2010). Spitting was described as "dangerous, indecent, and against the Law," and violators were fined or arrested if caught spitting (Aimone, 2010). Spitting was categorized as a backwardness activity, associated with uncleanness and an activity that should be avoided.

However, Copeland did not expect his campaign to change the behaviors of the entire population: he targeted his educational campaign at the population most susceptible to the influenza and most likely to be influenced by indoctrination. He argued that the city's school system could do a better job at keeping students healthy than their families could do, and attendance at school would allow students to be constantly educated about the influenza (Aimone, 2010). Teachers had to inspect students daily and

were given permission to authorize home visits regarding potentially sick children (Aimone, 2010).

The anti-spitting campaign incorporated in the NYC's DoH's efforts is not a lost practice. Leading up to the Beijing Olympics, the Chinese Government's no-spitting campaign received much publicity internationally. More broadly, the Chinese government sought to reshape and remold Chinese social norms and local habits. The main concern, however, was not necessarily the worry of communicable disease through spitting, but was more to avoid international embarrassment: "So as Beijing is building new sports stadiums, subways lines, futuristic skyscrapers and public parks for the Games, city leaders are also trying to rebuild Beijingers" (Yardley, 2007). Many Chinese officials see these practices—public spitting, public cursing, and littering, among others—as "stubborn diseases that stain the image of the capital city" (Zi Huayun; cited in Yardley, 2007). In an attempt to curb these "stubborn diseases," the Chinese Government used similar tactics as the RSC and New York's Department of Health. The government used fear, moral, and monetary persuasion: people caught spitting in the public before the Olympics could face fines up to 50 yuan (Yardley, 2007); as well as educational, community-involved initiatives: Chinese individuals were encouraged to stand in line, as opposed to cutting the line, at subway stops, post offices, and other public places on official Queuing Day, which takes place once every month (Fong, 2007).

20th and 21st century public health campaigns—inside and outside the U.S. and on both a local and national scale—highlight the importance of health reforms that offer more than technical solutions. Rather, these campaigns have strong supply—centralized governmental bodies within a transparent, collaborative, long-term, and community-led

framework—which properly distribute the physical supply of health facilities and create demand for public health changes—through educational campaigns that institute behavioral and social changes. These mechanisms work to increase the utility a community acquires through participating in health treatments, as to increase the value of and demand for such treatment, so that supply and demand are adequately fulfilled.

Part 5: Concluding Remarks and Beyond

The provision of sanitation is still less than ideal in rural areas because people tend not to see toilets as essential, a perception influenced by the absence of appropriate technology, by inadequate infrastructure and by gaps in governance (Arghyam, 2005).

To work, sanitation campaigns cannot be a quick fix, technological solution. Rather they must engage with the cultural, social, historical, and political disposition of the community, state, nation, and even globe. The solutions, therefore, must be creative, innovative and influential: to increase individual demand requires attention to collective factors. They must pay heed to the drives of the particular community and the institutional constraints imbedded in the community, and will need to utilize roundabout techniques and incentives to awaken the drives for toilet construction and usage.

The remainder of this thesis applies knowledge gathered from Chapter 1 to a case study of India. By exploring the historical, cultural, and political backgrounds of sanitation in India, I showcase the deep-seated difficulties in how the country views, understands, measures, and addresses sanitation, but also the potential for the country to take a step in a new and innovative direction that presents hope for the eradication of open defecation and installation and usage of adequate sanitation facilities.

Rest Stop 2:

India has a very rich history—something that will be described in more detail in the following chapter. Thus, upon my return to the United States, I wanted to bring back a few tokens from India—both for myself and for others.

The day before I left, I went to a store that was essentially an indoor shopping mall, with each room selling a different Indian “souvenir.” My intention going into the store was to buy a few scarfs and an item for one of my friends. Yet, I walked out with three scarfs, a little figure of an Indian god that represented health and prosperity, a carpet-like wall hanging, and almost a living-room size Oriental carpet (that could be folded up in a square and conveniently packed for airplane travel), and a jewel (with a free necklace chain).

It was hard not to buy every item in the store, for each product had a history behind it—a story of what made that item special, significant, and monumental in India. Stories that were relentlessly emphasized as the salesman took me around the store, attempting to persuade me to buy each and every item. Nevertheless, India is proud of its past, present, and future, despite only obtaining independence from Great Britain in 1947—less than seventy years ago. And, from conversations with some of the Arghyam workers, despite this relatively new independence, there is not a sense of animosity towards Great Britain. Rather, animosity is more directed towards Pakistan.

And thus the moral of the story for this Rest Stop: reading or studying about India can only tell you some of the stories; to really understand how Indians feel or the little social and cultural norms requires conversations with residents. Perhaps the true souvenir I obtained from India was this little lesson.

Chapter 2: A Political Ecology Approach to India's Sanitation Movement

Part 1: The Scope of Sanitation Facilities in India:

Matthew Turner (1993), in his examination of livestock population in West Africa, contends that population rates of livestock are a function of politics: transitions in power relations among local cultural groups that influenced demand for cattle. Turner (1993) writes,

The changing spatial distribution of livestock during the year is determined in large measure by the management of daily and seasonal grazing movements by livestock owners and herders. The management of grazing movements, in turn, is strongly affected by changing patterns of access to pasture resources, labor resources, and livestock wealth among livestock-rearing households.

If only stocking rates—average number of animals grazing an area divided by the size of the range—are analyzed, the “true” story for changes in rates will be oversimplified, ignoring a “whole realm of social causality” (Turner, 1993). Turner’s realization that population rates are influenced by more than just environmental factors was an early form of political ecology inquiry into the politics of resource use and access. The field of political ecology, a subfield of geography, aims to understand the social and political conditions regarding “the causes, experiences, and management of natural problems” (Forsyth, 2003).

Political ecology analyses can take many forms. Walker (2005) summarizes several of the early political ecologists engagements with resource politics. Richard Schroeder (1999), for example, sought to understand how gender factored into early agro-forestry programs in The Gambia, and found that the programs changed village-level politics in ways that produced increased labor burdens on women. Walker and Fortmann (2003) examined the rural area of California Sierra Nevada and the competing

“imaginations” regarding the role of capitalism in land-use planning. What these and other political ecology studies have in common is attention to the “constantly shifting dialectic between society and land-based resources, and also within classes and groups within society itself” (Blaikie and Brookfield, 1987; cited in Forsyth, 2003). Political ecology is thus a useful approach for examining social movements of activism, or debates over equal distribution of rights and resources.

The story of India’s poor sanitation rates—and the way in which India views, understands, and addresses sanitation—is meaningfully examined through a political ecology framework, because it invites analysis of how India’s environment and its political, social, and religious history interacts with and mutually constitutes one another. Such a study builds on the conclusions from Chapter 1, which contend that improving sanitation is not just about providing infrastructure, but also requires attention to the role of institutions in supplying proper educational reforms or welfare programs to encourage demand (toilet construction, usage, and maintenance). In addition, sanitation reforms in India must be conceptualized within the broader context of India’s colonization by Great Britain, history of environmentalism and the caste system, and effects of these factors on other facets of society—from politics to education to employment.

Realizing that sanitation reform is thus not only about providing toilets, this chapter argues that in order for India to discourage open defecation and increase toilet construction and usage, Indian sanitation reformers have to critically examine how sanitation itself is historically and culturally understood—both within the environmental movement and its associations within the caste system. Focusing on these contextual factors of sanitation sheds light on which cultural and social changes should be

encouraged to facilitate the adoption of sanitation reform. This kind of structural and cultural change, I argue, will allow the government to effectively, efficiently, and equally deliver sanitation to all sectors of society.

In order to better understand the origins of the sanitation movement, this chapter investigates India's environmental movement and its significant influence by Great Britain's initial control of the land. This subsequently created an environmental movement that focused on survival, pitting big business against local inhabitants. To help explain the origins and future development of the sanitation movement, I analyze its development within the framework of the environmental movement, as well as its intricate relationship to India's history, and in particular the creation of the caste system. Finally, I investigate India's past and current sanitation campaigns to discuss the structural constraints plaguing past sanitation reforms, and the steps the government has taken in an attempt to remove these deficiencies.

Part 2: Sanitation in India: A Historical Perspective

2a. India's Environmental Movement

Sanitation in India can be better understood by looking at the origins of the environmental movement, which was shaped and influenced by India's colonial relationship to Great Britain up until Independence in 1947. During colonial rule, the environmental movement emerged out of a fight for local inhabitants' survival, and hence a battle between big business and the individuals who lived off of the land. Consequently, Great Britain's decisions on environmental and public health concerns in pre-Independent India have had an influence on how post-Independent Indian citizens view the environment and their place within it.

In many ways, environmental degradation in India has been a result of a transition away from community control and management of a common property, towards exclusive control and ownership by state or individuals, namely the British (Agarwal, 1999). The British government and officials viewed India's natural environment, particularly its forests and timber reserves, as simply a source of wealth, and therefore as an obstacle to agricultural production (Shiva, 1999). The value of the forests was not found in its role in nature; rather, under this reductionist approach, "it has reduced the diversity of life to the dead product, wood, and wood in turn to commercially valuable wood only" (Shiva, 1999). The monopolization of the forests not only included the forests itself, but all that was enclosed within, including the homes and livelihoods of tribal communities. British control of the forests necessitated the resettlement and rejection of tribal communities' customary rights to the land and resources: "[the British] displaced local rights, local needs and local knowledge and reduced this primary source of life into a timber mine" (Shiva, 1999). Fights for the environment's protection in India became fights for one's livelihood and freedom: to keep the environment as a pool of common resources and protect the local inhabitants within it, required preventing the seizing of the environment by the government and big business.

The very subjection of the forests to Great Britain's rules and regulations had significant ramifications for the future health of the state after Independence: "What exists today is a complex legacy of colonial and pre-colonial interactions that defines the constraints and parameters within which and from which present thinking and action on development, resource use and social change have to proceed" (Agarwal, 1999). The

actions Britain instituted benefited some groups over others, and as a result, environmentalism became a site for conflict, particularly within the realm of survival.

The environment as a zone of conflict continued even after Great Britain's control over the land was transferred to the Government of India and big business after Independence. The beginnings of India's post-Independence environmental movement are ascribed to the Chipko movement of the Central Himalaya—a movement that was rooted in a conflict between local inhabitants and big business. The Chipko movement¹ refers to a case where several peasants of Mandal threatened to “hug the trees” in order to prevent their destruction by commercial felling (Gadgil & Guha, 2007). Their protests stemmed from the fact that local peasants, in post-Independent India, were pitted against India's state forest policies because the policies favored commercial interests over an individual's right to fuel, fodder, and small timber (Gadgil & Guha, 2007). Great Britain's regulations set in motion a view of the environment as intricately tied to individual survival and livelihood, and hence the environment's role was seen not within a framework that valued nature's intrinsic value, but rather within the realm of productivity.

With big business and governmental interests and desires for resource use in opposition to those of its local inhabitants, the voices of those residing in nature were disregarded. Consequently, political action was not taken to protect the homes and livelihoods of its inhabitants, or the forest itself. Great Britain saw nature “as individual

¹ Similar movements and instances of retaliation did take place in pre-Independent India. For instance, after the Forest Acts of 1878 and 1927, which allowed for the exploitation of the forests by the British, a series of villagers (or forest satyagrahas) participated in non-violent protests to proclaim their right to the forests and its products for their own survival (Shiva, 1999). Shiva (1999) writes, “The Forest Policy of post-colonial India continued on the colonial path of commercialization and reductionism, and with it continued people's resistance to a denial of their basic needs.”

parts rather than as an interconnected system of vegetation, soil and water” (Agarwal, 1999), and viewed the local individuals residing in nature in a similar way. The voices of individuals interacting with nature—farmers and forest-dwellers, for instance—were “deemed less valuable” and thus not considered in political institutions (Agarwal, 1999). This ingrained in India a systematic top-down approach, whereby one group is considered experts (scientists/professional), and the other (village users) ignorant (Agarwal, 1999). Such an approach, which failed to hear the opinions of the groups most affected, gave way to the Indian Government’s focus on short-term relief of problems, rather than investigating and fixing the deep-seated causes: “the distortions in resource flows, preferential subsidies and short term horizons of capitalists and the state have all worked to sharply circumscribe the access of the poor to the gifts of nature” (Gadgil & Guha, 2007). Consequently, reforms that take into consideration the long-term sustainability of the environment—in contrast to nature’s economic productivity—and incorporate the needs and desires of all populations, have not been successfully or effectively initiated.

These combined factors—a focus on productivity, which favored the interests of big business against those of local inhabitants, and the environmental movement’s emphasis on individual survival—might help explain the course of the country’s future environmental movement and development. Gadgil and Guha (2007) compare and contrast India and America to help explain the divergent paths of these two environmental movements. For Americans, environmentalism is “a natural product of a rising rent standard of living. [America has] simply reached the point where, for many Americans, the next item on their acquisitive agenda is a cleaner environment” (Gadgil &

Guha, 2007). As a British journalist said, “Greenness is the ultimate luxury of the consumer society” (Moore, 1989; cited in Gadgil & Guha, 2007). This new focus for many western countries is a result of a post-industrialized world, which allowed the public to shift from problems of environmental sustainability—availability of forest produce, or protection of soils—to problems of environmental quality—cleanliness of air and water, and protection of pristine habitats (Gadgil & Guha, 2007). This new focus also marked a shift in environmentalism from the perspective of a threat to subsistence-oriented economic activities to a threat to individual health or public resources: a transition from economic conflicts to quality of life conflicts (Gadgil & Guha, 2007). The environment’s role could be seen, appreciated, and understood apart from its connection to human survival and productivity. In contrast, India, according to Gadgil and Guha (2007), has yet to make this transition, and is rather facing all these problems at the same time—land and resource depletion, pollution, and declining biodiversity. The very fact that India is facing all these issues at once makes it difficult for these problems to be fixed in the near future, and hence for the environment to be viewed beyond a zone of economic conflict.

2b. The Caste System

Great Britain’s involvement in shaping India’s environmental and political movements helps to elucidate the current lack of attention and improvement in India’s sanitation sector. Pre-colonial history established nature simply as a vehicle by which productivity could be harnessed, and the individuals residing in the land, typically lower-class farmers and forest-dwellers, were not given voice, power, or sway in political institutions. To fully understand the political ecology of sanitation in India and hence the

factors acting together to stymie political power of certain groups of individuals, the development of the Hindu caste system and the designated occupation of the “untouchables” as street and latrine cleaners must also be explored. The “untouchables” have been intricately associated with public feces, and as a byproduct, anti-Western ideals and backwardness. Any attempt to improve sanitation requires India to come to terms with “untouchability;” and any effort to rid society of “untouchability” is an attempt to encourage individuals to clean up their own excreta—a job many would seek to avoid—and give voice to a class of individuals that have been politically and socially voiceless.

The Hindu caste system most likely originated between 1000 and 200 B.C.E., with the lowest class, the “untouchables,” regulated to perform the most “menial of tasks” of “manual scavengers, removers of human waste and dead animals, leather workers, street sweepers and cobblers” (Majid, 2012). The caste system hierarchy is based on the principle of purity and pollution determined by birth (Majid, 2012). Following the belief of karma, individuals are reincarnated, with their next life representing either a reward or punishment for their past lives (Majid, 2012). Thus, it is believed that those residing in the lower castes are merely being punished for actions in their previous lives (Majid, 2012).

In pre-Independence India, there were a series of movements to rid society of the practice of untouchability. Due to the untouchables’ close association with human excreta, the issue of untouchability became an issue of sanitation: “In [Gandhi’s] opinion not only physical sanitation of the city was important, but there was also a need for internal sanitation of the citizens” (Kumar, 2010). Mahatma Gandhi, a prominent leader

of India's pre-Independence sanitation campaign, believed "Cleanliness [was] next to godliness. We can no more gain God's blessing with an unclean body than with an unclean mind" (Kumar, 2010). Gandhi championed that every individual should care for his/her own excreta: manual scavenging by the untouchables was unacceptable. Thus, he encouraged Congress workers and others not to force scavengers to dispose of waste, but rather to be their own scavengers (Kumar, 2010).

Nevertheless, it was difficult to eliminate the social connotations of scavenging. Despite the creation of committees designed to find a substitute for manual scavenging and ameliorate the conditions of these workers, the history of scavenging in India prevented these committees from instituting any significant change. Moreover, without a forum, union, or leader for the untouchables, it was nearly impossible for this group "to plead for their salvation" (Mehta, 1996). Despite the Indian Constitution providing untouchables all the rights of other citizens, including a program of affirmative action that guarantees to them and other tribes (Scheduled Tribes and Other Backward Classes) a quota of places and jobs in schools and universities, state and central governments, and state legislatures and parliament, the untouchables remain stuck in their current socio-economic position without a way to improve their livelihoods or wellbeing. They have difficulty in securing stable employment, and little political sway to create alternative futures.

In urban and peri-urban areas, the untouchables are often spatially marginalized and live in slums. Only half of the approximately 50,000 slums are notified or recognized by the Indian government (Dasra, 2012). Without official governmental designation, local municipal bodies are not required to provide services to these slums: "Neglected

and practically nonexistent to the authorities, these communities bear the worst consequences of inadequate sanitation” (Dasra, 2012). Within these constraints, even those who have tried to give political voice to the untouchables have been unsuccessful and have been swayed by the political power of those with political say, namely upper class citizens. For instance, after former V.P. Singh championed the Mandal Commission Report (1989)—recommending that the Other Backward Classes (OBCs) receive 51% of all government jobs, positions in universities, and medical and engineering schools—he was quickly bombarded with so much criticism from upper class members that he lost his prime minister position (Mehta, 1996).

The association by the middle class between toilets and Western ideas as more modern has further engrained the untouchables' historical relationship with excreta and public defecation by characterizing toilets as civilized, and hence public defecation—and those related to it—as uncivilized and backwards. Under the rule of Nehru, the first Prime Minister of India post-Independence, the Nehruvian ideal of modernity and its Western implications, was applied to all facets of Indian society and culture. In an attempt to imitate western ideals, rural landlords built toilets in their backyards and Western-style water closets with flushing cisters were introduced in Bangalore City (Srinivas, 2002). Although public defecation was once seen as a social activity among the middle class, the new Indian “ideal” under Nehruvian rule replaced public—and social—defecation with individual defecation in a private room (Srinivas, 2002).

In addition to influences by Prime Minister Nehru, publicized Western ideals greatly influenced Indian culture and understanding of defecation and its proper location. With the introduction of the television in the 1970s, broadcasting new and modern

lifestyles, the current perceptions of Indian society were transformed: “Television brought what Indians referred to as the attached bathroom—attached to the bedrooms, which quickly became fashionable in upper class homes in Bangalore” (Srinivas, 2002). And in the 1990s, with yet another form of media, magazines of home decorating, such as *Indian Architect and Builder*, *Architecture + Design*, and *Interiors*, westernized ideals of bathrooms replaced current Indian norms. Consequently, defecation in toilets was seen as westernized, proper, and modern, and its opposite, public defecation—and those historically associated with it, the untouchables—viewed as backwards and uncivilized.

2c. The Political System

The untouchables, as those most impacted by poor sanitation amenities, did not have a forum, union, or leader, and were thus unable to politically voice their opinions. Without political representation, their low status—as backwards and non-modern—and lack of sanitation were perpetually reinforced. The status of and associations tied with the lower class would remain after Independence from Great Britain: “the environmental problems confronting Indian cities today...are the result of the legacy of the colonial city and the nature of the post-colonial state, which includes segregated cities, marginalized local governments and a failure to manage urban growth and provide sufficient housing” (Chapter, 2011). Institutions and regulations formed in pre-Independent India continued after Independence and thus shaped India’s current relationship to the environment, as well as the status of its lower class citizens.

Before the influence of Great Britain, sanitation and health were given high priority in Indian society. In fact, the origins of the importance of sanitation and health in India date back to the Vedic Period (2500 BC): the Smritis, the oldest scriptures in Hindu

religion, outlined the code of conduct for family and society (Kumar, 2010). One of the Vedic-period literatures, the Manu Samhita, delineates proper sanitation and hygiene maintenance of Hindu followers. It calls for a holistic approach to internal and external cleanliness, with a particular attention given to spiritual health: “Believing in the omnipresence of God, the human body is treated as a temple where God resides so it is mandatory that the body should be kept clean” (Kumar, 2010).

However, sanitation’s holistic representation advocated for in Hindu scriptures was slowly lost in pre-Independent India, as it was no longer seen as a high national priority (Kumar, 2010). In fact, British involvement in sanitary work was not prompted by the health of the Indians, but rather the unsanitary conditions of British troops. In 1859, after the Royal Commission reported a mortality rate of 69 troops per 1000, the British established a Commission of Public Health in each presidency, designed to improve sanitation and lower the rate of epidemics amongst British troops. Specifically, to improve military hygiene, a sanitary police force was established under the Military Cantonments Act of 1865; and for civil sanitary conditions, sanitary boards were created in each province (Mushtaq, 2009).

Great Britain worked to ensure the health and wealth of its own citizens and big businesses, at the expense of sanitation for all Indian citizens and the survival of the environment and the inhabitants within it, respectively. In addition, Great Britain gave these favored individuals, particularly business leaders, high positions in government. With the Viceroy Lord Ripon’s resolution on Local Self-Government in May 1882, a number of Europeans and wealthy Indian ratepayers were incorporated into the political system (Chaplin, 2011). Business and upper-class interests were at the center of reform,

with the lower class forced to relocate from one demolished slum to the next. Most reforms enacted by municipal authorities were to ameliorate reoccurring civic problems, such as epidemics and fires, paying particularly attention to only those issues that negatively impacted Europeans or Indian middle classes (Chaplin, 2011). Despite the government's active role after the plague outbreak in Bombay and Calcutta in 1896, sanitary and housing reform was more focused on eradicating the crisis by demolishing slums and creating new roads and housing estates, rather than providing improved housing for the poor and working class (Chaplin, 2011). As noted previously, with a top-down approach, solutions initiated by the government offered only temporary fixes, with the individuals residing in the lowest classes most affected.

Chaplin (2011) contends that sanitation reforms have taken place, but have been directed away from the lower class and towards the middle class, due to the middle class' ability to monopolize government sanitation service and direct action and funds towards the installation of sewers and piped water. The middle class' ability to influence the dissemination of funds and resources is a product of two reinforcing components. First, unlike the rural and urban slums of India's poor, the colonies and suburbs in which the middle class occupies legally require provision of sanitation and water supply services (Chaplin, 2011). And secondly, the middle class has little incentive to improve the sanitary conditions of the lower classes, for the middle class is able to shield themselves both physically from the insanitary conditions of the lower classes and mentally from the voices of the lower class which are not heard in the political arena. Chaplin (1999) concludes that this has created an environment without a "threat from below."

In contrast to India, Great Britain experienced a series of “threat[s] from below”—such as the spread of disease (typhoid, typhus, and diarrhea) and of social revolution—which effectively brought the concerns of the lower class to the political forefront. The middle class feared the spread of such diseases to their suburbs, which resulted in “the preoccupations with the predicament and comportment of the poor, with the sanitary dangers these implied for the established citizens and with the need for urban sanitary and administrative reform” (Chaplin, 1999). Without relief to the poor, the “threat from below” would remain salient. The middle class in India has effectively shielded, and perhaps blinded, themselves from the disasters plaguing a majority of Indians, particularly in slums, through the usage of modern medicine, health care, and insecticides to halt the spread of disease (Chaplin, 1999). Thus, India’s middle class does not show interest in, or responsibility for, advocating on behalf of the lower class for improved environmental conditions (Chaplin, 1999). Without a “threat from below,” or an acknowledgement of the rights of the lower class—which itself is a byproduct of Great Britain’s role in shaping the environmental and historical focus of India, and the lower class’ association with excreta—sanitation facilities are unlikely to be improved for the vast majority of Indian citizens.

Nevertheless, the voices of the lower class are starting to be heard. In fact, the 74th Amendment of the Indian Constitution required women to compose 33% of seats in municipal elections, which has increased the number of women becoming mayors, particularly those of Scheduled Castes (SCs) (Chaplin, 1999). In addition to increased political voice, non-governmental organizations and state agencies have focused on community participation. As will be discussed further below, India’s Total Sanitation

Campaign in 1999 was intended to direct attention away from toilet construction and towards a “community led” and “people centered” framework (Kumar, 2010). Chaplin (1999) writes, “If they can become effectively organized by participating in such projects, the poor may be able to provide a check on the nexus that has developed between the bureaucracy, technocrats and contractors, and to counter-balance administrative corruption.” Although this does not necessarily create Chaplin’s “threat from below,” involvement of the lower class in politics will provide an opportunity for these individuals to voice their concerns and perhaps help break down the social and cultural norms regarding the abilities, statuses, and occupations of the untouchables and other segregated classes.

Part 3: National Sanitation Reforms

3a. The Difference: Urban and Rural Sanitation Programs

Provisions under the Indian Constitution for water and sanitation are administered in a decentralized format. Although the Indian government sets the national policy, as well as provides financial support to state level programs (Water Supply & Sanitation Collaborate Council, 2010), states—through State Departments of Public Health Engineering or Rural Development Engineering and State Water Boards—are responsible for operation and maintenance, as well as execution of such plans (Water Supply & Sanitation Collaborate Council, 2010). Usually, however, the local government leaves authority of utilities to either the village or district-level Panchayats in rural areas (Panchayati Raj Institutions), or to municipal governing bodies in urban areas (Urban Local Bodies) (Leavens & Derksen-Schrock, 2010). In fact, the government’s policy is not only decentralized in terms of who is responsible for water supply and sanitation, but

the policy itself also emphasizes decentralized solutions. Rather than a comprehensive reconstruction of piped sewerage and centralized treatments to improve sanitation amenities, the policy champions reconstruction of existing sanitation infrastructure, rather than the recreation of new infrastructure (Leavens & Derksen-Schrock, 2010). Such an approach harkens back to the government's strategy for the outbreak in Bombay and Calcutta in 1896: the government sought to physically demolish the slums and remove its inhabitants, rather than fix the root of the problem by providing improved housing for the poor and working class (Chaplin, 2011).

Table 1 provides an outline to navigate India's history within the sanitation sector in both urban and rural areas.

