MODERNITY'S GARBAGE: STRUGGLES OVER MUNICIPAL SOLID WASTE IN
URBAN INDIA

by
Aman Luthra

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ABSTRACT

The challenges associated with waste are worsening with increasing urbanization and economic growth in contemporary India. A range of actors--public and private, formal and informal--currently manage urban waste. Challenged with managing growing quantities of waste, municipalities across the country have recently been outsourcing waste management services to private firms, and in the process privatizing what used to function as the urban commons of waste for the informal sector. This new form of privatization has created a struggle over access to waste. Using a combination of qualitative and quantitative methods based on fifteen months of fieldwork in Delhi, this dissertation examines waste as a contested object of urban planning in contemporary India, through four inter-related arguments. First, privatization of waste management services reveals a contradiction between neoliberal theory and practice. While free markets are privileged in neoliberal theory, the reforms disrupt existing well-functioning markets by displacing (or threatening to displace) countless independent informal entrepreneurs and set the stage for national oligopolies where a few firms dominate the landscape. Second, in response to such displacement or threats thereof, informal sector workers are organizing into formal entities that can enter into contracts to provide certain waste management services, through a process called formalization. This process requires disciplining informal workers and an expenditure of free labor on their part. Under a persistent threat of displacement and dispossession, formalization is both strategic and necessary for the informal sector. Third, even though the composition of Indian waste has been deemed unsuitable for incineration, such technologies are increasingly being promoted. The emergence of such a technological fix can be explained in practical terms but also ideologically in the promise of modernity that such technologies embody. If

implemented, it will necessitate that informal workers no longer extract recyclable materials and a livelihood, from the waste stream. Fourth, behavior change has recently emerged as the focus of how to make cities in India cleaner. However, a discourse of behavior change privileges aesthetic over infrastructural concerns. It also makes visible the voluntary labor of the privileged while erasing from memory the economically necessary labors of the marginalized.

Advisor: Dr. Erica Schoenberger

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Chapter 1. Garbage/Modernity: An Introduction

The ubiquity of waste demands that we examine its relationship with our contemporary

societal condition. In the first half of the title of this dissertation "Modernity's garbage", I

invoke a phrase—"the garb of modernity"—from Jawaharlal Nehru, the first Prime Minister

of independent India's oft-cited quote,

> *India was in my blood and there was much in her that instinctively thrilled me. And yet, I*
> *approached her almost as an alien critic, full of dislike for the present as well as for*
> *many of the relics of the past that I saw. To some extent I came to her via the West, and*
> *looked at her as a friendly Westerner might have done. I was eager and anxious to*
> *change her outlook and appearance and give her the garb of modernity. And yet doubts*
> *arose within me. Did I know India?—I who presumed to scrap much of her past heritage?*
> *There was a great deal that had to be scrapped, that must be scrapped; but surely India*
> *could not have continued a cultured existence for thousands of years, if she had not*
> *possessed something very vital and enduring, something that was worthwhile* (Nehru,
> 2010, p. 41).

This quote comes from Nehru's book titled *The Discovery of India,* written during his time in

prison just before India became independent. Described as a nationalist historiography, the

book documented and celebrated India's cultural and historical diversity, in the hopes that a

secular India "could join the world-historical march towards modernity"(Prakash, 1990, p.

389). But even as "her past heritage" needed to be preserved and celebrated, there was much

to be "scrapped" if India were to be a participant in the modern world stage. Modernity and

modernization, along the lines of the industrialization of modern European societies, was to

Nehru, what newly independent India needed as its "national philosophy"(Parekh, 1991, p.

35). To critics, the book's narrative, in its omissions and attentions, signaled the coming of

age of the bourgeoisie in India (Kosambi, 1946).

The early 1990s mark a pivotal moment in India's developmental history. Economic

liberalization broke with the past socialist state-led centrally planned development praxis

initiated by Nehru. For some, economic liberalization shows more continuities than ruptures with the past (see for instance McCartney, 2009). The idea of modernity and modernization are also continuous with the past except that what it means to be modern and to modernize is different now than it was during Nehru's time. The ideology of modernity sustains even though the praxis of achieving those aims might be different. In this dissertation, I examine the place of waste in India's contemporary modernization project.[1]

The problem of waste, however, has assumed new proportions. Struggles against and over waste appear to be different in the period following economic liberalization. As matter out of place, waste has always posed a threat to modernity and its aspirations (Chakrabarty, 2010; Douglas, 1965; Moore 2009). A crusade against waste marked and haunted Nehru's modernist vision of nation building (Gidwani and Reddy, 2011). Despite his own personal struggles with modernity/tradition, waste was something that needed to be scrapped. Yet, in contemporary times the scale of the problem of waste is dramatically different than that of the past, requiring ever more modern ways of dealing with it. Economic liberalization has brought dramatic increases in production and consumption of commodities, which at the end of their useful lives need discarding. Waste's strikingly ubiquitous presence in the landscapes of cities like Delhi is visible testimony to the excess of contemporary modernity in India. Within those landscapes, however, excess is accompanied by visible deprivation. Hordes of poor people in shantytowns live alongside high-rise buildings and malls. One such section of the urban poor survives on modernity's excess. In almost every slum in Delhi (and other cities across India and the rest of the developing world), there exist people—referred to as

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[1] In this dissertation, I use the terms waste and garbage interchangeably even though strictly speaking, they are analytically different terms. Waste is a more general technical term used for all types of materials while garbage is a more colloquial term often used specifically for municipal solid waste (MSW). For the purpose of this dissertation, this distinction is largely irrelevant.

scavengers, rag pickers, and waste pickers, among other terms—who make a meager living by collecting, sorting, transporting, and recycling the discards of our collective urban life. These workers and their ways of life are simultaneously modern and pre-modern. They are modern because contemporary systems of production and consumption make their lives and livelihoods possible and necessary for the maintenance of those systems. They are pre-modern because neither they themselves nor their ways of working fit into the visions and aspirations of what modern cities should look and be like. The post-liberalization period, characterized also by neoliberal reforms within the government has seen a spate of efforts to privatize what was already private at least in the case of waste management services. Domestic and foreign firms offering waste management services varying in scale, scope and complexity now dot the Indian urban landscape. New ways of managing garbage uncomfortably sit alongside ways of the old. As a result, the contemporary landscape of waste and its managers is patchy, characterized by hybrid forms that simultaneously maintain and dissolve boundaries between dualisms—public/private, property/commons, formal/informal, modern/pre-modern and the like. In the worst case, older systems and their actors are simply displaced and dispossessed by newer ones. In what appears to be the best case on offer, they are disciplined to conform to norms of modernity imposed upon them. Modernity necessitates not only the ordering of unruly matter (garbage) but also unruly people (waste pickers). The boundaries between dualisms are at once imposed and dissolved to serve particular politico-economic ends. This dissertation is an examination of the struggles that ensue as the "garb of modernity" is imposed on cities and their garbage in contemporary India.

In this introductory chapter, I start with providing a brief history and landscape of waste and its management in contemporary India. I then provide a description of the methods used to gather and analyze the data that informs my arguments. In the final section, I provide an overview of the structure of the dissertation and the key arguments I will make.

Landscapes of waste in contemporary urban India

Waste management in Indian cities involves a combination of public and private service providers, but what counts as public and what counts as private have to be carefully parsed. The "private" includes the formal sector, typically firms to which municipalities outsource certain waste management functions. It also includes the informal sector, a complex network of private actors who make a living by collecting and trading in recyclables from waste. This latter sector may have a formal arrangement (such as a contract) with the state or a community of waste generators (such as a Resident Welfare Association or RWAs) or individual waste generators (such as hospitals, malls, schools or hotels) to provide specific services. An organization of informal sector actors might have different organizational forms such as a cooperative, a union or an association. For lack of a better term, actors in this sector are sometimes referred to as the formalized informal sector. Most large cities have such organizations but not all of them do. Even where such organizations exist, not all of them have formal arrangements with the state. Further, where such organizations exist, not all informal private actors are their members.

In India, the responsibility of waste management service provision by law rests with the municipality. But municipalities may provide only some of those services. Firms who the state has contracted with may provide other services. Formalized or independent informal sector actors may provide yet other services. The figure below is a conceptual representation

of the various actors in this sector. It uses two axes—the vertical axis uses represents the

binary in the nature of the sector itself—formal versus informal.[2] The horizontal axis

represents the type of arrangement between actors. A formal arrangement could be a legally

binding contract between two or more entities that delineates the roles and responsibilities of

each in that arrangement. An informal arrangement by contrast is not legally binding but

might be enforced through informal mechanisms that bind actors through traditional

networks and relationships. Figure 1 places each of the four types of actors—municipality,

private firms, formalized informal sector, and independent informal sector workers—along

quadrants that specify the nature of the sector and the type of arrangement.

Figure 1. A schema for understanding formal and informal sectors and arrangements
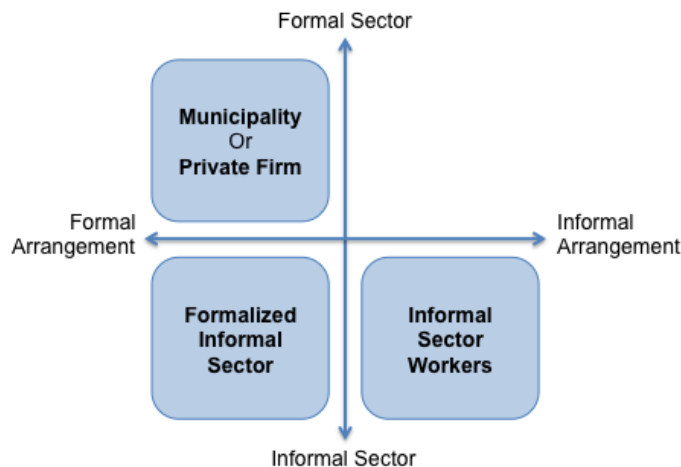
Municipalities are formal organizations that are legally bound to provide certain waste

management services. The private formal sector—waste management firms—is contractually

obligated to municipalities to provide the services that they have been contracted for. The

formalized informal sector—for instance organizations such as Chintan or SWaCH—

organizes previously independent informal sector actors and enters into contracts with

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[2] For the purposes of this figure, I am using a broad definition of the informal sector as those enterprises or employment that is not legally regulated, or is unregistered or unincorporated (Chen, 2012).

municipalities to provide certain services.[3] Even though organizations such as Chintan or

SWaCH are formal and so are their contracts, the boundary between formal and informal is

not clear. For instance, informal sector workers formalized by Chintan are labeled as

volunteers. Further, there may or may not be a fiscal relationship between those who provide

the service (i.e. workers themselves), those who organize the service providers (i.e.

organizations such as Chintan), and those who seek the service (i.e. the municipality).

Meanwhile, independent informal sector workers that continue to provide certain services

such as doorstep collection without being affiliated with an organization such as Chintan

continue to function independently within the informal sector via informal arrangements with

individual service consumers (i.e. waste producers). The top right quadrant is blank, partly

because in this dissertation I have been unable to address the issues that come with such

arrangements. But there are instances, where registered firms might be contracted with to

provide certain services. But these firms rely entirely on informal labor to do so. Such

workers work for firms but do not have any legal or social protections as part of such

employment.

Lets take the example of the city of Delhi to see what this patchy mosaic of state, formal,

formalized informal and informal waste service providers looks like. Figure 2 shows the

various actors and spaces of waste management in Delhi. Spaces include the spaces of waste

production (e.g. residential or commercial establishments) as well as spaces of waste storage

and treatment/disposal (e.g. the community bin and the landfill). As a waste generator, I

typically produce waste that is dealt with in more or less three ways. I keep aside high-value

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[3] Chintan Environmental Research and Action Group or Chintan is a Delhi-based NGO that works with waste
pickers. SWaCH is a similar Pune-based cooperative of waste pickers.

recyclables to sell to the itinerant buyer (or *kabariwala)*. I give my daily waste to the doorstep collector and I produce litter in streets and public spaces.

The city does not itself provide almost any doorstep waste collection services. Most of the city relies on independent informal sector actors who collect waste from households and transport it to the nearest community bin or *dhalao*. For a small percentage of households, a private firm that the state has contracted with provides doorstep waste collection services. For another small percentage of households, an organization of informal sector waste collectors provides doorstep waste collection services. For example, Chintan, a Non-Governmental Organization (NGO) provides such services to about 30,000 households in the city. In yet other cases, RWAs might outsource their waste collection to a private firm or to an NGO such as Chintan. In these cases, the state is not involved at all. Within the waste collection market, we not only see a number of different types of actors but also different types of contractual relationships between service providers and service consumers.

Figure 2. A generalized depiction of Delhi's waste management landscape
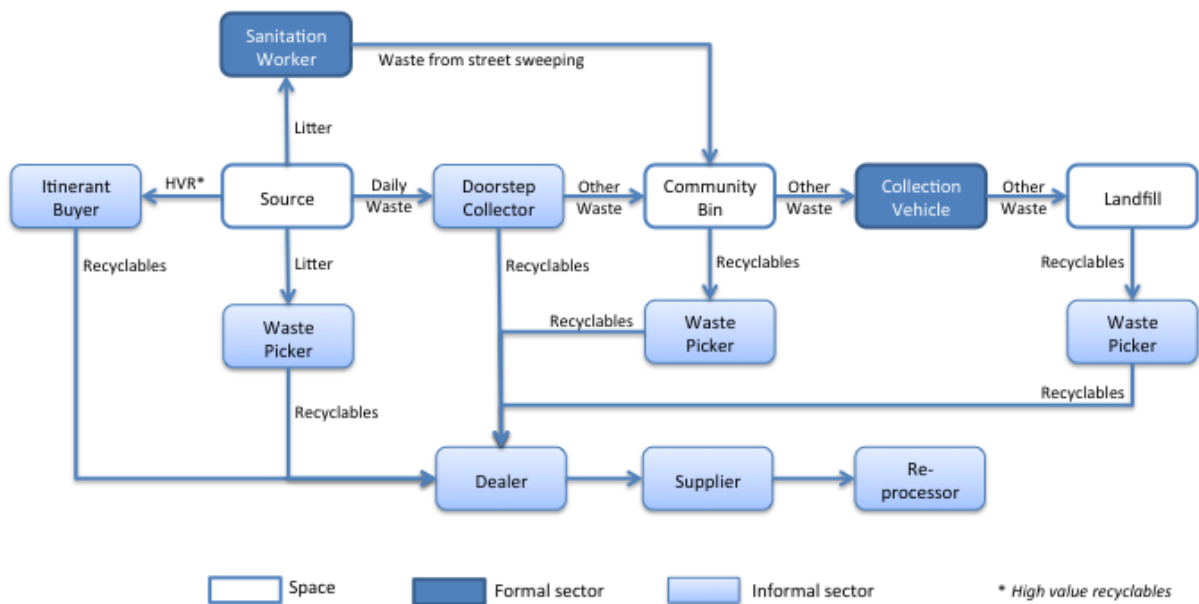
The state or its private partner provides the rest of the services along the chain e.g. transportation of waste to the treatment/disposal plant, and treatment/disposal services. For instance, in Delhi the municipalities as well as private firms provide transportations services. The city has two different types of centralized treatment facilities currently—a waste to energy (WtE) plant and composting plants—run by private firms. Landfills in Delhi are currently owned and operated by the state. But there is a large amount of material recovery that also happens largely outside the purview of the state by the informal sector.

Aside from the doorstep waste collectors and itinerant buyers of high value recyclables, there are many other informal sector actors who make a living off of waste. How they earn their money is by trading recyclable materials extracted from waste. Other than doorstep waste collectors, there are those who collect recyclables from roadsides, community bins and landfills. Recyclables are sold to dealers who then supply them to wholesalers and suppliers and onwards to reprocessing units. Estimates of the number of people involved in this sector vary, ranging from 40,000 to 200,000 depending on who is counting and who is being counted (Agarwal et al., 2005; Chaturvedi and Gidwani, 2011; Chintan, 2003; MCD, 2004). For workers in the informal sector, waste acts as an urban common pool resource, rights to which are not private but are negotiated within the community and with state actors such as municipal sanitation officials (Bose and Blore, 1993).

But this patchwork of actors in the sector is not constant. The large-scale involvement of private firms by the municipality has been relatively recent, starting in the early 2000s. This new mode of privatization of waste management services has displaced and dispossessed many informal sector actors (Chaturvedi and Gidwani, 2011). The earliest contracts for waste management involved the transportation of waste from collection points (e.g. *dhalaos*) to

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landfills. At first glance, this would not appear to conflict with the way that the informal sector manages its livelihoods. Yet, those contracts assigned property rights to the space (e.g. *dhalaos*) and the waste materials within that space to private contractors. Chaturvedi and Gidwani (2011) have shown how such forms of privatization ended up displacing informal sector workers, because that space was crucial for segregation, temporary storage, and even scavenging of recyclable materials. By privatizing the space and the materials within it, the state conferred the power to extract monopoly rents from informal sector workers to the private firm.

The scale and scope of privatization efforts is also expanding and deepening (Schindler, Demaria and Pandit, 2012). Transportation-only contracts are giving way to doorstep waste collection, which will affect the informal sector more deeply than current arrangements have. Informal sector workers who provide doorstep waste collection services will have to find other ways to earn a living. The adoption of certain technologies, particularly WtE technologies have already displaced waste pickers from landfills (Chintan, 2012). Landfills that used to receive fresh waste that contained all types of recyclable materials, now only receive ash from the WtE plant. Waste pickers who depended on extracting recyclable materials from fresh waste are forced to find other means of livelihood in the city. Although it might be tough to imagine other ways of earning a livelihood as being worse than working in waste, they are. Construction work, for instance, is much more taxing on the body and pays much less than picking waste. The informal sector with support of social and environmental activists are not passively watching but have ramped up their tactics for fighting against ongoing and impending forms of displacement and dispossession.

Organizations at local, national and even global levels have been fighting for the rights of informal sector workers to their livelihoods.

The fast changing landscape of waste management in India involves several events that include the publication of crucial government reports, filing of litigations, passing of rules and laws, and the establishment of different organizations and waste management facilities. Throughout this dissertation, I refer to many of these events. The timeline in Table 1 was created to make it easier for the reader to trace the temporal trajectory of these developments. This is not meant to be a comprehensive list by any means. It merely intends to highlight events of importance to the arguments I will be making in subsequent chapters.

Table 1. Timeline of key events

Time	Event
1987	Timarpur WtE facility begins operations and stops working within a month due to a mismatch between the quality of waste it receives and what it can handle.
1990	The Government officially shuts down Timarpur WtE facility.
1991	Prime Minister P.V. Narsimha Rao announces economic reforms and bailout deal with the International Monetary Fund (IMF), marking the beginning of economic liberalization in India.
1992	74th Constitutional Amendment Act (74th CAA) is passed, devolving functional and financial responsibilities to municipalities.
1993	In Pune, Maharashtra, waste pickers form a trade union called Kagad Kach Patra Kashtakari Panchayat (KKPKP).
1994	Surat, a city in Gujarat, suffers an outbreak of the plague bringing the issue of health hazards associated with mismanaged garbage into public discussion. A temporary ban on waste picking in Delhi ensues but is subsequently lifted.
1995	A High Power Committee on Urban Solid Waste Management in India releases its report to the Planning Commission.
1996	Almitra Patel files a public interest litigation (PIL) on waste management in the Supreme Court arguing that municipalities have failed to provide crucial services that they are constitutionally required to provide.
1996	Government of India forms an Expert Group on the Commercialization of Infrastructure Projects, which recommends widespread privatization of public infrastructures.
1999	A Supreme Court Committee releases its report on *Solid Waste Management in Class 1 Cities in India.*
1999	The Government of India launches a "Total Sanitation Campaign (TSC)" to end open defecation in India.
1999	Chintan, an NGO that advocates for and secures livelihoods for waste pickers is established in Delhi.
2000	Ministry of Environment and Forests (MoEF) releases the *Municipal Solid Waste*

Time	Event
	(Management and Handling) Rules, the first ever such set of rules governing waste management.
2000	Ministry of Urban Development (MoUD) releases its *Manual on Municipal Solid Waste Management* providing detailed guidance to municipalities on all aspects of waste management.
2006	Jawaharlal Nehru National Urban Renewal Mission (JnNURM), an urban modernization program is launched to encourage fast-track development of cities by catalyzing investment flows in urban infrastructure.
2006	MoEF releases the *National Environment Policy* which specifically calls out the contribution of the informal sector in waste management and recycling in India.
2008	Comptroller and Auditor General (CAG) of India releases its performance audit on solid waste management in India, claiming that states have failed to follow rules and policies on waste management.
2008	MoUD releases the *National Urban Sanitation Policy* that mentions the informal sector and the need for their inclusion in waste management systems.
2008	Ministry of New and Renewable Energy (MNRE) releases a *National Master Plan for Development of Waste-to-Energy in India.*
2009	Residents of Sukhdev Vihar file a petition in the Delhi High Court against the upcoming Timarpur-Okhla WtE facility arguing that toxic emissions from the facility will pose health hazards.
2009	Government of the National Capital Territory (NCT) of Delhi releases the *Delhi Cleanliness and Sanitation By-laws.*
2009	The Municipal Corporation of Delhi (MCD) is trifurcated into North Delhi, South Delhi and East Delhi Municipal Corporations.
2009	Government of India establishes the National Green Tribunal (NGT) for the expeditious handling of environmental cases.
2010	"The Ugly Indian (TUI)," a group of Bangalore-based volunteers who clean public spaces launch their Facebook page.
2012	Timarpur-Okhla WtE facility begins operations.
2012	Ministry of Tourism launches its "Clean India Campaign" with support from Volkswagen.
2012	"Nirmal Bharat Abhiyan (NBA)" replaces the previous TSC.
2013	Litigation against Timarpur-Okhla WtE facility is transferred to the NGT.
2013	Finance Minister announces budget outlays for WtE facilities in the 2013-14 Union Budget particularly through the MNRE.
2013	Planning Commission announces the establishment of a Task Force on WtE to assess the feasibility of WtE on a large scale.
2013	MoEF releases *Draft Municipal Solid Waste (Management and Handling) Rules.*
2013	MoEF withdraws its *Draft Municipal Solid Waste (Management and Handling) Rules* following an order from the Karnataka High Court alleging that the draft rules were regressive and would undo the progress made on waste management in the last decade.
2014	MoUD releases an updated manual on solid waste management developed with the assistance of Deutsche Gesellschaft fur Internationale Zusammenarbeit (GIZ), a government-owned German company that specializes in international development.
2014	Planning Commission Task Force on WtE releases its report advocating for WtE projects.
2014	Almitra Patel PIL is transferred to the NGT.
2014	Prime Minister Narendra Modi inaugurates the Swachh Bharat Mission (SBM) that allocates funding for building toilets, managing waste and changing public behaviors. SBM replaces the previous NBA.
2014	MoUD releases SBM guidelines specifically recommending WtE as the technology of choice.
2015	NGT issues an order on Almitra Patel PIL setting a precedent for the establishment

Time	Event
	of centralized waste management facilities across the country.
2015	MoEF issues a fresh draft of *Solid Waste Management Rules* for public comment.

I am going to summarize some of these developments noted here. Economic

liberalization of the early 1990s ushered in changes in income and consumption

patterns of a growing middle class, concentrated largely in cities. Two related processes

in the period that follows are worth mentioning. The first is the recognition of cities and

urban infrastructures as necessary to national economic growth and development. The

74th Constitutional Amendment Act (74th CAA) devolved administrative and fiscal

powers to municipalities, which previously were vested in state governments. What

followed were a series of efforts to find the best ways to improve urban infrastructures

and foster economic growth. These efforts culminated in the establishment of the

Jawaharlal Nehru National Urban Renewal Mission (JnNURM)—the largest urban

modernization program in India history—that encouraged governments to provide

urban infrastructures and services through privatization.

The second related process has to with growing quantities of waste that pose public health,

environmental and aesthetic challenges to aspiring "world cities" in India. An outbreak of

plague in Surat, Gujarat in 1994 brought to public attention the hazards of poor waste

management. Soon thereafter, Almitra Patel, an environmental activist, filed a public interest

litigation (PIL) in the Supreme Court alleging that municipalities had been unable to deliver

crucial waste management services to citizens. Following a series of investigations on the

state of waste management in India, the first set of rules governing the management of

municipal solid wastes was passed in 2000. Municipalities, unable to conform to these new

rules, and encouraged by a general climate of infrastructure privatization, started to outsource

waste management services to private firms. Meanwhile, informal sector actors and organizations started to organize to counter the threat of privatization and dispossession from their means of livelihood. Government agencies also officially recognize the contribution of the informal sector in its policies.

Despite the passing of the rules in 2000, a 2008 Comptroller and Auditor General (CAG) report noted that almost none of the states had been able to implement them. Waste management had shown little improvement across the country. Waste-to-energy technologies that promised to reduce waste volumes and generate electricity at the same time started to emerge as an attractive solution. Planning agencies started commissioning reports assessing feasibility of these technologies. Implementing agencies—various central and state government ministries—started allocating funding in budgets for adopting these technologies on a broad scale. The judiciary passed orders in favor of these technologies even as the only functioning facility in India is being litigated against in the same court system on grounds of toxic emissions from the facility that pose severe public health hazards. As a new mode of privatization of waste and waste management that require complete control of the waste stream, WtE technologies are ushering in a new regime of displacement and dispossession of the informal sector.

As new technologies and new ways of managing waste are being experimented with, so are new ways of regulating individual behaviors. There is an increasing sense of waste being not simply an infrastructural problem but a cultural one that requires changes in individual behaviors. Not only do systems need to modernize but people do as well. The government's most recent campaign focuses primarily on inculcating a public ethic. Groups of volunteers

that clean up public spaces and regulate public behaviors against littering are emerging across the country.

This quick and brief overview of recent developments and shifts in ways of managing waste is merely to alert the reader to the diverse sets of issues I will be examining in this dissertation. In the next section of this chapter, I describe the set of methods I used to gather and analyze the data in my research.

Methods

My diligently planned set of methods did not play out in the field as I had imagined and hoped they would. Although I only have my own experience to go by, I imagine that I am not an anomaly in having such an experience. In planning on writing this section of this chapter, I was debating describing my methods as unconventional which I also imagine many students do. Therefore, I leave it up to the reader to judge whether the methods I use are actually unconventional or not.

Before I started my fieldwork, in my dissertation proposal, I outlined a discrete set of methods: participant observation, interviews, surveys and the like. My time in the field was to be carefully apportioned into this discrete set of data gathering activities. Not surprisingly, it was anything but that. I arrived in Delhi in September 2012 and stayed till December 2013. Delhi is the city I grew up in until I was 18 years old at which point I moved to the U.S. to study. I would return to Delhi each year to see family but had not spent extended periods of time in India since having left 15 years prior. I thought I knew Delhi. I realized I did not. I thought navigating the city and knowing how things worked would just be a matter of jogging my memory a bit. I was wrong. Either my memory had failed me or I had become a

completely different person. Delhi was no longer home, no longer a place I could claim to have some knowledge about. I needed to learn a lot about the city and as quickly as I could. Intent on learning, I had made an arrangement with Chintan, an NGO to be my host institution. Chintan has been working with waste pickers in the Delhi area since its establishment in 1999. To my knowledge, it was at the time and still is, the largest and most well funded organization that works with waste pickers in the National Capital Region (NCR). Its programs can be described as four sets of activities: research in partnership with academics and academic institutions on the informal sector of the waste economy, advocacy for the rights and livelihoods of waste pickers, building livelihoods through waste management programs such as doorstep waste collection, and education of children in waste picking communities. When I showed up at Chintan's doorstep in October 2012 ready and willing to help with their work before I would start focusing on my own research, they immediately assigned me to two projects: one a research report based on a survey on the impact of a newly established WtE plant on waste pickers; and another helping film a documentary about two waste pickers who would travel across India talking to other waste pickers about their displacement due to various kinds of privatization and modernization of waste management systems in their cities.

Soon however, I would become involved in several other aspects of the organization's work: writing proposals for funding, developing and delivering training manuals for Chintan staff and beneficiaries, improving internal financial and administrative processes, writing policy memos for government officials, managing interns, coordinating field visits for donors and students, attending conferences and meetings on behalf of Chintan, and acting as a personal advisor and confidante for staff members at all levels within the organization. My own

research plans took a back seat. I became deeply involved in the internal and programmatic operations of the organization, so much so that I was officially given the title of "Interim Deputy Director." I served in that position for two months before resigning. The stress of that position combined with anxieties that I was letting my own research take a back seat helped me make a decision to quit. But I didn't quit the organization, just the official position. Organizations such as Chintan are constantly understaffed and underfunded, so free labor from an enthusiastic and relatively competent person was an opportunity that the organization could not easily forgo. At times, I tried to extricate myself from the organization's operations but the Director would cajole me back in.

I was involved deeply in the organization not just for the sake of the organization but for selfish reasons also. My affiliation with Chintan allowed me to apply my theoretical knowledge in the field. Throughout my studies, I have been concerned that my work will remain purely in the realm of the academic, without any actual meaning for or impact on the real world. I wanted to be useful. My time at Chintan allowed me to ease some of these worries by participating in meaningful activities, whether they were raising money for the organization by writing a successful proposal for funding, or writing policy relevant documents, or participating in a protest against displacement of waste pickers. During my time, I helped write a proposal for funding from the Google Impact Challenge that awarded Chintan USD 250,000 to expand its work. Among the many policy documents, the most significant one that comes to mind was a toolkit on the inclusion of waste pickers in waste management projects. This toolkit was subsequently published by the Ministry of Urban Development on their website. One of the most memorable activist moments was when I marched with a group of 200 waste pickers in pouring rain to demand justice from Ghaziabad

municipality where a private contractor was extorting bribes from waste pickers in return for letting them pick waste. The protest was not successful. The government not only refused to hear the demands of the waste pickers, they forced us to leave the premises. Even though in this dissertation I am sometimes critical of the work that Chintan and other organizations do, I want to stress the point that I think they do genuinely good work and I was very glad to have the chance to be a part of it during my fieldwork.

But with regards to my fieldwork specifically, my affiliation with Chintan gave me access to people and information that I would not have otherwise had. The Director of Chintan often took me with her to her meetings with senior government bureaucrats and senior managers of private waste firms.[4] She would also often let me accompany her to private working group meetings within the government and elsewhere that she was frequently invited to.[5] These meetings were very different from interviews where I would have had the chance to ask them questions in structured, semi-structured or unstructured ways. Nonetheless, they allowed me to observe conversations that were often about issues that I was interested in and would have asked in any case albeit not in the same manner. While this mode of data gathering has its limits, it also opened up possibilities for investigating issues that I would not have otherwise thought of. But also, because of my affiliation with Chintan, I had the chance to informally interact with waste pickers and other actors in the informal economy of waste. I did not have to build trust with them before they would open up to me. They talked to me openly about

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[4] During my time at Chintan, I met with senior officials from the Government of Delhi, the Delhi Development Authority, the Delhi Pollution Control Committee, and municipal corporations. Within the central government, I met with senior officials from the Ministry of Urban Development, the Ministry of Environment and Forests and the National Green Tribunal.

[5] Some such meetings include a working group on revising the solid waste management manual at the Ministry of Urban Development, the meetings of Environmental Pollution Control Authority of the Delhi metropolitan area, a meeting of activist organizations on revising the municipal solid waste rules, and various meetings of the Delhi government on waste management issues. I also attended various conferences such as one organized by WtE Research and Technology Council, another on waste and climate change organized by GIZ, among many others.

their problems in general but also their problems with the way Chintan was or was not able to support them. But perhaps most of all, these formal and informal conversations within and outside the organizations helped me deepen my understanding of various issues in waste management that following a standard method would not have allowed. For instance at Chintan, I was frequently asked to help design programs or help facilitate a discussion on why Chintan does the work it does or what the impact of its work is. Many conversations such as these involved deep discussions between participants—internal and external to Chintan—about the issues surrounding waste and the informal sector. Its impossible for me to say exactly which conversation helped inform my thinking and the ideas presented in this dissertation. Suffice it to say that all those conversations, however unrelated they may have seemed to my research at that time, have helped inform my understanding nonetheless. Finally, Chintan also allowed me access to data, whether it was data that they themselves collected through surveys or government documents that were otherwise inaccessible. Among these, there are three data sets that I have used extensively in this dissertation that I want to mention and describe briefly. Although I have access to other data sets, I was involved in designing and implementing the methods for these studies--survey instruments, interview questionnaires, focus group discussion format and questions.

The first of these is a survey of 1,577 informal waste worker households (a total of 6,500 individuals) in Delhi. The survey was funded as part of a large grant from the United States Secretary of State and was designed to determine the geographic areas in which Chintan should focus its programmatic work. The survey asked respondents to report on their household size and composition, educational status, income, occupational status and type of waste-related occupation they are engaged in, and the main problems they face in their work.

The survey covered seven major communities of waste pickers across Delhi. The survey covered all households in those communities and the respondent was asked to answer questions about all members in their household. This survey was conducted in Hindi and questions were read out aloud and responses documented by the surveyor, since most respondents were illiterate. The survey was administered to all households within these communities that reported having at least one household member who worked in waste. About ten members of Chintan's field staff, who I trained through a series of training sessions and a pilot, administered the survey.

The second is a project jointly funded by the Government of Delhi and GIZ and involved conducting a survey, interviews, and focus group discussions. The outcome of the project was to develop a solid waste management policy for Delhi using a participatory process. 3,047 households across four municipalities in Delhi were surveyed. Aside from basic demographic information (age, gender, education, household size and household income), the survey elicited respondents' knowledge, attitudes and perceptions towards various aspects of waste and waste management: quantity of waste produced, waste storage systems, waste segregation practices, attitudes towards the informal sector, satisfaction with the conditions of waste management infrastructures and services and willingness to pay. The study involved 59 interviews with a range of actors: representatives from RWAs and market associations, municipal sanitation workers and officials, institutional waste generators, social and environmental organizations, and private waste management firms. The study also involved six thematic focus group discussions: waste collection and transportation, source segregation, composting, recycling, landfilling and waste-to-energy. This survey was conducted both in

English and Hindi depending on the respondents' preference. For illiterate respondents, the survey was read out aloud and their responses captured by the surveyors.

A small Delhi-based consulting firm—Strategos Consulting—subcontracted by Chintan administered the survey. Chintan staff conducted the interviews and focus group discussions. Strategos hired a team of 25 surveyors on a daily contract. Along with the head of the firm, I trained this team so that they had an understanding of the purpose of the study and the survey instrument. To ensure that survey respondents represented a spectrum of income groups, neighborhoods were selected based on ward-level socio-economic classification (SEC) data collected by A.C. Nielsen as part of the Indian Readership Survey. Specific survey areas within those neighborhoods were selected based on visual inspection. The surveyors used the right-hand rule targeting every other household on the right of the street. To ensure that visual inspection of the neighborhood matched the sample size requirements for an income group, the survey used the SEC system to document the consumption potential of the households. The SEC system uses the education of the chief wage earner and the number of "consumer durables" that the household has access to, to classify households (MRSI, 2011).

The third is a project funded by the World Bank on improving waste management in cities and towns in Uttar Pradesh through the inclusion of the informal sector. This study involved a survey of 1,092 informal waste workers in eight towns and cities across Uttar Pradesh. Aside from basic demographic information about the respondent, the survey asked detailed questions about their current and past occupation, length of the workday, income, quantities, types and prices of materials they collect and sell, conditions of work, health and safety issues, and willingness to change occupations. The Strategos team also administered this survey in Hindi. Since most respondents were illiterate, surveyors read the survey questions

aloud and recorded the responses. Surveyors identified neighborhoods where waste pickers

live based on reconnaissance visits to those cities. Sample sizes were determined based on

estimates of total population of waste pickers in each city, which was estimated based on the

amount of waste the city generates.

Asides from the data mentioned thus far, I have also relied on a few other sources: discourse

analysis of key government texts (reports of various government committees, judicial rulings,

and policies), news coverage from domestic and international news agencies, an analysis of

social media, particularly the Facebook page of the online group "The Ugly Indian." An

analysis of a rich and diverse set of sources deploying a range of methods, I hope, has

yielded interesting and important insights. It also means however that the scale and

complexity of the data is enormous. Although I have not been able to do justice to the data

that I have, I hope that the arguments I make in the following sections are valid and valuable.

Structure of the dissertation

This dissertation is organized in four chapters in each of which I make distinct yet

interrelated arguments about the changing landscape of waste and waste management in

contemporary India. A concluding chapter where I connect and draw some overarching

conclusions from the arguments made previously follows the four chapters.

Chapter two deals with the question of the "private" in waste management in contemporary

urban India. Waste management, or at least some aspects of it, has historically been a private

affair. Yet, new forms of corporate privatization are replacing older informal private actors.

In this chapter, I start with economic theories that provided the rationale for privatization of

public services, specifically the theory of natural monopolies in this sector. I then examine

economic theories that have informed the privatization of waste management services and the

experience of their application across the world. Here I examine the question: Has the application of economic theory yielded the intended results? If the goal of privatization was to increase competition in waste management service markets and therefore make them more efficient, then what has the experience shown us thus far? Next, I take a brief look at the history of infrastructure privatization in India in general and in the waste management sector in particular. I examine the experience and outcomes of privatization of waste management in India by taking a look at major firms providing those services. Next, I turn to older systems of waste collection and explore whether economic theories could apply to an understanding of how those systems work. If so, why are they being replaced by newer systems that are continually failing? Such an examination reveals a contradiction in neoliberal theory that has informed public sector reform. Designed to increase competition and the efficiency of service delivery, newer forms of privatization informed by neoliberal theories of privatization have done just the opposite.

Chapter three focuses on the response of informal sector organizations against privatization of waste and waste management services. In some cases, such organizations have been able to safeguard the livelihoods of informal sector workers by securing and legitimizing their profession through a process sometimes referred to as formalization. Theories of accumulation through dispossession have successfully explained cases where the informal sector has been displaced and dispossessed from the means of subsistence through the recent corporatization of waste. But in cases where the informal sector has been able to retain access to their means of production, the theory seems irrelevant. In this chapter, I examine whether the irrelevance of this theory should in fact be a foregone conclusion. By examining changes in the labor process associated with the formalization and professionalization of informal

labor, I argue for the continued relevance of the theory. In this chapter, I start by examining certain dominant discourses about the informal sector that continually attempt to delegitimize their social and economic place in cities. I then examine the tactics of formalization and professionalization that informal sector organizations deploy to specifically respond to those discourses and secure a legitimate place for informal sector workers. But formalization and professionalization involves new kinds of work and new ways of working by informal sector workers. I argue for understanding this shift as a different kind of accumulation by dispossession that moves beyond the question of property/commons.

Chapter four focuses on the substance of waste (its physical, chemical and biological properties) and emerging technological solutions (particularly WtE) that leverage those properties to manage waste. As mentioned previously, WtE is emerging as the preferred high-technology option for managing the ever-growing problem of waste in India. It requires, however, that waste have specific characteristics—for instance, high calorific value and low moisture content, neither of which are characteristics of typical urban Indian waste. In this chapter, I examine why, despite its unsuitability, WtE has emerged as the preferred technological solution for managing waste. I pay close attention to the discourses employed by WtE industry proponents that promise an infrastructural modernity that is simultaneously practical/technological and aesthetic/ideological. I argue that the substance of waste is irrelevant because it can be changed through coercive means to make it suitable for WtE with potentially dire consequences for the informal economy.

Chapter five deals with the management of waste at the individual level. At first glance, the imperatives of cleaning the city's public spaces and segregating waste at home seem to operate at vastly different scales. The "home" and the "outside" have always marked the

boundary between the "private" and the "public." Yet, seemingly private actions—source segregation in the home—have emerged as a public issue, with the private constantly under scrutiny by the state, NGOs and sometimes even private firms, pushing waste generators to segregate their waste in an effort to optimize waste management in cities across India. Garbage uncomfortably sits at the border of public and private realms. Popular campaigns urging people to not litter in public, segregating waste at home, and cleaning up public spaces, are regulatory devices intended to change individual behaviors supposedly burdened by a "culture" of indifference. The discourse that underlies the work of many concerned organizations and campaigns is that the state has failed in providing clean public spaces; therefore the matter needs to be taken in their own hands. A seemingly "public" matter of unclean public spaces is "privatized" in action. Both problems—un-segregated garbage and littering—are seen as "cultural" or social problems, that is, problems that can be attributed to the way people think and act publicly in urban spaces and privately inside their homes. In this chapter, I argue that such a discursive logic privileges aesthetic over infrastructural concerns while simultaneously making visible the voluntary labor of the privileged and erasing from memory the economically necessary labors of the marginalized.

Chapter six summarizes the findings of each of the previous chapters. I then do two things. First, I offer some concluding thoughts on the relationship between waste and modernity in contemporary India, paying attention to traditional dualisms—formal/informal, private/public, and property/commons—separations that are simultaneously markers of modernity but must also be disrupted in the process of modernization. Second, I offer some practical thoughts on how waste management systems could be improved without displacing and dispossessing those who depend on it for their livelihoods.

Chapter 2. Contradictory neoliberalism: "Old" and "new" public-private partnerships in solid waste management in urban India

Every morning as I look down at the street from the balcony at Chintan's office in Lajpat Nagar, an upscale neighborhood in South Delhi, I see Iqbal, a doorstep waste collector with his rickshaw. Stopping at every house on the street, he quickly makes his way to where I can closely watch what he is doing. His rickshaw has two large bags, the contents of which at a callous glance look no different from each other. He rings the doorbell. The maid answers and hands him a plastic bag. In a matter of about thirty seconds, Iqbal sifts through the contents of the bag that has just been handed to him putting some stuff in one of the two giant bags on his rickshaw and the rest in the other. In a matter of a few seconds, Iqbal has segregated household trash, separating what carries value from what does not. Both bags on his rickshaw look equally full. One bag carries the stuff from which he will make his day's income. It is likely not going to be much but still probably higher than the minimum wage in this city where only the rich can afford to live comfortably. The other bag is a liability. It carries no value other than that his ability to find the valuable stuff is contingent on him providing the service of transporting the non-valuable stuff to the nearest *dhalao* from where it will be taken to the landfill.

Not very far from Lajpat Nagar is another upscale neighborhood of R.K. Puram.[6] In 2007, the Municipal Corporation of Delhi hired Delhi Waste Management (DWM) to provide waste collection and transportation services in this area. There were and still are some like Iqbal in R.K. Puram but most of them now work under a different set of conditions. The

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[6] The rest of this story is adapted from a letter that Chintan submitted on behalf of Safai Sena in November 2013 to Shazia Ilmi, an erstwhile Aam Admi Party's candiate for the Delhi Legislative Assembly 2013 elections.

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private firm operates garbage trucks to collect household trash, replacing rickshaws and the people like Iqbal that used them. The firm is also responsible for guarding and maintaining the *dhalao* where smaller collection vehicles dump and temporarily store the garbage until a larger vehicle collects and transports the garbage to the landfill. Waste pickers like Iqbal now rely on this neighborhood dump to find materials they can salvage and make a living from. They no longer get fresh waste right from the household. Now they sift through larger and deeper mounds of garbage to find the valuable stuff. Non-valuable stuff like food waste or used diapers can spoil the valuable stuff like cardboard or plastics. The nature of their work has changed and so have the conditions under which they do their work. To access this *dhalao*, they pay between INR 1,000 to 1,200 (approximately USD 15 to 18) monthly to the firm's guards.[7] Unable to afford this new 'fee,' many waste pickers have moved on to work in other parts of the city. Those who remain have no choice but to live by these new rules. While the legal responsibility of waste management services may lie within the public domain, on the contrary, in many developing countries such as India, the provision of some of these services has historically been a private affair. But recent changes in the landscape of waste management in urban India have led to the emergence of new kinds of privatization of these services, often flourishing under the globally popular rubric of public-private partnerships (PPPs). This chapter describes these two very different kinds of private actors in waste management in urban India: one such as Iqbal represents the "old" private and the other such as the private firm represents the "new" private. The two exist side by side, at least for the time being. The "new" represents the dream of urban modernity while the "old" represents the arcane that needs to struggle to carve out its place in modern urban India. The

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[7] Considering that the minimum wage in Delhi is currently INR 7,722 per month, this amount is substantial even though waste pickers typically earn more than the minimum wage.

place for the "new" has already been carved out, architected as part of India's post-liberalization development trajectory. Beyond the simple ideas of teleological progress inherent in theories and practices of economic development, why is it that the "new" is privileged over the "old"? Even as there is widespread agreement on the importance of the informal sector in waste management by policy makers, development practitioners and academics alike, this agreement is largely ignored in practice. By implementing programs that negate the "old" while making way for the "new", policy makers and implementers in India have willingly or perhaps unwittingly made a choice. In this chapter I explore the ideological underpinnings of these policy choices. Doing so will allow us to uncover the contradiction between the theory and practice that underlies the ideology.

To do this, the first section of this chapter examines theories that have argued for privatization of public services, particularly waste management services. Using the example of the waste management industry in the United States, I show how the application of theory has resulted in outcomes that contradict the basis of that theory. In the second section, I provide a brief history of infrastructure privatization in India in the post-liberalization period. In the third section, I take a close look at the existing landscape of waste management service provision by first examining the emergence of private firms in the sector and then arguing for the need to see the informal sector equally as entrepreneurs. I end with a brief conclusion summarizing the key points argued in this chapter.

(Un)natural monopolies in the waste management industry: a review of the literature

Privatization of urban infrastructures

Infrastructure markets for large-scale public services have long been characterized as natural monopolies, defined in simple terms as the condition where a single firm is most efficient (or

has the lowest social costs) than multiple firms at producing a given output (Baumol, 1977; Lowry, 1973). Regulation or government intervention in such markets was deemed necessary so as to limit the potential abuse of powers by a single firm providing crucial public services such as electricity, water and sewage (*ibid.*). Unregulated private markets could exacerbate social inequalities by not providing services universally or charging unfairly high prices for those services. Many governments responded to this problem by setting up state-owned enterprises or public utilities for delivering those services to rapidly increasing urban populations in what has been described as the rise of municipal socialism from the late 1800s to the 1940s (Leopold and McDonald, 2012). Some have urged us to understand this rise as a direct challenge to *laissez faire* capitalism, an advancement of 'socialist' agendas by exerting local government power in countering social inequalities resulting from unfettered capitalist industrialization and urbanization (*ibid.*).

More recently, since the late 1970s, proponents of neoliberalism have questioned the efficiency of state-owned public enterprises in providing public services citing failures of such enterprises worldwide (Harris, 2003). [8] Public enterprises were seen to incur losses and drained government budgets while simultaneously being unable to keep up with rising demands that required an expansion of existing infrastructures and services (*ibid.*). For instance, 2010 estimates of global infrastructure requirements are as high as USD 3 trillion per year and spending was well below this need (World Economic Forum, 2010). Private participation in infrastructure services was recommended as a solution worldwide as a means to increase the efficiency of failing public enterprises and to meet the investment deficit that

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[8] Following Ferguson (2010), I am using the term neoliberalism here to refer to a set of mechanisms, rationalities, technologies and "arts" of government that find their manifestation in projects of privatization. In contrast to Ferguson however, this chapter does not focus on how neoliberal governmental techniques might be repurposed in support of potentially progressive political projects. In the next chapter of this dissertation, I will take on that issue more seriously.

rising demands for those services required (Paul, 1988). Critics of public enterprises on the far right question the validity of the theory of natural monopolies arguing that the free market can discipline firms much more effectively than regulatory processes (Demsetz, 1968; DiLorenzo, 1996).

DiLorenzo (1996) argues that economists in the twentieth century *ex post* developed the theory of the natural monopoly to rationalize the government's monopoly power in those utilities just when municipal socialism was also becoming popular. DiLorenzo's claim is that genuinely free markets and private property would have never even allowed monopolies to emerge. The problem of duplication that is often raised in favor of regulation or public ownership of public utilities, DiLorenzo argues, exists only because governments have failed to put a price on the use of those scarce urban resources. So, for instance, in a truly free market with private ownership of all assets including roads for instance, putting new power lines or drainage systems by a new service provider would not be a problem; such duplication would only occur if consumers wanted the new service because it was cheaper or better and would be therefore willing to undergo the inconvenience that the new infrastructure development process entails. In a somewhat similar vein, Jordan (1972) investigates whether regulation of utilities, the basis of which had been to protect consumers, actually succeeded in doing so. He concludes that instead of protecting consumers, regulation instead had the effect of protecting producers by enabling them to form cartels, thus allowing them to exert market power. In yet another analysis of regulation, Glaeser and Schleifer (2003) investigate the issue as a matter of law enforcement in response to market failures, suggesting that while regulation may have been the most efficient response as a law enforcement strategy in the late nineteenth and early twentieth century in the United States,

"doing nothing" to correct market failures might be the most efficient response across many different contexts currently. Glaeser and Schleifer suggest that regulation where administrative capacity is limited as is the case with many developing countries, enables subversion of justice by corrupt regulators and therefore wastes resources without correcting the market failure. In developed countries with high levels of law and order, the most efficient response to market failure, therefore is private litigation rather than regulation. These proponents of free markets tell us that regulation is a bad idea. Markets work and should be allowed to work. The power of arguments such as these is reflected in the ongoing, even if highly contested, embrace of deregulation and privatization reforms worldwide. But advocates of de-regulation and privatization in specific sectors often do not question monopoly behavior in those sectors. Instead they debate the issue of efficiency and quality of service of different market structures, or in the methods or modes of privatization used to achieve different ends. Berg and Berg (1997) identify five broad but not mutually exclusive categories of the methods of privatization: sales of shares or assets; capital dilution (through joint ventures for instance); management-employee buy-outs; broad-based or mass privatization; and indirect or partial privatizations via management contracts, leases or service contracts. Feigenbaum and Heinig (1997) propose a different typology of privatizations: systematic privatization where the goal is a long-term transformation of society as in the case of Eastern Europe; pragmatic privatization or ad hoc privatizations based on cost-benefit analyses or resource-saving goals as in the case of municipal privatizations in the U.S.; and tactical privatizations that achieve short-term political goals such as with the conservative governments in France and Britain. Batley (1996) identifies three processes of privatization: programmed privatization where governments make policy

decisions to privatize assets and services (similar to systematic privatization above);

pragmatic privatization or ad hoc privatization; and informal or unintended privatization

where failure of public services has let to different types of actors taking charge for proving

such services.

Regardless of the taxonomy used to classify and understand different types of privatization

methods, typologies or processes, there is no doubt that privatization of infrastructures and

public utilities has been underway and is ongoing. This chapter focuses on one specific

method of privatization: PPPs. PPPs generally tend to be medium to long-term

"arrangements . . . between the public and private sectors whereby some of the services that

fall under the responsibility of the public sector are provided by the private sector, with clear

agreement on shared objectives for delivery of public infrastructure and/ or public services"

(World Bank, 2014a). Although PPPs differ from full privatization, they essentially share

underlying neoliberal and neoconservative premises and ideologies (Linder, 1999). Whereas

full privatization involves full divestiture, PPPs in infrastructure involve arrangements that

range from joint ventures and partial divestiture to service and operations contracts (Delmon,

2010).

The World Bank's "Private Participation in Infrastructure (PPI) Database" boasts recording

data on over 5,000 infrastructure privatization projects across 139 countries in energy,

telecom, transport and water sectors (World Bank, 2015). In 2013, PPI projects amounted to

a total of USD 150.3 billion, down 24 percent from the previous year (*ibid.*). As a percentage

of Gross Domestic Product (GDP), regional investment varies from a low of 0.17% in the

East Asia Pacific region to a high of 1.4% in the Europe Central Asia region (World Bank,

2014b). Brazil, Turkey, India, Mexico, Russia and China were the top six countries, representing 59% of all private investment in infrastructure (*ibid.)*.

Cities and urban environments form a crucial market base for private infrastructure investment, particularly in many developing countries where urbanization and concomitant demands for urban public services are increasing. In 2014, approximately 54 percent of the world's population lived in cities, up from 30 percent in 1950, projected to increase to 66 percent in 2050 (UN, 2014). An imminent urban demographic transition of the developing world excites as many as it concerns others (Montgomery, 2008). The connection between urbanization and economic development has long been assumed even though the empirical validity of a causal relationship between urbanization and economic growth is questioned (Bloom, Canning and Fink, 2008; Henderson, 2003; Quigley, 2008). Proponents of neoliberalism see infrastructure as a key ingredient for supporting and even fostering vibrant urban economies. By increasing the productivity of labor and capital, urban infrastructures enable agglomeration economies while minimizing its diseconomies (Mohanty et al., 2007). Public choice theory dictates that for local governments to fully benefit from privatization through competitive markets in public services, they need to be fragmented (responsibility dispersed over several tiers within the local government), autonomous (control over their own decision-making), and financially independent (control over their revenues and lower reliance on grants from higher levels of government) (Boyne, 1996). The rise of neoliberalism has seen the creation of these conditions within local government, a process that has been termed by some as neoliberal urbanism (Peck, Theodore and Brenner, 2009; see also Harvey, 1989; Jessop, 2002; Smith, 2002; Weber, 2002).

Critical social scientists have argued that cities and the built environment in general, offer up the opportunity for the absorption of surplus capital, pointing the "essential, dialectical connection between infrastructure networks and modern urbanism" (Graham, 2000, p. 115, see also Harvey, 1978). Following Harvey (1981), this opportunity has been understood as a spatial fix (Schoenberger, 2004). Much of the literature on cities and neoliberalism has already offered us a deep understanding of this subject (see for instance, Brenner and Theodore, 2002). Similarly, the restructuring of the regulatory landscape under neoliberalism has opened up state activities to private capital investment often through interventions by international financial institutions such as the World Bank and the IMF, a process that Peck and Tickell (1994) have described as an institutional fix. Schoenberger (2003) has argued for understanding the growth of international investment in the environmental management industry such as water supply, wastewater treatment and solid waste management, as a spatio-institutional fix. Regulatory frameworks enabling infrastructure privatization that allow for a "rearticulation of the state with the private economy," also open up urban infrastructures into the ambit of capital (*ibid*., p. 84). In other words, infrastructure privatization mechanisms are designed to spur investment from the private sector. As aforementioned critics have argued, private sector investment in public assets and services is not simply to make better the availability and efficiency of those assets and services, but to allow those assets and services to become a conduit for the profitable investment of surplus capital.

Meanwhile with regards to the success of infrastructure privatization projects across the world, the jury is still out (see Joskow, 1997 and 2008 for a discussion of competitive restructuring of electricity markets in the US and elsewhere). While proponents celebrate the

benefits of privatization in terms of expansion of services, efficiency gains, better service quality and even lower prices for service consumers, critics have pointed out the negative effects of such projects in disadvantaging the poor, damaging the environment and increasing corruption (Harris, 2003). Scholars such as Spronk (2010) has taken proponents' claim of efficiency gains through privatization to task by arguing that empirical evidence is either ambiguous or lacking (see also Bayliss, 2002). In his examination of private sector involvement in different public services in six countries, Batley (1996) finds little evidence that private firms perform better than the public sector. Bayliss (2002) has argued that privatization has negatively affected the poor through loss of income and employment for the poor and by reducing their access to public services (see also Miraftab, 2004). This is particularly important because one of the cornerstones for justification of privatization policies has been its impact on reducing poverty by stimulating economic growth, expanding access to services, and increasing government spending on the poor (*ibid.*). Critics also point out the increasing influence of independent actors such as private firms and international organizations in policy formulation accompanied by a reduction of government influence in those spheres (Baindur and Kamath, 2009; Gerbasi and Warner, 2007; Ricupero, 1997). Martimort and Straub (2009) have shown how efficiency gains through privatization have been accompanied by new patterns and degrees of corruption fueling public discontent and dissatisfaction with the process.

Proponents argue that we shouldn't be too concerned with the problem of corruption because privatization will help the transition from a "bankrupt and essentially corrupt economic system to a more democratic one" (Kaufmann and Siegelbaum, 1997, p. 458). Many proponents acknowledge the existence of some problems with privatization but suggest that a

large-scale return to public provision is unlikely and unfeasible. The question for them is not

if privatization will succeed in meeting certain social, political and economic objectives but

rather *how* to make those projects succeed in meeting specific objectives (Cook and

Minogue, 2002). The answer is often through the institution of new types of frameworks that

can allow for regulating competition and pricing in infrastructure markets—"clear policy and

legal frameworks for PPPs, competent and enabled institutions that can appropriately

identify, procure and manage PPPs, and efficient oversight and dispute resolution

procedures" (World Bank, 2006, p. 7). Privatization, originally understood as the retreat of

the state, is better seen as a restructuring of the relationship between the states and markets,

through the increased involvement of the state in promoting the interests of private capital

(Fine and Hall, 2012; Peck, 2010). Meanwhile, in some sectors particularly in the case of

water, privatization efforts have failed in part due to the failure of competition in those

markets (Bakker, 2005). As a result, water has been remunicipalized all over the world with

235 observed cases in 15 years (Kishimoto, Libina and Petitjean, 2015). Some are hopeful

that public enterprises are back in vogue (McDonald, 2014).

Empirical evidence has sought to question whether privatization has achieved its intended

outcomes of increased efficiency and better and more services. Critics have presented

evidence that also shows negative consequences of such efforts across the world. Yet, the

drive to privatize rages on even though in some sector remunicipalization might be on the

rise. In the following section, I focus on the theories that inform privatization of solid waste

collection markets. [9]

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[9] Solid waste collection in urban India is very different than contemporary market structures in the developed world, so it should seem that economic theories formed in the latter contexts may not necessarily apply. Nonetheless, the policy prescriptions that emerge out of economic theory that relies on empirical evidence from the developed world, is ruthlessly applied as cities in India outsource their

Privatization of solid waste collection markets

Monopolies in waste management at the scale of the city are explained as being a consequence of the nature of the infrastructures and services that firms in the industry provide. Economies of scale, density and contiguity allow for the emergence of natural monopolies in this sector. For instance, waste collection services are characterized by economies of contiguity, that is, there are "cost savings attributable to servicing all households on a given route" (Stevens, 1978, p. 439). Further, there are some economies of scale to be realized from better utilization of the capital equipment. For instance, if the capacity of the garbage truck is 1 ton or say, waste from 5,000 households, then the capital in that truck is not fully realized if the truck only serves 2,500 households. Economies of density, that is, the idea that "the average costs of waste collection decrease as the volume of waste collected from a fixed length of network increases" also play a crucial role (Franckx et al., 2008, p.7). But collection and transportation of wastes is only one aspect of the waste management lifecycle. Once waste is collected and transported, some materials might be recovered and ultimately recycled. The rest of the waste stream might go through a treatment process, and/or be incinerated or disposed of into a landfill. Capital inputs in the infrastructure to support at least some aspects waste management service provision tend to be high, creating economies of scale that simultaneously create barriers to entry. The principle of cost subadditivity, that is, the idea that a single firm is able to produce products at a lower social cost than more than one firm producing fractions of those products, has been the basis for the argument that municipal waste management is a natural monopoly and that competition is not sustainable (Begovic, 1996; Franckx et al., 2008; OECD Competition

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waste management services. Therefore, it is important to pay attention to what those theories say, what evidence supports them, and how much agreement there is within the academic community on this subject.

Committee, 1999). In what follows, I will focus on these debates related to solid waste collection.

The argument of natural monopoly has historically been the basis of two different models-- state provision or state-regulated private monopoly for waste management infrastructures and services--as remedies for correcting market failures that may arise out of an unregulated market. Much like other sectors, waste management services in developed and developing countries alike have been and are being privatized (Eggerth, 2005; Lee, 1997). In fact, the World Bank assessed the feasibility of private sector delivery of different infrastructures and found solid waste collection to have one of the highest marketability potential (1994, p. 115). Based on this analysis, they recommend "private sector with access regulation or regulation of exclusive service contracts" as the best option for privatizing waste collection services in low and middle-income countries (*ibid.,* p. 118). Advocates of de-regulation and privatization in this sector do not question the necessity of monopoly behavior in those sectors; instead they debate the issue of efficiency and quality of service under different market structures: public monopoly, franchise, contract, and competitive markets (Walls, Macauley and Anderson, 2005). [10,11]

Much like other public utilities in the West, the late nineteenth and the early twentieth centuries saw the emergence of municipal control and responsibility over waste management systems shift away from contract systems of the past (Melosi, 1981). By the 1960s, two-

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[10] In an empirical study of local government decision-making on the choice of market structure for solid waste collections, Walls, Macauley and Anderson (2005) conclude that cost or efficiency concerns do inform public decision-making in local governments in the U.S. Compare to Ohlsson (2003) who finds that cost differences do not influence choice of market structure in Sweden.

[11] These four organizational forms cover the gamut of market structures in solid waste collection. In between the two extremes of monopoly government provision and private competitive markets where more than one firm might provide waste collection services, there are franchise and contract structures which differ only in minor ways. In a franchise structure, the franchisee is responsible for collecting user charges while in a contract scenario, the government collects charges (through taxes for instance) and pays the contractor for the service.

thirds of America's disposal systems were publicly controlled even though the private sector dominated in terms of tonnage of refuse because the latter controlled commercial and industrial waste markets (Crooks, 1993; Macaulay, 2009). A survey of 1,373 municipalities in 1975 showed that over 60 percent provided municipal waste collection services while the rest had contract, franchise or private collection systems. The 1970s represented a crucial change in the way public services would be delivered in the U.S. and waste management was no exception. E.S. Savas was the "academic voice" calling for the privatization of waste management services (Crooks, 1993, p. 13). In a series of studies on solid waste collection funded by the National Science Foundation, Savas examined the relationship between organizational form (public/private) and the efficiency and effectiveness of service delivery (Savas, 1977, 1978, and 1981).

From these studies, Savas and his colleagues concluded that private firms can provide collection services cheaper than municipalities (Bennett and Johnson, 1979; Stevens, 1978). Stevens (1978) found no returns economies of scale in waste collection in cities with population up to 20,000, small to constant returns to scale in cities between 20,000 and 50,000, and constant returns to scale in cities with population greater than 50,000. Following these findings, Savas (1977) recommended that for cities less than 20,000 inhabitants should consider consolidating with other cities to form larger markets of up to 50,000. Cities larger than 100,000 should consider breaking up the market into districts of 50,000 each and contracting with one or more private firms to provide collection services. While the nature of the service does not allow for continuous competition, Savas argued that periodic competition for exclusive contracts or franchising would address issues arising from the potential monopolization or oligopolization through collusion among contractors. Savas'

work has spurred a flurry of research on this subject. Ensuing debates can be grouped into the following two questions: First, are public monopolies more efficient than private monopolies in the waste collection sector? Second, does periodic competition-for-the-market make service delivery more efficient?

Regarding the first question, Antonio and Filippini (2002) agree with Stevens (1978) and find significant economies of scale and density in waste collection markets. They argue that a franchised monopoly in waste collection is the most efficient market structure for Italian waste collection markets. McDavid (1985) similarly finds that in Canada public waste collection is less efficient than private collection. Bel and Miralles (2003) find that in Spain, municipal decision to outsource varies with population size in an inverted U curve. Smallest and largest cities are less likely to contract out than medium sized cities. In smaller cities, transaction costs related to supervision of the contract may outweigh the economies of scale, while in larger cities, economies of scale may be exhausted, thus offering no efficiency gains. If Spanish cities were to comply with Savas' recommendations of bundling smaller cities and parceling out larger cities into districts, transaction costs might be reduced (*cf.* Sorensen (2007) who argues that inter-municipal cooperation in solid waste services can lead to efficiency losses). A comparison of collection vehicle efficiency between public and private waste collection service providers in different developing country cities showed that not only did private vehicles transport more waste per trip, they also employed fewer people per vehicle (Fernandez, 1993). Obeng, Donkor and Mensah (2009) found that private sector participation in solid waste improved efficiency and service coverage in Kumasi, a city in Ghana. Cointreau-Levine and Coad (2000) summarize their arguments for private sector involvement through a cartoon with the following caption: "Fair competition is one key to

the provision of good waste management services. The runners represent service providers—both public and private sector. They are closely watching each other's performance. They are motivated!" (p. 9) (see Figure 3).

Figure 3. Competition and waste management service provision[12]
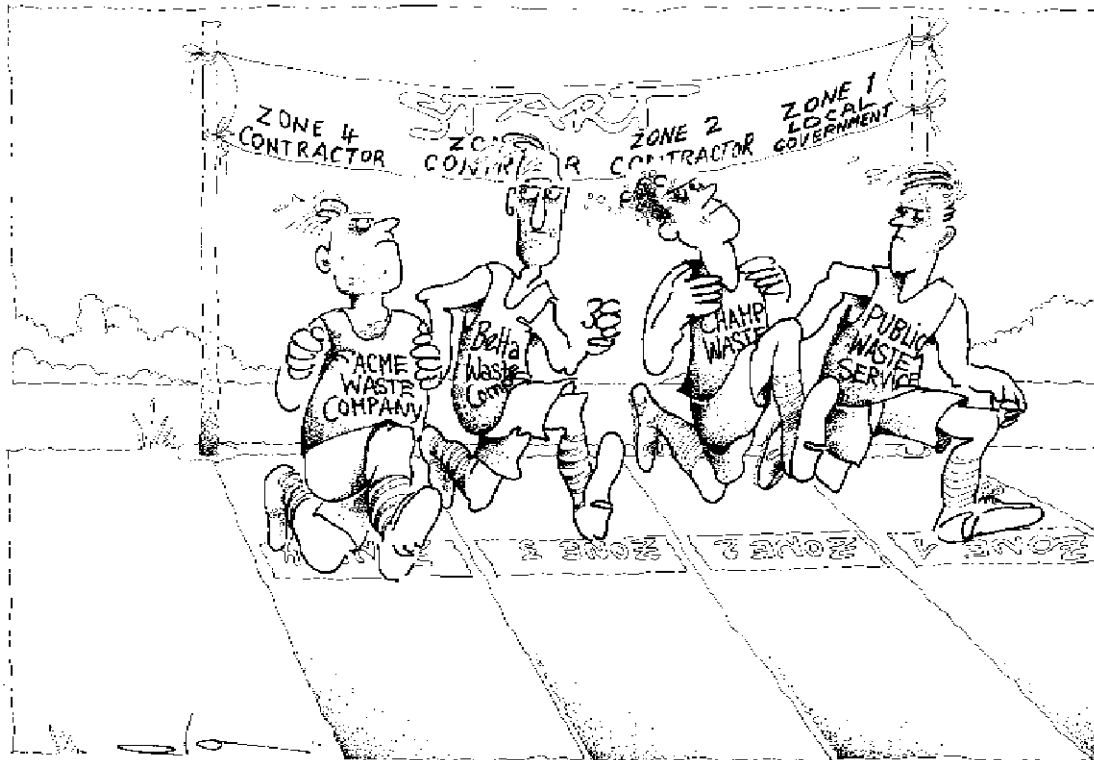
However, not everyone agrees that private ownership is more efficient than public ownership. In a comprehensive review of econometric studies from 1970 to 2008, Bel and Warner (2008) find no systematic link between cost savings and privatization in solid waste services markets. Hirsch (1995) questions the validity of the cost comparisons between private and public market structures arguing that the sample in these studies is biased because private firm cost data pertains to only those cases where they are already providing services, presumably at lower costs than the public sector was able to deliver, therefore costs savings in the private sector might be overstated. Ohlsson (2003) also finds that public production

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[12] Source: Cointreau-Levine and Coad (2009, p. 9)

costs were lower than private production costs in Swedish waste collection markets. In an analysis of 14 PPPs in three Ghanaian cities, Awortvi (2004) found minimal increases in service quality levels, and no cost savings in two out of the three cities. Ghanaian local governments in Accra and Kumasi were paying more for solid waste collection as compared to when the services were delivered in-house or by small local contractors. Nelson (1997) suggests that transaction costs—cost of writing and monitoring contracts—are often so high that municipal delivery may actually not be as inefficient as it is made out to be.

Others suggest that public ownership might be the most efficient market structure with specific services outsourced. Massarutto (2007) finds evidence in Italy that outsourcing to large multinational firms such as Waste Management Incorporated (WMI) does not yield cost advantages. Instead, where waste management has continued to be a public undertaking, with a significant and increasing portion of the service outsourced to SMEs and cooperatives, publicly owned companies were found to improve economic performance and reduce direct cost. Additionally, a "lively market of SMEs specializing in blue-collar and in high-value added services" has resulted (*ibid.*, p. 15). Summarizing the results of these various studies, we can safely conclude that empirical evidence is inconclusive on the issue of efficiency in public versus private delivery of waste management services.

Regarding the second question related to the efficiency of competition for-the-market, many argue that competitive markets in waste collection might be more efficient than previously suggested. Dubin and Navarro (1988) argue that Stevens (1978) and other studies have overstated the costs associated with private (competitive) market structures and understated the costs associated with interventionist market structures (public or private monopolies). Competitive market structures may be more efficient than previously thought. But the most

efficient way to ensure reasonable competition in contracting is through what is often

referred to as competitive tendering (Antonio and Filippini, 2002; Stevens, 1978). The

OECD Competition Committee (1999) summarizes this as follows:

> *Competition for-the-market (in the form of periodic competitive tendering for the right to provide a service) will be more efficient than either a regulated monopoly or direct service provision when at least the following conditions are met: when the level of sunk investment required is low, when other firms can assess how much it costs to provide the service, when the quality of the service can be easily measured and when there are a sufficient number of firms with the potential to compete in the tendering process. Residential waste collection meets all these conditions and so can be efficiently provided through competitive tendering* (p.8).

In the UK where compulsory competitive tendering (CCT) for waste collection was in effect,

it was found to reduce costs and not affect service quality (Szymanski, 1996).[13] Further

Szymanski (1996) found the greatest cost savings under CCT followed by non-CCT private

markets followed by public provision.

On the other hand, economies of density have been argued to be the strongest in residential

waste collection, making opportunities for competition very weak in this market (OECD

Competition Committee, 1999). In a comparison of waste collection markets in the U.S. and

Spain, Warner and Bel (2008) argue that emphasis on public choice and reliance on

competitive markets in the U.S. led to lower levels of privatization whereas in Spain,

monopoly production through hybrid public/private firms have enabled a much more stable

environment for privatization and service delivery. The authors suggest that managing a

monopoly may be more important than managing competition in service delivery.

Despite the lack of unanimous agreement on the most efficient market structure in waste

collection, privatization of waste collection systems has occurred and continues to be pushed.

Much as in the case of privatization in other sectors, advocates do not question *if*

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[13] CCT has since been replaced with the concept of "best value" (Bovis, 1999).

privatization works but rather they focus on *how* to make it work. The goal has become to

ensure that the tendering process itself ensures reasonable competition, and is fair and

transparent. Fair, transparent and well-documented contracts and contracting processes are

key to realizing the efficiencies latent in private provision of public services. The contract—

the document itself—is crucial; so much so that the costs associated with writing and

monitoring contracts may be high enough so as to make the public option more efficient

(Nelson, 1997).[14] The stakes are high to make sure that these costs are minimized. To achieve

this, the role of the public manager shifts from being one in charge of overseeing operations

of service provision to one whose responsible for writing, administering and monitoring

contracts (Hoornweg and Gianelli, 2007). Management expertise is what is needed

(Ohnesorgen, 1993). For this, an appropriate regulatory environment and institutional

capacities need to be fostered.

