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## The Labors, Infrastructures and Plastics of Mumbai's Waste Flows

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## The Labors, Infrastructures and Plastics of Mumbai's Waste Flows

### Abstract

This thesis attends to some of the diverse flows of various plastic post-discard in Mumbai, India. I examine the material and imagined geographies of plastic discard and collection; the labors through which these different kinds of plastics move; and the infrastructures, spaces and relations that shape the rhythms and subjectivities of waste discard and work. I think with these flows alongside concern for marine plastic pollution and within the context of rising seas in particular. I show, for example, how the existence of marine plastic is not just the result of intentional disposal into waterways because of infrastructural exclusions, but that the very practices of waste collection and disposal are not designed to accommodate unstable grounds and matter in assemblages that produce “flood” vulnerability. At the same time, these dynamic infrastructural ecologies of waste and water create expanding and shifting spaces for plastic collection. I also consider how efforts to circulate “low-value plastics” which often enter the sea might shift the infrastructures and organization of waste collection and work. Together, this thesis hopes to raise questions of how different relations to water and of wasting might be considered in relation and obligation to the lives that plastic and waste helps sustain and with consideration to ongoing forms of vulnerability and inequality.

### Keywords

waste, labor, infrastructure, plastic, pollution, water

### Disciplines

Anthropology

THE LABORS, INFRASTRUCTURES AND PLASTICS OF MUMBAI'S WASTE FLOWS

By

Courtney Daub

In

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Department of Anthropology

University of Pennsylvania

Thesis Advisor: Nikhil Anand

2021

## **Abstract**

This thesis attends to some of the diverse flows of various plastic post-discard in Mumbai, India. I examine the material and imagined geographies of plastic discard and collection; the labors through which these different kinds of plastics move; and the infrastructures, spaces and relations that shape the rhythms and subjectivities of waste discard and work. I think with these flows alongside concern for marine plastic pollution and within the context of rising seas in particular. I show, for example, how the existence of marine plastic is not just the result of intentional disposal into waterways because of infrastructural exclusions, but that the very practices of waste collection and disposal are not designed to accommodate unstable grounds and matter in assemblages that produce “flood” vulnerability. At the same time, these dynamic infrastructural ecologies of waste and water create expanding and shifting spaces for plastic collection. I also consider how efforts to circulate “low-value plastics” which often enter the sea might shift the infrastructures and organization of waste collection and work. Together, this thesis hopes to raise questions of how different relations to water and of wasting might be considered in relation and obligation to the lives that plastic and waste helps sustain and with consideration to ongoing forms of vulnerability and inequality.



## Table of Contents

<b>Abstract</b>	<b>ii</b>
<b>Table of Contents</b>	<b>iii</b>
<b>Acknowledgements</b>	<b>v</b>
<b>Introduction</b>	<b>1</b>
Plastic Politics: Composing the Shore	1
The Archives/Evidence of Water and Waste	7
<b>Literature Review</b>	<b>14</b>
Following Things: Approaches to Value, Siting and Circulation	14
Waste, Value, Labor	18
Infrastructural Labors of Circulation	23
<b>Methods</b>	<b>27</b>
<b>1. The Things that Circulate: Thinking Value from Scrap Dealing</b>	<b>31</b>
<b>2. Garlic for Plastic</b>	<b>36</b>
<b>3. Watery Infrastructural Ecologies of Waste</b>	<b>41</b>
<b>4. The Ambivalences of the Nala</b>	<b>48</b>
<b>5. Recycling the Un-Recyclable</b>	<b>54</b>
<b>Conclusion: Returning to the Shore</b>	<b>63</b>
<b>References Cited</b>	<b>65</b>

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## Introduction

### Plastic Politics: Composing the Shore

Before YouTube personality Dhruv Rathee's interview with environmental activist Afroz Shah, a camera pans over Mumbai's Versova Beach in 2016. From a drone's distance, the shore is white with masses of plastic. An ominous buzz gives way to redemptive orchestral music as Dhruv recounts Shah's efforts in leading the world's largest beach clean-up alongside collected piles of sandy bags, packaging and excavators. The boat on which they sit three years later in 2019 is situated on a Versova that is more sand than plastic, as Afroz tells the story of how he and his neighbor began recruiting people to clean the shore. The video is as much a call-to-action as it is a demonstration of the ways in which plastics disrupt intertidal shores and urban living.



**Figure 1.** Versova Beach before and after clean-up campaigns (Arora 2017)

Within this demonstration Dhruv and Afroz present many different plastics as evidence to a problem: a chip packet to explain the difficulty of recycling multi-layered packaging and the failure of policy for holding plastic producers accountable, a milk packet to explain qualities of

“low-value” plastic not collected by ragpickers, and a plastic water bottle which is actually recyclable, but which viewers should avoid consuming along with the other plastics anyways. Among these many actors briefly mentioned and addressed in the video— viewer-consumer-discarder, ragpicker and plastic producer — the figure of the slum appears most prominently. Dhruv and Afroz’s conversation quickly switches from plastics to toilets. Standing next to Sunil, a resident of a nearby settlement who now helps clean toilets and collect plastics, Afroz asks: “In a year he has learned that the toilet is my responsibility. Plastic is my responsibility... What is the need for Sunil to go into the formal system of governance?” In another video sporting images of a plastic Versova, Shah visits a settlement near a creek with the aim of educating people about the segregation of plastic waste.

This thesis starts from the same problematic that Dhruv, Afroz and many other residents of Mumbai encounter on the city’s shores, though in a much less polemical way. What are the plastics circulating through the cities supply chains and waterways? Who collects and discards them, where and why? And how do these activities relate to the waterways of the city?

Mumbai, the story often goes in prefaces to bureaucratic reports, is one of India’s largest cities and its financial center. Attempts by the municipality to quantify waste generation in the city have varied from 5,000 to almost 10,000 metric tons per day over the past decade, but the common refrain is that it is a lot. The things that constitute this daily weight, the reports also note, have been changing alongside consumption patterns and “economic growth.” While plastics only constitute a (likely underestimated) five percent of the city’s waste, they have emerged as a material of controversy, clogging city drains and washing up on shores. Plastics are thus symbolic— as has been true since their origin in the mid-twentieth century— of a “garbage modernity” which nonetheless makes new demands of waste management (Luthra 2015, 1).

The city is also one that has over a few hundred years been built on land reclaimed from the Arabian Sea, some of it, like other coastal cities around the world, historically by using the very garbage the city generated as landfill (Mirza 2019). These processes of landfill on which Mumbai is made, Anuradha Mathur and Dilip da Cunha have argued, separate land and sea— a colonial representation and material process (da Cunha and Mathur 2009). Attempts to make land dry— through landfill and the engineering of rivers and streams to be efficient drains— have only served to worsen flooding in the city, which, like other coastal cities, faces sea-level rise and more extreme weather events. The city has several rivers and many nalas, or streams, which are concretized to varying extents. The Arabian Sea these water bodies drain into, and rains, which are at their heaviest during the monsoon, soak the city (Mathur and da Cunha 2009). It is these monsoon rains, which every year return the greatest amount of plastics to the shore in the plastic tides which have in recent years garnered so much attention through frequent massive beach clean-ups praised by local and international media.



**Figure 2.** Deonar dumping ground from NASA satellite imagery during 2016 fire (Joshi 2016)

Mumbai's shorelines are not the only sites of waste accumulation which have garnered attention in recent years. The Bombay High Court has ordered since 2013 that the Brihanmumbai Municipal Corporation (BMC) close two of three of their formally active landfills, arguing that they are at capacity. These landfills have historically been situated in wetlands in the eastern and generally poorer side of the city. The oldest, Deonar, frequently catches fire due to high levels of methane. In 2016, newspaper articles noted that the fire that broke out at Deonar was so massive a wing of smoke could be seen extending across the city in satellite imagery.

The politics produced by the plastic tide or landfill fires are neither specific to Mumbai or new, but situated within longer histories of sanitation and the postcolonial city. The project of sanitation and other infrastructural projects such as those of water in Mumbai beginning in the colonial period have always been uneven as infrastructural investment favored "economic infrastructures" in the interests of the colonial elite (Anand 2017; McFarlane 2008, 427). Postcolonial governments "continued the tendency to view sanitation infrastructures as integral to the production of an ordered, clean and modern city" (McFarlane 2008, 427). Productions of such a city rely not necessarily on addressing unevenness in infrastructure, but on distinctions between public and private space, and which see other uses of space as disorderly and dirty, ways of marking people that are also important in the construction of caste. Nationalist and post-independence projects of cleanliness would emphasize civic virtue and responsibility, with Gandhi having famously said "sanitation is more important than independence." (McFarlane 2008, 427). These projects produce ideas of citizenship and belonging as wealthier and often upper-caste residents of the city— through acts of cleaning or legal advocacy— position themselves as legitimate citizens acting in the public interest (Baviskar 2003; Melosi 2004).