Year	Milestones in Rural Sanitation Program/Public Health Policy in India
1954	First Five Year Plan of the Government of India <i>Included The National Water Supply and Sanitation Program, introduced in the health sector by the Government of India</i>
1972	An Accelerated Rural Water Supply Program (ARWSP) <i>Designed to provide funds for "problem villages" (tribal peoples, harijans, backward classes)</i>
1975	The 20-Point Minimum Needs Program replaced ARWSP <i>Program gave further attention to "problem villages"</i>
1977	ARWSP reintroduced <i>Received funds from the Minimum Needs Program</i>
1981	Beginning of the International Drinking Water and Sanitation Decade Creation of the International Drinking Water Supply & Sanitation Program <i>Specified individuals to have 40 liters of safe drinking water/capita/day; for there to be at least one hand pump/spot source for every 250 persons; and for all dry latrines to be converted into low cost sanitary latrines, among other provisions</i> Government of India made its first sanitation target
1985	Management of rural and urban water supply and sanitation transferred from the Central Public Health and Environmental Engineering Organization to (1) The Ministry of Drinking Water and Sanitation for rural water supply and sanitation; and (2) The Ministry of Urban Development for urban water supply and sanitation
1986	Central Rural Sanitation Program (CRSP) launched <i>The focus of the CRSP was on supply (providing toilets) and subsidy-driven</i>

	<i>Received funds from the Minimum Needs Program; designed to increase sanitation coverage to all rural areas; established the National Technology Mission to provide states with technical and scientific guidance</i>
1990	Intensive Sanitation Project (ISP) launched in Medinipur <i>ISP called for the elimination of subsidies and a focus on education</i>
1991	National Technology Mission renamed the Rajiv Gandhi National Drinking Water Mission (RGNDWM)
1992	National conference on rural sanitation organized by the Government of India
1993	CRSP restructured using insights from the 1992 National conference <i>Unit cost of latrine was increased to Rs 2,500, and beneficiary contribution for latrine price was increased</i>
1994	73 rd and 74 th constitutional amendments <i>Created a three-tier elected local self-government system (Panchayati Raj Institutions) as well as recognized powers and functions of Urban Local Bodies (ULBs)</i>
1996	National Slum Development Program (NSDP) <i>Intended to upgrade urban slums by providing physical and social amenities, community infrastructure, and shelter, among others</i>
1996-1997	Knowledge, Aptitude and Practices Survey (KAPs) administered by the RGNDWM <i>Highlighted the convenience and privacy as main motivational factors, rather than subsidies, for toilet construction</i>
1999	CRSP restructured, and TSC launched
2001	Replacement of NSDP by Valmiki Ambedkar Awas Yojana (VAMBAY) <i>Construction and upgrading of urban slums, particularly through community toilets; the government provides a subsidy of 50% for construction, with remaining 50% supplied by the state government; the program more recently works to create community toilets under the Nirmal Bharat Abhiyan (NBA) scheme</i>
2002	TSC is the primary national sanitation program of the Government of India 10 th Five Year Plan <i>Acknowledged the importance of urban water supply and sanitation</i>
2003	Nirmal Gram Puraskar (NGP) launched <i>Incentive scheme to encourage Panchayati Raj Institutions (PRIs) to become open defecation free</i>
2005	Mahatma Gandhi National Rural Employment Guarantee Act (MGNREGA) <i>Provision of at least 100 days of guaranteed wage employment per year in rural areas to each adult household member that volunteers for unskilled manual work</i> <i>In 2012, the MGNREGA was converged with the NBA; however, in 2014, the MGNREGA was removed from the new sanitation campaign (SBA)</i>
2007	Jawaharlal Nehru National Urban Mission (JnNURM) launched <i>Provision to develop basic services for the urban poor</i>

	Urban Infrastructure Development Scheme for Small & Medium Towns (UIDSSMT) launched
2008	National Urban Sanitation Policy (NUSP) is launched <i>Designed to “ensure and sustain good public health and environmental outcomes for all citizens with special focus on hygiene and affordable sanitation facilities for urban poor and women” (Dasra, 2012)</i>
2012	TSC is renamed Nirmal Bharat Abhiyan (NBA) <i>Target set for 100% coverage of sanitation in rural areas by 2020</i> Rajib Awas Yojana (RAY) initiated <i>Create a slum-free India during the Twelfth Plan Period (2013-2017)</i>
2014	Swachh Bharat Abhiyan (SBA) replaced NBA <i>New target to make India 100% clean by 2019</i>

Table 1: Key milestones in sanitation programs in India

The Government of India’s first national water and sanitation program was established in 1954 with The National Water Supply and Sanitation Program, as part of the country’s first Five Year Plan (Kumar, 2010). Since its inception, governmental programs—and non-governmental aid—have primarily focused on rural, as opposed to urban, sanitation. A report by Dasra (2012), a strategic philanthropy foundation in India, notes, “Urban sanitation remained the poor cousin to urban water supply both on paper—where it was generally subsumed under water supply—and also in practice where the bulk of investment was allocated towards and spent on large infrastructure projects for water.”² Attention towards rural sanitation might in part be a result of the lower percentages of latrine facilities in rural areas, in comparison to urban. According to the 2011 Census of India, only 30.7% of Indian rural households had a latrine facility compared to 81.4% of urban households (Gosh & Cairncross, 2014). Figure 1 shows toilet facility coverage for rural and urban India (King, 2014).

² Although water supply must come before the construction of urban toilet systems, the coupling of water and sanitation supply diminished attention and resources provided for urban sanitation coverage.

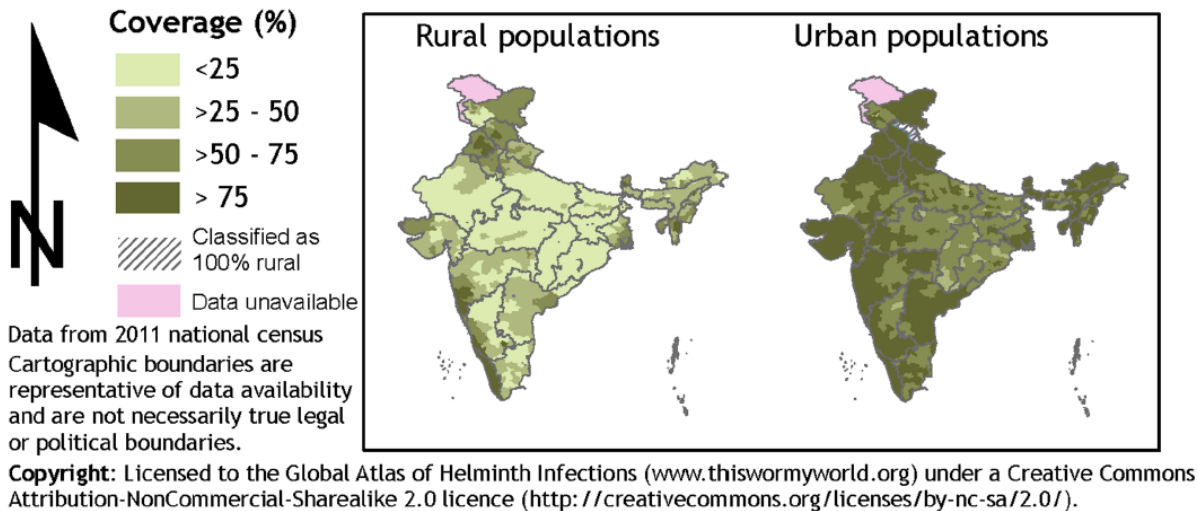


Figure 1: Toilet coverage in rural (left) and urban (right) India

As depicted, toilet coverage rates are significantly greater in urban than rural populations.

In fact, in the majority of urban areas, 50% or more of the population is with toilet facilities (shaded in medium- and dark-green in Figure 1).

The lack of involvement in urban projects might also be a direct result of the different problems faced in urban and rural settings. In comparison to rural areas, more households in urban areas have a demand of and value for toilets (the left-side of Equation 10 in Chapter 1): with increasing population growth and scarcity of land, not only is land available for public defecation diminishing, but also the act of open defecation, and the embarrassment or security issues of such an act, are more easily seen. However, urban settings face certain issues that are not prevalent in rural areas, such as land tenure or the proliferation of slums that are not notified or recognized by the government (Dasra, 2012). Issues with tenant rights and tenure in slum communities both prevent and discourage households from investing in sanitary facilities (Nivedita, 2010). In addition, the most common type of sanitary facilities in rural areas is a pit toilet; whereas in urban areas, toilets are connected to sewer networks. Neglect to connect all

urban households to sewer networks prevents households from using—and benefiting from—the infrastructure, and inadequate operation and maintenance contributes to the depreciation of the structures over time (Nivedita, 2010). These complications necessitate resources and tools that might not be readily available or easy to obtain, and thus shifts attention of non-governmental organizations away from urban sanitation and towards rural (Dasra, 2012).

The apparent differences between urban and rural sanitation are also displayed in governmental institutions—with each urban and rural area administered by different bodies within the Indian Government, the Department of Drinking Water and Sanitation (DDWS) within the Ministry of Rural Development, and the Ministry of Urban Development and Growth respectively. Without a similar “Rural Department of Drinking Water and Sanitation” in urban areas, efforts to improve urban sanitation, before the enactment of the cornerstone urban sanitation project in 2008 (the National Urban Sanitation Policy), were incorporated within other slum improvement projects. Since the 1970s, for example, the Accelerated Urban Water Supply Program has provided monetary assistance for city sewerage and treatment infrastructure, and in the 1980s, the Integrated Low-Cost Sanitation Scheme has provided subsidies for households to purchase low-cost toilets (See Table 1; Water and Sanitation Program, 2011).

Additionally, the National Slum Development Project and its replacement program, the Valmiki Ambedkar Awas Yojana (VAMBAY), were policies enacted to construct community toilets for slum populations (General Knowledge Today, 2009). More recently, in 2005, the Jawaharlal Nehru National Urban Renewal Mission (JnNURM) was launched, which includes a provision to develop basic services—housing, water supply,

sanitation, road network, urban transport, and the development of inner city areas—for the urban poor, as well as the Urban Infrastructure Development Scheme for Small & Medium Towns (2005), which covers the remaining cities and towns that were not provided assistance under the JnNURM (See Table 1; Water and Sanitation Program, 2011)

Given the failure of past reforms to ameliorate urban sanitation, the Government of India initiated the National Urban Sanitation Policy (NUSP) in 2008 (See Table 1), designed to produce totally sanitized Indian cities and towns: to “ensure and sustain good public health and environmental outcomes for all citizens with special focus on hygiene and affordable sanitation facilities for urban poor and women” (Dasra, 2012). The focus is not simply on infrastructure—sewerage networks or toilets—but also on behavioral change; continual operation and maintenance; proper disposal, treatment, and potentially reuse of wastes; and state involvement via state and city sanitation plans (Nivedita, 2010). This policy was monumental on two fronts: first, the government afforded separate recognition of urban sanitation, rather than tying policy of urban sanitation with that of urban water; and secondly, it set planning and implementation targets for states and cities to reach (Dasra, 2012). To achieve such targets, each city is mandated to create a City Sanitation Plan (CSP)—which is run by a City Sanitation Task Force composed of governmental agencies, key experts, businesses, non-profits, worker unions, elected representatives, and ULB, among others—and all CSPs are formulated into a State Sanitation Strategy. The Ministry of Urban Development (MoUD) will provide support financially, for national-level awareness generation, and for monitoring and evaluation, knowledge management, and capacity building.

India's more recent campaign, the Swachh Bharat Abhiyan (SBA), intends to make India "clean" by 2019, in all parts of the country. The SBA itself includes two sub-missions: one for rural areas and one for urban areas (Joyita, 2015). The urban component will be initiated over a five-year period and within 4041 statutory towns, with an expected total cost of Rs 62,009 crores, with Rs 14,623 crores contributed by the government (Diligent Media Corporation, 2014a). Within five years, the SBA's goal for urban India include the elimination of open defecation, a transition towards pour flush toilets, the removal of manual scavenging, the installation of municipal solid waste facilities, and the hope of changing behaviors in regards to the current perception of sanitation practices (Diligent Media Corporation, 2014a).

3b. Rural Sanitation Reforms

In comparison to urban sanitation, the Government has enacted multiple programs to tackle deficiencies in rural sanitation. Beginning in 1986, India has had four different national rural sanitation campaigns, with each hoping to improve the delivery and implementation of the former. As outlined in Table 1, the reforms include the Central Rural Sanitation Program (CRSP) in 1986, the Total Sanitation Campaign (TSC) in 2001, the Nirmal Bharat Abhiyan (NBA) in 2012, and the Swachh Bharat Abhiyan (SBA) more recently in 2014. Table 2 compares and contrasts the latter three sanitation reforms. Without a uniform mechanism, and more importantly, knowledgeable and effective leaders in localized communities to carry out such campaigns, sanitation reforms—despite their praiseworthy approaches—are oftentimes plagued by a focus on the short-term construction of toilets, rather than long-term infrastructure or educational activities. The following sections will first provide a historical overview of the different rural

sanitation campaigns in India, and then will analyze a few of the issues with past campaigns and how subsequent reforms attempted to ameliorate these problems.

	Total Sanitation Campaign (TSC)	Nirmal Bharat Abhiyan (NBA)	Swachh Bharat Abhiyan (SBA)
Date Implemented	1999	2012	2014
Goal/Target	End open defecation by 2017	100% access to sanitation for all rural households by 2022	To make India 100% clean by 2019
Convergence with MGNREGA?	No	Yes	No
Subsidy Amount	Rs 3500 – (2200 by Government; 1000 by state; 300 by beneficiary contribution) <i>Note: amount ranged; above is June 2011 subsidy amount</i>	Rs 5500 – (3200 by Government; 1400 by state; 900 by beneficiary contribution) Rs 5400 – MGNREGA Total: Rs 10900	Rs 12,000 – supplied entirely by the Government
Who can receive subsidies?	Households classified as Below the poverty line (BPL)	Households classified as BPL, with inclusion of a select number of above the poverty line (APL) (SCs/STs, small and marginal farmers, landless laborers with homestead, physically handicapped, women-headed households)	
Information, Education and Communication (IEC)	Limited to 15% of funds to be spent on IEC; funds available in pre-Nirmal phase only	Minimum of 15% of funds to be spent on IEC; funds available in post-Nirmal phase to ensure sustainability	Minimum of 8% of funds to be spent on IEC
Implementation	The Department of Drinking Water and Ministry of Rural Development create the policy framework and send money to District Water and Sanitation Committees, who work with the Communication and Capacity Development Unit (CCDU)—which plans and disseminates public information and education—as well as a series of block rural sanitary markets and production centers; Gram Panchayat (GP) ultimately acts as	4-Tier Implementation mechanism at the State/District/Block/Village level; creation of the State Water and Sanitation Mission (SWSM), tasked with supervising implementation in the State, and preparing the Annual Implementation Plan, among other things; creation of the District Water and Sanitation Mission (DWSM); creation of the Block Resource Centers (BRC), designed to provide support and guidance to Gram Panchayats (GPs); creation of the Village Water	Creation of a 5 Year Plan with 5 independent annual plans

	“motivator” to encourage household toilet construction; outside agencies are also instrumental in support	Sanitation Committee (VWSC)	
Novel Components of the Campaigns	Marked India’s first campaign to be “community led” and “people centered” Created the Nirmal Gram Puraskar (NGP) incentive scheme, which gives monetary rewards for open defecation status of a village	Increased focus on the Gram Panchayat (GP) level, namely through encouraging Nirmal Gram Puraskar status (which was initiated in 2003 under the TSC)	Conduction of the Baseline Survey of 2013 Prime Minister Modi’s “Swachh Bharat” challenge; social media components (mSBA mobile application)

Table 2: Differences and similarities among the TSC, NBA, and SBA

3b1. Historical Overview

As mentioned previously, and outlined in Table 1, the first Five Year Plan period, in 1954, welcomed in The National Water Supply and Sanitation Program (Kumar, 2010). The Program’s purpose was to provide safe water supply and adequate drainage facilities to both urban and rural areas, with a particular attention given to “problem villages,” which were composed primarily of tribal peoples, harijans, and other backward classes, located in predominately rural areas (Chaturvedi, 2011). In 1972-1973, the Indian Government instituted the Accelerated Rural Water Supply Program (ARWSP) to help direct funds to state programs, and in 1975, the Government initiated the 20-Point Minimum Needs Program, which gave further attention to these “problem villages.” Jointly, the 20-Point Minimum Needs Program and ARWSP ensured safe drinking water to all rural areas.

With the Sixth Five-Year Plan, further attention was brought to drinking water and sanitation, with 1980 marking the inception of the International Drinking Water and Sanitation Decade (Chaturvedi, 2011). During this period, the Government of India made

its first sanitation target: 100% coverage for water, 80% for urban sanitation, and 25% for rural sanitation (Kumar, 2010). Additionally, structural changes were implemented: management for rural water supply and sanitation was transferred from the Central Public Health and Environmental Engineering Organization (in the Ministry of Urban Affairs)—which originally administered both rural and urban water supply and sanitation—to The Ministry of Drinking Water and Sanitation (part of the Ministry of Rural Development under the Ministry of Agriculture) (Chaturvedi, 2011). The MoDWS is tasked with the responsibility to support water supply and sanitation policy, construct guidelines, contribute technical inputs, and document progress and outcomes of participating state programs (Ganguly, 2008).

Before 1986, sanitation programs were mainly focused on distributing funds, declaring national sanitation goals, and appointing a national body to manage rural and urban sanitation. Although urban sanitation provisions remained incorporated within slum improvement reforms, rural sanitation embarked on a different route, with the initiation of the first nationally sponsored sanitation program, the Central Rural Sanitation Program (CRSP) in 1986 (see Table 1). Receiving funds through the Minimum Needs Program, the CRSP's goal was to increase sanitation coverage in all rural areas, with a special attention afforded to ensuring the privacy and dignity of women. The CRSP also established the National Technology Mission (renamed the Rajiv Gandhi National Drinking Water Mission, RGNDWM, in 1991) within the Department of Rural Development, to provide states with technical and scientific guidance. The CRSP was predominately supply-driven, focusing on providing toilets through an 80% subsidy for construction of individual sanitary latrines for below-the-poverty-line (BLP) households

(Bhaumik & Kumar, 2014). With such a high focus on supply, a substantial amount of funds was required to achieve its goal of providing 25% of the rural population with sanitation facilities by the end of the decade. Consequently, funds allocated to other rural development programs were transferred to the CRSP, which were further portioned to states based on rural population, area, and severity of poverty (Kumar, 2010). As CRSP progressed, many opponents began to question the effectiveness of the subsidy-heavy policy, remarking that very few toilets installed under the program were reported as being used. Moreover, opponents argued that not only did the “poor quality of construction” deter people from using the toilets, but also one of the main barriers preventing individuals from using the toilets was a lack of information regarding why or how to use the amenities: “a lack of awareness about the leach pit technology...[led] people to believe that since water remained in the hole excreta would not get flushed out properly” or that “the pit [would overflow]” (Ganguly, 2008).

The inefficiencies of the CRSP and its supply-driven focus ultimately prompted the Government of India to conduct a series of pilot projects for rural sanitation, all of which focused on an “integrated approach,” and the inclusion of Information, Education, and Communication (IEC) components (Ganguly, 2008). Among these projects was the Intensive Sanitation Project (ISP), launched first in Medinipur by the Ramakrishna Mission Lokshiksha Parishad (RKMLP)—a group with the mission to eradicate poverty and increase social development (See Table 1). This project championed the creation of a market of sanitary facilities, and in particular, a focus towards demand generation in rural communities (Kumar, 2010). ISP called for the elimination of subsidies, and rather a

focus on education: “education is the panacea for all social ills”³ (Swami Vivekananda; cited in Kumar, 2010). The lessons learned from the ISP would help create the future framework for rural sanitation programs of India: a focus on demand, over supply; the minimization of subsidies; and the importance of encouraging school sanitation and hygiene education, among others (Ganguly, 2008).

Using the success of the ISP’s Ramakrishna Mission Lokshiksha Parishad (RKMLP)—whose educational and community engagement approach increased the willingness to construct and use toilets, without the presence of hardware subsidies—the Indian Government adopted the RKMLP’s methodology, the ISP, and reconstructed the CRSP by launching the Total Sanitation Campaign (TSC) in 1999 (see Table 1). The TSC “introduced a paradigm shift in the rural sanitation strategy by making it ‘community led’ and ‘people centered’ with increased stress on awareness creation and demand generation” (Kumar, 2010). A motivating factor encouraging the revamping of the CRSP was the results of the 1996-1997 Knowledge, Aptitude and Practices Survey (KAPs), a nationwide baseline survey administered by the Rajiv Gandhi National Drinking Water Mission (RGNDWM). Conducted in 65 districts over 25 states, the study was designed to both create a baseline to measure the effectiveness of previous water and sanitation programs, and to better understand motives and constraints of toilet construction in order to devise future IEC programs (Kumar, 2010). The results of the study supported the ISP platform: in comparison to the CRSP’s supply-driven and subsidy-focused program, the study found convenience and privacy to be the main instigators of latrine adoption (54% of respondents), whereas only a few individuals (2%)

³ Nevertheless, education is a two-way relationship: there is also a need to understand how locals value and interpret sanitation facilities in order to create a proper educational framework.

cited subsidies as a motivating factor for latrine construction (Kumar, 2010).

Additionally, the survey reported that 51% of people were willing to spend up to Rs 1,000 for constructing toilets (with a toilet's cost approximately Rs 2,500) (Kumar, 2010). The CRSP's 100% subsidy, provided to BPL households and to households of scheduled castes and scheduled tribes, was therefore not necessary for construction and usage of latrines (Kumar, 2010). The controversy over the effectiveness of and eligibility for subsidies will be discussed further below.

In order to adequately encourage demand generation, a cornerstone of TSC was its focus on smaller institutional structures, and its reorganization of the delivery system to “build capacity at all levels by having a core team of specialists to plan and mobilize human resources for bringing quality into implementation and communications” (Ganguly, 2008). Ganguly (2008) provides an overarching diagram that outlines the various bodies involved in the TSC, as well as their contributing roles and the organizations that provided support. Specifically, the Department of Drinking Water and Ministry of Rural Development create the policy framework and send money to the District Water and Sanitation Committees, who work with the Communication and Capacity Development Unit (CCDU)—which plans and disseminates public information and education—as well as a series of block rural sanitary markets and production centers. However, it is the Gram Panchayat, who ultimately acts as a “motivator” to encourage household toilet construction (see Table 2) (Ganguly, 2008). Among these main organizations, outside agencies—ranging from UNICEF, Water, Sanitation and Hygiene (WASH) Advocates, non-governmental organizations (NGOs), community-based

organizations, and volunteers—are all instrumental in supporting these efforts (Ganguly, 2008).

In fact, the vital role the Gram Panchayat could have on sanitation and hygiene promotion initiatives in villages was harnessed through the government’s incentive scheme, the Nirmal Gram Puraskar (NGP) program, initiated in 2003 as part of the TSC (Kumar, 2010). The NGP awards accomplishments by PRIs between Rs 50,000 to Rs 5 million for open defecation free villages, under the mandate that the cash award will be used to improve and maintain sanitation facilities in the village (Kumar, 2010). In 2012, the TSC was renamed the Nirmal Bharat Abhiyan (NBA) with a renewed focus to increase the pace of sanitation coverage (see Table 2). The NBA set a target of 100% access to sanitation for all rural households by 2022, with a new vision: from “access to toilets to all” to “attaining Nirmal status” (Shome, 2012).

More recently in 2014, the Prime Minister of India launched the Swachh Bharat Abhiyan (SBA) (see Table 2). Specifically, “The Mission shall strive [to make India clean by 2019] by removing the bottlenecks that were hindering the progress...and focusing on critical issues affecting outcomes” (Mojumdar, 2014). The 2019 deadline, which will mark the 150th anniversary of Gandhi’s birth, is three years earlier than the NBA’s goal to achieve sanitation for all of India by 2022 (see Table 2; MoDWS, 2014).

The SBA differs from past rural sanitation campaigns, for its goal is to ensure “sanitation to all,” both urban and rural, poor and rich. In fact, Prime Minister Modi has himself taken publicized actions to encourage every Indian—regardless of class, religion, or income status—to participate in the SBA. Modi has created the “Swachh Bharat” challenge, in which the Prime Minister himself chose nine individuals to spread

awareness about cleanliness. The Prime Minister nominated well-known celebrities, such as actors Salman Khan, and the Goa government, Mridula Sinha, among others, all of which pledged to “remain committed towards cleanliness and devote time for this...[to] neither litter nor let others litter” and to “devote 100 hours per year...to voluntary work for cleanliness” (The Times of India, 2014). The hope of the Challenge is that these chosen individuals would each nominate nine additional individuals to raise awareness for cleanliness, creating a chain reaction in Indian society to collectively create a Clean India (PTI, 2014; cited in The Times of India, 2014). In addition to the Challenge, the Government of India has produced its first ever television campaign to create awareness of the SBA (Tewari, 2014). The 60-second commercials incorporate sarcasm to embarrass members from all classes polluting in public spaces: “Despite countless messages by the government, we still see a total lack of involvement from our brethren for the cause. The sarcasm in the film is an attempt to drive home the point harder by now literally ‘humiliating’ the offender, albeit nicely” (Mehra; cited in Tewari, 2014). These two efforts will hopefully incentivize all members of the Indian society to make India a cleaner country.

Beyond celebrities, Modi has also initiated a mass awareness campaign through social media. One of the major social media developments is the mobile-based application of Swachh Bharat Mission (mSBA), developed by the National Informatics Centre. After registration through the Ministry of Drinking Water and Sanitation’s SBA website, users can post photographs of sanitation facilities, as well as information regarding the date, time, and location of construction—GP name, village, and habitation

(National Informatics Center of the Government of India). Figure 2 shows an example of a photo uploaded via the mobile application.



Figure 2: Photo uploaded via mobile-based application of mSBA. Photo taken in the state of Andhra Pradesh, in the district of Krishna. Taken from the Swachh Bharat Mission (Gramin) website, this photo provided information regarding: district name, block name, GP name, village name, habitation name, family headed name, and father/husband name; as well as a category (yes/no) for whether the toilet is functional and maintained, and if a water facility is available. This particular individual answered “yes” to all three questions.

Such a platform is hoped to increase awareness of and involvement in the campaign, and allow citizens to share their accomplishments with others. Users are able to provide information regarding whether the toilet is functional, maintained, and if water facility is available. It is hoped that this application will act as a database to provide up-to-date information regarding the number of toilet facilities and their maintenance, as well as prompt governmental officials to repair damaged facilities. These SBA platforms, by creating an accessible and direct means to obtain services from the state, without

administrative delays, will hopefully “empower the million of Indian citizens who in their day-to-day lives face social and economic barriers that otherwise prevent them from actively participating in, and benefiting from, government initiatives” (Advani, 2014). As will be discussed more thoroughly in Chapter 5, the SBA’s ability to “empower” these citizens and reverse their economic and social situations have been questioned and criticized. Nevertheless, the SBA’s strategies are minimally an attempt in the right direction to address the most marginalized individuals in society.

However, a number of obstacles existing in past sanitation campaigns—execution shortfalls, economic and political barriers, and administrative delay—remain present today and might stand in the way of “empowering” the citizens of India to reach the SBA’s goal of “sanitation for all.” With so much diversity—both in cultural ideologies and in the geographic coverage of sanitation facilities within India—it is nearly impossible to create a national sanitation plan that will effectively work across all states, districts, or villages. The evolution of India’s sanitation campaigns—from the TSC, to NBA, and now to SBA—have attempted to address problems of its predecessor campaigns as to increase both the construction and usage of toilet amenities. The following sections explore a few of such barriers.

3c. Effectiveness of Past Campaigns

3c1. Supply-Side Versus Demand-Side

The guidelines for the TSC, NBA, and SBA have all allocated different amount of funds designated to Information, Education and Communication (IEC) activities. IEC activities are designed to encourage educational components that focus on generating demand for construction and usage of toilets, rather than on purely the supply or

construction of toilets. However, the effectiveness of these funds, and whether or not they are spent, are unclear.

With the transition from the TSC to the NBA, the guidelines for the new campaign required that a minimum of 15% of total allocated funds be spent on IEC efforts, as well as mandated the appointment of motivators in GPs to encourage individuals to construct toilets. Despite these changes, many states did not use all funds allocated to IEC activities during the NBA campaign, with the majority of states focusing on actions to increase hardware (construction), rather than software (educational) components. The Planning Commission study, for example, found that out of the 46% of GPs who have appointed motivators, most of these individuals encouraged construction of latrines, rather than behavioral change (Kapur, 2013b). In addition, “states [continued] to underprioritize IEC funds:” as of August 2013, money spent on IEC had remained at 58.75% of its allocated amount, whereas 81.31% of approved allocations for school toilets, 76.63% for angawadi toilets, and 67.81% for household toilets had been spent (Kapur, 2013b). In fact, the states Kapur (2013b) found to have an increasing number and proportion of individuals without toilet facilities between the 2001 and 2011 Census, were among the states to have spent the lowest amount of allocated IEC funds as of August 2013—Bihar (15%), Jammu & Kashmir (18%), Orissa (20%), Jharkhand (26%), Madhya Pradesh (33%), Karnataka (38%), Rajasthan (39%), Uttar Pradesh (40%), Assam (42%), Tamil Nadu (43%), Chhattisgarh (61%), and Mizoram (62%).

The more recent SBA also adjusts the amount of allocation funds for IEC, and only mandates 8% of funds to be spent on IEC efforts, rather than 15% (Joyita, 2015). This adjustment might be a result of the low percentage of IEC funds spent under the

NBA as noted above. In compensation, the SBA does outline additional mechanisms to generate demand, particularly through the involvement of corporate bodies, which will help with funding sources. Under the TSC and NBA, non-government organizations and Swachhta Doots (volunteers), were established to help create total sanitation in GPs (Sengupta, 2014). The corporate organizations incorporated in the SBA will create community sanitary complexes (CSCs)—designed to provide funding—particularly to ensure sustainability and maintenance of sanitation facilities after implementation (Sengupta, 2014). Apart from financial assistance from the CSCs, funds will also be collected via Special Purpose Vehicles (SPV), which will help obtain funds from governmental and non-governmental sources, specifically for Corporate Social Responsibility activities (Sengupta, 2014). Moreover, as noted previously, the SBA’s innovative incorporation of social media, particularly through the Swachh Bharat Mobile Application, might be a replacement—and one that is used nationally—for the TSC’s and NBA’s locally-induced IEC efforts.