If we are to agree that private firms are more efficient at providing public services, then the

question of how exactly private firms achieve these efficiency gains remains to be answered.

Savas (1977) explains the reasons for the cost efficiencies in private provision as follows:

> [The] *high cost of municipal collection compared with contract collection is apparently*
> *due to what some might call "bureaucratic inefficiency" or "governmental inefficiency":*
> *compared to private firms with contracts in cities of over 50,000, municipal refuse-*
> *collection agencies in such cities have higher employee absentee rates (12 percent vs. 6.5*
> *percent, significant at the 99 percent level); employ larger crews (3.26 men vs. 2.15,*
> *significant at the 99.9 percent level); serve fewer households per shift (632 vs. 686, not*
> *significant at the 95 percent level); spend more time servicing each household (4.35 man-*
> *hours per year vs. 2.37, significant a the 99.9 percent level); and are less likely to utilize*
> *labor-incentive systems (80 percent vs. 89 percent, not significant at the 95 percent level)*
> (p. 71).

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[14] By contrast, Awortvi (2004) in his analysis of PPPs in solid waste collection in three Ghanaian cities found a
weak correlation between a good contract document and quality of service, suggesting efficiency gains from
contract writing might not be all they are made out to be.

In waste collection, capital and labor are said to be theoretically substitutable; the production function is homothetic and exhibits a constant elasticity of substitution (Stevens, 1978, p. 440). In reality, over 50 percent of the cost of collection service is attributable to labor (Szymanski, 1996). Taking both into account—capital-labor substitutability and high labor inputs—reducing input prices or wage rates and increasing the productivity of labor and equipment are ways to reduce costs (Szymanski, 1996). Critics have argued that a rise in labor intensity, or the exploitation of labor, that is lower wages and reduced or no benefits, can explain efficiency gains as much as improvements in technical efficiency to achieve cost reductions by private contractors (Ganley and Grahl, 1988; Hirsch, 1995). Lower labor productivity in public sector monopolies is often cited as a reason for greater efficiencies in the private sector (Stevens, 1978). Responses to criticisms of labor exploitation argue that the workforce in public sector monopolies are paid higher and competition only disallows the expropriation of monopoly rents by workers (Domberger, Meadowcraft and Thompson, 1988). Aside from the efficiency of labor in public sector monopolies, what is also at stake is the labor wage rate for waste collectors in the public sector. Efficiency of labor can be increased through "effective monitoring of the workforce" but if wage rates are the problem, there is only one way to reduce costs—bring them down to market rates (Szymanski, 1996, p. 3). Cubbin, Domberger and Meadowcraft (1987) disagree arguing that efficiency gains are not achieved by lowering wages and benefits but rather through increasing the productivity of labor and vehicles in waste collection. Samson (2003) has shown that privatization of waste management services in South Africa has both increased productivity and lowered wages: increased the intensity of work (work became more strenuous and required more

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tasks), increased duration of the work day, made work conditions more unsafe for women, and lowered wages and benefits for workers who became employees of the private provider. From this review of the somewhat contradictory literature on the efficiency of waste collection under different market structures, the following points may be gleaned. First, although economies of scale and density do characterize solid waste collection markets, the low degree of sunk investments calls into question the necessity of monopoly behavior. Regardless, either public or private monopolies dominate the waste collection market landscape in many developed and increasingly even developing countries. Second, public provision of waste collection is in general regarded as inefficient. Policy prescriptions that emerge from these studies often call for privatization of these services on grounds of improving efficiency. Third, the best way to bring about privatization is by enabling *competition for the market* through competitive tendering, an assemblage of regulations and processes designed to ensure that contracting is governed in a fair and transparent manner. Local autonomy of the city governments to manage their own finances as well as to govern the contracting process is likely to lead to higher efficiency gains (Boyne, 1996; Fernandez, 1993). Finally, efficiency gains in private service provision may come at the expense of increasing labor intensity and reduced wages and benefits for the workforce in waste collection. In the next section, I explore the material implications of economic theory on the waste management industry, using the United States as a case study.

The contradiction in theory and practice: Monopoly and competition in the waste management industry in the U.S.

Proponents of privatization of public infrastructures and services have been arguing for a while now that public monopolies are inefficient and private sector delivery through some form of regulated competition between private firms can be more cost effective and provide

higher quality of services to consumers. Following Marx (1977) who argued for monopolies as the logical and perhaps even inevitable result of competition through economic concentration, Marxists have noted the emergence of monopoly capital even as competition continues to axiomatically be touted as the cornerstone of capitalism (e.g. Baran and Sweezy, 1966). Within economy theory, competition continues to be widely held as the foundation on which a free market stands in spite of the reality of increasingly ascendant monopoly power in all sectors of the economy (Foster, McChesney and Jonna, 2011). The waste management industry in the U.S. has also seen the emergence of monopoly power in the past five decades. The contradiction between economic theory that argued for privatization of waste management services in the 1970s to foster efficiency through competition, and the current landscape of waste management industry dominated by a handful of major players, is starkly evident.

Even though solid waste management services were municipalized in the early twentieth century along with other public services, small private firms continued to provide a variety of waste management services ranging from collection and recycling to operating municipal dumps (Melosi, 1981). Even in the 1960s, more than 12,000 private firms were a part of a highly fragmented industry that regulated itself and avoided competition through the formation of trade associations that divided territories among themselves (Crooks, 1993). Municipalities used to control disposal facilities or dumps. In the 1960s, the industry began to change however. Environmental regulations, starting with the U.S. Solid Waste Disposal Act of 1965, enforced stricter control over disposal practices (Crooks, 1993). The Resource Conservation and Recovery Act (RCRA) of 1976 reformed waste management practices even further by banning open dumps and setting standards for landfilling (Macauley, 2009).

Landfills that could not meet standards were closed or upgraded to meet those standards. New landfills had to comply with new standards that required significant capital inputs in their design and construction. 2,200 landfills were closed in 1970 (Crooks, 1993). Between 1988 and 1994, after the new RCRA compliant Environmental Protection Agency (EPA) rules came into effect in 1993, the number of landfills decreased from 7,924 to 3,558 (Macauley, 2009). By 2002, the number of landfills reduced even further to a mere 1,767 as the amount of waste they could absorb increased four times on average. Local dumps were replaced by large, regional facilities (*ibid.)*. Municipalities could not make the investments to upgrade existing landfills or build new landfills to conform to new EPA regulations: "Environmental regulation created a massive opportunity for investment by large private players in new alternatives, something that neither cash-strapped municipalities nor smaller firms could afford to do" (Crooks, 1993, p. 8). This period saw the emergence of large firms that would come to dominate the landscape of waste management industry in the United States. Control of landfill space became the key to market power for the big players (Consumer Action at al., 2008).

At around the same time, outsourcing of public services was also gaining traction in mainstream policy practice as a way to resolve the fiscal problems that cities were facing. In waste management, academic policy advisors such as E.S. Savas demonstrated why privatization was the way forward to reduce the financial burden on cities and make waste management services more efficient for consumers (Savas, 1979). Although smaller private players already existed in the market that provided industrial and waste collection services, they carried the reputation of operating as Mafioso cartels, legitimately in some cases (Reuter, 1987). For this reason, cities such as New York sought bids from large "continental"

firms rather than the local firms "in order to bypass "territorial problems" associated with the Mafia-run garbage cartel in New York" (Crooks, 1993, p.16). Large firms seized upon this opportunity. Some of the firms decided to consolidate through vertical integration offering end-to-end waste management services from collection to disposal (Macauley, 2009). Smaller firms could not resist takeover bids from larger firms "who offered attractive shares in the arrangement at a time when waste management stock prices were rising rapidly" (Crooks, 1993, p. 7). Smaller firms were also priced out of the market. Firms with disposal contracts, for instance could charge high tipping fees for smaller firms that provided collection and transportation services. Unable to afford these fees, smaller firms went out of business (Consumer Action et al., 2008). Opportunities for market expansion—vertical integration of services along the value chain, geographic expansion, tighter regulation, and environmental concerns—have underpinned the emergence of national (and even international) monopolies in the waste sector. By 2004, although publicly traded waste management firms formed only 0.1 percent of the total number of firms in that market, they controlled 63 percent of the market share in value (Consumer Action et al., 2008). Further consolidation continues. The time of mom-and-pop shops being taken over a by larger firm has long passed. For over a decade now, large players are acquiring and merging with each other (Corkery, 2010). In 1998, WMI and USA Waste Services merged. Allied Waste responded by acquiring Browning Ferris in 1999. In 2008, Allied Waste and Republic Services merged in order to rival WMI, the current global leader (Carlson, 2008). In 2012, WMI and Republic accounted for 39 percent of the industry revenue (Waste Business Journal, 2012). In 2012, the private sector in the industry controlled 78 percent of the market,

while the municipal sector controlled the remaining 22 percent, down from 35 percent in 1992 (*ibid.*).

Meanwhile, the justification for privatization of waste management services—cost efficiency—is being questioned as large firms exercise their monopoly powers to raise prices for both collection and disposal services (Consumer Action et al., 2008). Further, critics suggest that these companies engage in anti-competitive practices such as cartelization through horizontal market division and price-fixing—practices that closely resemble the old Mafia-like industry (Crooks, 1993). While the intent of new modes of privatization may have been to get rid of those old practices (Reuter, 1987), the new industry might simply be a re-incarnation of the old:

> *Clearly, there is overwhelming evidence to suggest that though the new waste giants are creatures of capitalism their business practices in many respects defy conventional notions of free and open market behavior. Although a company like WMI can point to its periodic and mandatory antitrust compliance seminars for line officers, as well as to its written and audio-visual antitrust educational materials for all employees, evidence . . . has shown that the present industry bears a strong family resemblance to the old one . . . Financial muscle had replaced the physical kind. However, and crucially from the perspective of public policy, the industry had not outgrown some of the practices originating in the era when mobsters had a grip on segments of the business, and above all, it had not outgrown the need for order that strong arm types had once provided* (Crooks, 1993, pp. 254-5).

The waste management industry betrays the fundamental contradiction in neoliberal economic theory and practice. While the theory celebrates the importance of free enterprise and competition as the basis for achieving optimal social outcomes, in practice it seems to have achieved quite the opposite—stifled out competition to create monopoly power in those markets. Neoliberal critics had bemoaned the existence of inefficiency of public monopolies and argued for their privatization. They imagined private monopolies or oligopolies (depending on the size of the city) that would compete periodically for rights to serve their

assigned jurisdictions. Instead, public monopolies and local private oligopolies and monopolies have been replaced by national ones ridden with the same problems of price-fixing and cartelization as before. Not much has changed except that capital is now consolidated in a lot fewer hands in the waste management industry. The lofty dream of free enterprise in waste management is reality only for the very few that have remained in the market space. Moreover, as with other sectors of the public service economy, discourses and practices of privatization in waste management have not only minimized alternatives, they have also obliterated the rationale, capacity, and knowledge of the state's ability deliver on those alternatives (Crooks, 1993; Fine and Hall, 2012). As Bakker (2005) has shown, similar contradictions (failure of competition and full-cost pricing) had emerged in the case of water utility privatization in the U.K. Water proved to be a particularly "uncooperative commodity" and was subsequently remunicipalized (p. 543). Waste as a commodity, however, continues to cooperate. In fact, it is a particularly great commodity (Lehman, 1999). Remunicipalization is not a likely possibility.

My purpose in examining economic theories of privatization, particularly of waste management services, and tracing the evolution of the waste management industry in the U.S. has been two-fold. First, literature within economics on privatization in general, and privatization of solid waste management services in particular, is divided on whether the intended outcomes have indeed been achieved. Yet, privatization and the encouragement of competition in solid waste management markets dominate policy discourse and practice. Second, a discourse of competition is contradicted by increasing monopolization in many economic sectors. The evolution of the U.S. waste management industry offers a case in

point. In the following section, I hope to bring this discussion to bear by tracing the ongoing restructuring of the waste management industry in India.

Infrastructure privatization in urban India: a brief history

The provision of waste management services is an obligatory function of the government. This is written into laws that established municipalities and urban local bodies across the country making them responsible for "the scavenging, removal and disposal of filth, rubbish and other obnoxious or polluted matter" (GOI, 1957, Section 42). Even though laws accorded the responsibility for waste management services to municipalities and urban local bodies, they never really assumed this responsibility fully. A range of actors in the informal and formal sector has historically provided different aspects of waste management services. But this has changed recently. Increasingly, in the past two decades, municipalities have been outsourcing waste management services to private firms. Just two decades ago, there were very few firms specializing in waste management services, most of them providing few and specific services such as waste transportation. Now there are many firms offering a diverse portfolio of services and competing for municipal contracts across the country.

In part this has been due to increasing rates of urbanization, economic growth, and higher per capita and total quantum of waste generated that are together putting further pressure on already overwhelmed capacities and infrastructures (Sankhe et al., 2010). Per capita waste generation rates estimated at 0.34 kg/capita/day in 2012 are expected to double by 2025 to 0.7 kg/capita/day (Hoornweg and Bhada-Tata, 2012). During the same time, the total quantity of waste is expected to increase by 250 percent (*ibid.*). A different estimate claims that the gap between supply and demand for solid waste services in urban areas in India will increase four-fold between 2007 and 2030 (Sankhe et al., 2010). Supply is not the only issue

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however. Demand for waste management services has also started to rise from residents demanding cleaner cities.

Almitra Patel v. the Union of India, a landmark public interest litigation (PIL) filed by a Bangalore-based activist in 1996, resulted in the issuance of *Municipal Solid Waste (Management and Handling) Rules 2000,* the first set of rules that clearly outline the responsibilities of national, state and local governments in the management of urban wastes.[15] PILs such as this one and the subsequent issuance of waste management rules served two inter-related purposes.[16] First, they highlighted the inability of the state to provide crucial public services. Second, they put pressure on municipalities to find solutions to their waste management problems. The passing of the 2000 rules in essence, re-municipalized waste management services. A new kind of privatization of waste management services emerged as a potential solution (Chaturvedi and Gidwani, 2011). What was starting to get privatized was not entirely public to begin with. Large chunks of waste management services (collection, segregation and recycling) had for a long time been provided by private actors of a different kind in the informal economy of waste in urban India. These historical developments almost mimic how the regulatory environment, for instance the RCRA, changed the market structure of the waste management industry in the U.S. But these developments are even more interesting in the context of the general urban politico-economic environment that was changing at around the same time.

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[15] The 2000 rules are currently in the process of being revised. Draft rules were issued in 2013 and faced severe criticisms from environmental and social activists organizations across the country. Updated draft rules were issued in 2015 but have not yet been finalized.

[16] Other PILs, most notably *B. L. Wadehra v. the Union of India* have been crucial also. This PIL highlighted the inability of the Municipal Corporation of Delhi and the New Delhi Municipal Council to perform their waste management functions as defined in the 1957 Act, and specifically their inability to manage biomedical waste, led to the passing of the Biomedical Waste (Management and Handling) Rules in 1998 (Chaturvedi and Gidwani, 2011).

In 1991, facing a serious economic crisis when balance of payments pushed the country to near bankruptcy, India carved out a bailout deal with the IMF and embarked on a series of structural economic reforms. This moment is commonly noted as marking the beginning of the period of economic liberalization of the Indian economy even though experiments with liberalization had been tried a few times prior and conditions of political support for these reforms had long been underway (Sharma, 2011). Following at least some of IMF's bailout stipulations, the economic reforms aimed at "reducing the extent of Government controls over various aspects of the domestic economy, increasing the role of the private sector, redirecting scarce public sector resources to areas where the private sector is unlikely to enter, and opening up the economy to trade and foreign investment" (Ahluwalia, 1994, p. 1). Cities, particularly the urban middle classes, played a key role by providing the crucial political support towards these market-oriented reforms (Sridharan, 2004).

Almost concurrently with the economic reforms, the 74th Constitutional Amendment Act (CAA) was passed in 1992 (GOI, 1992). This Act devolves certain functional responsibilities and financial powers to municipalities. Prior to the 74th CAA, local governments were organized on the *ultra vires* principle ("beyond the powers and authority granted by law"), which meant that state governments could exercise formal control over municipalities (NIUA, 2005). The Act was designed to put on a "firmer footing the relationship between the State Government and the Urban Local Bodies with respect to (a) the functions and taxation powers . . ." among other things (GOI, 1992, Section 2). A list of eighteen functions is delineated in the Twelfth Schedule of Article 243 W of the Act and include, among other things, "public health, sanitation conservancy and solid waste management" (*ibid.*, Article 243W). Urban economies emerged as central to India's hopeful entry into the developed

world and Indian lawmakers were quick to discern the necessity of this connection. Indian cities are estimated to host 40 percent of the total population and contribute to 70 percent of India's GDP by 2030, driving almost four-fold increase in the average national income (Sankhe et al., 2010). Most of this growth is likely to be restricted to India's megacities (Kundu, 2011). Even so, demand for urban services will continue to rise and unless infrastructures are improved, quality of urban services and urban life will continue to deteriorate (Sankhe et al., 2010). While the Act clearly delineated the functions of municipal governments, it did not ascribe them adequate financial powers to perform these mandated functions (Mohanty et al., 2007, p. 2). Indian cities for instance will need an additional USD 1.2 trillion in capital investment to meet this growing demand for urban services (Sankhe et al., 2010). How will urban India close this infrastructure investment gap?

In 1996, the Government of India formed an Expert Group on Commercialisation of Infrastructure Projects under the chairmanship of Dr. Rakesh Mohan. In his position as the economic advisor to Government of India's (GOI) Ministry of Industry, Dr. Mohan had also been deeply involved in designing the economic reforms package of the early 1990s (Mohan, n.d.). The report of this Expert Group, commonly referred to as the Rakesh Mohan Committee on Infrastructure, found that planned allocations for urban infrastructure was a mere nine percent of the investment needed during the period 1996 to 2006. The Committee recommended a set of "institutional arrangements, legal frameworks and financial arrangements that would facilitate the free flow of resources to infrastructure" and estimated private sector investment in infrastructures to rise from 1 percent of the GDP in 1995-96 to 3.5 percent in 2005-6 (Mohan, 2003, pp. 2-3).

Meanwhile, the GOI's Tenth Five Year Plan for the period 2002-2007 emphasized the goal of provision of sewerage and sanitation services to 75 percent of the urban population by the end of the plan period (Planning Commission, 2002). By the end of 2004, only about 63 percent of the urban population had access to sewerage and sanitation facilities (Planning Commission, 2007). Economic costs of inadequate sanitation, including solid waste disposal, in India are estimated to be approximately USD 54 billion a year, close to 6.4% of the country's GDP (Water and Sanitation Program, 2011). The funds required for providing these services over the five-year period were estimated at INR 537.19 billion (USD 8.37 billion) and availability of funds from various sources was estimated to be a mere 33 percent of the requirement (Mohanty et al., 2007, p. 13). To address these gaps in funding, the Government of India started pushing for new mechanisms to spur financial investment in infrastructure. Private sector entry in infrastructure markets became necessary (Baindur and Kamath, 2009). There were no alternatives other than private sector investment that would be able to meet the growing infrastructure deficit.

At about the same time, Jawaharlal Nehru National Urban Renewal Mission (JnNURM), the single largest urban reform program in Indian history, was launched. This program aimed to "encourage reforms and fast tracked development of identified cities" by catalyzing "investment flows in the urban infrastructure sector" over a seven year period (JnNURM, n.d., pp. 3-5). Financial assistance from the program in the form of grants from the central government to the tune of INR 500 billion was expected to foster private sector entry into the urban sector. "Implementing agencies" were "expected to leverage the sanctioned funds under JnNURM to attract greater private sector investment through PPP that enables sharing of risk between the private and public sector" (*ibid.*, p. 8). The purpose of JnNURM was

partly to provide a mechanism for the implementation of the 74th CAA by providing ULBs access to revenues to perform the functions assigned to them (Mohanty et al., 2007, p.16). To do this, the Ministry of Urban Development published a model municipal law as a template that would "assist urban local bodies in the areas of accounting reforms, resource mobilization and entry of private sector partnership" (MoUD, 2003, Preface). The MML aimed at "simplification of municipal bylaws, provision for enhanced borrowing, allowing the entry of private sector and authorising concessionaires to penalise users for non- payment of tariffs" (*ibid.*, Preface). MoUD also published primers or guidance manuals for ULBs delineating the mandatory and optional tasks assigned to them. A couple of these focused on the implementation the 74th CAA (MoUD, n.d.-a and -b).

But the definition of the term "infrastructure" itself needed clarity if it was to become a focal point of national development. The government coordinated a series of efforts to reach consensus on the definition of infrastructure: the Rakesh Mohan Committee in 1996, the Rangarajan Commission in 2001, the Reserve Bank of India (RBI) in 2007, and the Insurance Regulatory and Development Authority in 2008 (Planning Commission, 2008).[17] In 2008, an Empowered Sub-committee of the Cabinet Committee on Infrastructure headed by the Planning Commission reached consensus on a broad definition of infrastructure, which included solid waste management under the category of sanitation (*ibid.*). To further refine this definition, a Standing Committee on Infrastructure Statistics was incorporated in 2008. Concluding its deliberations in 2009, the Committee identified a list of infrastructure sectors and sub-sectors. In this list, "on site sanitation facilities, landfills, incinerators" were included

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[17] The Rangarajan Commission report specifically called out natural monopoly as one of the defining characteristics of infrastructures: "The scope for competitive supply of infrastructure also varies greatly across sectors, within sectors and between technologies. Many infrastructure facilities are characterised by declining costs, leading to what is known as a natural monopoly situation. It is important to remember that natural monopoly arises out of technological factors and not due to policy" (National Statistical Commission, 2001).

in the sanitation infrastructure sub-sector (MoSPI, 2013a, p. 11). While these efforts to define

infrastructure might have been rooted in the necessity of collecting and reporting consistent

and comparable data about the gamut of things in the broad category of infrastructure, they

also reveal something else. This process of defining infrastructures was a part of the

emergence of infrastructure as an object of state planning and the focal point of urban reform,

financing for which could be raised, allocated and measured over time.

Just as the precise definition of infrastructure was important, so was the definition of a PPP

not merely to achieve a shared understanding among stakeholders but to also "identify

eligible projects or arrangements that could be recipients of desired benefits or applicable

procedures or treatment" such as securing viability gap funding or delineating the fiscal

implications of the arrangement (MoF, 2010, p. 11). Adhering to the World Bank's

recommendations on developing capacities through "policy and legal frameworks, and

institutions and processes" for PPPs in India, the Ministry of Finance (MoF) launched a

National PPP Capacity Building Programme in 2010 (World Bank, 2006, p. 5). A PPP Cell

in the MoF's Department of Economic Affairs has since been established with

responsibilities for all matters concerning PPPs, including policies, schemes, programs and

capacity building (MoF, n.d.). The Cell helps develop the regulatory framework through the

development and implementation of national and state-level PPP policies and rules, ensures

the "speedy appraisal" of projects, provides technical expertise in assessing financial

feasibility of proposed projects, and publishes guidance and resources such as toolkits for

state and local governments to establish and implement PPPs (*ibid.)*. The *National PPP*

Policy 2011, one such effort of this governmental body, defines PPP as:

> [An] *arrangement between a government or statutory entity or government owned entity*
> *on one side and a private sector entity on the other, for the provision of public assets*

and/or related services for public benefit, through investments being made by and/or management undertaken by the private sector entity for a specified time period, where there is a substantial risk sharing with the private sector and the private sector receives performance linked payments that conform (or are benchmarked) to specified, pre-determined and measurable performance standards (MoF, 2011, Section 1.1).[18]

The definition outlines a set of conditions that define what a participating private entity in a PPP can be: ideally a single entity to be entered into an arrangement with, its ability to share financial risks, and consequently its ability to furnish financing to undertake the provision of assets or services per the arrangement with the State. One of the stated objectives of the *Draft PPP Rules 2012* is to ensure the "maximization of economy and efficiency, effectiveness of the terms of concession agreements and the promotion of competition, fairness, transparency and equity in the procurement process" (MoF, 2012, p. 1). PPPs are understood as a "means for harnessing private sector investment and operational efficiencies in the provision of public assets and services" (MoF, 2011, Preamble 1). The logic is simple. There exists an infrastructure deficit that the private sector can meet. In doing so, the private sector will absorb some of the risks associated with the public investment and will bring its operational efficiencies that the State currently lacks. Empirical evidence seems to point in a different direction however. Mukhopadhyay (2011) shows that there is no relationship between infrastructure need and investment patterns in her analysis of PPPs between 1991 and 2001.[19]

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[18] A private sector entity was defined as " (a) a company that is outside the purview of Sections 617 and 619B of the Companies Act, 1956; or (b) any other entity not under the control of the Government. For the purpose of this definition, control means the ownership, directly or indirectly, of more than one half of the voting power of the entity" (MoF, 2012, p. 4). Public assets were defined as the "use of which is inextricably linked to the delivery of a public service" (MoF, 2011, Section 1.2). Services were defined as "those services that the State is obligated to provide to its citizens or where the State has traditionally provided the services to its citizens" (*ibid.*).

[19] Another goal of PPPs stems from the idea that it will help resolve issues of equity by delivering infrastructures and services to India's poor. Mukhopadhyay (2011) demonstrates this is not the case. PPPs between 1991 and 2001 had no impact on the infrastructure stock disparity patterns in India (see also Miraftab 2004).

The Government of India's Ministry of Finance's website devoted to PPPs proudly declares in its title bar, "India – A Fast Growing Free Market Democracy" (MoF, n.d.). The website boasts that India has "emerged as one of the leading PPP markets in the world" thanks to "an elaborate eco-system for PPPs…including institutions, developers, financiers, equity providers, policies and procedures." World Bank statistics on private participation in infrastructure seem to agree that India is doing well on this account (World Bank, 2015). Between 1990 and 2013, India boasted the second largest number of infrastructure projects with private participation (*ibid.*). India holds this position in a ranking of investment dollars over the same period as well (*ibid.*). Allocations towards investments in infrastructure between the 11th (2007-2012) and 12th Five Year Plan (2012-2017) more than doubled (Planning Commission, 2013, p. 3). During the same periods, the share of private investments in infrastructure development was expected to increase from 37 percent to 48 percent (*ibid.*).

But what is the size of the share for solid waste management infrastructures in all this? The Twelfth Finance Commission, an organization established to define financial relations between the Central and state governments for the period 2005 to 2010, "stipulated that at least 50 per cent of the grants provided to each state for ULBs should be earmarked for solid waste management through public-private partnership" (Thirteenth Finance Commission, 2009, p. 151). The table that follows shows a summary of the number of PPP projects and private investment in those projects based on most recent data published by the Planning Commission (2013). The table shows PPP projects that have been completed, those that are currently being implemented and those that are in the pipeline. Under each of these categories, the table provides a summary of total investment and number of projects, within

those at the state government level, and within those, projects classified as urban
infrastructure.

In examining these projects in detail, I identified and tagged projects under urban
infrastructure that were related to waste management. In other words, waste management
projects fall under the category of urban infrastructure. Urban infrastructure projects fall
under the category of states/union territories. As Table 2 shows, total private investment in
urban infrastructure (including completed projects, those that are being implemented and
those that are in the pipeline) is 23 percent of the total private investment in states and union
territories. Waste management projects form a significant portion (approximately 15 percent)
of private investment in completed urban infrastructure projects. Overall, the number of
waste management projects is 14 percent of all urban infrastructure projects.

Table 2. PPP projects in India

	Completed		Under Implementation		In Pipeline		Total	
	Number	**Amount**	**Number**	**Amount**	**Number**	**Amount[1]**	**Number**	**Amount**
Total	569	1,342	738	5,117	1102	6,360	2409	12,820
States/Union Territories[2]	464 (82%)	917 (68%)	551 (75%)	3,086 (60%)	989 (90%)	4,762 (75%)	2004 (83%)	8,765 (68%)
Urban Infrastructure[3]	154 (33%)	98 (11%)	126 (23%)	387 (13%)	331 (33%)	1,549 (33%)	611 (30%)	2,034 (23%)
Waste Management[4]	32 (21%)	14 (15%)	36 (29%)	12 (3%)	19 (6%)	12 (1%)	87 (14%)	38 (2%)
All amounts in billions of INR. 1 For some PPP project, the investment amount was not available. 2 Percent of total PPPs project cost 3 Percent of PPP projects by States/UTs 4 Percent of PPP projects categorized as urban infrastructure. These include any projects related to waste management including e-waste and bio-medical waste.								

Unfortunately, these data might not provide an accurate picture of private sector participation
in urban waste management. For reasons not clear to me, some past and ongoing waste
management projects that I am aware of are not included in this list. For instance, none of
Delhi's waste collection and transportation projects, or its WtE projects are on this list. While
this casts doubt on the reliability of this data, I have no reason to assume that projects in

other categories would not have been similarly excluded. Further, in the absence of any other data on the scale of private sector investment in infrastructure, these data likely give us a fair sense of the PPP landscape in India. Overall, these data show us two things. First, private investments in urban infrastructures are significant. And second, although overall private investments in waste management might be lower than other sectors of urban infrastructure, this might only be due to the fact that investment costs are relatively lower in waste management than in other sectors. Not that waste management is a lower priority, simply that it does not require as much capital investment as do other areas of urban infrastructure sector. The high proportion of the number of projects in the waste management sector, on the other hand, does signal the importance of this sector in urban infrastructure.

Waste Collection in Urban India

Despite the somewhat conflicting and contradictory evidence in economic theories of markets in public service provision, policies of privatization of these services in India are based in them. Privatization of waste collection services is rooted in the idea that efficiency gains are to be made in those markets regardless of the existing market conditions and are quite different from how those markets work in the developed world. The purpose of this section is to provide an overview of what solid waste collection markets in India look like. As mentioned earlier, the provision of waste collection services is an obligatory function of municipalities. This was bestowed upon municipalities initially by laws that established those bodies (such as the *Delhi Municipal Corporation Act 1957*) and bolstered further by the 74th CAA and waste-specific regulations (such as the *Municipal Solid Waste (Management and Handling) Rules 2000*) (GOI, 1957; GOI, 1992; MoEF, 2000). Municipalities across India have assumed this responsibility to varying degrees, with some providing doorstep waste

collection services, others collection services from local community bins, and yet others providing none or minimal services (CAG, 2008; MoSPI, 2014). The private sector has historically filled the gaps left opened by the state in waste collection service provision either through formal contracts with the state or informally. But unlike the contemporary developed world, the private in urban India (and many other developing countries across the world) is largely informal and heterogeneous. Many different kinds of formalities and informalities exist in this market, some new while others have a long history. These range from independent informal sector workers providing waste collection services, informal sector workers organized by a cooperative or an NGO, private contractors with regular or contract workers hired for waste collection, to municipalities' own staff or contract workers hired for providing these services (Planning Commission, 1995, p. 5).

Recently, there has been a burgeoning of waste management firms in India. As discussed earlier, this has been fueled in part by the issuance of government regulations such as the *Municipal Solid Waste (Management and Handling) Rules 2000* that explicitly hold municipalities accountable for waste management service provision but also by public sector reforms that attempt to make governments more efficient by encouraging outsourcing of infrastructures and services through mechanisms such as PPPs. Several different private firms offering a host of specialized and vertically integrated waste management services have emerged. Most of these companies operate nationwide and some even internationally. Thus far, however, most of these actors are domestic firms with the exception of some international firms that are trying to enter specialized sectors in the market such as waste-to-energy and the production of refuse-derived fuels.

In the following sections of this paper, I compare two distinct modes of privatized waste management services in urban India—an older one that is informal and fragmented composed of thousands of individual actors who may be classified as entrepreneurs that is quite different than a newer, formal entrepreneurs. This new, formal entrepreneur has emerged in the past two decades and is composed of firms that provide a host of waste management services. This newer class of entrepreneurs is privileged in the neoliberal policy regime that characterizes development discourse and practice in post liberalization India.

The 'new': Formal entrepreneurship in waste management in urban India

There is no doubt that there is money to be made in managing waste in countries such as India. Rising incomes means higher consumption levels and therefore increasing amounts of waste. The waste management business is also quite stable as contracts are often long-term. Even when the economy slows down, the amount of waste produced changes minimally, offering further stability to the firm providing those services (Economist, 2009). Opportunities for market expansion in waste management services present themselves in a few different ways.

First, there has been a shift in demand for different types of service from municipalities. In Delhi for instance, initially, the Municipal Corporation of Delhi (MCD) contracted with three separate companies—Delhi Waste Management (a subsidiary of the much larger SPML Infra Ltd), Ramky Enviro Engineers Ltd. (REEL), and AG Enviro Infra Ltd—for solid waste collection and transportation. Initially, these contracts only involved collection of waste from community garbage bins (or *dhalaos*) and transportation to the landfill. Recently however, contracts have started including doorstep waste collection services as well. In addition, new types of waste management services—waste treatment and disposal--are being contracted out

as well. For instance, two WtE plants are currently operational in Delhi, one run by a subsidiary of the Jindal Group, and another by IL&FS, a leading infrastructure development and finance company. IL&FS and a subsidiary of Excel Industries also run two separate composting facilities in Delhi. Some municipalities are increasingly looking for "integrated" waste management solutions that will include doorstep collection, transportation and disposal. Schindler, Demaria, and Pandit (2012) have argued for seeing this shift as part of a "systemic transformation where the formal system is gradually being disconnected from the informal system" (p. 19). Opportunities for vertical expansion and integration are presenting themselves.

Second, there is wide scope for market expansion in geographic terms. There has been a shift in waste management contracting practices from parts of a city to the entire city to even clusters of cities (Agarwal, 2013). For instance, when Delhi first privatized certain waste management services in the early 2000s, there were three large contractors providing those services. The city was divided into zones that functioned as independent jurisdictions assigned to each contractor, much in line with recommendations from economic theory. In other cities such as Jaipur and Nagpur, a single contractor services the entire city. In yet another case, a single contractor services a cluster of 18 cities in the state of Punjab. Bel and Miralles (2003) find a neighborhood effect on municipal decisions to contract out waste collection, that is, municipalities are more likely to contract out if this practice is common in neighboring cities. The likely explanation for this are two fold: first, municipal managers likely have more information to base their decisions based on the experience of neighboring cities; and second, contractors in neighboring cities might be able to exploit economies of scale and offer efficiency gains. It is the latter that is driving a cluster-based approach for

smaller cities in India that by themselves may not be able to bear the burden of the costs of land and treatment facility development and operations (NGT, 2015).

Third, regulation and environmental concerns also offer up opportunities for larger firms to outcompete smaller firms. Typically, as incomes rise, so does the demand for tighter regulation and greater public environmental concern. Municipalities with tight budgets have a tougher time complying with stricter regulations and are therefore more likely to outsource waste management to companies that can afford the investments needed to comply (Economist, 2009). REEL's chairman is optimistic about his company's future, "It's going to be one of the most promising sectors as the government gets stricter about environmental regulations" (Limaye and Chaudhary, 2013). Further, concerns over climate change, such as greenhouse gas emissions from landfills, encourage the adoption of alternative technologies such as WtE. More complicated treatment technologies also offer up higher profit margins to those providing those technical solutions (Economist, 2009). Government subsidies and revenues from power sales and mechanisms such as the clean development mechanism (CDM) offer up another source of revenue. Multiple revenue sources, in turn, can help companies weather market downturns (*ibid.*). A report published by the European Business and Technology Center (EBTC) notes the following fiscal incentives available for private firms hoping to enter the Indian waste management market: a tax holiday in the form of a 10-year 100 percent deduction of profits coupled with a slough of other tax/duties relief including a 100 percent depreciation within the first year of project installation for direct tax purposes, exemption/reduction in excise duty, exemption from Central Sales Tax and custom duty concessions on the import of material, components and equipment used in renewable energy projects, and exemption from electricity taxes (EBTC, n.d., p. 6).

Fourth, opportunities for waste markets are driven by pragmatic and aesthetic concerns of cleaning up Indian cities. There is no doubt that unmanaged garbage poses public health hazards and there are pragmatic reasons why waste management systems need to improve. But these pragmatic reasons are being coupled with aesthetic concerns. Dirty cities do not fit the image of world-class urban modernity to which India aspires. Prime Minister Modi's recent Swachh Bharat Mission (SBM) is testimony to the market expansion opportunities that are latent in cleaning up cities across the country (Jaffrey, 2014). The government has promised INR 1,960 billion towards the campaign: "NGOs and corporates (many of them foreign) who have spotted a killing to be made in cleaning up India are licking their lips in anticipation at windfall projects for garbage and waste disposal, and recycling" (Sengupta, Misra, and Ittyipe, 2014). To fund this program, the most recent Union Budget announced a two percent cess tax on select services to fund the campaign and a 100 percent income tax deduction for contributions towards the campaign (Zee Media Bureau, 2015a). Although the bulk of the focus of this campaign is on building toilets across India, the program permits financial assistance of up to 20% as viability gap funding for solid waste management for state governments for implementation of PPP projects (MoUD, 2014a).

Opportunities for market expansion—vertical expansion and integration of services along the value chain, geographic expansion, tighter regulation, and environmental concerns—have underpinned the emergence of private firms in the waste sector in urban India. This closely mimics the recent history of changing market structure in waste management in developed countries such as the U.S., as discussed previously. But unlike the U.S. where smaller mom-and-pop shops were already providing those services and needed to be bought out, in the Indian policy discourse, waste management is an open field. New actors only need to

outcompete each other. The thousands of informal actors might as well be non-existent. Waste management services are a blank slate into which firms can write their own corporate histories.

So, what has been the strategy for firms to outcompete each other in this empty market space? One way to outcompete is to bid lower than the competitors even if it means bearing losses in the medium term in the interest of creating a longer-term stronghold on the market. Such practices of underbidding or adventurist bidding were noted as one of the biggest problems by many of my informants in the Indian waste industry as well as the government (Annepu, 2013; MoF, 2009; Sastry, 2013). Another way to be successful in getting contracts is by satisfying rent-seeking practices of public officials in charge of awarding contracts. Both such practices have allowed "non-serious" players to enter the market (Babu, 2012). "Serious players" are hopeful however that a transition to "more efficient systems" will require investment in technology and therefore create barriers to entry that do not currently exist. This should help weed out the "non-serious" players who are apparently tainting the field for the "serious" players. "Serious players" are the big contenders such as REEL, Antony Waste, SPML and A2Z that now have some years of experience providing such services in urban India and have come to dominate the market (*ibid.*). As well be clear in the remainder of this section, the distinction between serious and non-serious players might be quite arbitrary. Both have engaged in equally unfair practices to capture the market and have subsequently failed to deliver. The following section provides a profile of five such serious players: REEL, SPML, Antony Waste, A2Z and Hanjer.[20]

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[20] My reason for selecting these five firms is two-fold. First, although no clear market studies documenting the dominance and market shares of major players in the Indian waste management market exist, news reports have noted the dominance of many of these players (see for instance Babu, 2012). Second, all these players are or have been recently active in the Delhi metropolitan area waste management markets. Although my argument

Ramky Enviro Engineers Ltd (REEL), established in 1994, provides a range of waste management services in 55 locations across India and has expanded internationally with offices in the United Arab Emirates (UAE), Oman, Gabon, Peru and Singapore. Within India, REEL provides municipal waste management facilities and services in 22 cities boasting as being the "largest supplier of waste collection services across India" (REEL, 2012). Aside from waste collection and transportation, REEL also provides or will soon start providing waste treatment services for not only municipal solid waste (composting and WtE) but also hazardous and e-waste, as well as disposal services in landfill operations and maintenance, and landfill closure services. But the provision of this increasingly diverse array of services in domestic and foreign markets requires large capital investments. To do so, REEL is relying on several different financial strategies such as stocks (e.g. a USD 200 million initial public offering to raise money for a WtE facility in Hyderabad), joint ventures (e.g. a memorandum of understanding (MoU) with Sanfeng-Covanta for WtE technology transfer and a partnership with Sembcorp Environment to expand its reach into the bio-medical waste market in India), and acquisitions (e.g. a USD 45 million acquisition of the Australian environmental engineering and petrochemical services provider Enviropacific Services to expand to geographic markets outside India) (Devadiga, 2013; Kumar, 2012; Limaye and Chaudhary, 2013). REEL expects that these investments totaling approximately INR 17 billion (USD 308 million) will help almost triple sales to INR 50 billion by March 2018. In 2013, the company forecasted sales to increase 21 percent to INR 17 billion from the previous year. In 2012, they reported a profit after tax of INR 2.1 billion, compared to INR 1.5 billion in 2011 (Limaye and Chaudhary, 2013).

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applies to the rest of urban India, my fieldwork was based in Delhi, therefore I am using Delhi as a case to make a broader point about urban India in general.

In Delhi, REEL is one of the major players in waste management, currently providing

collection and transportation services and is slated to start delivering municipal waste

treatment such as composting and WtE services despite the latter's continued failures

(Halder, 2013). North Delhi Municipal Corporation Commissioner, P K Gupta noted, "We

are very dissatisfied with the services by Ramki [*sic*] Group. Even basic functions aren't

being carried out and they have delayed the project of waste-to-energy . . . we have been

regularly imposing heavy penalties on the contractor" (TNN, 2013a). Lack of segregation of

waste appears to be a thorny issue but the responsibility for this failure has not been clearly

identified. In North Delhi, for instance, a municipal official notes, "If residents are failing to

segregate waste, it becomes the responsibility of the concessionaire to do so. But it has come

to our knowledge that the work is not happening and we have imposed heavy penalties on the

concessionaires" (Akram and Lalchandani, 2013). REEL was fined with two separate

penalties of INR 5.1 million and INR 12.5 million as a result (*ibid.*). Not everyone agrees

however. South Delhi Municipal Corporation (SDMC) Commissioner confesses, "Till now,

we have left everything to the private concessionaire. The fact that it is a PPP project means

the civic agency has some responsibilities" (Chitlangia and Nandi, 2014). REEL officials

agree, "The first P (Public) in PPP is missing in the project. It is only the private party's

responsibility to implement the project. For the success of door-to-door collections, waste

segregation at source and awareness among people was crucial. But the civic agency didn't

do much" (*ibid.*).

In many other cities also where REEL provides or used to provide waste management

services, there were and continue to be problems in service provision. In Chennai, where

REEL provides collection and transportation services of household waste, the municipal

corporation fears it is overpaying the contractor significantly because construction waste is often mixed in the waste that is deposited at the landfill. The city pays for services by weight of waste and it is in the contractor's best interest to not segregate construction waste because the it is much heavier and means greater revenues for the firm (Philip, 2013). In addition, in 2012, the Chennai Municipal Corporation issued a show cause notice for the termination of their contract on grounds that REEL did not deliver according to the conditions in their contract which included door-to-door collection of garbage, collection of municipal solid waste on the stipulated time, sweeping of streets and night conservancy operations (Philip, 2012). The Chennai High Court dismissed the writ petition filed by REEL against the show cause notice allowing the municipality to terminate their contract and fine them INR 60 million for poor performance (*ibid.*). A news report from Chennai notes, "An official said the corporation's long-term strategy was to privatise garbage collection in all zones. But officials remain uncertain about how viable this will be because the performance of private players like Neel Metal Fanalca and Ramky Enviro Limited was not up to the mark" (Philip, 2014). The future for REEL in Chennai does not look bright.

In Hyderabad, REEL invested INR 150 million in the development of two transfer stations in support of its collection and transportation contract with the Greater Hyderabad Municipal Corporation (Mahesh, 2014). But due to opposition from workers' unions, work has not yet started. REEL is asking the state to either refund their investment in the transfer stations or allow them to commence work (*ibid.*). In 2010 in Aurangabad, the Aurangabad Municipal Corporation (AMC) had outsourced its solid waste management services to REEL for a period of 10 years (Chinchkhede, 2013). REEL however stopped work after two years alleging that the municipality had failed to abide by its contractual commitment (*ibid.*).

Regarding this issue, the Deputy Municipal Commissioner of Aurangabad said, "In the last attempts, the AMC's models were not designed by experts. This time, we want to involve professionals in the process" (*ibid.*). REEL's professionalism and ability to design and deliver services was in question. Similarly, in Guwahati, a Guwahati Municipal Corporation Councilor made a plea to the mayor to annul the municipality's contract with REEL for the latter not having fully provided any of the collection, segregation, street sweeping, drain cleaning, treatment and disposal services written in their contract (Patowary, 2014). In Cuttack, REEL's waste collection and mechanical sweeping services have been sub par even though the municipality pays the contractor INR 9 million each year (Jaiswal, 2013). In Bangalore, critics have questioned the technical ability of REEL to provide composting services for wet waste of 300 tons per day. Leo Saldanha of the Bangalore-based Environment Support Group (ESG), in a letter to the Joint Commissioner for Solid Waste Management of the Bruhat Bangalore Mahanagara Palike (BBMP) noted that REEL had plagiarized their technical note to the municipality from notes submitted to other municipalities across India and showed no understanding of how the wet waste would be processed at the proposed facility (email communication with Leo Saldanha). In Kochi, activists were demanding closure of a waste treatment plant run by REEL for not having environmental clearance (TNN, 2013b). The municipality had other concerns: "Francis Jacob, health committee chairman of the municipality said that the Ramky group of companies, which has set up the plant at the yard is concerned only about the money it has to get and not about the successful implementation of the project" (*ibid.*). Meanwhile, REEL is suing the municipality for non-payment of dues. REEL's proposed WtE plant in Hyderabad is facing opposition from the State Pollution Control Board because of its proximity to a

biological zone that would be endangered due to emissions from the facility (TNN, 2013c).

As of late 2014, the project had been put on hold. In Indore, REEL's toxic waste incineration

facility designed to burn toxic waste from Bhopal's infamous Union Carbide plant is facing

opposition from local residents (TNN, 2014a). Despite these issues involving REEL's

operations, many municipalities are continuing to contract with them for various waste

management services. Some of them are doing so for lack of better options. Others no longer

want to do business with the firm. In 2014, the Mumbai Metropolitan Region Development

Authority scrapped a proposed contract with REEL for setting up and running a solid waste

management facility at a landfill site at Taloja that "would have accommodated the solid and

electronic waste of the city as well as the surrounding municipalities for the next 46 years.

The agency [REEL] was reportedly blacklisted by some civic bodies of India" (Shaikh,

2014).

SPML Infra Ltd, an infrastructure development company, has been in operation in India

since 1981 (SPML, 2010). The firm provides water, power, infrastructure, manufacturing and

environmental services (solid waste, sewage and wastewater infrastructure management) and

boasts managing and implementing over 600 projects in India alone. During FY14, SPML

reported revenues of INR 12 billion with an order backlog of over INR 60 billion in January

2015, guaranteeing revenue growth for the next two to three years (Humayun, 2015). In line

with the company's growth potential, their credit rating was recently revised from BB+ to

BBB- partly in anticipation of India's massive infrastructure requirements that will likely be

filled through public-private partnerships with firms such as SPML (*ibid.*). The future seems

bright for SPML. Waste management, however, forms a relatively small component of the

company's portfolio currently. Within waste management, SPML provides the entire gamut

of services from collection, segregation, and transportation to treatment and disposal. Aside from providing various infrastructure services in over 20 Indian cities, SPML also has operations in Singapore, Indonesia and Benin (SPML, 2010). In solid waste collection, they boast three "signature" projects—municipal solid waste collection in three zones in Delhi, and waste management at Delhi and Hyderabad airports (*ibid.*). In a personal interview with the company's representative, however, they also noted solid waste collection projects in three other cities—Jamshedpur, Dehradun, and Allahabad. In solid waste treatment, although the firm is pushing for the adoption of its U.S.-based partner PEAT International's proprietary Plasma Thermal Destruction Recovery technology, no projects in India have commenced thus far (SPML, 2010).

SPML conducts its municipal work in Delhi through Delhi Waste Management (DWM), a special purpose vehicle for providing waste collection and transportation services through a public-private partnership with the municipality. DWM appears in the vignette at the beginning of this chapter for its problems with informal waste collectors in R.K. Puram. But Chintan is not the only NGO that has expressed issues with DWM. Another NGO, Vatavaran that provides decentralized waste management services on a small scale to different neighborhoods in South Delhi has also raised concerns. Vatavaran, much like Chintan, works with informal waste collectors to collect, segregate, recycle and compost different portions of the waste stream. The executive director of the organization claims that DWM is "working behind the scenes" with the municipality to ensure that waste does not get composted because they are paid based on the weight of waste they bring to the landfill (Mathur, 2014). Further, much like REEL, the municipality imposed a fine of INR 6.4 million on DWM for poor sanitary conditions in Sarita Vihar, one of the areas in South Delhi where the private

firm is contracted to provide waste collection and transportation services (Akram and Lalchandani, 2013). In 2007, the firm was fined INR 1.25 million for not segregating garbage and poor conditions of *dhalaos* in the assigned areas (Bhasin, 2007).

SPML's solid waste collection and transportation work in Dehradun, awarded in 2011 was found "unsatisfactory" in a review by MoUD in 2013 (Prashant, 2013). By December 2014, the firm had withdrawn from the project alleging that the municipality had failed to keep up its promises (Prashant, 2014). In Jamshedpur, SPML's waste management 30-year contract has yet to be approved by the state's urban development ministry because of certain changes that SPML made to the contract terms that the state finds objectionable (Sridhar, 2014). In Allahabad, SPML's integrated waste management project that includes collection and processing of waste was to be partly financed through CDM. Without CDM financing, the project is not financially viable (CDM-Executive Board, 2012).

Established in 2001, **Antony Waste Handling Cell Private Limited (AWHCPL)**, a part of the Antony Group of Companies, provides solid waste management services through three special purpose vehicles and a joint venture with a Brazilian waste management firm in Delhi, Gurgaon, Noida, Greater Noida, Amritsar, Jaipur, Mangaluru, Mumbai, and Navi Mumbai. The company boasts implementing over 20 projects and over 1000 garbage collection vehicles (AWHCPL, 2013).

In Mumbai, AWHCPL's joint venture received a prosecution notice from the Maharashtra Pollution Control Board in January 2013 for discharging untreated leachate from its landfill into and thereby polluting the nearby Thane creek and for using bioreactor technology without seeking the appropriate approvals from the Board (Ghanekar, 2013). In 2012, Navi Mumbai cancelled its waste collection and transportation contract with AWHCPL because of

the contractor's poor performance (DNA, 2015). In Delhi, the firm's special purpose vehicle, AG Enviro Infra Ltd, was fined INR 600,000 in 2007 for poor conditions of *dhalaos* assigned to their jurisdiction (Bhasin, 2007).

Established in 2008, **A2Z Infrastructure**, a part of the larger A2Z Group, provides end-to-end waste management services including waste collection, transportation, processing, disposal, and WtE. In 2012, the firm reported waste management service operations in 27 cities across India (Babu, 2012). In FY14, the group reported a turnover of INR 782 million and a compound annual growth rate (CAGR) of 82.26% between 2004 and 2014 (A2Z, n.d.). Its work in Kanpur for which the firm has received many industry accolades has had serious trouble since the contract with the municipality commenced in 2010. In April 2014, the District Magistrate order the municipality to "fix criminal liability" against A2Z for their failure to meet performance requirements in their contract (TNN, 2014b). Unhappy with their service, the municipality has since decided to cancel their contract and is now seeking another firm to replace A2Z (TNN, 2014c). In 2010, A2Z was awarded a 30-year contract for waste collection, transportation and disposal in Varanasi. Just two years later in August 2012, A2Z stopped work after being issued a notice from the municipality for improper disposal (TNN, 2014d). After renegotiating the terms of its contract in September 2013, the firm re-commenced its operations but a year later in 2014, the municipality demanded the termination of its contract alleging that the firm has been unable to meet its commitments (*ibid.*).

In Ludhiana, the firm allegedly dumps garbage outside of the earmarked dumping areas, and does not collect it on time or as frequently as specified in its contract (Singh, 2014a). In July 2012, a 10-year old girl drowned in one such unapproved garbage pit (Goyal, 2013). In

January 2013, A2Z's garbage truck killed a mother and son (*ibid.*). A2Z also provides

landfill operations and maintenance services in Ludhiana. Waste pickers at the landfill

bemoan the transfer of management of the landfill from the municipality to the private firm

arguing, "While earlier, when the dump was managed by the municipal corporation, we

could simply look for valuable materials; now, I pay [INR] 500 to A2Z to be allowed to pick

things from the waste" (Singh, 2014b).

In June 2011, Ranchi contracted with A2Z to provide waste management services for a 30-

year period. Failure to deliver according to contractual terms led the municipality to cancel

its contracts just two and a half years later (TNN, 2013d). In September 2013, the Madhya

Pradesh Pollution Control Board filed a complaint in the High Court against A2Z for

inadequate collection, segregation and processing of municipal solid waste in Indore (DNA,

2013). In February 2013, the Jaipur Municipal Corporation attempted to blacklist the firm

and seize its bank guarantee for not fulfilling the terms of its solid waste collection contracts.

The firm had allegedly also not paid its workers (TNN, 2013e). A2Z suspended its work and

approached the court alleging that the municipality had failed to fulfill its responsibilities

written in the contract (*ibid.*). Although the court ruled in favor of A2Z, workers have filed a

police report against the firm for non-payment of salaries of 600 staff members (*ibid.*). In

Nainital, a government review of A2Z's waste collection work found their performance

unsatisfactory (Prashant, 2013). In Patna, the firm suspended its services in July 2011 due to

the failure of the municipality to pay its dues (Choudhury, 2012). Even as late as July 2014,

the city has been unable to attract contractors to provide solid waste collection services due

to the municipality's reputation being tarnished by the A2Z fiasco (Pandey, 2014).

Hanjer Biotech Energies provides solid waste processing services in 25 cities across India with 16 plants currently operational and nine underway (Hanjer, 2011). Much like other firms, even as Hanjer receives accolades for its work, its work on the ground is plagued by failures.

In Pune, where Hanjer runs two processing plants with a capacity of processing 1,000 tons of waste per day, it is only able to process about 200 to 600 tons per day, which led NGOs from the city to file a complaint against the municipality to probe its spending in waste management (Banerjee, 2015). Further, the electric utility terminated the plant's electricity supply in December 2014 due to Hanjer's failure to pay its dues (Kulkarni, 2014). In Pune, Nagpur, Mumbai, Salem and Faridabad, fires gutted Hanjer's plants. Critics claim that Hanjer might have sabotaged their own operations because it is looking to close them down due to losses in its facility operations across India (Chakraborty, 2014). Hanjer officials deny these allegations blaming rag pickers for setting fires to extract metal waste (*ibid.*). In Faridabad, after the fire, Hanjer asked the municipalities of Gurgaon and Faridabad whose waste is processed at the plant to pay them INR 300/ton to be able to restart their operations (Jha, 2014). The Municipal Corporation of Gurgaon was allegedly looking for "alternative solutions and proposals" to address the issue (*ibid.*). In Nagpur, the municipality decided to terminate its contract with Hanjer in September 2014 because of the firm's failure to operate the plant per the terms and conditions of its contract with the municipality (TNN, 2014e). Much like in Pune, the firm's inability to pay its electricity bill led the electric utility to shut power supply to its plant in July 2014 (TNN, 2014f). In April 2014, the National Green Tribunal levied a fine of INR 2 million each on the municipality and Hanjer for not operating its waste processing facility to capacity (TNN, 2014g).

In Mumbai, a fire gutted the plant in January 2014. By June, the plant was still not operational leading the municipality to issue a show cause notice to Hanjer and look for other operators (Fazal, 2014). In Rajkot in May 2014, the municipality decided to replace Hanjer's waste processing plant with a new contractor who will set up a new plant using pyrolysis gasification technology to process wastes from the city (TNN, 2014h). The municipality has since blacklisted Hanjer. In Salem, Hanjer's facility was not functioning properly in July 2013 allowing waste to pile up in the open outside the plant (Hindu Staff Reporter, 2013). In March 2014, a fire destroyed the plant completely. The plant has since been shut down. In Bangalore, although Hanjer was initially awarded a contract in January 2013, the municipality terminated its contract with the firm in May 2013 because of the firm's failure to start operations (Malusare, 2014). In July 2013, Hanjer's private equity investors that own a 51 percent stake in the company were planning an exit after "a failed attempt to sell stake in a public offer in 2012" (Shah, 2013). In June 2014, the private equity investors had obtained consent from the Supreme Court to conduct a forensic audit of Hanjer's books over a potential INR 10 billion scam involving mismanagement and misappropriation of funds (Deedwania, 2014; Vyas, 2014). Even as its operations fail in India, Hanjer is looking to drum up business abroad. In May 2014, a subsidiary of the company was finalizing a deal to set up a waste processing plant in Accra, Ghana (GNA, 2014).

Clearly, examples of failure of PPP projects in solid waste management abound. Although it is difficult to discern the success or failure rates in performance of specific firms in their projects across the country, the above account should give the reader a sense of the various ways in which these projects have failed. Undoubtedly, some of these failures might not be ascribable to the firm itself. There are cases where the municipality is at fault by not fulfilling

its responsibilities of payment or providing facilities or other support that they were assigned as part of their contracts. But equally, there are many examples in the discussion above where the firm is at fault by not being able to provide services because they bid too low making the project financially unfeasible or because they were unable to comply with existing regulations or because they were not technically competent to deliver those services. But if you ask firms themselves or proponents of privatization, failures are all deemed external to the service providers, factors not under their control, whether it be markets that operate under imperfect information, rent-seeking behavior from state officials, poor contract management and evaluation processes, or the inability of the state to pay contractors on time (World Bank, 2006). Possibly these problems can only be rectified if the state complies and starts doing things right. Capital funding, assured supply of waste materials, subsidized land, tipping fees that adequately reflect transportation costs, and technical support—all from the state—can resolve waste management firms' operational dilemmas. Governance institutions and regulatory frameworks such as the PPP Cell in the Ministry of Finance are hoping to do just that. The kinks in the current system will resolve themselves as processes and institutions mature. Despite these failures, public officials do not question *whether* privatization is working or can work in solid waste markets. The only question for them is *how* to make it work. Meanwhile, as the 'new' continues to be experimented with, the 'old' remains largely marginalized. The following section deals with the old—quasi-independent informal sector workers that provide doorstep waste collection services.[21]

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[21] My choice of examining solid waste collection specifically is influenced by two reasons. First, based on my discussions with experts on the subject, the 'old' system continues to be the most prevalent across a range of cities in India. Even where 'new' systems are emerging, the 'old' continues to exist in parallel. Second, in light of the economic theories discussed in the previous section, the 'old' system conveniently lends itself as an example of extreme form of competition in waste collection markets.

The 'old': Informal entrepreneurship in waste management

As mentioned previously, municipalities have typically only held the responsibility of collecting waste from the community bin or garbage station and transporting it to the landfill. But waste still needs to be transported from the household to the community bin. In some cases, someone from the household (or more likely their domestic worker) brings the waste to the community bin. In most cases however, informal sector waste collectors do this. Typically, informal sector doorstep waste collectors collect waste from households on a daily basis using a rickshaw—a tricycle with an open cart. While the service they provide is doorstep waste collection, waste collectors make most or all of their income not from the provision of this service, but from the sale of recyclable materials they salvage from the waste they collect. Generally, households pre-segregate high-value recyclables such as cans, paper and glass and sell those to an itinerant buyer. They do not give such materials to the household waste collector. What the waste collector typically gets is mixed waste containing food waste, non-recyclables and low value recyclables that itinerant buyers do not usually buy. Just like Iqbal, in the vignette at the beginning of this chapter, most waste collectors quickly segregate the recyclables from the trash into separate bags on their cart during the collection process often in less than a minute per household. Once their carts are full or once all households in their jurisdiction have been served, waste collectors typically travel to the nearest community bin or garbage station where they get rid of the trash and temporarily store the recyclables they have extracted. They might even use the bin space to segregate recyclables into finer categories before taking it home or to the point of sale, that is the warehouse of a waste trader. The two—home and warehouse—may be the same place.

It is in the best interest of the waste collector to aggregate as large a quantity of particular recyclables as possible. Higher quantities fetch higher prices than smaller quantities. Segregated recyclables fetch higher prices than mixed recyclables (Gidwani, 2010, p. 43). Pure and clean recyclables fetch higher prices than impure or dirty/soiled recyclables. That which is impure must be made pure in order to re-enter the circuits of value. Consider Boo's (2012) description of this issue:

> *By 3 p.m., Abdul was facing down the bottle caps, a major sorting nuisance. Some had plastic interior linings, which had to stripped out before the caps could be assigned to the aluminum pile. Rich people's garbage was every year more complex, rife with hybrid materials, impurities, impostors. Planks that looked like wood were shot through with plastic. How was he to classify a loofah? The owners of the recycling plants demanded waste that was all one thing, pure* (p. 13).

Space plays a crucial role. The ability of waste collectors to access space for sorting and storage affects their income levels. Information is also important. If waste collectors know which waste dealer is buying recyclables at what prices, and if they have the ability and the means to sell to the highest bidder, this can also contribute to increases in income. Unfortunately, space is expensive and information is often limited. Even if collectors have information, they may not be free to make decisions based on it, for instance of choosing the dealers they sell to. This is because of the complex social arrangements between actors in the formal and informal economy of waste that structure access to neighborhoods that waste is collected from, space for sorting and storage, and subsequently whom they sell recyclables to. Markets are not entirely free and there are barriers to entry. To explore this further, let me start with how someone becomes a waste collector.

In Delhi, most waste collectors are migrants from rural areas. A new entrant may come in to the waste collection through kinship ties with an existing person in the business and replace someone else who might temporarily or permanently leave their position for various reasons.

Waste dealers often play a crucial role here. In return for living space in the warehouse that waste dealers own, new entrants might be required to perform the labor of segregation and/or sell their recyclables to the dealer at typically lower than market rates. In this relationship, waste dealers are assured a consistent supply of labor and raw material inputs for their enterprise and waste collectors are offered a kind of a social safety net by the waste dealer (Gill, 2010). For instance, waste dealers are often the only people waste pickers can take loans from in times of need.

How jurisdictions or households in a neighborhood are delineated is an important entry barrier a new entrant must navigate. Territorial delineation occurs through internal negotiations within the informal sector community. But municipal workers are also involved at least in Delhi. While generally, municipalities in Delhi do not have employees who provide doorstep waste collection services, they do have street sweepers or *safai karamcharis* responsible for cleaning streets in a neighborhood. The municipality defines the territorial responsibilities of street sweepers (Prashad, 2000). Over time, street sweepers have assumed territorial powers over the neighborhoods they are assigned such that waste collectors have to negotiate with them to gain rights to access households in the neighborhoods. In return, street sweepers get rents from the waste collectors operating in their jurisdictions. For instance, if households pay the waste collector monthly user charges for their services, these payments wholly or in part, might be forwarded to the street sweeper in return for the right to access the neighborhood.

Skill is another barrier to entry (Gill, 2010). The ability to know the material so that one is able to put it in the right pile in the process of segregation even when one may not be able to

read is a process that requires the use of all senses—sight, smell, hearing, taste, and touch.

Boo (2012) describes the attainment and exercise of skill in the following way:

> [Abdul] *excelled . . . in the sorting—the crucial, exacting process of categorizing the purchased waste into one of the sixty kinds of paper, plastic, metal, and the like, in order to sell it. Of course he would be fast. He'd been sorting since he was about six years old because tuberculosis and garbage work had wrecked his father's lungs. Abdul's motor skills had developed around his labor . . . "Slow down," his father had told him gently. "Use your nose, mouth, and ears, not just your scales." Tap the metal scrap with a nail. Its ring will tell you what it's made of. Chew the plastic to identify its grade. If it's hard plastic, snap it in half and inhale. A fresh smell indicates good-quality polyurethane* (pp. xiii-xvi).

Sense, innovative acumen, experience and the ability to capitalize on kinship networks for help, together yield an extraordinary ability to discern value from and segregate vast quantities of very different materials very quickly (Birkbeck, 1978; Gill, 2010).[22] One plastic polymer market in Delhi alone deals with as many as 450-500 different types of materials commonly referred to as "items" in the trade (Gill, 2010):

> *An 'item' can range from a branded product, such as Gillette advertisement hoardings or Saffola cooking oil cans, to generic items, for example, spectacles and pens. Items are also differentiated by colour and graded by darkness of permanent dye, with clear or lighter hued items more valuable than strongly coloured or black items, which have limited recycling potential. The complexity and the variety of products dealt with in the market, some supposedly hazardous, was so baffling that even after a year, it proved impossible to construct a comprehensive and structured list of items . . . The practice of using obscure vernacular terms or a branded name as shorthand for a product serves a distinct purpose. Familiarity with the jargon peculiar to the market, coupled with the ability to correctly recognize and match items correctly with their broader plastic composition, even where workers claim not to explicitly know the generic categories of*

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[22] Gill (2010) has specifically highlighted the importance of the use of senses in the work of segregation and recycling. A supplier from the Khatik community notes this in the following way: "Khatik knowledge of plastic and recycling in unsurpassed—by smelling it, seeing it, and burning it, we can tell what sort of plastic it is. Others have to check with painstaking methods. Because we have imbibed this knowledge from childhood, we can tell just from experience what sort of plastic we are dealing with, what processes may be used to recycle it. We know 180-200 items by sight. Our *biraderi* has maximum knowledge of this work." Similarly, a supplier from the Banja community notes the importance of experience and kinship networks and caste-based alliances: The minimum learning involved in this business is two years. If somebody entered the business now, with no prior knowledge, he would definitely make losses for two years—over wrong rates, lack of knowledge of plastic grades and processes, and so on. I did not make a loss when I entered this business for the sole reason that my labour belonged to the Khatik community. They were experienced, they had knowledge and so I was saved." (Quoted in Gill 2010, p. 162)

plastic waste, means even the least educated participant is able to fit every last piece into finely segregated types of polymer and thus, meet the rigid requirements of the mechanical plastic recycling process. This skill is a significant entry barrier to outsiders seeking to engage in the market and trade (p. 131).

In the survey of 1,092 informal sector actors in Uttar Pradesh, Chintan asked respondents about the quantity and prices of materials they collect and sell on a daily basis. Respondents identified 42 distinct items that were categorized into the following groups for analysis purposes: paper/newspaper, glass bottles, other glass, plastic bags, plastic bottles, other plastics, cardboard, iron, tin, footwear, files/notebooks, and jute or poly fiber storage bags. Below are two graphs: one shows the distribution of recyclable materials by quantity (Figure 4), and the other shows the distribution adjusting for price of those materials as reported by survey respondents (Figure 5).

Figure 4. What's in the waste picker's basket? Material composition by weight
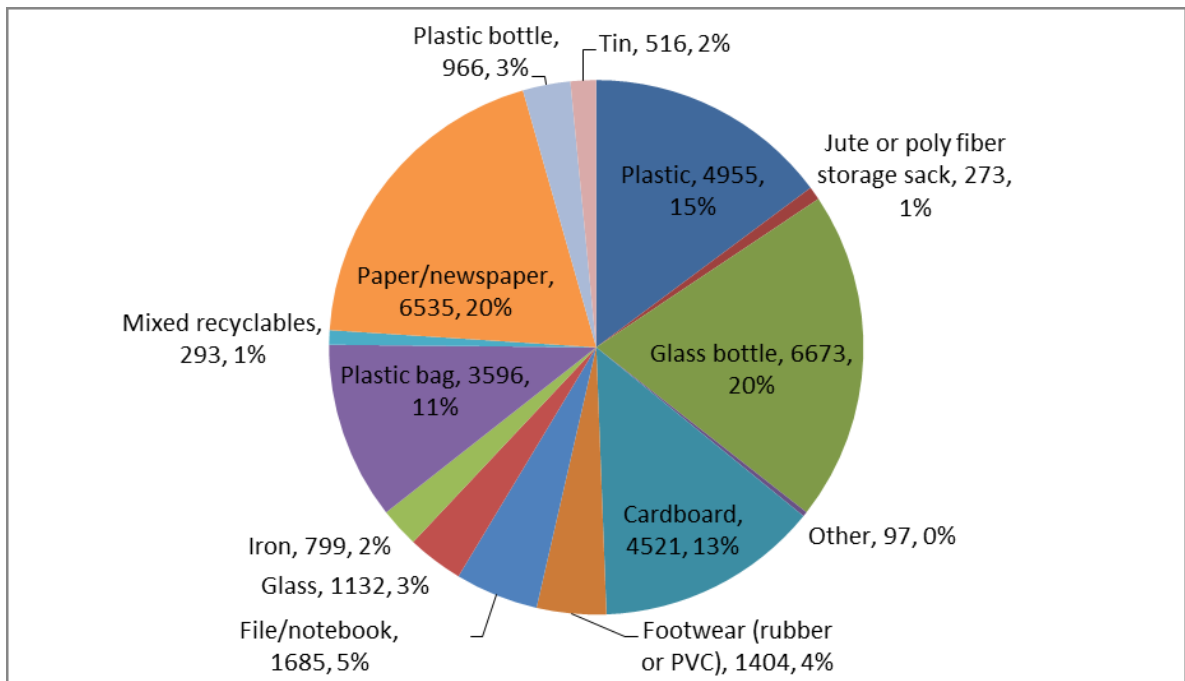
Figure 5. What's in a waste picker's basket? Material composition by value
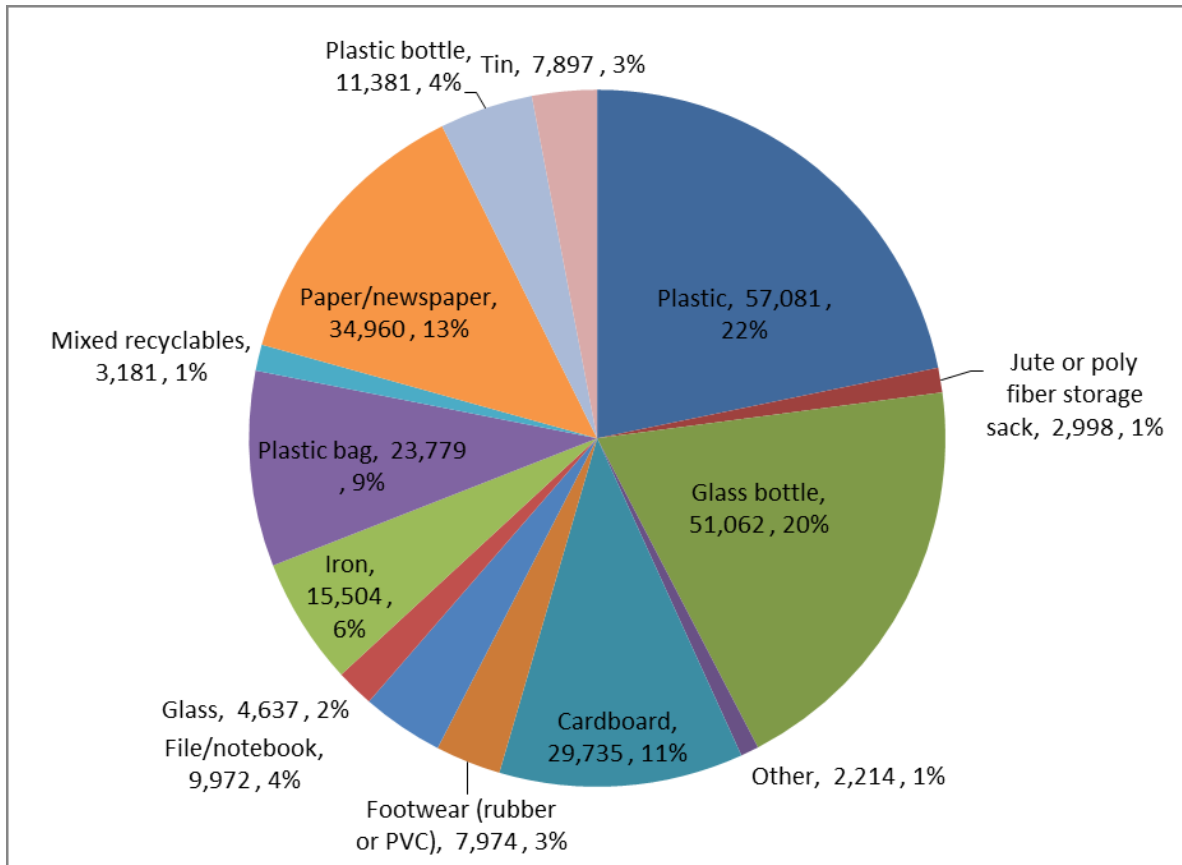
As the figures show, adjusting for price, the relative importance of commodities in recycling markets changes. Plastics emerge more important as sources of revenue for than paper and newspaper even though larger quantities of the latter are collected and traded on a daily basis. But can informal actors be described as entrepreneurs? The term entrepreneur has a long history with its first academic usage dating back to the 1730s (Sobel, 2008). But despite its long history, there is little agreement on the definition of the term (Carland, Hoy and Carland, 2002). In general, there are a few characteristics often used to describe entrepreneurs that include risk-taking, innovation, and some degree of managerial competence in running the enterprise (Brockhaus and Horwtiz, 2002). Definitions aside,

these characteristics are frequently used to describe the work of waste pickers.[23] Waste

pickers often take everyday risks in their decisions to segregate, store or sell recyclable

materials; they often innovate in developing the quickest ways to access and retrieve those

materials; and they exhibit managerial competence in managing their enterprises which often

include not just themselves but the entire household in transporting, segregating and selling

those materials.