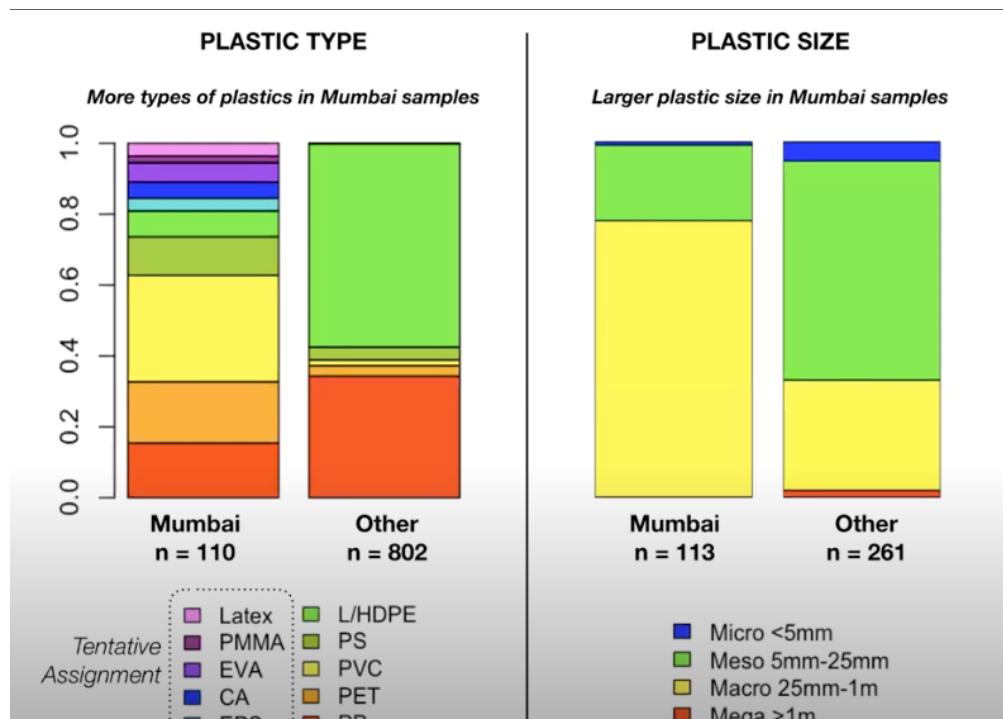
Without flattening the histories of politics and sanitation in Mumbai across time or the affects that plastic on the shore produces among the many people who clean and traverse it, these politics inform representations of the shore evidenced in Afroz's interview and demonstration. In 2014, Hindu Nationalist Prime Minister Narendra Modi launched the Swachh Bharat (Clean India) Mission in a similar nationalist spirit as Gandhi, who Shah says is his inspiration. Modi himself has been filmed walking along a beach to pick up a piece of plastic and many "marches" along rivers and shores throughout the country have been named after Gandhi's Dandi March in 1930 protesting the British salt tax. In these clean up campaigns, the need to educate people living in slum settlements on the civic virtue of segregating waste comes as no surprise.

In recent years, scholarship in waste geography has examined how waste spectacle, representation and aesthetics has shaped how waste materiality is understood and acted upon (Balayannis 2020; Crang 2010). Plastic tides and landfill fires not only serve to legitimize slums as needing policing, but also the many people that collect valuable recyclables from all over the city. For example, following the fire at Deonar, the dump has undergone processes of enclosure and policing that have either denied or reworked access for many waste pickers on the dump, a phenomena that has been seen at dumps and landfills across the world (Samson 2015). In one conversation about the problem of plastic waste in the city, diversion from the landfill, with reference to the Deonar fire, was cited as reason for particular intervention. Managing waste often involves managing particular people and their labors who are seen as dirty without necessarily responding to material harms.

The shore video I open this thesis with interests me not necessarily for some of the predictable narratives around waste that it demonstrates; that the behavioral changes and dispositions of people in the slums is the root of the city's waste problems. The video is also attentive to

materiality of plastic and how this materiality stands as evidence to fault different actors and behaviors for the event of the plastic tide: lack of segregation of plastics, the unrecycle-ability of particular plastics and the overconsumption of plastics among others.

I also begin with these readings of the shore because my own entry into thinking about plastics and water in Mumbai began trying to understand “plastic tides” together with oceanographer Dr. White and her lab. The lab collects samples from shores around the world and analyzes their composition by chemical type and size— PVC, micro, PET, mesa— to develop a plastic profile to compare with other samples globally. The work of the lab attests to the problem of petrochemical and plastic production and discard globally and especially within coastal cities, while also posing questions about the circulation of *specific* plastics through cities and other spaces, their implication in practices and infrastructures of consumption and discard, and the relation of these processes to the sea.



**Figure 3.** Plastic composition of Mumbai’s shores by chemical type and size Credit:

Helen White

The profiles generated in the lab— like the Versova drone photography or Afroz and Dhruv’s narrations— are another way of reading and composing the shore, although with the often universal aspirations of scientific language rather than within the context of local practices of recycling and discard that Afroz provides . What kinds of stories might photography, video, chemical analysis and ethnography produce together about plastics in the city? In the next section, I reflect on understandings of waste and water as archives in order to reflect further on the questions and methods that motivate this writing (Moore 2012).

### **The Archives/Evidence of Water and Waste**

Some of the earliest studies of “garbage” in anthropology have thought of garbage as an archive or an archaeology of the present (Rathje 2001). Materials become archives in their conception and curation. The archive’s conception begins with the “sample” itself; compositions are only significant within constructions of place and acts of siting. Studies of consumption might focus on the household as the privileged site of consumption; the things within the garbage are analyzed as consumer products, their unit of analysis and intervention the consumption practices of particular individuals or family. Governments and municipalities support compositional studies of waste in order to realize value from it and enable its circulation.

As the historical depository for much of the world’s waste, but also as itself a site of material histories and lifeworlds— waterways and the sea have also been thought of as archives. This concept is most provocatively explored by scholar and poet Alexis Pauline Gumbs, who in her speculative poetic work *M Archive* has a researcher retrospectively narrate the work of scientists

shortly before an end of the world event (Gumbs 2018). Throughout the work, the narrator recounts urgent efforts to sample, diagram and track the changing ozone, birds and fish before the end of the world: “they went back to nature to describe it,” the narrator says. “Ironically and too late” (Gumbs 2018, 19). This speculative world includes other scientists, ones that do not practice a science that imagines humans and scientific practice outside of relations to nature, but for whom the study of “nature” entails remembering violence at different temporal scales and study as a means of creating new relations: “critical Black oceanographers” and “chemical archaeologists” who try to understand the bioluminescence from calcium of the bones of people transported during the transatlantic slave trade (Gumbs 2018, 11, 24).

I understand Gumbs’ work as illustrating, alongside other feminist and indigenous scholars of science studies, the descriptive authority of science over both Black people and their bodies and also of ocean life as emerging from shared histories of violence under capitalism, a violence that is remembered, being made and circulating unevenly in oceans and seas. Investigations into the changing materiality of seas and oceans— of what exactly it is made of; how and why it comes to be made; what lives it sustains, can no longer sustain, or now sustains differently— are not separate from political imaginaries, ways of knowing and relating, and the emotions of grief and wonder they can entail and produce.



**Figure 4.** Various worn fragments of plastic identified by chemical type Credit: Helen White

Scientists and social scientists alike thinking with water pollution recognize this. Water quality standards and other measures of the “things” that make up water are premised on “evidentiary regimes” that attempt to quantify the risk of particular harms to individual bodies (Liboiron 2018, 331). These standards can be used to both make legal claims and demand different kinds of accountability, but also can legitimize state indifference through their manipulation, either quantitatively or by selectively measuring areas of water bodies (Anand forthcoming; Greene 2020).

The plastic samples from which this work started were taken from a couple different shores in Mumbai. As the oceanographer, Dr. White, explained, samples were taken from the shore that likely had come from the sea rather than being thrown on the ground by people visiting the shore. The presentation of her samples and profiles to our shared research collective raised a lot of questions: how can you tell how long a piece of plastic has been in the sea, how far it came or whether it came from an area outside of the city? After a while in the sea or exposed to sunlight, Helen explained, plastic tends to become faded, break down and degrade. The presence of large amounts of macroplastics in the beach samples suggest they recently entered the sea from the city. She noted that plastics, like bags, can often get buried or caught in sand or mangroves which filter the plastic that arrive on shore.



**Figure 5.** A plastic bag buried in the sand of one of Mumbai's shores Credit: Helen White

Curated as the plastics on the shore are by mangroves, the sea and time, I nonetheless started thinking with the hypothesis Dr. White proposed, which understood the site (in this configuration of the plastic profile: the aggregated shores of Mumbai) as reflecting the discard of the city. Given the very high level of recycling in the city, we understood the discard to be plastics which typically do not enter circuits of recycling, plastics that are left to waste in the city's water bodies. Dr. White hypothesized that the chemical composition, marking the plastics as either polyethylene terephthalate or polyvinyl chloride for example, would help us understand the value of plastics in the city. My questions thus became centered around understanding the geography of both the collection and discard in the city, and plastic circulation in general: what plastics are being taken away, where and by whom? Where, why and how are plastics being discarded? What is the relation of discard and collection to the rivers and nalas that feed the sea?