3c2. The Subsidy Debate

The 1996-1997 KAPs, as noted previously, revealed few individuals (2%) who cited subsidies as a motivating factor for latrine construction (Kumar, 2010). Nevertheless, the guidelines for the TSC, NBA, and SBA have all incorporated subsidies. As shown in Equation 10 from Chapter 1, an individual weighs both the benefits—the physical and emotional health benefits—against the costs of toilet construction. The intent of subsidies, therefore, is to provide households with monetary compensation to incentivize toilet construction: if money is constraining a household from transforming demand for toilets into construction, subsidies can help alleviate this limitation. However,

the role of subsidies in sanitation reforms has been contested for two different reasons, both of which question subsidies' effectiveness in generating demand for toilet construction and usage. First, some challenge the ability of subsidies to effectively generate behavioral change, in comparison to other forms of incentivizing demand, such as the community-led total sanitation (CLTS) efforts. Secondly, some question whether subsidies are distributed equally and efficiently, and thus whether subsidies are provided to the “correct” households, if the process to obtain a subsidy is provided in an easy-to-understand format, and whether compensation is given in a timely manner.

Shame or Subsidy?

In Chapter 1, Pattanayak et al.'s (2007) demand for individual household toilet model left us with the final trade-off: an individual will invest time and money to build and use a toilet when the marginal benefits of toilet construction and usage—the physical and emotional health benefits in monetary terms—equals the costs—the foregone wage one could have earned in the labor market and the cost of the materials for construction. Subsidies are designed to lower the cost of the materials for construction. According to Pattanayak et al.'s (2007) model, subsidies should increase demand for individual toilet construction.

The effectiveness of subsidies has been highly debated. Kumar (2014), looking at data from the National Sample Survey (NSS), finds that there has been little change in the level of deprivation of latrine facilities between 1993 and 2008-2009 for poor households—91.65% in 1993 to 83.8% in 2008-2009, marking a -0.57% annual compounded change. The debate over the usage of subsidies has been framed in comparison to other mechanisms to increase toilet construction, such as the community-

led total sanitation approach which focuses exclusively on behavioral change through shame techniques.

One of main critiques of subsidies is their inability to create “lasting behavioral change” (Pattanayak et al., 2009). Many opponents of subsidies worry that monetary compensation will not ensure “strong intrinsic motivation” for “people are more likely to use and value things they have had to pay for,” rather than when they are provided with it for free (Pattanayak et al., 2009). Many studies have attempted to evaluate which technique—shame or subsidy—is more effective at increasing toilet adoption; yet, results have varied. One study conducted by Pattanayak et al. (2009), collected data in Orissa before and after a community-led sanitation project in both treatment and control villages. This sanitation project incorporated both shame techniques and subsidies, with subsidies offered to only poor (below the poverty level) households. Such a set-up allowed the authors to compare poor and non-poor households in control villages to the number of latrines built by (1) poor households in treatment villages (shame and subsidies), and (2) non-poor households in treatment villages (shame only). The authors find that for both poor and non-poor households, households in the intervention area increased toilet ownership by 29% in comparison to the control area (Pattanayak et al., 2009). Moreover, by comparing poor and non-poor households between the control and treatment areas, Pattanayak et al. (2009) find that “subsidy only” induces one-third of the increase in latrine ownership, and “shame only” causes two-thirds. As a result, Pattanayak et al. (2009) champion a combination of shame and subsidy techniques to encourage toilet construction.

Stopnitzky (2012b) also looks at the effectiveness of subsidies, using data collected from the “No Toilet, No Bride” campaign. He finds, however, subsidies to be ineffective at encouraging marriage-age men to adopt latrines. As discussed in Chapter 1, the “No Toilet, No Bride” campaign showed that the highly competitive marriage market in Haryana—a higher composition of men relative to women—increased construction of toilets among marriage-aged households. Stopnitzky (2012b) works with the regression used in the “No Toilet, No Bride” campaign and adds a dummy variable for (1) presence of below the poverty line (BPL) card, and (2) an interaction of BPL card with marriage-aged boys in Haryana. The interaction dummy variable identifies the coefficient of interest, which itself compares the difference in mean latrine ownership between BPL and non-BPL holding marriageable boy households (i.e. the effect of subsidies), and compares this difference to the mean difference in BPL/non-BPL holding households (i.e. availability of subsidies) without marriageable boys. Stopnitzky (2012b), in contrast to Pattanayak et al. (2009), finds a statistically indistinguishable difference between marriage-age men with and without subsidy availability. Comically, Stopnitzky (2012b) names the paper in which he discusses his findings, “Throwing Money Down the Toilet? India’s Toilet Subsidies and Sanitation Investment.”

Such varying results regarding subsidies suggest that subsidies might be effective in some scenarios, and not in others. For instance, shame techniques might be more influential if income is not a limiting constraint, or if the community does not have a demand for toilets and therefore will not use the subsidy even if provided. In addition, subsidies might be ineffective at encouraging toilet construction if they are improperly distributed to households (i.e. to those above the poverty level) or if payments are

delayed. Nevertheless, the above studies imply that simply providing households with monetary compensation or solely focusing on construction of toilets is not enough to encourage toilet construction *or usage*. The SBA, although still offering a subsidy for toilet construction, has reconstructed the source of the subsidy funds, in an attempt to make subsidy dispersal more effective.

Eligibility of Subsidies:

Ineffectiveness of subsidies might be in part due to how subsidies are dispersed—which households are and are not able to receive a subsidy, how a household is made aware of subsidy eligibility, and the process by which a household obtains a subsidy.

A household must have a BPL card in order to be eligible for a subsidy. BPL cards are distributed based on a series of 13 criteria, such as food security, housing, occupational status and type, land ownership, durable assets, and education, among others (Stopnitzky, 2012b). Yet, this mechanism often inaccurately categorizes half of the poor as non-poor, and half of the non-poor as poor (Jalan & Murgai, 2007; cited in Stopnitzky, 2012b). Consequently, BPL cards are not always allocated to the entitled households. Stopnitzky (2012b) remarks that 18% of households in the wealthiest quintile have a BPL card and thus are able to access the subsidies under the NBA (and now SBA) for toilet construction. Hirway (2003) studied villages in Gujarat and finds that 11-18% of BPL cardholders were local elites, who pressured or colluded with officials in order to be added to the BPL card list (Spotnitzky, 2012). Similarly, Besley et al. (2012) find that households of politicians are more likely to have BPL cards, and that politicians are less likely to give BPL cards to the most poor households or households of dissimilar caste groups or social status (Spotnitzky, 2012).

If BPL cards are not distributed properly, we might expect the effect of holding a BPL card to be negligible on toilet construction. As shown in Equation 10, a household will equate the benefits to costs when deciding whether or not to construct a toilet. If cost is not an issue for a household, then possession of a BPL card will not change an individual's demand for a household toilet. In addition to investigating the role of subsidies in the "No Toilet, No Bride" Campaign, Stoptnitzky (2012) also uses economic regressions to dissect the role of holding a BPL card, and thus the availability of subsidies (rather than the subsidy itself), on toilet construction. Stoptnitzky (2012) finds that if a household has a BPL card and therefore is eligible for a subsidy under TSC, it increases the probability of the household having a latrine between 0.4 or 0.6 percentage points, namely a 2.0-3.1% increase given a mean latrine ownership of 19.3%. However, when this same regression is run for each of the 14 states in Stoptnitzky's sample, a significant amount of variation is observed: the results range from -0.025 in Uttaranchal to 0.057 percentage points in Haryana. Ultimately, these results "indicate important cross-state differences in the effectiveness of BPL subsidy program" and therefore suggest the inability to make any conclusive, national assumption about whether BPL cards are distributed to eligible households and the impact of subsidies on toilet construction (Stoptnitzky, 2012).

Regardless of who is and is not able to obtain a BPL card, difficulties are also met in regards to obtaining a subsidy under NBA program. Given that the SBA is a relatively new program, toilets that have (or have not) been constructed would be under the provision of the TSC or NBA. Thus, in analyzing the effectiveness of subsidies, it would be useful to understand the process of obtaining a subsidy under the NBA. Arghyam, in

conjunction with the Centre of Gravity, performed an experiment in the Davangere district of Bangalore to determine the effectiveness of the Behavioral Change Communication (BCC) campaign.⁴ Leaders in one of the control villages within this experiment conveyed the complicated process of obtaining a subsidy. In fact, there was little information online regarding the exact details of how to obtain a subsidy under the NBA. The procedures were not found on the Government of India's webpage. However, Arghyam did have details on the subsidy process through their work in the Davangere district.

Under the NBA, subsidies are provided to all BPL households and a selected number of APL households. First, applicants must fill in and submit an application, which must include three photos (a photo after the pit is complete, at an intermediate stage, and when the structure is complete), as well as a household's ration card, MGNREGA job card, voter's ID card, and bank passbook (Public Affairs Foundation, 2014a). Under the NBA, individuals can receive a wage for "work" (toilet construction) through the Mahatma Gandhi National Rural Employment Guarantee Act (MGNREGA). In order to receive the funds, the individual landowner must be a job cardholder (Shome, 2012), work on private land, and must not have been covered under the previous TSC for toilet construction (India WASH Forum, 2012). An individual can receive monetary compensation for a total of 20 person days of unskilled labor and 6 person days of skilled labor (India WASH Forum, 2012). Consequently, the individual in charge of MGNREGA at the village level must continually check in on the project to ensure that the requirements of the MGNREGA are met (Arghyam, 2013b). After construction, approval by MGNREGA, and submission of the application, the GP of the village will inspect the

⁴ Analysis of this campaign will be further discussed in Chapter 4

toilet. Given approval, the GP will provide the household with the subsidy (Rs 9,700).

Oftentimes, however, funds are not available, thus postponing payment, or GPs might delay payment, even in the presence of funds, in order to acquire bribe money from individuals (Arghyam, 2013b). Both of these effects discourage construction of toilets: “because villages are small economies, delay of payments gets spread throughout the community quickly” (worker; cited in Gopalan, 2015).

However, the SBA does take efforts to improve the dispersion of subsidies, by the removal of funds received under the MGNREGA (see Table 2). The subsidy amount, nevertheless, has not been decreased: the subsidy under SBA for individual household construction has actually increased to a total of Rs 12,000, and will be supplied entirely through the government (Joyita, 2015). The introduction of the MGNREGA into the NBA significantly slowed down construction of toilets, in comparison to construction prior to the addition of the Act under TSC, by nearly a half (Jitendra, 2014b). As shown in Table 3, year-wise achievements of household latrine constructions under TSC/NBA in the Eleventh and Twelfth Five Year Plan show significant decrease between 2011/2012 and 2012/2013 when the MGNREGA was integrated into the NBA (MoDWS, 2014; Distribution to State Governments).

Year	Household Latrines	Percentage Change
2007 – 2008	1,15,27,890	
2008 – 2009	1,12,65,882	-2.27%
2009 – 2010	1,24,07,778	10.14%
2010 – 2011	1,22,43,731	-1.32%
2011 – 2012	87,98,864	-28.14%
2012 – 2013	45,59,162	-48.18%
2013-2014	49,63,382	8.87%

Table 3: Year-wise achievement of household latrine construction under TSC and NBA. Table taken directly from MoDWS (2014), with Kaliski (2015) calculation of “Percentage Change.”

Such a marked decrease in the construction of the toilets due to the convergence of the NBA and MGNREGA can be partially attributed to coordination difficulties between the two programs. The combination of MNREGA payment delays, particularly given that construction of toilets is not the highest priority under MNREGA (MoDWS, 2014), as well as the Act's mandate of an unskilled labor to material ratio of 60:40 (India WASH Forum, 2012), might also hinder construction of toilets. Additionally, the payment delay might be a result of the complicated procedure to obtain compensation via MNREGA: after the toilet is constructed, a designated worker in village must certify the completion of the work. After this certification, an Overseer must produce the Measurement/Valuation Certificate/Completion Certificate, which is then passed on to the Block Development Officer (Village Panchayat). Here, the Village Panchayat President will receive the payment under the MGNREGA account and provide the payment to the beneficiary (Government of Tamil Nadu).

Improvements in subsidy delivery, and toilet construction as a by-product, are reliant upon clarity in who receives BPL cards, lucidity in subsidy guidelines, and timely payments. Because certain households are more likely to lack sanitation facilities—and these households are usually of low caste and low income—attention must be directed towards these districts and states. As concluded earlier in Chapter 2, negligence towards such households is deeply entwined with India's relationship with the environment developed under British colonial rule. These deep-rooted formations—which had subsequent political implications—will also require deep-rooted solutions that address more than just timely subsidy payments, but also give voice to historically marginalized households.

3c3. Financial Assistance to Local Authorities

India's decentralized approach to sanitation involves the dissemination of funds on two different levels—from the national government to citizens, and from the national government to local governments. As discussed previously, distribution of subsidies under NBA to citizens is fraught with complications and delays and is not necessarily provided to all households who are eligible for subsidies. In addition to subsidies, national funds are given to state, district, and village authorities for sanitation projects. However, before authorities at the GP level receive financial assistance, project proposals, initially formulated at the GP level, must be reviewed at the block, district, and state level, and then subsequently sent to the Plan Approval Committee (PAC) of the Ministry of Drinking Water and Sanitation (MoDWS) for approval (Kapur, 2013b). Although the national budget for TSC and NBA has increased from Rs 165 crores in 2002-2003 to Rs 1500 crores in 2011-2012, and to Rs 3200 crores with the inception of NBA in 2012-2013, there has been stagnation in the release of funds under the TSC and NBA to GPs (Kapur, 2013b).

According to research conducted by Kapur (2013b), most of the funds for sanitation campaigns are released during the last two months of the financial year (February or March), despite TSC guidelines that require funds to be released in two installments. Using data released from the TSC Portal, Kapur (2013b) finds that funds released in the last two months of the 2010 to 2011 calendar to be as high as 74% in the state of Haryana, 93% in Arunachal Pradesh, and even 100% released in Mizoram (Kapur, 2013b). Even when the TSC was restructured under the NBA in 2012, 100% of

funds were released in February 2013 in the state of Chhattisgarh, and over 70% for Arunachal Pradesh, Assam and Tripura in the last two months (Kapur, 2013b).

Following Kapur's (2013b) analysis, I use data released from The Ministry of Drinking Water and Sanitation to investigate whether funds in 2012/13 and 2013/2014 follow the same pattern as reported by Kapur (2013b). Table 4 reports the proportion of funds released in February and March for 2010/11, 2011/12, 2012/13, and 2013/14:

State	2010-2011	2011-2012	2012-2013	2013-2014
Andhra Pradesh	50%	0%	0%	100%
Arunachal Pradesh	93%	50%	77%	100%
Assam	49%	50%	76%	0%
Bihar	0%	0%	16%	N/A
Chhattisgarh	0%	0%	100%	N/A
Goa	N/A	N/A	N/A	N/A
Gujarat	50%	50%	0%	28%
Haryana	74%	0%	N/A	0%
Himachal Pradesh	49%	0%	0%	0%
Jammu & Kashmir	48%	0%	0%	0%
Jharkhand	50%	50%	0%	N/A
Karnataka	50%	50%	48%	100%
Kerala	49%	0%	N/A	50%
Madhya Pradesh	0%	0%	0%	50%
Maharashtra	50%	0%	0%	68%
Manipur	0%	36%	74%	N/A
Meghalaya	88%	50%	69%	48%
Mizoram	100%	0%	0%	50%
Nagaland	91%	0%	83%	N/A
Orrisa	8%	50%	N/A	N/A
Puducherry	N/A	N/A	N/A	N/A
Punjab	74%	0%	N/A	N/A
Rajasthan	49%	37%	50%	N/A
Sikkim	0%	N/A	53%	0%
Tamil Nadu	49%	50%	50%	50%
Telengana	50%	0%	0%	88%
Tripura	63%	0%	71%	0%
Uttar Pradesh	0%	0%	0%	0%
Uttarakhand	74%	50%	0%	72%
West Bengal	0%	0%	50%	34%

Table 4: State-wise proportion of funds released in February/March. Data for 2010/11 and 2011/12 taken directly from Kapur (2013b); data for 2012/13 obtained from: The Government of India: Ministry of Drinking Water and Sanitation: Swachh Bharat Mission (Gramin). "Monthwise funds released during the financial year (2012-2013).

<http://tsc.gov.in/TSC/Report/Release/RptCentreReleaseMonthwise.aspx?id=REL>; data for 2013/14 obtained from: "Year-wise, State/UT-wise, Open balance, central share released and utilized under NBA during last 3 years and current year." Annexure-IV: Annexure referred to in part (a) of Lok Sabha Unstarred Question No. 3649 due for reply on 13/02/2014.
http://164.100.47.132/Annexure_New/lsq15/15/au3649.htm.

The pattern appears to be similar in terms of releasing funds in 2012/13 and 2013/14 years. Andhra Pradesh, Arunachal Pradesh, and Karnataka had 100% of funds released in 2013/2014, and Uttarkhand and Telengana also had high percentages of funds

released in this period (72% and 99%, respectively). Although, one area of concern is the lack of funds released during any part of the year—this is shown in the table by “N/A.” Even if funds are received predominately within the months of February and March, the timing of the payment can have a “knock-on effect” in which “the result of...year-end bunching can create a serious expenditure management problem at all levels of governments” (Kapur, 2013b). This can severely limit the ability of states to plan, “resulting in a viscous cycle of planning and budgeting inefficiencies” (Kapur, 2013b).

In addition to a “knock-on effect,” delays in payments can also result in delays in expenditures, and therefore the accumulation of unspent balances. Kapur (2013b) also investigates state-wise unspent balances under the NBA in 2010-2011, 2011-2012, and 2012-2013. I extend his analysis to investigate unspent balances in 2013-2014 using data obtained from the Planning Committee. Table 5 below shows unspent balances during these time periods (in Rs in crores):

State	2010-2011	2011-2012	2012-2013	2013-2014
Andhra Pradesh	169.25	174.3	282.25	168.42
Arunachal Pradesh	6.9	3.84	5.31	0.99
Assam	94.49	94.73	60.18	100.77
Bihar	82.12	86.69	250.7	275.43
Chhattisgarh	40.84	35	24.23	61.78
Goa	0.22	0.22	0.22	0.44
Gujarat	27.66	35.49	54.4	53.96
Haryana	23.39	11.32	7.14	114.06
Himachal Pradesh	17.36	9.3	18.02	23.47
Jammu & Kashmir	26.35	11.4	38.42	27.18
Jharkhand	52.16	102.46	136.56	110.53
Karnataka	24.08	70.02	125.27	77.42
Kerala	20.5	12.31	4.97	12.62
Madhya Pradesh	74.4	58.16	104.26	292.28
Maharashtra	71.73	45.82	147.32	63.67
Manipur	4.37	8.24	6.16	15.96
Meghalaya	27.28	5.53	8.75	53.37
Mizoram	8.67	2.06	0.57	6.3
Nagaland	10.96	10.04	0.92	1.24
Orissa	127.46	192.65	166.14	163.85
Punjab	14.89	16.64	12.76	11.42
Rajasthan	66.64	89.52	99.03	95.54
Sikkim	1.12	1.12	1.82	6.23
Tamil Nadu	53.04	22.56	62.79	169.41
Tripura	11.04	4.85	4.06	15.98
Uttar Pradesh	45.62	94.27	85.3	342
Uttarakhand	11.61	6.53	10.07	9.34
West Bengal	61.29	87.39	117.6	137.16
Total	1176.54	1292.46	1835.22	2410.83

Table 5: State-wise unspent balances (in Rs crores). Data for 2010/11, 2011/12, and 2012/13 is taken directly from Kapur (2013b); data for 2013/2014 obtained from: "State/UT-wise un-spent balance as on 31.1.2014 under NBA." Annexure VI: Statement referred in part (d) of reply to Lok Sabha Unstarred Question No.3649 due for reply on 13-02-2014.
http://164.100.47.132/Annexure_New/lsg15/15/au3649.htm.

Unspent funds in 2013-2014 have increased at a national level—from Rs 1176.54 in 2010-2011 to Rs 2410.83 crores—as well as at a state level. For instance, Meghalaya increased from Rs 8.75 in 2012-2013 to 53.37 in 2013-2014; or Tamil Nadu from Rs 62.79 to Rs 169.41 crores. Consequently, not only must sanitation reforms reevaluate the

effectiveness of subsidies and their dispersal, but sanitation reforms must also restructure how and when local authorities receive funding. Moreover, authorities should encourage that all funds are spent in the most effective manner—perhaps with a focus towards increasing awareness and demand for toilet construction and usage, as well as addressing some of the underlying and more broader issues of sanitation, including divisions and discrepancies in India’s social affiliation groups. In a few years, further analysis should investigate whether funds released and used have improved under India’s new SBA campaign.

Part 4: Conclusion

A political ecology framework provides a platform to investigate India’s relationship with the environment, and ultimately how environmental movements, such as sanitation, are carried out in governmental movements. India’s current efforts to improve sanitation are a byproduct of Great Britain’s influence before Independence and India’s caste system, both of which laid a foundation for how citizens interact with and relate to the environment, as well as how poor sanitation facilities are handled and prioritized within the government. Although Gandhi advocated “sanitation for all,” India’s intricate history impeded such a statement from being recognized and catalyzing a call to action.

Nevertheless, India’s more recent campaigns and efforts to expand the role, and voice, of marginalized communities, is promising. As shown in Chapter 1 through Pattanayak et al.’s (2007) model, an individual will demand a toilet until the marginal benefits—the physical and emotional health benefits of toilet construction and usage—equal the marginal costs. An understanding of India’s history and its relation to the

sanitation movement, will help to elucidate the physical and emotional health benefits of toilet construction and usage that individuals recognize and value. India's governmental campaigns—starting with the Total Sanitation Campaign which was designed to be 'community led' and 'people centered' and the more recent Swachh Bharat Campaign which incorporates creative social media platforms—are designed to not only educate the beneficiaries on the benefits of toilet construction and usage, but also to involve the community in the process. The Indian Government has continued to evolve and shape its national sanitation reforms to better reflect the values of the country's constituents and eliminate bottlenecks and inefficiencies developed in past campaigns. The following chapter will examine the various surveys conducted in India with the attempt of measuring sanitation levels, and the discrepancies and often contradicting results the different surveys provide. Moreover, I will use data gathered from the more recent SBA campaign to determine whether India is on the right track to effectively, efficiently, and equally provide sanitation facilities "for all."

Rest Stop 3:

During my internship with Arghyam, our first stop in our two-day visit to the Davangere District, (the district that took part in the Behavioral Change Communication (BCC) campaign) was with a government official: Mr. Basavarjappa, Head and Coordinator of the District Support Unit of Zilla Panchayat (see Figure 1). Much of our time was spent asking him questions about the current state of open defecation in the villages, including the attitude and mindset regarding why people do not construct toilets.



Figure 1: Photo taken in Mr. Basavarjappa's office. Mr. Basavarjappa is sitting at his desk, and the three girls in front (it was unclear whether or not we were supposed to smile for this picture, hence my awkward grin) are myself, Hina Fathima (a student at Haverford who is also writing a thesis on sanitation), and Uzra Sultana (Consultant for Arghyam).

The one comment of his that surprised me the most was his extreme confidence of the SBA's 2019 deadline of sanitation for all. Just days before, at a company-wide meeting with Arghyam, many of the workers found it implausible—in fact somewhat laughable—that India would achieve the deadline.

What makes it complicated to judge whether or not the target is possible, is the scarcity of accurate data that quantifies open defecation rates or (usable) sanitation amenities. Chapter 3 will elaborate on these various data discrepancies, and hopefully will help determine whether Mr. Basavarjappa's statement can be taken seriously.

(As a side note, this building fortunately had a Westernized toilet).

Chapter 3: An Evaluation of India's Sanitation Campaigns

Part 1: Quantifying Sanitation Levels in India

One of the biggest challenges in the rural sanitation sector is that we still do not have a clear idea on what we are measuring (Kapur, 2013a).

In January 2015, Arghyam, a charitable trust working in the Indian water and sanitation sector, had a meeting on the future of the company's work in the urban sanitation sector (personal observation; Kaliski, 2014). The discussion focused primarily on the inability to effectively plan for the future without a comprehensive understanding of the scope of sanitation. Future actions depended upon reliable and accurate data, so that time, effort, and money would be spent in the most "needed" areas.

The concerns raised by Arghyam have been discussed and analyzed in various media sources and economic journals and reports: the "ineffective monitoring and wasted investment in sanitation" (Dietvorst, 2015), or the "weak governance and monitoring" which are "held responsible for poor implementation of India's sanitation programme" (Mamta Das; cited in Jitendra, 2014a). Conclusively, all expand on the inconsistent results of sanitation coverage, partially attributed to poor monitoring and data collection. As a result, there is not a definitive picture regarding the number of toilets that are constructed or used, and hence the prevalence of open defecation. Without an accurate baseline of sanitation coverage, it is difficult to not only determine which areas require most immediate action and hence where most resources should be dispersed, but it also makes it challenging to confidently measure the improvement (or lack thereof) of sanitation coverage.

The following chapter first investigates what an ideal survey to quantify sanitation levels would include, particularly in regards to how it is conducted and what it seeks to

measure. Secondly, I discuss the various surveys that have attempted to quantify sanitation levels, and compare the contrasting and conflicting numbers each survey provides. I find that although the surveys provide different numbers, there is a degree of consensus regarding the “problem states” each survey identifies—that is, the states with the lowest levels of sanitation amenities. Using the sanitation data provided, I use analysis by Gosh and Cairncross (2014) and Hussain and Mangla (2014) to provide a geographical understanding of the distribution of sanitation amenities; and using regression analysis by Pierce (2014) and Kumar (2014) I outline the characteristics that might help “predict” which households are most likely to be deprived of a latrine facility. Finally, I build upon Pierce’s (2014) and Kumar’s (2014) analyses by using more recent data of the SBA, which I collected from the Government of India’s Ministry of Drinking Water and Sanitation, to determine whether similar characteristics “predict” which households are more likely to be deprived of a latrine facility, as well as its effectiveness in improving toilet coverage.

Part 2: Survey Techniques and Measurements

An ideal survey to quantify “sanitation levels” would provide information on the number and usage of sanitation facilities, as well as whether facilities are continually maintained and hence usable. As noted in Chapter 1, it is important that facilities are both used and maintained, for the physical and mental health benefits of sanitation will not be realized unless a large portion of households within a community have, use, and maintain the facilities. In addition, an ideal survey would utilize uniform survey techniques as to eliminate any bias between years and provide a platform to analyze the progress—or lack there of—of sanitation facilities. Unfortunately, much data collected in India on

sanitation levels fail to meet the standards of an ideal survey. There are a number of reasons for such discrepancies: different definitions or measurements of sanitation levels or improvements; differences and bias resulting from surveying techniques; and overestimation of results due to the inclusion of toilet facilities that are no longer usable as a result of poor maintenance.

Coffey and Spears (2014) compare eight studies of data from rural India in order to investigate which surveys give the most accurate, or up-to-date, measurement of open defecation behavior. Their analysis suggests one possible criterion for an “ideal” survey, as well as addresses some of the reasons for the noted discrepancies in sanitation levels between surveys. Coffey and Spears (2014) categorize each survey based upon its level of disaggregation and balance in question type. A fully disaggregated survey would measure the behavior of each individual, rather than the aggregate household, as well as information on usage, rather than ownership, of latrines. Moreover, “the level of disaggregation is important...because it [also] creates an interview environment which slows down the survey” (Coffey & Spears, 2014). Such an environment, according to Coffey and Spears (2014), assumes that defecating in the open, despite the availability of a latrine, is normal. This hospitable atmosphere is further enhanced by the physical inspection of the latrine, for it implies that the surveyor does not expect all owned latrines to be in use, as well as provides information on the maintenance of toilets and how many are in-use (Coffey & Spears, 2014). The second category, balance, refers to a question that is unbiased and does not provide the responder with an implied answer. For example, a balanced question might be, “Does ‘x’ defecate in the open or does he use a latrine;” whereas an unbalanced question would exclude the possibility for options, and rather ask,

“Does ‘x’ use a latrine?” The use of both full disaggregation and balance is intended to encourage individuals to state their true defecation behaviors, and hence provide a more accurate portrayal of the extent of open defecation.