Advocates of waste pickers, particularly academics and development practitioners have taken

to describing them as entrepreneurs (Birkbeck, 1978; Chikarname and Narayan, 2009; Doan,

1998; Gerdes and Gunsilius, 2010; Gill, 2010; Scheinberg et al., 2010; Solo, 1999; UN

HABITAT, 2010; van Beukering, 1994; Wilson, Velis and Cheeseman, 2006). Here is a

sampling of the various ways in which academics and development institutions and

practitioners refer to informal actors in waste as entrepreneurs. Scheinberg et al. (2010)

define the solid waste informal sector as "individuals, families, and private sector (micro-)

enterprises working in waste management services and valorisation, whose activities are

neither organised, sponsored, financed, contracted, recognised, managed, taxed, nor reported

upon by the formal solid waste authorities" (p. 4). Chikarname and Narayan (2009) note,

"Ragpickers have always been self employed and the nature of their work has been

entrepreneurial" (p. 73). Gill (2010) in the very title to her book calls those in the informal

economy of waste as "scavenging and scrap trading entrepreneurs." UN HABITAT (2010)

defines informal service providers (ISPs) as "private entrepreneurs who collect and remove

waste and excreta and who have private economic relations with waste generators" (p. 144).

Further, in its glossary of terms, UN HABITAT defines a recycler as an "[e]ntrepreneur

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[23] Chintan staff often struggled with setting up new livelihood programs such as material recovery facilities. Instead of trying to do it on their own and failing, more often than not, the answer was in just letting waste pickers set up and run those operations instead. After all, waste pickers know this business the best.

involved in recycling" and the term includes scavengers, waste pickers, MRFs, and junk shops (*ibid.*, p. 215).

This framing is not merely an externally imposed identity by those who study their work or those who advocate for their rights. Actors in the informal waste trade have internalized this entrepreneurial identity themselves. Samson (2010, p. 24) notes that in the African context, governments, NGOs, and other external actors are framing reclaimers as entrepreneurs, and reclaimers also see themselves in this role rather than as just workers as a way to assert their independence and difference from wageworkers. In Brazil, on the other hand, two different organizations of waste workers frame themselves in different ways, one as entrepreneurs and the other as workers. These two different framings are intentionally designed to achieve specific political ends, in one case to get contracts with municipalities, and in the other to build alliances with other workers' rights organizations (Samson, 2009a, p. 86-88).

Yet, not everyone sees entrepreneurship in waste the same way. This is reflected in the accounts of well-intentioned policy practitioners who might have the interests of waste pickers in mind but are naïve in their understanding of the economic context in which the informal waste sector operates. Zhu et al. (2008) use the word entrepreneur and entrepreneurship seven times, only never to describe the existing activities of the informal sector. To them, entrepreneurs are always registered private firms offering waste management services.[24] The only instance in which the word entrepreneur is used in relation to the informal sector is in recommendations to assist them in creating value-added products from recycled materials. UNEP (2004) suggests that "scavenger communities" need to be helped "to move up the recycling 'chain' so that they become more like entrepreneurs or

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[24] For a similar treatment of the word entrepreneur in waste management, see also MoEF (2010) and Thapa (1998).

SMEs. This can be achieved by, for example, moving from bin sorting to itinerant buying or adding value to the materials they collect before selling them on to a 'middleman'" (p. 4).[25] Waste pickers are not yet entrepreneurs but can become so. Bernstein (2004, p. 133) suggests that one way to enhance the employment opportunities of waste pickers is to "[p]rovide assistance to waste pickers to help them start and operate small recycling enterprises . . . [through] training in specific skills, such as bookkeeping, and technical skills . . . [and] providing credit to entrepreneurs interested in setting up small businesses." Existing mundane forms of entrepreneurship that characterize daily work in the sector are ignored. Value addition as transformation of waste materials into new products is privileged over the existing forms of value addition in the sector. The latter form of value addition relies on segregating and hyper-segregating waste into ever finer categories of raw material for inputs into the recycling industry but does not produce crafty looking commodities which many well-meaning donors, policy practitioners, and even NGOs promote. They focus on upcycling as an enterprise that waste pickers could be involved in to upgrade their livelihoods. Making new products out of recycled materials such as wallets, bags and stationery or even decorative art, is the solution that many point to for improving the lives of waste pickers. There are some examples of upcycling enterprises that have explicitly included waste pickers in their business models. Green the Gap, a fair trade initiative of a Delhi-based NGO, Swechha, upcycles waste materials into wallets, bags, t-shirts, stationery and the like. Their website proudly stated, "Recycling is so yesterday. Upcycle" (Green the Gap, n.d.). Conserve is another such initiative that sells itself as "Fighting poverty through fashion" (Conserve, n.d.). Both these initiatives seem to be accompanied by a genuine

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[25] See Chapter 3 for a more detailed discussion of this and other related discourses that attempt to delegitimize particular actors in the informal waste economy.

interest in the lives and livelihoods of waste pickers. In addition to generating livelihoods, both organizations also invest in advocacy efforts towards fighting for the rights of waste pickers.

Such an understanding, although well intentioned, betrays a lack of understanding of how current markets in recyclable commodities work. How many waste pickers can be "rehabilitated" through such work? How will they access markets to sell their crafty wares? Can this work pay as much as existing work in waste picking? How will the downstream informal and formal recycling economy be impacted? These are questions that are never asked by those proposing such alternatives. Perhaps they are never asked because the answers are always discomforting.

More insidious are instances where such upcycling initiatives merely play a palliative role in placating opposition to large waste management projects that displace waste pickers. This is the case in Ghazipur, where a WtE facility operated by IL&FS has displaced waste pickers from the landfill. In an effort to show that they are working towards the "rehabilitation" of the displaced, IL&FS hired an NGO, Institute for Development Support, to start an initiative called Gulmeher, to train women in the community to make stationery items such as greeting cards out of waste flowers from the nearby flower market. When I asked how many women could make a living from this "skill development," the IL&FS representative had no answer. Instead, a Gulmeher representative asked if he could enlist Chintan's help in marketing some of the products these women were making.

But a push for upcycling isn't always simply a palliative measure. It is also driven by donor demand. For instance, Chintan relies on donated waste from bulk waste generators such as offices, schools and hospitals to generate livelihoods for waste pickers. Chintan does not

upcycle this waste, but merely treats it as a way to generate waste picker livelihoods. Waste pickers in Chintan's facilities segregate such waste and earn their income from the sale of materials to waste dealers, just like the informal sector otherwise would in the existing system. For a while, this worked well. But donors of waste are increasingly demanding something in return, a token that could memorialize their donation. Often, this token takes the shape of a thing, an upcycled product made from the donated waste, such as a picture frame or a bag. These upcycled products become markers of the donors' generosity and an indication of their status as socially conscious people, something they can proudly showcase as their CSR efforts when people visit their offices. But not all products qualify. In Chintan's engagement with Vodafone, Chintan used to provide bags of compost made from the organic waste of Vodafone offices. This upcycled product was not well received. Hundreds of such bags of compost laid around in Chintan's facility with no takers. Cute photo frames, however, might have been more successful.

The formal sector commands a higher degree of privilege in urban planning and policy in India than the informal sector. This is in part due to a misunderstanding of what the informal sector does, why and how. But it is also in part due to the idea that the formal sector is seen as holding a "repository of skills," "stock of human capital," the site of "investment and innovation," and consequently the engine of entrepreneurship" (Gidwani, 2010, p. 49). Ideology, it seems plays a role in the selection of market structures for waste management. Such privilege is reflected in donor documentation on waste management. Consider, for instance, that the USAID (2009) deems private enterprise/entrepreneurship as one of the valid modes of privatization of waste management services. This is described as "a mode whereby the city authority freely allows qualified private firms to compete for service

delivery. Individual households and establishments make private arrangements with individual firms who compete for business. Under such arrangements, city councils license, monitor, and (as needed), sanction the private firms. Private firms bill their customers directly." (USAID, 2009, p. 10). At a cursory glance, this describes quite well how waste collection services are delivered by informal sector in urban India. Yet, by restricting the definition of enterprise/entrepreneurship to private firms, it removes the possibility of the consideration of informal sector as valid competitors in that market.

In contrast to firms in the formal waste management sector, the informal sector in policy discourse in India tends to be treated as stakeholders in the waste management process rather than legitimate service providers. Especially in documentation related to PPPs, waste pickers and their advocates (mostly NGOs) are seen as a community from whom PPP projects need buy-in in order to be successful. For instance, in a *Toolkit for Public Private Partnerships in Solid Waste Management,* activities of the informal sector result in "loss of recyclables and low calorific value," a problem for private firms because it lowers the economic value of waste for the latter (MoUD, n.d.-c, p. ii).[26] To address this problem, there is:

> [A] *pressing need to formulate structured ICE (information, communication, and education) activities to involve [the] community of informal workers (rag-pickers), residents etc. and internal stakeholders like sanitary workers, employees. This is crucial to overcome apprehensions on job insecurity/re-structuring among workers/employees and helps in smooth implementation/transition of activities to the private player* (ibid., p. iv).

Scheinberg and Anschutz (2006) argue that welfare-based approaches to alleviating poverty tend to see waste pickers as a social problem rather than as economic actors: "Waste pickers and their children are seen as passive victims of society, not as entrepreneurs involved in a livelihood activity . . . waste pickers have only a social identity, not a professional one" (p.

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[26] This issue of calorific value of waste is explored in detail in Chapter 4.

9). In other instances, NGOs as advocates of the informal sector community are encouraged to be involved in providing waste management services by organizing waste pickers. Here too, waste pickers are merely a social problem that can be addressed through charity efforts. Chikarname and Narayan (2009) suggest, "Urban poverty in countries like India has been exacerbated because policy makers have singularly failed to comprehend or invest in the entrepreneurialism of the poor. Indeed, most Indian policy makers intuitively mistrust the idea beyond the limited remit of self-help groups and co-operatives" (p. 78).

This begs the question of why informal sector waste collectors are not accorded the same status as private firms in the choice of market structures for waste management services in urban India. Clearly, ideology plays a role. Some have posed the question of the role of ideology in explaining markets for garbage collection. But they have construed ideology purely in terms of political partisanship. For instance, Dubin and Navarro (1978) suggest that ideological preferences of the community play a role in explaining the market structure of waste collection in the US and this market structure may not always be the most efficient, that is the lowest cost option. In contrast, Bel and Miralles (2003) find no evidence that political or ideological motives guide municipal decisions to contract out waste collection in Spain. Both studies use the ideology of the political party in power (left versus right) as a proxy for ideology. In the case of urban India, the use of political partisanship in an understanding of ideology is not very useful. Instead, the disperse yet tangible imaginations and actions of powerful actors within the bureaucratic and political apparatus of the Indian state that privilege a particular understanding of the private sector, continually reiterate the importance of it to India's 'development' and 'progress', and accord material entitlements to its further growth through real policy changes and associated financial incentives. Linder

(1999) is instructive in this regard. In exploring the grammar of public-private partnerships, Linder finds that the "variety of day-to-day, public spirited partnerships" that are "woven into the fabric of civic life" and "have historical roots in their communities that extend across generations" are excluded. Linder is mostly thinking of non-profit organizations, schools, churches and the like that have filled in the gaps in the social service safety net due to fiscal austerity measures (pp. 48-49). Informal waste collection systems are omitted from the vocabulary of PPPs where only formal systems are accorded a legitimate place.

Beyond ideology, there is the question of technical issues in waste collection services that limit the consideration of informal sector workers as valid service providers. Informal sector waste collectors provide a limited service. They merely collect waste from the household, segregate recyclable materials out of it and transport it to the nearest municipal collection point. But "modern" waste collection and transportation systems require an end-to-end service--collection from the source and its transportation to the disposal point. An end-to-end service also removes the necessity of the community bins that have earned the reputation of being eyesores tainting the image of an aspiring world-class city. In a meeting NDMC chairman, Jalaj Srivastava, he noted the municipality's annoyance at the very existence of the community bin. According to him, the community bin is and should be an artifact of the past with no place in the "modern" city that Delhi aspires to be.[27] In January 2014, Srivastava publicly announced the introduction of an integrated waste management system for the municipality, which includes "collecting waste from doorsteps and sending it for disposal in a scientific and mechanised manner at the Timarpur-Okhla Waste Management Co. Ltd (TOWMCL) plant. That will eliminate the need for "dhalao" points, which have caused unhygienic conditions and dissatisfaction among people" (PTI, 2014a).

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[27] The issues related to *dhalaos* are discussed in further detail in Chapter 3.

On the surface, the elimination of the community bin alone might not pose too much of a problem other than that waste collectors will need to find alternative spaces for storage of recyclables temporarily. Non-recyclable waste could be dumped directly on to the collection point such as the collection vehicle. If the powers-that-be desired so, informal and formal systems of waste collection and transportation could co-exist with the informal sector bearing some extra burden in the process. But the problem runs deeper. Waste collection and transportation contracts typically are paid on the basis of the amount of waste they bring to the disposal point through a tonnage fee. Waste collectors' removal of recyclable materials reduces the amount of waste and thus cuts into their profits (Mathur, 2014). Even though from a waste management and environmental perspective, the work of waste collectors in material recovery is beneficial, from the perspective of waste management contractors, it decreases their revenues. But let us assume for a moment that this issue is resolved by structuring contracts in a different way. Even then, other problems related to the waste treatment infrastructures emerge.

In Delhi, WtE technologies have emerged as the preferred solution for the treatment of municipal waste. As will be discussed in detail in Chapter 4, such technologies rely on a consistent supply of waste material with a particular composition. Specifically, they rely on the presence of high-calorific value, low moisture content waste material that is only possible if dry, potentially recyclable waste remains in the waste stream rather than being extracted out of it. Waste collectors' extraction of such materials from the waste stream puts the operations of such treatment facilities at risk. In the case of New Delhi, Srivastava is clear that as part of an integrated waste management system, waste materials will be collected and

transported directly to the WtE facility. Consequently, the opportunities for resource recovery at intermediate points along this journey needs to be eliminated. There is little doubt that *dhalaos* are unhygienic and unsightly but under the guise of making the city healthier and more beautiful, NDMC is privileging "mechanized" and "scientific" (read "formal and "modern") at the expense of the informal. Unlike the most prevalent use of the phrase "integrated waste management," the cornerstone of which is the waste management hierarchy that ranks waste management solution options and actions, Srivastava uses this term in an economic sense of a vertically integrated waste management process.[28]

Other than WtE, centralized composting facilities also pose a similar challenge to the legitimacy of the work of waste collectors. Unlike WtE, composting does not involve competition over waste materials. Informal sector waste collectors are not interested in wet waste because it has no value. For public managers, this raises the question of the value of waste collectors' work to the city. Composting facilities, in order to be able to generate high quality compost, require that organic waste be pure, free of inorganic impurities that leach toxins into the final product thus rendering it unusable. Waste collectors do a great job of segregating waste but they only extract recyclable items that have resale value for them. In the absence of source-segregated wastes, the mixed waste that goes into the community bin is not fit for composting. The fact that waste pickers don't fully segregate waste, reduces the value of their work in the eyes of municipal managers. For the latter, the argument is that if we are to consider waste collectors a legitimate part of the collection system, then they need

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[28] Tchobanoglous, Thiesen and Vigil (1993) define integrated solid waste management as "the selection and application of suitable techniques, technologies, and management programs to achieve specific waste management objectives and goals." A hierarchy of integrated solid waste management ranks actions from the most desirable to the least desirable in implementing waste management programs. This hierarchy is typically structured in the following order from most desirable to least desirable: source reduction, recycling, waste transformation, and landfilling (pp. 15-16).

to do the task fully. Never mind that separate transportation systems for dry and wet waste do not even exist. There are however, some small-scale efforts at the community level that have involved waste pickers in composting (Mathur, 2014). Even in these cases, the private firm responsible for waste transportation is unhappy because it reduces the amount of waste they take to the landfill, thereby cutting into their revenues.

But another issue raises even more serious concerns about the prospect of waste collector livelihoods. Municipalities have the sense that waste management is a service that can pay for itself. Nisha Singh, the Joint Secretary at the Ministry of Urban Development said at a workshop organized by GIZ, "Solid waste management pays for itself. It does not require government funds." Elsewhere, the Ministry of Urban Development notes, "There is a dire need to develop bankable and sustainable projects in Solid Waste Management sector. There is considerable O&M cost involved to run SWM projects; hence cities must focus on developing projects which can sustain from the revenues generated from the SWM services" (MoUD, 2012, p. 30). Municipalities know that there is value in waste material. After all, as many as one percent of the urban population seems to be able to make a living on it. If they can, so could the municipality or the private firm that the service is outsourced to. There is increasingly the sense among municipalities that they are losing out on revenues from the sale of recyclable commodities in waste because waste pickers are extracting these from the waste stream.[29]

An analysis of these aforementioned issues with regards to the involvement of informal waste collectors tells us two things. First, although municipalities recognize the contribution

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[29] Bharati Chaturvedi, Chintan's director, recounted a conversation with Delhi's municipal officials on this issue. What remains unclear is whether they are voicing the perspectives of private waste firms who are also interested in the same commodities or if they feel that it is municipalities themselves that should earn revenues from the sale of those recyclable commodities.

of the informal sector to urban waste management, they are not necessarily seen as legitimate market participants in urban waste management service provision. Formal sector participants that provide 'scientific' and 'mechanized' systems are. This is partly due to the nature of informal sector service provision that does not quite fit with municipal needs. But it is also partly due to an ideological privileging of particular kinds of private actors. Second, this analysis also gives us a clue as to the process of planning for urban waste management needs. If the informal sector were treated as legitimate waste management service providers, then planning for a city's waste management needs would take their work into account. For instance, if composting were that important, then at the very least separate systems for collection and transportation of organic wastes would be in place. Waste-to-energy might not even be an option. It would be easy enough to carve out a legitimate space for the informal sector in the existing system. Many organizations such as Chintan in Delhi and SWaCH in Pune are indeed already doing that. But for countless others, such legitimacy seems a far off possibility.

Let us return to economic theory to understand better what might be at stake in treating waste collectors as valid participants in waste collection markets in urban India. Stevens (1978) points to the importance of non-exclusivity of territory as one of the reasons for lower efficiency rates in a competitive market structure for waste collection. This problem can be resolved if exclusive market areas are assigned to producers and either reasonable rate regulation or competitive contracting processes were in place. If this happens, efficiency losses in a non-monopolistic competitive market structure would not be as high as are commonly ascribed to them. In the case of waste collection by informal actors, as described previously, territories are exclusive, negotiated informally with state actors and within the

informal waste collector community. Rates or monthly user fees charged to households are not formally regulated but are either non-existent (households are not charged for the service), are determined by the municipal street sweeper, or in some cases by the collector themselves. In the latter cases, it is likely that rates are standardize but vary by income, that is, waste collection fees for one neighborhood in a specific income group are likely to be the same as fees for a different neighborhood in the same income group.

A survey of households in Delhi provides some evidence for this (see Figure 6). Approximately 55 percent of respondents noted that they pay monthly fees for waste collection services. Among those who pay, 44 percent paid the municipal sweeper, and 56 percent either paid the waste collector directly or a representative of the waste collector. Approximately, 59 percent of the respondents paid between INR 31 and INR 50 monthly, 22 percent paid less than INR 30 and 19 percent paid over INR 50. User fees varied by income of the household. In other words, richer households were more likely to pay more than poorer households (chi-square test p-value <0.001). In the survey, socio-economic classification system (SEC system) was used as a proxy for household income. The SEC system is commonly used for market research purposes in India. It classifies households based on two variables—the education of the chief wage earner and the number of consumer durables that the household has access to. Although there are twelve grades ranging from A1 to E3, for simplification purposes, in this analysis I use the broad classification from A to E with A referring to the highest socio-economic category and E the lowest (MRSI, 2011).

Figure 6. How much do households pay for doorstep collection?
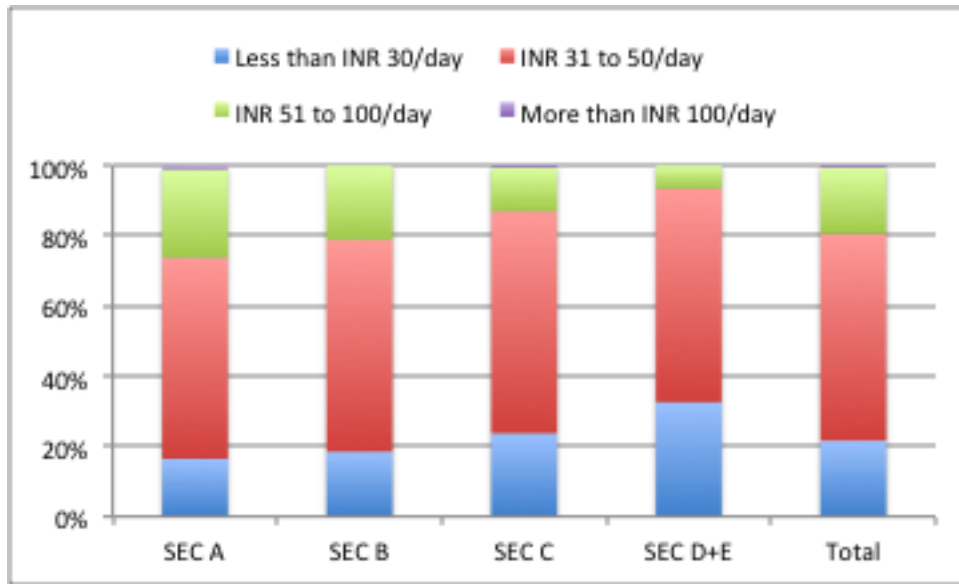
Economies of scale in waste collection are dependent on the technology used. Realizing economies of scale when using trucks as the collection vehicle is different from those using cycle rickshaws. Capital inputs in the form of technology changes the scope within which economies of scale can be realized. This wisdom in mind, the OECD Competition Committee (1999, p. 9) warns us that the "geographic size of the waste collection contracts should be no larger than is necessary for economies of scale, so as not to dissuade small firms from bidding. This may involve breaking a city up into smaller regions for the purposes of waste collection contracts." If when using a specific capital-labor mix (say garbage trucks and 3 persons per truck), 50,000 households seems to be the appropriate size of a jurisdiction where scale economies can be realized, jurisdiction size must be different for a different capital-labor mix. If the collection vehicle is a manually driven rickshaw and the "firm" "employs" only one or two people, the optimal size of that jurisdiction should be considerably smaller. Efficiency, the primary concern of this branch of economic theory, is high since collection services are provided at minimal or no cost to consumers or the state.

Informal contracts in waste collection in urban India display this wisdom in assigning territories to waste collectors. Typically, waste collectors in high-income neighborhoods service fewer households than waste collectors in low-income areas. This is for two inter-related reasons. First, houses tend to be further apart in higher income areas; therefore, each waste collector can service fewer households due to time constraints. Second, even though waste collectors serve fewer households, rich people's waste tends to be more profitable; a lower number of households is offset by larger quantities and higher proportions of recyclable waste. Territorial assignments are driven by both the ability to service the area in a reasonable timeframe using existing technology (e.g. rickshaw) as well as the income generating potential of the neighborhood. In deciding how many households to assign to a waste collector, NGOs that run doorstep waste collection programs with informal sector waste collectors use this principle in allocating households to waste collectors and designing collection routes. For instance, in Chintan's doorstep waste collection program in the relatively poorer and denser neighborhoods in East Delhi, a single waste collector is responsible for servicing as many as 250 households, while in the relatively more affluent and geographically disperse neighborhoods of New Delhi, each waste collector is assigned to approximately 125 households. Informal contracts capitalize on economies of scale, density and contiguity with an element of economic justice thrown into the mix.

Unwittingly I have painted a rosy picture of the labor process in the informal sector that is otherwise quite plagued by problems of exploitation and poor working conditions. But my purpose here has been to merely highlight that even contemporary informal arrangements in waste collection seem to follow economic theory quite organically. But one of the problems with such informal arrangements is the state's inability to monitor and control them. Waste

collectors act in their own interest of earning a livelihood, not in the interest of the state.

Although state actors—municipal sweepers—exert control over waste collectors, they are

also primarily acting in their own economic interest—the aggregated monthly user charges

collected from the households, for instance. Although this practice may work in the interest

of the state inasmuch as it provides a much-needed service, its "illegality" puts it outside the

purview of the state. In other words, the state is not legally responsible for the private actions

of its own actors—the municipal sweepers, or the actions of waste collectors. But municipal

officials are charged with finding ways to improve waste management systems in general.

How can one improve something that one does not yet have control over? This is what makes

a formal contract between the state and a private service provider necessary. It is also what

makes formal contracts between individual service providers such as waste collectors and the

state impossible. Monitoring thousands of such contracts poses a real challenge. The

transaction costs associated with writing and administering such contracts would be

enormous. A single or a few entities are ideal.

But this does not preclude waste pickers from continuing to collect waste as long as they are

a part of an organization that enters into a contract with the state. Most cities in India have

such organizations of informal waste sector workers but more often than not, these

organizations that have formal contracts with municipalities do not receive any funding for

providing those services. An exception to this is Pune, where a cooperative of informal sector

waste collectors, SWaCH, is paid by the municipality to provide waste collection services. In

other cities, Delhi for instance, the municipality will enter into a contract with an informal

sector organization such as Chintan without paying for those services. The justification for

lack of payment is that waste collectors make their money from the sale of recyclable

materials anyway. Waste collectors in Chintan's programs have identity cards that say "Volunteer for [Municipality Name]" to make clear that they are not getting paid by the municipality for their work. But how does one pay for running the organization, the monitoring and supervision of waste collectors, their uniforms and ID cards, and the like? If the organization is allowed to collect user fees from households, which may not always be the case, then those costs are potentially recovered from those fees. If not, the organization has to rely on the charity of individual and institutional donors. The discursive relegation of the work of the informal sector in waste management as "social" rather than "economic" is materialized in practice through such relations of dependence on charitable donors. But the dependence of such organizations on charity also renders them vulnerable to funding constraints outside their control and does not allow them to scale up their work. As a consequence, in Delhi for instance, "unorganized" waste collectors who are outside the purview of state control, serve large parts of the city. The state knows they exist but doesn't "see" them because they do not have a formal arrangement such as a contract with them. This "empty" market space offers an opportunity for informal sector organizations to capture them, as we will see in the following chapter. But it equally allows other actors such as private waste management firms to enter the market.

Proponents of new forms of privatization of the waste management sector often suggest that the informal sector need not worry about displacement too much. Instead of working informally, they could work as employees in the operations of the waste management firm. Or better yet, they could abandon this occupation altogether and find something more respectable. There are a few issues with this logic however. First, it is highly unlikely that firms would be able to absorb the entire informal sector labor pool in the existing market

structure. As mentioned previously, solid waste collection exhibits a homothetic production function where capital and labor are substitutable. Private firms would be contracted not just to transport waste from the community bin to the landfill but from source to the landfill. Depending on their size and capacity, trucks would replace a varying number of doorstep collectors and their rickshaws. This has already happened in parts of Delhi as mentioned previously.

Second, firms would at most pay what they are required to pay, that is, the minimum wage. Most firms prefer hiring labor from rural areas on a contract basis rather than hiring from the existing pool of waste pickers in that city. They do so because not only can they pay them lower wages, there is also a lower chance of workers organizing as migrants from rural areas. In a survey of 1,092 informal sector workers across eight cities in Uttar Pradesh, Chintan asked if they had any experience working for waste management firms. In at least three of the largest cities surveyed, representing 80 percent of the sample, private waste management firms are present. However, none of the respondents noted having been approached by these firms for work. On the other hand, in an interview with a former contract worker for REEL—Anwar—shared a story with me, paraphrased below.

Anwar moved to Delhi from Haldia in West Bengal as a kid with his parents in 1976 and started working as a waste picker. In the early 2000s, Anwar decided to move back to Haldia. During his time in Haldia, he tried to get work at REEL's waste management plant but was unsuccessful. After becoming frustrated with not being able to find work in Haldia despite frequent attempts, a labor contractor told Anwar about potential work opportunity in Chennai. In April 2012, Anwar became a "Compactor Help" at REEL's Chennai MSW Pvt. Ltd. Anwar worked in Chennai at this company for seven months before returning to Haldia

due to domestic issues. While in Haldia, he was contacted by an official from a REEL waste management facility in Jodhpur. The official promised Anwar work and for any others interested moving to Jodhpur. Anwar assembled a team of 27 men and headed to Jodhpur. When they arrived in Jodhpur, the locals were very surprised and agitated to see the team of Bengali workers. The locals in Jodhpur went on strike and asked that Bengalis should not be allowed to work in Jodhpur. Anwar and his group spent one week in Jodhpur and received no compensation for that time.

The REEL official—Murti—who had invited them to Jodhpur, asked them to go to Delhi instead where they were told they would have work. For the bus trip between Jodhpur and Delhi, Anwar and his team were bought tickets and given an allowance of INR 3,000 for all 27 of them. When they reached Delhi and called the REEL official whose number Murti had given them, they were told that Murti had not informed them about their arrival. Then they were told to meet REEL officials at the REEL truck garage. The REEL official they met told them that they would be given the work of loading garbage into trucks and will be paid on a per ton basis of INR 67/ton. This would likely work to be lower than the minimum wage in Delhi at the time. Only seven of the 27 workers agreed to stay in Delhi and work under these conditions. The rest wanted to return home to Haldia. Anwar asked the REEL official if they will pay for their tickets to return home, to which the official merely replied, "I didn't ask you to come here."

This is an anecdote from a single person and does not tell us how many such stories exist. There are no written accounts or quantifications of the number of people such things have happened to. My discussions with other professionals, however, confirmed that this is far from an anomaly and not unique to the waste sector.

But let us assume for a moment that firms would be willing and able to employ workers from the local waste picker labor pool. Waste collectors do not currently earn a standard daily wage. Instead, they earn their living from the sale of recyclable waste. There is a fair bit of unpredictability in income, which varies seasonally, weekly, and even daily. In a October 2012 survey of waste pickers, Chintan asked them about their minimum and maximum average daily incomes. While average minimum daily earnings were much below the established minimum wages at the time (INR 279/day), the average maximum were much higher than the minimum wages (Chintan, 2012). In the survey of 1,092 waste pickers across 8 cities in Uttar Pradesh, we found significant seasonal variation in incomes. One would assume that waste pickers would be willing to exchange such unpredictability in income for stable work with a private waste firm, if that were on the table. We asked respondents if they would be willing to become employees rather than remain self-employed. An overwhelming 95 percent noted that they were willing to do so. We also asked them reasons for wanting to become an employee. Surprisingly, over 60 percent of the respondents described their reasons for not wanting to be an employee even though they had answered previously that they would want to do so. Among the 40 percent who said that they were willing to become employees and provided reasons for doing so, there were two most commonly cited reasons: the respect and status that comes with stable employment, and the predictability and stability of income. However, the latter was also the most commonly cited reason for not wanting to become an employee. Of those that noted reasons for not wanting to be an employee, 95 percent stated that fixed income and work hours were a disincentive.

Proponents of new forms of privatization also often claim that current occupations are unhygienic, unsafe and resemble a kind of a modern slave system. Their recommendation is

that the system should be eradicated. Informal waste workers could instead be absorbed into more respectable industries. Rehabilitation plans often focus on skill development and training of the displaced but as we have seen previously in this chapter in the case of IL&FS, such rehabilitation efforts often do not extend beyond tokenism. Indeed, waste pickers themselves would much rather do different work (Viljoen, Blaauw and Schenk, 2015). To understand these aspirations towards alternative employment, in the aforementioned survey, Chintan asked if respondents would be willing to change occupations. An overwhelming 88 percent of respondents indicated that they would be. Chintan also asked them what they would want to earn as a daily wage with such employment. On average, respondents wanted to earn INR 322/day. By contrast, the daily minimum wage for unskilled workers in Uttar Pradesh at that time was INR 200/day. Further, Chintan asked them what they would like to do instead. The biggest occupational choice to emerge among respondents was municipal sweeping—employment with the government that guarantees a higher level of economic security and opportunities for rent expropriation than employment in a private firm. Municipal jobs are few and far between. Other occupations for unskilled labor are unlikely to yield as high returns as respondents claim to expect. Alternatives seem implausible.

These data beckon us to examine an understudied part of the concept of entrepreneurship and self-employment in this context. Part of the motivation for and returns from entrepreneurship are explained by non-pecuniary benefits—independence in decision-making and freedom from managerial constraints (Benz and Frey, 2008; Hamilton, 2000; Taylor, 1996). Further, entrepreneurship is often described as the willingness to bear perceived uncertainty (McMullen and Shepherd, 2006). Taking these two together, we can attempt to explain the implausibility even when there is apparent willingness of informal sector workers to

transition from self-employment to employment with a firm and to change occupations

entirely. The importance of non-pecuniary benefits or "being your own boss" is important

and is reflected in waste pickers' perceived lack of flexibility in work hours under formal

employment. Doorstep collectors, however, currently abide by a strict schedule yielding to

the demands of their daily work, often starting early in the mornings and ending in the early

afternoons (Chintan, 2003). There seems to be a paradox here then: If they already have a

relatively inflexible schedule, then why does inflexibility in schedule as a condition of

employment deter them? The answer lies partly in the way many waste pickers organize their

day. Waste pickers do not often only pick waste. They often spend the latter part of the day

segregating waste, and gathering information to make decisions about whether or not to sell

the waste on any given day. Some work other jobs in addition to waste picking. This kind of

juggling work requires a flexibility that they are likely to lose under conditions of fixed

employment hours. But these are also the same conditions that yield them the opportunity to

manage uncertainty or risk in their enterprises. There is already plenty uncertainty in the

quality and quantity of materials they would be able to extract any given day. But there's also

uncertainty in prices in commodity markets in which they trade those materials. Managing

these risk or uncertainties appropriately could potentially yield high returns. It's a risk that

one must necessarily take in the hope of a slightly better future.

Conclusion

Informal sector waste collectors and recyclers sit uncomfortably and precariously in the fast

changing landscape of urban India. Municipalities typically do not provide doorstep waste

collection services. What they do provide is the service of transporting waste from a

community bin to a disposal point. Informal sector doorstep collectors collect and transport

waste from source e.g. households to the community bin. In the process, they extract recyclables and make their livelihoods by selling those recyclables to dealers. Although exact estimates of how much they recycle vary considerably ranging between 22 and 59 percent, it is in their best interest to extract as much recyclable material as possible since their livelihoods depend on this ability (Chintan, 2003; Gunsilius, Chaturvedi and Scheinberg, 2011). Recent policy developments such as the passing of solid waste management rules have developed standards for municipalities such as the provision of 100 percent coverage in doorstep waste collection. For the most part, coverage in cities is close to this provision even when municipalities are not actually providing this service. However, since this system is outside the control of the state, their work is not "seen" by the state. Cities are outsourcing waste management services including waste collection to private firms for whom control of the waste stream is important for revenue generation. Even though incorporating the existing informal sector collection system makes sense in theory because it saves municipalities money that they would otherwise have to spend on labor costs of collection and provides livelihoods to a section of the urban poor, cities seem to be going a different way. Only in some cases have advocates of the informal sector such as NGOs been able to secure waste pickers' rights to a livelihood by implementing 'formal' doorstep waste collection systems. The rest is a blank slate where new forms of privatization models can be applied. As I have shown in this chapter, this has much to do with the ideological privileging of the 'new' private against the 'old'.

This recent restructuring of waste management markets in urban India betrays a contradiction in neoliberal theory and practice, however. Neoliberal interventions that have called for the privatization of public services are premised on faith in free markets and free enterprise. In

waste management markets, economic theory has guided policy interventions in developed and developing countries alike prescribing the most optimal ways to achieve efficiency gains in waste management services: dismantling public sector monopolies where they exist and replacing them instead with private service providers that can operate their own monopolies once they win those rights through periodic competitive tendering. But as the case of waste management markets in the U.S. demonstrates, these policy interventions have led to the emergence of national oligopolies, replacing prior public sector and smaller private service providers locally. Critics have argued that industry giants that dominate the market landscape have created the very same inefficiencies that those policy interventions informed by economic theory were trying to address. In the case of waste management markets in urban India, such interventions might be mimicking developments in the U.S. Over the past three decades, since India's economic liberalization, privatization of public services has been underway. This period has seen the emergence of a large number of firms offering waste management services but only a few dominate the national market.

Although as of yet, oligopolization of this industry in India is nowhere close to the extent of consolidation of this industry in the U.S., that day might not be too far off. But what's also different in India than the U.S. is who is displaced in the process. While in the U.S., it was local monopolies and oligopolies that have been replaced by national ones; in India it is thousands of individual actors in the informal economy of waste. Informal workers in the economy of waste are entrepreneurs and operate enterprises just like private firms do albeit on a different scale. In addition, the structure of the market in which they operate conforms quite well to the prescriptions of economists on how those markets should be structured to maximize efficiency gains. Yet, private firms command ideological and material privilege in

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the Indian state's discourses and practices of economic and infrastructure development. But the ability of informal workers to organize themselves into entities that can enter into contractual agreements with the state holds some promise that they will not simply or easily be obliterated from history. This is the focus of discussion in the next chapter.

Chapter 3. Accumulation through formalization? Disciplining labor in the informal economy of urban waste in India

If you happen to frequent the broad tree-lined avenues of Chanakyapuri—an upscale neighborhood in New Delhi dominated by diplomatic missions and state government offices—you might see Mukta. Riding atop a giant white sack filled with recyclable materials on a rickshaw driven by one of her workers, Mukta looks like a queen riding her chariot. Mukta "occupies" a *dhalao*, a concrete structure that houses garbage in this neighborhood of the rich. The rich produce rich garbage, which makes Mukta's spot in the patchy urban mosaic of Delhi highly prized. Everyone—other waste collectors, the police, and municipal workers—knows that Mukta controls a lucrative turf. Over the approximately 30 years that she has been living and working in the neighborhood, she has managed to keep control over her territory—sometimes through friendships (such as those with the municipal sweepers who often stop by her *dhalao* for a quick chat over a cup of tea), sometimes through fear (she always carries a knife and is not afraid to flash it when needed). Being Mukta is not easy. Not everyone in her position is able to do it as well as she has, particularly in these times when change—in urban spaces and infrastructures across India—is the only constant. The early 1990s marked a landmark moment in the history of urban management -- particularly urban waste management -- in India. While the early 1990s are much more well known for the opening up of the Indian economy, particularly to foreign investment, the historical moment also represents a change in how the urban and urbanization came to be thought of as "problems" that needed to be managed and simultaneously as opportunities for

national and local economic growth (Ahmed, Kundu and Peet, 2010).[30] This relationship

between the urban and neoliberal reform has been widely studied and theorized and does not

need to be repeated here (see for instance Brenner and Theodore, 2002; Harvey, 2006;

Jessop, 2002; Smith, 2002 among many others). Within India, economic reforms of the

1990s coincided with two inter-related urban political processes. The first was the passing of

the 74th Constitutional Amendment that allowed for decentralized governance of cities. The

second involved the privatization of urban infrastructures through large-scale centrally

funded and managed programs such as the Jawaharlal Nehru National Urban Renewal

Mission.

In the midst of these ongoing urban restructuring processes, the 1994 plague in Surat brought

to the forefront the problem of "unmanaged" urban garbage which led to the issuance of the

first ever Municipal Solid Waste (Management and Handling) Rules in 2000 following a

Supreme Court decision on a public interest litigation (Chaturvedi and Gidwani, 2010).

Placing responsibility for solid waste management service provision squarely on the

shoulders of municipalities, these rules produced a spate of service and infrastructure

privatization efforts across the country. The scale and scope of privatized services has been

expanding and deepening ever since (Schindler, Demaria and Pandit, 2012).

If urban wastes were truly "unmanaged," then the entry of private firms into this sector might

not have been a problem at all. But this is not the case. Wastes are informally managed by

thousands of private actors who collect, sort, transport and recycle waste and recyclable

materials in cities across the country eking out a meager livelihood in the process. Their work

doesn't seem to get rid of the piles of garbage in cities that municipalities rightly are

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[30] Chapter 2 has described in more detail such a discursive shift in the Indian policy that establishes a clear
relationship between cities and economic growth.

concerned about. What they do a great job of is reducing the amount of garbage that the city has to get rid of by anywhere between 20 and 60 percent depending on where the samples are taken for such measurements (Chintan, 2003; Gunsilius, Chaturvedi and Scheinberg, 2011). While the duty of municipal managers to assume responsibility for urban hygiene is certainly a complex, important problem, the rush to decentralize and privatize is certainly not the only answer. Municipal managers have a choice from a wide set of potential solutions to the problem, including ones that do not have to displace and dispossess informal sector workers. As Chapter 2 has described, the choice of new forms of privatization as the optimal solution betrays an ideological and material privileging of certain actors over others.

Privatization of waste and waste management directly competes with informal sector livelihoods and has dispossessed many such workers in urban India. Using examples from cities across the world, many have argued for understanding such processes through the lens of accumulation by dispossession whereby capital separates workers (those who informally manage urban wastes) from their means of subsistence (waste materials) by using overt and covert forms of economic, political, and sometimes physical violence that workers have sometimes been able to resist (Chaturvedi and Gidwani, 2010; Neocleous, 2011; Samson, 2009b; Schindler, Demaria and Pandit, 2012; and Whitson, 2011).[31] Although many have been dispossessed through these processes, others such as Mukta continue to maintain control over their means of subsistence. But Mukta is not immune to ongoing forces that constantly threaten to dispossess her from those means.

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[31] Historically, the trope of waste guided original accumulation through the enclosure of the commons. See for instance Goldstein's (2013) account of the designation of common land as waste as the justification for their enclosures in 19th century England. Gidwani and Reddy (2011) similarly recount for us how colonial discourses of waste shaped land policies in India in the 19th century and continue to manifest themselves today in different forms in their neoliberal guises and impose new kinds of social order. For a more recent account of how the relationship between waste, value and societal order permeates our contemporary lives, see Hendersen (2011).

Just as forces of neoliberal privatization of urban infrastructure dispossess or threaten to

dispossess the urban poor, a counter struggle against these forces has ensued through non-

governmental organizations (NGOs) that are taking a variety of organizational forms—

associations, unions, cooperatives, and even private for-profit businesses—that fight for

livelihood security for those engaged in the informal economy of waste (Samson, 2009a).

Such organizations have emerged across cities in India and the rest of the world at the local,

national and even global levels.[32] Polanyi has urged us to think of this as a double movement

whereby forces of economic liberalism are countered through forces of social protectionism

(Polanyi, 2001). This chapter investigates the effects of such a counter movement on the

labor process of workers in the informal economy of waste in urban India. Much of the

existing literature on urban waste focuses on examining processes of dispossession where the

latter is readily apparent and forces of capital (i.e. the state and private firms) can be easily

identified. In these accounts, labor is dispossessed from their means of subsistence and

forced to become a part of the industrial reserve pool of surplus labor. This chapter examines

a different process—what happens when dispossession of workers from their means of

subsistence has not yet occurred but the threat of such dispossession is persistent?

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[32] For instance, in Delhi alone, there are at least three different organizations working towards livelihood security and stability for waste pickers: Chintan Environmental Research and Action Group, an NGO and its affiliate Safai Sena, an association of waste pickers and small scale waste traders; All India Kabari Mazdoor Mahasangh, a union; and Sajag Society, an NGO and its affiliate Kachra Kamgar Union. At the national level in India, there are at least two organizations—the Alliance of Indian Wastepickers (AIW) and People's Alliance on Waste (PAW)—both loosely organized with different yet overlapping scopes and missions. At the global level, there is the Global Alliance of Waste Pickers (Global REC) and the Global Alliance for Incinerator Alternatives / Global Anti-Incinerator Alliance (GAIA). The existence of organizations at different scales allows local organizations to scale up their advocacy efforts to national and international levels and vice versa, that is, national and international advocacy efforts often percolate down through alliances with local organizations. The inter- and intra-scalar relationships between these organizations are not devoid of tension however. Online discussion in groups such as GAIA, PAW and Global REC often get hostile. Agreement between groups is never a simple matter. At the local level, territorial fights between organizations vying for the same "beneficiary" populations are also not uncommon in some cities.

Under the persistence of such a threat, NGOs and allied organizations—which have sometimes even included state actors—are able to organize workers while simultaneously disciplining them to conform to increasingly stringent requirements of service delivery. They do this through a process often referred to as "formalization" of the informal economy of urban waste. This type of formalization differs from other types of formalization where informal workers may become employees or contract workers for organizations in the formal sector that could be for-profit, non-profit or a government organization. In the type of formalization that I am focusing on this chapter, informal workers do not necessarily become employees of an organization. They continue to retain ownership of their means of subsistence (or waste materials) but work quasi-independently as "members" of an organization that has secured rights (contractual or otherwise) to provide a waste management service in an area. What changes for the workers is that they are no longer completely independent but instead are members of an organization that guarantees that they are able to continue earning their livelihood in the same manner as they always have. What also changes is that they now have to conform to certain protocols of professionalism in their work.

This chapter explores the material and ideological justification and consequences of the process of formalization of informal labor in urban India. In what follows, I first review relevant literature on informality, property and accumulation through dispossession. Following this, I describe how certain discourses about informal labor in waste provide an ideological justification for the formalization of labor in the sector. In the third section, I examine what formalization implies in terms of changes in the labor process. In the final

section, I offer some ways of contextualizing the new forms of labor discipline and surplus value creation as a necessity under neoliberalism.

Informality, property, and dispossession: a review of relevant literature

The provision of waste management services is an obligatory function of the local state. This is written into laws that established municipalities and urban local bodies across the country making them responsible for "the scavenging, removal and disposal of filth, rubbish and other obnoxious or polluted matter" (GOI, 1957, Section 42). These laws also allocate property rights over waste materials to the municipality or contractors hired for the purpose of providing waste management services within their jurisdictions.[33] Within these legal provisions however, there is no clear assignment of property rights over waste between the point of waste production, the household for instance, and the point of disposal into municipal bins. It is only when waste is in a municipal receptacle that it becomes the property of the municipality or its contractor. This lack of clear property rights has allowed urban waste—at particular points in its journey from source to sink—to emerge as urban commons, to which informal sector waste collectors have evolved customary or squatter rights (Bose and Blore 1993; Chaturvedi and Gidwani, 2011). In Chapter 2, I provided a detailed account of the recent corporatization of waste management services and the displacement of the informal sector in urban India. Rights to waste as private property or as a

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[33] Section 351 of the *Delhi Municipal Corporation Act 1957* titled "Rubbish etc. to be the property of the Corporation" states, "All matters deposited in public receptacles, depots and places provided or appointed under section 352 and all matters collected by municipal employees or contractors in pursuance of section 350 and section 355 shall be the property of the Corporation" (GOI, 1957). A limited review of municipal corporation acts shows that the same language for the assignment of roles, responsibilities and property rights is used across the country.

common pool resource are a fundamental part of the struggle between the State, formal and informal economies of waste management in urban India.

In Delhi for instance, three different waste management companies—Delhi Waste Management, Metro Waste Handling, and AG Enviro—each of them subsidiaries of larger conglomerates (Ramky Group, SPML and Antony Group), are contracted by the municipalities to provide waste collection and transportation services in different parts of Delhi. These firms were typically assigned the responsibility of collecting garbage from community bins (or *dhalaos*) and transporting it to the landfill. In certain instances however, the firms are also contracted to provide doorstep waste collection services. In response, informal sector advocates argue that the city cannot outsource doorstep waste collection because of the way municipal corporation acts are written. For instance, Shashi Pandit, leader of AIKMM, a Delhi-based waste picker advocacy organization says, "They have no right to collect waste door-to-door. It's not in their contract." Private waste management firms such as Ramky disagree, "Ragpickers don't have a right, per se" (R. Rao, 2013).

Thus far, doorstep waste collection has not been outsourced to private firms on a large scale. However, on the basis of their contract with the municipality, private firms and their functionaries are able to extract rents from waste pickers. In return for letting them access waste material, they have to pay a fee, as described in Chapter 2 (see also Chaturvedi and Gidwani, 2010).

In other cases, the introduction of a technology such as incineration diverts waste materials from landfills to those facilities depriving waste pickers access to their means of subsistence—recyclable materials—at the landfill (See chapter 4 for a more detailed discussion of this). In such cases, accumulation through the dispossession of workers from

their means of subsistence is readily apparent. Informal workers are dispossessed either entirely or partially and forced to enter the industrial reserve army. The commons of waste are privatized for profitmaking by private firms. The process is mediated by the state and the winners and losers are clear.

But in response to such forms of dispossession, waste picker advocates have been able to safeguard their livelihoods by entering into agreements with municipalities which allow waste pickers to continue making a living. In Delhi, Chintan has entered into such agreements with the New Delhi Municipal Council and East Delhi Municipal Corporation to provide doorstep waste collection services to a select number of households through Safai Sena, an association of waste collectors and traders. In Pune, SWaCH similarly has been contracted to provide doorstep waste collection services by the municipality through Kagad Kach Patra Kashtakari Panchayat (KKPKP), a trade union of waste pickers. Although there are major differences in the organizational strategies used by the two organizations—SwaCH and Chintan—they share a common goal of protecting the informal sector against the vagaries of government outsourcing of municipal waste collection services and safeguarding their access to waste materials, thereby ensuring livelihood security.[34] Advocate organizations thus help avoid the complete dispossession of informal sector workers. While many scholars have studied the forms of dispossession entailed when rights to waste as common property are lost, how the labor process changes even when rights to that property

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[34] SWaCH has organized Pune's waste pickers into a trade union which is a fundamentally different organizational form than Chintan's strategy of establishing a loosely defined association of waste pickers and traders—Safai Sena—in Delhi. In addition, SWaCH gets paid by the Pune municipality but Chintan does not get paid by the Delhi municipality. There is no doubt that different organizational forms—union versus association—impact livelihood security and waste workers' relationship with the state but that discussion deserves an entirely different paper.

are retained remains largely unexamined (Bose and Blore, 1993; Chaturvedi and Gidwani, 2011; Gidwani and Reddy, 2011; Schindler, Demaria and Pandit, 2012).

Unsurprisingly, however, this struggle to maintain access to means of subsistence is not simple or easy. There are a host of discourses that circulate around the 'unruliness' of the urban poor, particularly those who work in the informal waste economy. Economic sociologists have provided us tremendous insights into the place of the informal sector in contemporary capitalism by debunking the myth of modernization theory that conceptualized the informal sector as a relic of the past that would disappear with the onslaught of "development" (Portes et al., 1989). The informal sector, economic sociologists argue, has emerged as the new ideal with the state recognizing its necessity and importance in underwriting and subsidizing the "formal" sector (Agarwala, 2009; Jutting and de Laiglesia, 2009). Yet, the informal sector of the urban economy—street vendors, cleaners, waste pickers etc.—has long functioned as the "unplannable" object in the epistemology of urban planning in developing countries (Roy, 2005). Even as the necessity of the informal sector to local, national and global economic flows is widely recognized, the sector nonetheless continues to be associated with illegitimacy, disorder and illegality (Porter, 2011). To my knowledge, however, no one has systematically categorized and documented such discourses of illegality, criminality, and immorality about waste pickers in India thus far. To this end, in the following section of this chapter, I provide an account of such discourses about why workers in the informal economy of waste need disciplining.

I explore these discourses in such detail for a more important reason. The tactics of discipline involved in the professionalization and formalization of informal labor in waste specifically address these discourses. In examining these tactics, I also explore how these new forms of

discipline change the labor process within the informal economy of waste. Discourses

materialize by enforcing these new forms of discipline and control over informal labor and

laboring bodies. This mode of formalization is favored by those who have the interests of

waste pickers at heart because it averts dispossession from their means of subsistence—waste

materials—at least for the time being. But as I will show in the concluding section of this

chapter, such a sole focus on property rights conceals other processes of dispossession and

accumulation that remain to be critically examined.

Unruly people / unruly garbage: the justification for discipline

In the gated community in East Delhi where I lived during the course of my fieldwork, the

following notice was posted outside the elevator on April 24th, 2013:

> *This is to inform the residents that some mischievous persons and/or children are
> damaging the cars in E-block mainly, as well as society property in other blocks. Any
> residents noticing such activities may kindly inform the Society Office or Security at the
> gate immediately. Residents are requested to keep strict vigil on workers, drivers and
> housekeeping staff for missing articles and items.*

The notion that the poor, who make a living by providing crucial services to the rich, are

troublemakers is pervasive in middle and upper class India. As the notice above blatantly

shows, even if children of the rich are up to mischief and may have caused trouble, the

appropriate response is to keep vigil on "workers, drivers and housekeeping staff." Such

forms of vigilance have recently even become institutionalized through the police system.

For instance, the Delhi Police offers a "servant verification scheme" which allows one to

register and verify the "character and antecedents" of their "servants". The following is an

extract from the website introducing this system:

> *A large number of immigrant servants and floating labourers, chowkidars, plumbers,
> electricians and other casual labourers come to Delhi/New Delhi in search of
> employment. Crime committed by this class of population in Delhi constitutes a big
> problem. Some of them are of dubious, character and have previous convictions. The*

employers in many cases have no idea about the man's character. They employ them at times without anybody's recommendation and knowing nothing about them. To find out such bad elements it is necessary to start verification of character and antecedents of domestic servants, private employees and the chowkidars employed by the Resident Welfare Associations. It would help the local police greatly if previous convicts, suspects and other shady characters among such private employees are spotted (Delhi Police, n.d.).

Newspapers are flooded with reports of murders and burglaries where the prime suspect is always a person of such "dubious character." Public service announcements caution people on the hazards of employing "unknown," "uncertified," "unregistered" persons who will steal from and/or kill you at the first chance they get. Such criminalization of the urban poor and informal urban labor in India has been widely studied (Baviskar, 2003; Bhan, 2009; Ghertner, 2012; Menon-Sen, 2010; Truelove and Mawdsley, 2011 among many others). As these scholars have shown, informal labor is also central to the production and maintenance of the city and indeed even the country. Its economic importance has now been widely acknowledged in local, national, and international policy and planning discussions (Agarwala, 2009).[35]

The tension in the relationship between those whose (largely informal) labor produces surplus value and those who benefit from the production of that surplus value is placated through "formalization" that make labor less threatening on the one hand and through socially inclusive policy making on the other. Waste pickers, much like other sections of the urban working poor, are also at the center of this tension.[36] In this section, I describe five

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[35] Recently in December 2014, at the launch event of a Right to the City campaign in Delhi, a Member of Parliament representing the Standing Committee on Urban Development noted, "We need to ensure a just society for the working class as it creates wealth" (Hindu Staff Reporter, 2014)
[36] Labor in waste work can be distinguished in two separate streams: the municipal sanitation workers and the informal waste collection and recycling workers. Casualization of the former, that is, municipal sanitation workers is an increasing trend in cities across India. As cities have grown, the demand for municipal sanitation workers has also grown but instead of hiring new workers as employees, there has been a shift to using contract labor. Part of the reason for this shift is the perception within the government that Dr. R.M. Dubey, Chairman of the Assam State Pollution Control board articulated succinctly at a conference in Delhi in February 2013: "Once

inter-related narratives about waste pickers that are either used to justify their displacement from or their inclusion into modern waste management systems.

Criminal, illegal and immoral

Interlinked narratives of criminality (waste pickers as thieves), illegality (waste pickers as illegal Bangladeshi immigrants), and immorality (waste pickers as alcoholics and drug addicts) dominate the imagination of policy makers and increasingly insecure middle and elite classes. Many engaged in the waste trade in Delhi are Bengali-speaking migrants. The share of migrants in the informal waste sector workforce is estimated to be anywhere between 65 and 100 percent (Koberlein, 2003; IHD, 2012). Of these approximately 90 percent are Bengali-speaking and between 60 and 70 percent identify as Muslim (Koberlein, 2003; IHD, 2012).[37] Being poor, undocumented, Bengali speaking and Muslim is a perfect recipe for being branded illegal, immoral, and criminal in many parts of urban India. Consider for instance the following excerpt from a local fortnightly East Delhi newspaper about "illegal Bangladeshi immigrant" slum residents in a community near a landfill dominated by waste pickers:

> *The Acting President of Akhand Hindustan Morcha[38], Sandeep Ahuja, in expressing concern over the increasing population of Bangladeshi immigrants, noted that these Bangladeshi immigrants have established their own empire in the Ghazipur Dairy Farm community. These illegal immigrants have set up prostitution and illegal local liquor businesses . . . In protest against these Bangladeshi immigrants, on July 5th [2013] at 11*

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people become employees, they stop working." Private contractors that supply contractor labor to municipalities often flout labor laws. For instance, in Bangalore, municipal sanitation contract workers had not been paid by the private firm for 6 months, a union representative noted at a meeting in November 2013. While this gap is being filled by contract workers in cities like Bangalore, in other cities such as Shimla, the municipality established an organization of existing informal sector workers to bridge the gap between supply and demand for municipal sanitation workers. Clearly, the line between formal and informal sector is blurry. Although this deserves more attention, my paper focuses on the informal waste sector workers who may or may not have been "formalized" to provide municipal waste management services.

[37] These numbers are remarkably different from Gill (2010) where only about 4 percent of the waste pickers surveyed identified as Muslim. This is likely due to the specific geographic area surveyed by the author.

[38] Akhand Hindustan Morcha (Great India Front) is one of many political parties associated with Hindutva or Hindu nationalism.

am, a march will be organized where the Deputy Commissioner of Delhi Police will be issued a notice . . . He [Sandeep Ahuja] *said that the Bangladeshis have established 2000 illegal homes in this community over the past year and a half. This is a security issue . . . Every day one or two new homes are being built and they are even being provided Aadhar and ration cards.*[39]

On numerous occasions, my informants in the waste trade in Delhi noted that police harassment was one of the biggest problems they faced. The police often accuse them of being Bangladeshi and threaten deportation. Their religious affiliation and language don't help the situation either. What makes matters worse is that not many have government-issued identification to disprove the police's claims. The threat of deportation is real, fueled largely by increasing Hindu nationalism in mainstream Indian politics. Operation Pushback of the 1990s when many allegedly illegal immigrants were forcefully deported and the more recent Ghar Vapasi campaign both provide testimony to the reality of this threat (Ramachandran, 2003; Sen, 2003).[40] One informant—a waste picker from Delhi—recounted his experience for me:

In 1977 my mother brought me here from our village in Bangladesh. I won't lie. We were very poor. We came here for a livelihood. I don't steal because if I do the police will beat me up and trouble us. I am able to earn two square meals respectably. When I first arrived, Indira Gandhi was the Prime Minister. The basti [settlement] *you see there, those were slums. That's where we used to live. The cops used to be very good. They used to take care of us—the Bangladeshis. However, there are some people who say that the Bangladeshis are thieves. All thieves should be punished, no matter where they are from—here or America. The law is for everyone, rich or poor.*

Things have changed since the time my informant first came to Delhi in the 1970s. Public perceptions of waste pickers are largely negative. To understand and quantify some such perceptions in Delhi, Chintan conducted a survey of approximately 3,000 Delhi residents

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[39] These are key forms of government-issued identification cards that the urban poor use to access social security, financial, health and education services from government and private providers. Incidentally, Chintan is one of the main organizations involved in providing access to government-issued identification for waste picker communities across Delhi which includes this particular community also.
[40] "Ghar Vapasi" campaigns are organized by Hindu nationalist parties across India to forcibly re-convert Muslims and Christians into Hindus. Non-Hindus are being 'returned home' to their 'original Hindu-ness'.

(See chapter 1 for a detailed description of this survey). In this survey, we asked respondents to tell us whether or not they agreed with the statement "Waste pickers and *kabaris* can also be thieves." About 80 percent of respondents agreed with the statement. Further, there were no differences in responses between income groups. In other words, rich and poor people alike felt the same way. Waste pickers corroborate this widespread public perception. Fourteen percent of respondents in a 2012 survey of 302 waste worker households reported often being mistaken as thieves (IHD, 2012). During my time at Chintan, community organizers received calls at least once a week from waste pickers detained at police station based on accusations of theft.

Narratives of substance abuse (alcohol and drugs) among waste pickers are also common. Waste workers confess to substance abuse in order to cope with the nature of the work (IHD, 2012; Vyas, 2009). IHD (2012) summarizes a focus group discussion on the topic of substance abuse in the following way: "As per the views of the rag pickers, alcohol numbs their senses to make them feel courageous enough to spend their time day after day among discarded waste of varied quality, while giving them a false sense of dignity as they try to sort and sell items of value and end their day with food that has little taste or smell for their nauseous insides" (p. 57). It is not my intent to validate the prevalence of substance abuse among waste pickers but instead to point out that this issue is often raised by policy makers as one of the reasons to discipline them.

Consider, for example, the following excerpt from the influential Bajaj Committee report on the state of solid waste management in India: "[T]he dull drudgery of work under very poor working conditions make them long for escape and so they often fall a prey to several evils such as gambling, drinking, using drugs and drug trafficking . . . It might in the long run be

worthwhile to attempt to organize rag pickers cooperatives, so that in addition to getting a fair wage for their work they also can benefit from the non-formal education and learn skills that will be of use as they grow older. Such a measure would, to some extent alleviate their boredom and save them from acquiring alcohol/drug habits and gambling" (Planning Commission, 1995, p. 13-14).[41] Similarly, a World Bank report notes, "Rag pickers need to be educated on the ill effects of abusing alcohol and drugs, rummaging through garbage piles without safety gear, contracting infections through unsafe handling of waste, and so forth" (Zhu et al., 2008, p. 167).

Much as countering substance abuse is noted by policy influencers and policy makers as a reason for formalization of informal waste sector workers, addressing popular perceptions of them as thieves and illegal immigrants and dealing with police harassment is cited as a reason for organizing and formalizing them by NGOs and community activists. An itinerant buyer told me his reason for working with Chintan through a story:

> *The biggest problems I face are from the municipality and the police. Once a policeman asked me what I was doing. I told him that I was collecting recyclables, the same thing I have been doing for the past 15 years. The police told me not to come there everyday but only two days a week. I asked what I should do for the other five days. The policeman said that that was not his problem. I told him then that he should also come here only two days a week. The police told me not to talk back and slapped me. If we are to improve our working conditions, then we must first unite as* kabaris. *There have been changes in the past five years.*

Specter of the plague

The 1994 Surat plague brought the relationship between "unmanaged" waste and disease to the forefront of public and policymakers' political imaginations as described in Chapter 2.

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[41] The Bajaj Committee report is just one of many key government documents related to solid waste management that I have studied during the course of my research. The narratives across these different reports are quite similar. The reason why I highlight this particular report repeatedly in this paper is because this report is often hailed as a landmark document that was quite progressive in its blatant acknowledgment of the important role of waste pickers at a time when municipal solid waste management had emerged as an issue deserving national scrutiny (Gidwani and Chaturvedi, 2011).

The plague, however, also showed how the threat of disease allowed the state and urban residents to exercise new and violent forms of public surveillance and control. In Delhi, the Delhi Municipal Corporation Act was invoked after the plague to criminalize patients and those suspected of having contracted the disease (Qadeer, 1994). In Delhi, it also allowed the Municipal Corporation of Delhi to ban all waste pickers' activities. Many NGOs and activists vigorously protested against the ban and it was subsequently revoked (Gidwani and Chaturvedi, 2011). The logic of the ban was simple: waste pickers spread garbage and this increases the potential of spreading of diseases such as the plague. In the narrative of the ban, waste pickers themselves became vectors of disease, much like rats, the real vectors.

A similar logic is evident in government documents that were released after the plague. The Bajaj Committee report for instance notes, "The common method of disposal of the waste is by unplanned and uncontrolled open dumping at the land fill sites. In these sites, ragpickers often pick recyclable materials; rats, dogs and cattle forage for food; flies, mosquitoes and rodents swarm and thrive in these dumps." To address this problem, the report recommends "organized tipping of waste, use of mechanical equipment to level and compact the wastes and a final covering with earth followed by further compaction" in order to "reduce fly, rodent, animal and human intrusion into the garbage." Waste pickers, cattle, dogs, and rodents are all saprophytes that thrive on rotting garbage. They need to be done away with for all the harm they could cause.

Government reports such as this one also note the increased susceptibility to and prevalence of health problems among those who work with waste. Higher incidence of certain kinds of diseases among those who work with waste are widely known and acknowledged (Planning Commission, 1995; Hunt, 1996; IHD, 2012; Ray et al., 2005). Health problems aside,

working in waste dramatically increases the possibility of mortality either due to fatal injuries at work or due to the cumulative effect of an unhealthy work environment and years of arduous labor. A representative from the Shimla Municipal Corporation's Department of Health confessed to high mortality rates among formalized waste collectors in his city. During my time in the field, I heard of at least one incident where a fourteen-year old waste picker was crushed by a garbage truck at a landfill. In fact, even in the U.S. where occupational health and safety standards are typically better enforced, waste collection has consistently been among the top ten most dangerous professions (U.S. Department of Labor, 2014).

There is no doubt that conditions of work inflict a kind of "slow violence" on the bodies of the urban poor (Nixon, 2011). For waste pickers, this violence is partly physical, partly emotional, partly immediate, and partly long-term—traces of the "hidden injuries" of daily work linger on for a long time (Perry, 1978). Such physical and psychological effects are intimately connected with substance abuse (Da Silva, Fassa and Kriebel, 2006). But such narratives of poor work conditions are used as justification for change, by some as grounds for exclusion from "modern" waste management systems and by others for inclusion into socially just alternatives. For instance, the Bajaj Committee report notes, "Presently informal sector of rag pickers is contributing substantially to the recovery of recyclable material from urban solid waste. However, ragpickers mostly women and children live under and work in extremely unhygienic conditions" (Planning Commission, 1995, p. 14).

At a seminar in Delhi, N.B. Majumder, a well-known expert who often chairs or is invited to participate in various government committees on waste management, called for abolishing waste pickers, not waste picking as a profession but waste pickers themselves. At a different

meeting, in response to a municipal official's concern about high mortality rates among workers in Shimla, he said, "One feels bad for the workers because garbage drips on to their backs.[42] This is even more of a problem during the winter season and particularly acute for smaller lanes and bye-lanes where automation cannot happen. A new system is urgently needed." Majumder feels bad for the waste collectors. He wants to resolve their problems by rendering them superfluous by replacing them with machines where possible.

In an interview for a documentary, Manish Gupta, the Municipal Commissioner for South Delhi, responds to a question posed by a Safai Sena leader on the displacement of waste pickers from a landfill due to the establishment of a waste-to-energy facility: "When we were dumping waste at the landfill, then maybe there were a few ragpickers who would try to separate out items of value from the trash in extremely unhygienic conditions, in extremely dirty conditions. We want that ragpickers at landfill site who work in such extremely dirty conditions, in extremely unhygienic conditions, in extremely bad conditions should be provided some alternatives."[43] In Gupta's imagination, there are only a "few" waste pickers who "try" to make a living by retrieving materials from the landfill. On the contrary, the landfill that he mentions supported the livelihoods of approximately 400 people based on a survey conducted by Chintan in June 2011. At around the time of the interview, approximately 100 people still worked at the landfill (Chintan, 2012). The rest had been displaced once the waste-to-energy plant started operations, to other parts of the city, probably doing work that pays less and taxes their bodies more than the work of scavenging

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[42] Waste collectors in cities in mountainous areas carry baskets on their backs to collect and transport waste from households.
[43] This interview was filmed as a part of a documentary titled *Credits vs. Carbon Credits* at the municipality's office in Delhi (Safai Sena and Chintan, 2012).

through garbage. No alternatives were ever provided to the ones that have already left. No alternatives will likely ever be provided for those who remain.