Like other compositions of the city's waste, this way of seeing plastic intentionally and practically narrows their "social life": a term coined by anthropologist Arjun Appadurai (2013) which has been taken up in the social sciences to more generally describe social relations of production, exchange, consumption and discard within which "things" are made and circulate. In this thesis I focus on the space between plastics' production and consumption and their (non-)circulation often outside of the city bounds to reenter production. That is, I focus on the people and their diverse forms of labor who daily divert massive amounts of plastic from disposal and the plastics that are or are not diverted by these labors. I also focus on how both current and imagined infrastructures of disposal do or do not mitigate different forms of plastic harm and how they in turn might shape the organization, rhythms and affects waste labor.

In many instances changes in waste management that can threaten plastic livelihoods— such as public private partnerships in collection or waste-to-energy plants— only have to reject the

current system on aesthetic grounds or faux concern for the health and welfare of waste workers, (e.g. in response to garbage scattered around community bins and in the streets or just from sight of people working and living in the spaces of garbage), without any accountability for the new harms these changes in management produce environmentally or for waste workers. With the privatization of waste management services often looming as a threat, the right of waste workers to waste in the city is often predicated on an understanding of the work of recycling as an environmental good, with some scholars making arguments on the terms of efficiency set by municipalities, that is, understanding informal recycling networks as more efficient than private enterprises (Luthra 2020b). By focusing on the ways that plastics are harmful (and not the way that waste becomes an aesthetic problem) alongside practices of disposal and labor, I do not wish to reproduce narratives that justify new waste management regimes. Rather, taking inspiration from scholarship on “acting in a permanently polluted world” as I describe within the next couple of pages, I hope to bring them into relation, to raise questions about how visions of “harm” mitigation embedded in current or future waste management solutions might affect labor relations. But first, I would like to clarify the diversity of ways in which the plastic harm is understood.

Politics of plastic harm in the city center on different understandings of plastic along its social life. Gauri Pathak’s work has examined this discourse extensively (Pathak 2020). As she shows, people with interests in petrochemical production often cite not the production of plastic as a problem, but habits consumption and of discard (embodied in “single-use” plastics) and lack of proper disposal infrastructure. Producers also view plastics within the process of shipping as an environmental good, one that prevents breakage and hence waste during shipping and by virtue of its lighter-weight makes transport more efficient. She has also shown that some ways of



sensing plastic can inform intervention over other scales of knowing and materiality (e.g. tupperware is less likely to leach because the plastic feels sturdy).

Plastics not only rely on extractive and unsustainable petrochemical industries, they also can only be recycled so many times in plastic form before they inevitably need to be disposed of by other means. Plastic harm— including the effects of plasticizers in them and their changing materiality as they break down—cannot even be quantified by the usual measures of toxicity. The behavior of such substances in the human body (in the process of endocrine disruption for example) is caused by a “web of influences”; the amount of a substance is not causal to a particular harm (Liboiron 2013, 142). In this “permanently polluted world” of plastic, Liboiron et al. ask what forms of action might move beyond understanding pollution and toxicity as an event “with hard edges and ready narratives” and its attendant liberal politics and interventions of clear evidence and responsibility, to instead center projects of solidarity, obligation and relation (Liboiron et al. 2018, 337). Following plastics in Mumbai after their consumption is not so much a matter of assigning blame for the “event” of plastic in the ocean. Instead, it is to understand, to whatever extent my brief engagement can, their entanglements in the city — and the urban worlds of waste and social inequity — they animate in their circulation. In attending to these circulations and non-circulations, I want to think about how the actual (and not just aesthetic) harms of waste, and plastic waste in particular, might be thought of alongside practices of labor and living that plastics help sustain. In the next section I describe two approaches across anthropology and waste geography which attend to circulating “things,” value and relation in different ways before moving into scholarship on labor and infrastructure that might better engage with the space of recirculation and evaluation more fully.

## Literature Review

### Following Things: Approaches to Value, Siting and Circulation

Anthropology has had a long tradition of “following things,” to show how they are entangled with different desires and regimes of value, with processes of capitalist production and consumption as well as non-capitalist forms of exchange and relation (Carse 2014). As David Graeber has explored in his book overviewing and critiquing theories of value within anthropology, value, even as it is embodied in “things,” has as a term often been used in vague ways to refer to different kinds of social organization and relation (Graeber 2001). Theories of the value of things, so much as they are really questions about relations between people, are entangled in larger debates of structure, power and the individual and implicated in different kinds of politics.

For Marx, the dominant form of relation emerges in the production and consumption of commodities under capitalism. Things become commodities through labor, which is itself commodified in the wage-form. The socially necessary labor time— the average amount of labor time to produce a given commodity— determines its exchange-value independent of price. The commodity is a congealed form of labor, labor which is then through the equivalences of exchange obscured as value that is inherent to the qualities of the object itself. Follow-the-thing approaches, which proliferated in emerging globalization discourses in the 90s, have been situated in a “politics of consumption” that show commodity-producing labor becomes obscured in cultures of consumption as a form of commodity fetishism (Cook 2004). Other approaches to value, including in Graeber’s critique of Appadurai’s approach to the commodity in *The Social Life of Things*, might limit themselves primarily to the sphere of exchange, which tends to emphasize “self-interested calculation.” (Graeber 2001; Appadurai 2013) The “social life”

approach to objects as a methodology, Graeber argues, has developed as a term from its original conception within “economizing” models of value.

As various kinds of waste have increasingly become objects of concern in popular and now academic discourses, scholars in disciplines such as waste geography who follow such an approach have shown how “things” increasingly have a social life beyond consumption where other analyses had tended to stop. They have insisted on exercising a greater focus on the materiality and agency of things and how they move in and out of waste-status. These studies often move beyond singular “sites”—landfills, residential areas, cities—to consider material transformations along an objects’ biography. They also point to how many earlier studies following the “thing” have understood it as materially stable, merely moving through different systems of meaning. They examine, for example, how ships in Bangladesh are creatively disassembled, losing their history and significance as ships and entering diverse supply-chains, such as that of “chock-chocky furniture” wherein the ships’ wood is altered to mimic the shiny appearance of more expensive furniture and appeal to lower-middle-class consumers (Gregson et al. 2010).

Gay Hawkins has used a similar methodology for plastic PET bottles, following them across the sites of industrial research and development, cultures of consumption and informal recycling economies in Hanoi. In the production of PET, and the form it takes in bottles, its materiality is manipulated to serve in part as a technology of capital accumulation (Hawkins 2013). The light weighted-ness, relative impermeability and flexibility of plastics holding perishables often enables the transport of greater quantities of commodities, prevents breakage and increases the “shelf-life” of a commodity, elements important to “economic efficiency” within supply chains and logistics. These characteristics become contradictory when many consumer plastics are

quickly disposed and when recycling economies attempt to transform discarded plastic into new supply chains with different value logics. As plastics become an object of pollution and ethical intervention, Hawkins argues, particular practices of disposability can also be materialized within a “thing,” as material engineers attempt to make plastics more amenable to breakdown and recycling. Hawkins suggests thinking of materiality not as being transformed along a linear “biography,” but within a topology.

These approaches emphasizing multiple and shifting materialities have been inspired in part by philosophers and theorists of “new materialism,” such as Jane Bennett, who has argued that matter possesses a “vital materiality,” or that things act and to an extent have agency independent of “the words, images and feelings they provoke [in humans]” (Bennett 2010, xvi). The distinction between abstracted, symbolic waste in anthropology and other social sciences, however, and *the* shifting materiality of things many waste geographers call for in their methodologies is more blurred. “Waste management” in calls for a focus on “materiality in a networked world” is presented as a series of bureaucratic abstractions and targets expressed in weight, which is somehow counter to a more authentic materiality of the object (Crang 2010). If the goal of the methodology is to just describe the way the thing is materially unstable, both the “thing” and the “sites” through which it moves are sometimes reified, taking on an independence from the relations Bennett at times seems to downplay and which earlier analyses following the thing were keenly aware of. The “thing” does not necessarily need to change according to normative understandings of what it is in order for its materiality to be significant in different ways.

The labor that transforms the ships and the PET bottles in processes of revaluation in recycling appears in a somewhat superficial way. Labor disassembles the ship and wrestles with the

“recalcitrant” materiality of the PET bottle, but how these materialities are meaningful for the people laboring or their organizations of labor is unclear. Of course, no one can trace all of these associations as a thing moves, and as objects become matters of intervention, as plastic does, tracing its entanglements is an important project for understanding and building relations and politics, but tracing a single object across a site of “consumption” and then of “reevaluation” in recycling to make a point about some part of its changing materiality, risks missing all the different materialities that matter differently. The flexibility of plastic, for example, is no more material or less abstract than weight, a materiality that emerges with other “things” and not just the singular object, and an abstraction that has all sorts of material consequences in waste management (Butt 2020). Rather than focus attention on what waste is essentially, with one ontology of waste trumping another, it might be productive to see how multiple ways of seeing and relating to waste can be in opposition or emerge meaningfully together across different spaces, which do not necessarily need to be so far flung or across the different elements, so to speak, of a biography.

My attention to plastics in Mumbai has primarily focused on their circulation post-discard. While analyses of commodity fetishism, by virtue of stopping at consumption, have relied on these traditional categories of Marxist political economy and the social relations around objects they assume, recycling economies sit in the uneasy space between consumption and re-entry into production in emerging corporate and waste management visions of perfect circularity. A space which in early development discourse became known as the “informal economy” (Millar 2007). How do we understand this space more fully beyond *the* space of reevaluation through which a bottle or bag moves? In this next section I review literature on the organization of waste labor in

“informal” economies and infrastructure which is crucial to shaping the organization, materiality and subjectivities of labor within these waste economies.