The Census of India, as well as the India Human Development Survey (IHDS) and National Family Health Survey (NFHS), display no disaggregation (Coffey & Spears, 2014). They fail to distinguish between latrine ownership and latrine use (behavior), and by only asking one household member about toilet ownership, fail to account for other members who defecate in the open, despite household latrine ownership (Coffey & Spears, 2014). In comparison, the three surveys Coffey and Spears (2014) study which displayed full disaggregation and asked a balanced question—Barnard et al.’s (2013) study in rural Orissa; Coffey et al.’s (2014) SQUAT Study in rural parts of five states of north India; and another study in northern South Asia by Coffey et al. (2014)—report open defecation even among individuals who own a household latrine. Thus, even if the surveys without full disaggregation accurately identify the number of households who own latrines, they will provide an overestimation of latrine usage—for not all household members use latrines, even if available. Consequently, latrine ownership is not an accurate portrayal, or proxy, for toilet usage.

This same pattern is also evident in surveys Coffey and Spears (2014) classify as “intermediate disaggregation,” such as for the 69th round of the National Sample Survey (NSS). Despite the NSS’s survey inclusion of four items under the “latrine” section (6 categories under “access to latrine;” 10 categories under “type of latrine;” 6 categories under “reason for not using latrine;” and “whether all household members of categories specified are using latrine” based on age and gender), the survey was not fully

disaggregated for it measured latrine ownership and usage at the demographic level (below and above 15 years of age, for males and females respectively), rather than at the individual level, and is not balanced, for text of the survey does not mention the possibility that one might practice open defecation. To measure the accuracy of “intermediate disaggregation” in comparison to full disaggregation, Coffey and Spears (2014) analyze the reported fraction of households in which at least one person defecates in the open between the NSS and the SQUAT survey data. The SQUAT survey—conducted in five states of north India—was a fully disaggregated and balanced survey, measuring open defecation practices of each household member. Since the NSS did not measure open defecation among owners, Coffey and Spears (2014) estimate this quantity using the data the NSS provides.⁵ In the states where data was available for both the NSS and SQUAT survey, the open defecation rates among latrine owners were higher in the SQUAT survey than in the NSS. As shown in Table 1, the NSS reported 30.9%, 14.3%, 27.1%, 20.4%, and 21.1% for the states of Bihar, Haryana, Madhya Pradesh, Rajasthan, and Uttar Pradesh respectively; whereas, the SQUAT study reported 54.2%, 35.7%, 40.8%, 66.2%, and 42.5% respectively:

⁵ Coffey & Spears (2014) estimate open defecation among latrine owners as:

$$\frac{\text{open defecators among latrine owners}}{\text{latrine owners}} = \frac{(100 - \% \text{ HH who all use latrines}) - \% \text{ of HH without latrine}}{100 - \% \text{ of HH without latrine}}$$

State	Percentage of Households who Practice Open Defecation		
	NSS 69 th Round	SQUAT Survey	Difference? (SQUAT Survey – NSS)
Bihar	30.9	54.2	23.3
Haryana	14.3	35.7	21.4
Madhya Pradesh	27.1	40.8	13.7
Rajasthan	20.4	66.2	45.8
Uttar Pradesh	21.1	42.5	21.4

Table 1: Open defecation rates for selected states; measured by the NSS 69th Round and SQUAT Survey. Table taken from Coffey and Spears (2014), with the addition of the “Difference” column.

Coffey and Spears (2014) conclude, “these comparisons make the unsurprising suggestion that disaggregated survey questions will find more open defecation among people living in households that own latrines” (Coffey & Spears, 2014).

We might assume, however, that we could use latrine ownership as a proxy for toilet usage if we knew the percentage of latrine owners who actually use the toilet. For example, the Census 2011 reports 51.6 million households with a latrine facility, which equates to 30.7% of all households. If we knew that 70% of households with latrines actually use the toilet, we could extrapolate the Census data to find the number and percentage of households who use toilets: 36.12 million households, or 21.5% of all households. However, usage of toilets is not uniform across India, and thus we cannot use data regarding toilet ownership to gather an accurate portrayal of toilet usage. In fact, India’s Program Evaluation Organization (PEO) of the Planning Commission conducted an independent study to evaluate the Total Sanitation Campaign. Using a sample of 27 states, including 122 districts, 206 blocks, 1207 GP, 127 rural sanitary marts (RSM)/production centers, and 11,519 beneficiary households, PEO found that 72.63% of households in rural India practice open defecation, regardless of having or not having a toilet (Kumar, 2014). However, this fraction of households practicing open defecation

despite latrine ownership was not the same for all states: the Program Evaluation Organization (2013) found that in Assam, Meghalaya, Uttarakhand, and Haryana, between 50% and 60% of households have toilets. Yet, in Assam and Meghalaya less than 10% of the population defecates outside; whereas, in Uttarakhand between 10% and 20% openly defecate, and between 20% and 30% openly defecate in Haryana (Program Evaluation Organization, 2013).

In an addition to the criterion of Coffey and Spears (2014)—a balanced question about latrine use or open defecation (rather than toilet ownership) at the individual level—other obstacles might prevent the data source from being continually reliable, such as poor maintenance. As part of the Total Sanitation Campaign, the Nirmal Gram Puraskar (NGP) was launched to incentivize Gram Panchayats (GP) to obtain Open Defecation Free (ODF) status for the area of their domain. GPs who obtain ODF status receive a cash reward, which could be used to improve and maintain sanitation facilities in the village (Kumar, 2010). The NGP portal offered an opportunity to create a database that would accurately measure the number of GPs that have reached ODF status. However, without verification, and constant monitoring and assessment of ODF status, the long-term sustainability of ODF status, and hence the accuracy of the database, is likely to be flawed. According to a report published by Arghyam (2013a), prior to 2009, loose verification processes in determining open defecation status overestimated the number of NGP awardees: in 2008, 12,038 GPs were awarded NGP, however this number quickly dropped to 4,556, 2,808 and 2,857 respectively in 2009, 2010, and 2011 (Kapur, 2013b). The decline in NGP awardees might be in part due to individuals who openly defecate despite availability of household latrine, either because they do not have

a value of or demand for toilet usage (poor education on health benefits of latrine usage), or as a result of the unusable quality of the toilet (poor maintenance).

Part 3: The Data

3a. Overview

The main sources of data that report on the level of sanitation in India include data from the Census (both 2001 and 2011), the Total Sanitation Campaign (TSC), the Baseline Survey of 2012 (BSL-2012), the Nirmal Bharat Abhiyan (NBA), and the National Sample Survey (NSS). The surveys, however, have different measures for latrine coverage: the Census 2001 and 2011 measure households not having a latrine facility within the premise; the Total Sanitation Campaign, and its replacement, the Nirmal Bharat Abhiyan, measure physical achievement of construction of individual household latrines, with physical achievement based off of “achievement” of a target (with the target based on the Census 2001 number of households not having a latrine facility within the premise, which was eventually updated to reflect projections for 2011); the Baseline Survey of 2012 measures the presence or absence of toilets based on entries done by GPs; and the National Sample Survey (NSS) of 2012 measures “no latrine facility in the house” (Kumar, 2014). Unfortunately, the reported sanitation levels of these five data sources provide contrasting results, as very few of them follow the criterion outlined above by Coffey and Spears (2014). Table 2 outlines the ways in which the surveys differ in their definition of “sanitation amenities,” as well as the survey’s reported percentage of households without sanitation facilities:

Survey	Year	Description	Percentage	Notes
Census 2011	2011	Indicator: households not having a latrine facility within the premise	69.3% of households do not have latrine facility within the premise; 30.7% of households have a latrine facility within the premise	This percentage was calculated based on 116.3 million households not having a latrine facility within the premise and a total of 167.8 million households
TSC	Total “achievement” between 2001-2002 and 2010-2011	Indicator: physical achievement of individual household latrines, with physical achievement based off of whether or not target was reached (target of 108 million households)	72.5% of total target of 108 million households have a latrine facility within the premise based on Census 2001; 27.5% of total target does not have a latrine facility within the premise	This percentage was calculated based on 41.84 million BPL and 36.44 million APL households obtaining latrine facilities, and a target of 108 million households without latrine facility
NBA	Total “achievement” between 2001-2002 and 2013-2014	Indicator: physical achievement of individual household latrines, with physical achievement based off of whether or not target was reached (target of 125.7 million households)	76.9% of total target under 125.7 million households (based on projections for 2011) have a latrine facility within the premise; 23.1% of total target does not have a latrine facility within the premise	This percentage was calculated based on 52.04 million BPL and 44.56 million APL households obtaining latrine facilities, and a target of 125.7 million households without latrine facility
Base Line Survey – Ministry of Drinking Water	2012	Indicator: presence or absence of toilets; based on entries done by GPs (240,516 out of 249,907 GPs from 29 States)	59.6% of households do not have a toilet in their house; 59.0% of BPL and 60.1% of APL households are without toilets; 40.4% of households do have toilets in their house	This percentage was calculated based on 102.12 million households not having a toilet and a total of 171.22 million households
National Sample Survey (NSS)	2012	Indicator: no latrine facility in the house	59.4% of households without a latrine facility in the house; 40.6% of households do have toilets in their house	
Program Evaluation Organization of Planning Commission		Indicator: whether or not household practices open defecation (independent evaluation of TSC program conducted in 122 districts, 206 blocks, 1207 GPs, 127 Rural Sanitary Marts/Production Centers, 11,519 beneficiary households over 28 sample states)	72.63% of households in rural India practice OD, irrespective of having or not having toilet facilities	

Table 2: Differences in measurements of sanitation amenities for surveys in India.

However, even though various surveys report different numbers of household toilets, the surveys do reveal certain states with abnormally low sanitation levels.

Moreover, these particular states share similar characteristics—in terms of demographics,

socioeconomic traits, and group affiliation. This suggests that national efforts might be more effective if funds are redistributed to these “problem states,” or if campaigns focus not solely on supplying toilets or generating demand and awareness, but also, as advocated for in Chapter 2, address underlying differences—and often stereotypes and cultural and social norms—between the states in India.

3b. The Indian Census

The two phases of the Census of India include the “Houselisting and Housing Census” and the “Population Enumeration” phase (Kumar, 2014). The “Houselisting and Housing Census” looks at each building/census house and measures a series of variables of the house’s amenities and assets. One of those measures includes “Households not having latrine facility within the premise” (Kumar, 2014). The latrine facility must be within the premise, and so households would be classified as not having a latrine facility under Census guidelines, even if the household participates in public and open latrine use by using a water closet, pit, or other latrine that is not within the premise (Kumar, 2014). The most recent censuses were conducted in 2001 and 2011, and show a decrease in the percentage of households without latrine facilities in the premise—from 78.1% in 2001 to 69.3% in 2011, a 9-percentage point improvement. In 2011, the 69.3% of households who did not have a latrine facility within the premise represent households who use a public latrine (1.9%) or practice open defecation (67.3%); the 30.7% of households having latrine facilities within the premise represent households who use either a water closet (19.4%) or a pit or other latrine facility (11.3%).

However, as indicated by Kumar (2014), the presentation of statistics in percentages hides the changes in absolute numbers. As noted above, the Census reports a

decrease in the percentage of households not having latrine facilities within the premise; however, the absolute number shows a different story: in 2001, 108 million households did not have access to latrine facility within the premise, and in 2011, this number increased 8.3 million to 116.3 million households. At the same time, there has also been an increase in number of households with access to a latrine facility within the premise: from 30.3 million in 2001 to 51.6 million in 2011. Table 3 displays these differences:

	Census 2001	Census 2011	Growth?
Total Number of Households (in millions)	138.3	167.9	+21.40%
Number of Households with latrine facility (in millions)	30.3	51.6	+70.30%
Number of Households without latrine facility (in millions)	108.0	116.3	+7.68%
% of Households without latrine facility	78.10%	69.30%	-8.80%

Table 3: Percentages and absolute numbers of households with and without latrine facilities within the premise; based on Census 2001 and Census 2011 data. Table taken from Kumar (2014).

Therefore, the *percentage* of households without latrine facilities decreased by approximately 9 percentage points between 2001 and 2011; however, the *number* of households without latrine facilities increased by 7.68%. Because the number of households without latrine facilities between 2001 and 2011 increased by a smaller amount than the increase in total number of households, the *percentage* of households without latrine facilities decreased between these two periods. Such a difference in interpretation begs the question of how we should measure “improvement” or “achievement” of sanitation targets—should it be through percentages, absolute numbers, or an “achievement” based upon some set target? Moreover, the way in which

information from surveys is displayed might make it difficult to compare different surveys throughout time, might influence future policy decisions, and effect how the general public—both within and outside the country—views the progress and achievement of sanitation in India. Perhaps the most unbiased display of information would include both a percentage and an absolute number measuring the change between periods, or a measurement that takes into consideration the impact of population growth between years.

3c. Total Sanitation Campaign, Nirmal Bharat Abhiyan Campaign, and the Baseline Survey 2012 Data

Sanitation facilities constructed under the Total Sanitation Campaign (TSC) are primarily recorded through self-reported monitoring. Consequently, the very nature of measurement—regardless of how the data is displayed or presented—might be biased or inaccurate. Hueso and Bell (2013), for instance, argue that the TSC monitoring system itself was flawed. For example, the GP in Haryana claims 100% latrine coverage in 2011; however, Huseo and Bell's (2013) data reports 15% of households without latrines and 30% of households who practice open defecation. The authors attribute the inconsistencies of the data to “haphazard reporting” (Hueso & Bell, 2013): “In some states, like Haryana, GPs self-reported sanitation coverage. Others, such as UP [Uttar Pradesh], calculated coverage based on subsidy funds released from blocks, not on physical verification” (Hueso & Bell, 2013).

The data collected from self-reported sources is used to measure achievement of sanitation under the Total Sanitation Campaign in two ways: comparison to Project Objectives, and to Census 2001 sanitation levels. Project Objectives under the TSC are based upon Annual Project Implementation Plans (APIPs). APIPs, a needs assessment

constructed by the GP, are designed to “provide a definitive direction to the programme and also to ensure monthly and quarterly monitoring of financial and physical progress during the course of the financial year vis-vis planned activities” (TSC guidelines; cited in Kapur, 2013b). Assessments vary year by year, making it difficult to measure achievement: “While it is true that TSC is a demand driven scheme and project targets may vary year by year, if the goal of TSC was to achieve rural sanitation for all by 2015, there should be a means of measuring success or ‘achievement’ against benchmarks with relation to the number of households without access to sanitation” (Kapur, 2013b).

The TSC’s answer to Kapur’s remark is to base achievement as a percentage of the “Target fixed by the TSC programme” (Kapur, 2013b). In comparison to the Census’ measure of sanitation facility as the percentage of the number of households without access to sanitation facilities, the measurement of sanitation coverage under the TSC is a measure of the “achievement” based upon a pre-determined target (see Table 2).

According to the TSC, there was a 72.5% improvement for the total target of 108 million households who have a latrine facility within the premise between 2001-2002 and 2010-2012. This target not been modified to reflect changes in rural population, for it is based upon the Census 2001 number of households without a latrine facility within the premise, or to reflect changes in toilets that are no longer in existence or functioning (Kapur, 2013b). In fact, Kapur (2013b), after normalizing the TSC rate for rural households in 2011 to take into consideration the increase in households without sanitation facilities between the Census 2001 and 2011 (from 108 million to 116.3 million) found that sanitation targets of the Census 2001 data, in comparison to the Census 2011 data,

overestimate the “achievement” rate of the TSC (Kapur, 2013b). Unfortunately, even after the NBA replaced the TSC, a similar “achievement” measure was used.

The NBA reports the progress of physical achievement of individual household latrine (IHHL) using both absolute numbers, as well as an “achievement” percentage which was initially based on the total target of households not having latrine facility within the premise in Census 2001, 108 million households (Kumar, 2014). Between 2001/02 and 2013/14 the total progress of physical achievement of IHHL was 96.61 million, or an 89.5% achievement (of the 108 million target of the Census 2001). In lieu of the outdated Census 2001 data, an adjustment to the “achievement” rate was made to reflect the population growth, increasing the target from 108 million to 125.7 million households (Kumar, 2014). Using this target, 76.9% of households have an IHHL within the premise as of 2013-2014, under the NBA’s target. This represents a 4.4-percentage point improvement from 2010/11 to 2013/14 (see Table 2).

The replacement of the TSC to the NBA also welcomed in a new survey: the Baseline Survey 2012 conducted by the Ministry of Drinking Water and Sanitation (MoDWS). Gram Panchayats (GPs) collected the data for this survey, with 240,516 GPs reporting data out of the 249,907 GPs from 29 states. Despite the high involvement of on the ground data collection through GPs, the survey does not make any attempt to measure toilet usage. Nevertheless, the survey does estimate households with and without functional toilets, as well as toilet availability in government and private schools, among other areas. In addition, the Baseline Survey does attempt to quantify presence of demand generating factors by measuring percentage of GPs where Village Water and Sanitation Committees (VWSC) are formed and/or functional, as well as GPs where a Swachchhata

Doot, individuals designated as community motivators, is posted. Given the Baseline Survey's measurement of toilet adoption, the survey reported a total of 171.22 million households (the Census 2011 reported 167.8 million households), with 102.12 million (59.6%) without toilets in their homes. This measure represents a decrease from the Census 2011 level of 69.3% and the TSC achievement rate of 72.5%. Moreover, this would require a 17.3-percentage point increase from the Baseline 2012 survey to the NBA 2013/14 measure—an increase even larger than the 9-percentage point improvement from the Census 2001 to the Census 2011 (see Table 2).

3d. National Sample Survey Data

As mentioned previously in reference to Coffey and Spears' (2014) analysis of an ideal survey, the NSS conducted in India quantifies a broad series of factors, including housing, drinking water, sanitation, and hygiene, among others (Kumar, 2014). The indicator variable of interest for sanitation is “No latrine facility in the house,” referring to households who use public or community toilets or do not have a toilet in the house. This is a slightly different indicator than the Census 2001 and 2011, which measured households without a latrine facility “within the premise” (see Table 2). Similar to the Census, the NSS also finds an improvement in the number of households without sanitation facilities: 87.3% in 1993, 78.3% in 2002, 66.4% in 2008/2009, and 59.4% in 2012 (Kumar, 2014). Yet, the statistics between Census and NSS suggest different stories—although the Census and NSS report 78.1% (2001) and 78.3% (2002) of households without sanitation amenities respectively, the Census reports 69.3% in 2011, while the NSS reports only 59.4% in 2012 (see Table 2). The NSS survey, however, does provide similar results to that of the Baseline 2012 (see Table 2).

3e. Divergence and Convergence Among the Surveys

As shown in Table 2 (above), the various surveys conducted in India not only differ in terms of what each survey measures, but also in the level of sanitation coverage each survey reports. Between the Census 2001 and 2011, the number of households having a latrine facility within the premise increased by 21.1 million—from 30.3 million to 51.6 million. The TSC, however, reports an additional “achievement” of 78.28 households between 2001/02 and 2010/11. Between the two surveys, there is a discrepancy of 57 million households who obtain latrines according to TSC data (Kumar, 2014). In addition, the Census reports an improvement in sanitation amenities between the 2001 and 2011 Census of 9-percentage points. However, data from the NSS report a 10-percentage point increase over just one year, from the Census 2011’s report of 69.3% of households without latrine facilities to the NSS’s 2012 report of 59.4% of households without latrine facilities. For such an improvement to have occurred, Kumar (2014) asserts that the proportion of households without a latrine facility would have to decrease by 12.6% and the number of households obtaining a latrine facility would have to increase by 15 million.⁶ Kumar (2014) concludes that this divergence “[suggests] that the improvement over one single year (2011-2012) as reported from various data sources may be spurious, and requires urgent attention for future planning and policy making.”

Yet despite inconsistencies regarding the progress, absolute number, or percentage of households without sanitation amenities, there might be some consistencies

⁶ Kumar (2014) obtained these calculations by assuming the number of households in 2012 would be 171 million (based on forecasting using Census data). Using the NSS’s 59.4% of households without sanitation facilities in 2012, this would equate to 101.6 million households. The Census 2011 reports that 116.3 million households do not have latrine facilities. Therefore, approximately 15 million households would have to obtain latrine facilities between 2011 and 2012. The addition of 15 million households would be a 12.6% decrease in households without a latrine facility: $12.6\% = (116.3 - 101.6)/116.3$.

among the data. The most recent data reservoirs for sanitation amenities—the Census 2011, Baseline Survey (2012), NSS (2012), and NBA—are relatively consistent in which specific states have the lowest sanitation coverage. Table 4 uses data from these four surveys to determine what each survey would deem as the ten states with the highest percentage of households without sanitation amenities. Ideally, governmental and non-governmental efforts would target and provide additional attention and resources towards these “problem states.”

Census 2011 <i>(% of households without latrine facility on premise)</i>	Baseline Survey 2012 <i>(% of household not having toilet)</i>	NSS 2012 <i>(rural households without latrine facility)</i>	NBA <i>(“achievement” based on project objectives)</i>
Jharkhand (92.4%)	Orissa (88.49%)	Jharkhand (90.5%)	Jammu & Kashmir (61.27%)
Madhya Pradesh (86.9%)	Bihar (78.59%)	Orissa (81.3%)	Bihar (57.28%)
Orissa (85.9%)	Jammu & Kashmir (75.48%)	Madhya Pradesh (79.0%)	Jharkhand (52.56%)
Chhattisgarh (85.5%)	Madhya Pradesh (73.83%)	Chhattisgarh (76.7%)	Chhattisgarh (52.15%)
Bihar (82.4%)	Rajasthan (72.74%)	Uttar Pradesh (75.3%)	Orissa (43.26%)
Rajasthan (80.4%)	Jharkhand (71.97%)	Rajasthan (73.0%)	Assam (29.56%)
Uttar Pradesh (78.8%)	Andhra Pradesh (66.04%)	Bihar (72.8%)	Rajasthan (29.16%)
Tamil Nadu (76.8%)	Uttar Pradesh (64.76%)	Karnataka (70.8%)	Punjab (28.80%)
Karnataka (71.6%)	Karnataka (64.59%)	Tamil Nadu (66.4%)	Goa (23.76%)
Andhra Pradesh (47.3%)	Chhattisgarh (60.43%)	Gujarat (58.7%)	Andhra Pradesh (22.91%)

Table 4: Top 10 “problem states;” the top 10 states with highest percentage of households without sanitation amenities for the four most recent surveys (states are listed from highest to lowest percent of households without sanitation amenities per survey). Bolded states are the “problem states” agreed upon by all four surveys. Note: Union Territories have been excluded. Data for Census 2011 obtained from: Kapur (2013b), page 9; data for Baseline Survey 2012 obtained from: The Government of India: Ministry of Drinking Water and Sanitation: Swachh Bharat Mission (Gramin) Baseline Survey-2012. <http://sbm.gov.in/BLS2012/Home.aspx>; data for NSS 2012 obtained from: The Government of India: Ministry of Statistics and Programme Implementation: National Sample Survey Office. “Table T6: Number per 1000 households who got sufficient water throughout the year for all household activities during 2012.” Delhi, India, December 2013. http://mospi.nic.in/mospi_new/upload/kye_indi_of_water_Sanitation69rou_24dec13.pdf; data for NBA obtained from: Kapur (2013b), page 10.

The Census, Baseline Survey, NSS, and NBA all agree on five states that would fall within their top ten list (bolded): Bihar, Chhattisgarh, Jharkhand, Orissa, and

Rajasthan. In fact, as mentioned in Chapter 2, these “problem states” did not have any funds released during the 2013-2014 period (Chapter 2, Table 6), and between 2010/11 to 2013/14, these states had increasing amounts of unspent funds (Chapter 2, Table 7).⁷ The following sections will investigate the distribution of sanitation amenities in India, as well as particular characteristics that might make a household, district, or state more or less likely to have a sanitation facility.

Part 4: Distribution of Sanitation Amenities

4a. Geographical Distribution

Although the accuracy of the surveys conducted in India to measure sanitation has been questioned, these numbers—the best estimation of sanitation available—do paint a picture of unequal distribution of sanitation amenities throughout India. Gosh and Cairncross (2014) use data from the House Listing and Housing Census Data from the 2001 and 2011 Censuses of India to evaluate the extent of latrine facility access within the 20 most populous states of India. Although India as a whole increased the proportion of households with a latrine facility by nearly 9% between 2001 and 2011, not all regions of India experienced similar increases, with some states actually decreasing availability within this time frame. Much of this variation, however, can be partially explained by differences in socio-economic factors among and within the states. Consequently, such variation advocates for reforms that not only address the physical supply of sanitation amenities or the supply of educational information to generate demand for toilet construction and usage, but also look more broadly at differences in socio-economic factors—from poverty to religion and caste, at the state, district, and perhaps household

⁷ Bihar: 82.12 (2010/11) and 275.43 (2013/14); Chhattisgarh: 40.84 (2010/11) and 61.78 (2013/14); Jharkhand: 52.16 (2010/11) and 110.53 (2013/14); Odisha: 127.46 (2010/2011) and 163.84 (2013/14); Rajasthan: 66.64 (2010/11) and 95.54 (2013/14). *Note: all currency in Rs crores.*

levels—and the ways in which these differences contribute to the poor availability of sanitation amenities in India.

As mentioned earlier, despite India's sanitation coverage improving by 9-percentage points from 2001 to 2011 (according to the Census), the absolute number of households without sanitation facilities did increase. A similar situation is conveyed when states—rather than India collectively—is investigated. Data on percentages and absolute numbers of households without latrine facilities in 2001 and 2011 shows certain states whose percentage and absolute number of households without sanitation facilities is decreasing, however, in other states, the percentage of households without sanitation facilities is decreasing, yet the absolute number of households without sanitation facilities is increasing. For instance, Hamachal Pradesh decreased the number of households without sanitation facilities by 360,000 (44.8% decadal improvement), or Kerala, which decreased the number of households with facilities by 650,000 (69.9% decadal improvement) (Kumar, 2014). In comparison, the states of Assam, Bihar, Chhattisgarh, Jammu & Kashmir, Jharkhand, Karnataka, Madhya Pradesh, Orissa, Rajasthan, Tamil Nadu and Uttar Pradesh and the North-Eastern states of Arunachal Pradesh and Mizoram saw increases in improvement in decadal growth, but also increases in the number of households without sanitation facilities. In fact, Kumar (2014) attributes the increase in the number of rural households without latrine facilities in India to these particular states. Most of the states Kumar (2014) identifies are the “problem states” listed in Table 4.

Differences in sanitation coverage are not only found between states; there are also differences within each state, particularly at the district level. Gosh and Cairncross (2014) extend their analysis to the district level, showing that between 2001 and 2011,

6.3% of the districts made negative process in availability of improved sanitation amenities, 55.0% and 24.0% made very slow and slow progress, respectively, 9.8% made moderate progress, and 3.5%, 1.0% and 0.4% made good, very good and excellent progress, respectively (Gosh & Cairncross, 2014). Moreover, in nearly every state, the progress of each district was not uniform: some districts had less than 20% of households with a latrine available within the premises, whereas others had over 80% (Gosh & Cairncross, 2014). Kerala was the only state in which all of its districts had more than 80% of households with available latrine on the premises (Gosh & Cairncross, 2014).

Hussain and Mangla (2014) attribute the high degree of variation in terms of sanitation amenities to differences in growth and development among the districts. The authors compare 78 villages of the Mewat district to the state, Haryana, as a whole, as well as to India. Mewat represented an outlier both in terms of sanitation availability—the Census 2011 revealed that less than one-fifth of the sample population in Mewat had installed toilets; whereas, more than two-thirds of the population of Haryana and nearly one-half of the Indian population have installed toilets—as well as measurements of poverty—the percentage of households owning a television (9.75% for Mewat; 67.90% for Haryana; and 47.20% for India), radio (2.78%, 17.40%, and 19.90% respectively) and car (1.60%, 10.50%, and 4.70% respectively) (Hussain & Mangla, 2014). The differences found in Mewat, compared to Haryana and India collectively, suggest that the widespread and diverse dispersion of poor sanitation facilities in India—both between and within states—is not necessarily determined by geographical boundaries, but rather by certain cultural, social, economic, or political forces that hamper construction and usage of sanitation facilities.