Messy work, messy people

The temporary ban on waste picking in Delhi after the 1994 plague was premised on the idea that waste pickers spread garbage, which subsequently increases the prevalence of disease vectors such as rats. More recently this fear of pestilence due to scattered garbage is being complemented with a different kind of concern less focused on public health and more on the aesthetics of the city. Scattered garbage does not fit the image of aspiring world-class cities. Regardless of the desire for clean cities, this is of course not an unjustified concern. The problem however is that waste pickers are not the only reason, likely not even the main reason for the scattering of garbage in the city. Community bins or *dhalaos* are often overflowing with trash because they are not emptied often enough. Garbage also scatters as animals—cows and dogs—scavenge through it. Regardless of the source of the problem, waste pickers are often the first ones to be blamed for their contributions to creating unsightly cities. The following excerpt from a news article from Chennai is a case in point:

> *The Chennai Corporation has planned to replace garbage bins with specially-designed bags to facilitate better collection of refuse in the city. The new system is intended to prevent ragpickers from spoiling the area around a garbage bin, according to sources in the Chennai Corporation. A study by the civic body has found that ragpickers contribute to scattering of garbage on the roads. Most of the garbage being taken out of bins by thousands of ragpickers on a daily basis is strewn all around to facilitate easy identification of recyclable items in the garbage. The ragpickers fail to put the garbage back in the bins, thereby spoiling entire stretches on roads, the study had found. Under the new system, generated garbage will be collected directly from homes and packed in specially-designed reusable bags by conservancy workers* (Hindu Staff Reporter, 2012).

Private waste firm managers are also quick to point fingers to waste pickers. In Delhi, an official from Ramky said "ragpickers cause hygiene problems by strewing garbage around dumpsters, in their attempt to extract recyclables" (R. Rao, 2013). Infrastructural problems

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such as inadequately sized or lack of adequate number of community bins, and the inability

of municipal or contract workers to empty the bins on time are scarcely acknowledged. An

official from another private waste management service provider in Delhi acknowledges this

infrastructural problem: "There is shortage of garbage collection sites known as *dhalaos*"

(*ibid.*). But he is mostly alone in expressing such a view. In the aforementioned survey of

Delhi residents, we asked respondents to state their agreement with the following statement:

"Waste pickers make a mess of pavements and *dhalaos* by throwing waste everywhere." Of

the over 3,000 respondents, more than 90 percent expressed agreement with this statement.

Almost everyone—policy makers, municipal officials, private waste firms, and the public—

is in agreement that waste pickers create a mess. Waste pickers disagree. In my conversations

with them, some waste pickers pointed to the infrastructural problems mentioned above.

Others acknowledged they had not really thought about the mess at the *dhalao* or on the

pavement until it was pointed out as a problem that might threaten their livelihoods. To those

who work with garbage, such aesthetic concerns seem irrelevant, perhaps even pointless.

To address this issue, the *dhalao* has emerged as a crucial point of intervention for improving

waste management in Delhi. In preparation for the 2010 Commonwealth Games when the

image of the city as the host and as the capital city of a powerful global player was at stake,

the Municipal Corporation of Delhi decided to make the city *dhalao*-free but that campaign

subsequently failed (Anand, 2010; Khullar, 2010). More recently, in an effort to become

ISO-9000 compliant for health services, the South Delhi Municipal Corporation is pursuing

many initiatives, one of which focuses on creating "dhalao-free zones to keep away

ragpickers from the city" (Tribune News Service, 2014). New Delhi Municipal Council is

planning to introduce changes to its waste management systems by collecting garbage from

the doorstep and delivering it directly for processing and disposal which will "eliminate the need for "*dhalao*" points, which have caused unhygienic conditions and dissatisfaction among people" according to Jalaj Srivastava, NDMC Chairman (PTI, 2014a). If all goes according to plan, the *dhalaos* will be converted to public toilets (*ibid.*).

But the *dhalao* is much more than just an eyesore on the city's lofty aspirations. For many engaged in the waste trade, it is crucial space for sorting and temporarily storing recyclables (Chaturvedi and Gidwani, 2011). In imagining the city's future waste management systems, organizations such as Chintan see *dhalaos* as a massive opportunity for allowing waste pickers to run decentralized material recovery facilities. As cities such as Delhi have pushed out the poor to their outer margins, waste pickers have to travel longer distances to their own homes or *kabari godams* (waste dealer's warehouse) to sort and store recyclable materials. Existing *dhalaos* can provide a perfect space for sorting and storage.

For some like Mukta, a *dhalao* is also a place to live. In a city starved of space, real estate is a precious commodity that only a few can afford. The concrete structure not only keeps the value of recyclable materials intact by protecting it from rain, it also keeps many, particularly women and children safe from sexual assault. The smell of rotting garbage offers real protection. One women notes, "I live here to escape being raped and assaulted by men on the streets. The stench keeps them at bay . . . Children too live here sometimes. It is far too dangerous to sleep in the open" (Perapaddan, 2013). The right to live in a *dhalao* is not free. One family is noted to have paid the "previous owner" INR 150,000 to be able to call it their home (Akram, 2014). Nearby neighbors are not happy with this set up. They claim that their streets are filled with trash because the space meant for storing their trash has been "illegally" occupied (*ibid.*). Government officials echo this concern. In a meeting, the Chief

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Secretary of Delhi noted that if he were to formally allow waste pickers to use spaces such as *dhalaos* for waste segregation, they would start living there.

In addition to waste pickers making a mess of public areas, another common belief is that waste pickers have been one of the main reasons for the failure of waste segregation at-source efforts because they mix it all. Segregation of waste at-source is widely hailed as being fundamental to effective and efficient waste management systems that maximize resource recovery (Anantharaman and Luthra, 2014). Many attempts have been made in Delhi to encourage waste generators to segregate their waste but these have largely failed. The reasons for failure are plenty—unwillingness or inability of waste generators to store segregated wastes, lack of city's infrastructural capacity to store, transport, process and dispose of segregated wastes, and lack of a clear understanding of the categories into which waste is to be segregated among waste generators as well as the government. But the most often cited cause of the failure of these efforts is that waste collectors mix everything. The Chief Secretary of Delhi echoed this concern in an interview noting, "Source segregation efforts have failed because waste pickers mix everything. RWAs [Resident Welfare Associations] have often complained about this." Public opinion on this issue follows suit. In the survey of Delhi residents, we asked whether or not they knew the difference between biodegradable and non-biodegradable waste, categories used by the Government of Delhi to encourage source separation (see footnote 14). Only about 40 percent claimed to know the difference. To test their knowledge, we asked them to tell us whether they thought the following statement was true or false: "Metal and glass are biodegradable materials." A little over 20 percent responded correctly. We also asked respondents whether or not they segregated their waste. Over 90 percent of the 3,000 respondents said that they do not. As a

follow up, we asked them why they did not segregate their waste and over 60 percent said that it was because their efforts would be futile because the waste collector would mix the waste anyway. Ironically, the income of waste collectors depends on their ability to quickly segregate recyclable materials from mixed wastes. In a span of about 30 seconds, a doorstep waste collector segregates potentially recyclable materials from a mixed bag of waste before moving on to the next house. The problem is that they do not segregate waste into those categories (e.g. biodegradable and non-biodegradable) into which municipal systems and infrastructures (usually imaginary or aspirational that have never been actualized) require that they do. Regardless, waste pickers are to blame for the failure of source separation efforts.

In addition to these two narratives—messy public areas and mixing of segregated garbage—waste collectors and traders are also often blamed for two unrelated incendiary problems. The first is the idea waste pickers openly burn waste often to extract materials of value such as copper but sometimes also to get rid of unwanted waste that remains uncollected by municipalities (Government of Karnataka, 2004; Hunt, 1996; Reddy, 2011). Most such fires are spontaneous because of the high levels of methane in garbage and are persistent at landfills (*ibid.*). People who are not waste pickers also burn waste. The second relates to the warehouses or *godams* of waste traders where recyclable materials are sorted and stored. Because these places contain concentrated amounts of highly combustible materials, risk of fires is exacerbated. During my fieldwork, the waste picker community of Ghazipur burned down twice. During a visit to one of Srinagar's waste picker communities, a fight broke out between the neighboring residents and waste pickers over the latter's open burning of waste. On a different visit to Moradabad, I saw copper wires being burned in the open to melt the

plastic that coats the copper inside. There is no doubt that waste pickers sometimes burn

waste in the open but not all fires are caused by them. Deliberate fires are a necessity either

to overcome the city's inadequate infrastructural capacity or to extract the latent value in

specific materials. Further, not many city residents in general understand problems

associated with open burning. In the survey of Delhi residents, we asked respondents to tell

us whether the following statement was true or false: "Burning of waste in a neighbourhood

is safe as long as it is outside the home" (see footnote 14). Over fifty percent of respondents

thought that open burning was safe. Regardless of who burns waste or what causes a fire, the

informal sector waste community is often blamed for either causing or facilitating them due

to the nature of their trade.

Villainy of the middleman

Waste pickers make a living by collecting, sorting and selling recyclable materials to waste

traders—"middlemen" or waste intermediaries who further segregate recyclables into finer

categories to sell them as raw materials to other specialized middlemen or directly to

reprocessing industries. The "evil middleman" who buys cheap and sells dear, adding no

value to the product in the process has historically been a controversial figure (Munger,

2009). Cutting out the middleman—or disintermediation, in economic terms—has been the

mantra for making commodity supply chains more efficient (Graham, 2008). While the role

of waste pickers is widely acknowledged, the role of intermediaries remains quite

understudied in academic and professional literature on informal waste recovery (Mitchell,

2009). Discourses arguing for disintermediation in informal waste markets vilify the

middlemen, portraying them as exploiters whom waste pickers need to be emancipated from.

Consider for instance, the following excerpts from the Bajaj Committee report:

There is a need to create a cooperative for rag pickers in the cities so that the middlemen are eliminated and the rag pickers get due financial reward for their work . . . These children are exploited by the middle men who employ them and buy the recyclable material that they pick . . . Obviously waste pickers are playing a pivotal role in this recycling system but the income of the scavengers actually depend on the middle-man buyers (Planning Commission, 1995, p. 9-16).

At a meeting held at the Government of Delhi's Department of Environment, Director Anil Kumar was quite impressed with a PET recycler who was interested in setting up collection centers to access raw materials for his reprocessing unit. He wanted to buy materials directly from collectors and remove the middleman arguing that this would be better for waste pickers because they would get higher prices from him than intermediaries.

Much research, however, has shown that intermediaries provide a crucial social security network to waste pickers who otherwise have nobody to turn to, playing the role of a "general 'urban protector'" for waste pickers (Gill, 2010, p. 97; IHD, 2012). For instance, waste pickers typically do not have access to financial institutions for banking or credit services. In times of financial need, middlemen are the ones who give them loans (Gill, 2010, pp. 104-5). Middlemen often also provide the land on which waste pickers live (*ibid.*). Relationships between waste pickers and middlemen are long-term compared to relationships between other actors in the informal economy of waste (*ibid.*). The position of a middleman also promises (albeit falsely for most waste pickers) the possibility of upward mobility (Khullar, 2010). Most waste pickers aspire to become intermediaries some day. Not many do. But among the middlemen, many were waste pickers at some point in their lives. In Delhi, 78 percent of 80 middlemen interviewed for a study had been waste pickers in the past (Chintan, 2003). But this relationship of dependence comes at a price. For instance, waste pickers in such relationships are often required to provide their labor for free for segregation of wastes in the warehouses owned by middlemen. They are also often required to sell their recyclable

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materials to the middlemen they are indebted to at prices often lower than market value. There is no doubt that exploitation exists within this relationship but in popular and policy discourse, the degree of exploitation is often over-rated in comparison to other problems that waste pickers face on a daily basis. Countless informal conversations and surveys of waste pickers in Delhi and other cities have repeatedly shown that although their relationship with middlemen is far from ideal, it is by far one of the least of their worries.

At another meeting with the Ministry of Urban Development, Chintan presented their comments on the need to embrace principles of social justice by including the informal sector—waste collectors and intermediaries—in waste management systems. In response, Anand Madhavan, a GIZ Consultant asked the group to "think about what social justice means." He had recently read Katherine Boo's bestseller *Behind the Beautiful Forevers* and "knew" that waste pickers were exploited by middlemen, and that, therefore, this clearly was the biggest problem that the community faced. I responded by saying that a lot of research has shown quite the contrary and in fact the biggest problems that waste pickers face are due to the police and municipal officials. He shook his head in disagreement and everybody else remained silent. My point here is not to romanticize the picker-dealer relationship but to suggest that the vilification of middlemen serves a purpose. For municipalities, it provides justification for dismantling a functional system. For reprocessors such as the PET recycler mentioned previously, it increases the potential of profit by allowing direct access to raw materials.

In this section I have described some dominant narratives that are produced, circulated and reproduced and have the effect of delegitimizing informal labor in waste. No doubt I have missed some narratives that might be equally important. One that immediately comes to mind

is the issue of child labor in waste. The Bajaj Committee for instance infantilizes the entire

waste picker community: "Rag pickers come from the poorest, least organised and most

deprived segments of the urban population . . . These children are exploited by the middle

men who employ them and buy the recyclable material that they pick" (Planning

Commission, 1995, p. 15). There is no doubt that there is child labor in waste but the

persistent circulation of this narrative often does not take into account the ways in which

overall livelihood security of waste picker parents might affect child labor and children's

access to education or how work itself might be a space for informal learning about ways of

managing their own poverty (Aufseeser, 2014; Chintan, 2012). Child labor cannot be ended

through blanket bans. National and international policies promoting such bans do not take

into account the politico-economic context within which child labor is made necessary.[44]

Further, such blanket policy discourse is often detrimental to the socio-economic well being

of the children themselves. One of Chintan's most well funded programs is called "No Child

in Trash" that aims to provide alternatives to children in waste picking community through

access to education. Its popularity can largely be explained by its focus on an issue that

resonates with domestic and foreign donors who want to fund projects focusing on children

alone. These donors often do not even consider funding those projects that deal with

increasing the economic security of households within which those children live, despite

empirical evidence that demonstrates the efficacy of the latter strategy. International

institutions such as the UN are guilty of applying such thinking on their projects as well. In a

personal communication with a UN consultant, he shared with me his experience of

suggesting to the organization the necessity of providing appropriately sized safety gear

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[44] For instance, 2014 Nobel prize winner Kailash Satyarthi in an appeal to the Parliament to pass an anti-child labor law recently "said that the award has increased the weight of "moral responsibility" on his shoulders and that his job wouldn't be complete till the day not a "single child is enslaved"" (PTI, 2014b).

(boots, gloves and masks) for children who scavenge at landfills. He was told that the UN would not do that because it cannot "encourage" child labor. The children of course do not heed UN declarations and continue to scavenge, their hands, feet and lungs unprotected. The constant circulation of these discourses culminates in an idea that waste pickers and the informal waste trade are a part of an arcane, exploitative and unhygienic practice that has no place in a rapidly modernizing country. They are obstacles to the country's march towards the goals of development, modernization and progress. In an interview with a municipal sanitation engineer, when asked what he least liked about Chintan's work, he candidly noted, "Promotion of ragpickers, I don't encourage it." In the survey of Delhi residents, we asked respondents to state their agreement with the following statement, "There is no place for wastepickers/*kabaris* in India in the 21st century" (see footnote 14). Of the over 3,000 respondents, more than 50 percent agreed. Surprisingly, the rich were less likely to agree than the poor (40 percent versus 70 percent). Unsurprisingly, those who live in the nicest parts of Delhi (South and New Delhi) were also more likely to agree than those who live in less desirable areas (East and North Delhi).[45]

At a conference in Delhi, the panel chair, Vice President of a leading construction firm, following presentations from two waste picker advocacy groups in Delhi said, "I do not want to imagine a future with rapickers because it is an exploitative future." An attendee from Jindal, the operator of Delhi's controversial waste-to-energy facility asked, "Why allow this modern slavery to continue?" At a different meeting, the CEO of Hanjer, a private waste

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[45] Although in general, the rich are more likely to live in the nicest municipalities, the municipalities are large enough that each has residents belonging to a range of socio-economic strata. However, New Delhi and South Delhi generally have more and better maintained infrastructure and amenities than the other two municipalities. Our survey sample included all socio-economic classes within each municipality. The results are curious in that regardless of socio-economic strata, those who live in the nicer municipalities were more likely to agree with the statement.

management firm that has butted heads with waste picker advocates in the past noted, "We are offering CSR [corporate social responsibility] resources to uplift them rather than letting them continue working as ragpickers. We shouldn't increase the community of ragpickers. Instead we should upgrade them." An official from Ramky notes, "[W]e corporations, as well as municipalities, do have a responsibility to take care of them. What we propose is rehabilitation of these workers, not a continuation of the existing system" (R. Rao, 2013). This sort of corporate paternalism discursively reduces workers in the informal economy of waste from being valid economic actors to social charity causes. Waste pickers become discursive subjects that need to be, and indeed must either be emancipated or eradicated. Of course, upgrading what is currently hazardous and precarious work is a great idea. If upgrading means higher incomes, better healthcare, less dangerous working conditions, or perhaps even more bargaining power, then indeed upgrading or uplifting is a venerable goal that needs to be embraced. Unfortunately, however, it is not much more than empty rhetoric. The persons quoted above are all representatives of waste management infrastructure firms that have displaced waste pickers through the projects that they profit from. Upgrading often translates into one of three possible scenarios: minimum wage employment in the project facility at which waste pickers typically earn less than they do by waste picking; "skill development" for small-scale, handicraft industry which typically does not provide full-time employment and is ridden with other problems discussed in Chapter 2; or, in the worst case, nothing at all.

While all this is merely in the realm of the discursive, it serves a material purpose. For advocates of corporate involvement in waste management, the empty rhetoric of upgrading the informal sector serves to delegitimize their current involvement and legitimize the

corporatization of waste management. R. Rao (2013) asks a question about the future of the

waste management industry in India in the following way:

> *The question that looms over the industry today is how to view the participation of*
> *ragpickers in the waste business. After all, there are plenty of examples of old-world*
> *professions gradually being rendered extinct by new ways of thinking and doing. Should*
> *ragpickers be consigned to the same fate as, say, the town crier or the lamp lighter? Or,*
> *is there a way to legitimise their profession and include them in a new model for*
> *municipal waste management?*

Legitimation is precisely what advocates of the informal waste sector rally for. For advocates

of the formal, corporate sector, informal waste workers might as well suffer the same fate as

the town crier or the lamp lighter. In the next section, I describe how discourses that

delegitimize the work of informal labor in waste establish the rationale for their

'formalization' and 'professionalization'.

Formalization/professionalization: tactics of discipline

There is no doubt that waste management systems in urban India are not working. There is

also no doubt that the waste landscape is changing both in terms of the quantum and types of

waste generated by cities, as well as the nature of urban service provision as privatization is

increasingly being seen as the best solution. There is also no doubt that the informal sector

provides crucial urban services without the existence of which cities would be in much

deeper trouble than they are in currently. Taking these three conditions together, there is

widespread agreement between the government, international development institutions,

academics and advocacy organizations that the informal must have a key role to play in the

future of waste management in India. But business-as-usual is not an option for the informal

sector, as discussed in detail in the previous section. Almost everyone—government officials,

international development institutions, academics, NGOs and activists—agrees that the

informal sector needs to be formalized but there is little agreement on what that actually

means in theoretical or practical terms. Moreover, different terminology is applied variously to refer to what is essentially the same idea: organizing, upgrading, formalizing, legitimizing and so on.

To the government, the idea often denotes the organization of certain types of informal workers (such as doorstep waste collectors) into an entity such as a cooperative that can continue to provide certain types of services that would not necessarily be managed directly by the government but would nonetheless be accountable for a certain level of service provision.[46] To the private, formal waste sector, the idea often means minimum wage employment in their operations and facilities.[47] To advocates of the informal sector, it means a range of tactics that professionalize labor. Such professionalization of labor is not unique to this sector and is increasingly characterizing the work of NGOs (O'Reilly, 2011). These organizational tactics respond to many of the specific real and imagined "problems" discussed in the previous section (Assaad, 1996; Chikarname and Narayan, 2000; Chiu, 2010; Vyas, 2009).

Within India, there are examples of different organizational forms used by the informal sector advocates: unions, cooperatives, associations, for-profit ventures, and not-for-profit NGOs. An organizational entity allows waste pickers to enter into contractual agreements

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[46] For instance, at a conference in Delhi, Rakesh Kumar,of the National Environmental Engineering Research Institute said that one "area of innovation" is job creation. Although there are plenty informal sector jobs, "if we improve the system, then we can create real, good jobs that people would be willing to work in that sector." V. K. Chaurasia of the Ministry of Urban Development noted the following "way forward" for municipal solid waste management: "Recovery is currently taking place in an unorganized and unhygienic manner. It needs to be replaced with informal arrangement of ragpickers and NGOs/CBOs for effective doorstep collection. We need to encourage the public-private partnership (PPP) model to bring professionalism, efficiency and economy in this sector."

[47] But absorbing all existing informal labor in waste is an impossibility due to the sheer number of informal workers and the replacement of labor with technology for certain aspects of the production process by private waste firms. In an interview with R. Rao (2013), while talking about existing waste pickers that might be displaced by privatization, an official from Ramky for instance says, "We are quite happy to employ ragpickers as transporters or waste haulers." Rao rightly notes in the article, "Making good on this offer would mean providing fair wages and health benefits to a big chunk of the existing 150,000 workers in Delhi, which no company has done so far in the past decade since entering the business."

with municipalities to provide services as an organization, not as individuals (Medina 2008).

As mentioned previously, my point here is not to debate the efficacy of these organizational

forms but to identify some of the shared strategies and tactics they use to advocate for rights

of and secure livelihoods for the informal sector (For a comparison of different

organizational forms in other industries in India and elsewhere, see Agarwala, 2013; Tilly et

al., 2013).

Some commonly used tactics include the issuance of organizational IDs, uniforms, safety

gear (gloves, masks and boots), training of waste pickers to conform to certain operational

protocols, certification of waste dealers for compliance with labor and occupational health

and safety standards, supervision, facilitating access to government-issued IDs, services and

social security programs. This is not meant to be an exhaustive list but is a set of common

elements derived based on my field experience and understanding of the work of various

informal sector organizations in India and elsewhere. In this section, I discuss what these

tactics—IDs, uniforms and operational protocols—mean and how they play out in the 'field'.

Identification cards signify membership within the organization entitling the member to

benefits of the membership. But beyond serving an internal administrative purpose,

organization-issued identification cards also work as signifiers of the legitimacy of a person's

status, conferring validity to previously unidentified and unidentifiable labor and laboring

bodies (IHD, 2012). The importance of an identity was reiterated by many of my informants

who have worked with Chintan/Safai Sena. When asked if the identification cards have

helped her, one of my respondents said, "Yes, things have changed a lot. Earlier there used to

be a lot of fights with the NDMC and many police cases but now with this form of

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recognition we can do our work peacefully." Another informant recounted the following

story:

> *Years ago, at the time when there were few security guards in places like Akbar road, I used to pick waste there. Once there was a party in that area and I decided to go there to collect the garbage. At 3:30 in the morning, I rode my bicycle to the spot. The guards beat me up. Ma'am* [Bharati Chaturvedi, the Director of Chintan] *was passing by. She stopped her car and said something to the guards. They stopped beating me. Then she asked me my name and asked me if I have a card. I said I didn't know anything about cards. She told me to come by the office and get an ID card the next day. After I got the card, I mustered up some courage and went to a Safai Sena meeting in 1999 where I saw so many* kabari bhais [fellow waste pickers]. *Now when I see the cops, they recognize that I am an honest man. I do something. I have an identity. They don't confuse me for a thief or something. Chintan has taken our responsibility and have given me an ID. Not everyone is given an ID. We inform the office about thieves and they are not given ID cards. They can't join my group. The cops don't trouble me."*

In Bangalore, a news report similarly recounts the importance of an identification card for a

waste picker:

> *As 38-year-old Annamma holds up her government-issued ID card, she can't stop grinning. She has come a long way from her childhood on the streets: rootless, homeless, faceless . . . Now, her ID card gives her legitimacy and a defense against harassment by authorities. The card also entitles her to benefits like health care and a scholarship for her children . . . It gave her something she had lacked all her life: Maryada — respect. "Now there is dignity when we go to collect waste," she says. "If somebody questions us, we can show the card. Earlier, people would drive us away as though we were thieves."*
> (Chakraberty, 2014)

But not everyone agrees. Organization-issued identification cards offer limited protection.

Police violence may have decreased for some but many others continue to suffer. Following

is a conversation with another informant:

> *Q. Are the ID cards helpful?*
> *A. No, not as of now. I haven't needed it anywhere.*
> *Q. No one has asked for it?*
> *A. Yes, even when the police ask for an ID, we have to show them proof of being an Indian, not of Chintan membership. We have to carry everything. The police trouble a lot saying that we are from Bangladesh. When we show them our IDs, they ask for proof of residence in Bangladesh. When we have been here since the 70s, how will we have a proof of residence from Bangladesh?*

To address this very issue, advocacy organizations have been facilitating their access to forms of government-issued identification—signifiers of not a professional identity but a national one. Having such forms of identification also allows for access to government services such as health and education, social security benefits such as pension and insurance, and private services such as banking.[48]

Just as an identification card—the bearer of professional identity—allows the worker to be legitimate, it also defines the limits of the responsibility of other actors involved. Figure 7 is an image of an identification card of a waste picker in Srinagar where the municipal corporation and Chintan have recently been trying to formalize informal sector waste pickers.

Figure 7. Sample Identification Card

The card above contains both the logos of Chintan and Srinagar Municipal Corporation (SMC), the latter of which is more important for waste pickers to do their work without harassment from the public, the police and municipal officials. Only bearers of the card are identified as "bonafide wastepickers who are registered" with SMC and Chintan. The card

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[48] But Hindu nationalist political parties have already caught on to the idea that such access to government services by those who are "illegal" deprives those who are "legal." One Hindu nationalist party (Bajrang Dal) leader for instance says, "Our first demand is that they must leave the country, as they are abusing our resources. However, if they wish to live here, they must convert to Hinduism and adapt to the ways of our life" (Rai, 2014). A different Hindu nationalist party (Vishwa Hindu Parishad) leader doesn't agree with the conversion strategy and wants deportation of all "illegal Bangladeshis": "As per government statistics, there are around three crore Bangladeshis in India. They must all leave. There is no question of them converting to Hinduism. Because of them, unemployment and crime rates have risen. They indulge in anti-national activities. Despite all that, various governments in the past have been providing them with benefits. They have ration cards and voter IDs. Nothing will legalize their stay in India. They have to go" (*ibid.*)

also clarifies that the waste picker is self-employed. If there was any confusion about the

existence of an employee-employer relationship between the waste picker and SMC or

Chintan, the card declares, "This I-Card does not in any way imply any form of employment

with the Srinagar Municipal Corporation or Chintan." Just in case the waste picker might try

and use this card to access public services, the card warns that, "It does not serve as any other

form of identity except as proof of occupation." The card is valid for a year. Failure to renew

would mean losing the status of being a "bonafide wastepicker." Only those with a card

qualify for waste picking with dignity. Others who do not have such cards, as many who

might scavenge through trash occasionally to supplement their income from a different

occupation such as construction work, are not "bonafide" workers in the eyes of the state. In

its contract with the Pimpri Chinchwad Municipal Corporation (PCMC), SWaCH is required

to "be responsible for the conduct of the Rag Pickers employed for this Project while on

duty. However, this responsibility shall not extend to other free roaming Rag Pickers and

other waste collectors in the Assigned Area" (SWaCH, 2010, p. 12).

An identification card stabilizes the profession into a state of permanence that it may or may

not have signified for the worker previously. For those for whom waste picking is a long-

term profession, the stability the card provides is no doubt a good thing. For others however,

the validity of their occasional and supplementary employment is now dependent on

processes and decisions outside their control. It is dependent on whether or not the

municipality or the NGO has the resources for and deems their eligibility valid for issuing

that card. A card entitles many but it also delegitimizes those who do not or cannot have it. A

card also codifies relations between the state, civil society organizations and waste pickers in

new ways. This is not a bad thing except for those for whom those relations remain

uncodified, invisible and unread. In most cases, doorstep waste collectors are the only ones who are formalized. All other types of waste pickers—those who roam the streets to pick up recyclables from local dumps and in street litter, and those who work at landfills—remain undocumented, unformalized. Although I have no way to verify this, I suspect that the police and municipal officials who are looking to extort bribes can more easily target those without ID cards. The frequency and degree of extortion is likely to have become more severe for those who are now deemed even more illegitimate in the eyes of the state than they were before.

Uniforms are what distinguish a rag picker from a waste collector, one of my informants noted. In planning a protest against harassment of local waste pickers by a private contractor, one of the organizers said, "Get waste pickers to look nice for the protest because politicians like to meet nicer looking people. Get them to wear caps." At a Safai Sena strategy meeting, one community leader stressed the importance of a Safai Sena brand: "We need to present an image. We need to brand Safai Sena through uniforms to increase the visibility of Safai Sena members. The Safai Sena logo needs to be on the uniforms."

George Waring, New York City's Street Commissioner at the end of the 19th century, credited with having cleaned up the city is well known for his "most daring attempt at image molding for his street crews was dressing them in white uniforms" because he wanted them to be "eye-catching" to "have a greater impact on the public" (Melosi, 1981, p. 65). For Waring, aside from being eye-catching, the uniforms were meant to serve another purpose: "[A]ny worker who felt like sneaking off for a beer or taking a nap under his cart would find it tough to do in his dazzling duds. "The white suits . . . served to make every man realize that he was being observed"" (Nagle, 2013, Chapter 10, Section 1, Paragraph 9). Melosi

(1981) similarly recounts Waring's 1897 speech where he discusses his institution of new policies in the sanitation department including the issuance of uniforms, attendance at morning roll calls and "fines or dismissal for breaches of an elaborate set of rules ranging from absence without authorization to entering a saloon during working hours" (p.65). The problem of drinking during work hours must have weighed heavily on him and he was pleased to have addressed it through uniforms: "One of the rules that was made in reference to the men was, that no man should go into a liquor saloon in uniform or during working hours. I was told recently by a gentleman who owns a block on East River, near one of our dumps, where 150 laborers go five or six times a day, that before I "ruined" him he had four liquor saloons rented there at $1,000 each; but now three of them are closed and the other paid only $300 rent" (*ibid.*). Concerns related to substance abuse among waste pickers in contemporary India are reminiscent of late 19th century New York. But for contemporary India, uniforms also make potential thieves more readily identifiable. After all, if one is in uniform, one is much less likely to rob a house or hopefully not be accused of robbing a house at the very least.

But for Waring, uniforms were also a part of enforcing militaristic discipline in his workforce. Relying on his Civil War background, Waring had organized his over two thousand workers into a military unit and also showed them off to the city by instituting parades of his "legion of "White Wings" (Melosi, 1981, p. 66). This militaristic spirit continues on to the present day. In her observations of contemporary sanitation workers, Nagle notes that they are proud to refer to themselves as a "quasi-military organization": "you especially like it when someone says it's "paramilitary"; you picture yourself and your buddies wearing face paint and urban camo gear as you stalk bags of garbage with night

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vision goggles or leap from helicopters, wielding your hand brooms like rifles" (2013, Chapter 11, Section 3, Paragraph 2). Many organizations of waste pickers in contemporary India have militaristic names: Safai Sena or army of cleaners, Hasirudala or the green force, Paryavaran Sipahis or environmental soldiers and Cleaning Brigades. Invoking a militaristic rhetoric, in an interview a Safai Sena leader described the organization as being similar to the Indian military. The terrorist this army is fighting isn't a person but garbage, he noted proudly. The reputed organizational efficiency of militaries is an aspiration for sanitation workers and those who build and manage their organizations across national boundaries, in Delhi and New York alike.

Uniforms also come with a unique practical set of problems for those who have to provide them and those who have to wear them on a daily basis. First, uniforms are expensive, in a relative sense. If municipal governments are not paying for the uniforms (which is often the case), then organizations that work with informal waste workers need to find money to pay for them. Often this means relying on the charity of donors. This was a persistent problem for Chintan. Because Chintan could not always afford to buy new uniforms meant that waste workers had to make do with old, tattered uniforms that did not serve the purpose of professional image-making that they were intended for. Second, there is the issue of the adequate number and type of uniforms. In cities like Delhi where there is considerable seasonal variation in climatic conditions (temperature and rainfall, for instance), uniforms appropriate for one season may not be appropriate for another. Third, uniforms need to be maintained, that is, laundered on a regular basis. This is the responsibility of the workers themselves who may or may not have the desire, time and resources to do so. Workers who have been given a uniform not only need to make sure they put on that uniform but also need

to make sure that the uniform is clean. Working with garbage makes keeping uniforms clean a more difficult task than one would otherwise imagine. Even more so in the case of workers in Delhi because, unlike New York's garbage men who deal with controlled and contained waste, they are sifting directly through the waste.

Practical problems aside, uniforms also reveal a contradiction in their social intent. Ironically, uniforms intended to promote visibility of the workers, have instead become markers of invisibility, of "unmarked labor", as "unmarked laborers" (Nagle 2013, Chapter 1, Section 4, Paragraph 3). In talking about contemporary sanitation workers, Nagle notes, "Years on the job had taught him that when he put on his uniform every morning, like Federici and every other sanitation worker in the city, he became invisible" (*ibid.,* Section 3, Paragraph 5). When Nagle herself donned on the sanitation worker uniform, she noted, "It's not that they were ignoring me: I was never part of their awareness in the first place" (*ibid.*, Section 3, Paragraph 6). The uniform designates group membership and confers legitimacy thus acting as a device for resolving certain organizational and indeed even broader social dilemmas (Joseph and Alex, 1972; Rafaelli and Pratt, 1993). In doing so, however, uniforms also simultaneously conceal and reveal the social status of the wearer, and suppress individuality (Joseph and Alex, 1972). The introduction of uniforms for informal waste workers while conferring visibility as a class of workers also renders them invisible as individuals. One waste worker in uniform becomes like any other waste worker in uniform, easily substitutable. The person wearing the uniform does not need to be recognizable as long as the uniform itself is.

This is of course not to suggest that waste workers were recognized in all their individuality and personhood before the advent of the uniform. But there was a personal relationship

between the waste collector and the household. The household likely knew their name, likely even a little about their family or where they were from. And this is not unique to waste collectors but to the many informal sector workers who provide various kinds of services—ironing, domestic cleaning, driving etc. The uniform is a step in transforming that personal relationship into an impersonal one. My critique is not simply based in a nostalgia for those personal relations because many such relations are exploitative. Instead, I want to direct our attention to the changes in the labor process that the uniform is a part of. Waste collectors are not alone in seeing their occupations professionalized in such a way. Other informal sector service providers are seeing a similar shift. There are companies now who provide middle class consumers with professional drivers, security guards and maids in uniforms for instance. This is in part to appease middle class insecurities about informal labor but also to provide an image of professionalism. These companies work like placement agencies—connecting employers with employees. Most such agencies also conduct background police verification checks on potential employees. Professionalization of informal labor not only requires the professional appearance that a uniform brings but demands that workers be anonymous and substitutable as commodities, as labor power that they embody. Emerging market structures that trade in informal labor in new ways demand the uniform as a condition and benefit of employment and service provision.

But perhaps the most important tactics are a set of **operational protocols** that respond specifically to "problems" in the way that informal sector actors currently perform their work. These "problems" include messy *dhalaos* and pavements, and mixing of segregated garbage. To address these and other issues, many waste picker organizations have established protocols that waste pickers and dealers are trained in. Chintan, for instance, has developed a

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manual that describes in great detail protocols for running their doorstep collection program which includes processes for recruiting waste collectors, developing collection routes, collecting household fees, managing relationships with households (through daily interactions and a phone helpline), RWAs, municipalities, and the police, monitoring and evaluation, daily supervision, and managing the organization's relationship with doorstep collectors.[49] Protocol calls for training waste collectors on the importance of providing regular and timely service, displaying identification cards, wearing uniforms and safety gear, keeping their rickshaws clean, and segregating waste in the allocated space and in the proper manner so as to not create a mess. Many of these conditions are written into Chintan's contract with the municipality. Other organizations' contracts reveal similar conditions. For instance, SWaCH's MoU with the Pimpri Chinchwad Municipal Corporation states that it is the former's responsibility to "ensure that waste is not spilled on the roads or the space around the garbage containers and all the non-biodegradable waste collection centres are kept clean and neat at all times during the Contract Period" (SWaCH, 2010, p. 12). Contracts clearly serve a specific purpose. They outline the roles and responsibilities of the parties that enter into the agreement with each other. Whether these agreement conditions are monitored and enforced is a different question. The point is, however, that these are contractual responsibilities that they are accountable for. Other non-contractual documents, such as Chintan's doorstep collection program manual, was developed explicitly for the purpose of training its supervisory staff, so they would know exactly what, when, and how to do those things.

No doubt source segregation of waste makes work much safer for the waste collectors and optimizes the efficiency of waste processing, should such infrastructures be in place. Because

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[49] This is an internal Chintan document and is not publicly available.

source segregation efforts have been failing in many places, waste picker organizations have been training waste collectors to become agents of behavior change among waste generators by telling them to segregate their waste. While such a strategy has yielded positive results in some cases, it requires extra work on the part of collectors. An informant from Delhi recounts her experience of telling households to start segregating their waste, "I have tried explaining this to them and a lot of times their reply is that they don't have time for this. Take it or leave it, they say. We have lost a lot of work because of this. There has been a change in attitude recently but people still . . . They are more educated so they consider themselves superior and don't listen to us." Further, even though the responsibility of primary segregation of waste lies with the waste generators, per the SWaCH-PMC MoU, SWaCH would be penalized for non-segregation:

> *PCMC may issue public notice* [making it] *necessary for the generators of waste, viz. citizens and commercial establishments, to segregate their wet and dry waste . . . The foundation of the monitoring mechanism rests on the visual inspection by the PCMC. They shall visually inspect the segregation, collection and transportation of MSW . . . PCMC shall check for segregated waste at the designated collection points on a daily basis. In the event, the waste is not segregated as per MSW Rules 2000, then the same shall be treated as non-achievement/ default under this Performance Parameter* (SWaCH, 2010, pp. 15-16).

As mentioned earlier, waste collectors segregate waste to retrieve items that can be sold in recycling markets. Any additional segregation requirements such as separation of dry and wet waste requires additional work on the part of waste collectors particularly if waste generators haven't already provided pre-segregated waste.

A key aspect of ensuring "professional" waste collection services by "formalized" waste collectors is regular supervision. At Chintan, field officers have checklists that keep track of whether or not waste pickers come to work on time, are carrying their badges, wearing their uniform, and keeping their rickshaw clean. They are supposed to do random checks in the

field at least twice a month according to the program manual. The actual frequency of such checks varies depending on how busy the supervisors are. A part of this supervision involves ensuring that *dhalaos* are clean. In 2013, the municipality raised concerns about the cleanliness of *dhalaos* and threatened to annul their agreement with Chintan. Ever since, it has become imperative that these spaces remain clean and monitoring by Chintan supervisors has become tighter than before. But there is only so much that a waste collector can do. The problems of overflowing and messy *dhalaos* are not only the fault of the waste collector, as mentioned previously. It is also the problem of poor and inadequate infrastructures. Regardless, waste collectors are now informally in charge for their cleanliness and might be penalized if they are found to be messy. Supervision extends beyond the internal structure of organizations. Everyone including municipal officials, city residents, and the police is given the (optional) task of monitoring the work of waste collectors, as SWaCH's contract with PCMC also makes clear: "PCMC may engage resident welfare groups or any locality management association for support in monitoring the activities and to provide regular feedback, monitor compliant resolution and other such information to the to the grievance monitoring cell" (SWaCH, 2010, p. 16). Vigilance is universalized.

A final aspect of formalization is customer relationship management. This includes waste collectors' daily interactions with waste generators and some form of a complaint registration and redress mechanism such as a phone helpline. Waste collectors, as independent workers, have always managed their relationships with their customers on their own. With the advent of formal organizations, this relationship is now mediated through them. In other words, if customers have a complaint about a particular waste collector, rather than resolving these on their own, they now call a phone helpline at Chintan for instance. SWaCH's contract with

PCMC formally establishes the need for such a system holding SWaCH responsible for making "arrangements to receive and redress complaints of service users within a reasonable period of time" and for establishing "a standard protocol for addressing complaints from persons in the Assigned Area to the satisfaction of the PCMC" (SWaCH, 2010, P. 13). I analyzed data on complaints received through the Chintan phone helpline from January 2012 to December 2014. During this three-year period, they received a total of 315 complaints through the phone helpline.[50] Almost all complaints (99 percent) were about absenteeism, that is, the waste collector hadn't been coming to collect waste for one or more days. Here's how the complaint redress process works at Chintan: The helpline operator enters the complaint and informs the supervisor from whose jurisdiction the complaint is received. The supervisor who maintains a roster of waste collectors in their jurisdiction identifies the absentee waste collector and calls them to find out why they have not been working. In about 20 percent of the cases, absence was due to the waste collector being sick. For about 70 percent of the cases, no reason was documented. For the rest, the most common reasons were that the waste collector was on strike or on leave. In my conversations with supervisors, I asked them about what they thought the most common reason for absenteeism was for the 70 percent undocumented cases. They told me that it was most likely due to illness. The hazards of working with waste have been widely documented but new protocols of professionalism place the burden of such health hazards formally on waste collectors themselves. One informant recounts: "There are lots of problems due to the waste they dispose. Acids from batteries, blades, needles and other harmful substances cause burns and

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[50] Chintan provides doorstep waste collection services to approximately 4,000 households and 'employs' about 30 waste collectors in this program. On average, the program received 9 complaints each month.

cuts. We have to take leave and then they [the customers] call Chintan and ask, "Why hasn't your worker reported for work?" Then the supervisor also gets irritated."

But other than absenteeism, another type of complaint related to the waste collector's behavior with the customer. Although the database only documented three instances of such complaints, supervisors told me that this was a recurring problem. Appropriate behavior with customers is a key part of training waste collectors to provide "professional" services—what Hochschild (1983) has elegantly described as "emotional labor." In fact, as previously noted, organizations assume responsibility for the "conduct" of waste collectors, even as part of their contract with municipalities. But workers aren't always docile. They resist constant control of their behaviors in subtle and overt ways by activating a kind of an "infrapolitics" (Bayard De Volo, 2003). One informant noted,

> *We tell our fellow collectors to handle the customers patiently and politely even if it's a difficult customer . . . One time a customer shouted at me for whistling in front of his house saying who gave you the permission to do so I have come from night duty let me sleep. I replied politely, "Sir we are from Chintan and NDMC has given this permission to us if you don't like it we will stop it. What is the need to shout?" He calmed down and the next day he brought the waste out himself on whistle. If they get too aggressive we say that we are doing our work, you can do whatever you want.*

But "conduct" extends beyond daily interactions with customers and involves in a sense, the "total personality" of the individual (Alexander, 1935). Personal problems such as substance abuse become public. Municipalities threaten to annul contracts with organizations on this basis. Organizations therefore have to constantly vouch for the personality, behavior and conduct of their laborers. In one such instance, when a municipality was threatening to cancel Chintan's contract due to various reasons, one strategy was to "get each doorstep collector to get a health check up for free, showing that they are not drug addicts" (personal communication). Chintan wanted to use this simultaneously as an opportunity to get health

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exams for free for the waste collectors and show the municipality that they were wrong in their thinking.

Professionalization through uniforms, identification cards, and operational protocols no doubt serves an important function: They are markers of what labor in an "arcane" and "old-world profession" must do to secure a legitimate place in modern urban India. But they also function as technologies of discipline designed to tame an unruly people and appease middle class anxieties. Discipline requires work on the part of waste collectors, often unpaid work. Identification cards, uniforms, and operational protocols require that workers expend their time, labor, and sometimes even money. Renewing ID cards before they expire takes a little bit of time. Cleaning and getting replacement uniforms also takes some time. Following new protocols of work, segregating wastes to an additional degree to satisfy municipal requirements, attending meetings and getting trained on new ways of doing work, and keeping urban spaces clean—all require that workers expend their own labor time and often money to get to those meetings. On an individual basis, this expense may seem small but cumulatively, accounting for hundreds or even thousands of workers, it adds up. Further, professionalization or formalization extends new forms of discipline and control over informal labor and laboring bodies. Tactics of formalization also attempt to define the terms of inclusion of the informal sector into their projects. Who's included and who's not depends on, in the first instance, whether or not they have an ID or a uniform. Whether or not they are carrying the ID and wearing the uniform offers another point of potential inclusion/exclusion. Whether or not the ID is expired or the uniform is not clean enough adds yet another testing point of inclusion/exclusion.

In the concluding section of this paper, I examine what such disciplining through formalization means, how it fits into contemporary processes of neoliberalization, where the extra labor of informal workers goes and to whom the surplus from this labor might accrue.

Conclusion: Disciplined labor, wage depression and surplus value production

Municipalities are under pressure to clean cities. Privatization of waste management is an easy solution on offer and is being encouraged through programs and policies promoted by the government. Where such privatization has happened, the informal sector has been displaced and dispossessed from their means of subsistence. A host of discourses frame the informal sector simultaneously as illegal criminals and victims of exploitation, serve to justify the politico-economic restructuring of the waste management sector. In response, informal sector advocates have been fighting to counter the discourses and processes of privatization by establishing formalized systems that provide waste management services in professional ways. Common tactics of formalization include identification cards, uniforms and a series of operational protocols that govern the labor process in new ways. These tactics have proven helpful for those enrolled in such formal programs. They provide legitimacy, livelihood stability and security, and protect informal sector workers against harassment and exploitation. Informal sector workers are not just passive recipients of an externally imposed set of rules but are willing and active participants of the programs acknowledging the benefits of such participation. But these tactics also act as tools of discipline over informal sector labor and laboring bodies. In addition, they require that workers spend their own labor time and sometimes money to comply with the new rules. Workers are not blind to this. They

openly share the limits of such programs and in some instances, actively resist the new forms of discipline.

Formalization programs developed and advocated by organizations working in the interests of the informal sector are strategic. They serve to secure not only livelihoods in the present but also show how a different, inclusive future is possible for waste management in India. But they are also necessary in that such professionalization is a system-wide demand that requires labor to work and behave in different ways. ID cards, uniforms and operational protocols are not only necessary for legitimizing informal labor, they are also necessary for the creation of documented, professional, substitutable and efficient laboring bodies.[51]

Marx's account of original accumulation and the proletarianization of labor has been widely studied, perhaps most notably by Harvey as "accumulation by dispossession" where he argues for us to examine contemporary processes of proletarianization as not always wholly coercive but often also consensual:

> *The process of proletarianization, for example, entails a mix of coercions and of appropriations of pre-capitalist skills, social relations, knowledges, habits of mind and beliefs on the part of those being proletarianized. Kinship structures, familial and household arrangements, gender and authority relations . . . all have their part to play. In some instances the pre-existing structures have to be violently repressed as inconsistent with labour under capitalism, but multiple accounts now exist to suggest that they are just as likely to be co-opted in an attempt to forge some consensual as opposed to coercive basis for working-class formation. Primitive accumulation, in short, entails appropriation and co-optation of pre-existing cultural and social achievements as well as confrontation and supersession* (Harvey, 2003, p. 146).

Many have already shown how contemporary privatization of urban infrastructures, including waste management infrastructures, have dispossessed independent or self-

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[51] Roy (2009) has proposed a concept of "civic governmentality" to understand such processes: "Within regimes of civic governmentality, the urban subject is simultaneously empowered and self-disciplined, civil and mobilized, displaced and compensated. Such contradictions constitute the politics of inclusion and indicate the ways in which urban struggles involve much more than "inside" and "outside" geographies. There is a great deal to be learned about power and authority by studying how subjects and spaces come to be "inside" the project of citizenship" (p. 161).

employed workers from their means of subsistence through an enclosure of the urban

commons of waste. The processes they have studied thus far have primarily involved

coercion by the state and corporate interests. The counter movement has battled such

enclosures by ensuring that workers retain their rights to the commons through the

"formalization" of their work. In such cases, existing narratives of accumulation through

dispossession—the dominant theoretical explanation that thus far has governed our

understanding of neoliberal urbanization in this context—do not prove themselves adequate,

primarily because workers continue to retain access to their means of subsistence. The focus

on property as commons or private stalls the discussion if property is prevented from being

privatized and retained as the commons. However, as this chapter has shown, there is yet

more to examine and debate. We must not just end with celebrating a success, because that

success comes with new a set of conditions, processes and outcomes. I am not suggesting

that a discussion of property is irrelevant. Indeed the privatization of property remains quite

important in most spheres of life under capitalism and primitive accumulation explains quite

well the forms of dispossession occurring all over the contemporary world. But this critique,

in a sense, beyond the privatization of property, is not a critique for critique's sake. Instead, it

is a plea for acknowledging that certain tactics of the struggle against dispossession are also

themselves a part of a broader neoliberal ideology that frames the struggle and its resolutions.

Under the constant threat of dispossession, workers are disciplined and discipline themselves

to retain their rights to a livelihood. The new forms of discipline are by and large consensual.

But such forms of discipline require that workers expend extra labor time to conform to the

new rules of work. Who benefits from this extra labor? In what follows, I examine how this

extra labor might benefit three sets of actors—municipalities, the NGOs, and the informal

sector workers themselves.

One of the beneficiaries is the city and its administrative apparatus--the municipal

government. How so? Here my contention is two-fold. First, by performing extra labor,

workers subsidize municipal services.[52] Informal sector workers have always done this work

to make a living for themselves. The waste reduction and public health benefits to the city

have been, in a sense, incidental. But through the formalization of their work, they are

required to perform work—such as keeping the city clean or segregating waste for the

optimization of the city's waste management systems—for which the responsibility is and

has been always with the municipality. In many instances, informal sector workers perform

this work for the municipality for free, and therefore subsidize municipal services for the city

and its residents. [53] Second, "unmanaged" waste in the city is not simply an aesthetic

problem; it also hinders the city's ability to attract capital investment. Municipal bonds are

emerging as an important tool for cities to raise funds in India (Baindur and Kamath, 2009;

Mohanty et al., 2007; Sankhe et al., 2010). Bond rating agencies explicitly use the

municipality's current levels and capacities to deliver services as one of the rating criteria

(CRISIL, n.d.; ICRA, 2008). For instance, ICRA, an associate of Moody's notes,

"Investments in urban civic infrastructure have remained inadequate in the past, as evident

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[52] In their analysis of the economic contribution of the informal sector in six cities, Gunsilius, Chaturvedi and Scheinberg (2011) quantify this subsidy: "The informal sector saves the formal authorities a great deal of money, in total €39 million in the six cities. If material is recovered through door-to-door collection by the informal sector, this material no longer needs to be collected, so all expenses – collection, transport and disposal – are reduced, according to the amount that is recovered. The savings on transport depend on the point at which the material is removed from the waste stream for recycling. If material is recovered at the disposal site, transport costs are not reduced, but disposal costs are reduced . . . Most of the avoided costs in the study cities is avoided collection costs, €14 mil- lion per year in Lima, €12 million in Cairo, and € 3,4 million in Quezon city. The average avoided costs per worker are €571, which in many cities is more than that same worker earns in a year" (p. 18).
[53] The case of SWaCH and KKPKP in Pune have been, in some sense, anomalies because they are paid for their services by the municipalities. No other organization in India, to my knowledge, is paid for their work by the municipality.

from the unsatisfactory standards of basic services, including water supply, sanitation and sewerage, and solid waste management . . . This has led to the Indian municipal bond market remaining largely underdeveloped" (ICRA, 2008, p. 1).[54] As cities across India increasingly seek sources such as municipal bonds to meet their fiscal gaps, the image as well as the ability of the city to meet its residents' demands for services becomes crucial. The work of waste pickers not only makes cities places that the bourgeois class can more comfortably live, work, and play in but also spaces that it can invest its idle capital into and expect returns from.[55]

A closer examination of municipal bond markets development reveals an unfortunate paradox. As mentioned earlier, to make themselves creditworthy, cities need to provide a host of municipal services including waste management. Benchmarks for such services include 100% waste collection efficiency, 100% waste segregation, 80% waste recovery/recycling, and 80% efficiency in customer complaint redressal (MoF, 2009, p. 15). Where they exist, the formalized informal sector helps municipalities in meeting these benchmarks by providing these services even though they may or may not be paid by the municipality to do so. Admittedly, waste management is only one service among a host of other urban infrastructure services that impact creditworthiness of a municipality but it does play a part, however small. Municipalities, however, want to raise funds through mechanisms such as municipal bonds for infrastructure projects that include waste management. In fact, municipalities are allowed to issue tax-free bonds for large waste management infrastructure

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[54] Thus far, the municipal bond market in India has not performed as advocates of such financing mechanisms had hoped. Even though by 2009, only 22 municipal bonds were issued and raised a "paltry" sum of INR 12.24 billion, advocates are optimistic about its prospects, "Looking forward, it seems that thanks to the robust growth of the GDP and high domestic savings rate of the economy, India presents an excellent opportunity for municipal bonds to finance urban infrastructure by tapping into the growing market of pension funds, insurance funds, and provident funds" (GOI, 2011, p. 146).

[55] For a critique of the increasing reliance of debt financing mechanisms such as municipal bonds, see Weber (2002) and Goldman (2011), among many others.

projects such as waste-to-energy facilities (MoF, 2009; MoUD, 2014a, 2014b). Such large scale waste management projects are also what have displaced and continue to threaten to displace informal sector workers as seen in Chapter 2 and will be discussed in more detail in Chapter 4. In providing professional waste management services to cities, formalized informal sector workers are, in however small a part, setting conditions for their own future demise.

Another beneficiary of the extra unpaid labor of waste workers could be the organizations such as NGOs that advocate for the interests of the waste pickers and professionalize their work. The surplus accrues to them in the form of building their image and reputation. This is not merely symbolic, however. A better image and reputation also means more funding for the organization. At the local level in cities where more than one NGO may work with waste pickers, turf wars often break out between them with each claiming a larger share of waste picker constituents than the other. At the national level, ideological differences between NGOs that implement different models of formalizing informal workers are frequently debated online and in public fora. This battle for image, reputation and funding often turns hostile, calling into question the objectives of those organizations (see for instance, Kamat, 2003, 2004; Sahoo 2013; for an opposing view, see Fowler, 1991). During my time at Chintan, I also had the occasion to observe and participate in the organization's reflexive deliberations about the nature and impact of their work. However, donor and government priorities often trumped Chintan's own well-intentioned ideas of what is and is not needed in the communities they work in, thus constraining both through funding and legitimacy what the organization could or could not do.

Another set of beneficiaries is the waste pickers themselves. The benefit to them, however, is not economic, at least not at first glance. Their effective income (or wages) have been reduced because they spend more time doing in order to comply with the new discipline of work but earn the same amount of money. This could be understood as a kind of a speed-up whereby workers do more work for the same wages. If not economic, then the benefit to the worker is something else. My contention is that this benefit lies in the promise of livelihood security. Workers work more not for more money but for merely the hope that private firms eyeing the business will not displace them. If I were an economist, I would perhaps be able to quantify in economic terms what livelihood security is worth to waste pickers. Perhaps wage depression could be explained by the economic gains associated with increases in livelihood security. Such a question, however, is beyond the scope of this paper. But there is another potential explanation for the observed wage depression—competition from the private waste management firm. In Chapter 2, I described in detail the increasing corporatization of the waste management sector in India. Theoretically, municipalities have a choice between outsourcing certain waste management services to a private firm or to organized waste pickers. In this sense, the two might be considered competitors. Wage depression due to competition is well known.[56] In this case, potential competition from a private firms serves to discipline labor and consequently lower effective wages.

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[56] Marx's (1999) comments on the relationship between competition and wages are instructive here: "Whatever be the power of the means of production which are employed, competition seeks to rob capital of the golden fruits of this power by reducing the price of commodities to the cost of production; in the same measure in which production is cheapened - i.e., in the same measure in which more can be produced with the same amount of labour – it compels by a law which is irresistible a still greater cheapening of production, the sale of ever greater masses of product for smaller prices . . . But what effect do these conditions, which are inseparable from the growth of productive capital, have upon the determination of wages? . . . The labourer seeks to maintain the total of his wages for a given time by performing more labour, either by working a great number of hours, or by accomplishing more in the same number of hours. Thus, urged on by want, he himself multiplies the disastrous effects of division of labour. The result is: the more he works, the less wages he receives."

But chasing unpaid labor time in the manner in which I have done so far might not be so productive. In fact, it can be construed as reformist and reductive. Reformist in the sense that such an account might make it seem as though if workers were only paid for the time they spend conforming to the new rules that govern their labor, things would be alright. But this is obviously far from the case, since that additional income would do almost nothing to lift them out of the dire levels of poverty they are entrenched in. Higher wages are of course a good thing but the amount of wage increase associated with payment for the extra labor time would not be much at all.

Reductive in the sense that it reduces extra labor time to that of exchange value of labor or that of the surplus value that labor produces. Returning to Marx is helpful in this case. If we think of the process of formalization of informal waste workers as a consensual kind of proletarianization, then it might be easier to see how and why informal workers become complicit in their own self-discipline. One of the hallmarks of capitalism (and contemporary neoliberalism) is its ability to pervade and subsume all forms of social relations, relations understood not merely in narrowly economic terms but broadly cultural ones. Examining the process in this sense makes clearer that it might not be that useful to chase the accumulation of surplus by NGOs or waste pickers or municipalities for instance, but rather understand the limits and constraints imposed on them by the necessity of being a part of the circulatory system of capital. Formalization and professionalization is a necessity for each set of actors to secure funds and legitimacy. Similarly, the enforcement of protocols of formalization—ID cards, uniforms, new work processes—also mean that old, informal and perhaps even personal relationships must be replaced by new, formal and impersonal ones. Formalization turns an individual worker into an abstract, substitutable laboring body. This in no way

diminishes the agency of the workers themselves. Instead it points to how they negotiate with new systems of discipline, often to their own advantage, but also within a field of externally imposed limits and constraints. This is the strategy. If neoliberalism constrains, then it also opens up opportunities that can be and are "repurposed, and put to work in the service of political projects very different from those usually associated with that word" (Ferguson, 2010, p. 183). Although it might be possible to trace the origin of the discourse of formalization to specific texts of government, international development institutions or NGOs, its emergence can only be understood through a critical examination of the political-economic context that demands a restructuring of socio-economic relations. Such a restructuring of relations is simultaneously strategic and necessary.

But even as informal workers are organizing and some have been able to secure their livelihoods for now, the emergence of new technologies is threatening their longer-term security. In the next chapter, I examine how the emergence of one specific technology is threatening to displace and dispossess informal sector workers.

Chapter 4. Refuse to Burn: Waste-to-Energy, Value, and Unruly Matter

Scene 1[57]. October 21, 2012. It is 7:00 am at the Okhla landfill in South Delhi. On the

surface, the scene is much like what one expects at any other landfill in India. Waste pickers,

cows, dogs, and eagles—all anxiously awaiting the next garbage truck. A truck comes and

tips its grey-brown, ashy contents. Waste pickers hover very close to the truck but maintain

careful guard so that they are not crushed under it. Incidents of waste pickers being crushed

by or buried under truck or its contents are common enough across the country[58]. Those

concerns notwithstanding, as the truck tips, waste pickers get to work. Some, mostly

children, use their bare hands, others, mostly adults, use a crude version of a magnetic metal

detector, to sift through and pick out metals in the ash. There is nothing else but metal in

what the truck has just deposited. All else has been burned. This garbage truck has arrived

from the nearby waste-to-energy plant that became operational just nine months prior, in

January 2012. A couple of hours into our visit, one waste picker politely requests us to leave

the landfill otherwise he and his coworkers would get into trouble with the municipal

officials guarding the landfill. The team wraps up and we leave.

Scene 2. Same day. It is now 11:00 am and we arrive at the Ghazipur landfill in East Delhi.

The scene here is similar in actors yet strikingly different in matter, in the colors and smells

of garbage. There are a lot more waste pickers too. The place smells rancid, of fresh, rotting

garbage. As the truck tips over its contents, colorful pieces of garbage fall like confetti—

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[57] As a volunteer with Chintan, I was assisting a film crew from IMAK studios, in making a documentary *Credits versus Carbon Credits* about the impacts of waste projects approved for funding through the Clean Development Mechanism on waste pickers in three cities in India (Safai Sena and Chintan, 2012).

[58] On September 20th, 2013, a 15-year old boy was crushed by a bulldozer while picking waste at the Ghazipur landfill (Personal communication with Qasim Ali, a waste picker from Ghazipur). When asked if we should raise the issue to the municipality, Mr. Ali raised concern that such action might create trouble for waste pickers who would not then be allowed to access the landfill.

plastics, paper, cardboard, decaying food, and lots more. There is a grotesque, carnival-like quality to the event. But this will soon change. Next to the landfill, another waste-to-energy plant is being built. Just its massive skeleton is in view now, quickly rising like a phoenix from the ashes it will soon be spewing out.

The difference in these two scenes tells a story about the fast-changing landscape of waste and its management in contemporary urban India, a story whose protagonists include waste pickers, the state and private waste companies, all of whom are interested in the same matter—waste—albeit with different motivations. This difference appears in the first instance, in the content of waste matter, in its constituents, ash in one case, and diverse, colorful discards of daily urban life in the other. For good reason, waste management professionals in government, private firms, non-government organizations, and academics have been obsessed with the composition of our waste. Those charged with solving waste management issues would not know where to begin if they did not know exactly what the problem is (MoUD, 2000). Knowing is the first step in taming a potentially unruly and indeterminate problem (Gille, 2013; Hird, 2012). The material properties of waste—its moisture content, calorific value, chemical content, percentage of recyclables, organic matter, inert matter and the like—are the things one needs to know in order to decide what to do with garbage, what solutions to look for.

One such emergent solution in the landscape of waste management practices in India is waste-to-energy (WtE). For this technology set, the material properties of waste are particularly important because they help answer the question: Can our waste burn? This question haunts government bureaucrats looking for quick fixes to the growing urban waste problem and private waste management firms ready to provide those services. Another

important question that frequently gets asked is: Should our waste be burned? This question is raised by environmental and social activists, politicians, and sometimes even government bureaucrats. The focus of why waste shouldn't be burned among these groups is often related to its environmental and social impacts, that is, concerns over emissions from incineration, issues of environmental justice particularly due to siting of such facilities in marginalized neighborhoods, impacts on recycling and livelihoods of those who depend on that waste (Chintan, 2011, 2012; Connett and Connett, 1994; Davies, 2008; Doward and Burke, 2013; Gandy, 1995; Melosi, 1981; Pellow, 2002; Samson, 2009a; Tangri, 2010). But environmental impacts of WtE are what primarily haunt the operators of the WtE facility mentioned in the first scene. The National Green Tribunal, a court dedicated to the expeditious handling of cases related to environmental issues, threatened to shut the facility if it doesn't comply with existing pollution control standards, as a result of a public interest litigation (PIL) filed by a group of residents who live in the plant's vicinity. In their PIL, the group complained that the plant "releases harmful 'dioxins' into the air. Municipal bodies are supposed to segregate wet waste for composting, pick out recyclables and send only non-hazardous, dry waste to this plant. But residents allege this hardly happens; the job left to "illegal" rag-pickers" (Singh, 2013). By mentioning "rag-pickers", those who collect, segregate and sell recyclables from waste, the resident group has exposed the crux of the issue, which is otherwise clouded by concerns related to financial and environmental costs, the appropriateness of technology, and the characteristics of waste material in the public debate around WtE in India. If, as the residents group suggests, waste is segregated for composting and recycling, there wouldn't be much left to burn at all. The struggle over waste is about what gets burned and who gets allocated rights to waste as property to either burn,

compost, or recycle. Technocratic and bureaucratic concerns over the ability of waste to burn

and environmental concerns over the pollution from burning, both tend to hide the central

issue at hand, the struggle over waste, one that can only be uncovered in understanding waste

as a commodity. And this has little to do with its physical properties and much more to do

with its economic potential. This chapter examines these struggles with and over waste in

India.

The "natural" properties of waste: Can it burn?

Characterizing the current and future components of waste and their physical, chemical and

biological properties is the "basic requirement" to developing systems to manage it (UNEP,

2009, p. 7). "[I]nformation and data on the sources, composition, and properties of municipal

solid waste" and the potential "transformations that can be used to alter the form of the

materials constituting the waste"—this "knowledge is critical to the planning and

implementation of effective" waste management programs (Tchobanoglous, Theisen and

Vigil, 1993, p. 37). Characterizing the waste involves answering some of the following

questions: Where is the waste produced? How much waste is produced in total and by type of

producer? What are the physical, chemical and biological properties of waste?

Physical properties involve an analysis of what the waste is in physical terms e.g.

biodegradable vs. non-biodegradable vs. inert or dry vs. wet or recyclable vs. non-recyclable,

etc. Physical properties also include more complicated measures such as its specific weight

(weight of material per unit volume), moisture content, particle size and size distribution,

field capacity (ability of waste to retain moisture subject to gravity—a measure used to

determine leachate formation in landfills), and permeability (a measure that helps understand

the movement of liquids and gases in compacted waste in landfills) (Tchobanoglous, Theisen

and Vigil, 1993). Analyzing the chemical composition of waste involves measuring its combustible components, the fusing point of ash, determination of major elements that compose the waste such as carbon, hydrogen, nitrogen, sulphur and ash, its energy content or calorific value, and essential nutrients and other elements (*ibid.*). The biological properties of waste include the biodegradability of its organic components, production of odors, and breeding of flies.

Some of these categories, however, are not fixed across spatio-temporal and politico-economic contexts. For instance, material that is not recyclable at the moment could be recyclable in the future were there to develop technologies for recovery, and markets for the absorption of the new raw materials produced. Or vice versa, as markets for particular recyclable commodities crash, recovery rates reduce. It's not that previously recyclable materials have suddenly become non-recyclable because of their material properties, it's just that it's no longer as profitable to recover them as before. Similarly, the physico-chemical properties of certain types of waste may classify them as biodegradable; however, the systems and technologies that for instance are designed to treat that waste may not be able to process what is otherwise, in its biological characteristics, biodegradable.

Just as these categories are not fixed, so is the actual composition of waste material, which varies through space and time. Waste composition varies temporally and across different temporal scales. Waste generated on a weekday might be different than waste generated on a weekend. Waste generated in the summer might be different than waste generated during the winter. Waste generated during holiday seasons is different than waste generated otherwise. For this reason, waste characterization studies often ask that sampling take these differences into account. But waste management planning must also take into account predictions of the

future. Not surprisingly, waste quantity and composition changes with economic growth and development (Agamuthu et al., 2007; Khan and Burney, 1989; Shekdar, 2009; and Schoot Uiterkamp, Azadi and Ho, 2011). The relationship between economic growth and waste production is found to be so strong that it was found to be better correlated with stock prices than traditionally used measures of consumption (Savov, 2011). In terms of composition, empirical studies have found that the proportion of recyclable materials typically has increased over the years (Chattopadhyay, Dutta and Ray, 2009; Gupta et al., 1998; Kaushal, Varghese and Chabukdhara, 2012).

Waste also varies spatially. It is easy enough to comprehend that waste generated by an average household in a city is likely to be different than waste generated by an average household in a different city or in a village. But spatial variation in the composition of waste varies also varies along its own journey from source (the point of generation) to sink (the point of final disposal). The question of waste composition is plagued by the problem of what is being measured—composition of waste at source, along its journey from source to disposal site, or at the disposal site. Composition changes as waste moves through the city, particularly because waste pickers have the opportunity to collect recyclables at various points along the way. In providing guidance to municipalities, MoUD recognizes this and therefore recommends sampling at multiple points along waste's journey (MoUD, 2014b; p. 46-47).

The categorization of waste based purely on their properties--physical, chemical, biological-- attempt to classify and simplify a complex, ever-changing thing. One could argue that the properties of waste are just that, simply a way of categorizing what waste is made of. Characterization, however, is always done with a purpose, that of planning and managing the

physical, chemical and biological transformations of that material. But both—the properties

of waste, and the categories we use to understand and manage those properties—are not

constants. To borrow from Myra Hird (2012), "knowing waste is rendering the indeterminate

determinate" (p. 454). Without such knowledge, we wouldn't know what to do with the

mountains of unruly matter that constantly accumulates around us, even as achieving that

knowledge is itself a mountainous task.

Characterizing waste, other than being difficult, is also expensive. For this reason, very few

studies have embarked on this task in India. Government agencies, scholars and academic

institutions have attempted to characterize waste composition in India, mostly focusing on

waste produced by cities. During the course of my research, I have uncovered 16 distinct

studies that have attempted to characterize waste in either single cities or multiple cities

across India. These studies span a time period of 30 years starting 1982 and ending in 2012.

Of these, government institutions, most notably by the Central Pollution Control Board

(CPCB) and National Environmental Engineering Research Institute (NEERI) and some

municipalities (CPCB, 2000; CPCB-NEERI, 2006; EPTRI, 1995; IHPH, 1982; MCD, 2004;

MCGM, 2006; NEERI, 1996; and NEERI, 2005), conducted eight. Academics, academic

institutions and development consultancies conducted the rest (Bhide and Sundaresan, 1983;

Chandra and Devi, 2009; JICA-IPE, 2004; Katre and Pandey, 2012; Khalil and Khan, 2009;

Mor et al., 2006; Nair and Sridhar, 2005; Sastry and Gurunadha Rao, 1984). While I have

been able to access the results of actual studies in some cases, in many I had to rely on

summary tables cited in secondary research. One of the biggest problems in relying on

secondary sources (and in some cases, even primary ones) is that there are no clear

descriptions of the sampling methodology. For instance, in many cases, it is unclear what

was sampled—waste at the landfill, waste in vehicles arriving being transported to landfills, or waste generated at source.

In the tables below I summarize the results of these waste characterization studies of Delhi's waste specifically (CPCB, 2000; CPCB-NEERI, 2006; IHPH, 1982; JICA-IPE, 2004; MCD, 2004; Mor et al., 2006; NEERI, 1996) (see Tables 3 and 4). These studies span approximately two and a half decades between 1982 and 2006. Of these, the most comprehensive is one commissioned by the Municipal Corporation of Delhi (MCD, 2004) that characterizes waste from different sources and at different points. I have chosen to focus on the following elements specifically: waste composition (percentage of compostable/biodegradable, recyclable, and other materials in waste by weight), calorific value (lower and higher), moisture content, and C/N (carbon to nitrogen) ratio. My choice of these particular properties was influenced by two reasons. First, these are the most frequently documented properties in most studies. Second, these properties are most frequently used for analyzing different treatment options (composting, recycling, incineration, and other WtE treatment options). As the reader will note, in many cases specific data was not available or was not reported in the documentation (denoted as "N/A" in the tables). Researchers sometimes used different ways of presenting the results e.g. a range of values in some cases and means in other cases. Researchers also used different categories for reporting the physical characteristics of waste. To keep the summary simple, I have used three broad categories for reporting the physical characteristics: biodegradable or compostable (some studies used one term while others used the other), recyclable (paper, metal, glass, and plastics), and other (cloth rags, stones, bricks, earth, ash, leather, rubber, and other miscellaneous materials not included in the other two categories).