### **Waste, Value, Labor**

Scholars of Marxist political economy have theorized waste as the antithesis to value— that which can be commodified through labor to enable the accumulation of surplus value under capitalism, or what Vinay Gidwani has called “capitalist value in waiting” (Gidwani 2013, 773). He includes in his analysis not only the post-consumption “objects” of waste, but also colonial conceptions of “wasteland” as ecologies that have not been subsumed by the interests of private property. Other analyses have similarly understood waste as a “frontier,” ecologies which hold the excesses of capitalism and enable its perpetuation, which also come to threaten capitalism and need to in turn be subsumed (Doherty 2019). Max Liboiron has similarly understood recycling as an effort to constantly bring surplus back into production to enable accumulation and fuel the growth economy of materials such as plastics. In the spirit of de-growth, they ask what a different ethics of wasting would look like, whereby surplus need not reenter processes of production (Liboiron 2015).

Within these analyses, labor is central to the circulation of waste and the reproduction of capitalism. Waste workers, understood as themselves an outside surplus force excluded from formal wage work, nonetheless subsidize the circulation of waste back into production (Yates 2011). Waste workers as well as other forms of life that enable the circulation of waste also bear the bodily burden of waste as a result of their disposability under different organizations of labor under capitalism (Doherty 2019; Fredericks 2014; Yates 2011). The concept of “human-as-waste,” however, has been challenged in a number of ethnographic accounts of waste work. Likening the comparison of informal labor and waste to similar anxieties in urban theory

over the planetary proliferation of slums, Kathleen Millar argues: “to repeatedly invoke images of waste, abandonment, excrement” can “reinforce the notion of human disposability.” (Millar 2014, 7)

Analyses of the actual rhythms, relations and affects of working and living with waste engage in some capacity with the idea of the “informal” economy. Blanket characterizations of activities not entirely legible to the state range from “entrepreneurial self-help” to “survivalist and deeply individualist” to uniquely cooperative (Millar 2007, 10). Some, following Kalyan Sanyal, have theorized the informal economy as resembling a “need economy.” Vinay Gidwani has primarily theorized relationships between people collecting waste from public spaces as well as between waste collectors and scrap dealers. Landfills, like streets among street vendors, he notes, are often cooperatively managed as a commons. While the scrap dealer might generate surplus, Gidwani argues, “the zeal for profit maximisation can foreseeably yield, within limits, to a logic of revenue optimisation that accommodates more workers than the tenet of neoclassical efficiency sanctions” (Gidwani 2015, 584). Beyond the exchange of recyclables, scrap dealers might also be an important source of credit, offer a place to stay or offer valuable knowledge to new waste collectors (Gidwani 2015). Knowledge sharing and apprenticeship often occur between people collecting waste (Millar, 2007). Such relations are often made through ethnic, caste or familial affiliations and networks and can ease, Gidwani argues, the competition that inevitably still exists in such a need economy.

The ambiguity and diversity of such arrangements and exchanges and the difficulty in theorizing them can be seen in the slippage of terms: at times the waste collector-scrap dealer relationship is patron-client; at other times the scrap dealer is generating surplus, but not necessarily accumulating. As Gidwani has said in his own critique, Sanyal’s formulation of the

need economy tends not to engage with value theory in his distinction between the surplus for need economies and the surplus for accumulation, as both rely on M-C-M relationships (Gidwani 2014). His conception of the need economy, however, is still crucial to Gidwani's theorization of capitalist value production subsuming other modes of value production within waste economies. Within these formulations, waste economies are posited as outside capitalism, partially inside in circulating surplus and also at times subsumed, but still according to apparently distinct value logics.

In Diane Elson's interpretation of the labor theory of value, which Gidwani also uses in his works, the theory is primarily concerned with the form of labor and its political significance, i.e. how socially necessary labor creates a norm for productivity and becomes a tool for discipline (Elson 2016; Gidwani 2008). She also points out another common use of the labor theory of value is how it elaborates a theory of exploitation through the extraction of surplus value from labor, which becomes useful politically (Elson 2016). The distinction between accumulating surplus and need surplus in need economies seems to be another attempt to understand the nature of relations in informal economies and how they can be understood in relation to power, precarity and exploitation, characterizations that then become useful in making informality an object of intervention. In Gidwani's formulation, the prospect of wage work is implied as always desirable to the precarity of informal work. Rather than people being permanently ousted from formal work, Gidwani contends, some oscillate between formal and informal work, demanding attention to the spatio-temporal rhythms of work (Gidwani 2015).

Other accounts of waste work have called for a greater attention to the diversity of work arrangements, rhythms and affects that are otherwise glossed under the terms "informal economy" and in attempts to condense these relations into economic models. In her work with



people who collect waste from a landfill in Rio de Janeiro, Millar forgoes the idea entirely that wage work is always preferable to non-wage work and that workers are always looking to be “formally” employed. The informal economy, she argues, is always understood through the lens of what it is not. She asks why people that collect from the garbage dump often return, demonstrating that the landfill can act as a site of “detachment” when formal wage work, while technically an available option, limits the flexibility and autonomy that “enable life.” This flexibility includes control over the time of payment and of work, which can help meet urgent costs and provide time to attend to other responsibilities. She also notes how the “rich associational life” that often exists within communities that often simultaneously work, socialize and often live together can bring attention to the alienating aspects of wage work. How can non-wage workers, she asks, change our understanding of class politics and the heterogeneity of capitalism (Millar 2007)?

The subjectivities and organization of waste work is also shaped by different understandings of purity and pollution. In her ethnography of municipal garbage workers in Dakar, for example, Rosalind Fredericks argues that “cleanliness— as a symbol of faith and piety are key symbols of the political valence of trash in Dakar” (Fredericks 2014). Waste workers protest the “flexibilization” of their labor by positioning their cleaning of the city as “an act of piety”. The affects and organization of waste work in South Asia in particular are inextricable from notions of purity and pollution in the construction of caste. As Gauri Pathak notes, understandings of the body as “permeable” to “biomoral substances allow for the transfer of purity and pollution between people and things, and people’s ability to police their bodily boundaries and avoid pollution is reflective of caste and other hierarchies” (Pathak 2020, 755).

Waqas Butt has also called for a movement “beyond the framework of the abject” with an attention to how organizations of waste work must be understood alongside the historical formation of work and caste (Butt 2019). The stigma of Muslim and Christian waste workers in Pakistan cannot be attributed anachronistically as the influence of Hinduism in Pakistan, Butt argues, rather waste work and caste must be understood as historical formations. He describes how the association of people belonging to the Chuhra caste grouping with waste work emerged in colonial Punjab, when caste groups and their associated roles were defined by the British as a “category of governance” crucial to revenue settlement, which created a system of “private property rights” with which to extract revenue. These groups, many of whom would also convert to Christianity during the colonial period, would later become a part of urban sanitation workforces when municipalities contracted the work of sweeping and other waste duties to someone who would then organize workers through customary relations. Present-day organization of Christians around this work, Butt argues, has enabled waste workers to gain “access to work and income” and find settlement. Abjection obscures these “life-making aspirations.”

The caste organization of waste work is also shifting in some areas, and proximity to particular kinds of garbage— particularly wet garbage— shapes power relations. Dana Kornberg, for example, has shown how in Delhi, Muslim migrants from West Bengal have increasingly taken over the collection of waste from Balmiki workers, who are now primarily involved in collecting fees from households. While losing some of their income, by virtue of their distancing from mixed wet garbage, Balmiki workers can engage more with upper-caste households and might find other opportunities for other employment (Kornberg 2019). While for many Bengali

workers, Kornberg argues, working with wet waste is a source of shame and disgust, the recovery of recyclables also “offers the possibility of a better daily living.”

Butt has also sought to capture these intersections between caste, class and waste work. He develops the concept of “waste intimacies”: “a projected and condensed social relation that expresses certain interdependencies and ambivalences.” These ambivalences include understandings of and relationships to “self, waste, work, and a world of others.” He describes, for example, how some waste workers doing the same tasks distinguish themselves from others on the basis of caste; doing waste work by circumstance rather than by birth is one instance of distancing. He also describes the work of people who collect both wet waste and recyclables from middle-class households directly in the private sphere. One collector knows the children and workers of the household well and is called son by some members. In addition to taking their garbage, he is often given other household items. These relationships of reciprocity, Butt argues, also serve to “organize caste hierarchy.”

As these scholars show, the spaces of collection and proximity to particular kinds of waste organize waste labor, relations and subjectivities. The relationship of waste work to capitalism and regulated spheres of work and labor is also of continued importance to understanding waste economies. In the next section I examine literature on infrastructure, which is helpful for thinking about how various kinds of labor (whether deemed formal or informal, inside or outside capitalism), practices of discard, materialities of plastic (mixed and unmixed), subjectivities, knowledge, etc., relate and coalesce.