In fact, Gregory Pierce (2014), using data from the 2007-2008 Indian District Level Household Survey, supports the assumption that variation in sanitation coverage, although clustered geographically, is correlated less with state boundaries, and more with other socioeconomic factors. The 2007-2008 Indian District Level Household Survey, administered by the International Institute for Population Sciences under the direction of the National Ministry of Health and Family Welfare, reports data on 611 districts, a total of 720,320 households. Using GIS mapping (see Figure 1), Pierce (2014) concludes that districts with similar percentages of household toilet use are clustered near one another.

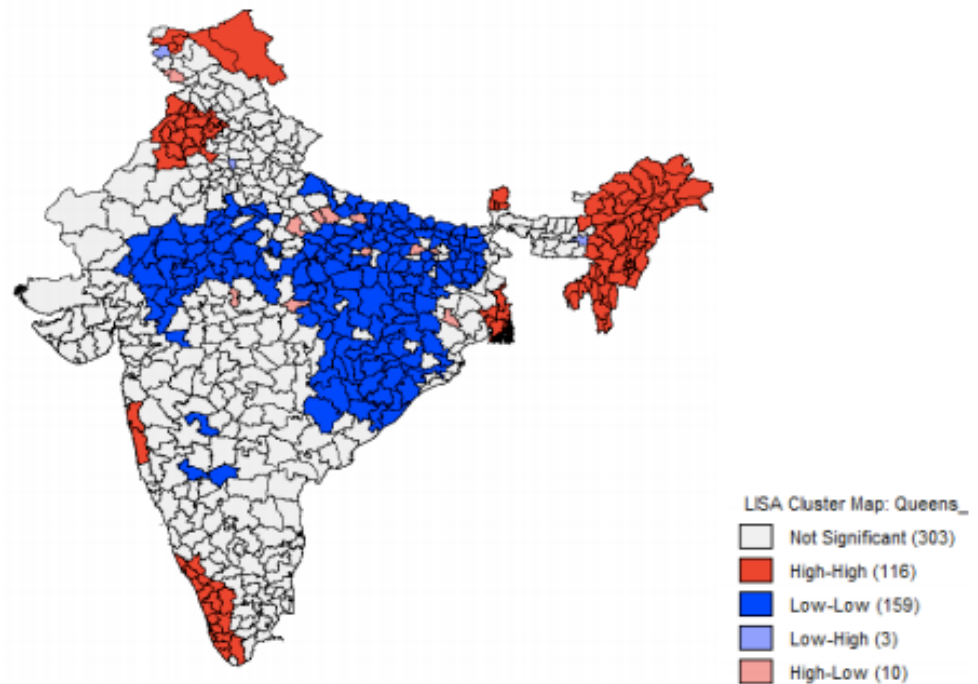


Figure 1: Spatial correlation of sanitation use (Pierce, 2014). “High-High,” for instance, means that districts with high sanitation use are next to districts also with high sanitation use.

As shown in Figure 1, districts with high sanitation use are congregated on the southwestern coast of the country, in the far north and the far northeast; whereas, districts with low sanitation use are predominately found in the central north of India. To substantiate his conclusion, Pierce (2014) uses a global Moran’s I test (which reported a

p-value < 0.01), a measure of spatial autocorrelation across the sample based on how related the dependent variable, the percentage of households using toilets, is to location. In fact, the distribution of districts with low sanitation facilities reported in Figure 1, align with the “problem states” identified by the Indian surveys (Table 4), as well as the states Kumar (2014) attributes to the 7.7%⁸ rise in the number of rural households without latrine facilities between 2001 and 2011.

4b. Predicting Households with Household Toilets

It therefore appears that certain states and particular geographical clusters are more prone to have lower percentages of households with sanitation amenities than others. The above analysis by Hussain and Mangla (2014) and Pierce (2014) suggest that sanitation “does not adhere to state borders, and may be better explained by long-standing cultural differences between Indian regions” (Pierce, 2014). In order to test this hypothesis statistically, Pierce (2014) and Kumar (2014) use various data sources in an attempt to “predict” which households are most likely to be deprived of a latrine facility. The two studies investigate similar socioeconomic factors—natural gas connection (a proxy for income); presence or absence of a Below the Poverty Line (BPL) card; asset ownership; employment; and social group, among others—to determine whether these variables increase or decrease the likelihood of latrine facility coverage.

If governmental sanitation reforms were effective and non-discriminatory, we would expect socioeconomic factors to have little to no effect in determining which households receive governmental attention and hence are more likely to have sanitation facilities. Moreover, we would expect money spent on reforms to increase availability of

⁸ Note: this is the decadal growth of households not having a latrine facility within the premise (from 108 million in 2001 to 116.3 million in 2011)

sanitation amenities; and conditional on income, the presence of BPL cards to allow more households to obtain subsidies and thus increase toilet construction. However, even if reforms are implemented equally in all areas alike, we might still expect to see variations. As noted in Chapter 1, an individual's decision to construct and use a toilet is influenced by how an individual values a toilet (for instance, whether or not an individual sees the physical and emotional health benefits toilet construction and usage would afford) and how an individual allocates income among various goods and services. The ability to “predict” which households are more prone to have poor sanitation facilities would be useful in formulating future sanitation policies in order to target the most-needed areas. For example, if cultural or social factors are diminishing demand for toilet construction, this might suggest that sanitation reforms should focus efforts towards awareness and demand generation. Or, if socioeconomic factors, funds used, or presence of BPL cards move in the opposite direction than predicted, this might signal a governmental favoritism towards one socioeconomic class over another, or an inefficiency in how funds are used or in the dissemination of BPL cards. Such a finding might suggest that governmental welfare programs should be readjusted to ensure that all groups—regardless of income, employment, social class, or religion—receive sanitation amenities, and that other factors—besides installing infrastructure, or increasing demand for sanitation facilities—be included within sanitation campaigns, such as increasing employment opportunities or equalizing the rights or abilities among different social groups.

Pierce (2014), using data from the 2007-2009 District Level Household Survey (DLHS-III), looks at factors that might help explain differences in the district-wise

percent of households that own a toilet. The DLHS-III survey divided the country into 611 districts, and was conducted in 720,320 households. Pierce (2014) runs an ordinary least squares (OLS) regression with the dependent variable of the percentage of households in the district that own a toilet, with a toilet facility defined as an indoor toilet with plumbing, or a latrine with septic pits or dry pits attached; and with independent variables of the district-wise percentage of households that have access to an improved water source; district-wise percentage of household that have a natural gas connection (a proxy for economic status); and district-wise percentage of households that have a “Below Poverty Line” card. Additionally, Pierce (2014) includes population and density from the Census 2001, as well as data from the Total Sanitation Campaign, regarding the amount budgeted per capita, and an index measuring the benchmark of TSC performance. These two measures were included to control for the assumption that poorer performing districts were given more funding.

Pierce’s (2014) regression model—conducted within a spatial lag framework to account for the high degree of spatial autocorrelation—explains over four-fifths of the variation in toilet use between districts. He finds drinking water access and possession of a BPL card to be negatively correlated with toilet possession; whereas Liquefied Natural Gas (LNG) connection to be positively correlated with toilet possession. Given that Pierce’s (2014) regression looks at the district-wise percentage of households without toilet facilities, and not the improvement, the negative coefficient of possession of a BPL card makes intuitive sense. Households with BPL cards are of lower income, and thus we would expect that households without toilet facilities are more likely to possess BPL cards. However, as discussed in Chapter 2, we might expect that improvement of

sanitation facilities has a more ambiguous relationship with BPL cards. For instance, possession of a BPL card makes a household eligible for a series of welfare programs, one of which is a subsidy for toilet construction. This subsidy would make it easier to construct a toilet, and hence we would expect to see the possession of a BPL card to be positively correlated with improvement in the percentage of households with toilet facilities. Nevertheless, many past studies (Ram, Mohanty and Usha, 2009 & Besley, 2011; cited in Pierce, 2014) highlight the inconsistencies of the distribution of BPL cards: often households that are not eligible receive cards, and households eligible do not receive cards. These issues would mask the relationship between BPL card and toilet construction. Additionally, Pierce (2014) finds geographic variables—land area and density—to not be statistically significant in the model, along with TSC budget per capita. The insignificant role of TSC budget on toilet construction suggests that the TSC program might not be effective at increasing either toilet construction or usage. Consequently, it appears that the role of TSC has a minimal effect on toilet usage, and rather geographic clusters or LNG connections (a proxy for income levels), might be better indicators of toilet usage. Moreover, the most influential factors in determining toilet construction are not necessarily the efforts of the TSC, but rather income—income that directly correlates to a household’s ability to construct a toilet with or without help from a subsidy.

Kumar (2014), similar to Pierce (2014), investigates the correlation between socioeconomic factors and toilet construction, and in particular, looks at certain group classifications in India. Using NSS data during 2008/09 that provides information at the household-level, Kumar (2014) shows that in terms of employment, 83.1% of agricultural

laborers are deprived in access to latrine facilities in the house, followed by other laborers (68.1%), self employed in agriculture (65.1%), self employed in non-agriculture (53.0%), and Others (41.28%); for social groups: Scheduled Castes (77.4%), Scheduled Tribes (76.5%), Other Backward Classes (70.4%), and Other households (44.5%); and for religious groups: Hindu (69.9%), Muslims (50.6%), and Other households (38.2%). In comparison to Pierce's regression model, Kumar (2014) runs a probit model, which provides information regarding the probability that a household will have a toilet facility. His dependent variable is households having a latrine facility in the house, and his explanatory variables include household's Monthly Per Capita Expenditure (MPCE) quintile, household's employment type, household's social group, household's religious group, and the household's state and/or union territory. Kumar's results suggest that (1) the probability that a household has a latrine facility in the house decreases as MPCE quintiles approach the bottom quintiles; (2) agricultural laborers and other laborers have lower probabilities of latrine facility in the house as compared to other households types; (3) Scheduled Tribes and Scheduled Castes households have lower probabilities followed by Other Backward Classes relative to Others' households; (4) Hindu households followed by Muslim households were found to have lesser probabilities compared to Other Religious Minorities; and (5) households in backward states, such as Bihar, Chhattisgarh, Jharkhand, Madhya Pradesh, Orissa, Rajasthan, and Uttar Pradesh were found most likely to have lower probabilities than other states, as compared to the reference category state (Kerala). Similar to Pierce's (2014) results, Kumar's (2014) probit regression highlights the role of income, as well as other social and religious factors in determining the likelihood of toilet adoption. Such results have subsequent

political implications: not only must sanitation reforms focus on installing toilets and encouraging behavioral change, but reforms must also address income constraints and the reasons why certain employment types, social castes, or religious groups are less likely to construct toilets. These reasons might require increasing welfare programs, such as providing additional income or subsidies to certain households; or, might necessitate changing more deeply rooted reasons why certain households are without sanitation amenities, such as the historical connotations associated with sanitation as discussed in Chapter 2.

Given that Pierce's (2014) and Kumar's (2014) analyses use data from 2007/08 and 2008/09 respectively, we would hope that more recent data would show that there is not a certain "type" of household that is more likely to not have a household toilet. In the following section, I build upon Pierce's (2014) and Kumar's (2014) works to perform a similar analysis using more up-to-date data, in attempt to conceptualize the improvement under India's most recent campaign, the Swachh Bharat Abhiyan (SBA). I run two analyses—one with the dependent variable of district-wise percentage of households with toilet facilities in 2015, and a second with the improvement in district-wise percentage of households with toilet facilities between 2012 and 2015.

Part 5: Analysis: The Swachh Bharat Abhiyan Campaign

5a. Data Sources

The Government of India's Ministry of Drinking Water and Sanitation provides public information regarding the SBA Target verses achievement under the Baseline Survey of 2012 (BLS-2012). As described in Chapter 3, the Baseline Survey measures the presence or absence of toilets based on entries done by GPs. Specifically, the Ministry

of Drinking Water and Sanitation provides data, by district, on the total number of households under the BLS-2012, the number of BPL and APL households without toilets as documented under the BLS-2012, as well as the number of households (BPL and APL) covered after the survey (between 2013-2014 and 2014-2015 onwards). Using this information, I calculate the percentage of households with toilets under the BLS-2012, as well as the percentage of households with toilets after the survey (see *Appendix* for calculations).

One shortcoming of this calculation, however, is that the percentage of households with toilets after the survey is based upon the total number of households reported in the BLS-2012. As discussed in Chapter 3, the “achievement” rate under the TSC and NBA did not account for the population growth between the Census 2001 and 2011. Similarly, my measurement of the percentage of households with toilets after the survey does not take into consideration the population growth between 2012 and 2015. Additionally, my analysis assumes that the toilets of all households covered prior to the BLS-2012 remain usable and intact. Consequently, the estimate of the percentage of households with toilets after the survey is most likely an overestimate, rather than an underestimate.

The majority of the independent variables were gathered from the 2011 Census, which provides information at the district-level.⁹ However, it should be noted, that information on religious composition (percent Hindu and percent Muslim), as well as percentage of households who use LPG (Liquefied Petroleum Gas) for cooking were not available at the district-level. Therefore, I use state level information for these select variables. Additionally, district-level information on drinking water source within the

⁹ Data obtained from IndiaStat.com

premise was provided as an absolute number, rather than as a percentage. Therefore, I estimate the average number of individuals with drinking water within the premise by multiplying the district-wise number of households with a drinking water source within the premise by the average household size by state.¹⁰ To find the average percentage of individuals with a drinking water source within the premise, I divide the calculated average number of individuals with a drinking water source within the premise by the population of the district (determined by the Census 2011).

The remaining independent variables—literacy rate, density, and below the poverty line population—were determined by the Census 2011 data and provided at the district-level. I also use the independent variable of the percentage of expenditure used, which was provided from the Government of India’s Ministry of Drinking Water and Sanitation homepage. This number expresses the percentage of funds spent on water and sanitation measures, given the number of funds available and released by the Government of India. The final independent variable I use attempts to measure the effectiveness of the social media component of the SBA.¹¹ These variables can be considered proxy variables for Information, Education and Communication approaches and hence measure the effectiveness of the SBA to not only construct toilets (supply), but also encourage behavioral changes (demand). These variables—total number of individuals registered for the mobile application, and number of photos uploaded—will be measured as binary variables, due to the relatively low numbers reported due in part to the relatively recent initiation of this campaign and its social media application.

¹⁰ Average household size was provided under the Census for only a select number of states (average household size was not provided by district). For Arunachal Pradesh, Manipur, Mizoram, and Tripura, I used the average household size based upon the National Family Health Survey (2007).

¹¹ This new social media component was briefly mentioned in Chapter 2 and will be discussed more thoroughly in Chapter 5.

Table 5 summarizes the independent variables used:

Variable	Did Pierce or Kumar use this variable?	Reason for Inclusion	Data Source
Religion (percent Hindu) <i>Note: percent Muslim was excluded due to high correlation between percent Muslim and percent Hindu</i>	Kumar (2014)	As noted by Geruso and Spears (2014), Hindus and Muslims have different public defecation rates. Additionally, Chapter 2 elaborated on the influence of religion and its connotations towards sanitation, as well as the role of the Hindu caste system in India.	Census 2011 (state-level)
LPG	Pierce (2014)	Pierce (2014) notes that LNG connection can be a proxy for economic status and urbanization. We would assume that wealthier households are more likely to be able to afford toilet construction.	Census 2011 (state-level)
Literacy Rate	<i>Not included in either study</i>	Literacy rate might serve as a proxy for education. We might assume that those more educated might be more likely to install toilets. In addition, as will be described in Chapter 4, educational information to encourage toilet construction requires literacy. The ability to obtain a subsidy for toilet construction requires completion of a form (and hence ability to read/write).	Census 2011 (district-level)
Density	Pierce (2014)	Pierce (2014) uses density as a measure of urbanization. We might expect areas with high density to have a higher degree of social influence/pressure and hence increase the number of households who construct toilets.	Census 2011 (district-level)
Below the Poverty Line	Pierce (2014)	The number of households classified as BPL might have an ambiguous relationship to toilet construction, as discussed earlier.	Census 2011 (state-level)
Expenditures Used	Pierce (2014)	Pierce (2014) uses a similar expenditure measure in his model (TSC budgeted per capita). We would expect states with higher expenditures used to have higher percentages of households with toilet facilities.	MoDWS (district-level)
Registered Individuals for Mobile Application (Binary Variable)	<i>Not included in either study</i>	This variable attempts to measure the effectiveness of the new social media components of the SBA, as well as serves as a proxy for IEC.	MoDWS (district-level)
Photos Uploaded and Approved via Mobile Application (Binary Variable)	<i>Not included in either study</i>	This variable attempts to measure the effectiveness of the new social media components of the SBA, as well as serves as a proxy for IEC.	MoDWS (district-level)

Table 5: Independent variables used in regression; this table describes the variables used in my study, as well as the reasons behind their inclusion and where the data was collected (source) for each variable.

5b. Summary Statistics

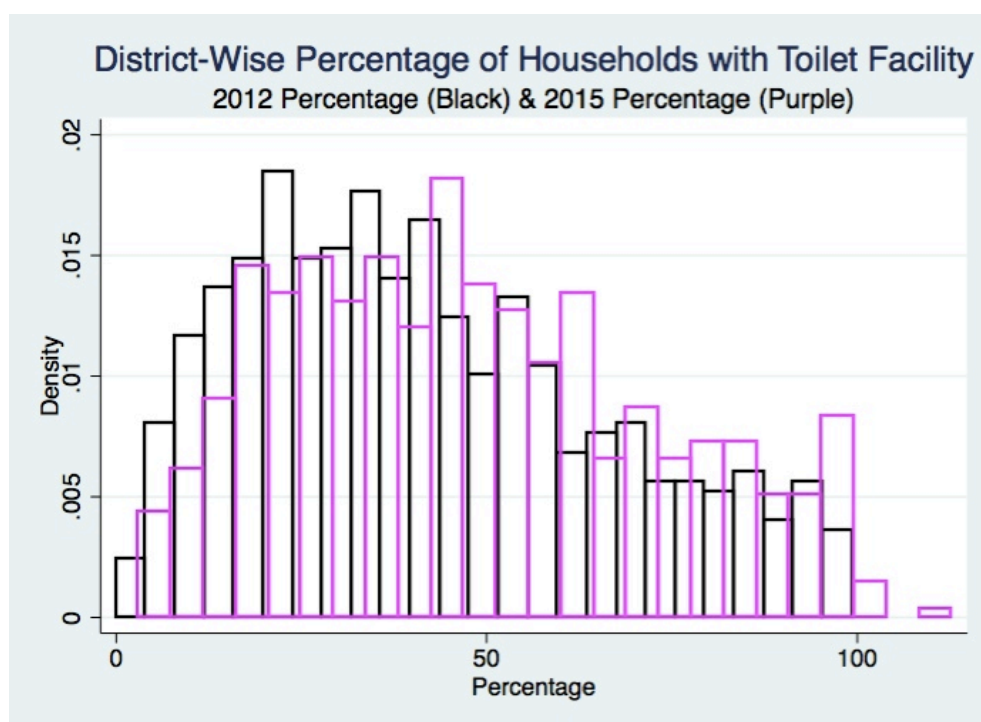
Pierce (2014), using 2007-2008 data, finds a district-wise percentage of households with toilet facilities to be 44% (mean) and 36% (median). Table 6 provides summary statistics (median, mean, and standard deviation) for the variables used in my study.

Variable	Median	Mean	Standard Deviation
District-Wise Percentage of Households with Toilets at Baseline	38.36	41.91	24.09
District-Wise Percentage of Households with Toilets 2015	44.81	47.85	24.76
Improvement	4.63	5.94	6.12
State-Wise Percentage of Households Hindu	82.23	76.70	21.26
District-Wise Literacy Rate	72.17	71.66	10.06
District-Wise Percentage of Households who use LPG for Cooking	52.51	47.81	14.09
District-Wise Percentage of Households with Drinking Water Source Within Premise	36.66	41.23	41.20
State-Wise Percentage of BPL Population	40.85	36.54	12.15
District-Wise Percentage of Expenditures Used Released from Central Government	50.6	53.96	35.10

Table 6: Summary statistics for variables used in regression

The mean district-wise percentage of households with toilet facilities in 2012 was 41.91%. This, however, is a decrease from Pierce's finding of 44% of households with toilet facilities in 2008/09. However, our data do come from different sources, and my percentage of 2012 does align with the results from the National Sample Survey, which indicated 40.6% of households do have toilets in their house as of 2012. Moreover, my

results suggest an improvement from 2012 to 2015—from 41.91% (2012) to 44.81% (2015).¹² Graph 1 is a histogram that shows the distribution of district-wise percentage of households with toilet facilities in 2012 (black) and as of 2015 (purple).¹³



Graph 1: Histogram of district-wise percentage of households with toilet facility (black = 2012 percentage; purple = 2015 percentage)

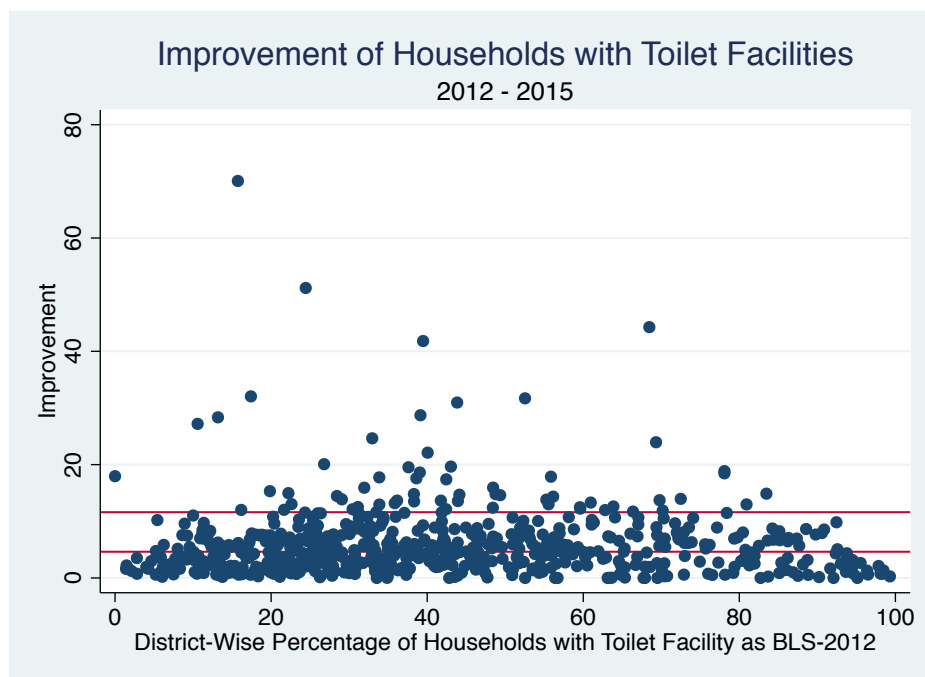
Both distributions are skewed to the left, suggesting that a large proportion of districts have low household toilet coverage, and a few have high household toilet coverage. However, as mentioned earlier, since my estimate of the percentage of households with toilets facilities after the survey does not take into consideration (1) the population growth between 2012 and 2015, and (2) assumes that all toilets installed

¹² Note: although my data suggests an improvement of nearly 6-percentage points between 2012 and 2015, as mentioned previously, this does not take into consideration population growth. Moreover, if India's population was growing at 1% per year, more than half of the 6-percentage point increase in sanitation improvement would be explained by natural growth.

¹³ Note: some points on the histogram represent situations in which the district-wise percentage of households with toilet facilities is greater than 100%. Because my measure does not take into consideration growth in households between 2012 and 2015, this represents a scenario in which more households have toilets in 2015 than the total number of households reported in the Baseline survey.

before the BLS-2012 remained usable and intact, the estimate of toilet coverage in 2015 is most likely an over-estimation. Nevertheless, it is still useful to analyze this improvement—and in particular, which states or districts might be influential in the increase in sanitation coverage between 2012 and 2015.

In fact, there is much variation in the improvement¹⁴ of district-wise percentage of households with toilet facilities between 2012 and 2015. Graph 2 is a scatterplot, which shows the district-wise percentage improvement (2012 – 2015) of households with toilet facilities in each district against the baseline district-wise percentage of households with toilet facilities. Two additional horizontal lines are displayed on scatterplot: the lower line demarks the 50th percentile rank (4.625% improvement) and the upper line demarks the 90th percentile rank (11.6075% improvement).



Graph 2: Scatterplot of district-wise percentage improvement against baseline district-wise percentage of households with toilet facilities; first horizontal line shows the 50th-percentile (4.625%); second horizontal line shows the 90th-percentile (11.6075%).

¹⁴ Note: “improvement” is an absolute percentage. Therefore, we might expect districts that have relatively low sanitation coverage to experience greater improvement, and districts with relatively high sanitation coverage to experience less improvement. This will be analyzed further below.

As shown in Graph 2, 63 districts fall above the 90th-percentile line. Table 7 provides summary statistics for all districts, for districts above the 90th-percentile, and for districts below the 90th-percentile line.

Improvement	Observations	Mean	Median	Standard Deviation	Mean % of HH with Sanitation (2012)	Mean % of HH with Sanitation (2015)
All Districts	627	4.50	4.66	2.96	41.91	47.85
Above the 90th-Percentile	63	18.78	14.69	10.53	42.26	62.04
Below the 90th-Percentile	564	4.503	4.14	2.96	41.76	46.27

Table 7: Summary statistics based on district categories; row (1) shows all districts; row (2) shows districts above the 90th-percentile; and row (3) shows districts below the 90th-percentile

The mean and median is significantly greater for the districts above the 90th-percentile line. However, when the districts above the 90th-percentile are excluded, the mean district-wise percentage of households with toilet facilities in 2015 is 46.26%—which is still greater than the mean in the BSL-2012 of 41.76% for the same restricted group of districts. This suggests that particular districts are not solely driving the improvement in district-wise percentage of households with toilet facilities from 2012 to 2015. Rather, improvement has taken place throughout India. Districts above the 90th-percentile line of improvement do have a slightly higher percentage of households with toilet facilities in the Baseline 2012 (42.26% vs. 41.76%). Thus, although improvement is not driven by a subset of districts, such a result might imply that districts with higher initial sanitation coverage are more likely to increase coverage in the future.

The districts above the 90th-percentile line of improvement come from a variety of states, and thus are not segregated to a particular cluster of states or districts, or geographic location. Table 8 provides information on the states with districts above the

90th-percentile line, as well as the mean district-wise percentage of households with toilets facilities in 2012 and 2015:

State	Number of Outlier Districts	Percentage of Outlier Districts (outlier districts/total districts)	Mean Percentage of Households with Toilet Facilities (BLS-2012)	Mean Percentage of Households with Toilet Facilities (2015)
Arunachal Pradesh	8	61.54%	38.66%	50.34%
Assam	2	7.69%	38.84%	43.87%
Gujarat	1	3.85%	54.83%	60.69%
Haryana	13	61.90%	73.82%	81.97%
Himachal Pradesh	2	16.67%	85.93%	89.78%
Jammu & Kashmir	2	9.09%	29.09%	36.05%
Karnataka	17	64.48%	39.54%	53.37%
Madhya Pradesh	5	10%	26.68%	34.35%
Maharashtra	2	6.06%	46.53%	53.52%
Manipur	5	55.56%	53.31%	65.06%
Meghalaya	5	71.43%	49.01%	63.48%
Nagaland	2	18.18%	45.05%	55.10%
Rajasthan	2	6.25%	27.53%	34.02%
Sikkim	1	25%	82.33%	92.13%
Tamil Nadu	1	3.45%	45.90%	51.85%
Uttarh Pradesh	1	1.33%	36.95%	42.24%
Uttarakhand	2	15.38%	68.30%	77.71%
West Bengal	5	26.32%	52.12%	60.15%

Table 8: Summary statistics for districts above the 90th-percentile in each state

As shown in Table 8, a fairly large proportion of states had some amount of districts above the 90th-percentile. Figure 2 displays a map of the improvement in district-wise percentage of households with toilet facilities.¹⁵ Improvement does not seem to be clustered in a certain area; however, improvement of 0% - 5%, does seem to be somewhat clustered in the northern part and southern tip of the state.