Table 3. Physical composition of Delhi's waste

Source	Sampling Site	Compostable (%)	Recyclable (%)	Other (%)
IHPH (1982)	N/A	58	8	34
NEERI (1996)	N/A	38	13	49
CPCB (2000)	N/A	32	12	56
JICA-IPE (2004)	Household (Low income)	62	22	16
	Household (Med income)	61	33	6
	Household (High income)	64	28	8
MCD (2004)	Household (High income)	72 (67 - 77)	23 (20 – 26)	5 (2 – 8)
	Household (Med income)	77 (71 - 80)	21 (17 - 26)	2 (1 – 4)
	Household (Low income)	58 (46 – 67)	16 (8 – 20)	26 (10 – 45)
	Household (Slum)	69 (61 – 79)	14 (9 – 18)	17 (5 – 30)
	Vegetable markets	97 (90 – 100)	2 (0 – 10)	1 (0 – 5)
	Institutional areas	60 (0 – 100)	34 (0 – 100)	6 (0 – 46)
	Streets	28 (13 – 57)	12 (2 – 26)	60 (24 – 89)
	Commercial areas	16 (0 – 58)	68 (40 – 100)	16 (0 – 57)
	Landfill inputs	74 (21 – 95)	9 (3 – 16)	17 (0 - 88)
	Compost plant inputs	77 (69 – 84)	8 (5 – 13)	15 (10 – 24)
	Compost plant rejects	26 (0 – 70)	13 (0 – 22)	61 (15 – 100)
CPCB-NEERI (2006)	Landfill inputs	54	16	30
Mor et al. (2006)	Landfill	59	13	28

The numbers in parentheses indicate the minimum and maximum values and have been noted when available.
N/A indicates that I was unable to glean the sampling site based on the descriptions of the sampling method.

Table 4. Physico-chemical composition of Delhi's waste

Source	Sampling Point	LCV (kcal/kg)	HCV (kcal/kg)	Moisture (%)	C/N Ratio
IHPH (1982)	N/A	661 - 1200	N/A	15 – 40	28
NEERI (1996)	N/A	712	N/A	44	24
MCD (2004)	Household (High income)	1623 (1300 – 1887)	4907 (4503 – 5359)	59 (51 – 65)	31 (19 – 58)
	Household (Med income)	1339 (731 – 1939)	4942 (3415 – 6307)	65 (59 – 75)	30 (13 – 50)
	Household (Low	1398	3446	54	39

Source	Sampling Point	LCV (kcal/kg)	HCV (kcal/kg)	Moisture (%)	C/N Ratio
	income)	(754 – 2226)	(2238 – 4844)	(39 – 76)	(23 – 56)
	Household (Slum)	884 (204 – 1548)	3429 (1582 – 4912)	63 (59 – 71)	46 (19 – 103)
	Vegetable markets	497 (0 – 1309)	3827 (3083 – 4442)	76 (62 – 82)	16 (4 – 38)
	Institutional areas	1693 (129 – 3778)	4159 (2642 – 5459)	50 (5 – 84)	35 (6 – 110)
	Streets	1598 (1007 – 2041)	2199 (1188 – 3289)	19 (5 – 33)	51 (11 – 78)
	Commercial areas	3532 (1815 – 4593)	4576 (3372 – 6185)	18 (2 – 52)	158 (34 – 345)
	Landfill inputs	1777 (191 – 4495)	3927 (2042 – 5315)	47 (8 – 82)	38 (5 – 110)
	Compost plant inputs	1767 (896 – 2838)	4076 (3153 – 4582)	50 (34 – 65)	39 (22 – 61)
	Compost plant rejects	2148 (100 – 3501)	2527 (153 – 3996)	13 (7 – 17)	N/A
CPCB-NEERI (2006)	Landfill inputs	N/A	1802	49	35
Mor et al. (2006)	Landfill	N/A	N/A	40	N/A

LCV and HCV refer to lower and higher calorific values respectively. C/N ration refers to Carbon to Nitrogen ratio. N/A in the second column indicates that I was unable to glean the sampling site based on the descriptions of the sampling method. Other N/As signify that the data were not available.

Although specific numbers vary in these different reports, in general the consensus is that a large proportion, roughly 50-60%, of the waste is biodegradable (or compostable), the rest, 10-20%, is recyclable, and 20-40% is other waste (dirt from street sweeping, construction waste, and other non-biodegradable and non-recyclable materials). Also, in very broad terms, there seems to have been little change in the overall composition of waste over this time period, although changes are difficult to glean because the sampling methodology for earlier waste characterization efforts is not known. It is likely that certain kinds of plastic wastes have increased considerably over this time period, and the difference in the recyclable fractions might attest to this. Also, the data provide some evidence that the proportion of recyclables in waste decreases from source to sink. For instance, the proportion of recyclables in waste from low, medium and high-income households ranges from 16 to 33

percent (JICA-IPE, 2004; MCD, 2004). When in collection vehicles, it ranges between 9 and 16 percent (CPCB-NEERI, 2006; MCD, 2004). Within the landfill (down to a depth of 9 meters), it forms 13 percent of the total waste (Mor et al., 2006).

Moisture content varies widely depending on where waste is collected. The moisture content of household waste ranges between 54 and 65 percent, between 47 and 49 percent before being deposited at the landfill, and around 40 percent within the landfill (down to a depth of 9 meters) (CPCB-NEERI, 2006; MCD, 2004). Estimates of the actual calorific value of Delhi's waste also vary widely but are also more inconsistent than moisture content. For instance, presumably MCD (2004) and CPCB (2006) both determined the higher calorific value (HCV) in waste being transported to landfills. MCD (2004) estimated the average HCV at 3,927 kcal/kg while CPCB-NEERI (2006) estimated it at 1,802 kcal/kg. MCD caveats their results noting that they had selected samples for "low inert content" (2004, p. 131). C/N ratios show more consistency with only a few outliers. For instance, samples from collection vehicles entering landfills reveal that C/N ratio ranges between 35 and 38 on average (CPCB-NEERI, 2006; MCD, 2004).

Physical, chemical and biological properties of waste are important to understand and determine suitable treatment alternatives. Decision makers and technology lobbyists alike bemoan the lack of standardized data on quantities and properties of waste (see for instance, CAG, 2008; MoF, 2009; and Sastry, 2012). The Ministry of Finance (MoF) says, "There is conspicuous lack of accuracy regarding estimation of [m]unicipal [s]olid [w]aste . . . Waste [q]uantification and characterization pose a serious problem in technology assessment and feasibility studies" (MoF, 2009, pp. 31-32). For WtE technologies, such lack of knowledge poses an even greater risk because they rely on inputs of specific qualities and quantities. An

industry lobbyist remarks, "[a]n extensive characterization study of [m]unicipal [w]aste of a city shall be the corner stone for assessment of the heat value" (Sastry, 2012). Knowledge [of the waste] will be power. Power in two senses: in the literal sense of energy from the waste and the power to inform decision-making that will hopefully allow WtE technologies to emerge from the traps of ignorance and into the mainstream as a viable option for managing India's waste. Although there are several different processing and treatment technologies available and being implemented in India, for the purposes of this chapter, I am going to focus on two of these: composting and WtE technologies (massburn and RDF).[59] Composting, as a low-cost and low-tech alternative is often discussed and by policy makers, waste management industry advocates, and social and environmental activists in contrast to high-tech, expensive technologies such as WtE. Composting is also fairly commonly practiced across the country. Massburn and RDF, while only two of the many available WtE technologies, are the one whose implementation has caused a stir in Delhi. While there are other technologies being experimented with, massburn and RDF are considered one of the most viable options for the Indian context.

So, what do these technologies require in terms of the properties of waste? For composting, carbon-to-nitrogen ratio (C/N ratio) is one of key factors determining the ability of organic waste to compost with the ideal ranging between 20 and 25 (UNEP, 2005, p. 201). Higher ratios result in lower decomposition rates. Ratios can be lowered by adding "nitrogenous waste" or "chemical nitrogen fertilizers" (*ibid.*). Moisture content is largely not a concern

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[59] Waste-to-energy technologies can be of several types. Broadly, two kinds are distinguishable—those that require no pre-processing of waste (e.g. massburn and modular incinerators), and those that require mechanical or manual pre-processing of waste (e.g. refuse-derived fuel (RDF incinerators, biogasification/anaerobic digestion, thermal pyrolysis, and fluidized bed composting (UNEP 2005, p. 254; see also Tchobanoglous, Theisen and Vigil, 1993, p. 91). Depending on the type of waste-to-energy technology being considered, different properties of waste are important.

except during rainy season when waste in open area composting facilities might get waterlogged, thus hindering the composting process and allowing the breeding of certain disease vectors.

Two properties—calorific value and moisture content—play a key role for thermal treatment technologies. Incineration requires that waste have an average annual lower calorific value of at least 1,672 kcal/kg and must never drop below 1,433 kcal/kg (Rand, Haukohl and Marxen, 2000, p. 6). MoUD (2000), however, recommends that the calorific value be greater than 1,200 kcal/kg and moisture content be less than 45 percent for thermochemical conversion processes (p. 264). Cointreau (n.d.) suggests that for self-sustained incineration, an annual minimum lower calorific value of 1,300 kcal/kg is needed while for waste-to-energy plants (with significant energy recovery), a calorific value of 2,200 kcal/kg is desired (p. 8). Broadly, there seems to be some consensus that calorific values for incineration range between 1200-1400 kcal/kg (Talyan, Dahiya and Sreekrishnan, 2008; Leperniere, 2013).

Is Indian waste best suited for composting or incinerating? Of course, by looking at the numbers in the tables above and the requirements of those technologies ourselves, we could come to our own conclusions regarding the suitability or unsuitability of various treatment options. But it might be worthwhile instead to see what the conclusions and advice of academic, government, and international development institution reports on this matter are. Not surprisingly, almost all of them agree that Indian waste is suitable for composting and not suitable for incineration. Many of them have made their assessments on data they collected and analyzed themselves while some rely on data collected primarily by government agencies such as CPCB, IHPH and NEERI. My review of this literature spans approximately the same time period as the waste quantification and characterization studies

discussed previously. Let us briefly take a look at the conclusions that these different actors have drawn from their assessment of waste properties.

International institutions such as UNEP, UN-Habitat, and the World Bank provide general conclusions about the applicability of certain technologies to waste in developing countries. As early as 1994, a World Bank report says, "Waste-to-energy incineration systems are not technically viable for most developing countries, because the refuse, on an as received basis (wet basis), is not sufficiently high in calorific value to sustain incineration" (Cointreau-Levine, 1994, p. 17). A slightly more recent World Bank report says, "Municipal solid waste in [many low to middle income countries or areas] often ends up with a low calorific value and its ability to burn without auxiliary fuel is questionable either year- round or in certain seasons" (Rand, Haukohl and Marxen, 2000, p. 56). A UNEP (2010) report says, "Incineration of mixed wastes is a largely unfeasible option in non-OECD countries due to cost and often unsuitable waste composition . . . Much of the waste in the non-OECD region is characterised by a high percentage of putrescible waste with consequent high moisture and low calorific value, making it unsuitable for incineration without considerable pre-treatment, such as pressing or drying" (pp. 22-23). A UN-Habitat (2010) report cautions against "magic solutions" for managing solid wastes:

> *Many 'new' technologies are being developed to treat solid wastes, and salesmen target both developed and developing country cities. In principle, this is fine, but it is important that decision-makers have the information they need to make informed choices. Unfortunately, experience shows that there are no magic solutions: technologies developed for relatively dry wastes with high calorific value in the 'North' may not work when confronted with wet and mainly organic wastes with low calorific value in the 'South'. If a solution seems 'too good to be true', it's probably not true* (p. xxii).[60]

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[60] In an interview, Dr. Shymala Mani, an expert on waste management issues at the National Institute of Urban Affairs pointed out to me that bureaucrats are often under a lot of pressure for providing solutions and answers. The constant pressure of providing answers and solutions forces the bureaucrat to think that the easiest thing to do is to outsource the problem. Private firms are often quick to jump at the opportunity of offering a solution: "Look boss, I'll take care of this whole thing. I have this magical wand called Integrated Waste Management.

Admittedly, international institutions talk in generalities about developing countries and their waste. After all, Indian waste might be very different than the waste of say, Botswana. Their advice and counsel must be taken cautiously. Fortunately, many Indian government agencies in planning, urban development and environment have at various points in time, taken on the task of making their own assessments and recommendations on the matter (IMaCS, n.d.-a, -b, and -c; IL&FS, 2010; MoF, 2009; MoUD, 2000 and 2012; Planning Commission, 1995 and 2014). Almost all these reports have drawn their conclusion based on data collected by government agencies mentioned previously, most notably NEERI (1996) and CPCB-NEERI (2006). A 1995 Planning Commission report says, "Urban solid waste from Indian cities has low calorific value and high moisture content with high percentage of non-combustible materials; hence it is generally unsuitable for thermal technologies (p. 5). Composting, however, is deemed suitable because of the "physical characteristics and chemical composition of Indian city refuse" that "could take care of upto 20-25% of municipal solid waste (organic fraction)" (pp. 19, 48). The report, however, is not totally dismissive of thermal technologies suggesting that these technologies be further evaluated for their applicability.

Analyzing waste composition data on 43 Indian cities that showed relatively low calorific values overall, MoUD remarks, "Self sustaining combustion can not be obtained for such waste and auxiliary fuel will be required. Incineration, therefore, has not been preferred in India so far" (2000, p. 285). However, the case for incineration has become stronger "with the growing problems of waste management in the urban areas and the increasing awareness

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I'll just wave it around and then you'll see this huge equipment and an incinerator at the end of it. Then you can tell the Supreme Court that I have also produced some compost and this and that. Your problem is solved. All you need to do is pay me Rupees 1,500 or 1,700 or whatever it is that we negotiate between you and me. And over and above that there is always an icing. The icing is the under-the-table negotiations."

about the ill effects of the existing waste management practices on the public heath, the

urgent need for improving the overall waste management system and adoption of advanced,

scientific methods of waste disposal, including incineration, is imperative" (*ibid.*). Other

more recent reports similarly note that low calorific values combined with high moisture and

inert content, and the subsequent necessity of adding auxiliary fuel all limit the technical and

economic feasibility of the application of thermal technologies (IMaCS, n.d.-b; IL&FS,

2010; MoF, 2009; MoUD, 2012; and Planning Commission, 2014). Yet, almost all of them

do not reject outright the adoption of those technologies. The following conclusions can be

drawn from this assessment. First, the physical and chemical properties of Indian urban waste

make it largely unsuitable for thermal processing but suitable for composting. Second,

despite this knowledge, the government intends to explore further the applicability of those

thermal technologies. WtE technologies, despite their unsuitability, might be here to stay.

But why is the calorific value of Indian waste so low? Almost everyone is in agreement on

this matter also. Waste pickers do a supremely efficient job of extracting recyclables from

urban waste. Most but not all recyclables (paper, cardboard and plastics for instance) are also

highly combustible, and could have increased the overall calorific value of waste. Following

are extracts from reports of the government and international institutions on this matter:

> *Paper, plastic and metals are present in very low quantities because (a) many of these*
> *are separated at source and sold by the householder to* kabadis*; (b) even those which are*
> *considered as worthless and thrown with the refuse by the householders are salvaged*
> *from garbage dump sites by rag pickers. The calorific value of urban solid waste is low,*
> *less than 1,500 kcal/kg in most cities, because paper, plastic and wood have already been*
> *removed and used for recycling* (Planning Commission, 1995, p. 4).

> *All sorts of waste materials are generated in the Indian cities as in other countries.*
> *However, in the absence of a well planned, scientific system of waste management*
> *(including waste segregation at source) and of any effective regulation and control of*
> *rag-picking, waste burning and waste recycling activity, the left-over waste at the*
> *dumping yards generally contains a high percentage of inerts (>40%) and of putrescible*

organic matter (30-60%). It is common practice of adding the road sweepings to the dust bins. Papers and plastics are mostly picked up and only such fraction which is in an unrecoverable form, remains in the refuse. Paper normally constitutes 3-7% of refuse while the plastic, content is normally less than 1%. The calorific value on dry weight basis (High Calorific Value) varies between 800-1100 k-cal/kg (MoUD, 2000, p. 285).

The current composition of MSW after purchase / salvaging of recyclable components by kabadiwalas */ rag pickers have low calorific value (less than 2,000 Kcal/Kg) and is not suitable as a raw material for W to E plants* (Planning Commission, 2014, p. 51).

As a result of the socio-economic situation in many low to middle income countries or areas, only limited amounts of useful resources are wasted. Organized and informal recycling activities in the waste handling system tend to reduce the amount of paper, cardboard, and certain types of plastic in the waste (Rand, Haukohl and Marxen, 2000, p. 56).

India has had limited success with thermal treatment projects, which tend to focus on turning MSW into refuse derived fuel (RDF), or 'fluff', to combust for energy production or to supplement fuel for cement kilns. The informal recycling sector in Indian cities recovers much of the dry, high calorific material from MSW, leaving a moist residue with high green waste content unsuitable for production of combustible 'fluff' without considerable pre-treatment (i.e. drying) (UNEP, 2010, p. 23).

There seems to be agreement that informal resource recovery activities lower the calorific value of Indian waste. This begs two follow-on questions. First, why are these technologies still being favored, despite evidence that says it doesn't quite fit with the current context, if that context remains unaltered, that is? Second, how can the mismatch—between inputs available and inputs required by those treatment technologies—be resolved? In other words, how can unruly matter be disciplined to fit the requirements of the machinery? The following sections of this paper deal with these questions.

Regime change? The Re-emergence of WtE in India

It all began with the Timarpur WtE plant (not to be confused with the currently operational Timarpur-Okhla WtE facility) in Delhi. The facility now lays waste (pun intended). Its massive edifice, now in ruins, provides testimony perhaps to the failure of the state's grandiose project, or perhaps to the unruliness of waste material that refused to be burned, or

perhaps the state's inability to feed its machinery the refuse that it needed to function. Commissioned by the Government of India in 1984, a Danish firm built the facility in 1987 at a cost of INR 250 million (USD 5.7 million) with support from the Government of Denmark (Sharholy et al., 2008). Designed to incinerate 300 tons of waste per day and produce 3.75 MW of electricity, the plant failed shortly. The time period it operated varies depending on whom one asks: some say 6 days (Maclaren and Thu, 2003), others 21 days (Shah, 2011; Talyan, Dahiya and Sreekrishnan, 2008), and yet others a few months (MoUD, 2000; Sharholy et al., 2008). On its last day of operation, the Prime Minister at the time—Rajiv Gandhi—paid it a visit ceremoniously as if to publicly commemorate its impending demise, to pay his last respects (Forsyth, 2006).[61]

Soon after it began operations, rumors of its malfunctioning flooded the news. The Delhi Court ordered an enquiry into the matter. The Comptroller and Auditor General of India were subsequently called in to conduct an assessment and the plant was officially shut down in 1990 (Shah, 2011). The Danish firm subsequently filed a lawsuit (Forsyth, 2006). The oft-cited reason for failure is a mismatch between the plant's requirements based on its design and the quality of waste it received. Calorific value, moisture content, and its physical composition were blamed for its poor performance. Some say the plant didn't work because the plant needed higher calorific values (1200-1500 kcal/kg) and was supplied with waste whose calorific values were less than half of what was needed (550-850 kcal/kg) (Shah, 2011; Talyan, Dahiya and Sreekrishnan, 2008). Others argue that the failure was due to a miscalculation of the moisture content in waste; the plant wouldn't work unless diesel was added as auxiliary fuel (Forsyth, 2006). Yet others blame the physical material itself, too fine

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[61] Although I did not find any news reports of the visit of Prime Minister in my research, my guess is that the visit was intended to be celebratory especially since the plant had been functional for such a short period of time. It is ironic that the visit turned funereal.

for some and not fine enough for others. For some, it was the "dust in the garbage" that was "jamming and wearing out the conveyor screws" (MacLaren and Thu, 2003, p. 6). For others, it was "unscreened garbage" that affected the "performance of the equipment" (MoF, 2009, p. 58). Apparently, a screening plant was installed in 1989 to address this issue and even though the "plant commenced operation [and] . . . did show some improvement, it was still not adequate to operate at its capacity" (*ibid*.).

Despite this failure, often cited as an example of the unsuitability of Indian waste for those technologies, the excitement over WtE is alive and well. Meanwhile, the facility's maintenance and upkeep is "continuously being carried out through the Delhi Vidyut Board" at least till the plant assets can be put to an alternative use: "A possibility is being explored to lease out the entire facility, on 'as is where is basis' to entrepreneurs interested in taking over the plant and making their own investment to carry out necessary modifications or additions to the plant and for operating it on commercial basis" (MoUD, 2000, p.6 of Annexure 15.1). Perhaps the Government itself can provide assistance. Apparently, the Government's Department of Science and Technology analyzed the reasons for the failure of the facility and has subsequently "developed and demonstrated the technology . . . suitable for Indian conditions" (MoF, 2000, P. 58). The rights to this technology have been vested in Technology Information, Forecasting and Assessment Council (TIFAC), an autonomous body under the Government. Nobody else seems to be talking about this technology, however.

Delhi took a long break from WtE technologies. Twenty-two years later, in early 2012, another plant eerily in the vicinity and sharing the name of the now non-functional one, became operational. This is the plant mentioned in the introduction to this chapter. The plant

is built, owned and operated by Timarpur Okhla Waste Management Company Ltd.[62] It has

the capacity to treat 1,950 TPD and generate 16 MW of electricity (ASSOCHAM, 2015).

Unlike the previous Timarpur facility, this plant faces a slightly different set of challenges.

The problem of waste inputs still lingers—mixed wastes containing large amounts of inert

wastes (construction and demolition waste and waste from street sweeping (dust and drain

silt)) do not burn and pose a problem to the plant's machinery. The main challenge, however,

has been on environmental grounds, that the plant emits toxic gases (dioxins and furans) that

are damaging the health of those who live in its vicinity (Planning Commission, 2014).

Residents of the nearby communities filed a litigation in the Delhi High Court. The litigation

was subsequently transferred to the National Green Tribunal in February 2013.[63] The

litigation alleges that the plant is violating emissions standards because it is using cheap

Chinese technology that was not initially approved in the design documentation and does not

have the requisite equipment for controlling toxic emissions. Apparently even in China, the

technology has since been phased due to the pollution it was causing. In February 2015,

residents from the communities met the new Chief Minister of Delhi Arvind Kejriwal, who

assured them that the plant would be closed. However, the plant continues to operate for

now.

Even as this plant was mired in controversy, a new one was being built in another part of

Delhi. WtE industry proponents were busy touting its success:

> *While the situation across India is grim and official action has to be demanded through*
> *courts or public protests, there are a handful of local governments which are planning*
> *ahead and leading the way. The steps taken to solve New Delhi's waste management*
> *problem is [sic] laudable. If it was not for the kind of leadership and determination*

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[62] This is a 100% subsidiary of Jindal ITF Urban Infrastructure Limited, which is a subsidiary of Jindal SAW, is
a part of the larger conglomerate O.P. Jindal Group, valued at USD 18 billion (Jindal ITF, 2012).
[63] This narrative has been recreated from news stories on the topic (Bhatnagar, 2015; Ferris, 2013; K. Pandey,
2015).

showcased in Delhi, India would not have had its only operating WTE plant. This plant was built in 2011, at a time when the need for WTE plants was being felt all over India. 1300 tons of Delhi's waste goes into this facility every day to generate electricity. The successful operation of this facility reinvigorated dormant projects across the nation (Annepu, 2013, p. 4.15).

Part of this reinvigoration involved the budget announcement in February 2013. The Minister of Finance of the Government of India, P. Chidambaram, in his annual budget speech releasing the 2013-14 Union Budget of India, caused a flurry of excitement when he announced:

> *India tosses out several thousand tonnes of garbage each day. We will evolve a scheme to encourage cities and municipalities to take up waste-to-energy projects in PPP mode which would be neutral to different technologies. I propose to support municipalities that will implement waste-to-energy projects through different instruments such as viability gap funding, repayable grant and low cost capital* (Chidambaram, 2013).

The Union Budget 2013-14 promised to allocate central financial assistance to the tune of INR 9.1 billion, roughly 60 percent of the total domestic budget of the Ministry of New and Renewable Energy (MNRE) for "grid-interactive and distributed renewable power" programs that include urban and industrial WtE (MoF, 2013). Although the specific allocation for WtE is difficult to discern from the budget documents, WtE projects utilizing municipal solid waste for power generation are eligible to apply for a capital subsidy of INR 20 million per MW of energy that the facility proposes to generate, up to a ceiling of INR 1 billion per project (MNRE, 2013). The allocation of funds to this ministry signals that the problem of urban waste is nationally being seen as a real opportunity for not only managing the problem of urban waste but also as a viable source of energy—two problems that the country urgently needs solutions for. I do not know whether the funds were actually applied to the development of new facilities but the allocation of public money on such a large scale signals a departure from old ways of thinking about waste management.

A few months after the budget announcement in June 2013, the Planning Commission

commissioned a Task Force on Waste to Energy charged with the identifying and assessing

WtE technologies in the Indian context. The task force submitted its final report on May 12,

2014 which recommends a combination of decentralized biochemical conversion facilities

for biodegradable waste (composting and biomethanation) and centralized thermal

conversion facilities for other waste (incineration, RDF, gasification and pyrolysis) as a

viable technology mix for processing urban Indian waste (Planning Commission, 2014).

While large cities with populations above 2 million can afford to have their own stand-alone

WtE facilities, smaller cities might need to pool their combustible waste to supply to

facilities in nearby larger cities or to regional facilities. If the report's recommendations were

to be implemented, the country's map would soon be dotted with hundreds of WtE facilities:

88 in the next 5 to7 years, 215 by 2031 and 556 by 2050 (Planning Commission, 2014, p.

xiv). By contrast, only 8 WtE plants were either in operation or being built in 2011 (*ibid*., p.

6).

But who would own and operate them? Municipalities themselves will not be able to. Neither

do they have the financial resources, nor the administrative and technical capacities to do so

on their own. Here, the private sector will come to the rescue through pubic private

partnerships. In a flowchart, the report delineates what it recommends as the appropriate

functions of the municipality alone, private enterprise alone, and those that may involve

either of those parties (see Figure 8).

Figure 8. Municipality's outsourcing options for waste management functions[64]
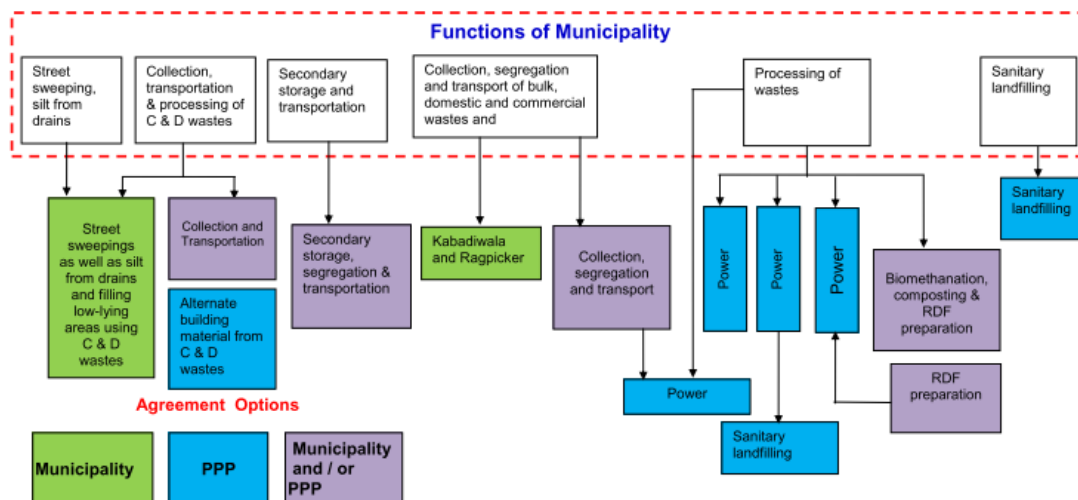
To encourage private sector entry, the report recommends viability gap funding for such projects of "40% towards capital expenditure by the central government upfront or 20% viability gap funding each for capital investments and O&M costs linked to performance and another 10% by the state governments for the sustainability of such projects" (*ibid.*, p. xv). For existing defunct or partially functioning plants, the report recommends inviting the private sector to operationalize them and envisions the following capital subsidy mix: 50 percent from the central government, 20 percent from state government, and 30 percent investment by the private operator (*ibid.*, p. xxiii). The old, now non-functional Timarpur may yet have a chance at a new life. In addition to these capital subsidies, governments are encouraged to pay all facility operators a tipping fee "to bridge the gap between the amount spent by the concessionaire on processing the waste and the income derived from the products" (*ibid.*, p. xxv). The notion of tipping fees has been discomforting to municipalities.

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[64] Source: Planning Commission (2014, p. xvii)

The idea that the municipality should not have to pay for waste management services through such things as tipping fees is common even at the highest levels within the government.[65] A few months after the release of the task force report, Prime Minister Modi embarked on his own campaign to clean India—Swachh Bharat Mission.[66] One of its components is to improve solid waste management capacities and infrastructures in cities. For this, the mission provides an incentive from the Central Government in the form of a 20 percent grant or viability gap funding for each project to encourage public-private partnerships in solid waste management (MoUD, 2014a, p. 12). While the guidelines suggest that states are "free to chose the technology for SWM projects," WtE has been accorded a special position: "In order to promote projects of waste to energy, it is clarified that the central government Grant / VGF may also be used for such projects, either upfront or as generation based incentive for power generated for a given period of time" (*ibid*.). The balance can be raised through other sources which include but are not limited to: private sector participation; additional resources from State Government or ULB; beneficiary share; user charges; land leveraging; innovative revenue streams; Swachh Bharat Kosh; corporate social responsibility; market borrowing; and external assistance (*ibid*., p. 5). While the news may not be as great as the task force was expecting, it does not seem that bad either. The mission will be in force until October 2019. Private sector aspirants have a little time to start marketing their dream projects.

Meanwhile, as the NGT deliberates on the case against the WtE plant in Okhla, the Court deliberates on a different yet related matter: the case of Almitra Patel vs. the Union of India,

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[65] MoF notes, "the concept of tipping fee is alien to most ULBs (2009, p. 32). A WtE industry proponent puts the matter this way, "Despite cities' inability to properly manage wastes, the majority of municipal officials consider waste as "wealth" when approached by private partners" (Annepu 2013). At a meeting, Ms. Nisha Singh, Joint Secretary of the MoUD validated these industry concerns by saying that solid waste management pays for itself and does not need government funding.
[66] While the next chapter discusses this campaign in detail, in this chapter I want to examine those portions that are relevant to the issues being discussed.

originally filed in 1996 before the Supreme Court mentioned in Chapter 2. Various grievances have since been filed in this case including the case of the WtE Okhla plant which is now being dealt as an independent case. The Supreme Court transferred the case to the NGT in September 2014. The NGT has heard "certain independent matters" such as "the establishment of MSW plants, along with Waste to Energy projects" relevant to this case (NGT, 2015). One such matter had to do with the establishment of waste-to-energy plants for a cluster of cities in the state of Haryana. The NGT approved the petition and approved an RDF project and asked that the WtE plant "be established without any delay and . . . be made operational at the earliest." Further, the Court noted, "At the cost of repetition, we may notice that Karnal is a pilot project and based on the performance of this project we would issue further directions in relation to other clusters, especially for clusters having Waste To Energy plants." To opponents of WtE technologies, this NGT order has been no less than catastrophic. To them, this order means that WtE technologies have been deemed suitable, not just for Haryana but all of India. Contesting them in court again will be a difficult task. These new developments signal a discursive policy shift towards WtE technologies in the recent years. While certain government actors were questioning the suitability of these technologies a few years ago, it is no longer in question or up for debate. Perhaps this new way of institutionalizing and regulating waste management technologies warrants the use of Gille's (2010) term "waste regime." If waste regimes are to be understood as a set of "social institutions" that "determine what wastes . . . are considered valuable by society" and "how these institutions regulate the production and distribution of waste in empirically tangible ways," then the emergence of WtE in India as a dominant paradigm of how urban wastes should be managed might qualify for the term regime, at the very least a discursive one (Gille

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2010, p.1056). Further, Gille's regime-based conceptual framework focus on the "production, representation and politics of waste" lends itself quite well to the purpose of this chapter (*ibid.*).

But why are WtE technologies so enticing to begin with? This might require stating the obvious but I think it is worthwhile laying those reasons out. First, WtE technologies promise to reduce waste volumes significantly. In cities where mountains of landfills make it apparent that there is no space for any more waste and where both per capita and total quantum of waste is on the rise, massive reductions in the quantities of waste that need to be disposed offers real hope (Annepu, 2013). Hope that Indian cities could be clean some day, that garbage won't be so publicly visible perhaps. By some estimates, thermal treatment technologies can reduce waste quantities by 85 to 95 percent (Tchobanoglous, Theisen and Vigil, 1993, p. 291).

Second, land is already scarce especially in urban areas (MoF, 2009; NGT, 2015).[67] In peri-urban areas, where land might be more easily available, people do not want landfills in their backyard. Reports of protests against the siting of a new landfill facility are common in newspapers across the country. Of course, the same could be said for WtE facilities, as is evidenced in the case of the Okhla WtE facility. But WtE not only requires less land than its alternatives, for instance composting or landfills, it also reduces the need for landfill space (MoUD, 2012; Planning Commission, 2014). Land scarcity, otherwise a massive urban problem, offers an opportunity for WtE service providers. A representative of a Swiss WtE technology provider said at a conference, "Lack of space for landfills is a market expansion opportunity for incineration in India" (Vogler, 2013a).

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[67] NGT (2015) notes, "Land anywhere and everywhere today is a scarce item." MoF says, "Land is the single most important factor in SWM sector. Availability and clearances are to be ensured for successful implementation" (2009, p. 32).

Third is the promise of electricity (MNRE, 2008; Bhada-Tata, 2010). According to the Ministry of Power (MoP), the power deficit for 2015-16 is on average 2.1 percent with peak deficit at 2.6 percent. For some states, however, the deficit is as high as 30 percent (MoP, 2015). Estimated energy potential from urban waste is approximately 511 MW per day (Planning Commission 2014, p. ii). According to a slightly older MoSPI (2013b) estimate, waste-to-energy generation potential was approximately 2,707 MW or 3 percent of total renewable power generation potential (p. 6). At present, renewables hold a 2 percent share in the Indian fuel mix (*ibid.*, p: i). The energy potential from waste is obviously limited.

Fourth, some WtE technologies accept unsegregated wastes, at least in theory. This proposition is exciting because segregating waste is a massive undertaking in and of itself. There are only two options: either waste is segregated at source and it goes through the system via segregated streams; or waste is segregated at a centralized facility, requiring equipment and/or labor to perform those tasks. Even though the attractiveness of some WtE technologies is based on their ability to process unsegregated wastes, this doesn't quite materialize in practice. For instance, inert wastes still might need to be removed from mixed waste before it is fed to the facility. Nonetheless, the theoretical promise of a facility that can handle unsegregated waste is appealing.

Fifth and finally, WtE also promise modernity—technological, ecological and social. In a later section of this paper, I will elaborate on this point further. For the meantime, lets return to the question of the ability of waste to burn.

The task report does not expect that all the waste produced will be burned. It recognizes the importance of the existing informal recycling sector, the need for bio-chemical treatment (biomethanation and composting) and the presence of inert wastes that may need alternative

treatment and/or disposal methods. In their own words, "The waste that can be recycled should be recycled to manufacture new products saving natural resources, the wet wastes that can produce biogas or compost, should be processed and the wastes that are non recyclable and yet have high calorific value should be used for W to E projects" (Planning Commission, 2014, p. x).[68] In its summary of how they envision waste would be treated in such a scenario, the task force estimates that on average about 65 percent of the waste is treatable (10 percent in the form of recyclables that are recovered through the informal sector and 25 percent inert waste that cannot be treated through either of the recommended treatment options). 26 percent of the total waste would be thermally treated, about 6.5 percent through biomethanation, and 32.5 percent composted (*ibid.*, p. 130).

Intuitively, it seems that if everything that could be recovered for recycling was recycled either by informal sector actors along the way or by "persons or the firms authorized for handling" such waste, (NGT, 2015), and if everything that could be treated biologically or biochemically through composting or biomethanation was managed in such a manner, there wouldn't be much left to burn. But I want to compare two data sets to the recommended treatment options by the task force (see Table 5). To keep things simple, I am restricting this

[68] NGT (2015) imagines the future system working out similarly: Municipalities will "make every possible effort to collect municipal solid waste in a segregated form right at the first point of collection . . . The municipal solid waste so collected shall be transported by the corporation separately and in different containers/vehicles . . . There would be complete segregation of the waste at the site into wet and dry waste without fail. No wet waste would be directly put into the incinerator or for power generation, except specifically permitted. The wet waste shall be composted scientifically through approved techniques . . . As far as the remaining MSW is concerned, it shall be further segregated into recyclable and un-recyclable waste, particularly plastic and other wastes. In relation to former, the operating agency, State Government and the Corporation shall frame a proper policy so that it can be collected from the site, transported in accordance with law and can be provided to the persons or the firms authorised for handling recyclable plastic and allied waste or for making RDF. However, in relation to the later, it would be seen whether un-recyclable plastic or other waste can be used for the purposes of construction of roads or such allied activity, where it is scientifically permissible. Whatever is still found to be un- recyclable, the same shall be put into incinerators for disposal. The waste left in the incinerators shall be collected and disposed . . . It is obvious that the amount of remnant waste would be the least."

analysis to data from Delhi. One of the data sources in CPCB-NEERI (2006), which is also

the same data that the task force report uses in its recommendations. The second set is from

MCD (2004), the most comprehensive waste characterization study that I have come across

thus far in my research. Both sources report the data in different ways. From CPCB-NEERI

(2006), I only have access to the proportion of recyclables and compostable in waste

collected from residential, commercial, industrial and market areas combined. The MCD data

however is a little more detailed and provides the composition of waste from each of those

sources separately. It's important to note, however, that each of the waste compositions

provided in the table below was measuring the same thing—composition of waste at source.

Waste composition in the MCD (2004) data was reported according to the following

categories: recyclable, biodegradable, inert, and other. Their categorization maps quite easily

to the categorization used by the task force for treatment options.

Table 5. Suitability of waste streams for treatment alternatives

Source	Recyclable (%)	Inert (%)	Thermal (%)	Bio-chemical (%)
Planning Commission (2014)	10	25	26	39
CPCB-NEERI (2006)	16	N/A	N/A	54
MCD (2004)				
High income households	23	0	5	72
Medium income households	21	1	2	77
Low income households	16	23	3	58
Slum households	14	16	1	69
Vegetable markets	2	1	0	97
Institutional areas	34	4	2	60
Streets	12	56	4	28
Commercial areas	68	0	16	16
N/A indicates that data were not available.				

From this table, it seems clear that if all waste were to be collected, transported and

segregated according to plan, not much would be left for thermal treatment. We do not know

how much exactly each of those sources contributes to the total waste of Delhi but we do

know that households and vegetable markets combined contribute to about 64 percent of the total waste generated in Delhi (Talyan, Dahiya and Sreekrishnan, 2008). The amount of potentially thermally treatable waste from these sources ranges between 0 and 5 percent, a far cry from the task force's estimate of 26 percent. Further, the task force seems to be underestimating the percentage of recyclable material in waste. Waste from all sources except vegetable markets is greater than the 10 percent estimate used by the task force. Let us for a moment imagine that the task force, instead of implementing its perfectly designed system, is working in the present context where mixed wastes from which recyclables (10 percent of the total per the estimates of the task force) have been already extracted and it arrives at the facility where it is then segregated into those potential treatment categories. Removing the 10 percent recyclable material we get 28 percent inerts, 29 percent thermally treatable and 43 percent bio-chemically treatable waste. For this comparison, I am using the waste composition data in trucks arriving at the landfill from MCD (2004). Two caveats need to be noted here. First, for the purposes of this exercise, I will assume that even though there are recyclables in the mixed waste, these will not be extracted and assumed to be a part of the combustible portion to be treated thermally. Second, as MCD (2004) points out, in their sampling exercise, they preselected samples for low inert content. This does two things in favor of the task force's assessment. It reduces the proportional quantity of inert material and increases the proportional quantity of combustible material in this estimate. But even doing so does not help matters much, as shown in Table 6.

Table 6. Suitability of different treatment alternatives for waste received at landfills

Source	Inert (%)	Thermal (%)	Bio-chemical (%)
Planning Commission (2014)	28	29	43
MCD (2004)	11	15	74

As Table 6 demonstrates, the thermally treatable portion of the waste is still half of what the

task force estimates. This problem of lack of appropriate waste needs to be resolved if

massive investments in expensive treatment technologies is to be made. We already know

from the previous section of this chapter that one of the reasons for the failures of past

experiments with WtE technologies is the unsuitability of waste whose calorific value is too

low. We also know that the reason for low calorific values is that waste pickers extract high-

calorific value materials from the waste stream. How can this problem be addressed?[69] The

easiest way is to control the end-to-end process, starting with collection through disposal.

Such control will allow the disciplining of the material properties of waste to fit the supply

requirements of technologies that would otherwise be rendered non-functional. The machine

needs to be fed continuously and with the right inputs.[70]

Government agencies and international institutions that provide them technical and financial

expertise know this of course. MoUD (2012) bemoans that the absence of "any effective

regulation and control of rag-picking . . . and waste recycling activity" is partly why thermal

technologies have not worked so far (p. 285). A World Bank report warns:

> *Introduction of advanced waste treatment like MSW incineration will have a significant impact on existing informal recycling activities. For example, scavengers may lose their source of income. Even if these people are compensated for their loss of income, some of them will shift to the early stages of the handling system. This may alter the composition and combustibility of waste arriving at an incineration plant. Scavenging and other recycling activities must therefore be carefully managed* (Rand, Haukohl and Marxen, 2000, pp. 5-6).

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[69] Leperniere (2013) poses the question in a different way: "What effects are the upstream elements of the waste management system having on the waste in terms of the quantity and its composition? Is a waste to energy facility likely to get enough waste to make it viable, or is much of it being diverted for composting or recycling?"

[70] A World Bank report cautions, "Refuse of least 1,300 kilocalorie per kilogram of "lower heating value" needs to exist on a year-round basis for incineration without supplemental fuel. If waste- to-energy incineration is viable, the frequency and duration of downtime for maintenance require 100 percent standby capacity. A waste-to-energy incinerator needs to operate continuously, on a 24-hour basis, at no less than 5 tonnes per hour per unit" (Cointreau-Levine 1994, p. 17)

Disciplining an unruly matter (i.e. waste inputs) requires disciplining an unruly people (i.e. waste pickers). In the following section, I examine some of the impacts of the introduction of these technologies on the informal sector in India.

Displacement and dispossession: Mechanisms of control

To address the gap between what WtE technologies need in terms of inputs and what mixed wastes currently contain, government reports call for streamlining the entire end-to-end waste management process so that wastes collected at source is what arrives at processing facilities (IMaCS, n.d.-b; MoF, 2009; NGT, 2015; and Planning Commission, 2014).[71] Poor quality waste is a risk that must be minimized. Either the private operator or the municipality must have control and ownership over the process and waste materials. Following are some select quotes from these documents on how and why this must be done:

> *The municipal authorities are advised to have MSW department or cell in each ULB, introduce door to door collection, transportation of bio degradable and recyclable as well as high calorific value of waste directly to processing facility and separately collect inert waste such as street sweepings, silt from the drains, construction & demolition waste for their further treatment and/or disposal without mixing this waste with doorstep collected waste to facilitate cost effective processing of waste* (Planning Commission, 2014, p. xxv).

> *The basic project risks under PPP in SWM i.e. waste supply risk, waste quality risk, technology risk and marketing of process outputs to improve commercial viability need to be mitigated for success of PPP in SWM. The developer must have long-term rights to waste and guaranteed MSW volumes and characteristics* (MoF, 2009, p. 34).

> [In] *the case of Langariawas RDF project, the* [municipality] *is providing mixed un-segregated waste to the processing facility, hence, the complete risk of extracting bio-degradable waste from mixed waste lies with the private operator. Further, the informal stakeholders like rag-pickers & household waste collectors (*kabariwalas*) extract most of*

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[71] Forsyth (2005) describes this necessity for control in the following way: "Biomethanation is frequently preferred by organizations working with poor people in urban areas, as biomethanation allows poor people to sift through waste to collect recyclables to sell. Such participation by waste collectors (or waste pickers) is sometimes not feasible with pyrolysis because the pyrolysis procedure requires the inclusion of recyclable paper and plastics in order to achieve an adequate calorific value for the waste. Companies investing in pyrolysis therefore usually want to gain ownership of the entire waste stream, whereas investors in biomethanation normally only want the organic matter" (p. 433).

the organic/recyclable waste from the MSW, thereby significantly affecting the quality of the waste. The Langariawas RDF plant has also suffered as the calorific value of the input waste supplied by [the municipality] is not sufficient enough due to extraction of valuable elements form the waste by informal stakeholders in the MSW value chain. Hence, there is a need to establish inflexible door-to-door collection system in the city and ensure that all the waste collected is transported to the processing facility (IMaCS, n.d.-b, p. 82).

Government institutions of course are not oblivious to the fact that such a system would totally exclude the informal sector from its means of livelihood. To address this, most reports nominally recognize the contribution of this sector and simply state that they need to be "included" in proposed future systems. The task force, for instance, proposes the following: "To facilitate sorting of recyclable materials collected by informal sector and supporting recycling industry, the municipal authorities should set up waste sorting facilities at suitable locations and permit the informal sector to use the facility for segregation of recyclables" (Planning Commission, 2014, p. xi). NGT (2015) is less tentative on the matter: "We direct the State Governments, Corporations, Councils and Committees to involve the rag pickers, whether organised or not, by framing a policy in that behalf which would prevent individual rag pickers from rag picking . . . Rag pickers, who are included under the Policy, shall ensure that sale of recyclable MSW is only to the people who are authorized." There are a few questions that these policy prescriptions pose. First, how would waste pickers have access to waste/recyclables if the municipality tightly controls the entire waste process? For the task force, the answer lies in letting them use the waste sorting facilities. For the NGT (2015) however, that question is more complicated. In its order, it doesn't explicitly ask that municipalities collect waste at source, simply that they "make every possible effort to collect municipal solid waste in a segregated form right at the first point of collection." This ambiguity potentially leaves some space for informal sector doorstep collectors.

But this ambiguity and token inclusivity might also serve a real discursive purpose—that of placating protests from social activists and organizations who advocate for the interests of the informal sector. In practical terms, however, they are not much more than palliatives. The informal sector extracts valuable combustible material from the waste stream thus putting into question the suitability of WtE technologies. They need to be stopped if WtE technologies are to work. Most of this remains in the government's discursive realm so far since there are very few WtE plants currently in operation but it is an omen, a sign of things to come. In Delhi, it might already be coming.

In the New Delhi Municipal Council (NDMC) area where Chintan provides doorstep garbage collection services to residents by formalizing existing waste pickers in the area, the NDMC Secretary was reportedly asked by the Okhla WtE operator to disallow segregation in the area in June 2013 because the WtE operator wants to segregate waste at its own facility (Personal communication with Bharati Chaturvedi). Doorstep waste collectors primarily make their living from segregating and then selling recyclables from household waste. Chintan has been providing these services since 2005 but since June 2013, the organization regularly receives complaints from NDMC officials regarding the lack of cleanliness at the community bins that waste pickers use for sorting, segregating and storing recyclables. There have even been threats of cancellation of Chintan's contract. Many waste pickers have been issued citations that they are violating the law: the New Delhi Municipal Council Act of 1994.[72] It is an interesting coincidence that NDMC is expressing concern regarding the cleanliness of these spaces at around the same time as the WtE operator is demanding unsegregated waste as fuel

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[72] Waste pickers are apparently in violation of the NDMC Act of 1994. Although NDMC did not exactly specify how, we suspect that it has to do with a clause regarding "encroachment on streets." The segregation activities of waste pickers often take place around community bins and recyclable materials are stored on pavements which may be against the law that states, "Overhang, jut or project into, or in any way encroach upon, and obstruct in any way the safe or convenient passage of the public along any street" (GOI, 1994).

for its operations. Just a few months later, in March 2014, NDMC announced its plans to introduce "an integrated waste management system by collecting waste from doorsteps and sending it for disposal in a scientific and mechanised manner at the Timarpur-Okhla Waste Management Co. Ltd (TOWMCL) plant" (PTI, 2014a). The Okhla WtE plant needs inputs and the only way to guarantee a certain quality of inputs is by controlling or vertically integrating the end-to-end process.

But even in their token inclusivity, there is a hierarchy of the value of the work of different actors within the complex informal economy of waste in India. At the top are *kabariwalas* or itinerant buyers (those who buy high-value recyclables from households). Policy makers know that this system will be impossible to disrupt because it functions entirely separately from the regular waste management system that includes other informal actors. Next in this hierarchy are doorstep waste collectors. Policy makers are well aware of the important (and free) waste collection services they provide, in the absence of which the government or a private firm would have to provide those services at a cost. But they do not like the fact that their work lowers the calorific value of waste since these actors make their money primarily by extracting and selling recyclables from the waste that they collect. While they perform useful work, they will also need to be contended with particularly over the issue of waste ownership if it comes to that. Lowest in this hierarchy, and often deliberately ignored, are the waste pickers at the landfill. These folks survive on the discards of those upstream who have had a chance to pick at the waste before them.[73] By the time waste reaches the landfill, most

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[73] This hierarchy also reflects caste and class hierarchies within the community. Those who deal with high-value recyclables belong to a different socio-economic class, and often to a different socio-economic caste than those who deal with mixed garbage (Gill, 2010). There are others who don't quite fit into the simplistic hierarchy that I have developed—those who roam the streets to pick out recyclable materials from public litter. For them, however, the task force envisions a purpose also, "The municipal authority may also involve the rag pickers (there are an estimated 1 million rag pickers in the country) through NGOs or private sector for picking plastic and other recyclable materials from the streets in a designated area for making the cities "litter free" and

of what is valuable in it has already been culled. Yet, the waste carries a glimmer of possibility. Maybe someone upstream overlooked something of value. Or more likely, it was not valuable enough for their labor—soiled plastics, paper, cardboard, nails mixed in with construction debris. For municipalities, landfill workers are not much more than a nuisance. Their work doesn't "help" the municipality in any way because it has already (directly or through a service provider) borne the costs of transporting those materials to that point. Compared to itinerant buyers whose work is independent of what municipalities are tasked with, and doorstep waste collectors whose work subsidizes the cost of collection and transportation, landfill workers, to put it crudely, are not useful.

It's no wonder that there is scarce mention of landfill workers in government texts on WtE technologies. Most of these documents, while they mention other informal sector actors along the chain, fail to mention landfill waste pickers. But so far, landfill workers have been the ones most deeply impacted by the establishment of WtE facilities such as the one in Okhla. When waste gets diverted to WtE plants instead of landfills, its composition when it finally reaches the landfill is completely different. Fresh waste from homes, offices, and markets is replaced with ash from the WtE plant. In ash, there's only metal.

To understand and document these socio-economic impacts, Chintan conducted two surveys of the three main communities around the Okhla landfill that were dependent on the landfill for their livelihoods—one about six months before the WtE plant became operational and another about nine months after (Chintan, 2012). In the first round, the survey found 683 adults engaged in waste related work in the three communities. In 2012, this number had dropped to 377 adults. The number of waste pickers at the landfill declined from 400 to 105.

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preventing the useful material going to landfills. Such rag pickers could be paid incentive money for carrying out the task satisfactorily" (Planning Commission, 2014, p. xi).

The proportion of waste pickers dependent on the landfill decreased from 60% to a mere 28% of the total community population. Through informal conversations, I asked where the people had gone. Most had either moved to other parts of the city or returned to their villages. Survey respondents noted an overall 20% decrease in income since the WtE plant began operations. Specifically, landfill workers reported having to work longer hours in multiple shifts to make a living. One informant told me, "Before we made 300-500 Rupees working 3-4 hours a day on the landfill. Now we have to start work at 6 in the morning and work until the evening and even then we only make about 200 Rupees, if that." In the survey, landfill workers reported working the most number of days per month, more than 3 days on average more than other respondents.

Despite the fact that working at the landfill is precarious and unpredictable in terms of income, scavenging at the landfill seemed to foster a hope, a chance of some days being better than others. Salman's mother, Sadhna stopped working at the landfill once the WtE plant opened and started working as domestic help in a nearby wealthy neighborhood. This is the reason why:

> *I worked on the landfill but when the trash stopped coming, I started working in a bungalow doing dishes, dusting, cleaning, and cooking. I used to make more money working on the landfill than I do working in a bungalow. On the landfill, we used to find many different things of different qualities and different prices. Working in a kothi, I always make the same amount of money, about 5000 Rupees. On the landfill, I could have made 10,000 and maybe even 15,000 Rupees.*

In the 2012 survey, Chintan asked respondents about the amount and frequencies of their minimum and maximum daily incomes. Landfill workers reported the highest and most frequent minimum daily incomes and among the lowest and least frequent maximum daily incomes. This suggests that the economic promise of scavenging at the landfill does not lie so much in their ability to make a huge income on any given day but that it almost guarantees

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that one will eke out a living somehow. The unpredictability of income is a chance that landfill scavengers choose to take but never out of false hope of striking gold or finding bundles of accidentally discarded cash, merely out of the hope that today might be better than yesterday.

As I talk to my informants, in the background, a group of waste pickers are back from the day's work. As they empty out their bounty, grey-brown dust fills the air. The sacks contain metal and only metal. Broken pieces of the hard infrastructure of urban living, having been cleansed by the deadly fire of the WtE plant will now find new life. Salman describes this in the following way:

> *Now that the trash gets burned, nothing comes to the landfill. Now we make do with the metals in the ash that gets dumped on the landfill. Before the trash started getting burned, we used to find cardboards, tins and many other recyclables . . . Now we find iron, brass, bronze. Before the trash used to get burned, we used to get a lot more iron. Now it seems that they take out the big iron pieces at the plant. All we get is nails and other small metal items that we make do with. After the trash stopped coming, we found out why 10-15 days later*.

There is no doubt that WtE technologies and waste pickers (for now mostly at the landfill) are competing for the same materials of high calorific value (Gerdes and Gunsilius, 2010). And if the promotion of these technologies carries on with the same spirit as it has been recently, there is little doubt as to who will win. It is to the (soon-to-be) winners that I turn to in the next section of this paper.

New forms of value extraction from waste

There has always been value in waste. For instance, in Hindi, a practical distinction is maintained in the definition of waste matter. Most commonly, it is the distinction between *kooda* (or *kachra*) and *kabaad*, with the former being waste matter that has no value and the latter as that which does. One produces and disposes of *kooda* daily. *Kabaad*, on the other

hand, is that which is hoarded as an asset, sometimes for long periods of time but often only till the *kabariwala* (itinerant waste buyer) makes his way to buy it from the asset hoarder, most commonly the household. The term *kabaad* can be applied not just to the regular recyclables (such as glass bottles, newspaper, tins cans) that most households in India collect and sell but also to other, more irregular items that one either has not yet had a chance to discard (or sell) or one is unwilling to part with just yet (such as old furniture and electronics). The decision of what to throw in the bin versus what to keep aside is an economic decision made by individual households based on their assessment of what the "*kabariwala* will take and *kabariwala* will not take," as one my informants succinctly clarified for me. Similarly, the ability of waste pickers to make money is dependent on their skills and capacities to identify and extract *kabaad* from *kooda*.

The fundamental property that unites disparate matter into *kabaad* is its potential for economic exchange, its exchange value. In contemporary waste management science and practice, distinctions of biodegradable/non-biodegradable, dry/wet are applied to waste matter. The illegibility of these "modern" distinctions is rendered public as these segregation categorizations consistently fail in achieving practical segregation results (more on this in Chapter 5). The categories of *kooda* and *kabaad*, unlike these imposed categories, are not fixed (Douglas, 1966). Their boundaries shift with politico-economic contexts. Commodity and labor markets determine the fate of waste matter into these categories. Portions of *kooda* can become *kabaad* through the labor of waste picking (collecting, segregating and transporting recyclable materials), and *kabaad* can become *kooda* if particular commodity markets crash indefinitely (Chintan, 2009a; Mitchell, 2009). For sure, in older systems of value extraction from waste, material properties matter but economic properties win.

In newer systems such as WtE, material properties certainly matter and they seem to matter even more than in systems of old. Now, the search for economic value in waste has become more imperative:

> *One of the striking characteristics of the materiality of rubbish is precisely how important it has become to extrude economic value from it. In contrast to common-sense conceptions of rubbish, it emerges that waste is not that which has no value; rather, it is that which motivates the search for value . . . In fact, waste never loses its consumption value, for the value of waste underpins major economic sectors, providing incomes for multinational conglomerates, local authorities and individual refuse operatives alike* (O'Brien, 1999, pp. 281-282).

In the case considered in this chapter, we see that in older systems of recovery and recycling, economic value in waste was that of its ability to persist in new forms, while in newer systems of WtE, the economic value lies in its ability to disappear. Newer forms require closer attention to waste's material properties than before. The transformation of waste into new materials in older systems is a disparate and dispersed process, not under the control of a singular actor or entity. WtE technologies require that those material transformations occur through centralized control because such singular control guarantees the ability of those materials be transformed into energy, ash, and gases. Older systems meant extracting value for means of subsistence for waste pickers, fueled by larger circuits of value production outside their own control. Newer systems mean extracting value for profit for private firms, guaranteed and controlled through the backing of the state.

Of course, the private sector is excited, or at least its lobbying arm is. In February 2015, just two months after MoUD released guidelines that specified how SBM funding would be used, ASSOCHAM (Associated Chambers of Commerce of India) released a report proclaiming the next USD 1.5 billion for Indian industry in waste (ASSOCHAM, 2015). The report seems more realistic about waste composition and appropriate treatment options for it: "The

majority of municipal solid waste generated in India is organic matter (40%) which is compostable in nature, followed by 10% of combustible waste, 5% of recyclable materials and the rest of the material (45%) are inerts. It is important to highlight that this waste composition is at the dumpsite and not at source, since majority of recyclable material is removed by the informal sector prior to waste dumping" (ASSOCHAM, 2015, p. 12). The two technologies that the report recognizes as being an investment opportunity are composting and WtE. However, it also notes that the current finance models do not invite private sector participation because they continue to not be financially viable. ASSOCHAM is hopeful that the government is "mulling over" the recommendations of the Planning Commission task force that increases the capital subsidy (per the task force recommendations), pays tipping fees (between INR 730 and 1000 per ton) and increases the purchase price of electricity generated (to between INR 7.1 and 8.5 per kWh).

The report is not silent on the issue of the informal sector either. It notes that thus far the informal sector has not been meaningfully integrated in the waste management value chain. In the final section of the report, it proposes an "action agenda for urban municipal waste management in India" in which the informal sector has a place in the short, medium and long-term time frames. In the short term (by 2017), the report calls for "creating guidelines for setting up waste collector's cooperatives and holding consultations with NGOs and SHGs to bring the informal waste collection players under the formal purview" and "collecting data on informal waste picking sector to enable designing of better collection models" (ASSOCHAM, 2012, p. 48). In the medium term (by 2025), ASSOCHAM calls for "promoting informal waste collector's cooperatives for better integration of the informal sector within the value chain" and "ensuring safety and well-being of informal sector

engaged in waste collection and sorting by providing requisite facilities and safety gear"
(*ibid*.). In the long term (by 2050), it hopes for "ensuring the informal sector is completely
embedded as a part of the formal waste management value chain" (*ibid*.). These are certainly
lofty goals but they don't quite yet clarify how the discrepancy--between what the informal
sector needs to extract to earn a livelihood and what WtE plants need as input—will be
resolved. Perhaps to ASSOCHAM, there is no discrepancy, as they acknowledge that only 5
percent of the waste is combustible. But to come up with their estimates of the value of this
USD 1.5 billion opportunity, they use data from the task force report which has a completely
different idea of how WtE facilities will work. Regardless of these discrepancies, one thing is
clear: there is potentially a massive business opportunity here and one would be a fool not to
take it. It is too soon to say whether that has happened yet or not. But the attendance of
foreign and domestic firms (even those who do not yet have experience in this particular
sector) at various WtE industry conferences signals their interest.

Industry interest in expanding their business is par for the course. As mentioned previously,
WtE is enticing in practical terms for sure. But there is a less tangible, ideological reason for
its emerging popularity in India as well. And the industry capitalizes quite well on the
ideological promise of modernity that WtE brings.

WtE and the promise of modernity

In discussing technological networks of water flows in urban areas, Kaika and Swyngedouw
(2000) describe a "shift from celebrating urban technological networks in the beginning of
modernity to their subsequent underground burial during high-modernity" (p. 122). During
early modernity, urban infrastructures were "'urban fetishes' . . . 'compulsively' admired and
marveled at, materially and culturally supporting and enacting an ideology of progress . . .

The subsequent failure of the 'ideology of progress' is paralleled by their underground

disappearance during high-modernity" (*ibid*.). Waste and its urban infrastructures in

contemporary India are different from the water networks that Kaika and Swyngedouw

describe, both in the "economic/functional role" and "aesthetic/ideological and cultural

position and representation" (*ibid*.). While similar to water, new infrastructures of WtE

attempt to render waste flows invisible, to recast the urban in the image of "the new utopia"

into an "ideal city . . . clean and sanitized" (*ibid.*, p. 134). However, WtE infrastructures also

promise an aesthetic modernity, not dissimilar from the "phantasmagorical" qualities that

water infrastructures possessed as "fetishized objects of desire" in early modernity (*ibid*., p.

130-131). In this section, I am going to examine three inter-related aspects of the promise of

modernization that WtE brings: technological, environmental and social.

WtE industry proponents often invoke science and modernization in opposition to

ideology/politics and backward traditions to justify their claim to the waste management

service market in India. The idea that a search for waste management solutions in India must

be rooted in "robust research and agile policy" as opposed to ideology and politics is used by

WtE industry to claim technology-neutrality in its lobbying for WtE solutions,

"[R]esponsible management of wastes must be based on science and best available

technology and not on ideology and economics that exclude environmental costs and seem to

be inexpensive now but can be very costly in the future" (Kumar and Kumar, 2013, p.1.1).[74]

At a conference, a representative of Ramboll, a consulting firm, takes the approach of

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[74] Ranjith Annepu, a key organizer of the WTERT-India meeting said, "WtE is marred by ideological debate in India versus robust research and agile policy in the West."

debunking "fairy tales" about WtE by arguing that all opposition to WtE is based in myths that can easily be countered through science and scientific "facts" (Brunner, 2013).[75] Public opposition to WtE is explained away by the apparent inscrutability and the irrationality of the Indian mind. A representative from Hitachi Zosen, a WtE technology provider expresses his dismay:

> *I come from Switzerland which is very clean and has very good waste management. I was very surprised when I came to India that nobody likes incineration plants because in Switzerland we have them right in the middle of cities. Even children play right in front of them. So, we realized we needed to change our marketing strategy* (Vogler, 2013a).

Public opinion in India over the validity of WtE technologies is rendered irrational by highlighting that the "West" has thought it out and adopted this technology for rational reasons. India needs to learn and do the same if it is to solve its growing waste management problems and progress like the "West" already has. But it also renders mute any public debate within the "West" over the validity of these technologies by circulating and reproducing images and texts showing successful plants in various European cities. The images serve an aesthetic purpose, highlighting the monumentality of WtE plants as urban objects of desire. Infrastructures of waste need no longer be shunned away to the margins of cities. They fit into the urban landscape, aesthetically and culturally, so comfortably that even children can play in front of them. Commenting on the new WtE facility in Delhi that is about to start operations, Delhi's Deputy Chief Minister said, "It is undoubtedly expensive but we need to do such experiments to make Delhi a world-class city" (Bhatnagar, 2015). To push the point further, Brunner (2013), a WtE proponent, refutes the contention that that "Waste-to-Energy is always a public nuisance and the objective of public refusal" (p. 5). Instead, Brunner argues, the public does not care and perhaps even wants the plant right in

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[75] Opponents such as GAIA (2012) also use a similar "myths vs. facts" logic to argue against WtE.

the middle of the city. Brunner gives us the example of Zurich where a public referendum was held to vote on the placement of a WtE plant in the immediate vicinity of a residential neighborhood. Seventy-five percent of the enlightened and scientifically minded public of Zurich voted in favor. But if the audience thought Zurich is an anomaly, Brunner readily provides examples of other such cases—Bergen, Bern, Nurnberg and two others in Zurich— all of which are in and around cities. Brunner conveniently ignores mentioning any of the past and ongoing struggles against incineration in the "West" or India. In the very city that Brunner was delivering his talk, the WtE facility operator was being taken to court by communities in its vicinity because toxic emissions from the facility were posing a serious health hazard. The case had just been transferred from the local court to a national one. When a representative of a waste picker NGO, All India Kabari Mazdoor Mahasangh (AIKMM) cited public opposition in Spain against WtE, he was laughed at for suggesting that Spain compares in any way to the rest of Europe. The Spanish and the Indians can revel in this fleeting moment of solidarity of shared "irrationality" and "backwardness." Meanwhile, the WtE industry is not shy about admitting that the "scope of these projects has to be reduced. It cannot be the same as in Europe" (K. Rao, 2013).

Reminiscent of Rostow's linear theory of modernization, proponents of WtE technologies deploy the idea of the centrality of modern waste management solutions in India's march towards "development" often drawing upon evidence from the history of environmental and sanitation developments in the "West."[76]A representative of Hitachi Zosen demonstrates humanity's linear progress towards modernity through two figures: one that maps the development of waste management infrastructures against an economic indicator (GNI per

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[76] This is of course not unique to India. Such a discourse was applied to the introduction of incineration technology from Europe to the US also, for instance (Melosi, 1981; Newsday, 1989).

capita); and another that shows a linear timeline of global investment in waste management

infrastructures (K. Rao, 2013, pp. 7-8) (see Figure 9). In these linear histories, time and

degree of socio-economic development are intertwined. The story depicted in these figures

says that as a country develops, so does its infrastructure. But they also say that

infrastructures develop with time. Rostow's specter is immanent.

Figure 9. Linear history of development and adoption of sanitation technologies[77]
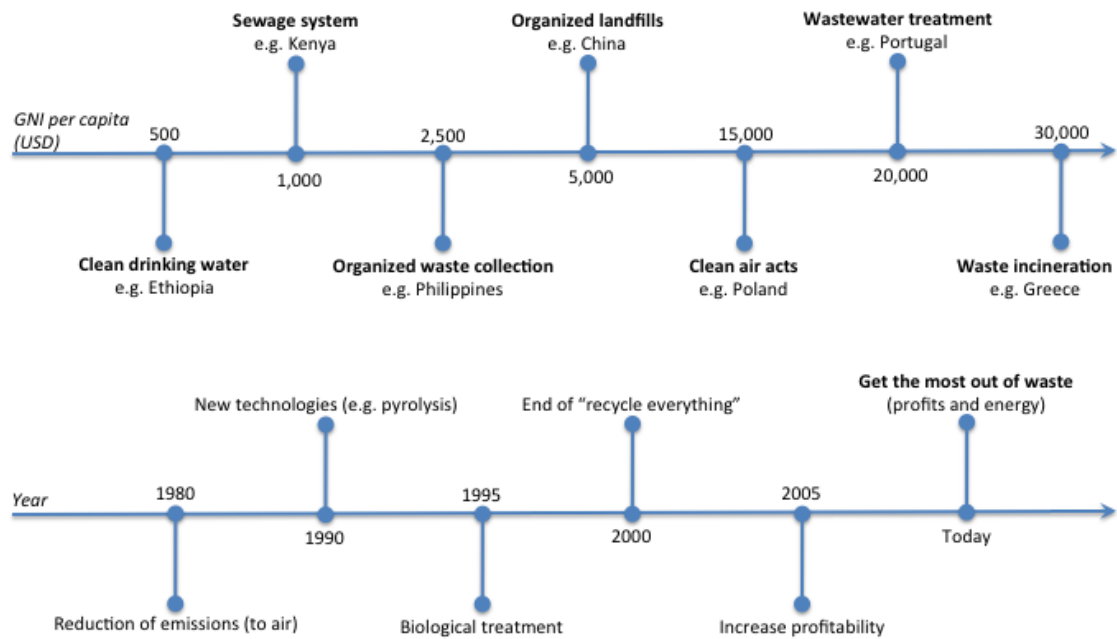
Both figures converge in WtE—the pinnacle of waste management technology, an indicator

of development, progress and modernization. A linear history such as this erases all

contextual differences, and puts everyone on a shared path to progress and development. This

linear path invokes both desire and inevitability. Our shared global history of infrastructure

development in waste tells us so. Profits and energy from waste may be desirable, but they

are also necessary for dealing with the ever-growing problem of waste.

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[77] These figures have been recreated from K. Rao (2013, pp. 7-8).

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At another meeting, a representative of an RDF technology provider provides the following reason for adopting RDF technology in India, "We should do this. Europe has done it" (Bharadwaj, 2013). A representative of Chintan asks why. Everyone in the audience giggles, perhaps at the simplicity of the question or maybe at its cynical tone. The KHD Humboldt Wedag representative simply responds, "Because its possible." Perhaps unwittingly so, Bharadwaj has raised an important concern related to the conditions of possibility of WtE as a technological solution for India's urban waste problems. These conditions are as much ideological as they are material. They are ideological in the sense that they appeal to normative, scientific ideas of rationality and modernity, and material in the sense that particular state-corporate relationships that are mobilized in support of WtE make those technologies possible. Such discourses of science and modernization mask the underlying motive succinctly summed by a representative from Ramky: "Can the Indian waste sector attract private investment and motivate technology participation from abroad?" (Sastry, 2013, p. 16) The question isn't so much whether waste management in India is backward or modern, influenced by ideology/politics or in conformance with international scientific standards, but how conditions for market expansion by private WtE technology providers can be created.

The failure of the Okhla plant continues to haunt hopeful WtE technology providers. In public forums, however, they do not discuss the possibility of increasing the calorific value of waste by removing the pesky informal sector that extracts high calorific materials from it. Instead, they rely on the promise of teleology of development and urbanization. Hitachi Zosen's K. Rao (2013) says, "Urbanization and development increase the calorific value of waste. Past failures with waste-to-energy can be ignored because this is no longer a problem

for megacities." The task force agrees, "Studies conducted by NEERI shows that the waste composition has changed rapidly during 1996-2011 and the proportion of high calorific value waste is increasing. Table 11 shows that there is over 380% and 1650% increase in paper and plastic waste respectively. This calls for serious effort to utilize compostable as well as burnable waste, adopting both compostable and waste to energy technologies" (Planning Commission, 2014, p. 54). Others, analyzing the same data as the task force disagree: "The chemical characteristics . . . show an increasing trend in moisture content. This is most likely due to the presence of a higher proportion of fresh and unprocessed vegetable waste. Although the calorific value of waste has risen substantially in the year 2005, it is still not in the range 'suitable for incineration'. The calorific value reported is on the higher side for the type of waste composition reported and should be further analyzed" (Chattopadhyay, Dutta and Ray, 2009, p. 1450). Hitachi Zosen's Vogler is also less hopeful of WtE's contemporary suitability but for him the future certainly holds promise. If not now, 40 years down the road, calorific values won't be a problem for WtE technologies (Vogler, 2013a). Yet, if the task force's recommendations were to be fully implemented, in 40 years there would be 556 such facilities in India.