### **Infrastructural Labors of Circulation**

Brian Larkin’s definition emphasizes infrastructure as “material forms” that enable circulation or “matter that moves other matter” (Larkin 2013). Yet this simple definition belies

the diversity of approaches under the umbrella of infrastructure. Infrastructure may be thought of as a material base with an ideological superstructure in the Marxian political economic sense, an instrument of discipline in analyses of biopolitics and governmentality or a network of materials, knowledges, practices and affects through which power is exercised, challenged and negotiated. Thus, as Larkin also notes, “discussing an infrastructure is a categorical act,” which can move away from the site of the material infrastructure to sites of knowledge and expertise where infrastructure is planned and maintained or which can focus on the way infrastructure is experienced, contested and remade by different people in its network.

Larkin also points to how infrastructures often act as vehicles for the “desire and promise” of modernity, a modernity based in enlightenment ideals which aims for the seamless circulation of water and electricity, and more recently as a waste management imperative, the seamless circulation of various kinds of waste as well. The project of modernity, however, has always been premised on particular exclusions. Scholars of infrastructure have also been interested in the way infrastructure shapes particular subjectivities and the rhythms of everyday life. Susan Leigh Star famously said that infrastructures are invisible until they breakdown (Star 1999). Scholars have since brought attention to the ways experiences of breakdown are commonplace for some people. Behind this logic is the idea of infrastructure as large, unwieldy networks which are both materially durable and subject to additions. “Accretions” which offer a sense of how infrastructure also endures across time and can offer insight into temporality and politics (Anand et al., 2018). Labor too is in many ways intentionally obscured and devalued in the representations of large grids or networks of pipes as themselves enabling seamless flow.

Waste infrastructures seem to operate somewhat differently. The recycling bins, community waste bins, trucks and landfills that enable the circulation of discard do not

necessarily span long distances seemingly uninterrupted nor are they necessarily durable in space. Instead they are organized as “nodes” which are easily moved and disrupted, reshaping the spatiality and dynamics of waste economies and markets (Gidwani 2015). The “things” that these infrastructures help circulate are also materially diverse. If we understand materiality to be a form of knowledge-making to particular ends, water that moves through pipes can also be materially diverse, but the changing compositions of municipal waste are especially open to many interventions.

In my analysis I understand infrastructure in its conception as an assemblage of materials, practices, knowledge and affects. Waste infrastructures in Mumbai sustain multiple circulations through the interaction of both formal municipal and “informal” waste rhythms and work, and it is through infrastructure that struggles to change these flows through different kinds of knowledge, claims to property and practice emerge. If the labor of circulation— such as maintenance work on pipes or sewage infrastructure situated in part underground— is in any way obscured, waste work has been hyper-visible and a large part of the disruption of the desired “world class aesthetic” of cities and infrastructure (Ghertner 2015). Waste work, again, involves various kinds of “intimacies” rather than distances between waste, the self and others (Butt 2020). In centering the importance of labor in shaping the circulation of waste through material infrastructures, I emphasize what Abdou Maliq Simone refers to as “people as infrastructure”: the way that social relationships that are both sustained and flexible, not readily defined by preconceived notions of space and practice, help produce “expanded spaces of cultural and economic operation” (Simone 2004, 407). Other recent analyses of waste infrastructure have also called for a greater attention to the relationship between infrastructure and labor as well as the material and affective dimensions of infrastructure and waste (Fredericks 2014).

What are the “things” moving through these infrastructures? In what quantities and qualities are they accessed, and what relationships, rhythms of work and subjectivities do these different spaces and infrastructures of collection sustain?

## Methods

This project was originally conceived as an ethnographic project which would take place during my travel to Mumbai in the summer of 2020, but these plans were disrupted by the COVID-19 pandemic. My original conception of the project was developed in conversation with Dr. White's shore composition, focusing much more on particular materialities (such as chemical compositions), questions of why particular "things" are circulating according to some conception of value and understanding how waterways become sites of disposal for the things that are not valuable through different organizations of service provision.

Following "the plastic leaks" in Mumbai was the name for the approach I had conceived with others about eight months into the pandemic when I proposed the project to Zulekha, a filmmaker, and Siddharth, an architecture student, in Mumbai just as the city's transport was beginning to open back up as Mumbai's COVID case load fell and United States' COVID numbers were again rising. Following a circulating "thing" is not just a methodological approach that encompasses several theoretical traditions. It is an approach that also allowed us to be open and flexible in where we ask questions about plastic and the multiple kinds of questions and interests we could encompass across what came to be a group of four, including Adwaita, a PhD student at Penn.

Between November and February of 2020-1, we developed questions collaboratively, according to a list of our own plastic "sites": scrap dealers; workers at NGOs; municipal ward employees; people involved in beach clean-ups; people involved in waste-picking; and people living in informal settlements and housing societies which might be differently serviced. Some of these interviews were brief and unrecorded, while others agreed to be recorded on video with an

understanding that the video would be part of a film project. These interviews are thus mediated through the video work of both Siddharth and Zulekha.

Both the nature of the interviews and the people that agreed to be interviewed are shaped by the fact that they are being filmed and how the person filming them is also situated. As Waqas Butt also notes, narrations in general, but especially of waste work by waste workers depend in part on the person they are talking to and how they decide to represent themselves to others. The voices present here are probably different than if I had carried out the ethnographic non-film project as a white American woman; some people might be more willing to speak with me and others less so and in different ways. While I am often translating directly from the interviews I analyze in Hindi, which I understand, other interviews I analyze are in Marathi, for example, and are also mediated by translation. In addition to following plastics, Siddharth and Zulekha followed water bodies and wetlands in the city with an attention to plastic, including rivers, nalas and shores. Following their field visits, we met once or twice a week over zoom to discuss the materials they had recorded as well as made note of questions, comments and themes in a common document.

From these discussions and further reading, my focus shifted less from the “what” of plastics— an answer that quickly became clear through the large amounts of multi-layer packaging and bags— to how particular plastics are accessed at different spaces of collection, or rather through the relations that make space and access. My own critique of just following particular things across sites to understand their shifting materiality thus emerged from my own shifts in understanding of how plastic is meaningful within a fuller space of recirculation and reevaluation. In addition to reading and working through the field research that Zulekha and S were doing, I read through archives of photographs and films; policy documents; news articles;



interviews from the Tata Institute of Social Sciences archive on waste in Mumbai; and with reports and studies of waste circulations and economies in other South Asian cities to understand these geographies of discard and collection, both their constitution and meaning.

## **Structure of the Thesis**

In “The Things that Circulate: Thinking Value from Scrap Dealing” I address some of my original research questions about “what” plastics enter circulation according to their materiality and value and from the segregation space of a scrap dealer. To do this, I bring together my observations from Zulekha’s footage and interview of a scrap dealer in Mankhurd, with other accounts of plastic materiality, value and scrap dealing from other waste economies in Delhi, Pune, Lahore and also cities outside of South Asia. I focus on *weight* as the primary form of remuneration in these economies and think about how weight might be understood according to value as social relation and organization. Ways of knowing, manipulating and disputing weight are also mediums of expressing (lack of) trustworthiness during exchange and of making particular moral claims about organizations of work in the “informal” economy. Given the diversity of exchanges and relations within the “informal” circulation of plastic in the city and the outstanding difficulties in theorizing it in terms of concepts that have been used in economics and anthropology (e.g. gift/need economies, commodity fetishism), which may be an unproductive way to think about the experiences of workers in these economies anyways, I end my focus on materiality/value with weight to be picked up perhaps at another time.

In “Garlic for Plastic” I think with the collection routine of a woman who exchanges garlic for plastic and her narration of her life and work. I draw inspiration from arguments thinking against the abject and with the “intimacies of waste,” understanding her work as indicative of the many rhythms and affects of work and spaces and relationships the exchange of plastics sustains.

In “Watery Infrastructural Ecologies of Waste” and the “Ambivalences of the Nala” I follow a municipal contractor’s employees’s narration of his routine collecting waste for disposal in settlement by a nala (i.e. streams that are variously made and rerouted by concrete). I draw on ideas of nature as infrastructure/infrastructures as ecologies to consider how dynamic spaces of collection are enabled through the exclusive spatial logics of formal service provision. Collection within private space is considered by the municipality as both a necessity for settlements with narrow lanes and a privilege. Contracted waste collectors charge fees for door-to-door collection to supplement their low wages, making the nala a free and alternative space of disposal where people collect plastic. Differential vulnerability to flood produced by an assemblage of monsoon rains and the built form of the nala among many other elements, disrupts these spatial logics, makes waste and changes these geographies of collection. I put these insights into conversation with work from the Inhabited Sea research collective which seeks to understand how Mumbai is and might be designed and inhabited in wetness.

Finally, in “Recycling the Un-Recyclable” I look ahead to emergent efforts to bring “low-value” plastics into circulation by opening new supply chains and supporting scaled infrastructures through plastic neutral capital. These efforts require valuing the labor time of waste workers to incentivize the collection of light-weight plastics. The unsubsidized cost of wage work comes into friction with the unprofitability of low-weight plastics, stimulating imaginaries of efficiency through segregation and regular, large-scale collection at source, and necessitating rhythms and expectations of work common to wage labor. The NGO staff member interviewed imagines new relationships between waste generators and collectors materialized through particular practices and infrastructures of discard and collection.