¹⁵ District shapefiles obtained from Giron, Ernesto. "India Districts." Esri: ArcGIS. <http://www.arcgis.com/home/item.html?id=8b8a2b7ab20149cd97420c93cb453ce2#>.

Improvement in District-Wise Percentage of Households with Toilet Facilities (2012 - 2015)

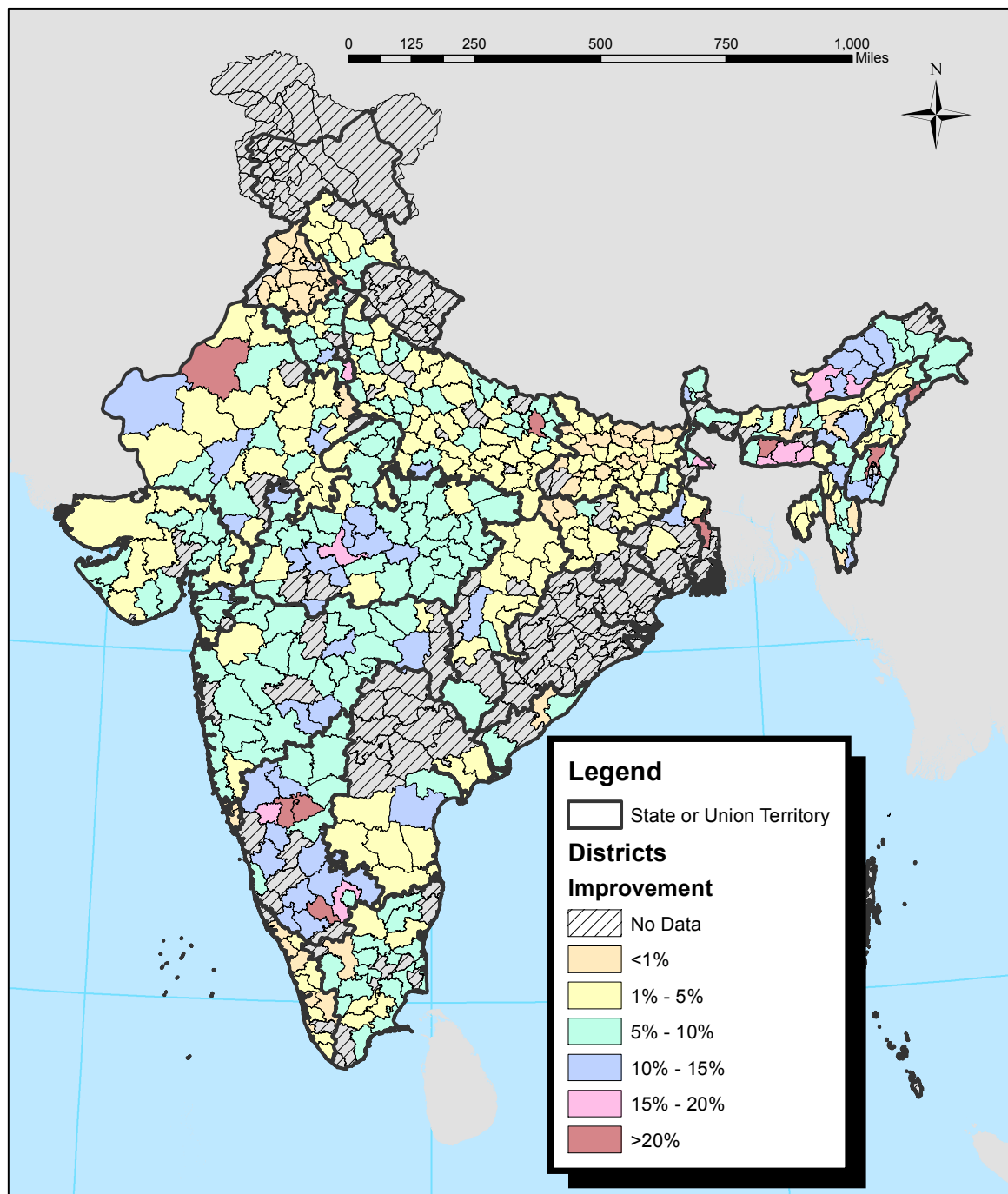


Figure 2: Improvement in district-wise percentage of households with toilet facilities from 2012 to 2015

In addition, Table 8 shows that a few states had a larger proportion of districts above the 90th-percentile line than others. Unfortunately, out of the five problem states identified in Chapter 2—Bihar, Chhattisgarh, Jharkhand, Orissa, and Rajasthan—only Rajasthan had districts above the 90th-percentile.

In addition to the variables described above, two more variables are incorporated into my regression—the number of registered mobile users, and the number of photos uploaded via the mobile application. As noted above, both of these variables attempt to capture the IEC components of the SBA. Figures 3 and 4¹⁶ depict which districts do and do not have registered mobile users, and which districts have and have not uploaded photos via the mobile application, respectively. As shown in Figure 4, not many districts have individuals who have uploaded photos. Among the districts that have partaken in either of the SBA activities, most of the districts are located in the western portion of India. When compared to Figure 2, the districts that displayed the most significant improvement between 2012 and 2015 do not necessarily correlate with the districts with registered mobile users or who have uploaded photos. In addition, four out of the five “problem states” identified earlier in this chapter are among the 18 states that have uploaded photographs so far (from 1/10/14 to 5/7/15), and all five states have a handful of registered and active users of the mobile application. Even if the IEC effects prove to be insignificant in the regression, perhaps IEC efforts are targeting the states with the lowest levels of sanitation coverage. The impact of these social media variables will be tested further below. Nevertheless, a lack of correlation would suggest that these social media or IEC components of SBA might not be encouraging toilet adoption or

¹⁶ District shapefiles obtained from Giron, Ernesto. “India Districts.” Esri: ArcGIS. <http://www.arcgis.com/home/item.html?id=8b8a2b7ab20149cd97420c93cb453ce2#>.

improvement to as great an extent as hoped. However, the SBA and these components are relatively recent, and so we might expect these social media activities to become more influential in the coming years.

Registered Mobile Users for SBA Mobile Application

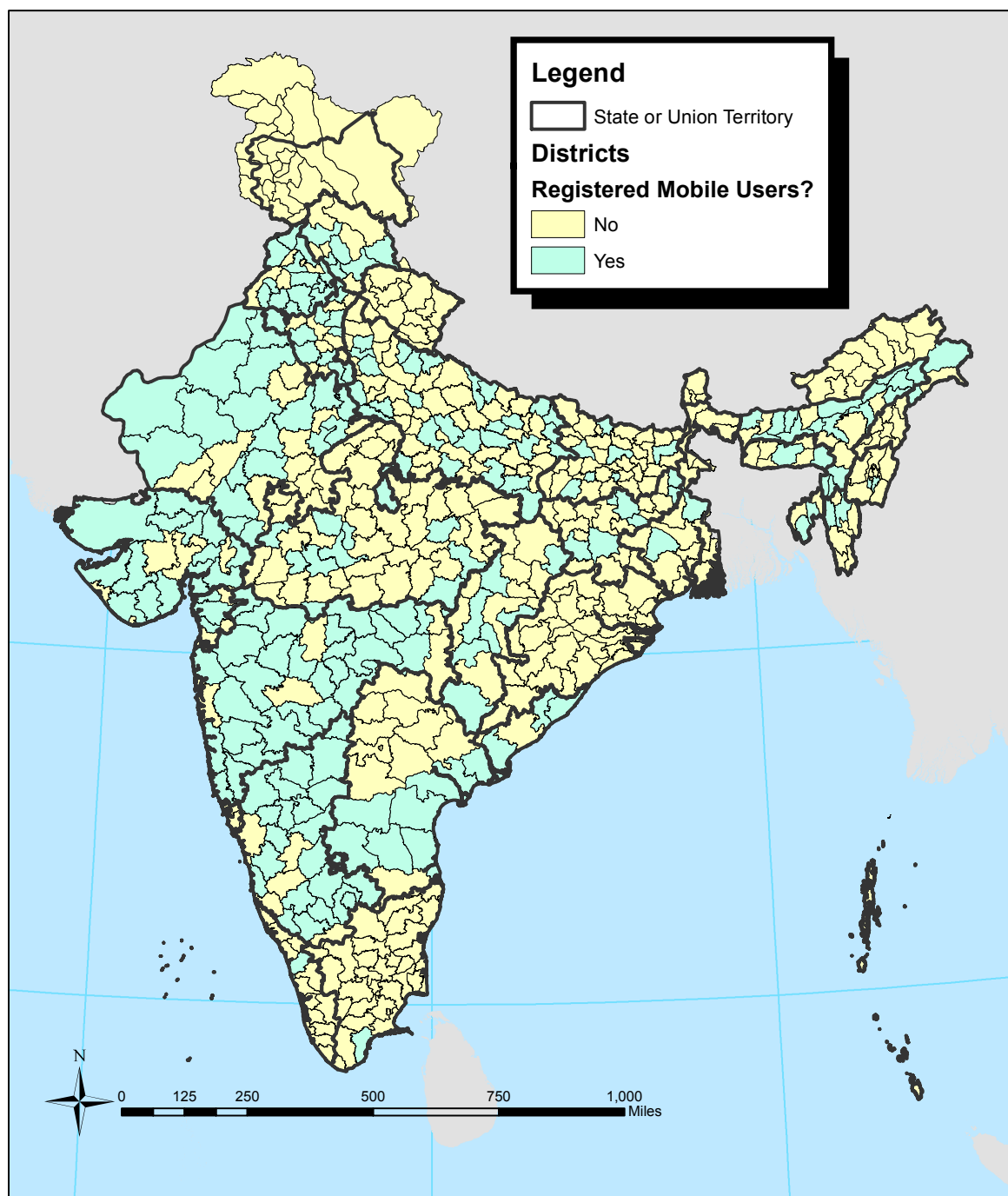


Figure 3: District-wise registered mobile users for SBA mobile application

Photos Uploaded Using SBA Mobile Application

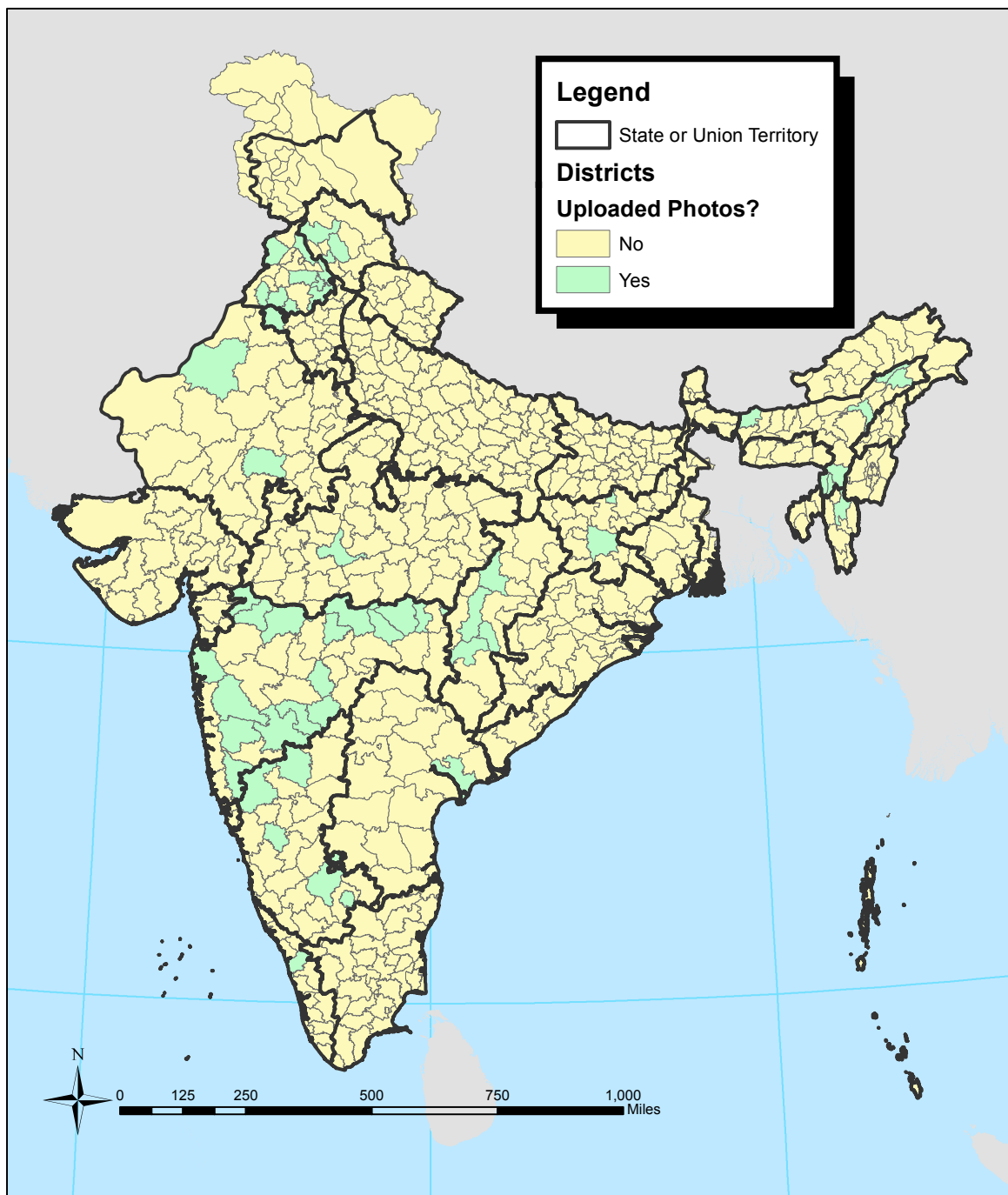


Figure 4: District-wise photos uploaded using SBA mobile application

5c. Regressions

The data I gathered from the Census, as well as the Ministry of Drinking Water and Sanitation, was provided at the district level. I will more closely follow Pierce's (2014) OLS regression, as my dependent variable of interest is the percentage of households in the district with sanitary facilities, rather than a binary variable (such as Kumar's binary variable in regards to presence or absence of a household toilet).

Table 9 presents the results of five simple OLS regressions.¹⁷ Columns (1) and (2) use the dependent variable of district-wise percentage of households with toilet facilities as of 2015; columns (3) and (4) use the dependent variable of the improvement in district-wise percentage of households with toilet facilities from 2012 to 2015; and column (5) uses the growth rate of improvement¹⁸ as the dependent variable. Columns (2), (4), and (5) include the IEC components of the SBA, namely binary variables for whether or not the district has any registered mobile users, and for whether or not the district has uploaded any photos (and photos that have been approved by the Government).

¹⁷ Note: when the same regressions were conducted with the addition of state fixed effects, similar results emerge.

¹⁸ Growth rate of improvement = improvement/(percentage of HH with toilet facilities in 2012)

	(1)	(2)	(3)	(4)	(5)
	Dependent variable: District-wise Percentage of Households with Toilet Facilities (as of 2015)		Dependent variable: Improvement in District-wise Percentage of Households with Toilet Facilities (as of 2015)		
	b/se	b/se	b/se	b/se	b/se
State-Wise Percentage of Households Hindu	-0.205*** (0.045)	-0.193*** (0.046)	-0.039 (0.016)	-0.036* (0.016)	-0.0009 (0.000)
District-Wise Literacy Rate	0.847*** (0.135)	0.866*** (0.139)	-0.017 (0.022)	-0.012 (0.023)	-0.005*** (0.001)
State-Wise Percentage of Households who use LPG/PNG for Cooking	0.441*** (0.070)	0.424*** (0.072)	0.074*** (0.017)	0.069** (0.017)	0.0004 (0.001)
District-Wise Percentage of Households with Drinking Water Source Within Premise	0.104 (0.062)	0.110*** (0.061)	0.00007 (0.007)	0.002 (0.007)	-0.001 (0.0003)
District-Wise Density	0.0001 (0.002)	0.0001 (0.003)	-0.001 (0.001)	-0.001 (0.001)	-0.00006* (0.00003)
State-Wise Percentage of BPL Population	-0.411*** (0.088)	-0.404*** (0.089)	0.015 (0.016)	0.018 (0.016)	0.0009 (0.001)
District-Wise Percentage of Expenditures Used Released from Central Government	0.052* (0.024)	0.058** (0.024)	0.048*** (0.007)	0.050*** (0.007)	0.002*** (0.0004)
Registered Individuals for Mobile Application (Binary Variable)		0.255 (1.852)		0.108 (0.533)	-0.011 (0.030)
Photos Uploaded and Approved via Mobile Application (Binary Variable)		-4.236 (2.588)		-1.242 (0.778)	0.020 (0.042)
Constant	-10.525 (10.457)	-11.924 (10.778)		3.779 (2.136)	0.497 (0.133)
Adjusted R²	0.401	0.402	0.102	0.102	0.0584
N	564	564	564	564	563

* p < 0.1 ** p < 0.05 *** p < 0.001

Table 9: OLS regressions; columns (1) and (2) use district-wise households with toilet facilities as of 2015 as the dependent variable; columns (3) and (4) use improvement in district-wise households with toilet facilities between 2012 and 2015; column (5) uses growth of improvement in district-wise households with toilet facilities between 2012 and 2015; column (2) and (4) include variables that try to capture social media components of the SBA. Note: standard errors are in parentheses.

In analyzing columns (1) and (2), which used the dependent variable of district-wise percentage of households with toilet facilities in 2015, nearly all variables are significant, except for density and households with a drinking water source within the premise in model (1). Moreover, it appears that the addition of the two IEC variables does not greatly increase the explanatory power of the district-wise household toilet adoption, for the adjusted R^2 value increases by merely 0.001. Nevertheless, these IEC variables might be more influential in determining the *improvement* in the district-wise percentage of households with a toilet facility from 2012 to 2015, which is analyzed in columns (4) and (5).

As shown in columns (3) and (4), which use the dependent variable of improvement, most variables are not significant, except for households that use LPG for cooking and expenditures used that were released, as well as state-wise percentage of Hindu households for model (4). However, when the growth rate of improvement is analyzed (column (5)), literacy rate becomes statistically significant, yet very small and negative—the opposite result than found in models (1) and (2). Similar to columns (1) and (2), the addition of the two “IEC” variables does not greatly increase the explanatory power of the improvement in district-wise household toilet adoption, for the adjusted R^2 value remains the same.

5d. Discussion

Table 9 indicates that literacy rates, presence of drinking water within the premise, the use of LPG for cooking, and expenditures used that were released by the central government all move positively with higher district-wise percentage of toilets facilities in 2015. In comparison, the Hindu religion and BPL population move negatively

with district-wise percentage of toilets. In terms of improvement, the most influential variables included use of LPG for cooking and expenditures used that were released by the central government—both of which moved positively with improvement—with the variables of percentage Hindu and literacy rate moving negatively with improvement rates.

Similar to my results, both Pierce's (2014) and Kumar's (2014) variables measuring income—LNG connection and household MPCE quintiles—both move positively with household toilet presence. As mentioned previously, we would expect income to be an indicator for percentage of households with toilet facilities and to move positively with toilet ownership. Additionally, Kumar (2014) finds Hindu households to have lower probabilities of toilet access, in comparison to Muslim and other religious minority households. As mentioned earlier, Geruso and Spears (2014) show that Hindu households are more likely to practice open defecation than Muslim households, and hence might be less likely to construct a toilet for various religious reasons. My results also support this conclusion.

In addition, both my results and Pierce's (2014) show a negative correlation between households classified as BPL or households with a BPL card, and percentage of households with toilets. As noted previously and more thoroughly in Chapter 2, BPL classification or BPL cardholders' relationship to toilet construction might be ambiguous: BPL signifies lower income, thus decreasing toilet construction; however, possession of a BPL card provides households with a subsidy for toilet construction, thus possibly increasing toilet construction if subsidies are effective at encouraging construction. Additionally, not all households classified as BPL receive BPL cards, and some APL

households receive cards. Thus, BPL cards might not be an accurate proxy for income, for BPL households are not the ones actually obtaining BPL cards, and the subsequent welfare benefits. Given the negative coefficient for BPL in my results (columns (1) and (2)), this might suggest that (1) BPL is a proxy for low income households who are less likely to be able to construct toilets, or (2) subsidies provided to BPL households are ineffective in encouraging toilet adoption. Moreover, when improvement is used as a dependent variable (columns (3), (4), and (5)), BPL card is insignificant. Thus, the effectiveness of subsidies, as discussed in Chapter 2, should be further investigated.

However, Pierce (2014) found drinking water access to be negatively correlated to toilet access, whereas my results suggest a positive relationship. We would expect drinking water availability to be positively correlated to toilet construction, especially if water is required for toilet usage, or if presence of drinking water is reflective of higher household income or more localized or national governmental efforts directed towards the water and sanitation sector.

Unfortunately, in models (2), (4), and (5) the SBA's IEC components were not significant in determining district-wise percentage of households with toilet facilities in 2015, nor in improving district-wise percentage of households with toilet facilities between 2012 and 2015. Although insignificant, it is interesting to notice the signs of the variables: districts with registered mobile users moves positively in columns (2) and (4), however districts who have uploaded photos moves negatively in columns (2) and (4). This might suggest that registering for the mobile application, rather than uploading photos via the application, is more influential at encouraging households to construct toilets. Perhaps registration for the mobile application incentivizes toilet construction, but

does not necessarily encourage individuals to upload photos. Thus, awareness of the campaign or the need to construct toilets is reflected through registration for the mobile application, rather than uploading photos of the constructed toilet. Nevertheless, both the ability to register for the mobile application and to upload photos is a relatively recent innovation. Therefore, not many districts have participated in such IEC components.

Table 10 reports summary statistics for district-wise improvement from 2012 to 2015, and district-wise percentage of households with toilets at the baseline and after the survey (2015) for various sub-groups of districts. The first column reports the mean and standard error for all districts, the second reports only for districts with registered mobile users, the third for districts who have uploaded photos, the fourth for districts who have registered mobile users and/or uploaded photos, and the fifth for districts who do not have registered mobile users and/or have not uploaded photos.

	All Districts	Districts with registered mobile users	Districts who have uploaded photos	Districts who have mobile users and/or uploaded photos	Districts who do not have mobile users and/or uploaded photos
Improvement	5.94 (6.11)	6.00 (5.60)	5.39 (6.44)	6.00 (5.60)	5.98 (6.05)
District-wise Percentage of Households with Toilet Facilities (2012)	41.91 (24.09)	42.42 (24.22)	40.03 (28.10)	42.42 (24.22)	42.41 (23.39)
District-wise Percentage of Households with Toilet Facilities (as of 2015)	47.85 (24.76)	48.42 (25.04)	45.42 (29.48)	48.42 (25.04)	48.39 (23.87)

Table 10: Summary statistics for district-wise improvement from 2012 to 2015 based on district categories; column (1) includes all districts; (2) includes only districts with registered mobile users; (3) includes districts who have uploaded photos; (4) includes districts who have registered mobile users and/or uploaded photos; and (5) includes districts that have not done either.

Although Table 10 depicts summary statistics alone, and hence does not control for other variables, it does show that improvement and district-wise percentage of

households with toilet facilities as of 2015 is highest in columns (2) and (5): in districts with registered mobile users, or in districts that have either registered mobile users or have uploaded photos. However, in districts that have uploaded photos, the improvement, and district-wise percentage of households with toilet facilities in 2012 and 2015 is drastically lower. This might support the negative (although insignificant) coefficient of districts that have uploaded pictures to the mobile application.

5e. Conclusion

The above analysis revealed similar conclusions to that found in Pierce (2014) and Kumar (2014). In comparison to analysis using 2008/09 data, more current data from the Indian Government's Ministry of Drinking Water and Sanitation does suggest that district-wise percentage of households with toilet facilities has increased, and this improvement has not been segregated in a certain geographic location, as most states contained districts with improvement above the 90th-percentile line. Nevertheless, the data collected from the Ministry of Drinking Water and Sanitation is subjected to similar discrepancies, which were described in more detail earlier in Chapter 3, and thus the estimate of toilet coverage is most likely an overestimation, rather than an underestimation.

In addition, under this preliminary analysis, we might be able to conclude that the mobile application (both registered users and number of uploaded photos) does not currently have a significant impact on toilet construction; however, due to its relative newness, the mobile application might have more significant influence in the future. Moreover, encouraging households to upload photos might not be the best tactic for incentivizing toilet construction. It might, however, help publicize globally the success of

the SBA; and, moreover, if more districts participate, it might be a promising tactic to encourage social pressure and/or competition among districts for greatest percentage of households with constructed toilet. Analysis should be conducted in a few years to determine the influence of these IEC components, as well as whether India is on track to reach its goal of “sanitation for all” by 2019.

Part 6: Conclusion

The focus of sanitation reforms cannot only be on constructing toilets, or supplying educational components or welfare programs to generate demand: attention must also be given to adequate data collection and monitoring. As shown above, even if sanitation levels among surveys are inconsistent, if the surveys point to similar “problem states,” appropriate funds and attention can be provided, and sanitation levels can be improved. Moreover, analysis shows that the majority of households in “problem states” are of lower income, lower status/caste, and are in particular minority groups. As mentioned in Chapter 2, the low priority of sanitation in India, as well as the high open defecation rates, are in part results of ignoring the issues of these marginalized households. Consequently, if India continues to make efforts to incorporate these marginalized individuals in the political system or sanitation reforms, or if India takes efforts to uproot social and cultural norms associated with the caste system, India might not only increase the number of sanitation amenities among this population, but also make these marginalized households less likely—rather than more likely—to be without toilets. Nevertheless, India’s new sanitation program, the SBA, shows promise for increasing sanitation coverage in the future; however, additional research should

investigate the effectiveness of subsidies, as well as the usefulness of the SBA's social media components.

Appendix:

Percentage of households with toilets under the BLS-2012 was calculated as follows:

1. The MoDWS provided data on the number of households with toilets as BLS-2012, as well as the total number of households as BLS-2012. Using these two numbers, the percentage of households without toilet facilities was calculated:

$$\% \text{ of Households Without Toilet Facilities} = \frac{\text{Households without toilets as BLS}}{\text{Total Households as BLS}}$$

2. Since households either have or do not have a toilet, the percentage of households with toilets was simply found by subtracting the answer from (1) by 1:

$$\% \text{ of Households with Toilet Facilities} = 1 - \frac{\text{Households without toilets as BLS}}{\text{Total Households as BLS}}$$

Percentage of households with toilets after the BLS-2012 was calculated as follows:

1. The MoDWS provided information on the number of households without toilets as BLS-2012, as well as the number of households covered after the survey. Using these two numbers, the number of households without toilets facilities was calculated:

$$\begin{aligned} \# \text{ of Households Without Toilet Facilities} \\ &= (\# \text{ of Households Without Toilet Facilities}) \\ &\quad - (\# \text{ of Households Covered After Survey}) \end{aligned}$$

2. The percentage of households with and without toilet facilities was calculated the same above (in reference to the percentage of households with toilets as BLS-2012).

Rest Stop 4:

One of my favorite moments in India occurred while I was in the car. I remember looking out the window and seeing two cows, a few stray dogs, and a handful of monkeys all consuming a pile of trash on the side of the road.

In this moment, I laughed—not because it was actually funny—but more because I was awe-struck, frazzled, and did not really know how to react to this situation. Not only did no one (besides my family and me) think this scene was absolutely ridiculous (for such a scene must have seemed very commonplace to an average Indian citizen), but I did not even know these animals interacted with each other. I guess trash brings people together.

Nevertheless, this image made me realize that poor sanitation is just one problem among many issues plaguing India. Yes, encouraging people to install toilets might solve one problem—but what about cleaning up the streets? Or making sure all this trash doesn't pollute water sources? Or, what about the abundant number of plastic, non-reusable water bottles that are used every day, and most likely not recycled? What about the educational system? Agricultural production? Technological progress? Pollution? The ever-growing disparity between the rich and the poor? The list could go on and on.