Economic development produces the conditions for and the necessity of dealing with its consequences. There is little doubt that the quantity and quality of waste changes over time even if the extent of such changes might be debatable. But economic development and infrastructure modernization are intertwined. WtE is not only an impending inevitability in India's teleological march towards modernity, it is also a necessity for dealing with the problems that this march produces. While urbanization and economic development create the problem of ever increasing quantities of waste, they also lend WtE as an obvious solution to

that problem. If the problem of low calorific value were left entirely to resolution by macro-economic processes such as "development" and "urbanization," there would seemingly be no contemporary struggle over waste. But this is far from the case. The WtE industry and its proponents within the state are not merely passively watching and hoping for the energy content of waste to change over time so the facility operations run profitably. They are actively and coercively creating these conditions by offering control over waste streams and in the process dispossessing those who do not have the political power to assume that control themselves. Waste composition is not only changing with time as part of a natural process of development, it is being made to change.

In India, however, waste to energy faces opposition on environmental and social grounds. Market forecasts recognize this, "The biggest hurdle to success in this market is the opposition that companies are likely to face from environmental activists and non-governmental organizations (NGOs)" (Frost and Sullivan, 2011). Social activists and organizations point to the displacement and dispossession of people through waste-to-energy (see for instance Chintan, 2011 and 2012, GAIA, 2012). Environmental activists point to issues related to public health from uncontrolled toxic emissions from such facilities and that WtE discourages waste reduction, reuse, and recycling in favor of burning waste. WtE proponents must therefore articulate a vision of modernity that responds to both of these.

The waste management hierarchy is often invoked in these debates and discussions. The hierarchy is a broad, widely used framework for informing waste management policy decisions. In the shape of a pyramid, the hierarchy describes policy options in order from most preferred to least preferred: reduction, reuse, recycling (or material recovery), energy

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recovery, incineration (without energy recovery), and finally disposal (or landfilling).[78] A

representative of Ramky, one of the largest waste management service providers in India,

cites US EPA'S integrated waste management hierarchy and Italy's community directives on

waste to show how the developed world has prioritized and given preference to energy

recovery from waste (Sastry, 2013). The argument here is that the developed world's

embrace of this hierarchy signals how modern their waste management systems are. While

WtE opponents use the hierarchy to argue that recycling needs to be privileged over WtE,

proponents deploy it to argue that energy recovery needs to be privileged over landfilling, the

currently dominant mode of waste disposal. But the debate does not end here because they

still need to respond to the environmental argument that WtE goes against the waste

hierarchy. WtE proponents use the hierarchy when it suits their argument and dismiss it when

it does not.

WtE industry proponents couch their response to the dilemma of seeming anti-environmental

in three inter-related ways by arguing for (a) the compatibility between WtE and recycling;

(b) greenhouse gas reductions through and the environmental sustainability of WtE solutions;

and (c) the practical impossibility of zero waste and other waste management solutions such

as composting. In doing so, this response serves three purposes. First, by using "facts" on

how environmentally friendly WtE is, it pacifies those who might oppose it from an

environmental bent. Second, it effectively masks the more important underlying issue of

waste picker livelihoods by shifting the conversation to something more benign. Third, the

set of arguments deployed necessitates WtE as the most obvious, rational, scientific solution

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[78] Dijkgraaf and Vollebergh (2004) question the hierarchy, arguing that landfilling is the social cost minimizing
compared to WtE even though the latter might be better in terms of environmental costs.

to waste management problems in urban India, where all available alternatives are deemed

impractical, existing only in thought as concepts that can never really be implemented.

Consider the Confederation of European Waste to Energy Plants' (CEWEP) stance on the

issue of WtE versus recycling:

> *There is no competition between energy recovery and quality recycling . . . There is no technical, environmental and certainly no economic reason to limit energy recovery of plastics wastes that are not suitable for recycling. Waste-to-Energy is an efficient and effective way to reduce the amount of plastics that is sent to landfill, hand-in-hand with recycling* (CEWEP, 2013a, p. 2).

Two different WtE industry proponents in a meeting display similar graphs that claim to

show that WtE does not compete with recycling. The graphs show the percentage of

recycling, landfill, and thermal treatment of waste in approximately 30 European countries.

The conclusion is that since the proportion of waste landfilled decreases as both recycling

and thermal treatment increase, we can therefore deduce that WtE is not incompatible with

recycling (K. Rao, 2013; Themelis, 2013). The "fairy tale" that "[r]ecycling is always better"

can countered by the "fact" that "[r]igid principles of waste hierarchy (Reduce > Reuse >

Recycle > Recover (WtE) > Dispose) fosters processes which finally are environmentally

adverse (composting, plastic recycling, etc.). Current legislation clearly favors the treatment

process with least environmental impact, which in many cases can be WtE" (Brunner, 2013).

Countering this claim, Villanueva and Wenzel (2007) review 73 separate life cycle

assessments of paper recycling versus landfilling or incineration that have concluded that the

former is better than the latter options. Porteous (2005) similarly says,

> *It is important to take on board that recycling/composting may diminish waste quantities, but have little effect on the calorific value (CV), which is often increased. Daventry District Council's current recycling rate is 44% which consists of 14% materials collection and 30% composted garden waste and cardboard used for the revegetation of landfill cells . . . the CV of the residual waste can increase with recycling. In any case, an*

EfWI plant can cope with a wide range of CV from any post recycling/composting operation (p. 452).

Developed countries have achieved fantastic recycling rates hand in hand with WtE solutions. India could do the same. I am not questioning that this is indeed true in the European context. However, the unquestioning application of this apparent relation between WtE and recycling to an entirely different context is at best naïve. The components of recyclable, non-recyclable and organic fractions of waste in India are likely to be very different than in Europe. Further, what is recyclable in Europe may not be the same as what is recyclable in India. Who recycles how much of what and through what mechanisms in Europe versus India are questions that are not asked. All we are to take away is that we do not have to fear that WtE will affect recycling purely on the basis of the European experience. How that will play out in India is not questioned.

WtE industry proponents also deploy a climate change discourse in their environmental discourse promising ecological modernization through greenhouse gas (GHG) emission reductions. GHG emissions from waste are a matter of concern globally as well as in India, not because waste makes a big contribution (between 3 to 5 percent globally) but because the sector is "in a unique position to move from being a minor source of global emissions to a major saver of emissions" (UNEP, 2010, p. 1; see also Garg et al., 2001; Jha et al., 2008; and Talyan, Dahiya and Sreekrishnan, 2007 for emissions estimates from the waste sector in India). WtE technologies are considered one such way in which the waste sector can become an emissions saver (ISWA, 2009). In a report to the Intergovernmental Panel on Climate Change, Bogner et al. (2007) note, "Incineration and industrial co-combustion for waste-to-energy provide significant renewable energy benefits and fossil fuel offsets. Currently, >130 million tonnes of waste per year are incinerated at over 600 plants (high evidence, high

agreement)" (p. 587). For this reason, WtE projects such as the controversial Okhla facility were approved for CDM funding. The facilities operations manager touts its environmental benefits, "The more (a landfill) will ferment, the more methane gas it will generate and harm the atmosphere . . . We are incinerating the waste so these landfill areas can be reclaimed" (Ferris, 2013). WtE industry lobby touts these environmental benefits. A Hitachi Zosen brochure titled "Waste is our energy" announces, "The recovery of [e]nergy from [w]aste results in an over proportionate reduction of greenhouse gases. The process alleviates the greenhouse effect and thus makes a valuable contribution to climate-neutral energy generation." Similarly, greenhouse gas (GHG) emissions from landfills are often cited as one of the reasons why WtE is a better option (Brunner, 2013).

But while claims of GHG emissions reductions may be valid in developed country contexts, these are not entirely applicable to developing countries (UNEP, 2010). GHG emissions estimates are often based on life-cycle assessment methods that are "primarily focused on scenarios for developed countries" and "the key underlying assumptions on which these assessments are made" do not make the results "necessarily transferrable to other countries" (p. 1). Further,

> [T]*here is general global consensus that the climate benefits of waste avoidance and recycling far outweigh the benefits from any waste treatment technology, even where energy is recovered during the process . . . The informal waste sector makes a significant, but typically ignored, contribution to resource recovery and GHG savings in cities of developing nations* (*ibid.*).

Activists have often used this argument to point out that the work of waste pickers goes farther in reducing GHG emissions than any large scale projects such as WtE that receive CDM funding (Chintan, 2009b; Tangri, 2009). Yet, the WtE industry continues to use this in

their favor and thus far has also received institutional and financial support for reducing GHG emissions.

But WtE proponents must also deal with theoretical and practical alternatives to WtE—particularly waste reduction, zero waste, and composting--suggested by environmental and social activists and organizations. Waste reduction is at the top of the waste management hierarchy. Activists often invoke it to argue that if we are to attempt to solve waste management problems, then we need to as a first step, reduce the amount of waste we produce. Some tie the problem directly to economic growth: "Attempting a clean up without a strategy to reduce growth or redistribute consumption is like trying to mop up a flooded bathroom without turning off the faucet" (Jayaraman, 2014). But WtE proponents are not convinced that reduction is a real possibility. One industry advocate at the WTERT conference noted, ""Reduce" is romanticization. How can you ask me to reduce consumption when government is asking us to consume more and more? Europe and America have been partying for a long time but for India, the party has just begun." Public opinion on the issue of waste reduction is divided, as I will discuss in the next chapter.

WtE proponents dismiss the very idea of zero waste outright. "No waste society" is a "myth" (Brunner, 2013). In fact, "zero waste is not possible; it is mainly an academic term" (Vogler, 2013b). Although circular economies and zero waste may be far from being achieved in practice, governments across the world at local, national and even world-regional levels are increasingly looking towards applying the framework in waste management. The European Commission is in the process of development a circular economy strategy which it plans on releasing in late 2015 (European Commission, 2015). This strategy extends further several existing directives and legislations that call for a move towards a circular economy. Ten of

the largest U.S. cities have zero waste plans and strategies to get there (Bodamer, 2015). Within the developed world, advocates of zero waste and circular economy specifically acknowledge the incompatibility between recycling and incineration (Marx, 2015). While zero waste may remain a lofty goal yet, it is nonetheless being incorporated as part of waste management strategies worldwide.

In theory, composting should not compete with WtE. But large scale composting would reduce the quantity of trash that WtE facilities might otherwise be able to receive. Recall that WtE facilities need to be fed continuously even if it means being fed with lower quality waste. Successful composting at a large scale in India might also eliminate the need for WtE because there just wouldn't be much waste left. But there's also a competition for policy space and financial resources between composting and WtE. The more is allocated to composting, the less is left for WtE. For these reasons, WtE proponents must contend with composting also.

WtE proponents dismiss composting on environmental grounds, and its technical and economic feasibility. That "composting is an environmentally friendly waste treatment process" is a "fairy tale." The "facts" instead are that "composting has been unsuccessful in Europe for the past 30 years, only works for source segregated waste, has massive emissions to air, and marketing is an obstacle" (Brunner, 2013). One WtE proponent compares mercury, cadmium, benzene, PCB, PAH, and dioxin emissions from composting versus WtE and suggests that the latter fares better in each case except dioxins (K. Rao, 2013). A Ramky representative referring to the failure of composting facilities across India simply says, "limitations of compost process as a stand alone solution needs no further deliberations"

(Sastry, 2013). Marketing of compost is a widely recognized problem widely (ASSOCHAM, 2015; Chattopadhyay, Dutta and Ray, 2009; IL&FS, 2010; MoUD, 2012).

But if marketing is one of the primary challenges associated with composting, then so it is with energy from waste also. It is fairly well recognized that energy from waste cannot price compete with traditional sources. WtE proponents often accept this publicly and propose the solution that state simply buys the energy produced from waste at predetermined and relatively high prices (Astrand, 1997; Miranda and Hale, 1997; Schiller, 2011; and World Bank, 1999). Recognizing the problems with marketing compost at a meeting with DPCC, a Chintan representative suggested that the government design a buy-back scheme for compost. The DPCC representative disagreed and said that they will let the market do its thing. There was no need to intervene when the invisible hand could work things out for itself. What for composting is a marketing problem that is allowed to remain a problem or left to the invisible hand to work out, is for WtE an opportunity for the state to intervene and rectify.

Finally, WtE proponents also present a vision of social modernity in which waste pickers are specifically denied a place. Activist organizations often invite public figures to events in the hopes of a show of public support from them. Often many invited public officials may not have otherwise thought about these issues to be able to talk about them in a public forum. A Delhi Member of Parliament (MP) invited to talk about the negative impacts of WtE on the waste pickers said, "I don't know if energy can be created from trash but we have an electricity problem. We also have a problem of children in waste picking. I also know that plastics don't melt." For him, WtE resolves two problems simultaneously: children stop picking waste because they lose access to it and much needed electricity is generated. His

concern about plastics is misguided but likely alludes to the fact that the combustion certain types of plastics releases dioxins and furans. The organization that had organized the event was hoping that the MP would publicly denounce the industry. Instead, unwittingly perhaps, he affirmed the need for WtE technologies.

The economic practice of waste picking is deemed a social problem in India generally. Everyone is quick to denounce its evils as described in detail in earlier chapters. Here, at the risk of repetition, I am going to take a brief look at how WtE industry proponents talk about it. This is important partly because of the form the struggle over waste has taken in this space, one that is directly between the informal sector and the WtE industry over access to waste materials. Defending the Okhla WtE facility, its operations manager says, "The negative part will always be there, the coin has two sides. You can say, 'OK, ragpickers are not getting that much business.' But then in the larger interest of society, I think these incinerator plants are sounding better than maintaining the livelihood of ragpickers" (Ferris, 2013).

At the WTERT-India conference, a representative from Chintan presented the results of a study on the socio-economic impacts of the Okhla WtE plant on waste pickers. This precipitated a lively discussion in an otherwise tedious meeting. During the discussion, a representative of Ramky incredulously asked, "How do we know people were displaced by the WtE plant?" A representative of Hitachi Zosen went a step further. He recognized that people may have been displaced but said, "For the sake of 300 people, we can't sacrifice progress." Other responses were more reflective of general public attitudes towards waste pickers where any defense of their livelihoods is seen as a defense of an archaic profession that should have no place in modern India. A representative of Jindal, the umbrella company

that runs the Timarpur-Okhla plant, asked, "Why do we allow this slavery to continue?" The panel chair, Dr. Vikay Kulkarni of Shapoorji Pallonji Infrastructure Capital Company Limited, declared, "I do not want to imagine a future with ragpickers because it is an exploitative future." Such a response is not uncommon in public discussions around the issue of waste picking. At a separate panel discussion in January 2013, a representative of IL&FS called for abolishing waste pickers. I am not alone in discovering such a discourse by the industry. Forsyth (2005) quotes an Australian investor seeking to establish a pyrolysis plant in Chennai, "[T]here is no manual handling of raw garbage under [this technology]. I am proud of that, and the company is proud to say that we have no handling of raw garbage. Use people to handle garbage? Like hell! Not on my watch. If you want to perpetuate the system where human beings handle other people's raw garbage then I refuse" (p. 437).

That proponents of WtE would deploy a discursive logic of morality is understandable and expected. Waste picking is precarious and risky, so an absolute moral stance against is understandable. But such a stance is also expected from corporations who use morality to stake their claims in a market that is otherwise threatened by the work of waste picking. Calorific value of waste can only increase if waste pickers do not extract high calorific value recyclables from it. Material dispossession requires ideological and moral backing. Discourses of modernity provide it.

As waste management services, waste pickers and WtE do very different things even though the struggle is over the same resource. From the perspective of municipalities, while waste pickers make an important contribution by reducing the waste burden through recycling, waste pickers do not solve the problem of getting rid of the increasing quantities of total waste. WtE technologies provide a solution of getting rid of all (or most) of the waste. But to

do so, they need what waste pickers also need to maintain their livelihoods. Recyclable

materials possess different forms of value for the two. For WtE, the property that makes such

materials valuable is their calorific value, their combustibility, or their ability to transform

from matter into energy. For waste pickers, what makes them valuable is their ability to be

exchanged for money in the market, so that they can later be transformed into new materials.

Social and environmental activists argue for that WtE technologies are not the right choice

for India for two reasons. First, the scale of dispossession and displacement that such a

choice entails. Second, recycling is better from an environmental perspective than burning

those materials as fuel so that the rest of the waste can also burn. But does this mean that the

choice is between either living with massive amounts of waste that we do not know what to

do with or burning it all to get rid of it? This is the choice that municipal managers seem to

be struggling with but this is a false dichotomy.

There are other ways to get rid of the mountains of waste without having to burn it. WtE

technologies that rely on incineration may not be the right choice for India but composting

and WtE technologies for organic waste (e.g. biomethanation) offer real alternatives.

Composting is cheaper and does not compete with waste pickers' livelihoods.

Biomethanation is expensive but also does not compete with waste pickers' livelihoods.

Neither, and composting to an even greater extent, promises aesthetic and technological

modernity as WtE does.

Conclusion

If waste management must begin with knowing waste, its composition, its material

properties, then this is ever more the case with WtE because its processes (and the industry's

profits) rely entirely on the ability of waste matter to transform into energy. There has

recently been a burgeoning of interest in the materiality of waste (Kirsch, 2012; Moore, 2012). The materiality of waste is important. Studies that attempt to quantify and characterize waste attest to the importance of this materiality. Knowledge of waste's properties allows for the possibility of taming an unruly matter that is constantly changing and escaping that possibility.

WtE is emerging as the preferred solution for managing India's waste. The knowledge of waste composition, however, reveals the unsuitability of waste to be transformed into energy as long as waste pickers continue to extract high calorific value materials out of it. This requires that composition of waste be actively controlled through coercive means that privatize ownership of the waste management process to private firms and dispossess waste pickers. The calorific value of waste may be low at the moment but can be increased to fit the requirements of WtE. Control and dispossession are necessary for this to happen. Material properties aren't just so, and they don't just become, but are produced in particular interests. The struggle over waste matter between the WtE industry and waste pickers (and their allies) is a struggle between two competing systems of value production—one in which value lies in waste's possibility of re-incarnation into new commodities and the other in its disappearance and transformation into energy. Energy from waste is as much a commodity as is recyclable material. One requires centralized, capital-intensive technology to produce; the other involves the persistent, quotidian labor of thousands of men, women and children who collect, transport, and segregate waste materials in order to survive. Both rely on material properties but only one requires systematic and coercive control over those material properties. And those forms of control need the support of the state. O'Brien (1999) is instructive: "[I]n order to valorise rubbish-capital, it is necessary to intervene into the

relationships between specific institutions and organizations. Commodification is not a single transformative act that suddenly determines a market price for an object: it is a moment in a complex realignment of institutional relationships that draws on and, in some cases, disrupts, the values of other commodified objects" (p. 288).

The valorization of capital from recyclable materials in waste to energy from waste requires new types of social arrangements between the state and private firms, and results in contestations between environmentalists, waste pickers social activists, the state, and private firms. WtE as we have seen in this chapter offers practical solutions to many of India's problems. It promises to reduce significantly the mounting piles of garbage using a relatively small amount of land and even produces much needed energy. But its popularity also lies in a promise of modernity that stakes its claims in techno-scientific and moral-ideological discourses. WtE plants function aesthetically as monuments of modernity fitting in quite well with the aspirations of world-class city making. They are not only necessary but also inevitable in the country's development trajectory. Meanwhile, waste pickers have no place on this path of progress. They need emancipation from the shackles of precarious and risky work. But as obstacles, they also must be removed in the interest of modern waste management.

In this and the previous chapter, we have seen how waste materials and those who informally manage waste must be disciplined if waste management systems are to modernize. In the following chapter, I examine how those who produce waste must also be disciplined if they are to become modern.

Chapter 5. Old habits die hard? New urban modernities and the making of disciplined subjects[79]

I think our cities have the dubious distinction of being the dirtiest cities in the world. There is no doubt about it. But if there is a Nobel Prize for dirt and filth, India will win it hands down. There is no competition for that and we have to do something dramatic on municipal solid waste.

Jairam Ramesh, Union Environment Minister is noted to have said this at an event organized by The Energy and Resources Institute (TERI) in Delhi in November 2009 (TNN, 2009). According to a journalist for *The Guardian,* his legacy during his time in the ministry left some tough shoes to fill, "Until he took reins of his ministry in 2009, most Indians could not place who their environment minister was or what s/he said or did" (Padma, 2011). On its homepage, an online group—The Ugly Indian—lauds Ramesh's quote among select others, "We salute them for saying publicly what we all know privately! Let's face it. We Indians have abysmal standards of public hygiene. Will The Ugly Indian ever change? Is there any hope?" (TUI, n.d.-a).[80] Indeed, there is hope. The visitor to their website can find out where that hope lies. But they have to accept the following conditions first:

We Ugly Indians are part of the problem and only we can solve it. Explaining ourselves as 'we are like that only' is cute. But does not help. You believe that change is possible in your lifetime. Foreigners may enter - but secretly! We Indians are very conscious of what you think! (ibid.)

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[79] Although I had somewhat recklessly picked this title for this chapter, as I was writing, I noted that the subjects of my research used this phrase repeatedly. For instance, TUI in a news column discussing illegal dumping of garbage says, "Old habits die hard. Rather than wait for collection, people come here and dump like they always used to . . ." (TUI, 2014). Prime Minister Narendra Modi, in one of his speeches encouraging behavior change, says, "Old habits take time to change. It's a difficult task, I know . . ." (Modi, 2014a).

[80] Other choice quotes include what some other noteworthy people have said about the problem of hygiene and public trash in India. Lalit Bhanot, the General Secretary of the Commonwealth Games (CWG) 2010 said, "Indians have different standards of hygiene than Westerners." A "Westerner"—Lucy Ivimy, a London Councillor—agrees, "I know that in India throwing rubbish out of a window and total disregard for the cleanliness of a public area is normal behavior … in London this is not acceptable behavior" (TUI, n.d.-a).

The hope lies within us—the "not-so-ugly Indians"! The next page of the website offers

stories of some key problems and some "successful experiments" that have found "smart

ways of changing our behaviour" (*ibid.*). The site showcases Bangalore's Church Street:

> *This is Bangalore's prime 'fun' street – with over 30 restaurants, pubs, bookstores and entertainment spots. Due to the efforts of a few not-so-Ugly Indians, (see their photos) it has become quite a pleasant, walkable street. It's still not perfect. But it's a whole lot better than it has ever been. More importantly, there is hope that the Ugly Indian can change. Over a dozen 'problem' spots have been 'solved'. Local support has been overwhelming. Maybe, just maybe, we can keep one street in one Indian city clean. It is a small beginning, but we see hope. Do you? (ibid.)*

The Ugly Indian (TUI) is not alone in professing the idea of individual responsibility and

action for addressing India's sanitation woes. In his Independence Day Speech, Prime

Minister Narendra Modi announced that he would launch a national sanitation campaign—

Swachch Bharat Abhiyan—to commemorate the 150th birth anniversary of Mahatma Gandhi

who had "sanitation and cleanliness closest to his heart" (Modi, 2014b).[81] At the actual

launch of the campaign on October 2nd, 2015, Modi asked ministers and senior government

officials to go out in public with brooms and lead the cleanliness effort by example

(Sengupta, Misra and Ittyipe, 2014). Normally a public holiday in India, this past October

2nd, schools and government offices were open so that government officials and school

children could kick off the campaign by taking the following pledge:

> *Mahatma Gandhi dreamt of an India which was not only free but also clean and developed. Mahatma Gandhi secured freedom for Mother India. Now it is our duty to serve Mother India by keeping the country neat and clean. I take this pledge that I will remain committed towards cleanliness and devote time for this. I will devote 100 hours per year that is two hours per week to voluntary work for cleanliness. I will neither litter nor let others litter. I will initiate the quest for cleanliness with myself, my family, my locality, my village and my work place. I believe that the countries of the world that appear clean are so because their citizens don't indulge in littering nor do they allow it to happen. With this firm belief, I will propagate the message of Swachh Bharat Mission in villages and towns. I will encourage 100 other persons to take this pledge which I am*

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[81] Swachh Bharat Abhiyan translates literally to Clean India Campaign. It has since been started to be referred to as Swachh Bharat Mission (SBM).

taking today. I will endeavour to make them devote their 100 hours for cleanliness. I am
confident that every step I take towards cleanliness will help in making my country clean
(SBM, 2014).

There is no doubt that India, particularly urban India, is filthy. Everyone knows it, recognizes

it and thinks that something needs to be done about it. This is not new. Nation-wide

campaigns attempting to address the problem are not new either. Colonial and post-colonial

governments in India have tried and failed to address the problems of hygiene and sanitation

multiple times. Although most agree that the problem is partly infrastructural, there is

widespread consensus that the problem is also cultural, deeply rooted in our "national

psyche," a problem that can only be corrected by building a "consciousness" and inducing

behavior change (Delhi Greens, 2011). News articles in domestic and international media

have discussed the issue of filth and the lack of hygiene as an "inherently" Indian issue (e.g.

see MacMillan, 2012; Raghavan, 2015). Modern India must have modern citizens who do not

trash their surroundings or else "the filth and squalor without will eventually be reflected

within" (Delhi Greens, 2011). Lack of hygiene stands in the way of India's seat on the world

stage. We need to change, stop littering, and become modern. The responsibility is ours.

At the same time however, there is no doubt that India faces a severe deficit in waste

management infrastructures (see chapter 2 for a discussion of this issue). Reports of the

government, media, and environmental organizations and activists equally bemoan the

inadequacy of existing financial and administrative/technical resources against ever growing

requirements. Existing landfills have reached or in many cases even exceeded their waste

carrying capacities. Land within cities is becoming increasingly expensive and reports of

outlying villages protesting when new dumps are planned in their backyards are rampant all

across India. Simply put, there is no space to dump waste. Space is one issue.

Transportation, treatment and disposal facilities suffer from lack of funds and the appropriate technical, engineering, and administrative capacities required to run them. Waste to-energy plants lie dysfunctional. Compost plants produce poor quality compost and even if they produce good compost, they have no customers for it. Landfills are by and large giant open dumps that pollute the air as decomposing trash releases methane and ground water as toxic leachate permeates beneath the surface. Yet, popular initiatives such as SBM target the problem as one that needs individual behavioral change solutions, not infrastructural ones.

This chapter examines two solutions to the problems of waste in urban India. Both place responsibility of the individual and require behavior change—a break from the habits of the past and the development of a new disciplined modern citizen subjectivities. One of these is the responsibility of not littering in public and assuming the responsibility of cleaning up public spaces: SBM and TUI are examples of such a solution. The other is slightly different, asking households to separate their waste at source before handing it to the waste collector. Segregation-at-source is considered a vital foundation for improving waste management systems. The act of separating household trash provides pure waste streams that can be processed/treated through applicable technologies, systems, and processes. It also makes work safer for those handling the trash. Both solutions involve voluntary labor on the part of individuals in pursuit of a common good. Both also represent the formation of a new kind of a disciplined citizen-subject and a particular vision of urban modernity. These are obviously good things. But as this chapter will show, both also involve the erasure of existing labors that were already largely invisible, the labors of women and domestic help at home, and the labors of formal and informal sanitation workers outside. Both also rely on static notions of culture that reinforce hierarchies of gender, race, class and caste. In this chapter, I hope to

show how such a reliance on an ontological black box of culture makes visible the voluntary labor of the privileged and tries to erase the economically necessary labors of the marginalized (Mitchell, 1995).

Framing the issues: A review of the literature

In her seminal work, Mary Douglas (1966) argued for seeing dirt or filth as "matter out of place." Notions of hygiene are not fixed. Instead they vary across spatial and temporal contexts (see also Jewitt (2011) for a comprehensive review of the literature on this subject within geography and other disciplines). Douglas' work challenged normative Western ideas of pollution and argued against fixing responsibility for cleanliness or filth to a group's cultural or religious affiliations. Yet, popular narratives and explanations of contemporary urban filth in India rely on normative notions of hygiene and ascribe responsibility to the collective habits of individuals or their 'culture'. No doubt standards of hygiene are necessary. Lack of sanitation is associated with myriad public health problems. But they are also simultaneously moral and ideological in that they seek to transform individual and collective actions in line with normative ideas of modernity. In Nichols' (2008) words, "the need for sanitation is conflated with the moral demand for purity" (p. 472). But where does this demand for cleanliness come from? Two inter-related strands of theory try to explain the roots of this demand—one that focuses on colonial and subsequent nationalist desires for standards of modern hygiene and another that focuses on the rise of new kinds of subjectivities under neoliberalism.

Following Foucault (2009), some scholars have argued that colonial discourses and practices of public health acted as technologies of government designed to discipline subjects (Anderson, 1995; Kupinse, 2005). These colonial projects were readily available to be

transformed into projects of modern nation building in the post colonial period but largely failed to achieve the standards, norms and practices of urban hygiene that they set out for themselves (Chakrabarty, 2010; Mukhopadhyay, 2006). Many have been thinking about and trying to explain the apparent paradox between highly sanitized private spaces and filthy public spaces in India (Kaviraj, 1997; Milner, 1987; Nagarajan, 1998; Srinivas, 2002). But the "outside" is not equally filthy. Dirt and disorder persist in public spaces alongside capitalism's modern monuments that provide highly sanitized environments of recreation and consumption such as malls for the very few that can afford them. Chakrabarty (2010) offers an explanation for why people in India "have not heeded the nationalist call to discipline, public health and public order" (p. 544). Their "refusal to become citizens" and participate in the "universal" collective desires or rituals of modern public life, Chakrabarty argues, is a result of capitalism's inability to deliver its "pleasures" or its "cultural goods in sufficient quantities" (pp. 544-5). The universality of hygiene and sanitation is far from a "self-evident fact" for those who cannot participate in these spectacles of capitalism (*ibid.,* p. 545). The subject cannot be disciplined because the justification for that discipline is largely irrelevant for that subject. Kaviraj (1997) similarly argues for seeing such insubordination and defiance against middle class moral restraint as "a way of registering a complaint against the stable condition of economic inequality" (p. 112).

Chakrabarty (2010) ends his article with a short story about an interaction with a young boy who he had once told not to throw rubbish on the street in Calcutta. The boy defiantly littered and asked Chakrabarty cheekily, "Why not? I suppose that you like to think we live in England, do you?" (*ibid.*, pp. 545-6). Folks like the boy in Chakrabarty's story are precisely the subjects of national and local campaigns of urban cleanliness that focus on inculcating

behavior change. Contrast this boy and people like him with those who volunteer to clean urban public spaces such as those in the group The Ugly Indian (TUI). While the boy needs to be disciplined, TUI has disciplined itself. While Chakrabarty (2010) and Kaviraj (1997) have urged us to reflect on the former as a historical condition, Mukhopadhyay (2006) might urge us to see the latter as a grassroots approach that has been partially successful as top-down approaches continue to fail. He might see this as an example that shows "that there are other authorities apart from and above those we commonly associate with civil society in liberal democracies: namely, the state, the municipality and so on" *(ibid.*, p. 227).

But there is another way to view those that have disciplined themselves and those that need to be disciplined. Both are neoliberal subjects. The changes in subjectivity associated with neoliberalism that normalizes a certain kind of entrepreneurial and consumerist individualism has been the subject of much research (e.g. see Barnett (2010) for an overview). In India, much recent research has focused on the relationship between the state and civil society, particularly the relationship between processes of urban restructuring and middle class subjectivities and collective actions. According to some scholars, the middle classes dominate the domain of civil society in India and do not necessarily concern themselves with the problems of the poor (Chatterjee, 2004; Harriss, 2007).

Civil society organizations have stepped in to fill in the gaps in public service delivery—such a retreat of the state is considered one of the hallmarks of neoliberalism. But increasing relegation of public services to certain kinds of civil society organizations hasn't entirely meant that citizens have accepted the retreat of the state unconditionally (Chandhoke, 2005). One of the ways of asserting claims to the state has been through the judiciary, through public interest litigations (PILs). The judiciary is increasingly acting as a "rudimentary public

sphere" where "civil society and state act in a rational, critical, and rule-bound" manner (Dembowski, 2001, p. 3). But critics argue that the judiciary and its rulings in PILs protect corporate and middle class interests at the expense of the interests of the poor and the environment, precisely the opposite of what PILs were intended for (Bhushan, 2009; Véron, 2006).

Civil society or middle class activism over urban environmental issues are not necessarily environmentally effective or socially progressive and indeed are even violent against the poor at times (Baviskar, 2003; Bhan, 2009; Gandy, 2008; Ghertner, 2012; Mawdsley, 2009; Menon-Sen, 2010; Truelove and Mawdsley, 2011). Fernandes (2004) has termed this process a "politics of forgetting" which she defines as a politico-discursive project in which the middle classes have been effectively able to engage the state in urban restructuring processes from which the poor are displaced in order to create and maintain urban spaces in the interest of those classes (p. 2416). Baviskar (2003) has similarly termed this process bourgeois environmentalism, "an organised force" whereby upper-class concerns around aesthetics, leisure and safety have come significantly to shape the disposition or urban spaces" (p. 90). However, many have suggested that the middle classes are heterogeneous and spatially differentiated enough that it does not make sense to refer to them as a middle *class* but rather as middle *classes*. (Mawdsley, 2004; Ranganathan, 2011; Sridharan, 2004). Nonetheless, despite their heterogeneous and differentiated character, as a class or as classes, the exercise of power in the restructuring of urban spaces cannot be denied.

In the case of sanitation services, Chaplin (1999) has argued that the current state of poor sanitation in India can largely be explained by the lack of middle class pressure for sanitation reform because of their ability to monopolize basic services that they are able to exclude the

poor from accessing. On the other hand, as we have seen in previous chapters, PILs such as *Almitra Patel vs. the Union of India* lay testimony to the power of middle class activism in claiming access to sanitation services from the state. Chaplin (1999) might have spoken too soon because the year that her article was published was the same year that the first set of national rules governing the management of municipal solid waste were passed as a direct result of a Supreme Court judgment in the PIL.

If activism has been the dominant way to assert class interests in the cleaning of urban spaces thus far, then a new way is also quickly emerging. This new way is characterized by a responsibilization of the individual whereby their behaviors require new forms of discipline such as by segregating waste at home, not littering in public or by participating in group volunteer efforts to clean up public spaces. In the remainder of this section, I contextualize these three behavior change strategies within a diverse set of existing literature.

Recycling is a modern environmental virtue, widely celebrated as an environmental success story even though its efficacy is questionable (Gandy, 2004; MacBride, 2011). Part of being modern, environmentally conscious subjects requires that we embrace recycling "materially and spiritually" and "help advance the sustainable, community-building, natural harmony it promotes" (Hershkowitz, 1998, p. 212). So powerful and pervasive is such a rhetoric that recycling is now "an end in itself, an activity," complicit in reproducing the very same problems it was imagined to address (Horton, 1995, p. 18). To others, recycling as a "commodity-sign", signifies a "crisis of meaning" that allows poor waste management practices to continue (Liboiron, 2010). If recycling is an industrial process of resource recovery, then segregation-at-source is its domestic companion enabling those industrial processes by providing raw materials in its service (Anantharaman and Luthra, 2013).

Recycling (and segregation-at-source) both require that the individual or the household be the unit of social change (Liboiron, 2010; Reid, Sutton and Hunter, 2010). Recycling is one of the behaviors that signal our transition from a mindless consumer-citizen to a "green" consumer-citizen (Peattie, 2010). Indeed, a lot of research has focused on finding the best ways to encourage recycling behavior (see for instance Hopper and Nielsen, 1991; Hornik et al., 1995; Iyer and Kashyap, 2007; Schulz, 2002; Vining and Ebreo, 1990; and Viscusi, Huber and Bell, 2011 among many others). An examination of this wide-ranging literature from different disciplines compels us to think about individual or household recycling (and waste segregation-at-source) behaviors not as normative virtues, but as those that can be better understood within their politico-economic contexts. Just as recycling requires self-discipline exercised within the private domain, volunteering to clean up public spaces requires a different kind of self-discipline exercised visibly and publicly.

Many scholars have explored the relation between volunteerism and neoliberalism arguing for seeing its rise as a result of "roll-back" of the state locally and globally that produces the need for volunteering against a background of an uncertain economic future in which volunteering is constructed as a professional development opportunity (e.g. see Lorimer (2010) and Smith and Laurie (2011) for an analysis of international volunteering; and Bloom and Kilgore (2003), Gramberg and Bassett (2005), Perkins (2009), and Rosol (2012) for an analysis of local volunteering). Newman (2013) shows how middle class residents exercise "vigilant citizenship" by assuming the traditional municipal role of managing and overseeing an urban park in Paris against "unruly" immigrants (p. 948). This rich literature has not only allowed us to understand the politico-economic context behind the emergence of volunteering but also cautioned us to its limits. It is against the background of this literature

that I will examine the rise of groups such as TUI and the emergence of nationwide

campaigns such as SBM. Volunteerism in India has a long history rooted in culturo-religious

practices such as *kar seva* and *shram daan* that have recently also been invoked to incite

communalist violence against Muslims (Deshpande, 1993).[82] Indian nationalists and social

reforms encouraged volunteerism during the colonial period. The post-colonial period saw

the emergence of volunteer organizations to fill in gaps in state service delivery (Salustowicz,

Dutta and Ramanathan, 2014).

Dirty public spaces in India are as much a result of the state's inability to provide appropriate

waste management infrastructures as they are of purported cultural predispositions. Littering

has long been treated as a behavioral problem that needs to change (see for instance Burgess,

Clark and Hendee, 1971; Cialdini, Reno and Kallgren, 1990). Milea (2009) argues that

attitudes of Delhi residents towards littering and source separation of waste can be explained

by their moral norms which she elicited by asking a series of questions about her subjects'

sense of responsibility towards their waste. Perry, Juhlin and Normark (2010) argue that

when viewed as a socially deviant behavior, "natural surveillance" acts as a deterrent against

littering. In contrast to psychological modes of behavior analysis that place responsibility on

the litterer alone, "public trashing . . . is shaped by the actions and interactions of multiple

individuals, and not just the trasher" (p. 91).

However, strategies to address littering as a problem focus on education and awareness to

induce behavior change among a previously uneducated and unaware populace that is also

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[82] *Shram daan* and *kar seva* both translate to donation of physical labor or voluntary work. While the former is attributed to Gandhian philosophy, the latter is a Sikh tradition that was most recently famously invoked by the Hindu right wing in the demolition of an ancient mosque in Ayodhya. Both concepts have been invoked as part of SBM to encourage people to perform the voluntary labor of cleaning public spaces. For instance, the Lieutenant General of Delhi, in his own take on supporting Modi's SBM, polished shoes of devotees at the largest Gurudwara in Delhi on the day of the campaign's launch (India Today, 2014). In doing so, he attempted not only to show his support for the campaign, but he also erased the term's recent communally violent history. How polishing shoes contributes to cleaning India is anyone's guess, however!

burdened by its "culture" of indifference. For instance, Milea (2009) recommends, "As for ways out of the problem, it is suggested that public campaigns should emphasise residents' responsibility for their waste and the importance of each and every citizen's cooperation, thus creating a sense of a shared social goal around solving the waste problem" (p. 2). Perhaps Milea's recommendations follow her simplistic framing of the problem: "waste problem is caused by human behaviour and therefore the solution lies in changing that behaviour" (*ibid.*). But Milea is far from the only one suggesting such solutions. For instance, Ohnesorgen (1993) notes, "We need to show people in developing countries how to use garbage cans . . . [W]ith proper citizen education, people will learn to use them because it is in their own best interests" (p. 12). As this chapter will show, such calls for behavior change lie at the heart of the ideology of groups such as the TUI and campaigns such as the SBM. As Kaviraj (1997) has written, such a "transition narrative" where "[g]iven time, training, incentive, goodwill, they [people living in colonial or neocolonial modernity] would learn the new universal practice of modernity" is conceptually flawed (pp. 112-3). Transition narratives assume a stable, singular modernity to which we teleologically tend towards and in the process "blind us to the responsibility of looking at the shapes and forms our modernity is taking" (*ibid.,* p. 113).

In this chapter, I intend to show what shapes and forms seemingly benign causes such as cleaning up cities blind us to, pointing to the invisibility of labor and laborers that currently perform that work (Nagle, 2013). Those who are marginalized and oppressed due to their class, caste and gender often perform the work of waste. That formal and informal workers in waste are often from among the poorest of the urban poor in India is well known. As discussed in the previous chapters however, there are marked socio-economic differences in

the type of waste work one is engaged in. In the formal sector, municipal employment is a highly coveted job because of the income security it affords. Municipal sweeping as an occupation is dominated by particular castes, sometimes referred to as the "untouchables" (Prashad, 2000). Contract work is less secure and desirable but there is an increasing trend among municipalities to replace employees with contract workers which allows for flagrant violation of labor laws. Even as cleanliness is a normative marker of neoliberal modernity, those whose labor is required to create and maintain those clean spaces is becoming more precarious (Tomic, Trumper and Dattwyler, 2006).

Within the informal economy, the type of work is a signifier of social class and caste categories. Itinerant buyers of recyclables deal in high-value, dry, and clean waste commodities are typically wealthier and of a higher caste than waste pickers who have to work with mixed, dirty garbage to extract recyclables (Gill, 2010; Koberlein, 2003). Workers at the landfill typically earn less than those who collect garbage from the doorstep. In Delhi, women typically are more involved in the work of waste segregation at home while men dominate the "outside" work of collecting. This differs across cities in India however. Within the home, women also work with waste in a different sense. Women are the ones who are often responsible for what happens to the waste that is produced in the household, how it is stored, treated and disposed, so much so that sanitary reform in the early 20th century in the U.S. was supported by women's groups and described as municipal housekeeping (Melosi, 1981). But as Schultz (1993) has argued in her analysis of changes in municipal waste systems in Germany that required increased labor of source segregation, women's unpaid labor at home instead of simply being necessary for reproducing human labor power, has

become a "direct component of the production process and the accumulation of capital" (p. 63).

The invisible work of these invisible workers allows cities to maintain their metabolic functions of consumption and excretion, however imperfectly. However, as Anantharaman (2013) has argued, the new middle classes in Bangalore, India are increasingly engaging in voluntary pro-environmental waste management behaviors such as recycling and composting that require the necessary labor of those who depend on waste for their livelihoods yet fail to recognize their contributions. I extend Anantharaman's (2013) analysis in two ways. First, I scale the examination up to the national level by looking at two initiatives—SBM, a state sponsored campaign that is nationwide in scope by design, and TUI that has become reached a national scale through an organic expansion process that continues to be restricted to middle classes. Second, while Anantharaman (2013) focuses on household behaviors, I examine the underlying ideological underpinnings of individual, household and collective actions in three seemingly disparate activities and campaigns against littering, for source segregation, and voluntary cleanups of public spaces.

Locating responsibility for waste

If individual responsibility is one of the hallmarks of neoliberal ideology, then it behooves us to explore how individuals themselves imagine such responsibility. For my research, the specific responsibility in question relates to that of waste management. Others have been similarly concerned with this question albeit for different reasons, primarily with the goal of finding the best ways to encourage more responsible waste management behaviors. In this section, I examine the notion of responsibility for waste as evidenced from the results of questions posed in three different surveys. The questions are important in and of themselves

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as they not only influence responses but also uncover the intentions of those who ask them. Each of these surveys ask the respondents a set of questions about who they think is responsible for waste management in slightly different ways. Admittedly, surveys such as these provide limited information but in the absence of alternative research on this subject using different methods, I am using these surveys to supplement my analysis that follows in the subsequent sections. The Energy and Resources Institute (TERI), a Delhi-based environmental think tank, as part of their annual TERI Environmental Survey across eight Indian cities (TERI, 2014), conduct the first of these. Another was conducted by a Lund University master's student as part of her thesis research in Delhi (Milea, 2009). And Chintan, a Delhi-based NGO, conducted the third, in the design and execution of which I played a key role. Since I have access to the raw data for the third set of questions, I was able to disaggregate and analyze it in more detail than the other sets.

TERI surveyed a total of 11,214 individuals across eight urban agglomerations and asked their opinions on overall environmental issues, water and waste and waste management (TERI, 2014). Three questions on this survey are relevant to the issues being discussed in this chapter:

- "According to you, which amongst these is the best strategy to manage the problem of solid waste/garbage? (1) Generate less amount of waste in the house; (2) Segregation of waste; (3) Improve recycling capacity; (4) User charges (charges for amount of waste generated, e.g. in kilograms or the number of bags collected); (5) Other (Please specify); (6) I don't know" (p. 122);

- "Are you willing to segregate your waste (into biodegradable and non-biodegradable component) before disposing it?" Response options were limited to "Yes" or "No" but also asked the reasons for the particular response choice (p. 122);

- "Who do you think should have the greatest responsibility for disposing of city's solid waste and garbage? (1) Individuals/households; (2) Municipality or other government departments/agencies; (3) Private companies; (4) All of the above; (5) Other (if any), please specify; (6) Don't know" (p. 123).

In the first question, although it is unclear what exactly "segregation of waste" means, it most likely means segregation-at-source rather than segregation in a municipal run material recovery facility. This leaves us with only one response option that is external or outside the control of the individual: "(3) Improve recycling capacity." In this question, it is likely that this option refers to government intervention in some form – although to anyone with a basic understanding of the recycling economy in India, it might be unclear whether the questionnaire is pointing to a municipal action or to the activities of omniscient informal recycling sector. Improving recycling capacity even in the informal sector will require the government to intervene in some way to enable those businesses to function more easily. In response to this question, across all cities about 60% felt generating less was the best way, followed by 25% who felt that waste segregation was the best way. In contrast, 75% of the respondents from Delhi felt generating less waste were the best strategy, about 14% chose increasing recycling capacity and only about 6% chose waste segregating waste as the best strategy.

The second question asks about the respondents' willingness to segregate their waste into biodegradable and non-biodegradable components. Although the survey was translated into

five other languages, the concepts of waste categories might not be so easily translatable. In response to this question, overall more than 50% of respondents were unwilling to segregate their waste. By contrast in Delhi, only about 35% of the respondents were willing to segregate. In both cases, the most oft cited reason for unwillingness was that it was the municipality's responsibility. Other commonly cited reasons were that it was cumbersome to segregate or that it required space that did not have or that it was not worth the effort because waste was not being collected separately in any case.

Finally, the third question asks about responsibility for disposing solid waste and garbage. Arguably, individuals could never be expected to dispose their own garbage. That responsibility does and should lie with the state at least in urban areas. But in the context of municipal failures to do so across the country, the responses should signal popular opinion even though the question is framed somewhat ambiguously. In response to this question, overall about 40% felt that it was the municipality's responsibility, and about 25% each felt that it was the household's or all stakeholders' responsibility. By contrast, respondents from Delhi overwhelmingly (66%) thought that it was a shared responsibility and about 25% thought that it was the responsibility of the municipality. Almost no respondents thought that this was an individual or household responsibility. Further, higher income respondents were much more likely to fix responsibility with the municipality (about 41%) as compared to medium and low-income respondents (14% and 20% respectively).

Adriana Milea, as part of her master's thesis on the management of waste in Delhi, conducted a survey of 99 city residents (Milea, 2009). The questions relevant to my research are:

- "How can you contribute to solving the garbage problem? (Please circle the answers you think are relevant, you may circle as many answers as you like): (1) By not throwing garbage on the street/roadside; (2) By segregating waste at home into biodegradable and non-biodegradable waste and therefore contributing to recycling and composting of waste; (3) By producing as little waste as possible; (4) By informing others about the waste problems; (5) By educating my children about the waste problems; (6) Other" (p. 54);

- "Which of the following best describes how you feel about managing household waste? (1) Managing waste is the local government's responsibility, not mine; (2) Managing waste is first the local government's responsibility, then mine; (3) Managing waste is equally my responsibility and the local government's; (4) Managing waste is first my responsibility, then the local government's; (5) Managing the waste I produce is my responsibility" (p. 54).

In response to the first question, not littering (throwing garbage on the street/roadside) emerged as the most commonly cited contribution to solving the garbage problem, followed by educating children and informing others. Producing less waste and segregating emerged as the lowest priorities for individual action. The term "garbage problem" is ambiguous; it does not specify what exactly the researcher wants the subject to think of in terms of the scope of the problem but it does limit their responses to specific individual actions. The results speak as much to the intent of the researcher as they do to the individual priorities for action to solve that particular problem. In response to the second question, almost 47 percent of respondents thought that household waste management was equally the responsibility of the individual and the local government. Another 34 percent thought that it was primarily the

responsibility of the individual and then the local government's. Compare this to how a similar question was framed in the TERI survey: While here the only two actors at play are the individual/household and the local government, the TERI survey had added "private companies" as a third actor. While very few respondents actually selected this actor as one that has responsibility, it points to a lack of assessing public opinion on the responsibility of government contractors as service providers especially in the context of public services increasingly being outsourced.

The third survey was conducted by Chintan as part of a project that aimed to develop a participatory solid waste management policy for Delhi jointly funded by the Department of Environment, Government of the National Capital Territory of Delhi and Deutsche Gesellschaft fur Internationale Zusammenarbeit (GIZ). The survey gathered data on 3,047 households across socio-economic categories and four municipalities within the city. The following questions from this survey are immediately relevant to this research:

- The first of these does not ask about waste in general but about specific types of waste that are toxic and harmful. Although this does not permit for easy comparison with the other two surveys that ask a broader question about waste, nonetheless, I think an analysis of the responses to this question is useful because it demonstrates how people conceive responsibility for the management not of waste in the abstract but of very specific types of waste: "Certain kinds of waste are toxic and cause harm. Do you think the following should be responsible for the proper disposal of such waste? (1) Government; (2) Producers whose products generate such waste; (3) Consumers of such products such as you." For each of the selections, respondents were allowed to choose between "Yes," "No," and "Don't know" response options. In

other words, respondents didn't have to choose one actor over the other but instead say whether each of those actors should assume responsibility on their own account.

- A second question asked respondents to specify "True" or "False" for a series of six statements. One of these statements was "Reducing consumption, and therefore waste, is not an option for India at this moment on its path of economic progress." Although this statement does not directly ask about individual responsibility, it prods the respondents to think indirectly about the collective responsibility of "citizens" as "consumers" and the part they play in it.

- A third set of questions asked respondents to state their agreement with a set of 15 statements. Three relevant ones in this set were: "I am willing to segregate my waste to make recycling more efficient and to safeguard the health of workers"; "Reusing more things is better than buying new things"; and "I am willing to start composting." Respondents were asked to choose from "Yes", "No", "Maybe" and "Do not know."

On the first question, overall over 70% of respondents felt that that municipality should be responsible, followed by about 50% who felt that producers should be responsible, followed by only 25% who felt that consumers should be responsible. Disaggregating the data by income yields some interesting results. The following series of three graphs describes the results disaggregated by income category using the socio-economic classification system, whereby SEC A is the highest income category and E the lowest (see Chapter 1 for details). The first of these graphs shows differences between income categories to the question of whether or not the government should be responsible for the management of toxic and harmful wastes (see Figure 10). The trend in the graph seems clear: the lower the socio-

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economic category, the higher the proportion of respondents that feel that the government should be responsible (see graph below; chi-square test p-value < 0.001).

Figure 10. Summary of responses to the survey question: "Do you think that the government should be responsible for managing certain kinds of wastes?"
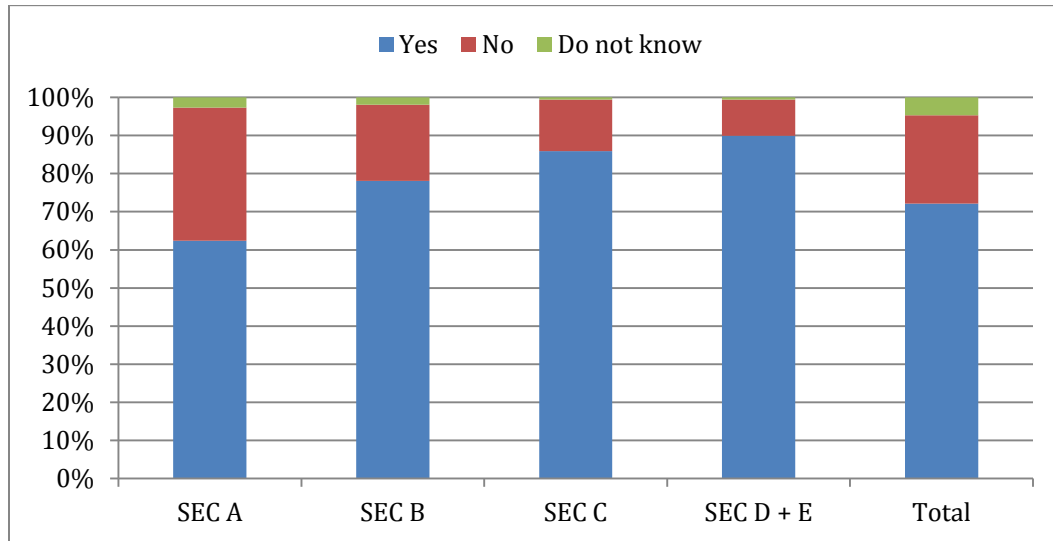
The responses to the question of producer responsibility in the management of toxic and harmful wastes yield an opposite response (see Figure 11). The higher the socio-economic category, the higher the proportion of respondents that feel that producers should be responsible for the management of those wastes (see graph below; chi-square test p-value < 0.001).

Figure 11. Summary of responses to the survey question: "Do you think producers (or manufacturers) should be responsible for managing certain kinds of wastes?"
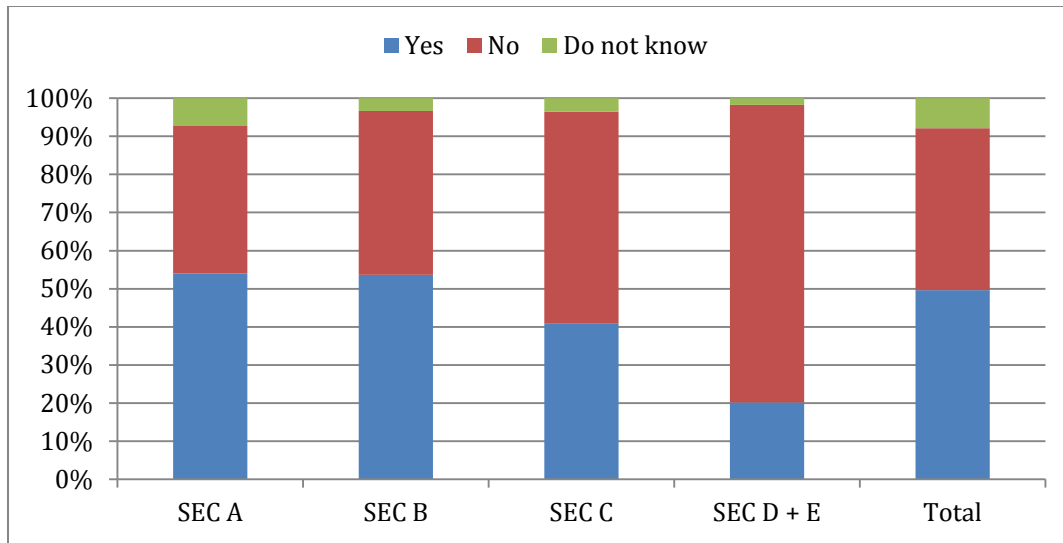
The question of consumer responsibility yields mixed results (see Figure 12). While the lowest and highest socio-economic groups feel that consumers should not be responsible, middle groups are slightly more likely to hold them responsible (see graph below; chi-square test p-value < 0.001).

Figure 12. Summary of responses to the survey question: "Do you think consumers should be responsible for managing certain kinds of wastes?"

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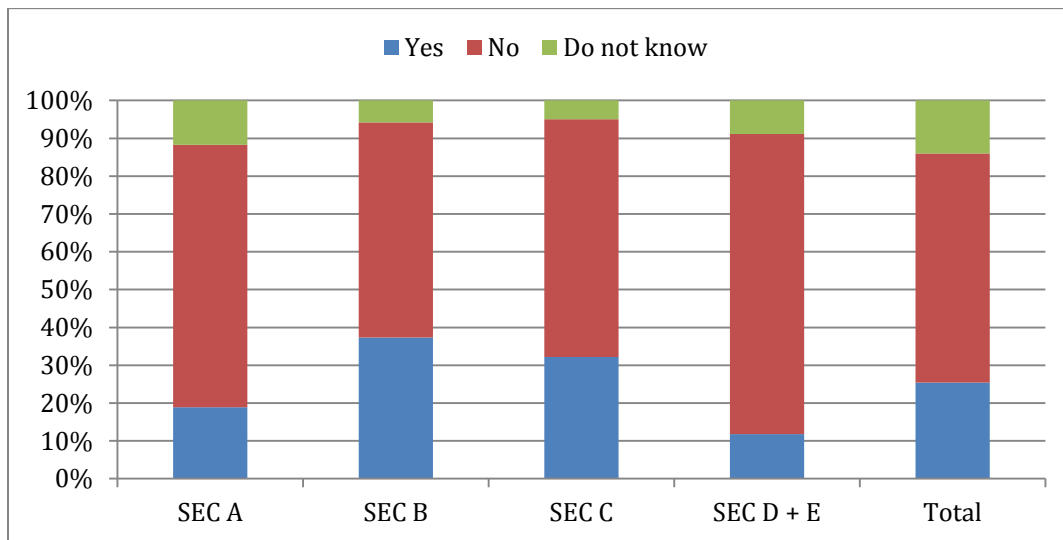
On the second question, respondents were split evenly among those that thought that reducing consumption is a possibility and those that did not (see Figure 13). This varied by income however (between 40% for high-income and 57% for medium-high-income respondents). Highest and lowest income respondents were slightly less likely to agree than medium income respondents on reducing consumption as an option (chi-square test p-value < 0.001; see figure below).

Figure 13. Summary of responses to the survey statement: "Reducing consumption, and therefore waste, is not an option for India at this moment on its path of economic progress."
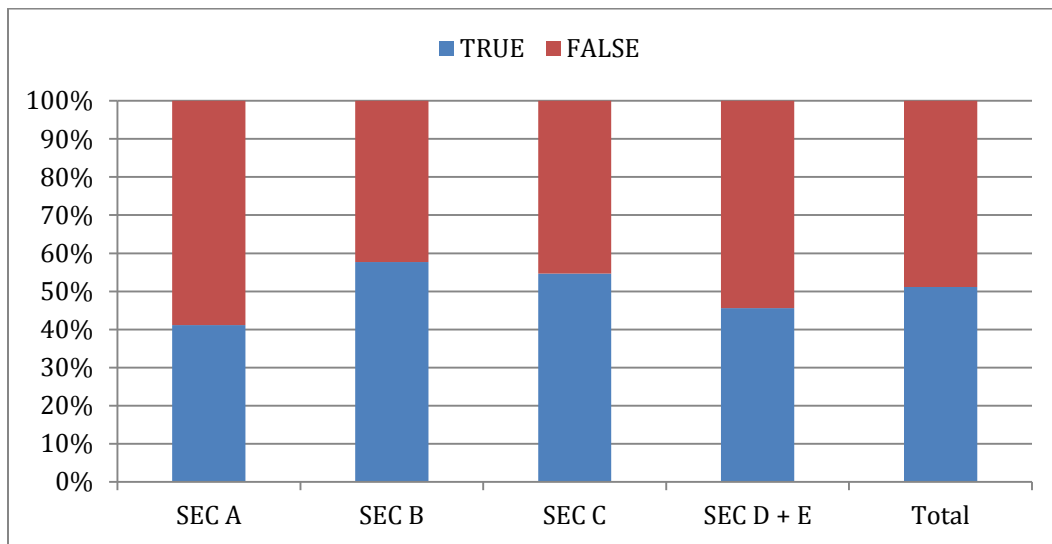
On the first statement in the third question regarding willingness to segregate their waste, over 70% of the respondents were willing (see Figure 14). Here again, middle-income respondents were slightly more willing than low or high-income respondents (chi-square test p-value < 0.001). Between income groups, willingness ranged from a low of about 70% to a high of about 85% (see figure below).

Figure 14. Summary of responses to the survey statement: "I am willing to segregate my waste to make recycling more efficient and to safeguard the health of workers."
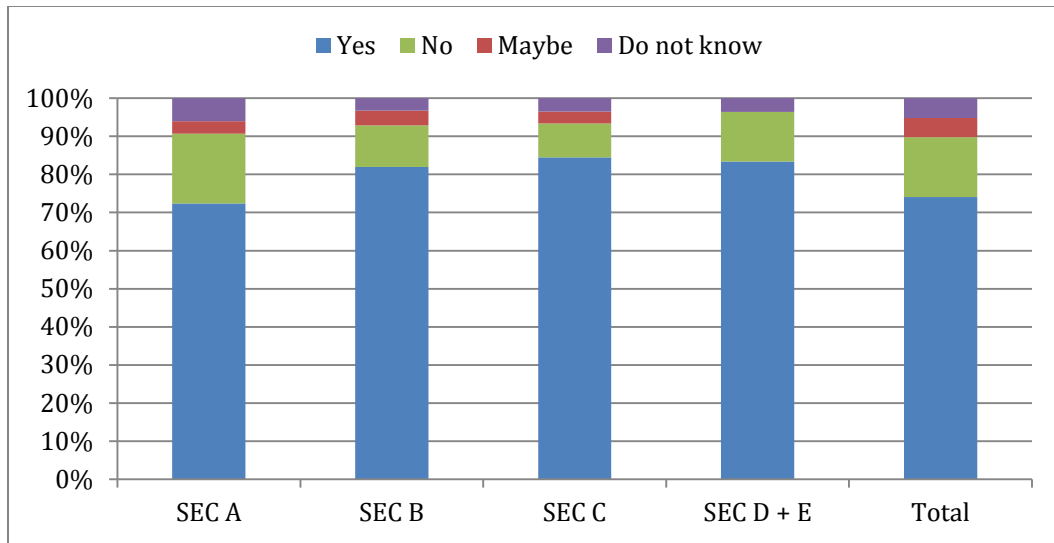
On the second statement regarding willingness to reuse, over 75% of respondents were willing (see Figure 15). Willingness to reuse varied by income with highest income respondents being least willing as compared to other income categories (chi-square test p-value < 0.001). Between income groups, willingness ranged from a low of about 75% to a high of about 85% (see figure below).

Figure 15. Summary of responses to the survey statement: "Reusing more things is better than buying new things."
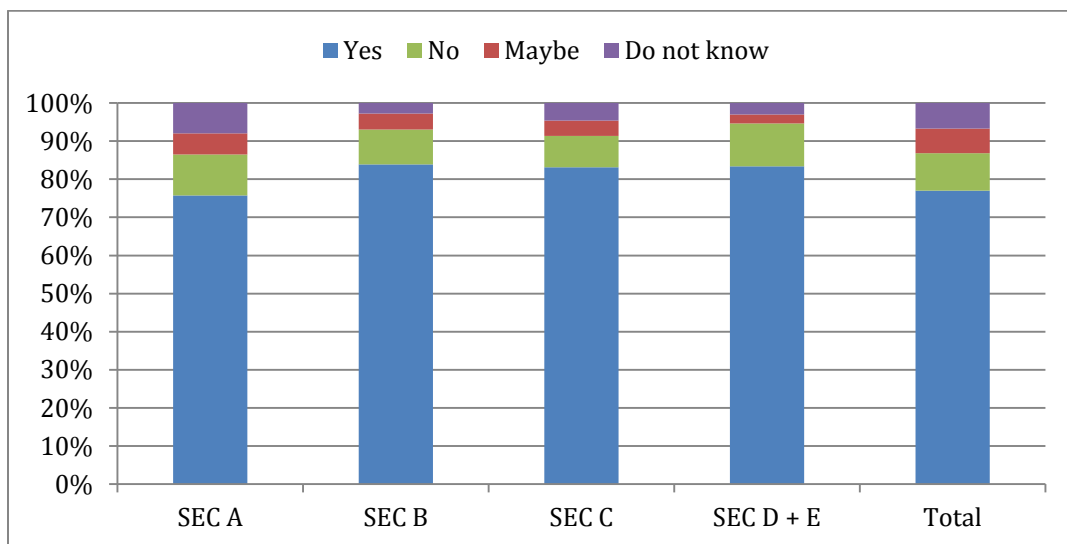
Finally on the third statement regarding willingness to compost, about 70% were willing (see

Figure 16). Willingness to compost also varied by income inversely. Highest income

respondents were least willing and lowest income respondents most willing to compost (chi-

square test p-value < 0.001). Between income groups, willingness ranged from a low of less

than 70% to a high of over 90% (see figure below).

Figure 16. Summary of responses to the survey statement: "I am willing to start composting."
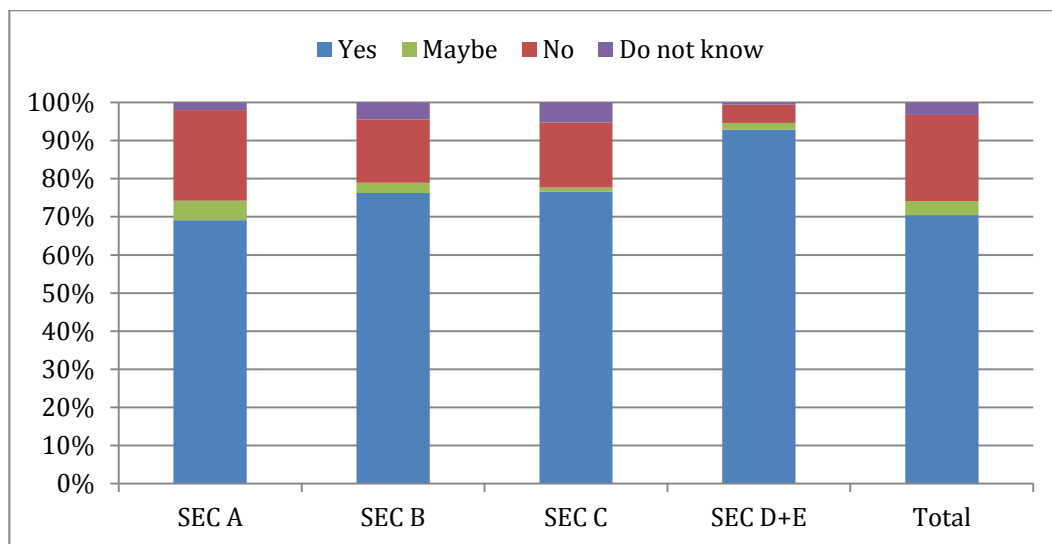
To the extent that surveys reflect underlying popular opinion, the results of these three

surveys are mixed. The results do, however, show that to varying degrees, urban residents

believe in sharing responsibility for waste management between themselves as waste

producers and the government as waste management service provider. The weight of the

portion of the responsibility that individuals assign themselves versus the government seems

to vary with how the question is framed. Additionally, there seems to be little agreement on

the nature of responsibility of individual action but this seems to have been partly influenced

by the set of solution options that the survey designers made available to the respondents.

Overall, the results of these surveys suggest both a sense of responsibility for waste

management among waste producers but also demands for waste management services from

the state among city residents. From the survey results alone, it is not possible to glean the extent to which the sense of individual responsibility is influenced by failures of the state to provide those basic services or by a general neoliberal ideology that fosters particular kinds of civic engagement and moral behaviors. The next sections of this chapter will examine these links using a very different set of methods than surveys.

Voluntary labor and the aesthetics of urban modernity

Recently there has been a burgeoning of activity around volunteering to clean up public spaces. In this section, I examine two such activities. The first of these is the SBM, an initiative of the central government led by Prime Minister Narendra Modi. Although this initiative is much larger than volunteer clean ups alone, volunteering has been one of its most publicly visible programs in the media. The second is the TUI, a much more organic movement of volunteers who come together to clean up public spaces. Although the movement started in Bangalore, it has spread to several other parts of the country. Both TUI and SBM are premised in the idea of visible filth as a signifier of (bad) character, of (im)morality, of (a collective lack of) values—all of which can be rectified through behavior change and individual action.

Swachch Bharat Mission (SBM): The theatrics of the broom

In his Independence Day speech, Prime Minister Narendra Modi, urged his audience "to give a serious thought" to the question of our "national character" (Modi, 2014b). Terrorism, sexual violence against women, communal violence, and public filth are manifestations of flaws in our national character that can be rectified if we realize that not "[e]verything is for self-interest alone" but for the welfare of the country: "Today in the face of global competition, when we have to realise the dreams of millions of Indians, the country cannot

run on the lines of "it happens", "it goes."'" One of the many ways Modi (2014b) wants India

to be globally competitive is through tourism:

> *But there is a big obstacle in promoting tourism and in our national character and that is - the filthiness all around us . . . after so many years of independence, when we stand at the threshold of . . . [the] 21st century, we still want to live in filthiness? The first work I started here after formation of government is of cleanliness. People wondered whether it is [the] work of a prime minister? People may feel that it is a trivial work for a Prime Minister but for me this is big work. Cleanliness is very big work. Can our country not be clean? If [1.25 billion] countrymen decide that they will never spread filthiness, which power in the world has ability to spread filthiness in our cities and villages? Can't we resolve this much?*

To achieve this goal of cleanliness, Modi announced that he would launch SBM on Mahatma

Gandhi's birthday, October 2nd, 2014. Why specifically on Gandhi's birthday? Because

"[c]leanliness was very close to Mahatma Gandhi's heart" and therefore a "clean India is the

best tribute" to pay him back for his contributions (Modi, 2014c). The campaign's logo is

Gandhi's famous glasses with "*swachh*" (clean) on one lens and "Bharat" (India) on the

other, connected with the tricolor of the Indian flag (see Figure 17). The drawing on the left

is Gandhi with a broom. The text in Hindi translates to "Clean India Campaign: One step

towards cleanliness." The logo and tagline were crowd-sourced and winners announced at

the campaign's launch:

> *It was right to the point. I can see, that through these glasses Gandhiji is looking and asking whether we have cleaned India or not. This is not just a logo. Through these glasses he is looking, asking- what have you done? What will you do and how? When will you do it? This is the message of the logo that has Mahatma Gandhi's glasses. They give us the message of Clean India* (Modi, 2014d).

In an earlier message related to the campaign, Modi urged every one "to devote at least

hundred hours every year, that is two hours every week towards cleanliness . . . On 2nd

October I myself will set out with a broom and contribute towards this pious task" (Modi,

2014d). In the campaign inaugural speech, he said, "Sometimes I feel that the job of getting

rid of filth belongs to *safai karmchari* [municipal sanitation workers] only? Isn't it the duty of all the [1.25 billion] countrymen? Will we keep on imposing everything on them? Something good happens or bad, will we keep on blaming them? We have to change this situation" (*ibid.*).