## 1. The Things that Circulate: Thinking Value from Scrap Dealing

Near a road and what appears to be a municipal garbage bin where a municipal employee is sweeping the street, sits a big pile of plastic things: bottles, buckets, cans and baskets among many others. One kid has already started the large task of collecting the PET bottles in the pile when the others, picking up some of the interesting toys from the pile, are told to follow suite.

Alongside other areas of the road, other people are also segregating large bags of plastic. Watching Zulekha's video of the segregation process, I was surprised by the many people involved. I was used to reading about lone waste collectors that go to scrap dealers to segregate and weigh their recyclables before selling them to the scrap dealer. While some of the men segregating might be collectors, others are there most of the day segregating. Whether there is a main "scrap dealer" and the work and payment arrangements of the men and children in the space are difficult to know in such a short interaction.



**Figure 6.** The work of plastic segregation in Mankhurd

Dilip Chavan is one of the men that segregates the plastic they receive from 15-20 customers a day. Taking a break from segregating, he explains the different kinds of plastic. Many he referred to by their common commodity form. Plastic bottles, for example, are known as terry. Oil cans and slippers (chappal) also sell at a particular rate. Other names referred to the method of reprocessing. Bhangar, for example, could be melted and reused while phuga—referring to HDPE containers—could be made into plastic granules. I was also surprised by the confidence with which he named the precise prices and profit margins for different plastics at kilo rates. Other studies of informal waste economies note how prices frequently fluctuate according to oil prices which affect the demand for “virgin” plastics (Millar 2014; Doherty 2019; Butt 2020). Scrap dealers might wait for market prices to change before selling (Gidwani 2015; Butt 2020).

The chemical formulas of Dr. White’s plastic profile matter in some ways; chemical composition often determines whether the plastic can be transformed by conventional forms of melting, extrusion and granule production, but the centrality of weight to informal plastic economies means the form of plastic matters much more often for its collection: qualities such as density, weight and size. Recycling technologies require material purity as well because of differences in plastic melting points, so materially complex items—such as multi-layered packaging—cannot be recycled by mechanical separation without significant amounts of energy for little product. Even for commodity items considered recyclable, such as PET bottles—their component parts—caps which get stuck in machines and multi-material labels—are removed, producing waste even post-collection. Studies of materiality and value in informal recycling economies point to volume, purity, level of deterioration of the plastic and “stickiness and fetidness” as aspects of plastic which effect their value. Waqas Butt has argued that these ways of seeing and knowing waste are one way of making value, which is often counter to other ways,

such as value-making by private waste contractors being paid by the total waste weight disposed (Butt 2020). How do we situate these qualities, however, in an understanding of value which centers social relations?



**Figure 7.** The waste of recycling: a scrap dealer’s dumping ground full of bottle labels and situated in a wetland Credit: Siddharth Chitalia

Given the ambiguity over what kinds of organization of work and social relations the “informal economy” entails, trying to theorize value across materiality and social relations is an equally daunting task. If the circulation of particular commodities has been extensively examined within “formal” production and consumption, an attention to both the materiality and social relations embodied by the specific things that circulate has been noticeably absent in theorizations of waste in informal work. Even within frameworks with clear theorizations of social relations, such as Marxian political ecology, value has been criticized for being immaterial since value and the commodity have been understood apart from the qualities “inherent” to the object (Castree 2002). The material qualities necessary for something to maintain its use-value,

however, can pose challenges to profitability and require greater amounts of labor time (Castree 2002). In recent examinations of infrastructural ecologies and “lively commodities”, for example, storage has been theorized as a site where the value of perishables is maintained through regulating temperature and keeping out other organisms, or in other words, producing favorable ecologies. In these analyses, however, labor time and/or the disabling of use value rendering a commodity unsellable is the central mode of thinking with materiality and value (Banoub and Martin 2020).

Payment by weight is the primary form of remuneration within plastic recycling economies. While this might be considered a form of piece-rate pay that is also related to time, this assumes a relative homogeneity of the things being collected and their concentration within a particular place. The distribution of different quantities and qualities of waste across the city ensures that equal weights of plastic are not necessarily an equivalent in labor time. Worries over proper compensation for weight, especially for women, of plastics fuel criticisms from NGOs of exploitation within informal economies, with one NGO claiming that scrap dealers often “steal” women waste picker’s waste. Weight as a measurement is also subject to manipulation. Kathleen Millar notes how people working on the landfill in Rio de Janeiro will wet cardboard to make it weigh more (Millar 2014). During the monsoon, the same member of a recycling NGO in Mumbai claimed, prices for recyclables go down because part of the weight is attributed to water that gathers on the surface of plastic.

Proper remuneration for weight as a measure of credibility and trustworthiness is mentioned in reports of waste buyers in Pune as well. One study notes how dabbabatliwalis—women who exchange garlic and peanuts for bottles and containers—were slowly pushed out by men with pushcarts (Narayanan and Chikarmane 2015). Part of this change— in addition to the

greater access to credit, better rates and advances scrap dealers gave to the men— was their ability to buy scales. Dabbabatliwalis, on the other hand, estimated weight by sight or feel and inspired less confidence. Leaving the matter of social relations, materiality and value of plastics throughout the plastic supply chain open to further consideration, in the bulk of the rest of my analysis, I focus on how different quantities of heavier and materially simple plastics— which I will just refer to self-evidently as valuable plastics now— are accessed by differently situated waste workers across various social relations, infrastructures and negotiations.



## 2. Garlic for Plastic

Many of the customers that bring plastics to Dilip Chavan in Mankhurd are local garlic sellers. Vimal is one such garlic seller who collects plastic from households in Sathe Nagar, one of a few settlements situated near the Deonar dump. She is one of many women (lahasunwali) who exchange garlic for plastics with households, and took the time to sit with Zulekha to tell the story of how she came to collect plastics and also gave her permission to film her process of collection. Her work starts in the morning when she buys garlic from the market to exchange. In her collection rounds, she announces her arrival by shouting “lahasunwali!” (garlic seller). Women bring bags of plastic collected from their households, which she sorts through for recyclables to add to her sack.



**Figure 8.** Vimal on her daily rounds Credit: Zulekha Sayyed



Vimal was introduced to Sathe Nagar and the work of plastic collection by her sister nine years ago after her husband died from a heart attack. Her long-time presence in the area is notable from her interactions with different women and children in the households. After almost tripping and falling a voice can be heard calling out, “Did you fall?” “I fall every day.” Others inquired, sometimes jokingly, after Zulekha’s presence with the camera:

“Is she your daughter?” “Aren’t you going to show her the plastics?”

“She already saw them.”

Sitting down to rest, Vimal also asks one girl to help her crush plastic oil cans. The girl agreed, standing on the cans to crush them to a smaller size and conserve space before Vimal adds them to her sack.



**Figure 9.** Vimal next to the crushed plastic cans Credit: Zulekha Sayyed

Having to meet rent among other costs on her own after her husband’s passing, when she first started collecting plastics Vimal hesitantly decided to take the advice of an NGO and send her daughter to a hostel so she could go to school. The 100 to 200 rupees she makes collecting

plastic in addition to her main job working in a factory have gone toward paying extra costs such as school fees for her sons.



**Figure 10.** Some of the bottles and containers from Vimal’s collection Credit: Zulekha Sayyed

In many reports of waste work Vimal might be considered an “itinerant waste buyer,” someone who through arrangements with individual households, gated communities and/or waste management officials exchanges money or other things for plastics before they reach waste bins. As that list already suggests, however, access to this waste within the space of households spans a number of arrangements. In Delhi and Lahore— and maybe even in other areas of Mumbai as well—many door-to-door collectors handle both organic and inorganic waste and receive payment, recyclables and other things in return (Butt 2020) Kaveri Gill has noted that in Delhi there are often important caste distinctions between “itinerant waste buyers” and waste pickers who take recyclables from mixed garbage in public areas, and some scrap dealers will only buy from itinerant waste buyers (Gill 2007).

While I do not have an understanding of any caste dynamics, which would be an inappropriate expectation given my brief and removed engagement with Vimal and Sathe Nagar,

this distinction seemed also significant for Vimal. Rather than feelings of shame present in the household collection of organic and inorganic waste in Butt's examination of waste collection in Lahore, Vimal takes her work as a point of pride, something that has prevented her from having to rely on family members in or return altogether to her home village, and which supports educational opportunities for her children that she herself did not have as a girl in her family growing up. She notably distinguishes her work collecting plastics from that of collecting garbage. Her collection of plastic as supplemental to her income from other work may also be an important distinction and is another form of waste work contrary to the surplus figure.

I also think it is worth raising the question of what kind of "waste intimacies" might exist outside of collection of recyclables and waste from middle-class households. Access to certain kinds and volumes of plastics depends in part on the area of the city. Areas in which wealthier residents live tend to produce higher amounts of plastic, but the plastic goes through many different hands before reaching a garbage bin and garbage truck due to the nature of service provision. As one scrap dealer explained to Siddharth, in some areas *bhangarwalas* can store large amounts of plastic from households in their carts and can afford to pay money in return for the plastic. The plastic is segregated and sold usually either by domestic workers for themselves or on behalf of their employers or by women that are often responsible for the bulk of domestic labor (Luthra 2020a). If higher value plastics reach the bin, they may also be taken by guards in gated communities or by people driving garbage trucks. Many informal settlements in Sathe Nagar and other neighborhoods nearer to the Deonar dump—Rafi Nagar and Shivaji Nagar, for example—either do not or else infrequently receive formal garbage service (McFarlane 2014). Lack of service provision and lower consumption in many settlements might enable different relations of collection for people with less disposable income, and, thinking with Vimal's

narration of her work and life as well as the care, knowledge of her life and assistance with plastics from some of members of the households she collects from show, might entail less shame or unequal relations of reciprocity.