India does have a lot of problems, but the only way to fix these problems is to start. The next chapter looks at one such campaign, the Behavior Change Communication (BCC) Campaign in the Davangere District of India, which attempts to tackle one of India's problems, sanitation. Although implemented in just a handful of villages, it is one step in the right direction.

Chapter 4: A Case Study of Arghyam's BCC Campaign

Part 1: Introduction

In January 2015, I spent two weeks in India, working with an Indian charitable trust, Arghyam. India was unlike any other place I had previously traveled to—not to imply that I am a well traveled individual. From the chaotic driving that was ironically organized and regulated by constant honking, to the mounds of trash on the sidewalks that were thoroughly eaten by a combination of wild dogs, horses, cows, and monkeys—I was first welcomed to the world of toilets at a restroom at the Red Fort in Delhi. These bathrooms were pay-to-use, and thus before entering, we had to pay our fees to an official. When we first stepped into the bathroom, there were two stalls; yet, one was not being used. In the United States, when a toilet is not being used its usually because it is clogged, too “dirty,” or has an unwanted sight of the last user’s remains in the toilet. This particular toilet, however, was not being used for an entirely different reason: it was a Western toilet, and by the standards of the woman in line in front of us, was “unsanitary.” She would rather wait her turn for the squatting toilet, than use the sitting one.

This woman’s comment excited me—not merely because I got to cut her in line and use the toilet—but because her opinion substantiated the lessons I had learned and discussed in Chapter 1. The installation of toilets does not guarantee their use. Toilets cannot be constructed without catering the type, shape, or size to the users. Providing toilets—and hence improving individuals’ physical and emotional health—involves a two-way conversation between provider and user. Demand cannot be met without a supply of toilets; but a supply of toilets will not be used without a demand.

My experience at this pay-to-use toilet at the Red Fort was the welcome ceremony to my forthcoming two weeks in India.

Part 2: Background on Arghyam

Given the widespread impacts of poor sanitation in India and the relatively ineffective campaigns by the government, many private organizations have taken initiatives of their own to help ameliorate the sanitation crisis. Arghyam, an Indian charitable trust, is one of those organizations, with the goal of providing “safe, sustainable, water and sanitation for all” (Arghyam, 2005). Arghyam is both a grant-making organization—for it provides grants and support to NGOs—and a research and development group—for it conducts surveys, provides the general public with information on water and sanitation, and carries out developmental projects of its own (Sunita Nadhamuni; cited in Herro, 2010). Focusing on providing these amenities “for all,” Arghyam strives to include all populations of society in its water and sanitation projects, with particular attention given to those most vulnerable and marginalized, and a focus towards the long-term sustainability of “potability, adequacy, convenience, [and] affordability” of water supply (Arghya, 2005). With a staff composed of individuals from a variety of fields—, from the technology and engineering industry, to governmental and non-governmental organizations—Arghyam is able to effectively work within a holistic framework to ensure “social, institutional, technical, environmental, and financial sustainability” (Arghyam, 2005).

While at Arghyam, I visited the organization’s campaign in the Davangere district in the state of Karnataka. This campaign, termed the Behavior Change Communication (BCC), took place in 50 “treatment” villages during January and February of 2014. In

addition to designated “treatment” villages, Arghyam conducted analysis in 25 “control” villages, allowing for comparisons between the “treatment” and “control” villages both before and after the campaign. In addition to analyzing the effects of the BCC campaign, the baseline survey provides insights into toilet demand—household constraints, limitations, and behaviors—under the Government’s NBA campaign. An analysis of the baseline survey highlights many patterns preventing toilet construction and usage reported in previous chapters—from financial difficulties and governmental inefficiencies, to lack of demand among certain portions of the population. With the BCC campaign designed to address these deficiencies and constraints to toilet construction and usage, the endline survey allows for an assessment of the effectiveness of the BCC campaign, as well as a comparison to the “control” villages whose “treatment” is the NBA campaign. The results of the BCC campaign are encouraging, but also suggest areas for improvement. Moreover, the campaign gives hope that funds allocated to Information, Education and Communication (IEC) efforts, if used properly, can incentivize toilet construction and usage.

Part 3: The Behavioral Change Communication (BCC) Campaign

3a. Overview

The BCC Campaign was undertaken to show that properly used funds for IEC can effectively bring about behavioral change, leading to toilet construction and usage, and its subsequent physical and mental health benefits. Under the Indian Government’s NBA program, 15% of the budget is allocated towards IEC efforts, intended to further shift attention away from supply-driven initiatives and towards demand-driven campaigns. However, this does not necessarily mean expenditures will increase for IEC purposes. As

noted in Chapter 2, many states do not use all available IEC funds, and of the funds spent, such as for the appointment of GP motivators, most are used to encourage toilet construction, rather than toilet usage. Specifically, under the TSC, oftentimes less than 8% of the budget was reported as used for IEC undertakings, with Rs 1176.70 crores of the IEC budget for TSC remaining unspent in FY 2010-2011 (Kapur, 2013b). However, it should be noted that in many government programs, less than 50% of designated IEC funds are used (Gopalan, 2015). Thus, the low percentage of IEC funds used in the NBA is not abnormal. IEC funds might not have been used for a number of reasons: (1) village usage of IEC funds might be unnecessary if the demand for toilets is already present within the village; or (2) poor leadership and organization, or lack of knowledge of skills, might limit the ability of the village to properly, and effectively, utilize all IEC funds.

The “Arghaym Approach” was designed “to provide the state government with professional, relevant and contextual communication strategy and campaign that is scalable and can effectively incentivize people to build and use toilets” (Gopalan, 2015). Not only did Arghyam seek to prove that properly spent IEC funds could be effective at encouraging construction and usage of toilets, but Arghyam also sought to ensure that such a campaign could be replicated and scalable, in other districts and villages. Arghyam, therefore, did not contribute financially, and simply constructed the communication plan and relied on already present government resources to fund the campaign. Moreover, to substantiate the ability of the campaign to be replicated in future villages, the campaign was unleashed in the district of Davangere, for this district represented the “average” district in the state of Karnataka: the percentage of households with toilet facilities in Davangere was approximately the average for all districts in

Karnataka in 2011; and geographically, Davangere is located in the middle of the state, and thus is not biased towards the more educated, irrigated, and higher employment rates found in the southern part of the state.

The remaining portion of Chapter 4 discusses results gathered from the baseline and endline studies, put together by the Public Affairs Foundation (2014a & 2014b), as well as my personal experiences and conclusions gathered from visiting two “treatment” and two “control” villages in the Davangere district, and attending the Center of Gravity’s presentation as part of their “Learning Workshops.” Using lessons gathered primarily from Chapters 1 and 2, I use the various components of the efforts in the Davangere district as an example of a campaign which took into consideration both the supply and demand components necessary to encourage toilet construction, usage, and maintenance.

3b. The Baseline Survey

Arghyam partnered with the Centre of Gravity, to design the strategies of the BCC campaign. The Centre of Gravity has a past history in changing health-related behaviors in villages, such as in encouraging the use of toothpaste or hand washing with soap. Before a framework for the BCC campaign could be created, a baseline survey of the villages in the Davangere district was conducted with data analysis from the Public Affairs Foundation (PAF). The survey was designed to measure the current coverage of sanitation amenities and the existent demand for toilets in the Davangere district. The results of the baseline survey provide an example of the conclusions highlighted in the previous chapters: sanitation reforms must not only construct toilets, but also restructure

the supply of sanitation reforms as to encourage demand for toilet construction, usage, and maintenance.

3c1. Reasons for Toilet Demand

Chapter 1 argued that demand for toilet construction and usage is a function of both “emotional” and “physical” health drives. Specifically, construction and usage of toilets can directly improve physical health via improved environmental quality (such as decreased incidents of diarrhea); and can improve emotional health through general mental health—feelings of comfort, convenience, or privacy—and socially induced mental health—reduction in feelings of shame or guilt due to public defecation, and hence improved health through social inclusion. Demand for toilet construction and usage among respondents in the baseline survey was primarily found within these “emotional” health drives—the desire to be seen as more urban or modern; to provide comfort for the ailing; or to prevent women from feeling inconvenience, fear, shame, or humiliation while defecating outside. In fact, adoption of toilets to emulate modern practices might be a symptom of the more general aspiration to adopt urban ideals: the construction of rural homes are slowly imitating urban household layouts via the presence of separate rooms divided by walls, rather than one open area, or shelves in the kitchen (Gopalan, 2015).

The baseline survey bears many similarities to the characteristics of demand for toilets found in the “No Toilet, No Bride” campaign discussed in Chapter 1 and analyzed by Stopnitzky (2012a). In the villages of both districts, demand was gendered: women expressed a stronger desire for a toilet than the men. As open spaces become more scarce, women were forced to travel longer distances to find a place to defecate: “It was always difficult to go there [and defecate outside] but now it’s even more difficult with new

houses being constructed” (female interviewee; cited in Gopalan, 2015). Consequently, women saw these demographic changes as contributing to a series of “emotional” health problems: inconvenience, as she had to wait till dark and subsequently walk longer distances to find an appropriate place to defecate; fear, due to traveling to defecate in an unknown village; shame, for there was a higher probability of being spotted by males; and humiliation if she had to defecate in someone’s else field due to the increasing unavailability of conveniently located areas to defecate (Arghyam, 2013a). In one of the Centre of Gravity’s baseline videos, a female interviewee remarked, “It is difficult to go out...there will be boys/men around. We can’t sit then. We need to go very far.”

Similarly, feelings of shame were invoked among female interviewees, “I feel so ashamed to even have eye contact,” (female interviewee), as well as a sense of urgency “to protect our honor—our dignity” (female interviewee). Beyond personal health and emotional concerns, the long journey in conjunction with the designated time females must defecate has negative repercussions on household work: “Since we are away from home for such a long time, much of household work suffers” (female interviewee).

3c2. “Determinants” of Latrine Ownership

Arghyam hired the Public Affairs Foundation, a company that conducts studies in different Indian states in order to improve public service delivery, to administer a survey before and after the BCC campaign, and analyze the campaign’s impact. Similar to the analysis by Pierce (2014), Kumar (2014), and myself discussed in Chapter 3, the Public Affairs Foundation (2014a) ran Chi-Square tests on the dependent variable of toilet construction, with a similar set of independent variables. PAF’s (2014a) analysis supported many of the findings found by Pierce (2014), Kumar (2014) and myself: the

likelihood that a household has a completed toilet is higher among households that (1) have a high affordability measure, (2) are part of the Other Backward Class (OBC) social group, as compared to the Scheduled Castes and Scheduled Tribes, (3) have an available source of water, (4) have a family member living in the city, or (5) use a LPG gas stove in the house. In contrast, Self Help Group (SHG) membership and gender of the head of household were not influential (statistically insignificant) among households with constructed toilets.

The variables that increase the likelihood of toilet construction might help explain the 44% of households in Davangere without toilets in the baseline survey (in both the control and treatment villages) (PAF, 2014a). Some factors—such as status as Other Backward Class (63%), possession of electricity connection, chairs, mobile telephone and watch/clock (90%), or public tap/stand post water availability (59%)—might help explain the percentage of households with toilet facilities (PAF, 2014a). However, other factors—such as the few households with family members living in the city (12%), the fairly low percentage of households with a high affordability measure (37%), or the use of wood as a fuel for cooking (80%) in comparison to LPG—might contribute to the households without toilet facilities (PAF, 2014a). Additionally, the majority of respondents were of the Hindu religion, and as mentioned in Chapter 1, Geruso and Spears (2014) attribute differences in child mortality rates between Hindus and Muslims to difference in public defecation rates, which might be a result of the Hindu caste system and its “ritual avoidance of excreta” and subsequent “[regulation of] its cleanup to the untouchables.”

As noted in Chapter 2, an “ideal” sanitation reform would provide sanitation facilities to all households, regardless of certain socioeconomic, cultural, or religious factors. Thus, the ability to “predict” certain households that might be more or less likely to own a toilet, suggests that governmental reforms should be restructured to ensure that all “types” of households have an equal probability of obtaining a facility. However, even if a governmental policy is equally distributed to all households, if a household does not have a demand for toilet usage such efforts will be ineffective. In fact, among those who did not use a toilet, 19% (treatment villages) and 17% (control villages) did not see a use or reason for a toilet, and a smaller minority worried that the pit would fill up too quickly, would emit a bad smell, or that there would not be enough available water for usage (PAF, 2014a). Consequently, solutions to increase the likelihood a household constructs a toilet must not simply be focused on socioeconomic factors or ability financially to construct a toilet, but also on changing behavioral, cultural, and social norms.

3c3. Supply: Government Inefficiencies

The baseline results in the Davangere district feature many of the governmental complications and inefficiencies outlined in previous chapters: many officials focused on toilet construction—rather than long-term behavioral change—and many provided poor awareness of subsidy eligibility, as well as untimely dispersal of subsidies to households. Thus, successful toilet construction is not solely about demand for toilet construction and usage, but must also be about supply—the governmental bodies that provide information and financial support to households.

The baseline survey in the Davangere District substantiates many of the claims regarding the poor dispersion of information from the government to the villagers.

Although the main channel for sanitation information was house-to-house visits by GP members, the frequency of these occurrences was either once a month or less.

Additionally, focus group participants reported that many of the messages conveyed to households emphasized construction: to “build the toilet,” or “build the toilet, we will give you money,” or “avoid defecating in open and ensure cleanliness” (PAF, 2014a). Consequently, messages that focused on long-term behavioral changes to discourage open defecation were infrequent.

The role of GP officials, among other governmental officials, is also to provide households with information regarding subsidy eligibility and procedures. As noted in Chapter 2, subsidies are provided to all BPL households and a selected number of APL households under the Government of India’s NBA campaign. The process to receive the subsidy requires completion of an application, three photos marking the process of toilet construction, and ongoing supervision (Arghyam, 2013a). Individuals can obtain subsidies either through the NBA or through the MGNREGA. Under the MGNREGA, households can receive compensation, or a “wage,” for work (toilet construction). The conjunction of the lengthy and relatively unclear process to obtain subsidies, as well as the inconsistent ability of GPs to receive or unwillingness to give compensation, left many households without payment reimbursement. Among the respondents interviewed, only one-quarter was aware of the incentive received under the NBA (PAF, 2014a). Moreover, even in the presence of subsidy awareness, only 27% of respondents who had built a toilet had received the subsidy, with the majority of households either obtaining the full Rs 9200 subsidy, or only Rs 4700 (PAF, 2014a). Although the NBA subsidy amount (Rs 4700) was received among the few households that did obtain

reimbursement, the MGNREGA payment (Rs 4500) was often unaccounted for (PAF, 2014a). Given that 67% of respondents who did not have a toilet reported financial problems as barriers to construction (PAF, 2014a), untimely payments might be a huge impediment to future toilet construction.

During my site visit to Davangere, there still remained much debate over the issue of subsidy payment between the villagers and GP officials in the Donnehalli Village of Jagalur Taluk, a village in the control group of the BCC campaign. The villagers blamed the corruption of the officials for untimely compensation: the officials did not explain to them how to obtain a subsidy via the NBA, nor did the officials release payments on time. At the same time, however, GP officials accused the villagers of corruption of their own—villagers would apply for multiple subsidy applications by changing their names on the application or taking pictures of toilets from different angles. Subsidy complications were found not only among the officials who provide the subsidies, but also among the villagers who were trying to obtain compensation.

Sanitation reforms must focus on demand factors—emphasizing the physical and mental health benefits of toilet construction and usage—on supply constraints and inefficiencies—improving subsidy awareness and timely payments—and on other socioeconomic factors and social norms, many of which might seem unrelated to sanitation. The BCC campaign attempted to address these concerns and create a framework that transformed social norms, conveyed the emotional health benefits of toilet construction, and improved subsidy dispersal.

3d. The Design of the BCC Campaign

While in Bangalore, I attended a “Learning Workshop” presented by Balaji Gopalan of the Center of Gravity (1/9/2015). These workshops were designed to bring the members of the company together, and provide a platform for communication, discussion, and problem solving. The particular one I attended was entitled, “Creating Demand for Toilets in Rural India,” and provided an overview of the Center of Gravity’s work in developing the BCC Campaign.

The Center of Gravity’s campaign provides a prime example of the inability for a one-size-fits-all solution: the layout of the BCC campaign was tailored to the specific communities in the Davangere district and utilized the desire among men to be “responsible fathers”—a cultural phenomena—to encourage households to construct toilets (Gopalan, 2015). The campaign attempted to change social and cultural norms by encouraging men—the individuals who usually hold responsibility for determining big financial decisions, are more likely and able to construct the toilet, and have more interaction with the GP—to sympathize with the mental health benefits—lack of security, privacy, and safety—their wives and daughters face during public defecation. By constructing a toilet for his daughter or wife, the father would be able to fulfill his duty and hence obtain status of a “responsible father.” Moreover, once men developed a demand for the toilets, the campaign sought to eliminate the supply constraints by increasing subsidy awareness among households and promising timely payment.

The BCC campaign’s tactics effectively created an environment for women to voice, rather than dampen, their concerns, and a platform that encouraged men to regard the construction of a toilet as a necessary, and aspirational, characteristic of a responsible

father. Appeal towards a responsible father was effective, particularly given that most men in the Davangere district had low self-esteem: “they feel like losers, because they feel as if they have not done a lot with their life. A man wants to be able to provide for his daughter, and if he is unable to provide for her, he feels as if he has not carried out his job” (Gopalan, 2015). The campaign therefore leveraged a man’s low self-esteem by convincing him to construct a toilet to provide for his daughter and, as a result, he would achieve his duty as a “responsible father.” To invoke the concept of responsible father, and champion the campaign’s platform—“Build a toilet. Fulfill your responsibility”—four main tactics were used: an animated film; testimonial films skits/songs; and posters/pamphlets/slogans (Gopalan, 2015).

During the workshop, the Center of Gravity presented the animated film and testimonial film that were displayed to the treatment villages in the district. The animated film, designed within a fairytale-like setting, was narrated from the point of view of the daughter. She characterized her father as a hero: despite her father’s traumatic childhood, experiencing the death of both his father and his grandmother, he made every effort to guarantee that his brother completed his education and that his daughter reached her highest dreams. When she approaches her father about the fear she experiences defecating in the open—conveyed in animation by a daunting snake transformed into a heckling and mysterious man—her father immediately constructs a toilet. He is acknowledged as a responsible father, not only by the audience, but also by his very daughter. The narration was designed with the hope that fathers in the audience would relate to the story and aspire to become the hero, role model, and responsible father in the eyes of his very own daughter and the community alike. The respect one can obtain by

becoming a responsible father was further displayed through a testimonial film. The film was composed of a series of interviews from members of the district who had constructed toilets. One male interviewee, for example, remarked, “If a man takes all the responsibility of the household, then he will have more respect” (male interviewee, cited in the Center of Gravity’s testimonial film; Gopalan, 2015). Additionally, many male interviewees in the testimonials made the comparison between spending money on toilets to money spent on other activities and items: just as many individuals spend money on their daughter’s education—even if that means taking out a loan—or spend money on festivals, responsible fathers should also be willing to spend money on the construction of toilets.

The campaign also attempted to invoke empathy among men for the challenges women face in open defecation—lack of safety, comfort, and convenience—through two main strategies—skits and songs—to help men better understand the day-to-day struggles women face as a result of open defecation. Skits, conveyed in a light-hearted and slapstick presentation, put a husband in the shoes of his wife to display the different struggles men and women face in open defecation. Similarly, a song (*Nadedalo Hennu*), written from the perspective of a woman, was broadcasted throughout the village to display the struggles she faces in her daily activities without a household toilet.

The “responsible father” tactic, designed to encourage demand for and value of toilet construction and usage, tackled the issue of demand. As mentioned in Chapter 1, “the degree to which a target population is prone, resistant, or able to adopt a new behavior derives from the presence or absence of: self-interest (motivation), opportunity, and ability to voluntarily adopt the new behavior” (Rothschild, 1999; cited in Jenkins &

Scott, 2007). Consequently, the inability to adopt toilets in the Davangere district was in part due to supply constraints—untimely and unreliable payment of subsidies and a relatively complicated process that hindered individuals from translating demand into actual construction of toilets. Many households had little disposable income, and without the assurance of a subsidy, construction of a toilet was only possible during “good years,” which were very infrequent. In fact, the construction of a toilet, in comparison to more immediate demands—food, health expenses, or marriage, among others—might have been a purchase the family could do without for another year: “[Individuals might think] we have lived so long without a toilet, we can do it again next year” (worker; cited in Gopalan, 2015).

To address the deficiencies regarding the supply of toilets, the BCC campaign reduced the barriers hindering individuals from obtaining financial support. Specifically, the project publicized the households eligible for the subsidy on a wall painting in the village, as well as sent personal invitations to these households (including the name and address of the household, and a description of the process of toilet construction); made the process of obtaining a subsidy easier by reducing it into six steps; and mandated, with the promise of the Chief Executive Officer of Davangere and Silla Panchayat President, that the Rs 9200 incentive would be paid within 20 days of construction (Arghyam, 2013a).

The campaign was initiated on January 26th, 2014, and lasted for four months, with the campaign itself conducted in two rounds. In the first day of the first round, Swachchata Doots, GP officials, and other community leaders were instructed to distribute invitations for the BCC programs, as well as hang up posters and stickers in

well-known areas of the village (Gopalan, 2015). In the second day, the campaign's activities were initiated: morning announcements of two songs; afternoon activities of games with schoolchildren and a school-rally; and evening activities of speeches by authorities, film screens, and skits performed by artists (Gopalan, 2015). In the second round, the campaign team filmed villagers' testimonials of households who had or were in the process of constructing a toilet (Gopalan, 2015). Round 2 used similar forms of activities as those in Round 1: announcements, broadcasting of songs, a rally (with members from the Self Help Group), skit performance, and speeches by local authorities. During the evening activities, the testimonial video was screened to the audience (Gopalan, 2015). The campaign was unleashed in 50 GPs, allowing for comparison between treatment and control villages following the campaign.

3e. Endline Survey: Analyzing the Impact

To analyze the impact of the BCC campaign, only households who had not constructed a toilet in the baseline survey were investigated (338 households from the treatment villages and 221 households from the control villages). Analysis of the endline campaign provides insights into the effectiveness of the BCC campaign, in comparison to IEC information under the NBA in the control areas, as well as suggests areas of improvement for future sanitation campaigns.

Overall, the BCC campaign did increase the percentage of households who heard about or attended the BCC campaigns. Moreover, using a Chi-Square comparison of the impact of IEC messages in the treatment and control areas on household toilet construction behavior, the Public Affairs Foundation (2014b) found that households in the treatment areas, compared to those in the control areas, had strong positive

associations with intermediate-term outcomes—a household submitting subsidy application to the GP, and/or starting toilet construction—and long-term outcomes—completion of toilet construction. Table 1, obtained via the Public Affairs Foundation (2014b), shows the state of toilet construction in the treatment and control areas following the endline survey:

Toilet Construction Status	Treatment Area	%	Control Area	%
Applied	21	6%	4	2%
Partially constructed/under construction	38	11%	9	4%
Fully constructed/completed toilet	75	22%	11	5%
No Toilet	203	60%	196	89%
Resumed Construction	1	0.3%	1	0.5%
Total (n)	338		221	

Table 1: Toilet construction in treatment and control areas (endline survey). Obtained from Public Affairs Foundation (2014b).

As shown in Table 1, a higher percentage of households in the treatment area applied for or started constructing toilets, and a smaller percentage of households were without toilet facilities at the end of the intervention period (60% compared to 89%).

Such differences in toilet construction can be partially attributed to differences in exposure levels: 93% of households in the control area had heard about and 89% had attended the BCC campaign activities; whereas, only 44% of households in the control areas were exposed to IEC messages under the NBA campaign (PAF, 2014b). Typically, a GP member dispersed IEC messages in the control villages via monthly house-to-house visits, with the most frequently recalled message of “construct a toilet,” from the GP official. Such an emphasis on construction, over behavioral change, might help explain the 22% of households ($n = 75$) in the treatment area who had constructed a toilet, in contrast to the 5% of households ($n = 11$) who had constructed a toilet in the control area. In addition to increased construction of toilets in treatment villages, changed perceptions

towards sanitation and open defecation were also observed in the endline survey (PAF, 2014b). Not only did households in the treatment villages change their rating of the village from “good” (in baseline survey) to “average” and/or “bad” (in endline survey)—implying that households understand the negative physical and mental health benefits of public defecation—but households also changed their viewpoint of who is responsible for toilet construction—from government and GP officials to individual households (PAF, 2014b). The change in responsibility for toilet construction found after the BCC campaign supports the campaign’s motto of “a responsible father,” as well as shows that the BCC campaign not only encouraged household construction of toilets, but also changed behavioral, social, and cultural norms regarding public defecation.

To determine which events proved most successful at incentivizing behavioral change, PAF (2014b) investigated the effects of certain events, the time of day such events were held, and the “exposure level” of each activity on encouraging toilet adoption. Specifically, PAF (2014b) found a positive association among households who reported attending the afternoon events and approaching the GP to apply for the subsidy, as well as a positive relationship with starting toilet construction. In addition, PAF (2014b) looked at individual activities that took place in the morning, afternoon, and evening, and found that the activities most viewed/heard/participated in during morning, afternoon, and evening events had a significant impact on toilet construction. These included announcement through vehicle, personal invitations, and *Banni Banni* song (which provided information about the NBA program, as well as a promise of subsidy amount from GP within 20 days of toilet construction) in the morning; the school rally in the afternoon; and the skit and responsible father film in the evening. Results from this

analysis shed light on which activities incentivize the greatest number of households to construct toilets—activities that are personalized to individuals and involve community participation—and the time of day such activities should be held—primarily in the afternoon.

Despite the BCC’s success in changing the perception of open defecation among individuals and encouraging steps towards toilet construction or completion of toilet construction, the campaign was not perfect: there still remain areas for improvement and further ways to adapt the funds received for IEC under the NBA to ensure effective utilization.

The BCC campaign’s attempt to increase security of timely payments with the Chief Executive Officer of Davangere and Silla Panchayat President promising that the Rs 9200 incentive would be paid within 20 days of construction, as well as increase knowledge of subsidy eligibility through personal invitations and a wall painting displaying eligible households, seemed to prove ineffective. The endline survey (PAF, 2014b) revealed that oftentimes these promises were not carried out: only 7% of respondents received the subsidy within 20 days as promised; 32% had yet to receive the subsidy (at the time of the endline survey); and 61% received the subsidy 20 days after the toilet was completed. In fact, among the households that reported the amount of subsidy they received ($n = 35$), 40% said they had received Rs 4700, and 14% reported Rs 4500. In comparison to the treatment areas, none of the five respondents who built toilets under NBA in the control villages received subsidies. Similar to the patterns observed in the baseline survey, the distribution of subsidy amount highlights the complications of coordination between NBA and MGNREGA subsidy dispersal.

Households received Rs 4500 (17%) or less (11%), or Rs 4700 (39%) or more (32%).

This corresponds to the amounts received under each program—Rs 4500 under MGNREGA, and Rs 4700 under NBA. Conversations with GP officials also substantiated complications in higher levels of government: “GP officials confirmed disbursing NBA subsidy amount immediately after the BCC campaign, however, procedural issues and objections raised by higher authorities on possibility of households not completing the toilets resulted in many GPs releasing total subsidy amount only after the households completed the toilet construction” (PAF, 2014b) Nevertheless, India’s new sanitation campaign, the SBA, does eliminate MNREGA inclusion in toilet construction subsidy, which might help to decrease untimely payments.