It is well known that Gandhi was obsessed with sanitation and individual responsibility in public hygiene. His famous 1923 quote "sanitation is more important than independence" is often repeated (Mara et al., 2010). He often made connections between cleanliness of the body, the mind and the surroundings as mutually interdependent. He held sanitation as one of the crucial responsibilities of municipalities, but one that could only be achieved through everyone's voluntary or even mandatory labor (Mkgandhi.org, n.d.). At a business summit in January 2015, Modi even co-opted Gandhi's famous term "*satyagraha*" (the struggle for or insistence on truth) for his cleanliness campaign: "The mantra of independence was *satyagraha*. And the warriors were *satyagrahis*. The mantra of New Age India must be *swachhatagraha* [struggle for cleanliness]. And the warriors will be *swachhatagrahis* [the warriors in the struggle for cleanliness]" (Modi, 2015). The term *satyagraha* invokes the philosophy of non-violent resistance that Gandhi famously coined and deployed in the struggle for independence. In Modi's re-incarnation of Gandhian philosophy, the non-violent struggle for independence and against oppression is transformed into one against filth. Just as colonial powers were the aggressors against whom the force of "truth" through non-violent self-suffering needed to be exercised, filth is the new aggressor that demands similar action. Speaking to business leaders at this summit, Modi argued for the economic impacts of cleanliness: averting health costs, developing jobs in waste management, ("*swachhata* entrepreneurs") and through tourism (Modi, 2015). Cleanliness is good for the economy. It

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isn't just a moral imperative but an economic one, and all of us (apparently equally) will reap the benefits from sowing the seeds of cleanliness as the campaign "changes people's mindsets . . . our lifestyles" "becomes a habit" and the "nation gets identified with cleanliness" (*ibid.*).

Figure 17. Swachh Bharat Mission logo and tagline[83]

Although Modi does not directly mention this in his speech, Gandhi's particular relationship with cleanliness had also to do with his caste politics. The historical relationship between caste and sanitation work was to him something that could be dismantled by taking on responsibility and the labor of sanitation work upon ourselves, particular as upper caste members of Hindu society. Some have argued however that Gandhi's stance was romantic and even retrogressive (Srivastava, 2014). He was more interested in changing the attitudes of elite castes rather than dismantling the caste system itself (Roy, 2014). Modi himself claims a lower caste status, which the opposition party (Congress) alleges is a political maneuver to boost his "humble image" and win votes of the low caste poor (Nelson, 2014). In invoking Gandhi for his campaign, some have argued that Modi is playing another

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[83] Source: National Portal of India (n.d.)

political game—that of robbing the "Congress of its proprietary claims over Mahatma Gandhi" (Sengupta, Misra, Ittiype, 2014). Regardless of the validity of these claims, the message of Modi's campaign seems to be as follows: Cleanliness needs to involve everyone. In order to achieve it, we have to shed our backward ways of thinking whether they are rooted in casteism or a indifference towards public filth. We must all take on brooms and sweep the streets and tweet about it while doing it.

And this is precisely what has happened since October 2nd, 2014. Major political figures, including the PM himself have taken the broom to sweep the streets (see Figure 18). The cleanliness campaign, much like his election campaign is quite savvy in its use of social media.[84] In the cleanliness campaign inaugural speech, Modi "urged people to share their contributions on social media using the hash-tag #MyCleanIndia" (PMO, 2014).[85] On the campaign's website, one is encouraged to "[t]ake up the Swachh Bharat Challenge and Challenge others . . . (Login to Publish Your Activity)" (MyGov, n.d.). Participating in a challenge involves a clean up activity of one's choice, posting "before-and-after" pictures of their activity on this site as well as other social media sites. As of April 7th, 2015, the site had a little over 400 participants, over 250 challenges and over 600 activities from across the country. The campaign proceeds in a manner similar to the ice bucket challenge. One person or group performs a clean up activity, posts its "before-and-after" pictures and then

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[84] So successful was Modi's (and the BJP's) social media election campaign that in advance of his visit to New York, the *New York Times* said, *"American politicians seeking to do well on social media may want to take note: one of the world's best will be in New York this weekend"* (Willis, 2014). His social media strategy during the election campaign has been well analyzed by many (see Das (2014) for instance).

[85] In the campaign inaugural speech, Modi said, "I have decided to start a movement in social media also. It is there on MyGov.in website also. A new website has been created on 'Clean India'. Work has been started on Facebook and Twitter also. #MycleanIndia was started today. I appeal all the countrymen to upload photographs of garbage, then clean that and upload the video and the photographs of the cleaned place. I also appeal to media . . . Come let's see on MyGov.in, my Facebook or twitter, the mood that I am witnessing, the enthusiasm that I see, fills me with hope that public is ready to move hundred steps ahead of the Government" (Modi, 2014d).

challenges others to do the same thing. They also record the number of hours they spent on their specific activity. The Ministry of Urban Development hosts its own Swachh Bharat site where among other things, one can get diverted to the Airtel website offering a selection of four Swachh Bharat cellphone ringtones free for download (MoUD, n.d.-d). There is nothing wrong with the use of social media. The only reason I discuss this strategy is to point out the similarities between this campaign and TUI in their use of social media specifically in the visual displays of successes of clean up efforts through the "before-and-after" pictures. The campaign seems to be working in terms of shaping public opinion and actions. In a survey of 1200 middle class respondents across 8 cities, SBM was by far the best liked of Modi's national initiatives (TNN, 2015a). Further, 71 percent of respondents noted having participated in a cleanliness initiative since the beginning of the campaign (*ibid.*).

But some argue that the taking of the broom to sweep the streets is not much more than theatrics providing plenty of photo opportunities for the savvy social media campaigns of the ruling party (Sengupta, Misra, Ittiype, 2014). News media has been littered with (pun intended) reports of sanitation workers and others deliberately littering the areas where celebrities were going to be making their 'broom-in-hand' appearance (PTI, 2014c). But if the invocation of Gandhi was an attempt to rob one opposition political party of its "proprietary" symbol, then the broom symbolically and physically steals the party symbol of another, the Aam Aadmi Party (AAP), which has recently received widespread support and is currently the ruling party in the National Capital Territory of Delhi. Explaining the party symbol, the AAP's website declares:

> *Aam Aadmi Party is happy to announce that the Election Commission has allotted the party a reserved symbol of 'Broom' for all the 70 assembly constituencies of Delhi. With this the party has crossed the second milestone (after party's registration) on its way to cleaning up the polity of the country. With the Broom which symbolizes dignity of labor,*

the party hopes to clean the filth which has permeated our government and our legislature. The country needs a clean sweep of its corrupted main stream [sic] *political parties* (AAP, n.d.).

Figure 18. PM Modi taking the brook at the launch of SBM[86]

As a symbol, the broom offers hope of a clean India, free of waste on the street as well as within the government machinery. The trope of waste is invoked to symbolize corruption and the associated waste of resources within an efficient government that power hungry political parties thus far have had little interest in or capacity to dismantle. The broom and all that it represents—the labor of cleaning India of its wastes both literally and symbolically—has come to occupy an important place in contemporary politics. Modi's campaign also has its own carefully picked set of "brand ambassadors" who are expected to spread the word about the campaign in their own spheres of influence. At the launch of his campaign, Modi announced that he had invited nine prominent public figures to "make a contribution towards Swachh Bharat, share the same on social media, and invite nine other people to do the same,

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[86] Source: PMO (2014)

hence forming a chain" (PMO, 2014). One of the figures along the chain was a prominent ex-AAP member Shazia Ilmi who had otherwise been critical of the BJP (Modi's party) but decided to join the campaign because it "is a great mission and I am happy to be part of it" (PTI, 2014d). Just a few months later, right before the critical Delhi election, Ilmi decided to join the BJP. The AAP won the election anyway but SBM seems to be as much about increasing political support for the ruling party as it is about cleaning the country. Predicting such criticism, at the launch of the campaign, Modi asked that sanitation not be treated as a political tool but as patriotism (*rashtrabhakti*) and commitment to public health (PMO, 2014).[87]

Other than volunteering to clean up public spaces, the campaign also hopes to become a mass movement on behavior change: *"na gandagi karenge, na karne denge"* which translates to "We will not litter nor let others litter" (PMO, 2014). This is also a part of the pledge that the campaign encourages everyone, specifically schoolchildren to take. At the launch, Modi visited and wielded his broom in Valmiki *basti*, a low-income neighborhood in Delhi named after a low-caste group engaged in sanitation work. This is where Gandhi also lived during his time in Delhi. In his speech in the neighborhood, he urged children to become *safai senanis* or cleanliness soldiers (Modi, 2014d).

His speech points to the need for self-discipline but also embodies a certain notion of urban modernity that can only be conceived in comparison to "foreign countries":

> *Wherever we see filth or see someone throwing papers why don't we feel like picking that up? I know this will not be accomplished only by publicity campaign. Old habits take time to change. It's a difficult task, I know . . . Often when we go to foreign countries, we say how clean it was there, there was no dirt anywhere. Then I ask these people, did you like the fact that it was so clean? Then I ask, did you see anyone littering or spitting? They say, no we didn't. Then I say that the secret of cleanliness is in the discipline of their*

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[87] In his speech, he says, "Finger pointing will not help as I told earlier this is beyond politics. This is a work solely inspired by patriotism. We will do it with patriotic feeling. There is no place for politics.

citizens. If we manage that, I am sure we will do wonders . . . I believe that the countries of the world that appear clean are so because their citizens don't indulge in littering nor do they allow it to happen. (Modi, 2014d)

Those places are clean because their citizens are disciplined, not burdened by their "old habits" as we are. Filth is a problem that can only be rectified through behavior change. We the children of "Bharat Mata" or "Mother India" need to grow up and learn the ways of modernity. Modi invokes a kind of "soft paternalism" of the state governing its subjects through behavior change (Pykett, 2012). Popular opinion on this matter follows suit. For instance, one columnist urges Swachh Bharat to learn from Swachh Japan based on some observations she made on her recent visit to the country where what impressed her most was the "country's attitude—well, almost an obsession with garbage" (Bhargava, 2015). Amazed at the country's efficient waste management system despite its dense population, Bhargava points us to the discipline and attitudes of the "locals" who "left the parks cleaner than when they entered them" and didn't give a second thought to "picking up something dropped by someone else and depositing it where it was meant to go." She urges a rethinking of the cleanliness campaign in India. Cleaning up with brooms won't help but not littering in the first place will. India, Bhargava suggests needs rules just like Japan that ensures that the problem of garbage "trickles down to everyone" (*ibid.*).

The 'foreign' countries that Modi wants India to become like in terms of cleanliness have their own histories of similar campaigns. Melosi (1981) provides such a history of waste as a public health, engineering, and aesthetic/moral concern in the U.S. where similar discourses of public indifference, the need for moral responsibilization? and civic pride, and the relationship between modernity, progress and sanitary conditions were circulated widely. Swachh Bharat mimics many of the same strategies applied at the turn of the 20th century in

the United States both in rhetoric and practice. In the U.S. during this time, immigrants and the poor were often blamed for public filth. Even a cursory look at SBM inspired media campaigns such as *The Times of India's* "The Great Indian Litterbug" reveals the class prejudices inherent in those campaigns.[88] Yet, although the similarities abound in terms of visible pollution and filth, the differences between end of nineteenth century cities such as New York and contemporary cities such as Delhi are stark—in scale and in existing infrastructures for managing the quantum of waste produced.

Recall Chakrabarty's (2010) conversation with a defiant young boy who refused to not litter in the previous section of this paper. He is the subject of Modi's campaign. His question to Chakrabarty, "Do you think we live in England, do you?" now has a simpler answer: "No we don't. But why shouldn't we make India as clean as England? It was Gandhi's dream after all." But other than just an ambiguous moral claim to cleanliness, Modi makes an economic one as well. Citing a WHO study on the economic costs of sanitation, Modi (2014d) says:

> *Brothers and sisters there is a startling evaluation of WHO – they say that the diseases created by lack of cleanliness results in additional loss of 6500 rupees* [equivalent to about USD 100] *to every Indian. Due to illness someone is not able to drive taxi or auto rickshaw or not able to distribute newspapers or not able to deliver milk. This is just the average of the total loss. If we take out affluent households then burden on poor people will go up to 12-15 thousand* [equivalent to about USD 190-235]. *If we just spread cleanliness, our poor will be saved 6500 rupees. This will save him from diseases and*

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[88] The Great Indian Litterbug is "a humorous campaign that celebrates various uniquely-Indian quirks that makes [*sic*] us 'like that only'" (TOI, 2015). In describing the campaign, Gupta (2015) says, "As PM Modi's Swachh Bharat campaign continues, can the Indian Litterbug change his filthy habits and come clean? TOI begins a campaign to find out . . . We aim to find out what makes him tick, why he has a diabolical need to spread the muck. Let's not sweep our guilt under the rug. Join us in this campaign with your jokes, stories, poems and anecdotes as we use the broom (apolitical version) to beat the gloom, and attempt to clean the cobwebs of indifference keeping our footpaths filthy. Mere desh ki dharti need not be dirty." The site and the associated print media ads and articles are a satirical celebration of "those Indians, who irrespective of their cast or status take littering as a birth right since the time they are born." The logo of the campaign is a man spitting *pan*, a betel leaf, areca nut and tobacco combination, frequently chewed for its psycho-stimulant effects. Tobacco consumption is strongly explained by socio-economic variables with the poor much more likely to consume such products than the rich (e.g. see Subramanian et al., 2004). The Litterbug site encourages people to submit entries—photos, videos, cartoons, jokes, anecdotes—on among other things, "[p]eople peeing and crapping everywhere" (TOI, 2015). Needless to say, public urination and defecation are also problems rooted in class. Poverty makes it a necessity, not a choice.

unemployment. This movement is very important for the health of the poor. Serving Mother India is serving the poorest (Modi, 2014d).

The young boy is ignorant. If only he know the direct economic consequences of his actions, perhaps his habits would change? Never mind that his health is impacted by factors way more toxic than filth alone. Leaving aside questions of poverty and its debilitating effects on the bodies of the poor, consider for instance the simple issue of air pollution in cities like Delhi.[89] Modi (2014d), in referring to the cleanliness of the part of New Delhi from where he delivered his cleanliness campaign inaugural speech noted that it "it feels nice to see the clean surroundings. Should not every corner of India be this clean?" In August 2015, the Government released the results of a survey of cleanliness rankings of cities and municipalities across the country. New Delhi, from where Modi spoke, ranked 16th while the other three municipalities ranked 397th of 476 cities surveyed (BS Reporter, 2015). Meanwhile, the same city that is free of litter in that particular neighborhood is also allegedly the most polluted city in the world and the country as a whole can now boast 13 of the 20 most polluted cities in the world, according to WHO (2015). The link between air pollution and mortality is stronger than ever: "In new estimates released, WHO reports that in 2012 around 7 million people died - one in eight of total global deaths – as a result of air pollution exposure. This finding more than doubles previous estimates and confirms that air pollution is now the world's largest single environmental health risk" (*ibid.*). Does the boy need to worry about littering when the air that he breathes is likely to slowly kill him anyway?[90]

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[89] For an excellent discussion of the notion of "slow violence" that examines relationship between environmental change and its specific impacts on the poor, see Nixon (2011).

[90] Parikh (2015) has urged the inclusion of clean air in SBM. As the government attempts to reign in the behaviors of the world's second largest populace, it is unable to reign in oil and auto mega industries towards the pursuit of cleaner air standards and technologies: "The right to drive" is superceding "the right to breathe."

This is not to understate the health problems that result from unmanaged garbage but merely to point out that a concern with the aesthetics of clean cities hides other problems that have much more immediate and long-term impacts on our bodies.[91] To his credit, Modi's campaign however is not only about not littering and volunteering to clean up filth in public spaces. Funding in the amount of INR 620 billion has been approved for the five-year long program, of which INR 140 billion will be central government assistance, jointly managed by the Ministry of Urban Development and the Ministry of Drinking Water and Sanitation for urban and rural projects respectively (PTI, 2014e). Each of the two Ministries has published detailed guidelines towards the implementation of the program by states in rural and urban areas (MDWS, 2014; MoUD, 2014a). Three kinds of projects are intended to be funded through this program: the building of individual and community toilets in villages and cities, solid waste management systems, and IEC (information, education and communication) campaigns to generate awareness and effect behavior change. For IEC and public awareness activities, the mission has earmarked 15% of central allocation amounting to approximately INR 22 billion, of which 80% is allocated to states for them to "undertake massive public awareness campaigns on sanitation and establishing its link to public health, hygiene and the environment through various means including - radio, social media, documentaries, plays, workshops, etc." (MoUD, 2014a, p.13). The rest is earmarked for use by MoUD to "draw a national media campaign and developing standard campaign tools for effective awareness and communication on sanitation" (*ibid.*, p. 13).

One of the hallmarks of the campaign is to build toilets with the goal to end open defecation in India. Modi frames this as an issue of women's dignity, a "blot" that needs to be removed:

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[91] The economic impacts of inadequate sanitation are well documented (see for instance WHO, 2014 and Water and Sanitation Program, 2011).

"In our villages more than sixty percent people are still going to toilet in open. I feel most

pained that even our mothers and sisters have to go in open. We have to remove this blot. I

have told corporate social responsibility people to prioritize this. We should do this much at

least for the dignity of our mothers and sisters" (Modi, 2014d). The rape and murder of two

teenage girls in a northern Indian village as they went out to relieve themselves in the field in

May 2014 brought global attention to the relationship between open defecation and women's

safety (UNICEF, 2014; WaterAid, 2014). Modi's highlighting of women's dignity versus

their safety points to the general patriarchal ideology that allows the framing of violence

against women as a question of honor rather than an inalienable right (Hundal, 2013).

For solid waste management projects, the mission provides up to 20 percent as grants or

viability gap funding. The guidelines specifically promote waste-to-energy projects, even

though states are "free to choose the technology for SWM projects" (MoUD 2014a, p. 12).

The problems and controversy over waste-to-energy in India have been discussed in the

previous chapter. The remainder of the funds will need to be raised through a combination of

mechanisms that include private sector participation, user charges, land leveraging, corporate

social responsibility (CSR), and market borrowing (*ibid.,* p. 5). A lot of money remains to be

raised. Corporate India has come to the rescue. According to news reports, by March 2015,

"India Inc had jumped on to the Swachh Bharat bandwagon" by earmarking approximately

INR 10 billion in their budgets for various projects (Dey, 2015). Luckily, these earmarks also

mean substantial tax deductions. The most recent Union Budget includes a 100% tax

exemption for donations to the Prime Minister's cleanliness campaign (PTI, 2015a). Private

companies above a certain turnover threshold in India are already required to donate 2

percent of their profits towards CSR initiatives. However, income tax rules do not incentivize

CSR spending because corporations are not allowed to deduct all of their CSR donations from their tax responsibilities. This year's budget announcement makes this tax deduction a reality for private companies donating to SBM.

Shamir (2008) has urged us to understand CSR as a process that "dissolves the distinction between market and society" and "encodes the 'social' as a specific instance of the 'economy'" (p. 14). Through such a process, moral considerations "lose" their "character as liabilities" and "re-merge as business opportunities" (*ibid.*, p. 14). Business opportunities in this instance extend beyond tax exemptions alone. Not all of the INR 10 billion is donations, "While most of these projects are under their corporate social responsibility (CSR) heads, there are also some that are partly funded through CSR or are designed as public private partnerships" (Dey, 2015). There is potentially big money to be made in cleaning India. Critics point out that many corporates "have spotted a killing to be made in cleaning up India are licking their lips in anticipation at windfall projects for garbage and waste disposal, and recycling" (Sengupta, Misra, and Ittyipe, 2014).

Campaigns such as this are not new to India. Past government leaders have tried campaigns similar to it (Sengupta, Misra and Ittyipe, 2014). What makes it different is its focus on volunteerism and behavior change at a scale different than in the past, enabled in part by forms of communication such as social media available now. Although past campaigns such as Clean India Campaign had a similar rhetoric of filth as a "cultural" or behavioral problem, the need to project a clean image for tourists, and corporate sponsorship for cleaning up high profile sites such as the Taj Mahal, their scope was limited in what they could achieve in terms of public engagement on the subject. Modi's highlighting of the issue in his Independence Day speech made it a topic of discussion within the household. The project of

cleaning India has become one of building the nation. On a visit to Delhi in December 2014,

Modi's campaign was brought up by many of my family members partly because they know

of my interest in the issue but also because it was a hot topic. Newspapers, billboards,

television, and radio were filled with public service announcements encouraging behavior

change. But behavior change is only one issue that needs to be addressed. Waste

management infrastructure continues to be largely absent. As one of my aunts said, "You can

sweep all you like but where are you going to put it?" Other critics of the campaign

particularly NGOs and environmental activists are of the same opinion (Manku, 2015). But

the campaign is not limited to behavior change. Funds are being allocated for infrastructure

projects as well. For instance, Delhi received INR 320 million from SBM for fiscal year

2014-15 (PTI, 2015b). SBM guidelines already give a clue as to where this money is going to

go in terms of the choice of waste management technology. SBM might be a further

opportunity for profit-making while displacing those whose livelihoods depend on managing

that waste such as has been the case with waste-to-energy technologies as discussed in the

previous chapter. Meanwhile, the quest to discipline the self and others continues.

The Ugly Indian: The morality of urban aesthetics

The Prime Minister, through his cleanliness campaign, wants to inculcate a spirit of

volunteerism, of civic duty among citizens. Through a massive communication effort using

social media, print media, television, radio, and billboards, the campaign is trying to induce

behavior change. A group of Bangaloreans however, has been on this task for a while now.

The Ugly Indian, an online community of individuals who commit themselves to organize

clean up activities that they refer to as "spotfixes" in urban public spaces (TUI, n.d.-b).[92]

According to the group's Facebook page, it was "born" on November 15, 2010. Since its

birth, the group has spread from Bangalore to the rest of the country. Inspired by The Ugly

Indian, numerous other groups have been formed engaging in clean up efforts in cities across

the country.

How does the group work? If I am a resident of a city concerned about public filth in general

or in a particular spot in my city and want to do something about it, I can click the

"Volunteer" button on TUI's Facebook page, fill out information about myself, and I will be

added to their database of volunteers. This will allow them to invite me to a planned "spot

fix" near me but I am also encouraged to plan one on my own while waiting to be invited.

Once I have participated in a "spot fix", I am encouraged to report it using their "Report a

spot fix" app on their Facebook page where I can post "before" and after" pictures

showcasing the clean up work of my group. It's almost as if SBM took a clue from TUI on

their communications strategy. Recall the challenges and activities on the SBM page that

showcase "before" and "after" pictures of the volunteer clean up efforts of participants.

These pictures are powerful and visitors to the Facebook page pay close attention to them.

For instance, one set of "before" and "after" photos sparked a discussion about their

authenticity. Facebook users played an uninvited "Spot the difference" game comparing the

photos, pointing out missing signboards, different construction material and the like. The

authenticity of the photos was subsequently validated after a heated discussion on

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[92] What is a "spot fix"? The Ugly Indian, on their Facebook page describe it in the following way: "The method of fixing ugly spots is called SpotFixing - and the shared belief is that a street, a neighbourhood, a city and a country can be fixed - one ugly spot at a time. While some citizens and elected representatives focus on system-level big-picture long-term solutions, the common citizen who spotfixes spends a few hours every week focusing on local 'spots' and fixing them to the best of his ability. Using his own hands, time and money" (TUI, n.d.-b)

disrespecting the labors of those who had worked hard to make that transformation happen. In explaining their choice of such photos, TUI said, "Whenever a Before-After pic is stunning enough to be inspirational, it gets reported here . . . As there is no attempt to deceive, the photographer rarely takes absolutely identical angles" (TUI, n.d.-b).

TUI professes a philosophy of *"kaam chalu, mooh bandh"* (or "start working, stop talking") (TUI, n.d.-c). This is rooted in two inter-related ideas that make them different from campaigns such as SBM. The first is a strong belief in action rather than discourse—"No activism, no lectures, no awareness drives, no moralising. Just go out and DO. Want to change the world? Start with your own street!" (TUI, n.d.-b). Unlike the SBM, where one is encouraged to moralize by "challenging others" or "taking a pledge," TUI discourages people from all this. They want people to shut up and clean. There is to be no moralizing with words. Further, while SBM has allocated a significant chunk of money for public awareness, TUI wants none of that. Telling people to change their behaviors will not work. Showing by example will. What both are on the same page is their dismissal of "activism", TUI explicitly so and the SBM implicitly. Recall Modi's speeches where he insists on keeping SBM apolitical. Modi's government in general has been accused of quashing dissent by suspending the registration of activist organizations such as Greenpeace (D. Pandey, 2015).

The group strongly believes that the root of public filth in India is the people themselves, not systems, money or technology but our deep-rooted cultural behaviors and attitudes: "it has something to do with us as a people" (TUI, n.d.-c). One of the examples the group uses to demonstrate this point is the state of cleanliness in diaspora communities: "After all, even in cities like Singapore, London and New York with efficient civic systems and a culture of

rule-enforcement, Indian-dominated neighborhoods are dirtier and have lower civic standards than other parts of the same cities. Seems like we ugly Indians can beat even the world's best managed cities into submission!" (Anamik Nagrik, n.d.).[93]

TUI has an opinion on public versus private delivery of services. In a post from May 2013, TUI celebrated the efficiency of a private garbage collection service where "public services fail or don't deliver":

> *Incredible as it may sound, Bangalore has an efficient privately-run Food & Commercial Garbage Pickup service – that services the Corporate sector, Tech Parks, Hotels & Restaurants and anyone willing to pay for it. And they work very efficiently, are customer-focused, and move a large part of the city's garbage in the dead of the night and early morning hours. Really! . . . Err, STUPID QUESTION: When there is an efficient pickup service available, why don't all restaurants and eateries use it? Simple – it costs money! And when you can get away by illegally dumping for free (and some poor BBMP garbage worker clears it every morning), why pay for a private service? Don't we all understand this sentiment? We are all ugly Indians, we are like that only:) Give us half a chance to take a free ride, and we will!* (TUI, n.d.-b)

Privatization resolves the problem of an inefficient public system by being reliable, on-time and customer-oriented while the continued existence of the public system causes free rider problems. Being a free rider is yet another characteristic of the ugly Indian, which pushes the idea of paying for the services that citizens aspire to have. One Facebook post raised the issue of how much an average homeowner pays for garbage collection through their property taxes, assuming that the entire property tax amount went for garbage collection alone. The

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[93] In June and July 2013, TUI (n.d.-b) organized an online "Bangalore black spot beauty contest" highlighting over 150 trash-ridden "black spots" in the city. The nominations themselves were crowd-sourced to Facebook users who were then asked to vote for the "beauty queen." TUI organizers were conscious of the fact that only "posh" areas were being submitted and encouraged submissions from lower-income and slum areas also. However, the one that emerged as the winner was the trash heap around the passport office. A series of spotfixes around the passport office took place in August 2013. One of the voters nominated this particular spot because lots of people visit and the queue for passports starts around the spot which means that those in queue have to take in the smells and sights of garbage for hours. The choice of the winner reveals not only the aesthetics of cleaning as a class project but in the context of passports as crucial documents allowing one to leave the country, the selection allows one to see the narrative of The Ugly Indian in comparison to the not-Indian. Those who have experienced beauty outside (the country) are the only ones who can see the ugliness inside (the country).

consensus that emerged after a lengthy discussion was that we pay too little and therefore

cannot expect better service from the state. The consensus, however was not to raise taxes

because everyone agreed that the corrupt bureaucracy would just end up with heavier

pockets. Instead, the consensus was that we need to pay more if we want better service. And

if we pay for the collection of the waste we produce and someone can make money off of it,

why not? In another post, TUI shared the news that "India's largest housekeeping firm BVG,

backed by Kotak and 3i Capital, will take care of half of Bangalore from Nov 15th. It's high

time the city got some professional cleaners for the money it spends" (TUI, n.d.-b).

Commenters celebrated this news.

While SBM encourages visibility of the individual actor and their volunteer efforts, TUI

wants to remain fiercely anonymous. The "*mooh bandh*" in their philosophy refers not only

to not talking about issues but also to not talk about themselves and reveal their own

identities. To provide "a detailed account of the thinking, the philosophy, and the process that

drives the Ugly Indian", Anamik Nagrik (or the anonymous citizen) has decided to tell the

world the TUI story through a self-published in-progress book available on their website

(Anamik Nagrik, n.d.). The reason for their anonymity as articulated in the book is that they

only want their work to speak for itself: "Because actions and results count much more than

WHO did them . . . Anonymity is power – only those who exercise it, understand it.

Anonymity is also a strong filter against non-serious publicity-seekers" (TUI n.d.-c). And

because speaking for oneself might put them in the same realm as moralizing activists,

people they do not want to be put in the same camp with.[94]

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[94] In another Facebook post, TUI shared a message that the group received from an Indian American who had
participated in a spotfix on his recent visit. His message reveals a similar anti-activism sentiment: "In a city
with numerous NGOs who talk a lot, raise funds, and deliver little in the way of concrete impact, The Ugly
Indian is rather unique . . . They work silently to fix problems. They don't talk to the press. The organizers are

In "Chapter 3: Spotfixing!" of their book, the reader gets a better sense of the roots of this sentiment against activism (Anamik Nagrik, n.d.). The protagonists—Agents V and X—are on a stealth mission to clean up a filthy spot on Bangalore's Church Street. Everyone—the media, the government, activists, and the industry—is complaining about the mess but nobody is doing anything about it: "One bearded guy in a *kurta* tells them –"don't waste your time, we have tried for years, cleaned it up several times, and the mess simply comes back. The people here are not good – North Indians", he whispers, with added emphasis. He looks the stereotypical activist – well-meaning at heart, but angry and frustrated with the people and the system" (*ibid.*). Our protagonists are sick of such responses from the "typical ugly Indian" who "blames someone else, discourages those who want to solve it, offers no practical solutions" (*ibid.*). They perform the very first SpotFix and deliver a dramatic result encapsulating it in a "Before-After image that is proof of dramatic change." Since that first SpotFix, thousands have followed and not just in Bangalore but across the country.

The idea is that once a "spot is fixed," it will likely stay so. Citing broken windows theory, TUI administrator(s) suggest that idea behind making an ugly spot beautiful is that a beautiful spot will deter ugly behavior: "An ugly space stays ugly, and often gets uglier, while a good-looking well-maintained public space attracts respect.[95] The same Indian behaves differently in a clean airconditioned [*sic*] mall than he does right outside (the same

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anonymous. Volunteers find each other on Facebook, show up for "spot fixes" and do the work quietly seeking no individual recognition" (TUI, n.d.-b).

[95] In yet another post, TUI shares "before-and-after" photos of a wall with the following caption: "Broken Windows Theory in action! This footpath is full of obstacles (broken concrete signboard and missing footpath slab), has lots of mud and debris dumped on it, hasn't been cleaned in years, and is an open invitation to urinators as there is a high grey wall that assures some privacy. Remove the obstacles, replace the slab, make the footpath look cheerful and cared for, and suddenly pedestrians use the footpath, and the urinators stay away. Ugly spaces attract ugly behaviour - remove the ugliness, invite positive behaviour. Try it - it works" (TUI, n.d.-b).

person who may spit on a wall outside a mall or urinate on it, will not do so inside a mall)"
(TUI, n.d.-c). An air-conditioned mall represents beauty and cleanliness to TUI founder(s).
An air-conditioned mall is also a contained, indoor environment that has an army of low-
wage workers who spend hours keeping it clean.

Just as the broom is the centerpiece of the theatrics of SBM, a particular kind of anonymity is
central to the discourse of TUI. In its description of itself, the group's representatives bring
up the reasons for maintaining anonymity over and over again. In a TEDx talk, a TUI
representative wore a mask to maintain this anonymity (TEDx Talks, 2014). But even as they
continually talk about anonymity, pictures on Facebook highlighting their volunteering work
often shows people with their faces. Moreover, while some of the "before and after" photos
only show blank landscapes that have transformed from ugly to beautiful, many pictures
show how such a transformation came to be. These pictures show people performing their
volunteer labor that allows an ugly place to become beautiful. Showing people doing this
work is important. It puts faces on the otherwise anonymous not-so-ugly Indian. It also
allows for volunteer aspirants to see how the work is done, how many people might be
needed, what kind of tools they use and so on. But it also allows documentation of the hard
labor that went in towards that work (see Figure 19).

Figure 19. Spotfixing in action[96]

Even as the labor of volunteers is highlighted and circulated through images on Facebook,

the labor of those who perform similar work but for different reasons is rendered invisible.

The following two images are one of many before and after pictures featured on the

Facebook (see Figures 20 and 21). In Figure 20, one sees a pile of garbage. One also sees two

waste-pickers (presumably children) picking through that pile of waste. In Figure 21, the pile

of garbage is gone. The wall is painted in a beautiful pattern appropriate for the institution (a

government school) that it protects. Gone are also the waste-pickers—children who will

likely not be able to even step into that particular school or any other one.

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[96] Source: TUI (n.d.-d)

Figure 20. Before the spotfix[97]

Figure 21. After the spotfix[98]

[97] Source: TUI (2014b)
[98] Source: TUI (2014c)

TUI does not conceive of filth as a public health issue, instead as mostly an aesthetic one. For

this reason, "spot fixes" are not merely about cleaning an area but "fixing" it aesthetically,

most often by removing posters and advertisements from walls and repainting them in their

signature red and white colors, and fixing and repainting sidewalks. In one post, TUI

explains its color choices in response to a suggested alternative. A TUI team had painted the

wall of Windsor Manor, a fancy hotel in Bangalore, in its signature white and red colors and

shared a photo to demonstrate how the repainting had subsequently deterred posters from

being posted on the repainted area (see Figure 22). One commenter proposed two alternative

color choices through renderings one of which was a "very Neutral Dark Chocolate which is

a deterrent just by way of its color adds a crisp look and also modernizing appeal" (TUI, n.d.-

b) (see Figure 23). This led to an extended discussion on the comment thread about aesthetic

appeal. TUI's response pointed to the relativity of aesthetics:

> [T]he colour that works is the right answer. Black is not popular among people in
> Bangalore (please appreciate that all these colour decisions need support from those on
> the ground) and will not be well received - in fact locals always ask for bright ('gaudy')
> colours like pink, yellow, light green - and terracotta red is the right middle path between
> those who like subtle white shades (the 'sophisticates') and those who want gaudy bright
> colours ('the masses') . . . Aesthetics and colour choice is a very personal decision and
> Bangaloreans exercise the choice freely- so deciding the colour for public spaces can
> never really be democratic - it has to be a colour that is LEAST disliked, or most
> universally tolerated or acceptable (TUI, n.d.-b).

In response, the commenter pointed to the "gaudier" option he had proposed (see Figure 24).

TUI's response was that because both options proposed "continuous solid colors," they

would not "deter a poster paster." However, what will deter defacers is "a break in the

colour/abstract design at eye level (where they put posters)" through the use of triangles

which are "an acceptable universal festive design" and "can be painted with minimum errors

by a group of amateurs." The commenter noted that the "triangles" was what he thought were

most "ill-fitting" and suggested "aesthetics needs to be dictatorial sometimes" in order "to maintain the integrity of the architectural style." The commenter appealed to a "certain order of color in design" so that one doesn't "end up with a mess like . . . the pinks yellows and who knows what other colors." Earlier, there was another discussion about potentially using religious symbols on walls to deter people from throwing garbage around it. TUI's stance was this: "Religious symbols, in our view, are not a good thing to do. It offends many and doesn't always work. The quality of the painting is what counts - not the content. Abstracts designs or solid colours that give the wall a fresh, maintained look are what is needed. Not slogans, art or religious symbols." In June 2014, TUI updated its cover photo on Facebook with a rendering of what an ideal color/design combination for its spotfix efforts would look like.

Admittedly, these are only a few posts among thousands of Facebook posts that discussed the aesthetic choices of TUI so deeply. However, even though they declare that they "have no design or aesthetic agenda," the discussion points otherwise. It shows a level of engagement with aesthetics that could otherwise easily be presumed unintentional and inconsequential. Yet, as this discussion shows those choices are far from it. Individual ideas of cultural acceptability of a particular aesthetic are universally imposed through these choices on the physical landscape of the city.

Figure 22. TUI showcasing a spotfix on Windsor Manor's wall[99]

Figure 23. Commenter's rendering: Option 1[100]

[99] Source: TUI (2014d)
[100] Source: TUI (2014e)

Figure 24. Commentator's rendering: Option 2[101]

Figure 25. TUI's own rendering of an ideal spotfixed wall[102]

TUI has also developed its own vocabulary to describe various conditions of messes and actions of the group, many of which are designed to only be referred to in their acronym incarnations: spotfix, black spots, UFO (under the fly-over), PDA (positive disruptive anarchy) and a series of seven "ugliness parameters": nGOG (no garbage on ground), nPOP

[101] Source: TUI (2014f)
[102] Source: TUI (2014g)

(no posters on public property), nPIP (no peeing in public), nTOT (no trash on trees), nFIF (no fault in footpath), nWOW (no writing on wall), and nDOD (no dumping of debris).[103] Some of these even have elaborate designs for addressing the issue (see the nGOG method rendering in the Figure 26). Although some of this terminology has not quite made it to common usage even in discussions on the page, the origins of some of these may lie within past discussions. For instance, in a post, one commenter said, "this is unconstitutional, these people are spreading anarchy........!!!!" To this, TUI responded, "Is there a good work [*sic*] for 'positive anarchy'? 'Positive vandalism'?" It is likely that PDA emerged from this exchange. Aside from the group's clever name, such a vocabulary also points to its cosmopolitan savvy. It also however points to the limits of who is being communicated to. Being a self-selecting group in which individuals share a common class, the limits that such a vocabulary might pose are possibly irrelevant.

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[103] One facebook post urges the reader to explore what these ugliness parameters are and what they look like in real life by examining actual images. TUI says the following about these parameters: "A simple way YOU can measure HOW UGLY a Street is! These 7 Ugliness Parameters are the result of UGLY HUMAN BEHAVIOUR. They can be easily identified, measured, corrected and eventually stopped. A NOT-UGLY STREET is one where all these 7 parameters are NOT PRESENT." Ugliness is within and without. An ugly person makes an ugly place.

Figure 26. TUI's nGOG method[104]
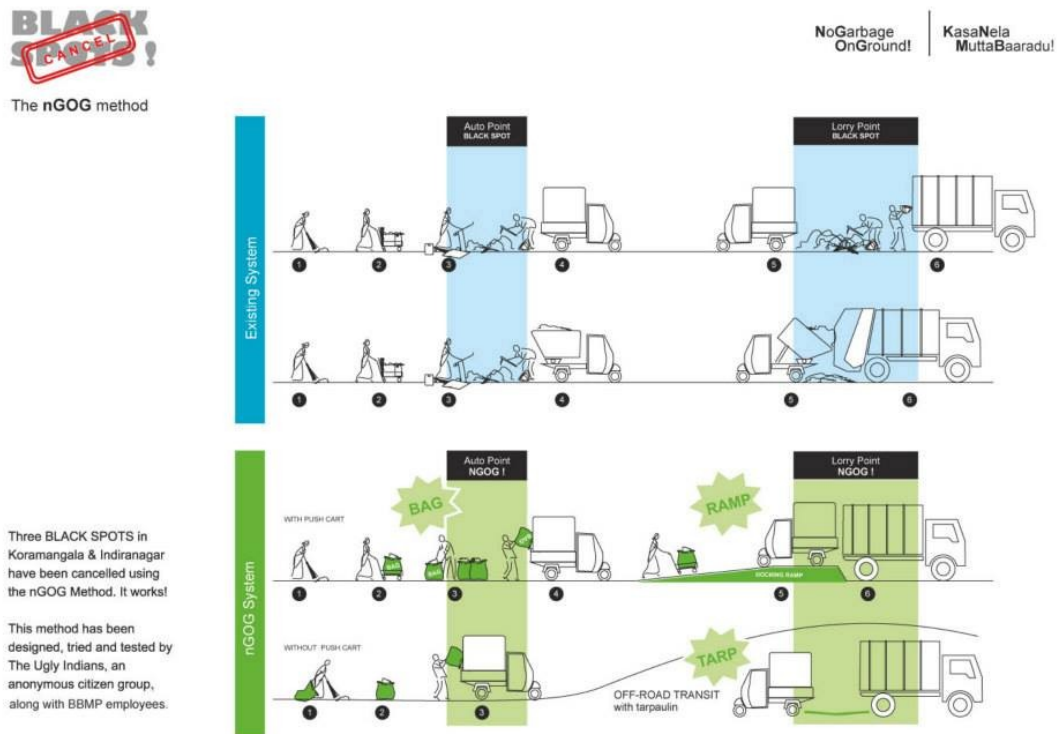
To examine the extent of their work, I analyzed postings on their Facebook page, which not only features their own work but also the work of organizations they have inspired across the country. As of April 15, 2015, the page had over 313,000 "likes." Outside of India, TUI also inspired the formation of a similar group in Indonesia and a post-riot clean up effort in Karachi, Pakistan (Kehar, 2012). Within India, there are teams in more than 65 cities that have been inspired by TUI to perform thousands of spotfixes. Forty-three groups that have their own Facebook pages have reported spotfixes using the app on TUI's page. Many of them have names like "'XYZ City or Neighbourhood' Rising" (e.g. New Delhi Rising) which seems to be the nomenclature recommended by TUI. The name itself recalls a revolution, of people rising up against public filth and taking action. Others have more clever names such as "A Bunch of Fools," "Farzz" (which translates to duty), "Lazy Humanz,"

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[104] Source: TUI (2013)

"UMEED" (which translates to hope) and "Kaam Aadmi Party" (a play on the political party

AAP mentioned in the previous section). While most of these groups' formation was directly

inspired by TUI, others pre-date TUI but have taken on spotfixing as one of their activities.

Many are just online groups or communities while some are actual NGOs that focus on

issues broader than spotfixing. While many were inspired by the TUI, Modi's SBM has

provided many groups an additional reason to establish themselves and perform clean up

activities. Some of these even identify their affiliations with Modi's campaign through their

names: "Swachh Bharat Bellary" and "Swachh Pune." In fact, of the 43 groups,

approximately 40 percent started after the launch of SBM in October 2014.

In 2012, when *The New York Times* featured a story about Bangalore's garbage crisis, TUI

shared some good news, "We can say with some pride that Bangalore's Central Business

District has remained clean through this crisis - and if you were to walk on MG Rd,

Residency Rd, Brigade Rd, Church St, Museum Rd, Commisariat & St Marks Rd (8 km of

footpath where TUI has an active presence), you cannot tell that such a Garbage crisis is

going on" (for the NYT story, see Harriss (2012)). The failure of public systems also

highlighted the success of the actions of responsible citizens. Where the government fails, the

responsible citizen needs to and does step in. But who are these responsible citizens? In

Bangalore, the birthplace and home of TUI, an analysis of Facebook posts reveals that many

of the volunteers belong to Bangalore's vibrant IT industry. This should not be surprising

since Bangalore is widely known as the India's premier IT industrial hub and the middle

class in the city is primarily affiliated with this industry. Spotfixing is a local activity which

means one does it in or near an area where they live and work. Teams from many big IT

firms such as InfoSys, Lenovo, McAfee, Oracle, HP, and IBM have been involved in

spotfixes around their offices and in the "Tech Parks" (e.g. Manyat and Bagmane) that their offices are in. But spaces around the offices are not the only spotfix targets. Prominently featured spots include those that the upwardly mobile middle classes of Bangalore shop, eat and play in.[105]

Aside from featuring spotfixes from groups across the country, the Facebook page also invites discussions on topics related to urban filth sharing news articles from local, national and international media, videos cartoons, tweets, and even emails from the group's fans. As is often the case with online comments, the discussion doesn't limit itself to the issue of filth alone but expands to questions related to labor markets, the economy, morality and beyond. Recently, TUI posted an article about the planned introduction of mechanical sweepers in Delhi pointing to the debate about whether instead this could have been an employment opportunity. To this, one person said, "if India wants young people rioting in the streets over unemployment like in France feel free to spend money on expensive machines made from imported materials that eliminate jobs..." Another responded:

> We don't want the majority of the unemployed population holding a broom either, they can be trained to better utilize their skills for manufacturing or service sectors. Mechanize and clean the streets spotlessly, don't need 1000 brooms raking up dust in the process of *cleaning* when 10 machines can do a cleaner, quieter job of it. Also NREGA is enough, we don't need more pointless socialist schemes to keep the population "employed".[106]

In another instance, TUI shared an email from someone who had visited China and has been impressed by the "basic civic sense of people." On his trip, he met a European who told him that "India [was] the most dirtiest country he has seen out of the 30+ countries he has travelled to" and he had been "disgusted by the attitude of our people." This posting spurred

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[105] Examples include commercial neigbourhoods such Bangalore's famous Church Street and the Central Business District, and expensive hotels such as Taj Vivanta, Oberoi and Residency Manor.
[106] The commenter is referring to the National Rural Employment Guarantee Act (NREGA) of 2005 (now referred to as the Mahatma Gandhi NREGA), a social security measure that aims to guarantee the right to work in rural areas by providing at least 100 days of wage employment annually.

a lively online discussion on issues of self-respect, rampant indifference, the need for self-reflection and confronting India's problems that extend far beyond the issue of public filth. In another instance, TUI shared Modi's (2015) speech inaugurating a business summit in Delhi and commented "it is heartening to see Clean India put right on top of the national agenda in a business leaders summit. A clean country makes good business sense and is just good common sense - who can argue with that?" The link between cleanliness and business was not discussed. Modi is right. A clean country makes good business sense.

Aside from the snowballing of their work across the country, the group has received much publicity for their work. There have been numerous articles in domestic and international media showcasing the group and their work, anonymously of course (e.g. see DHNS, 2013; D'Souza, 2013; Fast Company Staff, n.d.; Hariprakash, 2011; Hollis, 2013; Mohan, 2015; Rai, 2013; Rohith, 2014; Tabassum, 2013; TNN, 2015b). Anand Mahindra, a "one of India's most respected corporate leaders . . . who runs a $15bn business conglomerate with operations across 100 countries, and was recently voted one of the most influential voices on twitter globally" tweeted about the group: "Bravo! Whoever's behind this initiative deserves the Bharat Ratna. We need to make this a national movement; Now! theuglyindian.com" (TUI, n.d.-b). A TEDx talk titled "Why is India so filthy?" by TUI's Anamik Nagrik (wearing a mask so as to maintain his anonymity) had been been viewed over 1 million times by July 27, 2014 (TEDx Talks, 2014). By April 10, 2015, this TEDx Talk was already "already the top-viewed TEDx talk out of India" and "No. 79 in the all-time global TEDx videos list," according to a TUI Facebook post (TUI, n.d.-b). Even though TUI is not a company, it was featured as one of the "most innovative companies of 2015" that are

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"transforming the Indian economy" (Fast Company Staff, n.d.). In December 2013, TUI was voted a "Bangalore Hero" as part of the Bangalore Mirror Campaign (Tabassum, 2013). But if they have a sophisticated philosophy on behavior change, they must be aware of the limits. It appears that they are but are intentionally not focused on those issues:

> *Our focus is currently on improving garbage lifting from our streets. What they do with it is a totally different issue. We find it practical to solve one problem at a time! The Landfill issue is a city-level long-term Big Picture issue that a common citizen cannot fix in a few days - whereas a Black Spot is a local issue that is crying to be fixed - and is fixable* (TUI, n.d.-b).

This issue however has spurred several online discussions on the long-term efficacy of spotfixing. Many Facebook commenters ask the question, "But how will this spot stay 'fixed'?" Presumably, this question is not merely an aesthetic one but infrastructural. It points to infrastructural failures on the part of the municipality as much as it does to the continued "ugly behavior" of the perpetrators who might trash the place the next day. In response, TUI almost always points to its idea that "ugly places" encourage "ugly behavior" (its own adaptation of the broken windows theory) often citing examples of places that have been spotfixed and continue to remain so. Where that garbage goes is not a concern they engage with. Maybe a new "black spot" emerges in the place of an nGOG spotfix? Maybe that black spot has been displaced to a location not so readily monitored by TUI's ever-vigilant members? These unanswered questions point further to the class interest manifested spatially in TUI's project.[107]

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[107] Milner (1987) argues "since cleanliness is conceptionalized in India as relatively inexpansible, a certain amount of dirt and impurity is inevitable; this leads to a strategy which focuses on redistributing rather than eliminating dirt; this in turn produces a preoccupation with the cleanliness of private rather than public areas." The TUI has shifted the boundaries of the private to beyond the 'home'. Redistribution of dirt and pre-occupation with cleanliness is taking place at spatial scales different than the private of the home and the public of the outside.

If cleaning up and not littering in public spaces is an imperative performed publicly in the public interest, then managing waste privately within the confines of one's private home is another popular imperative that deserves examination. Much like TUI and SBM, this also demands individual responsibility. However, unlike TUI and SBM, there is much talk of and indeed in some cases even implementation of mandatory behavior change to encourage segregation of waste at-source. Regardless of whether it is mandatory or voluntary, one thing is for certain that behavior change of this kind is necessary and perhaps even vital to solving India's garbage woes. This is the subject of the following section of this paper.

Segregate at source! Disciplining domestic labor

Segregation-at-source refers to the process of separating waste into categories at the point of waste generation such as homes, offices, and schools. The point is to separate waste into different streams so that those streams can be managed (recovered, treated or disposed) separately. This is supposed to optimize the efficiency of stream-based waste management systems where they exist e.g. composting and material recovery. Separate waste streams reduce contamination of recoverable materials, reduce time needed to prepare them as input for the next process stage, and therefore reduce costs of the waste management process. Depending on the municipal infrastructure, waste generators might be required to separate their waste into categories that the infrastructures are equipped to deal with. For instance, some municipalities follow single stream systems where all potentially recyclable material might be separated into different streams at a centralized facility. Others require that waste generators separate out their waste into as many as nine different streams (Collins, 2010). However, the term recycling has become synonymous with the process of separating waste at source. Strictly speaking, recycling is the industrial process whereby materials recovered

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from waste are transformed into new commodities. But it is now commonly used to describe the acts of waste generators of separating their waste even though it is merely the front-end of what is a complex commodity supply chain. Recycling has come to signify not only individual actions of separating waste but also the municipal-industrial processes that follow. Recycling is also widely regarded as a universal environmental virtue even as its actual efficacy towards resource conservation is questioned at least in the U.S. context (MacBride, 2011). Nonetheless, because of the term's pre-eminence as a modern environmental virtue, segregation of waste at-source, as its synonym and its municipal-industrial counterpart, is also considered a similarly virtuous activity. Much like littering is talked about in reference to disciplined public behavior "abroad" as discussed in the previous section, discourses about segregation take a similar angle. One of my informants noted starting a segregation campaign in her neighborhood in Gurgaon, "People wanted it because we told them that everyone around the world does it. San Francisco does it. Everyone travels abroad so they know." At a meeting of the National Society for Clean Cities, the joint municipal commissioner related being "cultured" to segregation behaviors: "A city as cultured as Pune has only 40% segregation" (TNN, 2015c). In another news article, a resident says, "Pune is said to be a developed city, but citizens don't know how to segregate garbage" (Jadhav, 2015). Source segregation is intertwined with narratives of modernity and development where modern citizens in developed societies perform proper functions such as segregating their waste.[108] The importance of the process of waste separation is widely recognized in India as being vital to the optimization of waste management systems and resolving India's mounting waste

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[108] Much like anti-littering and volunteer clean up campaigns, there is an element of how source segregation is good for the country. For instance, MoUD (2000) notes, "It is essential to save the recyclable waste material from going to the waste processing and disposal sites and using up landfill space. Profitable use of such material could be made by salvaging it at source for recycling. This will save national resources and also save the cost and efforts to dispose of such wastes" (p. 182).

problems in policy discourse. *Municipal Solid Waste (Management and Handling) Rules 2000* codified this responsibility of the waste generator for the first time as national legislation (MoEF, 2000): "It shall be the responsibility of generator of wastes to avoid littering and ensure delivery of wastes in accordance with the collection and segregation system to be notified by the municipal authority" [Schedule II, Section 1.3]. The most recent draft version of the updated rules has considerably expanded the definition and duties of the waste generator with regards to source separation of waste (MoEF, 2015)[109]:

> *Every waste generator shall,- (a) segregate and store the waste generated by them in three separate streams namely bio-degradable or wet waste, non bio-degradable or dry waste and domestic hazardous wastes in suitable bins and handover segregated wastes to waste collectors as per the direction by the urban local body from time to time; (b) wrap securely the used sanitary waste as and when generated in a newspaper or suitable bio-degradable wrapping material and place the same in the domestic bin meant for non bio-degradable waste or dry waste; (c) store separately construction and demolition waste in his own premises, as and when generated and shall dispose off as per these rules; and (d) store separately horticulture waste and garden waste in his premises and dispose of the same as may be prescribed by urban local body from time to time* [Section 4.1] . . . *No person shall organise an event or gathering likely to generate solid waste at unlicensed place without intimating the urban local body at least three working days in advance and such person or the organizer of such event shall arrange for segregation of waste at source and ensure handing over of segregated waste to the placed designated by urban local body or to waste collection agency authorised by the urban local body* [Section 4.4] . . . *Every institutional generators of solid waste shall segregate and store the waste generated by them in three separate streams namely bio-degradable or wet waste, non bio-degradable or dry waste and domestic hazardous wastes in suitable bins and handover segregated wastes to authorised waste processing or disposal facilities or deposition centers either at its own or through the authorised waste collection agency* [Section 4.5].

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[109] Various forms of the word segregation appear only 11 times in the old rules as opposed to 59 times in the new ones. Just as the duties of waste generators have expanded, so has the definition of "segregation." In the 2000 version, it was defined as "to separate the municipal solid wastes into the groups of organic, inorganic, recyclables and hazardous wastes" (Section 3(xxi) of MoEF (2000)). In the 2015 version, it is defined as "sorting and separate storage of various components of solid waste namely biodegradable wastes or wet waste, non biodegradable wastes or dry waste- including recyclable waste, combustible waste sanitary waste and non recyclable inert waste, domestic hazardous wastes, e-waste and construction and demolition wastes" (Section 3(xl) of MoEF (2015)). Not only has the definition expanded to include storage of separated waste, it also now several different types of wastes that need to be handled separately.

If the responsibilities of the waste generator as individuals, institutions and as event organizers have been specified in the new draft rules, so have the responsibilities of other actors in the process. The number of other actors that are prescribed duties/responsibilities and authority for execution has also increased, presumably in light of the recognition of the scale and complexity of the problem of waste management that crosses traditional government departmental boundaries.[110] Urban local bodies continue to bear the mandate of generating awareness through IEC activities to enable source segregation behavior change among waste generators. This particular responsibility in the old rules was merely stated as the following: "In order to encourage the citizens, municipal authority shall organize awareness programs for segregation of wastes and shall promote recycling or reuse of segregated materials" (Schedule II, Section 2). In the new rules, the urban local body is responsible for not only creating awareness among waste generators on very specific issues but also to "mandate citizens" to store segregated wastes separately (Section 16.1.2).[111] Unlike the old rules, the new rules specify a timeframe of two years (from the time that the rules are actually notified) for urban local bodies and prescribed authorities for "enforcing

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[110] In the old rules, other actors included the Central Pollution Control Board at the central government level, State Department of Urban Development, State Pollution Control Board and District Magistrate or Deputy Commissioner at the state and district levels, and municipal authority at the city level. In the new rules, at the central government level, duties are prescribed for the Ministry of Environment, Forests and Climate Change, the Ministry of Urban Development, the Department of Fertilisers in the Ministry of Chemicals and the Central Pollution Control Board. At the state and district level, duties are prescribed specifically to the Secretary-in-charge of the Department of Urban Development, the State Pollution Control Board, the Commissioner (or Director of Municipal Administration or Local Bodies), and the District Magistrate (or District Collector or Deputy Commissioner).

[111] Awareness generation in the new rules covers the following topics that are part of the compliance criteria against which the performance of the ULB will be measured: "(i) reducing the generation of waste; (ii) reusing the waste material to the extent possible; (iii) processing food waste through home composting or community composting; (iv) separately store bio-degradable wastes or wet waste and non bio-degradable including recyclable and combustible wastes or dry waste; (v) encouraging waste pickers to take away segregated recyclable material stored at source; (vi) wrapping securely sanitary napkins/pads, tampons, infant and adult diapers, condoms, and menstrual cups before putting in domestic bin meant for non bio-degradable waste; (vii)storing separately domestic hazardous wastes such as contaminated paint drums, pesticide cans, Compact florescent lamps, tube lights, used Ni.cd batteries, used needles and syringes and health care waste; and (viii) storing separately construction and demolition waste at the source of waste generation" (Section 16.1.2(a)).

waste generators to practice segregation" (Section 19.4). Further, in the old rules, there was

no mention of what happens once wastes are segregated at source. In the new rules,

prescribed authorities have been assigned the responsibility of ensuring that separate

collection, storage and transportation infrastructures and systems are in place for the

management of those separate waste streams. Segregation is also recognized as an activity

that doesn't end with the waste generator but one that needs to continue to occur beyond that

point. For instance, dry waste is one of the categories into which waste generators are

required to separate their waste. But dry waste cannot be processed as is. It needs to be

separated into finer categories of recyclable versus non-recyclable and yet further into

different kinds of recyclable wastes. To address this, the new rules direct the State Urban

Development Department to "to ensure that a separate space for segregation, storage and

decentralised processing of Solid Waste is demarcated in the development plan for group

housing or commercial, institutional or any other non-residential complex exceeding 200

dwellings or having a plot area more than 10,000 square meter" (Section 9.1(f)).

This emphasis on segregation in the prime set of rules that govern the management of waste

in India signals its importance in policy discourse. But the rules did not usher in this concept

single handedly. Advocacy efforts by environmental and social activists and organizations,

various reports by expert committees commissioned by the government, and the circulation

of what are considered international best practices by bilateral and multilateral development

institutions likely had much to do with this as well. In 1995, a High Power Committee was

given the charge by the Planning Commission to recommend solutions to the urban waste

management problems. One of the four policy recommendations' of this committee was

"segregation of different types of waste at source" (Planning Commission, 1995, p. 8). A

committee constituted by the Supreme Court published its report in 1999 recommending that source segregation be mandatory (Supreme Court, 1999). Almost a decade later, a report of Standing Committee on Urban Development focused on solid waste management yet again suggested that segregation-at-source was "the most important" yet "most neglected" aspect of solid waste management and to achieve it, more awareness campaigns were needed (Lok Sabha Secretariat, 2008, pp. 53-54). The Ministry of Urban Development noted that they had "had sent an Advisory Note to all the State Governments in October, 2007 urging them to advise their urban local bodies to follow segregation of waste at source" (*ibid.*, p. 37). In their 2010 response, MoUD noted that they had made "necessary provision . . . for household bins for storing of segregated waste into bio-degradable and non-biodegradable portions under Solid Waste Management projects approved under JNNURM" (MoUD, 2010, p. 36). Further, the Ministry has allocated Central grant money to fund upto 5 percent of "IEC activities for promoting segregation of waste at source" (*ibid.*). A Ministry of Environment and Forest committee report in 2010 also arrived at the same recommendation of encouraging segregation of wastes at source through awareness campaigns and such (MoEF, 2010).

In 2013, when the first draft version of the updated rules was published, many organizations with an interest in waste management issues submitted comments individually.[112] Some of them met in Bangalore and formed an network called People's Alliance on Waste to put forth a unified response to the draft rules. Many of the individual organizations' as well as the Alliance's comments asked that segregation-at-source be more meaningfully included in the rules. Shortly thereafter, the Ministry withdrew the draft rules in response to a court order issued by the Karnataka High Court which had found the 2013 draft version to be regressive. The issue of segregation-at-source was central to the Karnataka High Court decision:

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[112] The latest version of the rules discussed thus far is different from the 2013 draft version.

It is pointed out though the definition of the word segregation in 2000 Rules is retained in the 2013 Rules, they have omitted the Schedule-II itself. The effect of deletion of Schedule-II would be segregation of solid waste at the source is given a go by. The segregation of solid waste was prescribed on the basis of the recommendations of the Expert Committee as well as in pursuance of the directions issued by the Supreme Court in more than one case. Accepting the said Rules, it is submitted the authorities throughout the country have spent considerable amount in educating the citizens of this country the need to segregate the waste at source . . . At this juncture of time, without any reason, justification or complaint against this well established system, curiously, in the 2013 Rules, Schedule-II is deleted giving an impression that it is not obligatory any more to segregate the waste at source . . . To the proposed draft rules, the petitioners have filed objections. Considering all the objections by the authorities is one thing, but on the basis of Rules of 2000, acting on the same, the court has passed orders from time to time to implement the said rules in particular, segregation of solid waste at source. In pursuance of the orders passed by this court, the Bruhat Bangalore Mahanagara Palike also has taken steps, spent considerable money and even citizens of Bangalore have come to know what their responsibility is and it is heartening to note that we are getting positive response from them . . . This order is necessary because in 2013 Rules, Rule-9 provides for waste collection, segregation, storage, transportation and processing giving an impression before waste collection there is no segregation. Segregation is done after waste collection. If segregation is to be made after collection, it involves public money. In order to avoid this liability on the public, the Rules wanted the public to segregate the waste and then it is to be collected by the authorities. If effect is given to that provision, it would undo what has been done in the last decade and in particular in Bangalore for the last one year in pursuance of the directions issued by this order. It is impermissible in law (Karnataka High Court, 2013).

The work of one Bangalore-based NGO, Environment Support Group, was crucial in opposing the draft rules and subsequently the passing of the High Court order (ESG, 2013). Shortly thereafter, the Ministry of Environment and Forests appeared before the Karnataka High Court, withdrew the 2013 draft rules and formed a committee to re-revise the rules. It is no surprise that segregation of waste features so prominently in the latest draft rules. The Ministry's last revision effort failed primarily because of its inattention to it. An even more recent order issued by the National Green Tribunal directs "the State Governments, Municipal Corporations, Councils and Committees to levy charges . . . on every household on the basis of 'Polluter Pays' Principle . . . [A] Team shall subsequently decide upon physical inspection that if a particular colony has provided 100% or maximum segregated

waste to the collecting agency, than the residents of that colony would be entitled to a rebate

of 10% on the property tax preferably" (NGT, 2015). Even if the Karnataka High Court is

optimistic about citizens taking responsibility and changing their behaviors, this seems to be

an anomaly.[113] Stories of failure of efforts to get waste generators to separate their waste

abound in the media and in government reports.

When asked what "major issues . . . were responsible for the present grim scenario," MoUD

representatives identified five issues, three of which had to do with segregation of waste:

"Absence of segregation of waste at source"; "Unwillingness of ULBs to introduce

segregation at source;" and "Indifference of citizens and lack of community participation

towards waste management due to lack of awareness" (Lok Sabha Secretariat, 2008, p. 3). At

another point in their report, they say, "indifference of citizens towards inculcating the habit

of segregating wastes" can explain the absence of source segregation *(ibid.,* p. 53). During

one of the meetings of the Standing Committee on Urban Development, on the issue of

collection of wastes separately, a representative from MoEF noted,

> *It is provided in the Municipal Solid Waste Management rules, segregation has to be done and it has to be done at the local level. The municipalities are required to do it at the local level and it should be done at the house level also. But as has been mentioned by one of the Hon'ble Members that it is the question of habit. We do not have the habit. We mix everything and send it. Unless there is inculcation of habits of segregating and sending disposal, things may not improve. Even now we are not doing separately* (ibid., p. 39).

The issue raised by the Standing Committee related to the infrastructure of collection but the

response of the MoEF representative was about habits. In many meetings that I attended

during the course of my fieldwork, segregation was always a question of behavior change,

and never a question of what happens if that behavior does indeed change. Whether or not

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[113] In their contingent valuation study on household behavior in Kolkata, Chakrabarti and Majumder (2009) find that households would be willing to comply with rules that mandate "compulsory segregation of waste at source level" when they know of municipality's problems with waste management (p. 129).

there was a collection, storage, treatment and disposal infrastructure in place or plans to

implement such an infrastructure was never even raised as a question. The conversation

always ended with policymakers bemoaning the unconcerned, indifferent, habit-driven

citizen. In a separate report however, MoEF provides a bit more nuanced account,

> *Although municipalities hold the primary responsibility for solid waste management, the key obstacle is inadequate investment on developing human resources for its management. For instance, in urban areas, solid waste is not segregated and collected properly for treatment and disposal because although home and community segregation programmes exist, the municipal workers are not trained to collect this waste separately nor are they properly motivated to transport or store them separately. This leads to de-motivation among citizen groups to segregate their waste at source* (MoEF, 2010, p. 3).

And if public opinion surveys are to be believed, then the "public" agrees. In the previously

mentioned survey of over 3,000 households in Delhi, we asked a series of questions on

respondents' waste segregation practices at home. About 93 percent of the respondents noted

that they did not segregate their waste. We probed the issue of why they did not segregate

and the most commonly cited reason (about 58 percent of respondents) was that waste

collectors mix the waste anyway, so there is no point in making the extra effort to separate

waste. But the next most commonly cited reason (about 16 percent of the respondents) was

that "family members don't listen even when I ask them to." Not surprisingly, when

disaggregated by gender, men were much more likely to cite this reason than women (22

percent versus 9 percent). This general opinion that women (and often domestic help, a

profession also dominated by women) doesn't listen when asked to segregate waste was

confirmed by participants at several meetings I attended during the course of my fieldwork.

For instance, at one meeting, Dr. Anil Kumar, Director of the Delhi Department of

Environment said, "In Delhi, everyone is too busy to take time and initiative, too busy to do

segregation. House work is done by maids who are unwilling to do segregation." In a news

report, one resident says, "Our domestic help gives the garbage to the wastepicker. We don't have time to either explain the whole concept to her or keep an eye so that she doesn't give the mixed garbage to the wastepicker" (Sudan, 2014). Another resident in the same article says, " What's the use of going through the pain of separating the garbage when it will be mixed by your maid and given to the wastepicker" (*ibid.*).

Women in their roles as housewives or as maids are cast as those responsible for lack of waste segregation at home. Municipal and domestic responsibilities intersect with women emerging as the subject that needs to be disciplined and educated. This is not new either. In the history of sanitary reform in the U.S. for instance, the involvement of women was seen crucial to the extent that sanitation was even termed "municipal housekeeping" in the early part of the 20th century (Melosi, 1981; see also Schultz, 1993 for a more recent discussion of women's labor in waste segregation at home in Germany). Talking about lack of segregation of hazardous waste within the home, a High Power Committee report notes, "Technical problems of the poor segregation of hazardous wastes at source might also be due to lack of awareness or due to the low education of personnel in charge" (Planning Commission, 1995, p. 38). Even though not explicitly stated, it is clear who the "personnel in charge" being referred to here is. A cartoon accompanying a news article shows a woman in a garbage throwing competition (Gupta, 2015; see Figure 27). Featuring a woman in the cartoon is likely not accidental.

Figure 27. Newspaper cartoon showing a woman competing in a garbage throwing competition[114]

As mentioned earlier, awareness and education campaigns are seen as crucial to instilling behavior change. But if the "public" needs to be educated on this matter, then it must not already have such knowledge. One news report from Mumbai concludes, "Litter bins in the city have markers and colour segregation, but many Mumbaikars cannot differentiate between wet and dry waste" (Rebello, 2014). One set of questions in the previously mentioned survey focused on their knowledge of segregation categories, particularly the difference between biodegradable and non-biodegradable waste—categories that have often been used in awareness campaigns by the Delhi government. Only about 40 percent of respondents claimed to know the difference. Perhaps unsuprisingly however, women were more likely to say that they knew the difference than men (44 percent versus 33 percent). To test their knowledge further, we asked if they thought that metals and glass were biodegradable materials. Only about 20 percent responded with the right answer. Once

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[114] Source: Gupta (2015)

again, women were much more likely to respond with the right answer than men (29 percent versus 20 percent). Women seem to know about waste segregation a lot more than men do.[115]

Yet, awareness campaigns must target women specifically. In its recommendations, the Standing Committee on Urban Development noted,

> *The Committee, therefore, recommend that the Government should boost up measures for Information, Education and Communication (IEC) of the public on the matter through print and electronic media, NGOs, student community, women, institutions, etc., at all available opportunities* (Lok Sabha Secretariat, 2008, pp. 53-54).

Note the Committee's mention of women specifically as a crucial stakeholder. In another section of the report on "Different Stakeholders and their Roles in Sustainable Solid Waste Management," one of the stakeholders is the "Public (including school children and housewives)" that "could help in reduction and segregation of waste at source" (*ibid.*, p. 31). This specific emphasis on women reveals that discourses of source segregation have women as the target of behavior change campaigns. But discourses aside, in practical terms municipal responsibility is turned into domestic responsibility. Without their labors of segregation, municipal waste management systems do not and will not function as planned.[116]

Conclusion: Erasing the labors of necessity

The three types of behavior change discussed in the paper so far highlight the need for voluntary labor of different kinds—of cleaning up public spaces, of disciplining the self and others to not litter, and of segregating waste at home—to clean the country. Highlighting and showcasing these types of labor also renders invisible the ongoing labor of cleaning the city.

[115] In their research comparing men and women's attitudes towards waste management in Lusaka, Nchito and Myers (2004) found that women "care more" than men but a "broader male-dominated context" hinders their ability to fully contribute to finding solutions (pp. 126-127).

[116] The results of a contingent valuation study confirms the necessity of women's labor in making source segregation projects successful: "the availability of non-working females in the family increases the likelihood" of participation in the project (Sarkhel and Banerjee, 2009, p. 625).

Thousands of municipal employees and contract workers perform the labor of street sweeping in cities across the country. Thousands of informal sector waste collectors (or waste pickers) roam the streets to pick recyclable materials from litter in public spaces to earn a livelihood. Thousands in the informal economy of waste conduct the work of painstakingly segregating recyclable materials from mixed waste to make a living. Yet others—*kabariwalas*—go from house to house to buy higher-value recyclable materials that they then segregate and aggregate to sell onward for their subsistence. The ability of these various actors to make money directly depends on their ability to segregate waste quickly and precisely (see more of this in Chapter 2). Finally, millions of women in their roles as homemakers and/or domestic help perform the work of managing household trash, many segregating and keeping aside high value recyclable materials to sell to the *kabariwalas* to meagerly supplement their household budgets. The biggest difference between the mundane quotidian labors of these workers are different from the *voluntary* labor discussed in this chapter is that they are *necessary*. This labor of necessity is the means of subsistence for those that need to perform it on a daily basis. They do this not to fulfill abstract ideologies of civic duty, responsibility, environmentalism, citizenship or nation-building but simply to maintain their precarious economic positions in a system that continues to be rigidly structured by hierarchies of class, caste and gender.