In the next section, I consider other spaces of collection enabled by the exclusive logics of service provision, the precarity of contracted waste work and wetness, and also consider what subjectivities and rhythms of work this space of collection may enable.

### **3. Watery Infrastructural Ecologies of Waste**

In one settlement situated alongside a nala that drains into the Poisar river, a contractor has been appointed to collect garbage. Siddharth had met an employee of an NGO during a beach clean-up that worked in the area, and they came across a supervisor and the collectors working under his supervision. The supervisor, at first taking Siddharth as a news reporter, asked that the interview be publicized until it reached Prime Minister Modi in order to raise awareness of the working conditions of the collectors. Finding he was a student-researcher, the collector, Kiran, still agreed to explain the process of collecting garbage.

Kiran, and the seven other people that work with him, begin collecting garbage at 6:30 in the morning. Moving a cart through the wider lanes, he blows a whistle so that people living in the smaller lanes can bring their garbage to the cart. For this task, in addition to cleaning nearby roads and unclogging drains, Kiran makes about 200 rupees a day, enough to make his 6000 rupees rent. He makes additional wages every month through service fees. People in the settlement that throw their garbage in the cart are required to pay 20 rupees every month, which is then pooled by the supervisor and divided among the people working under his supervision.

Kiran did not direct the frustrations of his work toward the BMC, who he and another collector claimed did their job perfectly, but instead at both the built form of the settlement and the residents that do not pay the 20 rupees and instead throw their garbage in the nala. Seemingly energized by the video camera, Kiran walked through the settlement often stopping to point at shallow potholes, broken tiles and tangles of water lines which made the movement of the cart difficult. Some residents offered their agreement on camera, noting that the bin is often hard to maneuver. Others were not in agreement with his grievances. One woman, after Kiran had pointed down her lane and noted how only those nearest to his lane of collection opted to throw

their garbage in the bin, argued that the whistle is too far away from her home. A brief argument also broke out when another woman mentioned that she had in fact put her garbage in the bin, to which Kiran rejoined that she had not put her trash in the bin in the past two or three instances. While at one point recognizing that many people do not pay the 20 rupees because they are unable or for other reasons, Kiran said that action should be taken against people who do not pay for their garbage. At the end of one lane by the toilets next to the nala, “kachrā” (garbage) is written on the wall where there is an opening to the nala, signifying its use as a place of disposal.



**Figure 10.** Entrance in the settlement near the nala labeled कचरा (kachraa or trash) Credit: Siddharth Chitalia

One way to understand waste collection in this settlement is through the politics of service provision. Lack of collection in settlements known as slums is often justified through elements of the environment and built form. In an interview with the Tata Institute of Social Sciences, a BMC officer too noted narrow lanes and hilly and marsh areas as issues that make garbage collection difficult and necessitate door-to-door collection by contractors (School of Cultural and Media Studies TISS 2017b). Similar justifications have been given for not installing other services. While these elements can produce legitimate challenges, “viability,” Nikhil Anand has



argued in the case of installing water lines in hilly areas in Mumbai, “is an effect of power” (Anand 2011, 554). Door-to-door collection is understood by the officer as a privilege that the municipality does not provide to even “serviced” areas. Amita Bhide has argued that the consideration of door-to-door collection—apparently necessitated by narrow lanes— as a privilege is rooted in the distinction between public and private space in solid waste management services and its implication for collection in areas considered to be illegitimate: “When it comes to waste collection... Public health begins with the streets and solid waste collection does not begin within the slum, but it begins within some defined point of collection, which would be near the road. [The city does] not contemplate household collection of waste at all” (School of Cultural and Media Studies TISS 2017a).

Both the BMC officer and Kiran also pointed to unruly rhythms of wasting and the former even to unruly compositions of waste as reasons for lack of collecting. Kiran noted that when many residents of the settlement return to their villages for a period of time, they throw all of the stuff they cannot take with or leave behind in the nala. With large amounts of garbage in the nala all at once and fewer residents, Kiran and his coworkers have to not only clean more, but clean more at a lower pay. The BMC officer also ignores the insufficient appearances of the municipal garbage truck to collect waste, instead laying blame for overflowing bins on the fact that the people disposing have not devised a schedule. In areas with a mix of residential and industry activities the officer noted that the waste is not properly domestic without elaborating how a greater proportion of cloth in waste, from people working with clothing for example, makes collection and disposal difficult (School of Cultural and Media Studies TISS 2017b).

Whereas for infrastructures providing more urgent needs such as water residents of settlements often form networks of political patronage (Anand 2011), work in anthropology on

garbage infrastructure has emphasized the “political valence” of garbage, whereby people use garbage and waste in protest. Christine Schwenkel has written about the “gendered apathy” of women in Vietnam set to be displaced soon from housing who do not abide by notices to put their garbage out at a particular time or to put it in the bin (Schwenkel 2018). In more spectacular instances such as that described by Rosalind Fredericks in her work in Dakar, garbage workers might strike, causing the streets to fill with garbage. Insofar as relations to the state are negotiated through infrastructure, whether conceptualized as a mode of state-disciplining of (especially gendered) subjects and/or as something that shapes people’s understandings of themselves, others and the state, the temporal and spatial practices of garbage have been central to these negotiations. These spatial and temporal expectations are present in Kiran and the BMC officer’s frustrations, which even come to encompass the composition of garbage. And while Siddharth did not have any conversations of length with residents in the settlement, the distinction between paid for garbage which goes in the bin when the whistle blows and unpaid for garbage which is thrown in the nala in varying amounts throughout the year, may also be meaningful to residents themselves.

What is most interesting then, is the way that these spatial and temporal distinctions are for a time suspended during the monsoon as the settlement fills with rainwater or is inundated with water from the overflowing nala. Even as Kiran walked through the settlement with minute attention to the cracks, scattered bottles and the people who (and the frequency with which they) had not given their garbage, he noted that collection stops altogether during the monsoon. When the rain stops, they focus on clearing the drains to mitigate future flooding. During this time, as one of his coworkers pointed out in conversation, water often floods the settlement, soaking



cotton mattresses which are discarded in the nala and taking with it plastic buckets from the toilets and other belongings.

What kinds of subjectivities— apathetic or otherwise— might the experience of flood generate, towards the state, self, water and waste? Here I understand flood not as “natural,” but as itself a way of relating to water and a vulnerability (often differentially) produced by an assemblage of patterns of settlement and development, built form, and as Kiran demonstrates, also of plastic, the spatial exclusions of service provision and overburdened and underpaid waste workers among many other elements.

This is not to say that seasonal flooding necessarily renders collection during any time useless, an argument which would only reproduce the idea of people living in wetlands as inherently unserviceable. Plastics and other garbage in the nala that accumulate both before the monsoon and in new ways during the monsoon exacerbate this very flooding in the first place. Collecting plastic and other waste during the dry season can possibly mitigate flooding locally and prevent stagnant water. But within a city that is also sea and wind, the presence of plastic in waterways and on shores cannot be attributed solely to intentional discard by irresponsible citizens, a reason which itself does not stand to scrutiny when considering the exclusions of waste infrastructure. The existence of marine plastics must also be understood as a result of infrastructures and logics of waste management as well as elements of built form and living which are not typically designed to accommodate water and which knowingly assume stable ground and matter. Gauri Pathak observed in her own fieldwork of waste management in Mumbai how municipal employees also engage in dumping waste in nalas. Even “properly” disposed garbage, they contend, goes to Deonar, which is situated in the wetlands of Thane

Creek. During the monsoon, garbage often seeps and slides into the soaked ground and creek, (Pathak 2020).

Following Dilip da Cunha and Anuradha Mathur's provocation to think with Mumbai beyond colonial land/sea boundaries, a separation which shares its history with public/private distinctions on which the notions of sanitation is premised, what new ways of handling stuff with care and accommodation for water might be devised, especially in light of rising seas? (Mathura and da Cunha 2009; McFarlane 2008). Not in the form of a particular technology or rigid protocol which seeks to maintain a purity unrealistic for a soaked terrain and in a "permanently polluted world", but as one which fosters different subjectivities and obligations which current waste infrastructure exclusions and modes of underpaid and overworked labor make difficult (Liboiron et al. 2018).

Here I think alongside fellow members and workshop participants of Inhabited Sea, a research collective which seeks to extend Mathur and da Cunha's provocations to understand current practices of living with wetness in the city might animate new imaginaries of governance especially in light of rising seas. As Ashok Sukumaran asked during one workshop, alongside understandings of the inseparability of humans/nature and of land/sea, how can particular boundaries be maintained? As much as de-centering human agency and control and recognizing the facile notion of human/nature separations can be productive of new relations, taken too far, it can undermine attempts to think how violent relations to other humans and within ecologies understood as "nature" might be remade or repaired by human actions. Actions exercised, however, with the expectation of contingency and with modesty and persistence.