In the baseline survey, PAF (2014s) used a Chi-Square test to determine which household characteristics were more likely to have a toilet facility. Following the BCC campaign, PAF (2014b) performed a similar Chi-Square test of association, designed to determine which household characteristics were more likely to respond favorably to the components of the BCC campaign and encourage household toilet construction. This Chi-Square test reported very similar results as the one in the baseline survey: the households that are most likely to be motivated by the BCC campaign and construct a toilet are households who used LPG as the main cooking fuel, whose social affiliation is Other Backward Class, and who have a family member living in the city. Consequently, it appears that households, who had characteristics that made them more likely to own a toilet in the baseline survey, were more influenced by the BCC campaign. The campaign, therefore, might have addressed the issues or concerns affecting a certain segment of the population. The “responsible father” tactic, for instance, might have been influential only

for households classified as Other Backward Classes. The campaign treated each household as identical within the village, and thus ignored differences between households—such as low class or caste status—which not only have ripple effects on employment and income, but might also create further obstacles that prevent households from constructing a toilet despite being motivated by the BCC campaign to construct one.

Issues of caste status were apparent upon site visits of the villages in Davangere. Within each village, divisions existed based upon social caste, with different geographic zones home to different social castes. Conversations reported by PAF (2014b) in Focus Group Discussion (FGDs) revealed the role of segregation within the village, and the subsequent impacts on toilet construction: “Those who are labourers, economically weaker sections in the village and those who do not have land will not build a toilet,” and, as a result, these “economically weaker section[s]” practice open defecation (PAF, 2014b). In comparison, those that are in better conditions financially, have one to two acres of land, and/or are educated are more able, and likely, to construct a toilet. In fact, economic constraints on lower social castes, or geographic differences in location of castes, which impact water availability or ability to dig a pit for toilet construction (such as a rocky landscape), were not the only reported complications facing households of lower castes. A focus group discussion comprised of women noted that GP officials discriminate against lower caste groups, and see the distribution of basic services to these households, such as water and sanitation, as their lowest priority (PAF, 2014b). The BCC campaign did not address differences in socioeconomic classes within villages, but rather treated the households in each village as identical. Such inter-caste differences might be an area for future sanitation campaigns to address. Yet addressing these issues requires

tackling larger social and cultural norms. Moreover, with the campaign's focus on convincing fathers to act responsibly and construct toilets for their wives and daughters, the campaign might have neglected to encourage toilet usage among men. As noted in Chapter 1, there is, theoretically, some threshold level at which the percentage of community members using toilets has a substantial effect on health. If only half the population is using toilets (women) while the remaining (men) is choosing open defecation, health benefits for the entire community might not be realized.

Despite the campaign's problems, its results are promising and provide insights into what sorts of activities are most influential in encouraging toilet construction. Moreover, the campaign demonstrates that if IEC funds under governmental programs are used effectively, perceptions of public defecation can change and households can be encouraged to construct (and hopefully use) toilet facilities.

Part 4: Conclusion

Arghyam's BCC Campaign showcased the ability to improve toilet construction through Information, Education and Communication initiatives, all within the budget provided for IEC efforts. Yet, such efforts required not only changes to demand—by encouraging the physical and emotional health benefits of toilet construction and usage—but also modifications to supply—by promising timely subsidy payments. Moreover, to adequately design a campaign required thorough analysis of the households, and a deep understanding of the social norms and values. This particular campaign and its “responsible father” platform offered an innovative solution to encourage toilet adoption. Nevertheless, such a program might not be effective in all households in a village, in a neighboring district, or in a different state. And although this campaign reported to

instigate intermediate- and long-term changes for toilet adoption, continual monitoring must occur to ensure long-term sustainability of behavioral change and assurance of usable toilets. Chapter 5 will investigate India's most recent campaign, the SBA, which, through its incorporation of social media and real-time data collection, might not only improve the accuracy of data on the number of households with sanitation amenities, but might also guarantee long-term sustainability and maintenance of toilets.

Rest Stop 5:

If you told me I was going to go to India at the start of the semester, I would have laughed. Me? India? Come on. I hardly knew where that was on the map (I blame my poor geographic skills on my mom; those skills are definitely genetic).

However, things changed after my dad had dinner with one of his past co-workers, Vineet, while he was in India for business. One of the topics discussed at that dinner was the issue of sanitation. My dad kindly introduced me to Vineet via email, explaining to him that I was writing my senior thesis on sanitation, and that he might be a good resource for me. I remember reading Vineet's response to my dad's introduction email, where he wrote, "In fact we would be very happy to host you at our house and make some resources available that can be of some help in your investigations." An invitation to India—a country that was halfway around the world—had fallen into my hands.

Although Vineet provided me with many resources—including the introduction to Arghyam, the organization I was fortunate enough to intern with for a few weeks—there was one thing he said that really got me thinking.

Vineet, who has experience within India's education system, finds one thing puzzling, and rather problematic: there is a heavy focus on the curriculum on countries outside of India and little attention paid to problems within the country itself. After graduating, many students leave India to help solve crises in other countries, leaving behind the significant and complicated issues of their own home country. Vineet remarks that educational institutions teach students about the problems outside of India; however, if students are only educated on these issues, how do we expect them to produce an interest in crises within their own country's borders? Just as a greater awareness for the value of toilets—its emotional and physical health benefits—increases demand for toilet construction and usage, perhaps greater attention in educational institutions or other public media sources on the crises within India—from water and sanitation to political corruption—will encourage the minds of Indian graduates to solve the problems plaguing their own homes.

In fact, such efforts seem to be on the rise. The Gates Foundation's "Reinventing the Toilet Initiative" (RTT) is an example of an organization that has brought sanitation reforms to the center stage of educational systems. The RTT is designed to motivate universities in four continents to design a toilet that will function without piped water, a sewage connection, or electricity, and cost less than five cents per day. Additional efforts like the RTT might inspire Indian graduates—or graduates from other countries—to solve the problems plaguing their own societies.

Chapter 5: Concluding Remarks and the Future of India

Part 1: Introduction

Chapter 2 examined the way in which India views, understands, and addresses sanitation through a political ecology framework—the social and political conditions regarding “the causes, experiences, and management of natural problems” (Forsyth, 2003). Great Britain’s colonization of India laid the foundation for the environmental movement as a fight between productivity and survival—as a battle between what the natural environment could produce (timber) and what the natural environment protects (the livelihoods and homes of the individuals within it). The caste system, which governed social, cultural, and political interactions, further alienated the lower class individuals from the public eye and from political voice. Sanitation—an issue concerning environmental and public health, and a problem primarily affecting the lower class, who had designated roles as latrine cleaners—was historically, politically, and socially given a backseat to more “pressing” issues of the middle- and upper-class. This has resulted in poor attention given to alleviate sanitation deficiencies, and when reforms have been put in place, they are often marked by an inadequate focus on long-term solutions and a faulty monitoring system to ensure toilet usage and maintenance.

Nevertheless, India’s new campaign, the Swachh Bharat Abhiyan (SBA), launched by the Prime Minister in late 2014, attempts to bring cleanliness into the focal light and assign everyone—regardless of class status—the responsibility to clean his or her surroundings. The SBA, unlike the TSC and NBA, is not restricted to either rural or urban areas, but rather expands its focus to the entirety of the country. The campaign not only focuses on toilet construction and generating demand through Information,

Education, and Communication (IEC) programs, but also attempts to improve data monitoring and toilet maintenance, as well as makes an effort to reverse historically tied associations of the lower social class and its occupation as latrine sweepers.

Part 2: SBA and the Role of Social Media

Many variables—both internal and external, and in the past and the present—can influence a country’s actions. Nastar (2014) employs a multi-level perspective to examine the actors participating in urban water regimes and how various factors influence current and future water policies. Using both a political economy and political ecology perspective, Nastar (2014) finds “particular solutions, policy instruments, and packages” to be “[promoted] by “the complex and long-term changes in technology, culture, policies, politics, power, and economics” and the “wide range of vested interests.” The factors involved in this multi-level perspective are categorized in three levels: landscape (“external contexts”), regime (“urban water governance”), and niche (“experiments and projects formed by a small group of agents”). The landscape level, is comprised of “demographical trends, political ideologies, societal values, and macro-economic patterns,” such as climate change, population growth, and the Millennium Development Goals, among others. This “level” is perhaps where global circumstances have influenced and will continue to influence India’s national sanitation reforms.

India’s poor sanitation coverage has been highlighted continually in news articles: “Sanitation scores in India have room for improvement” (Segelken, 2015); “Poor Sanitation in India May Afflict Well-Fed Children Malnutrition” (Harris, 2014); “Why India’s sanitation crisis needs more than toilets” (Biswas, 2014). Many of these articles cite the impending Millennium Development Goals—intended to half the number of

individuals without access to water and sanitation—or the World Health Organization Report’s statistic of 597 million individuals who defecate in the open. Moreover, reports on sanitation often incorporate other social issues—from malnutrition and diarrhea to water unavailability and instances of rape.

The “external context” or “landscape level” India faces might provide yet another incentive for India to improve sanitation, besides poor health or unequal distribution of sanitation coverage among the population. India’s SBA campaign utilizes a high degree of social media—perhaps an attempt to increase transparency and publicize globally the country’s efforts to improve its tainted image of poor sanitation levels. Chapter 2 discussed a few of these efforts: the “Swachh Bharat” challenge designed to encourage individuals of all classes to take a pledge to clean India, or the Mobile based application of the Swachh Bharat Mission (mSBA) where registered users can upload information and post photographs of sanitation facilities. The latter efforts were analyzed in Chapter 3 to determine their effectiveness in encouraging toilet construction. Although these social media components were not statistically significant in the regression model, these efforts are relatively recent and might become more influential in subsequent years.

In addition to governmental efforts, many Indians have also taken initiatives of their own to discourage open defecation through creative platforms. Similar to the government’s sarcastic commercials, the Indian Cartoon Gallery in Bangalore had an exhibit featuring toilet and sanitation cartoons in May and June 2014. This exhibit, organized by the Sustainable Sanitation Alliance in conjunction with the Indian Institute of Cartoonists, among other organizations, displayed cartoons from a contest of over 90 entries: “Normally, exhibitions have themes around daily news and satire. But this

exhibition was unique as it was around a public problem that is not usually spoken about” (G.S. Naganath; cited in *The Hindu*, 2014). Figures 1 and 2 show the cartoons of the first and second winners at the exhibition:¹⁹

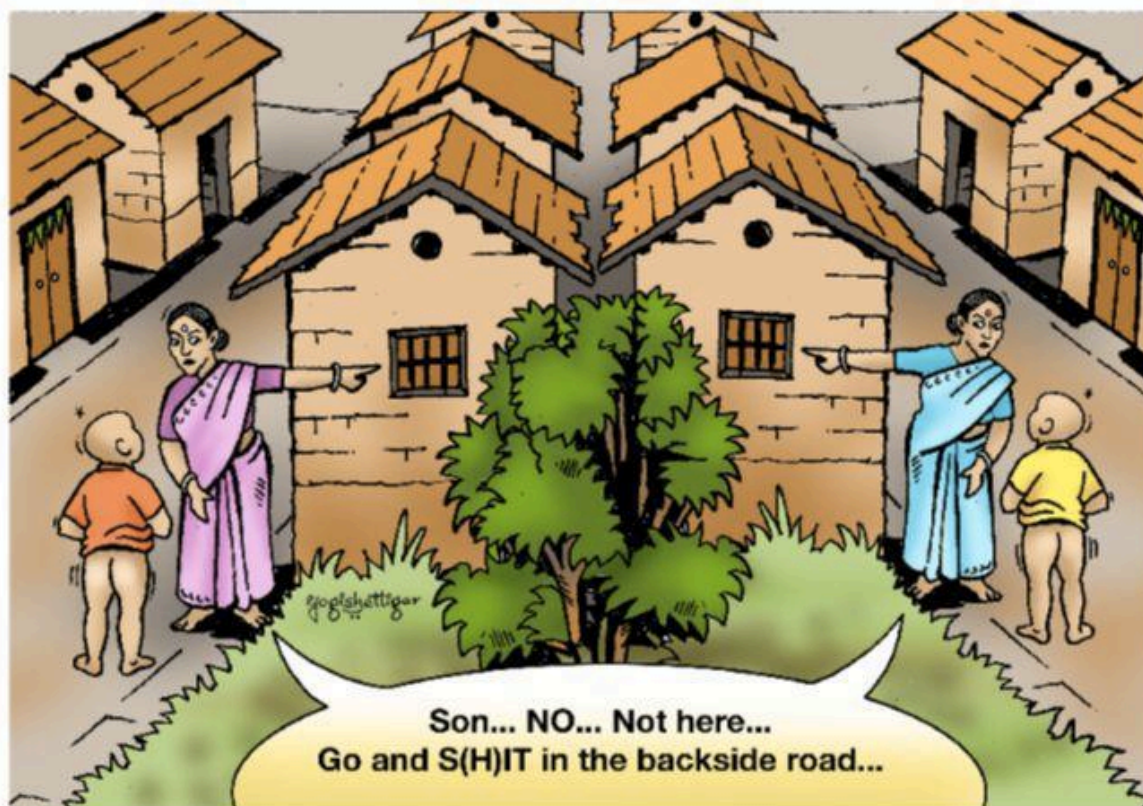


Figure 1: 1st prize winner at cartoon exhibition; Title: *Street Toilet*; Artist: *Yogish Shettigar*

¹⁹Figures retrieved from: “‘Breaking the Taboo about Toilet and Sanitation’ An Exhibition of Cartoons.” *Whatshapp Bangalore*, May 21, 2014. <https://whatshappbangalore.wordpress.com/2014/05/21/breaking-the-taboo-about-toilet-and-sanitation-an-exhibition-of-cartoons/>.

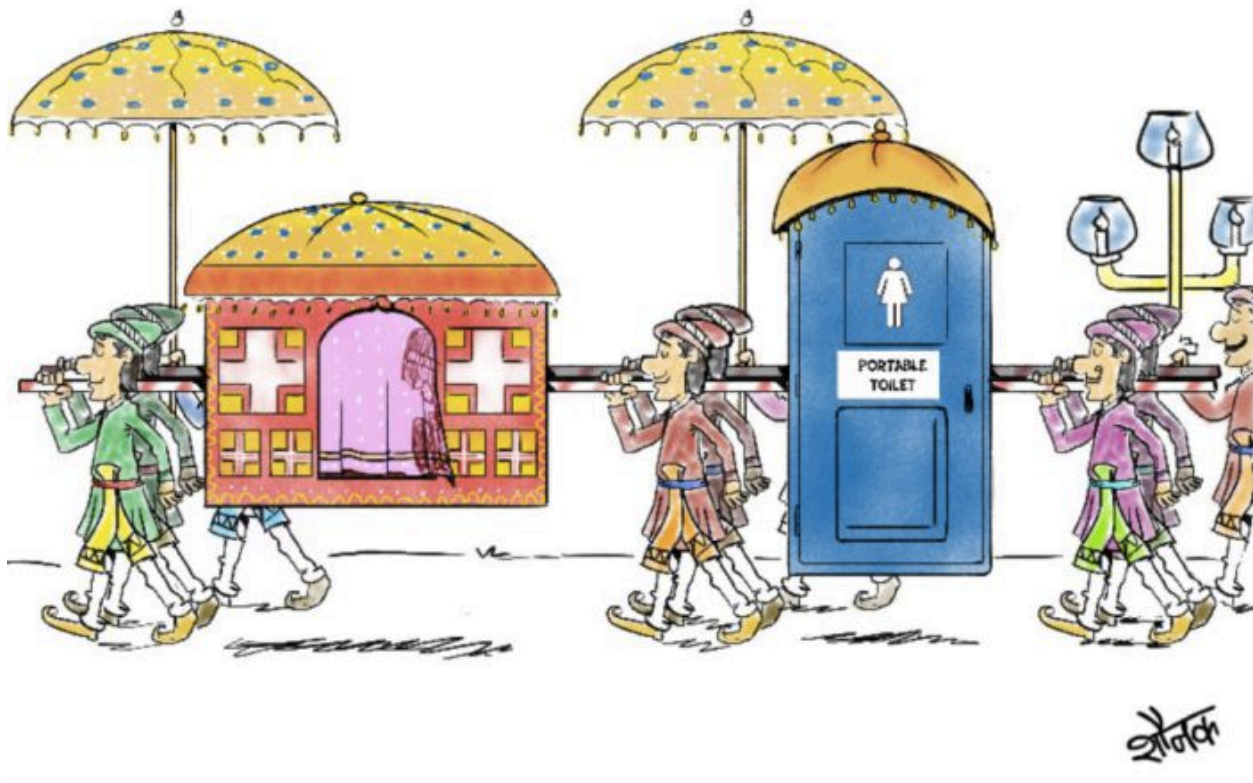


Figure 2: 2nd prize winner at cartoon exhibition; Title: Doli; Artist: Shaunak Samvatsar

Figure 1 pokes fun at the absurdity of open defecation as opposed to using a toilet when one is available. While, Figure 2 harkens back to the “No Toilet, No Bride” campaign, for the artist suggests that a “portable toilet” should be an item a bride receives (or demands) after the marriage ceremony, and thus should be part of the “Doli” (drawn in Figure 2), the ceremony in which a bride, along with her various items, leave her home following marriage.

Efforts have also been taken on a smaller, more local level. Shweta Bhattad, a Nagpur-based artist, is using art to raise money for sustainable public toilets in her village. Bhattad seeks to represent the experiences and feelings of her village’s social structure in her artwork, and includes a special section on open defecation, which

incorporates her own experiences as well as those of other women (Bhandari, 2015). Her artwork pictures the mythological “goddess” defecating in the open (see Figure 3):

“Indian mythology projects women as goddesses and since India is a land of religion, what better way to send across a message than showing how our ‘goddesses’ are forced to defecate in the open” (Bhattad; cited in Bhandari, 2015).



Figure 3: Photo by Shweta Bhattad. This image shows an Indian woman, pictured as a goddess, defecating in the open (Bhandari, 2015).

In addition to efforts in rural areas, in urban areas, children, with assistance from civic campaigners, are creating “their dream aspirational map,” which incorporate public sanitation infrastructures, play spaces, and trash bins and recycling areas, among others. Even if action is not taken to make these dream maps into realities, “it’s indicative of a young Indian generation coming to the fore with a keen awareness of disparity—who are eager to correct it” (Sturgis, 2015).

Part 3: Criticism of the SBA

Despite Prime Minister Modi's attempt to increase transparency of the SBA, as well as transform social and cultural norms by encouraging all citizens to make India clean, he has not been met without much criticism. Criticism towards the Prime Minister's campaign has taken two directions: one attacks the inability of such a plan to achieve total sanitation by 2019, and the other argument accuses the Prime Minister's campaign as a mere "photo opportunity" to enhance his status.

Many criticize the campaign for only skimming the surface of the problem, and not addressing its underlying symptoms: "While the campaign features pertinent issues of littering and urination in public places, I believe we as a society need more than just naming and shaming to achieve a clean India" (Sujata Anandan; cited in Tewari, 2014). By simply encouraging citizens to clean their homes—"most in India keep spotless homes, [yet] public spaces are filled with overflowing dumpsters, plastic debris and stains from public urination" (Mehrotra, 2014)—it might be difficult for the SBA to make large improvements, as it remains "absolutely silent on lesser consumption and less waste generation" (Naryanan, 2014). For instance, urban India creates approximately 47 million tons of solid waste every year with nearly one-third of the waste uncollected, yet the campaign makes no motion towards improving consumption (Central Pollution Control Board; cited in Varma, 2014). Sewage and wastewater disposal also pose issues: the Central Pollution Control Board estimates that among tier 1 cities, 38 billion liters of sewage were generated per day in 2009, with 26 billion liters dumped in the water sources (Varma, 2014). Without addressing these underlying issues, which require behavioral changes among Indians to lower consumption and a re-focus on long-term

maintenance of infrastructure, a “Clean India” seems highly implausible: “While the Modi government is planning to build millions of toilets, there doesn’t seem to be any concrete plan or allocation for laying down sewerage networks or treatment plants” (Varma, 2014). Beyond infrastructure, Naryanan (2014) argues that India must rethink and reorganize its existing management strategies. Although the SBA encourages sweeping and cleaning the streets, India does not currently segregate waste; rather, “organic and inorganic wastes including sanitary towels and poisonous hospital/factory rejects are transported to the nearby countryside, dumped and burnt” (Naryanan, 2014). Not only is waste improperly disposed—thus preventing potential recycling—but these toxic fumes are also released primarily in low-income areas, and thus pose a social justice issue (Naryanan, 2014). Thus, even efforts to construct toilets or eliminate public defecation will inadequately improve environmental and public health if waste is not properly disposed, recycled, and reused.

In fact, many argue that the Clean India campaign is far from its homage to Gandhi’s “sanitation for all.” A blog post from *Diligent Media Corporation India* (2014b), remarks, “While the many photo-ops by ministers and bureaucrats have sent out a message extolling the virtues of keeping public roads clean and sweeping them, those doing this work on a daily basis have been quietly forgotten” (Diligent Media Corporation, 2014b). The SBA, therefore, must address the working conditions of those at the lowest class of society—the ones who have occupations as manual scavengers—as well as the historical “culture of social hierarchy” that subjugates individuals permanently to certain social classes and stigmas (Mehrotra, 2014). Consequently, this deep-seeded stereotype prevents a sense of ownership among those historically not

responsible for cleaning the country: “It reinforces the notion that someone else will do it for you” (Nikita Sud; cited in Mehrotra, 2014), or that ““Dirty jobs are to be done by dirty people”” (Krishna; cited in Mehrotra, 2014). The efforts of Modi, such as his “Swachh Bharat” challenge, might be unable to break down these historical social class hierarchies and stigmas.

In addition to criticism over the feasibility of the SBA, others have accused Prime Minister Modi of using the SBA as a platform to increase his status. Congressmen Shri Rahul Gandhi, for example, attributed the campaign as a “photo opportunity” and “marketing gimmick” for the government (First Post, 2014). Yet, for Congress Gandhi, his resentment against Modi’s campaign might simply be a byproduct of Congress’ “mindset of still being unable to come to terms with their defeat in the last Lok Sabha elections” (Union Minister M Venkaiah Naidu; cited in First Post, 2014). In fact, congressmen in opposition to the current governmental party (Bharatiya Janata Party) equate support of Prime Minister’s campaign to defiance against Congress and acceptance of Modi’s doctrine. Accusations have also been made in newspapers: Daiji World (2014), for instance, writes, “Prime Minister Narendra Modi’s much-hyped ‘Swachh Bharat Abhiyan’ has been reduced to a sham by his own party leaders in the national capital.” The article comments on photographs that reveal the Bharatiya Janata Party (BJP) purposefully dumping garbage on a sidewalk in Delhi, so that it can be subsequently cleaned. Although this form of criticism is not as widely cited as that against the feasibility of the campaign, it does highlight the difficulty facing the SBA to encourage all Indians to take part in ensuring “cleanliness for all” by the 2019 deadline.

Part 4: Final Remarks

As I was researching sanitation in India, many of the news and journal articles I came across presented me with an awfully dismal picture—from 626 million people who practice open defecation, which accounts for 59% of the global population who practice open defecation, to the incidents of rape and insecurity faced by women as a consequence of open defecation. Yet, one article brought a glimmer of hope to this gloomy picture:

Think about the following. India has the second biggest population in the world and will move to first position overtaking China very soon. Thus, India will also produce the maximum amount of human waste in the world daily, which means that this will be a factor of India's comparative advantage vis-à-vis the rest of the world! ...It is in the interests of India to exploit this output, namely human waste, which is most freely available in India and not frittered away into centralized sewer systems as in Western countries" (Ramani, 2008).

If India is able to reevaluate its delivery of sanitation amenities and its system for waste removal, the country will not only set an example for the rest of the world, but will also be able to use the knowledge, technologies, and systems constructed and implemented to “exploit this output” financially, and also create a new and positive public image of India. However, this is no simple task: this will require a change in how sanitation is historically and culturally understood—both within the environmental movement and its associations within the caste system—and the reorganization of the governmental delivery of sanitation amenities.

Yet, we are seeing various organizations instituting cultural and structural changes, and allowing for effective, efficient, and equal delivery of sanitation. The “No Toilet, No Bride” campaign, as well as the Behavioral Communication Change (BCC) campaign in India both provide excellent examples of a sanitation reform which

effectively incorporated sustainable, long-term behavioral changes to permanently increase the value of and demand for toilets.

UNICEF, through its Poo2Loo campaign in India, marks another example. It has unleashed strategies that target a specific population group, children, who have the “potential to be very effective change agents” (Rahman, 2013). In order to increase the perceived value of toilets, UNICEF has incorporated engaging social media content, as well as provided children with the responsibility for hygienic practices and a sense of leadership and onus. Mr. Poo, a character invented to encourage children to use the toilet and prompt mothers not to dispose of dirty diapers in the open in India, is the centerpiece of the Poo2Loo Initiative. Mr. Poo stars in an educational video, accompanied by a song: “first thing in the morning, what do I see? I pile of shit staring at me” (Yallop, 2014), and his message is conveyed through various social media platforms—YouTube, Twitter (#poo2loo), Facebook, and its very own website. In fact, Poo2Loo released a smartphone app that allows users to report sightings of human feces, which are subsequently plotted, on maps of Indian cities (Yallop, 2014).

We are also seeing markets for toilets emerge. Funded by the Stone Family Foundation and the Bill & Melinda Gates Foundation, iDE created the Sanitation Marketing Scale Up (SMSU) project in Cambodia that utilized such a market-based approach. “Essential to a functioning market is a functioning supply chain that makes desired products or services available when the customer wants to purchase them” (McKinlay, 2014). Because in many developing countries, the supply chain for toilets is easily broken, iDE places humans at the center of the design process to better understand the community, reasons for deficiencies in the supply chain, and ultimately possible

business solutions. Another organization, Sanergy, has developed a similar business plan, by selling its Fresh Life Toilets (FLTs) to local micro-entrepreneurs in Nairobi. These local franchisees can then charge community members for usage of the FLTs, and can make up to \$40 per week. In addition to the FLTs, the local residents receive training, access to financing, ongoing operation and marketing support, and daily waste collection service. Individuals are incentivized to participate in the market for not only does it provide them with a source of income, but also a new lifestyle via improved sanitation for themselves and for other community members. Since its inception in 2013, Sanergy has opened 415 Fresh Life Toilets, provided 500 jobs, and has given nearly 200,000 people access to affordable, clean sanitation (Saleh, 2014).

The direction of future sanitation campaigns must be tailored to the specific community at hand and incorporate unique mechanisms that change behaviors. As UNICEF (2014b) proclaims, using the toilet must be seen in a positive light: we must “take the poo to the loo” and have a “poo party.” Using a toilet must have external benefits, values, and rewards—the reward of being a leader in maintaining sanitation facilities of a local school; or having a financial stake in the provision of usage of toilets through micro-financing. Future sanitation reforms must utilize other unique mechanisms that strike a chord for the particular idiosyncrasies of the target community. Toilet usage could be linked to cell phone usage: in order to receive a certain amount of cell phone minutes or data, an individual would have to construct and use a toilet, or would receive additional data every time the household empties the latrine’s pit. Or, because human excreta is organic matter, which produces greenhouse gases, once decomposed, proper and safe disposal of human excreta could be linked to carbon credits: every “ton” of

human excreta disposed through a toilet or latrine, which alters the decomposition in such a way as to reduce greenhouse gas production, could be equated to a certain number of “credits” (Kumar, 2010). Moreover, in order to encourage demand for toilet usage among the male population—the ones who typically lack demand, but have the financial and social capabilities to construct toilets—educational information could be oriented to show the link between public defecation and contamination of water sources, and its effect on agricultural production and income. Finally, UNICEF’s Poo2Loo campaign, in addition to invoking emotions of disgust and embarrassment with respect to the vast quantities of feces on the streets, could advertise associations of toilet usage to Western or modernized lifestyles. Private institutions can aid public institutions in their efforts to combat the sanitation crisis. Specifically, public institutions can provide the financial means for other organizations to provide on-the-site support or improved data collection and monitoring.

Karti Subramanian (Amherst ’07) in his TED-x talk last year (2013) advised listeners to ask big questions, for “asking better questions is the real innovation.” In order to solve the sanitation crisis we must do just that. We cannot focus solely on restructuring the supply or demand side using traditional, standardized, technology-oriented methods. But rather, we must challenge ourselves, and ask what innovative mechanisms and techniques we can use to incentivize toilet construction and usage. We must think outside the box, be creative and flexible, and ultimately be revolutionary.

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References: Data Sources

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Chapter 5: Concluding Remarks and the Future of India

Figures 1 and 2:

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