I do not mean to suggest that the people behind designing and those participating in these campaigns are oblivious to these labors of necessity. In fact, they are not. TUI, for instance, in a news column feature the work of a municipal garbage truck driver who is one among the "very hardworking lot" who "get no holidays. The street sweepers are expected to report 7 days a week at 7am- they get Wednesday and Sunday afternoons off. Really!" (TUI, 2014a).

On their website, they feature some "not-so-ugly Indians" among who prominently stand the

"BBMP garbage staff and street cleaners" as "the real heroes of this initiative. If only they

were treated with more respect and dignity...." (TUI, n.d.-a). Modi, in associating SBM with

Gandhi, highlights the work of sanitation workers but tries to disrupt the long-standing

relationship between caste and dirty work, "Cleanliness is not only the responsibility of the

'safaai kaamgar', it is the responsibility of [1.25 billion] Indians" (Modi, 2014c). Similarly,

many advocates of source segregation within the government acknowledge the work of

segregation that informal workers already do. Further, many also argue that one key reason

for segregating waste at source is to protect the occupational health and safety of waste

handlers (Lok Sabha Secretariat, 2008; Planning Commission, 1995). But this is all merely

rhetoric, which masks the material reality reflected and engendered by the underlying

ideology and practices.

Plenty has been written about the formation of neoliberal subjects as citizen-consumers that

enact an ideology through a display of both civic-mindedness and service consumers. The

SBM in its focus on behavior change and on funding solid waste management initiatives tries

to do both—create responsible citizens as well as provide better waste management services

by financially supporting waste management projects. TUI on the other hand, shows the

emergence of such responsibility voluntarily. Their discursive strategy however also shows a

different kind of a neoliberal subject in the making that moves beyond the assertion of class

power through a simple "I pay taxes therefore I demand services" logic. Instead, the logic is

that "I pay too little taxes and therefore I cannot demand the level of services that I want,

therefore, I have to take matters into my own hands by literally cleaning the city with my

own hands and/or by paying for private services from own pocket." This signals the

emergence of a new kind of a relationship between the citizen and the state. Unlike previous analyses of this relationship that have argued for middle class monopoly over public services (which continues to be the case), here we see the emergence of a subject that recognizes the fiscal and administrative capacity constraints of the state. Instead of demanding action from the state through legal channels or political forms of civic engagement, the subject is explicitly apolitical, doing seemingly apolitical things on their own, much like Modi had asked for in his SBM inaugural speech.

But as I have shown in this chapter, these are far from apolitical actions. They embody the class, caste, and gender privileges of those profess them. First, the particular ideas of urban aesthetics espoused by TUI for instance are far from being normative or universal. Instead, they inadvertently reveal underlying class interests. The objects of derision—people peeing in public or domestic servants not segregating waste as they are told to, for instance—the people whose behaviors need to change come from different classes and castes than those who are in charge of imagining particular urban modernities and deciding what fits and doesn't fit into it. Second, TUI in its recognition and acceptance of government failures to provide services and its ideological support of private action, and SBM in its funding of waste management projects through public-private partnerships, reveals an ideological and material support for broader projects of neoliberal public sector reforms. As discussed in detail in Chapter 2, corporate interests in public-private partnerships render invisible the work of the informal sector intentionally with the aim and often the effect of materially evicting them from their means of subsistence.

Third, talking about cleaning cities is easier than dealing systematically and structurally with questions of labor. Leo Saldanha of ESG in Bangalore, whose efforts were crucial to the

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revoking of the first draft update to the solid waste rules in 2013, confessed, "It is easy for the government to tell people to segregate at source but much harder for them to say that workers rights are important." He said this in reference to an ongoing labor dispute in Bangalore where contract *pourakarmikas* (sanitation workers on contract) has not been paid for the past 6 months. In the litigation process, even though the judges agreed that labor rights were important, the issues of contract workers were not considered in the case. In another telling instance, on April 1, 2015, as if playing a cruel April fools joke, two news headlines featured prominently on my Google Alert—one about a sanitation workers' strike in Delhi and the other about an Indian Army team heading to scale the Everest to clean 4 tons of trash from the summit's trails as part of Modi's SBM. As 12,000 sanitation workers in Delhi went on strike dumping heaps of garbage at traffic intersections in protest of unpaid salaries turning Delhi into the "garbage capital," a 34-member team set off to Nepal to take "Our prime minister's message of Swachh Bharat . . . to the top of the world and from there spread it across the globe" (Zee Media Bureau, 2015b; Sawant, 2015).

Changes in individual behavior are good especially if they mean better waste management systems and cleaner cities. Segregation-at-source campaigns for instance ask that ULBs "sensitize . . . people involved in door to door collection to understand the significance of segregated municipal waste" (Lok Sabha Secretariat, 2008, p. 38). But those "people" already do "understand the significance" not because it's a civic imperative but because their livelihoods depend on it. Because of their hard labors, we have an incredibly efficient recycling system. The problem is the aggregate waste we produce, not per capita but total waste we produce collectively. On a household level our recycling rates, through the *kabariwala* system might compare if not perhaps even exceed many developed country

norms. This is made possible through the labors of women (as homemakers and housewives) and workers in the informal economy of waste. But this is not deemed enough: "In all parts of the country, people by and large do salvage re-usable or saleable material from waste and sell it for a price such as newspaper, glass bottles, empty tins, plastic bags, old clothes etc., and to that extent such reusable /recyclable waste material is not thrown out for disposal. However, a lot of recyclable dry waste . . . is not segregated and is thrown on the streets along with domestic / trade / institutional waste . . . Segregation of recyclable waste at source is thus not seriously practiced by households and establishments" (Supreme Court, 1995, Section 2.3.2). The existing system is good but not good enough.

This might be because the aggregate waste produced seems "unmanageable" in light of already financially and technically constrained existing systems. This might also be because the existing system does a lot but doesn't go all the way. Informal sector workers segregate waste not to make the city's waste management systems better but to extract materials of value for themselves. If waste generators segregated wastes, then not only would their work be easier and safer, the municipalities would have the segregated streams of waste that they want so badly. But what happens if the municipality does indeed get those beautifully segregated waste streams? This requires not a behavioral but an infrastructural solution that not many in policy and administrative decision-making capacities are willing to talk about. Similarly informal sector workers reduce the amount of litter on the street by picking up recycling materials but they do not clean the entire street. The streets have litter not only because people litter, but also because there are not enough garbage bins or garbage bins are overflowing because they are not cleared often enough. This is yet another infrastructural problem that is hardly talked about. Instead, ascribing the problem to a "public" that is

refusing to be disciplined also erases the work of that portion of the "public" that is doing what is needed, but only to survive, not to win a volunteer-of-the-year award. They are not solving the problem but they are most certainly reducing the extent of that problem and can be a part of a solution to the problem, were they accorded the recognition and legitimacy to do so. This is also an infrastructural problem, not a behavioral one. Yet, infrastructural concerns, even when brought up in public discussion and debate, are mostly secondary to the question of behavior change. And maybe that is what is needed considering the poor financial and technical capacities of ULBs across the country. Maybe the responsibility of the individual does need to exceed what might otherwise be on par with global norms? The responsible subject might need to continue to morph from an Ugly Indian into a Beautiful Indian. And these three campaigns are certainly sowing the seeds for that to happen.

Lastly, an examination of these three campaigns reveals something curious about notions of "public" and "private," an issue that many scholars have been deliberating in the Indian context especially because of the stark difference between the cleanliness of the private home versus the outside. In a discussion on the TUI Facebook page, on commenter grappled with this question, "Why do we keep our homes clean and our streets dirty? One of the reason is that most Indian people have maids/servants doing all the cleaning at home. So when they litter the streets, they expect someone else to clean up after them!" TUI responded, "Very true. This logic extends to areas where even the maids/servants themselves live - we distinguish between 'private' and 'public' spaces - private space is 'my' job, public space is someone else's job." What the commenter was explaining through a class analysis, TUI respondent explained more generally as a public versus private issue. This discussion reveals what is common to all three campaigns—a curious reversal of the public and private. Litter

and dirty urban spaces are public issues that result from private actions no doubt. But they are also issues that point to a lack of public infrastructures. Yet, in their discourse, both SBM and TUI privatize the responsibility of public spaces entirely onto the individual. Segregation of waste within the home, on the contrary is a private issue with no doubt consequences for public systems of waste management and service delivery. Yet, this private issue is made public through policy interventions mandating household behavior change. My discussion of these three campaigns shows that they are as much about disrupting the traditional boundaries between the public and private as they are about making India clean.

Chapter 6. Modernity as garbage / Garbage as modernity: Conclusions for thought and practice

One frequently hears various versions of the following statement in popular media and policy discourse: India has a garbage problem. This is no doubt true. Ever increasing quantities and types of garbage pose a problem to those who suffer from its repercussions and to those who are assigned or have assumed the responsibility of dealing with it. Garbage poses a threat to contemporary Indian modernity, ideologically and materially. But overarching statements such as these do not get us very far in understanding the problem and finding ways to address it. I hope that this dissertation has contributed to an understanding of waste as a complex problem, struggles over which and against which are just as complex.

It is fair to say that most of us readily understand that beyond being a mere technical problem, garbage is a social one. The problem would not exist without people who produce it, manage it, or suffer from its consequences. What I hope this dissertation has shown is the need for a deeper examination of garbage as a social problem in order to understand what the problem is and why it is a problem. In the preceding chapters, I hope I have demonstrated that garbage matters in myriad ways. For instance, what matters is who generates what type of garbage; why, how and by whom it is removed; and what finally becomes of that garbage (e.g. recycled products, energy, compost); who talks about it, how, and in what venues; what perceptions people have and how they are linked to ideologies and actions. Garbage matters in all of these and many other ways. By putting these diverse ideas and understandings of waste together, we get a complex picture of what the problem is and why it appears as a problem in the ways that it does. Only once we have such an understanding, could we even begin to develop social and technical ways of addressing and solving a social and technical problem.

In what follows, I briefly reiterate the key findings from the previous chapters. I then draw some overall conclusions about the relationship between modernity and garbage. In the final section, I put forth some practical recommendations.

Summary of chapter-wise findings

In chapter two, I started with contextualizing the recent history of waste and waste management within broader politico-economic shifts in policy and public administrative practice in post-liberalization India. Economic reforms of the early 1990s have brought remarkable economic growth, much of it restricted to cities and particular classes within those cities. But urban infrastructures are failing, compromising the ability of cities to deliver on the promises of economic growth. At the same time, however, demand for urban services is increasing and municipal responsibilities for the provision of those services are being encoded through legislations, policies and rules. Private investment in and privatization of urban infrastructure assets and services has emerged as the preferred solution to meet the infrastructure deficit—the gap between demand for and supply of infrastructure assets and services. Waste management offers a great example of these politico-economic shifts governing infrastructure management. But somewhat unlike other infrastructure sectors, waste management is unique in having sustained an informal industry that provides certain services—collection, segregation and recycling. New modes of privatization of waste and waste management are displacing old modes of private service delivery.

Economic theories have provided intellectual justification for public sector reforms that argue for privatization. Within waste management, competition and regulated oligopolies or monopolies have been argued to be more efficient than state-owned enterprises. Waste

collection is said to exhibit natural monopoly conditions due to the economies of scale, density and contiguity that can be realized in service provision. These theories have been applied in developed countries such as the U.S. and have led to the emergence of national oligopolies in the waste sector, betraying a contradiction between theory and practice. What has emerged in the U.S. is a highly consolidated market structure with a handful of participants that control the entire market nationally. Within India, the contemporary landscape of private waste management firms is showing a similar trend despite the ongoing failures of those firms to deliver according to contractual conditions. Further, an analysis of the old private mode of service delivery shows that it meets the conditions and requirements of economic theories quite well, albeit with a very different capital-labor mix. Yet, the state does not recognize the old industry as valid economic actors and is privileging new private actors. Waste collection in the Indian case might also be characterized as a natural monopoly but on a very small scale because it uses a capital-labor mix that is vastly different than one studied by economists in the developed world. Yet, monopolies and oligopolies are emerging on urban, regional, and national scales because proponents of public sector reform rely on economic theories developed in completely different contexts. Economic theories are used to justify lateral and vertical consolidation and subsequently displacement and dispossession in an industry that looks quite different in its 'natural' condition.

But those who are threatened with displacement and dispossession are not passively watching. Organizations advocating for their rights to a livelihood have emerged at local, national, and international levels. As chapter three has shown, these organizations have to confront discourses of criminality, illegality and exploitation that threaten to delegitimize the place of informal workers in contemporary India. These organizations know that business-as-

usual will not work. Therefore, many organizations have started to formalize workers in order to secure their rights to a livelihood. Although the meanings and practices of formalization vary widely, there are certain shared tactics that respond directly to the discourses that attempt to justify their dispossession. These tactics include professionalization of informal work through identification cards, uniforms and a set of operational protocols that discipline workers even as they guarantee livelihood security. Abiding by the new rules of professionalization or formalization requires that workers spend their own time and sometimes money to attend trainings or meetings, to clean uniforms regularly, to get new identification cards before the old ones expire, and to perform work according to new rules. Workers, for the most part, have welcomed and comply with these new forms of discipline for the sake of livelihood security but they are well aware of the limits of certain tactics and contest their necessity at times.

Formalization creates forms of discipline that straddle strategy and necessity. Informal worker organizations think of formalization as a strategy to secure their livelihoods for workers in the short, medium or long-terms against the vagaries of a politico-economic climate that constantly threatens to dispossess them. Securing contracts with the state as a formal organization means securing livelihoods in otherwise precarious market conditions. But such forms of discipline are also a necessity. Anxieties and insecurities of the upper classes require that the lower classes be disciplined in new ways. Newly coded responsibilities of the state require that workers provide services in new and professional ways. Failure to comply with these demands will mean that the state will outsource waste management service provision to firms that promise professional services. The extra labor that workers now perform benefits themselves by securing their livelihoods, their

organizations by developing their reputations, and the state by subsidizing municipal services to an even greater extent than they were before.

But even as livelihoods for some workers might be secured for the time being, new technologies are being promoted that threaten to undermine their economic rights on a large scale. In chapter four, I focused on one such increasingly promoted technology: WtE or incineration. In Delhi, this technology had been tried in the past and failed because of the low calorific value of waste inputs. Many subsequent government reports have recommended that incineration technologies are not appropriate in the Indian context because the calorific value of the waste is too low and moisture content too high. These reports also recognize that the calorific value of the waste is low because the informal sector extracts high calorific value and combustible materials from the waste stream for recycling.

If waste composition currently does not allow for the successful implementation of this technology, then something needs to change if this technology is going to be implemented regardless. WtE technologies require that the service provider control the entire end-to-end waste management process so that high calorific value materials are retained in the stream for incineration. Such control will have disastrous effects on the informal sector and the recycling economy. Nonetheless, WtE technologies are being promoted widely because they promise a quick fix solution to a growing problem: incineration significantly reduce waste quantities and does not require as much land as other treatment or disposal alternatives. As chapter four has shown however, there are also aesthetic and ideological reasons why these technologies are being promoted. In promoting WtE technologies, their advocates offer a promise of technological, social and ecological modernization in addition to practical problem solving. Relying on teleological narratives of modernization, WtE advocates have

accorded these technologies a legitimate place in India's future as they simultaneously attempt to delegitimize alternative technologies and people from that future. Composition of waste has thus far guided debates in policy-making over the right solution choice for India's waste management problems. Composition of waste is no longer relevant because what may not have seemed like an appropriate technology choice in the past can be made appropriate through control of waste as property and dispossession of informal workers from the urban commons of waste.

Even as the appropriate infrastructural solutions are discussed and debated, the Prime Minister has embarked on a campaign that frames the problem in a very different way—a problem of culture and habits, a problem of public indifference to filth in public spaces. Framing the problem in such a way requires a different kind of a solution. If the problem is one of behavior, then the way to address it must be through behavior change. The Prime Minister is not alone in thinking so, however. Numerous grassroots groups across the country have similarly been thinking along similar lines and have taken to the streets, not in protest, but to clean up those streets and public spaces. In chapter five, I examine three 'movements' or campaigns that focus on behavior change and require voluntary labor: the Prime Minister's Swachh Bharat Mission (SBM), an anonymous volunteer clean-up group called The Ugly Indian (TUI), and policy prescriptions that ask for segregation of waste at source. Many scholars have noted the paradox of clean private spaces and dirty public spaces in India. As this chapter has shown, these new campaigns and movements rely on the disruption of traditional boundaries of public and private. The problem of filth in public is privatized through anti-littering and volunteer clean up of public spaces. Private ways of dealing with

trash at home are increasingly made a public issue through policy devices that encourage or sometimes even mandate segregation at source.

But these movements also do two other crucial things. First, by focusing on behavior change, the problem is construed as a cultural one, not an infrastructural one. In doing so, the aesthetic and cultural is privileged over the infrastructural. Second, the poor, lower castes and women often already perform the labors of cleaning public spaces and segregating waste, not as volunteers but as part of their daily, mundane labor to make a living. But in these projects, volunteerism and volunteer labor of the privileged in cleaning public spaces is made visible while the necessary labors of the marginalized are made even more invisible. In doing so, these projects reveal their class, caste and gendered nature.

In the following sections of this chapter, I will do two things. First, I will attempt to abstract my findings into a broad understanding of the relationship between garbage and modernity. Second, returning to the spirit in which I conducted my field research, of trying to be useful, I will summarize some practical implications of my work.

Modernity/Garbage: Conclusions for thought

The term modernity conjures up a specific gestalt: images, ideas and of ways of being modern. Urban modernity invokes an even more specific gestalt, a particular kind of a glittering city, for instance. A vast existing literature on world cities and global cities has engaged with the circulation, reproduction, and adoption of the ideas and practices of modern city making (see for instance Goldman, 2011; Roy, 2011; Sassen, 2005 among many others). Particular visions of urban modernity that world-class cities promise, act as ready templates to be aspired to, adopted and adapted (McCann and Ward, 2010). World-class city as metaphor and aspiration, at least in terms of urban waste management systems in India, holds

a powerful place as rhetoric and practice for urban policy makers. Corporatization of waste management systems, formalization of informal systems, introduction of new technologies, and the disciplining of urban citizens—provide testimony to the phantasmagoric powers of world-class city aspirations of decision-makers and urban inhabitants alike.

But existing urban modernity in Indian cities is starkly different than the gestalt of world-class cities. "Human waste" and "wasted humans" sit alongside things and people of value (Bauman, 2004). Slums sit along high-rise buildings. Piles of garbage sit outside sanitized, air-conditioned malls. Modernity must be defined against an opposite, even as those categories—modern and not-modern—are dialectically related. In urban planning for instance, Ananya Roy (2005) has argued that the "informal is an important epistemology for planning" (p. 156). The "apparatus of planning" produces the informal as "unplanned and unplannable" (pp. 155-156). Zygmunt Bauman (2004) has similarly argued,

> *The production of 'human waste', or more correctly wasted humans . . . is an inevitable outcome of modernization, and an inseparable accompaniment of modernity. It is an inescapable side-effect of order-building (each order casts some parts of the extant population as 'out of place', 'unfit' or 'undesirable') and of economic progress (that cannot proceed without degrading and devaluing the previously effective modes of 'making a living' and therefore cannot but deprive their practitioners of their livelihood)* (p. 5).

This is modernity. High-rise buildings would not exist were it not for the slums and the laboring bodies in those slums. Malls would cease to exist if they did not produce the garbage that lies right outside them. Yet high-rise buildings and malls must be protect against the threat of disorder that the slums and garbage piles pose to their secure and sanitized existence. This "paradoxical unity, a unity of disunity" is what Marshall Berman (1982) was referring to: "To be modern is to find ourselves in an environment that promises adventure, power, joy, growth, transformation of ourselves and the world—and, at the same time, that

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threatens to destroy everything we have, everything we know, everything we are . . . To be modern is to be a part of a universe in which, as Marx said, 'all that is solid melts into air'" (p. 15).

Modernity, therefore, cannot be a stable end-point because it constantly produces the conditions that threaten its own demise. Instead, it is the perpetual state of *becoming:* "To 'be modern' means to modernize—compulsively, obsessively; not so much just 'to be' let alone to keep its identity intact, but forever 'becoming', avoiding completion, staying underdefined . . . A hundred years ago 'to be modern' meant to chase 'the final state of perfection'—now it means an infinity of improvement, with no 'final state' in sight and none desired" (Bauman, 2012, p. 2). Waste has a special relationship with modernity, one that marks dependence and antagonism simultaneously: "Modernity produces waste, but without waste on which to operate there is also no modernisation. The idea of 'waste' thus involves a dialectical symbolic process in which there is a simultaneous production of that which must be disposed of" (Cooper, 2010, p. 1120). Much like modernity, waste is also in a perpetual state of *becoming* (and *unbecoming*) (Gregson and Crang, 2010). Much like modernity in a compulsive, obsessive chase for an unreachable final state of perfection, waste is what motivates a constant search for value, of turning what has no value into value (O'Brien, 1999).

Modernity produces waste quite literally, as matter that needs to be dealt with. Economic growth means more consumption of stuff. At the end of its life, this stuff must be disposed of or reincarnated into new stuff. Not only is there lots of stuff that needs to be dealt with, there are newer types of stuff. This is a problem for both the formal and informal systems of waste management. For instance, as markers of modernity, plastics also pose unique problems of

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dealing with their end-of-life.[117] Plastics increase the shelf life of consumables so they can be

reach a larger market over longer periods of time. But the rise in the consumption of plastics,

and therefore plastic wastes, worries everyone. According to a CPCB report, India generates

5.6 million tons of plastic waste annually of which 40% is not collected or recycled (CPCB,

2013). In response, the Supreme Court said, "We are sitting on a plastic time bomb"

(Mahapatra, 2013). For those who handle newer types of waste, categorization and decisions

about their potential value pose a problem. Katherine Boo (2012) describes her protagonist's

struggles against such a dilemma: "Rich people's garbage was every year more complex, rife

with hybrid materials, impurities, impostors. Planks that looked like wood were shot through

with plastic. How was he to classify a loofah?" (p. 13). To be able to manage waste, we must

know it—its quantities, its physical, chemical and biological properties. Yet, modernity

constantly renders it unknowable. Modernity compromises its own desires for order and

control.

While the matter of waste reflects the underbelly of modernity, as a problem it requires

modern ways of managing. But waste is a complex object that does not allow for easy

administrative and bureaucratic forms of planning and control. An examination of the place

of waste in the government's administrative and bureaucratic apparatus reveals its refusal to

be tamed as an administrative and bureaucratic object. For a long time, the management of

urban waste was under the authority of state governments. With the passing of the 74th

Constitutional Amendment however, the authority was transferred to municipalities and

urban local bodies (ULBs). Yet the central government has consistently intervened in how

urban waste should be managed, not only through policies and guidelines as the role was

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[117] A foreword to a report on plastics in India notes, "Plastics have moulded the modern world and transformed the quality of life" (ICPE, 2003).

intended to be but also through financing programs and the promotion of specific technologies. Within the central government, various ministries are involved in finding ways to manage the problem. The Ministry of Environment and Forests (MoEF) for instance, owns the national rules governing waste disposal. But the Ministry of Urban Development (MoUD) is in charge of not only implementing those rules but also issuing guidelines and conducting research and assessments on the problems of solid waste management. Further, SBM requires that MoUD be responsible for implementing the program in urban areas and the Ministry of Drinking Water and Sanitation (MDWS) in rural areas. The Ministry of New and Renewable Energy (MNRE) is increasingly being involved as waste-to-energy (WtE) projects gain ascendance in waste management policy and practice. The erstwhile Planning Commission (now Niti Aayog) is involved in long-term financial and infrastructural planning for the country's waste management needs. The Ministry of Finance (MoF) is responsible for guiding and regulating public-private partnerships (PPPs) in all sectors including waste management.

Perhaps this is a symptom of large bureaucracies in general where single 'problems' are managed by multiple entities and single entities manage multiple 'problems'. Each organization conducts its own assessments on what the current state of waste is and what India needs to address it. While some of these assessments are coordinated between entities, others are completely independent. Some rely on the same sources of existing information, others conduct their own new research. Although I cannot say this with the certainty of rigorous analysis, waste may be unique compared to other issues managed by the modern state. No doubt, other 'problems' of modernity are similar bureaucratic chaos but waste, even as material alone is complex enough. Within the bureaucratic apparatus of the Indian state,

waste is homeless, roaming the corridors of various ministries in search of the right place to be. Managing waste with the involvement of so many different organizational entities appears to be an administrative and bureaucratic nightmare. Within the bureaucratic apparatus of the state, waste is liminal (Gille, 2007).

But ways of dealing with waste also need to be modern both a personal and infrastructural sense. As I have shown in this dissertation, modern ways of dealing with waste require workers in uniforms, firms that use garbage trucks (as opposed to individuals using rickshaws) and high-tech solutions such as WtE. Old ways of managing waste do not fit the aspirations of world-class cities. Technologies such as WtE fit well into a teleological notion of progress. As waste gets more and more complex, systems to manage it must similarly become more and more technologically, socially and operationally advanced. In the modern world, formal systems must replace informal ones. Machines must replace manual labor. Infrastructure aside, people also need to become modern. The moderns do not litter; they segregate their waste and even volunteer to clean up urban spaces. Modernity requires discipline and control: of those who manage the waste, of those who produce the waste, and of waste itself.

Scholars grappling with understanding and defining modern life have thought of it as being "suffused with the sense of the fleeting, the ephemeral, the fragmentary, and the contingent" (Harvey, 1990, p. 11). Take Berman (1982) for example, who describes modernity as "a maelstrom of perpetual disintegration and renewal, of struggle and contradiction, of ambiguity and anguish" (p. 15). But as Harvey (1990) as shown, to understand modernity (and post-modernity or Bauman's liquid modernity), we must understand the nature and process of capitalist modernization. Drawing on Marx's insights on the process of capitalist

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modernization, Harvey has urged us to see the contradictions of modernity as the contradictions of capitalism: "Capitalism . . . is a social system internalizing rules that ensure it will remain a permanently revolutionary and disruptive force in its own world history. If, therefore, 'the only secure thing about modernity is insecurity,' then it is not hard to see from where that insecurity derives" (Harvey, 1990, p. 107).

As this dissertation has shown, the "disintegration and renewal", the "struggle and contradiction", the "ambiguity and anguish" of modernity is inherent in the process of modernization in India in general and the modernization of waste management more specifically. It involves real people struggling against other real people and real things. Bauman (2004) thinks of this in terms of human waste and wasted humans: "The 'problems of (human) waste and (human) waste disposal' weigh ever more heavily on the liquid modern, consumerist culture of individualization. They saturate all the most important sectors of social life, tending to dominate life strategies and colour the most important life activities, prompting them to generate their own *sui generis* waste: stillborn, unfit, invalid or unviable human relationships, born with the mark of impending wastage" (p. 7). Bauman is talking about those who are "the 'excessive' and 'redundant', that is the population of those who either could not or were not wished to be recognized or allowed to stay" (p. 5). To Bauman, waste material and "wasted humans" are both symptoms of our "liquid modernity". Modernity creates them as problems and then is challenged to deal with them as problems. Much of this dissertation has focused on a particular type of wasted humans—those that eke a livelihood from modernity's discards. If wasted humans are a general mark of and a problem for liquid modernity, then those who survive on modernity's waste are the "wasted humans" of "human waste." They signify the problems of modernity in starkly visible ways:

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one problem—wasted humans—survives on another problem—waste itself. They must, as they do, struggle to carve out a space for themselves within modernity even though modernity is what makes their economic existence even possible.

But what if we were to replace the term "modernity" with "capitalism." Capitalism necessarily produces waste and wasted humans. The antagonistic yet necessary relationship between capitalism and waste has been well studied (e.g. Henderson, 2011; Neocleous, 2011; O'Brien, 1999; O'Connor, 1994). The relationship between 'wasted humans' and capitalism is also well studied. For instance, Neocleous (2011) urges us to understand the development and expansion of capitalism as no less than a "war on waste"—a war against "uncultivated land and idle labor" (p. 508). By contrast, Yates (2011) has argued that by reducing labor to a factor of production, capitalism not only 'wastes' the laboring body at accelerated rates, it also excretes those laboring bodies as the unemployed and the underemployed as exigencies of the system. Disposability of humans or human-as-waste is a fundamental condition of the capitalist mode of production. Capitalism must fight waste even though it constantly produces it and indeed even thrives on it.

In this vein, I hope this dissertation has shown how struggles over waste in contemporary India are manifested as the general contradictions of capitalist modernity. Older systems of waste management must be modernized not just because such a transformation allows for the realization of abstract promises of modernity or that such transformation might radically improve, and therefore modernize, the quality of life of urban residents to whom garbage poses real problems. Instead, the management of waste provides an opportunity for the absorption of surplus capital. Large and increasing quantities of waste make the potential of large-scale private investment particularly lucrative. Existing informal systems appear as

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'blanks' on the landscape of waste management, leaving the possibility of formal sector entry open. But this shift requires state intervention. The passing of increasingly stringent regulations that municipalize responsibility for waste management also open up the possibility of private enterprises assuming that responsibility for profit. The informal sector responds through organizing and demanding legitimacy for their place in modernized waste management systems. But to secure such a place, they must discipline themselves to certain standards of professionalism without being paid for that extra labor. They must act like wage labor even if they are not paid wages. They must constantly try and convince the state of the necessity of their labors for managing the seemingly 'unmanageable' problem of waste. Liberal ideologies of the necessity of their emancipation attempt to modernize them by 'freeing' them from the chains that bind them to discards of modern life.

If the modern must only realize itself against the non-modern, this opposition manifests in other dualisms as well:, property vs. commons, private vs. public, formal vs. informal etc. As a sign and problem of modernity, waste uncomfortably straddles these opposites; it is liminal (Gille, 2007). Contemporary struggles over waste are framed as struggles between these opposing categories. Should waste be private property or continue to exist as commons? Is waste a private problem or a public one? Should systems of managing waste be formal or continue to remain informal? Are workers in informal systems legal or illegal? Should waste management services be publicly or privately provided? While some of these questions seem rhetorical, they are in fact not. Some already have answers that predict the outcome of the struggle: who the winners and losers are. The following section of this chapter offers some recommendations on how to make the losers lose less.

Modernity/Garbage: Conclusions for practice

As mentioned earlier, I am writing this section in the same spirit in which I chose to conduct

the fieldwork of this dissertation. But before I proceed, I want to add a note of caution. These

recommendations are not mine alone. They have emerged from several discussions and

readings over the past three or so years. But many of these recommendations are also already

well accepted by advocates of the informal sector within the NGO community, the

government, and international development institutions. The reason why I feel that it's

important to reiterate some of them is because they relate directly to some of the conclusions

that I have drawn in the previous chapters.

Socially progressive policy making with regards to the informal sector in India exists

(Chintan, n.d.). Policies are great but they also need to be actually implemented. For

instance, a 2008 CAG waste management performance audit found that despite the existence

of national policies such as the National Environmental Policy that explicitly asks that the

informal sector be given "legal recognition," the implementing entities at the central and state

levels had failed to do so (CAG, 2008, p. 26). At the central level, the MoEF had neither

recognized the informal sector (i.e. not provided the sector any legal protections through

constitutional acts or legislations) nor conducted an assessment of the "economic value" of

their contribution (p. 33). Of the 24 states surveyed, only five had recognized the role of rag

pickers in waste reduction and recycling in some form. None of the surveyed states had

verifiably assessed the economic value of the contribution of the informal sector (*ibid.*).

Advocates of the informal sector need to continue to fight, as they do, for policies inclusive

of the informal sector but the struggle must not end there. They also need to fight for the

implementation of those existing policies.

In earlier drafts of this dissertation, one of the major criticisms was to clarify what the informal sector does and does not do. The sector does a great job of recycling but that's only one part of urban waste management needs. Cities have problems that extend beyond recycling. Non-recyclable waste that litters streets and public spaces, has to be collected and transported to disposal points, and if does it overflows those disposal points because there is just too much of it. Figure 28 shows the end-to-end waste management value chain.

Figure 28. Simplified waste management process
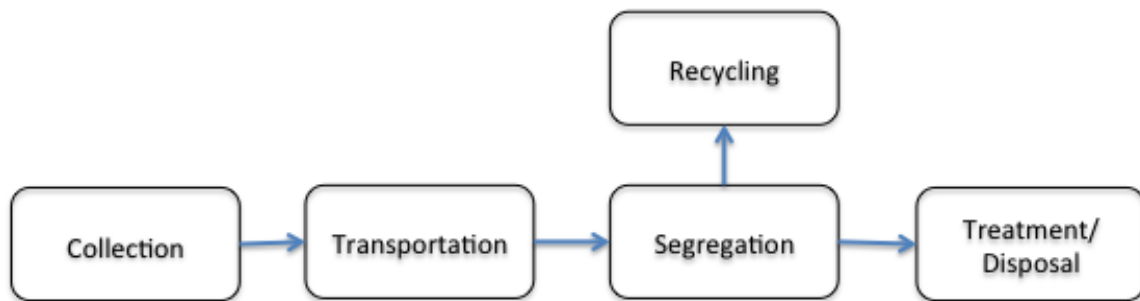
Informal sector workers act in their own self-interest. This is bad for municipalities because informal sector workers are not concerned about urban hygiene and aesthetics. They are instead concerned about making a living, which they can only do by extracting recyclables from waste. In doing so however, they provide crucial urban services. Informal sector doorstep waste collectors collect and transport wastes from source to the nearest community bin. Doorstep collection is a service that would otherwise cost municipalities a lot of money.[118] Municipalities would either have to use garbage collection trucks or in cases where the streets are too narrow for trucks, manual labor. These cost savings are calculable but require more in-depth research that is outside the scope of this dissertation. Admittedly,

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[118] According to estimates by Gunsilius, Chaturvedi and Scheinberg (2011) based on their study of the contribution of the informal sector in six cities, "The informal sector saves the formal authorities a great deal of money, in total €39 million in the six cities . . . Most of the avoided costs in the study cities is avoided collection costs, €14 mil- lion per year in Lima, €12 million in Cairo, and € 3,4 million in Quezon city. The average avoided costs per worker are €571, which in many cities is more than that same worker earns in a year" (p. 18).

informal sector doorstep collectors do not provide full collection and transportation services as the municipality or its private firms might. Firms would transport the waste from source to a material recovery facility or to the final treatment or disposal point, depending on the extent to which waste generators sort their waste, or the kind of treatment facility planned for managing that waste. But if there were a material recovery or treatment facility that depended on source-segregated waste, the municipality or its contractor would have to bear the cost of the social marketing or behavior change campaign to make that happen. If not, they would have to invest in a certain technology-labor mix to make that happen. Regardless, it would cost money. Therefore, by collecting and transporting the waste from source to an intermediate disposal point (i.e. the community bin), the informal sector saves the municipality a certain amount of money that they otherwise would need to spend.

But collection and transportation is not the only cost savings to municipalities that the informal sector brings. Recyclable materials in waste are what form the basis of their livelihood. But from the municipalities' perspectives, it reduces the amount of waste that then needs to be transported and treated/disposed of. Different types of actors including doorstep waste collectors, itinerant buyers and those who scavenge the streets and landfills all contribute to reducing waste quantities. Estimates of this reduction vary but is likely between 20 and 25 percent of the total waste produced in Indian cities.[119] Although exact cost savings estimates are not available, one can imagine that such cost savings from waste reduction and recycling are substantial. An elaborate recycling market thrives organically through a complex network of actors in the chain.

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[119] According to estimates by Gunsulius, Chaturvedi and Scheinberg (2011), in Pune, the informal sector recovers 22 percent of the total waste generated (p. 15).

Even if the informal sector doesn't fit perfectly into the existing system, it does provide services that reduce the waste burden for municipalities in most portions of the end-to-end waste management lifecycle. The reason they do not pick all litter from streets and public spaces is because most of that litter does not have economic value. The reason that they do not segregate waste into pure waste streams is because there is no economic incentive for them to do so. Piles of unsightly and unmanageable garbage make it seem that the whole system is broken, when only certain parts of it are. Unfortunately, problems with the current system have led to a false choice between keeping the old and bringing in the new. The struggle has therefore often taken the form of an assumed incompatibility between the old informal system and the new formal system. But this does not have to be so. Parts of the old system that function quite well could be retained. The state could leverage the skills, knowledge, and networks of the informal sector economy to mend what is broken and continue doing what works. Displacement and dispossession of the informal sector is not a necessity for modernizing or improving waste management systems in India. Some recommendations on what is needed follow.

First, there is no doubt that informal workers need to continue to organize to benefit from the collective bargaining powers that organizing brings. Across the world, waste pickers have organized into membership-based organizations such as unions, associations, and cooperatives to secure such rights with varying degrees of successes (Samson, 2009a). Globally, the waste picker movement in Brazil leads the way both in scale of the movement and the successes it has been able to achieve. Workers are organized at the local level into numerous associations and cooperatives, at the state level, and at the national level as part of

the Movimento Nacional dos Catadores de Materiais Recicláveis (MNCR). Following is a

snapshot of some key victories of the Brazilian movement:

- In 2001, the Brazilian Occupation Classification (CBO) included *catador de material*
  reciclável (collector of recyclables) as a profession (Dias, 2011, p. 2).[120]

- In 2007, Law #11.445/07 was passed. One of the provisions of this law "makes
  bidding unnecessary for the hiring of membership-based organizations (MBOs) of
  waste pickers." As a result, associations and cooperatives can be hired and paid for
  services directly by municipalities (Dias, 2011, p. 4).

- In 2011, the House of Representatives of Minas Gerais, approved the Recycling
  Bonus Law—"a state law establishing a monetary incentive to be paid by the state
  government to waste pickers who are members of a cooperative or workers'
  association . . . It is the first law approved in the country that authorizes the use of
  public money for ongoing payments for work done by waste pickers" (Silva, 2012, p.
  2).

Within India, waste pickers in Pune lead the way. Waste pickers are a part of a union called

KKPKP. SWaCH is a cooperative that has been able to secure a doorstep waste collection

contract with the municipality in which the municipality actually pays the cooperative for

waste collection services. SWaCH employs workers from the union for this work. A national

organization called Alliance of Indian Wastepickers (AIW) is largely non-functional at the

moment. While there are successes in the India context, Brazil has been more successful

partly due to the scale and scope of its organization. This is not to suggest that India and

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[120] According to Dias (2011), "The job description in the CBO is: "someone who might collect recyclables in streets or at disposal sites, work as waste sorter and/or other related activities either in cooperatives or junk shops." The CBO is the federal system of regulated professions. Professions included at the CBO result in appropriate occupational codes within national survey questionnaires and coding" (p. 2).

other countries have not had any successes. In Colombia for instance, the Constitutional Court ruled that Bogota's waste pickers be recognized as providers of a public service and be paid by the city for the materials that they collect (Republic of Colombia Constitutional Court, 2011). Other cities in India have had other victories. But the victories in terms of legal recognition as valid economic actors and urban service providers, and the associated opening up of economic opportunities in Brazil vastly outshine those in most other countries. Organizations such as Chintan are exploring models that do not require a fiscal relationship with the state, however. This is partly due to the problems with managing that relationship. In Pune, for instance, the municipality took almost two years to renew its contract with SWaCH in addition to owing the cooperative INR 20 million (Express News Service, 2014). In July 2015 in Panaji, the municipal sanitation employee union went on strike for eight days demanding better pay (TNN, 2015d). The city threatened to invoke the Essential Services Maintenance Act (ESMA) and privatize waste collection services if employees did not call of the strike. At the end, the union was able to negotiate a pay increase but the threat of municipal workers losing their jobs from privatization was real. If municipal employee work under precarious employment conditions, then informal workers are even worse off especially since engagement with the latter is seen primarily as charity or social work, not as valid municipal service provision, as discussed previously in this dissertation. A large readily available pool of cheap labor and private firms vying for government contracts keeps the threat of dispossession real and constant. As a result, organizations such as Chintan explore other options.

One such option is to provide doorstep waste collection services to households with the permission of the municipality but without payment for those services. Another option is to

provide waste collection services without the involvement of municipal actors altogether: by either engaging neighborhoods directly or by targeting bulk waste generators such as hotels, hospitals, and schools. The latter strategy can only work as long as the grey area in property rights over waste between point of waste production and the municipal receptacle exists. As discussed in previous chapters, cities are already reallocating those property rights through integrated contracts for the end-to-end waste management process, from doorstep collection to disposal. If WtE emerges as the standard way of doing waste management, then control of the end-to-end process will be necessary. If this happens, Chintan's latter strategy of by-passing the state will not work but Pune's strategy at least has a chance.[121]

Second, doorstep collection should not be outsourced to private firms. Instead, informal workers should legally be allowed, or at least have the first right to provide doorstep waste collection services. For this, informal sector organizations will continue to need to lobby with the government to pass laws at the national level that guarantee these rights. As discussed in previous chapters, informal sector waste collection services are efficient even within the framework of economic theories of efficiency in those markets. However, the assumed economies of scale need to take into account the capital-labor mix of collection services in the Indian context. These services are already provided by the informal sector in most cases. If doorstep collection were outsourced to private firms, the scale of displacement of the informal sector would be massive. For doorstep collection to remain in the domain of the informal sector, workers would need to organize, not just for the collective bargaining

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[121] Even though SWaCH's contract with the Pune Municipal Corporation took a long time to renew, the results of contract negotiations have been remarkable (email communication with Malati Gadgil). Under the new contract, SWaCH's members will provide service to the entire city including slum areas, where doorstep collectors will be paid a monthly subsidy of INR 10/household for serving those households. Doorstep collectors will receive equipment (e.g. pushcarts, buckets, raincoats, protective eyewear) in addition to INR 600/year for the maintenance of this equipment. SWaCH will be paid INR 32 million/year by the municipality with a 5 percent escalation each year.

benefits, but also purely in terms of transaction costs. Establishing and monitoring contracts with large numbers of individual workers is an impossibility.

The potential of stable livelihoods in doorstep collection is massive. To understand this potential, let us assume a city of 500,000 inhabitants. Assuming an average household size of 4, this yields approximately 125,000 households. Assuming that each doorstep waste collector serves between 100 to 200 households per day, it would mean that there could be between 625 and 1,250 doorstep waste collectors in that city. According to some estimates, there are as many as one percent of the total urban population engaged in the informal economy of waste in developing countries (Medina, 2008). Other estimates suggest that waste pickers form 0.1 percent of the urban workforce in India (ILO, 2013, p. 48). According to IIHS (2012), workforce participation in urban India is approximately 18 percent. Based on ILO (2013) and IIHS (2012) estimates, in our fictional city of 500,000 inhabitants, there are only 900 waste pickers. By Medina's (2008) estimates on the other hand, there might be as many as 5,000. Regardless of how many waste pickers there actually are, doorstep collection alone could, as it already does in many cases, provide work to many of them. This would of course require that doorstep collectors serve all households, not just middle and upper class ones. The primary reason why there are no in doorstep collection services in low income areas such as slums is because there is not enough recyclable materials in that waste. If cities want the informal sector to serve those areas, then they need to pay for the collection service much as they would pay any private firm.

Third, we need to stop pretending that there are alternatives for those who are or will be displaced from privatization of waste management services, when there aren't any. As I have discussed previously in this dissertation, the discourse of alternatives often serves merely a

rhetorical function. Often, the rhetoric of alternatives is deployed to avoid doing anything at all. In cases where alternatives are actually proposed, even a limited analytical examination of the alternatives on offer reveals their unviability. Following are three sets of alternatives that are usually proposed in such scenarios:

- *Private firms that might displace informal workers can absorb them. Working as employees would be better for them because there would be job security, occupational safety, and even benefits such as pension and healthcare.* Indeed some workers might potentially be absorbed into the private firms' operations, but as discussed in the previous chapters, many would be displaced as an outcome of the substitution of manual labor by machines. Further, even if private companies pay minimum wages to those workers they have been able to employ, this is likely to be lower than what those workers currently make by collecting and selling recyclable materials. As is evidenced from the current experience, firms are much more likely to hire workers from elsewhere than from the existing informal waste worker labor pool in those cities. They do this because they can exploit the supply-driven economies in the Indian labor markets and more easily by-pass labor regulations regarding minimum wages and benefits. Migrant workers are also less likely to organize than existing workers who may have well established organizing networks. Yes, theoretically employment in the formal sector sounds like a reasonable alternative. But in practical terms, until labor regulations can be better enforced, it is unlikely to be.

- *Displaced workers could be trained to work in different sectors of the economy that require workers with a certain skill set.* Indeed, this is a real possibility for those who

are going to be displaced. But it also requires a relatively deep understanding of the sectors of the economy in which that labor could be absorbed. To make these kinds of skilling and training decisions, one would need to answer several of questions: What firms need labor? Where are they located? What skills do they require? Who would pay for skill development and training? If relocation is needed, would workers be willing to do so? Who would pay for such relocation? How much would such new work pay? These are just some of the complicated questions that need to be asked and answered. Yet, decisions are made by people who hardly ever do so. Instead, there is usually a template they follow: Train everyone as tailors or hairdressers, for instance. What happens after they are trained is a question no one bothers to ask. Further, private firms in which displaced and subsequently trained workers might be employed, if they are lucky, offer the same set of labor relations problems described above.

- *Workers could be trained in upcycling, that is, making new stuff (usually handicrafts) out of waste materials..* This option is proposed not only for those who might be displaced but also as an option for 'upgrading' the livelihoods of those who might remain in the waste trade. As mentioned previously in this dissertation, many well-intentioned policy makers and influencers in the government, international development institutions and even some NGOs argue for such forms of upgrading. But again, such alternatives reveal the naiveté and 'feel-good' desires of those who propose them rather than a clear understanding of how and why the recycling economy works in the ways it does. As a stable, long-term, viable alternative, it leaves many questions unanswered: Is there a market for those upcycled products?

How many people could such forms of upcycling support? Who would be responsible for marketing those products? On the other hand, the existing recycling economy is industrial in scale. It does not place the burden of marketing and selling on the workers themselves. Current systems involve workers' dependence on a vast and complex recycling economy which in turn is dependent on the vagaries of local, national, and global commodity prices. Indeed such forms of dependence make livelihoods precarious, but less so than the proposed handicrafts market.

Fourth, the existing recycling economy works fine and does not require fixing. Everyone—government, international development technical advisors, NGOs—knows this. Yet, both government agencies and private waste management firms want a piece of the recycling pie because they know the revenues that recyclable materials could bring if they indeed could control it. If the end-to-end waste management process were to be controlled as envisioned in modernized systems, then the existing economy of recycling would be jeopardized. Or perhaps it may not be wholly jeopardized but certain actors within the complex economy would lose out. As mentioned previously, one of the popular discourses about the recycling economy concerns the evil middleman, the dealers who waste pickers sell recyclable materials to. The picker-dealer relationship is deemed exploitative and the argument is that waste picker livelihoods could be made better if they had access directly to recyclers who would give them better prices for the materials. Recyclers are interested because they could source raw materials cheaper if the middleman is removed from the equation. Both parties win.

Yet, even from a purely technical standpoint, this seems quite difficult to achieve. Where would waste collectors store their recyclable materials? How often would recyclers be able to

buy and transport them? In the current system, exchanges take place between recyclers and a few dealers and suppliers who buy materials from smaller dealers who in turn buy materials from waste pickers. Small dealers buy small quantities, enough to fully utilize the warehouse spaces they can afford. Larger warehouse spaces within the city's borders are hard to come by, in any case. The transaction costs of exchanges between recyclers and thousands of waste pickers, I imagine would be prohibitive for such a system to function. But aside from such technical considerations, the picker-dealer relationship serves another purpose. Indeed, it is exploitative in the sense that waste pickers are often tied to one dealer who they sell recyclable materials to at typically lower than market rates. They also often provide labor of hyper-segregation in the dealers' warehouses without getting paid for it. But in return, they receive benefits that they otherwise would not have access to: housing, access to credit, and protection from the police, for instance. Those who recommend removing the middleman have not thought through its repercussions on the socio-economic fabric of the community. Instead of intervening in the existing recyclable economy, the state should support and facilitate it. It makes sense to do this from a purely economic perspective in terms of letting the market do its thing. But it also makes sense from a social justice and an environmental perspective in terms of incentivizing recycling and therefore increasing resource efficiency.

Fifth, formalization of the informal sector is necessary both for the legitimization of work and workers, and to appease the systemic demands for the professionalization of work and workers. But in the name of professionalization and formalization, cities cannot expect free labor. If municipal waste managers want waste to be segregated into certain categories, then workers need to be paid for segregating waste into those categories. Recall that informal workers segregate only those waste materials for which there is a market to provide a

livelihood. If there were a market for pure waste streams of other kinds, say organic waste, then they would do that also. In the absence of other markets however, cities will need to pay for that labor of segregation. Similarly, if cities expect workers to maintain and clean *dhalaos* and other urban spaces, then they need to be paid for doing that work.

Dhalaos reveal another infrastructural opportunity for cities, however. As previously mentioned, these structures were designed to serve the purpose of temporarily storing waste from a neighborhood until it is collected and transported to the landfill. But they have come to serve another purpose—as temporary storage and segregation space for recyclable materials. In this sense, they function as material recovery facilities. In the grand new designs of how modern waste management systems will work in India, centralized material recovery facilities are being proposed where large amounts of waste would be transported to and segregated materials would, from there be sent for processing, treatment or disposal. This is a template borrowed from cities in the developed world, where such facilities serve as points of material recovery. In Indian cities that are already starved of space, establishing new, large centralized facilities such as these seems unnecessary and duplicative especially when the existing infrastructures of *dhalaos* could easily serve the same purpose. As much as they represent an aesthetic eyesore to government officials who dream of world-class cities, they also offer cheap ways making the existing system better using existing infrastructures.

Sixth, if we are concerned about waste, then we need to know exactly what portions of waste we need to be concerned about. Waste characterization studies classify wastes, but not in the correct ways. They describe waste in abstract ways using imported categories. Instead, if we used categories to describe waste more purposefully, then we know what we already have solutions for, and what is working and what isn't. To do this, I propose the following

categories of waste that we need to know and understand better: organic waste (compostable and non-compostable), the recyclable waste, non-recyclable waste, sanitary and bio-medical waste, hazardous waste, and inert and construction and demolition (C&D) waste. If we know this, I believe that we will be able to identify the key components of the waste stream that pose problems—non-recyclable plastic waste, C&D waste, and biomedical and hazardous wastes. Technically, C&D waste should not be in the municipal waste stream to begin with. Neither should hazardous and biomedical wastes but their quantities in the total waste are likely to be minimal, even if their impacts are significant. C&D waste, on the other hand, forms a relatively large proportion of the overall waste, and incurs significant transportation and disposal costs. Unfortunately, I do not know enough about such wastes to be able to offer any useful recommendations.

There are opportunities for managing non-recyclable plastics better, however. Showing some foresight, the Government of India passed *Plastic Waste (Management and Handling) Rules* in 2011 which govern and regulate the management of such wastes. These rules allow for the application of the framework of extended producer responsibility (EPR) that hold manufacturers responsible for managing the end-of-life of such products. The rules also allow for the formation of informal sector cooperatives in the establishment of collection centers for managing such waste. The rules, however, are not clear on assigning exactly what the responsibilities of manufacturers are, who is considered a manufacturer, and who has the authority to ensure that manufacturers comply with their assigned responsibilities. Yet, the rules open up a world of possibilities for targeting wastes that have been posing a particular nuisance especially in urban areas. If EPR were to be implemented, manufacturers would be forced to pay for the collection of those wastes. In others words, a market would

emerge for those kinds of waste. For informal sector actors, what is currently not valuable will have value. But for this to happen, appropriate pricing for that waste will need to be developed to ensure that it is worthwhile to collect. What happens if and once its collected is someone else's job but we do know that they are highly combustible and so could be supplied to WtE plants that are likely not going to have much else to burn.

If we know our waste better, we'll also be able to better assess technology alternatives. Such knowledge is likely to tell us, in no uncertain terms, that WtE, particularly those technologies that rely on incineration, are not a viable option for India at the moment. Calorific value of waste continues to be a problem for such facilities unless the informal economy is evicted from waste management systems and processes. Calorific values might change in the future making it a viable option, but investment in such expensive technology at the moment is nothing more than a waste of public money. Technologies for treating organic waste such as biomethanation and composting, on the other hand, should continue to be explored and invested in.

Lastly, behavior change may be needed but India has much more basic infrastructural issues to deal with first. Yes, littering is a problem but without the infrastructure to collect, transport and dispose waste, filth in public spaces is likely going to continue to be a problem. Spending massive amounts of money on behavior change is not going to go very far. Instead, that money might be better spent in improving infrastructures. Volunteerism for cleaning public spaces is great. We must recognize its limits and its unintended outcomes, such as the displacement on garbage piles into some other neighborhood where people may not have the luxury of free time to volunteer to clean up those spaces.

Despite my critique of source segregation in the previous chapter, I think it is necessary both for the health and safety of people who handle waste as well as for optimizing the functioning of treatment and disposal systems. But we must not continue to frame the problem of waste management as a cultural problem. Doing so simply betrays an uncritical embrace of colonial and post-colonial narratives that frame the Indian as an unhygienic subject requiring modern forms of discipline. Instead of social media campaigns, those funds could be better spent in getting waste collectors to create awareness among waste generators about the most appropriate ways to segregate waste. We must also value the knowledge of waste collectors - those who deal with other peoples' garbage on a daily basis know the most about it. It would make such a campaign more effective, and easier to monitor and enforce. Waste collectors could become the champions of such change themselves. But again, if municipalities choose this track, they need to pay waste pickers for the extra labor of communication and generating awareness. For a change, let the poor tell the rich what to do. These recommendations are not meant to be a comprehensive set of solutions. While many have thought about these issues more deeply and longer than I have and consequently, offer a more comprehensive set of ways to address many of these problems, the above set of recommendations deals directly with the specific issues identified in this dissertation. These recommendations are also not transformative or revolutionary in any way. Waste as an accompaniment and contradiction of modernity requires no less than a revolution. In that perfect world, there would be no waste pickers, as we know them now. But until the revolution comes, I hope this dissertation has provided deeper insight into some of the problems and where solutions to those problems might lie.

Glossary of frequently used non-English words

Basti   A settlement but commonly used to refer to slums
Dhalao   A neighborhood or a community garbage bin
Godam   A warehouse; in my usage it specifically refers to the spaces that waste dealers use for storing and segregating recyclable materials
Kabaad   Waste material that has economic value in reuse or recycling
Kabari   A person who deals with recyclable materials generally but the term is often used specifically to refer to itinerant buyers of high-value recyclable materials; same as *kabariwala;* sometimes also spelt as *kabadi*
Kabariwala   See definition of *kabari* above; sometimes also spelt as *kabadiwala*
Kachra   A general term for waste; same as *kooda*
Karamchari   A worker
Kooda   Same as *kachra.*
Safai   Cleanliness
Sena   Army
Swachh   Clean

Acronyms

74th CAA	74th Constitutional Amendment Act
AAP	Aam Aadmi Party
AIKMM	All India Kabari Mazdoor Mahasangh
AIW	Alliance of Indian Wastepickers
ASSOCHAM	Associated Chambers of Commerce of India
C&D	Construction and demolition
C/N	Carbon to Nitrogen ratio
CAG	Comptroller and Auditor General of India
CBO	Brazilian Occupation Classification
CCT	Compulsory Competitive Tendering
CDM	Clean Development Mechanism
CEWEP	Confederation of European Waste to Energy Plants
CPCB	Central Pollution Control Board
CRISIL	Credit Rating Information Services of India Ltd.
DWM	Delhi Waste Management
EBTC	European Business and Technology Center
EDMC	East Delhi Municipal Corporation
EPA	U.S. Environmental Protection Agency
EPR	Extended producer responsibility
EPTRI	Environmental Protection Research and Training Institute
ESG	Environment Support Group
ESMA	Essential Services Maintenance Act
GAIA	Global Alliance for Incinerator Alternatives | Global Anti-Incinerator Alliance
GDP	Gross Domestic Product
GHG	Greenhouse gas
GIZ	Deutsche Gesellschaft fur Zusammenarbeit GmbH
Global REC	Global Alliance of Waste Pickers
GNI	Gross National Income
GOI	Government of India
HCV	Higher Calorific Value
IHD	Institute for Human Development
IHPH	Institute for Hygiene and Public Health
IIHS	Indian Institute for Human Settlements
IL&FS	Infrastructure Leasing and Financial Services
ILO	International Labour Organisation
IMF	International Monetary Fund
INR	Indian Rupees
JnNURM	Jawaharlal Nehru National Urban Renewal Mission
KKPKP	Kagad Kach Patra Kashtakari Panchayat
MBO	Membership-based organization
MCD	Municipal Corporation of Delhi
MCGM	Municipal Corporation of Greater Mumbai
MNCR	Movimento Nacional dos Catadores de Materiais Recicláveis
MNRE	Ministry of New and Renewable Energy

MoEF	Ministry of Environment and Forests (now called the Ministry of Environment, Forests, and Climate Change)
MoF	Ministry of Finance
MoSPI	Ministry of Statistics and Programme Implementation
MoU	Memorandum of understanding
MoUD	Ministry of Urban Development
MP	Member of Parliament
MRSI	Market Research Society of India
MSW	Municipal solid waste
NBA	Nirmal Bharat Abhiyan
NCR	National Capital Region
NCT	National Capital Territory of Delhi
NDMC	New Delhi Municipal Corporation
NEERI	National Environmental Engineering Research Institute
NIUA	National Institute of Urban Affairs
NGO	Non-government organization
NGT	National Green Tribunal
OECD	Organisation for Economic Cooperation and Development
PAW	People's Alliance on Waste
PCMC	Pimpri Chinchwad Municipal Corporation
PIL	Public interest litigation
PM	Prime Minister
PMO	Prime Minister's Office
PPI	Private Participation in Infrastructure
PPP	Public-private partnership
PTI	Press Trust of India
RBI	Reserve Bank of India
RCRA	Resource Conservation and Recovery Act
RDF	Refuse derived fuel
REEL	Ramky Enviro Engineers Ltd.
RWA	Resident Welfare Association
SBM	Swachh Bharat Mission
SDMC	South Delhi Municipal Corporation
SEC	Socio-economic classification
SHG	Self help group
SMC	Srinagar Municipal Corporation
SME	Small and medium-sized enterprises
SWM	Solid waste management
TERI	The Energy and Resources Institute
TNN	Times News Network
TSC	Total Sanitation Campaign
TUI	The Ugly Indian
ULB	Urban Local Body
UN	United Nations
UNEP	United Nations Environment Programme
UN-Habitat	United Nations Human Settlements Programme

USAID	U.S. Agency for International Development
USD	United States Dollars
VGF	Viability gap funding
WtE	Waste-to-energy
WTERT	Waste-to-energy Research and Technology Council
WMI	Waste Management Incorporated

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Curriculum Vitae

AMAN LUTHRA

Date of Birth: May 31st, 1978
Location of Birth: Sonepat, India

EDUCATION

Ph.D., Geography and Environmental Engineering
Johns Hopkins University, Baltimore, MD 21218
September 2010 – December 2015
Dissertation title: "Modernity's Garbage: Struggles over Municipal Solid Waste in urban India"

M.A., Geography and **Master of Public Administration (M.P.A.)**
Syracuse University, Syracuse, NY 13244
September 2001 – December 2004
Thesis title: "Revisiting Shangri-La: Landscape representation and the politics of development in Bhutan"

B.S., Environmental Studies
University of Maine at Machias, Machias, ME 04654
September 1997 – May 2001
Honors thesis title: "Stakeholders' perceptions and challenges to participatory management: The case of the soft-shell clam, *Mya arenaria* L., industry in Maine"

ACADEMIC RESEARCH GRANTS

Doctoral Studies
- Social Science Research Council (SSRC) International Dissertation Research Fellowship (2012-2013);
- Wenner-Gren Foundation Dissertation Fieldwork Grant (2012-2013);
- National Science Foundation (NSF) Doctoral Dissertation Research Improvement Grant (2012-2013); and
- Johns Hopkins University (JHU) Environment, Energy, Sustainability and Health Initiative (E^2SHI) Fellowship (2012-2013) and Gordon Croft Fellowship (2011-2013).

Pre-doctoral Studies
- Syracuse University Bharati Memorial Research Grant, Syracuse University (2002); and
- Maine Public Policy Scholar, Maine Community Foundation (2000–2001).

PROFESSIONAL RESEARCH GRANTS

- World Bank funded project at Chintan Environmental Research and Action Group titled, "Improving municipal solid waste management through the inclusion of the informal sector in small towns and cities of Uttar Pradesh, India" (2014-2015); and
- Deutsche Gesellschaft fur Internationale Zusammenarbeit and Government of the National Capital Territory of Delhi jointly funded project at Chintan titled, "Participatory solid waste management policy for Delhi."

TEACHING EXPERIENCE

Guest Lecturer and Mentor
January 2012 – February 2015
- Delivered several guest lectures for undergraduate classes such as "Smith and Marx," "Sustainable Development for Engineers" and "Global Urbanism" at JHU;
- Mentored an undergraduate student's semester-long independent study on mapping population and socio-economic data using Geographic Information Systems (GIS) at JHU; and
- Delivered a guest lecture for an undergraduate class "International Development" at University of Maryland, Baltimore College.

English as a second language (ESL) Instructor
Literacy Council of Northern Virginia, September 2004 – April 2005
- Designed ESL courses for recent immigrants; and
- Taught two ESL courses to about ten students.

Instructor
Syracuse University, May 2003 – June 2003
- Designed and taught an intensive "The Natural Environment" summer class for eight undergraduates;
- Developed and administered the syllabus, exams, quizzes and field trips.

Teaching Assistant
Syracuse University, September 2001 – December 2003
- Assisted in teaching the following courses: "The Natural Environment," "Population and the Environment," and "Environmental Pollution and Policy;"
- Led discussion sections, and administered and graded quizzes, assignments and projects for about 25 students in each section;
- Participated in and completed the Preparing Future Faculty / Future Professoriate Project; and
- Won the Teaching Assistant of the Year Award in 2004 based on a submission of a teaching portfolio that included a teaching statement, sample syllabi, teaching record, and student and professor evaluations of my teaching.

Student Tutor
University of Maine at Machias, September 1997 – May 2001
- Tutored algebra and statistics to students needing extra attention; and
- Tutored students individually and in groups.

PROFESSIONAL WORK EXPERIENCE

Interim Deputy Director and **Research & Policy Consultant**
Chintan Environmental Research and Action Group, New Delhi, India
October 2012 - Present
- Designed a survey and wrote the final report and a guidance manual for municipalities for a World Bank funded project on the improving municipal solid waste management in towns and cities in Uttar Pradesh, India;
- Designed a research project jointly funded by GIZ and the Government of Delhi on understanding the knowledge, attitudes and practices of waste management in Delhi; Co-authored the final report;
- Co-authored a toolkit on the assessment of the inclusion of the informal sector in waste management projects published by the Ministry of Urban Development;
- Acted as the Interim Deputy Director from July to September 2013, managing the entire organization of 40 full-time staff with 8 staff members directly reporting to me;
- Designed and conducted research, and wrote reports on topics related to the waste economy in India including municipal solid waste, e-waste, end-of-life vehicles, and compact fluorescent lights specifically incorporating principles of extended producer responsibility (EPR) in the management of toxics in waste;
- Wrote policy memos for various government officials and participated in committees and working groups such as the Working Group on the Revision of the Solid Waste Management Manual, the People's Alliance on Waste, and the Environmental Pollution Control Authority of Delhi;
- Wrote proposals for funding to institutions and individual donors including a competitive grant proposal for the Google Impact Challenge that has been funded in the amount of USD 250,000;
- Trained Chintan staff on project management, communication, particularly Chintan's web and social media presence, and research practices; and
- Conducted performance appraisals of all Chintan staff.

Consultant and **Public Policy Research Fellow**
LMI Government Consulting, Tysons Corner, VA 22012
July 2004 – August 2012 and January 2014 – December 2014
- Worked as a business analyst on organizational improvement projects for various US and non-government public sector organizations;
- Used business process, value chain and supply chain analysis techniques to model and streamline public sector organizational operations;
- Used various modeling tools (System Architect, ARIS, Rational Rose, and Visio) to analyze and model an organization's structure, business processes, systems, information exchanges and technologies;
- Developed project and program management plans, strategic plans, communication/change management plans and risk management plans for a range of projects; and
- Managed several projects and wrote several proposals and research papers.

Island Steward
The Nature Conservancy, Brunswick, ME 04011
June 2001 – August 2001
- Maintained and renovated trails, signs and a museum on the island for tourists;
- Enforced Conservancy policies on the island;
- Conducted bird, plant and marine life surveys to monitor their populations;
- Mediated occasional conflicts between the Conservancy, tourists and the local fishing community regarding the use of harbor and docks.

Aquaculture Specialist
Beals Island Regional Shellfish Hatchery, Beals Island, ME 04654
August 1999 – December 2000
- Supported daily operations of the hatchery involved in raising soft-shell clams, sea scallops, and the various algae for feeding them;
- Assisted in various laboratory and field experiments for assessing the growth of clams and scallops;
- Organized outreach programs for school children and gave tours to tourists informing them of aquaculture operations and local marine ecology.

HONORS AND AWARDS

- 2014, Urban Design Research Insitute, Mumbai, India: Second Prize, Re-inventing Dharavi: An Ideas Competition (Team member);
- 2012, American Institute of Indian Studies: Alternate, Junior Fellow;
- 2010 – Present, Johns Hopkins University Elaine and Gordon "Reds" Wolman Fellow;
- 2005, Syracuse University Master's Student Award;
- 2003, Syracuse University David E. Sopher Memorial Award;
- 2003, Association of American Geographers' Rural Geography Specialty Group, Student Paper Award Finalist;
- 2002, Syracuse University Graduate School Summer Fellowship;
- 2002, Syracuse University Future Professoriate Project Award;
- 2002, National Collegiate Honors Council, Alternate;
- 2001, University of Maine at Machias Senior Watch Award;
- 2000, Associated Faculties of the University of Maine Scholarship; and
- 2000, University of Maine at Machias Excellence in Biological Sciences Award.

INVITED SPEAKING ENGAGEMENTS

- 2014 – 2015, Student Commentator, Ecologies of Urbanism in Asia Conference in Hong Kong and New Haven, CT;
- 2012, Participant, Summer Institute in Economic Geography in Zurich;
- 2010, Participant, Science and Technology Studies South Asia in Austin, TX;
- 2003, Keynote Speaker, University of Maine at Machias' Annual Graduation Alumni Banquet;

- 2002, Student Travel Award, Annual Meeting of the National Shellfisheries Association; and
- 2001, Ivy Orator, University of Maine at Machias' Annual Awards Convocation.

PUBLICATIONS

2014 (co-author). Segregation. In M. Liboiron, M. Acuto and R. Nagle (eds.). *Discard Studies Compendium* [online]. Available online at http://discardstudies.com/discard-studies-compendium/#Segregation

2013 (co-author). *Chintan's Assessment Tool for Informal Sector Inclusion (CATISI).* New Delhi: Chintan Environmental Research and Action Group. Available online at the Government of India Ministry of Urban Development's website: http://jnnurm.nic.in/wp-content/uploads/2013/11/Chintan-Inclusion-Tool-and-Appendices.pdf

2013. When automobiles die: Economic and material flows in the end-of-life (ELV) vehicles industry in India. *The Flag Post.* September 2013: 6-7. Available online at http://theflagpost.in/september-issue

2009. Post-modern tourism and the sham of Shangri-La. *Himal* January 2009. Available online at http://old.himalmag.com/component/content/article/405-postmodern-tourism-and-the-sham-of-shangri-la.html

2004. Un-straightening the SU landscape. *Interrupting Heteronormativity*. Syracuse: Syracuse University Graduate School. Available online at http://www.syr.edu/gradschool/pdf/resourcebooksvideos/Heteronormativity.pdf

2003. "Beyond the borders of civilized society": Women-society-nature interactions in peripheral Hindu societies. *The Maine Scholar* 15: 155-164

PRESENTATIONS

February 5, 2015, "Accumulation by dispossession? Formalization and the disciplining of labor in the informal economy of waste in urban India." New Haven, CT: Conference on the Ecologies of Urbanism in Asia

April 12, 2014, "The folly of waste-to-energy: development payola, the agency of matter, and the struggle over dry waste." Tampa, FL: Annual Meeting of the Association of American Geographers

February 25, 2012. "Modernity/Garbage: Capital, State, and Informal Labor in Delhi." New York, NY: Annual Meeting of the Association of American Geographers

November 3, 2011. "Modernity's Garb(age): Neoliberalism, Environmentalism and Urban Waste Management in Delhi." Cleveland, OH: Annual Meeting of the Society for the Social Studies of Science (4S)

October 21, 2011. "The violence of garbage: The production of urban spaces by the state, capital and the middle classes in Delhi." Madison, WI: Annual Conference on South Asia

April 14, 2011. "Unraveling the Enigma: The state as a moment in the co-evolutionary theory of social change?" Seattle, WA: Annual Meeting of the Association of American Geographers

April 12, 2011. "Wasted! A political economy of garbage in Delhi." Seattle, WA: Annual Meeting of the Association of American Geographers

May 15, 2010. "An urban political ecology of the green building industry in India." Austin, TX: Science and Technology Studies in South Asia Conference

April 18, 2010. "Greening the American economic ghetto: the role of the State, labor and environmental movements in transforming urban landscapes." Washington, DC: Annual Meeting of the Association of American Geographers

March 15, 2004. "Managing conservation-development trade-offs through intergovernmental transfers: fiscal federalism in Bhutan." Philadelphia, PA: Annual Meeting of the Association of American Geographers

March 14, 2003. "Preserving nature and culture: A political ecology of conservation, development and tourism policies in Bhutan." New Orleans, LA: Annual Meeting of the Association of American Geographers

April 15, 2002. "Stakeholders' perceptions and challenges to participatory management: The case of the soft-shell clam, *Mya arenaria* L., industry in Maine." Mystic, CT: Annual Meeting of the National Shellfisheries Association

May 8, 2001. "Management of soft-shell clams in Maine: Attitudes and perceptions of commercial harvesters and municipal shellfish committee chairs." Portland, ME: Northeast Regional Shellfish Sanitation Association Meeting

CERTIFICATIONS

- 2009, Association for Operations Management (APICS) Certified Supply Chain Professional;
- 2009, Federal Enterprise Architecture Certification (FEAC) Certified Enterprise Architect;
- 2007, Averill M. Law Associates' Certificate in Simulation Modeling and Analysis;
- 2004, Syracuse University Certificate in University Teaching; and
- 2004, Syracuse University Certificate of Advanced Study of South Asia.

LANGUAGES

English (Fluent), Hindi (Fluent) and Spanish (Basic)