The futures in which these ways of knowing and living with wetness in Mumbai's present might become relevant and how is yet unclear. Is an attention to these practices as they consist in

current configurations of power, as Anant Maringanti described, a way of “making things work” when structural change is no where near the horizon? A way of “cataloging” without yet being certain, by way of theory, what is to be built? Is it too optimistic to expect that the same states— themselves consisting of heterogeneous forms of knowledge and practice— which produce these violent relations might adopt practices and allocate resources counter to current relations under capitalism? Other infrastructural imaginations of managing waste with water must be scrutinized according to how they imagine future forms of vulnerability within rising seas, the kinds of relations of power that these projected vulnerabilities assume as stable in the future, and the kinds of labor they demand and from whom.

#### **4. The Ambivalences of the Nala**

Just as some have pushed for an understanding of the water as a commons antithetical to private property and enclosure, so has recyclable waste been understood as a commons (Gidwani 2015). Keeping in mind the challenges flooding has for people losing their possessions and for the risks to health stagnant water and garbage can pose, I also want to, keeping with my larger focus, consider the relationship between the spaces of service provision, water and plastic flows in the city. Here I consider nalas and waterways as part of larger infrastructural ecologies that act as sites for both the production and collection of waste.

Scholars have in recent years expanded the concept of infrastructure past traditional objects of analysis, the large built forms of roads, electrical grids, pipes and dams, to include “nature.” For example, Ashley Carse describes a transition in approaches to the management of the Panama Canal watershed from using the “hardware” technologies of locks and hydrographic stations that control water to enable shipping to “assigning infrastructural functions” such as water storage and regulation to landscapes in response to water scarcity (Carse 2012). Whether focusing on entire landscapes or specific organisms such oysters or mangroves, these analyses focus on organized attempts by governments and other institutions in power to manage life to particular and often conflicting ends, such as mitigating the harm of rising, surging or scarce waters (Wakefield 2020). In the management of urban waste, flies, storks and pigs, through the efforts of municipalities, residents and/or of their own accord metabolize organic waste in particular and produce new circuits of value (Zhang 2020; Doherty 2019). Not only are lives and ecologies intentionally instrumentalized, others have argued, but even “traditional” infrastructures are a “medium of life” as they (un)knowingly disrupt and shape and are disrupted and shaped by ecologies (Barua 2021).

Urban waters and their inhabitants have also historically been made by and enrolled in ecologies to manage organic waste. In 19th century New Orleans, as Marvin Melosi's history of waste management in the United States recounts, tug boats pulled and dumped the city's waste two miles down into the Mississippi River, where it, as the Reverend in Melosi's archival account notes, "disappears into the devouring jaws of gar, pike, codfish and other greedy denizens of the great stream, which attend in countless numbers at their daily dinner hour. What is spared by them is whirled away into the waters, and not a trace of any part of the offensive matters can be discovered four miles below" (Melosi 2004, 34). If fish in deep river waters could not be counted on to metabolize the city's waste, Melosi notes, engineers relied on the principle of dilution, or the idea that running water can "purify itself" to continue to use waterways as sites of disposal. The flawed logic of dilution would be exposed in cities such as New York City where waste that failed to sink crowded harbors and returned to the shores of cities downstream.

In Mumbai today, imaginations of untreated sewage as "nutrients" for sea life and the sea's ecologies as purifying infrastructures persist as a way of producing "ambiguity" (Anand forthcoming). By simultaneously making claims to the purifying powers of the sea, legally contesting water quality standards and marking urban waterways as drains so as to avoid taking measures of water quality, authorities, Anand argues, avoid taking responsibility for the slow violence exclusions from sewage infrastructures produce. While water quality standards render the persistence of sewage perceptible as legal evidence, the presence of plastics in the sea and on shores has been less ambiguous. Nalas and other water bodies in the city are thus popularly understood as drains where infrastructure ends. Formal infrastructure does end here, and it is violent. I also want to understand the nala, as an informal dumping ground of sorts, as sitting within the same tensions as the landfill. It is both a site of organized neglect, while also

“enabling life” in a world which does not see the precarity of both wage and non-wage labor ending soon, and in which ways of only superficially addressing the violence of the space could mean producing new forms of violence.

By approaching the nala as a nature-infrastructure or infrastructural ecology of waste-making, disposal and collection, nature here does not appear as separate from humans, but its materiality comes to matter and be instrumentalized in a larger assemblage of human and non-human elements. Nalas, which take various forms as some become concretized as a flood control measure, often serve several improvisational infrastructural functions of disposal that are negotiated and which change with the temporal flows of the monsoon. In Colin McFarlane et al.’s examination of sanitation in Rafinagar, situated near Mumbai’s largest garbage dump, they note how garbage thrown into the nala in absence of municipal garbage services is moved to the side by residents to enable the flow of water to prevent idle pools (McFarlane et al. 2014). Provisional toilets built over the nala also must be maintained or entirely rebuilt when the high tide erodes its base.

In her examination of the role of stormwater drains in different assemblages during Bangalore’s history, Malini Ranganathan argues that “the tension between flow and fixity has always been a defining feature of the socionatural relations comprising ‘storm drains’” (Ranganathan 2015, 1301). In the present-day, the fixity and flow of concrete, waste, capital and water come to bear on efforts to develop real estate over stormwater drains. Here I extend these insights to consider how nalas, just as they are crucial to the improvisational disposal under different modes of service provision are also an important element in making geographies of plastic collection.. If, as Gidwani notes, “geography matters in hard ways within urban need economies” what might an attention to the range of spaces of plastic collection—including water

and drains— and how they are enabled and produced offer to our understandings of pollution and disruption and how they fuel attempts to reform waste collection practices (Gidwani 2015, 584)?



**Figure 11.** Nala near the settlement Credit: Siddharth Chitalia

Returning to the settlement in which Kiran collects, as the bins full of the garbage of tipping-residents are rolled out to a truck outside the settlement, a number of other practices of collection are occurring. By the bins themselves, a woman searches for recyclables to add to her gunny sack. A man with his gunny sack is also moving along the nala where residents dispose of their garbage. He skips past the piles of wrappers and bags that by a quick glance make up the majority of the discarded waste and finds the occasional PET bottle to add the sack. Just as



public-private distinctions shape modes of service provision, they are also important in shaping spaces of different kinds of access for people collecting plastic and other recyclables. In these observations, the practice of tipped and non-tipped garbage enables different spaces of collection.

The floods which blur geographies of discard might also rework geographies of collection. In an informal conversation with a group of people involved in waste picking, Siddharth had asked them if there were any meaningful differences in collection during the monsoon. They responded that the monsoon is a preferable time to collect from the nala not only because the nala is cleaner with more water, but because many items that escape from the household enter the nala. People collecting recyclables was a repeated occurrence in Siddharth and Zulekha's observations of the nala. The nala is thus not only a depository for waste, but, within a larger infrastructural assemblage of flood, actively makes waste and brings it into new geographies of collection. Water bodies and nalas in the city not only bring waste into being in new spaces, they also circulate accumulations of waste differently. During the time of observation, much of the water in the nalas was stagnant and people took waste from accumulations of garbage. As the shores of Mumbai show, during the monsoon waste in nalas not otherwise removed during de-silting moves downstream and accumulates on the shore. In one instance Siddharth observed collection of the plastics that had accumulated at the end of a dried river bed by residents of a nearby settlement.

Much of my understanding of the nala as a dynamic infrastructure of waste making and transporting come from these quick informal conversations and observations. Whether and how the space of the nala as a site of collection is negotiated (as is usually the case in dumping grounds) is unclear. As a site where many different kinds of waste are often present, including



sewage, it might also entail a greater level of stigma for people that collect from it. One scrap dealer speaking with Siddharth claimed that the (mostly men and sometimes children) that take plastic from the nala are only doing so to supplement a drug or alcohol addiction, a common claim made about people involved in waste picking. One member of an NGO claimed that many people collect from the nala as a form of timepass to get extra money for food, and therefore are not actually engaged in waste collecting for significant periods of time. The large gunny sack many people had walking in the nala suggests differently.

## 5. Recycling the Un-Recyclable

So far, I have focused on the “kind” of plastics that circulate according (mostly) to their material simplicity and weight; some of the infrastructures, relations and spaces through which these plastics are accessed; and the different rhythms and subjectivities of work they might sustain. To conclude I would like to focus on efforts to bring “low-value” plastics left behind by extant practices into circulation through plastic neutral capital and the new ways of organizing infrastructure and labor and of forming subjectivities and relations they might enable.

However it might be theorized within the diverse organizations of waste economies, payment by weight is a key element of plastic value and the primary remuneration for different kinds of labors. One of the first conversations of which I was a part concerning value and plastics in Mumbai was with a fellow student who had partnered with several recycling NGOs in Mumbai and other cities in India to connect them to a new funding model. Their website front page opens with a picture of a woman laying on the shore in a towel, surrounded by plastic bottles and cans alongside a caption that reads: “This is how much plastic you waste, every year.” The site also guides individuals and businesses through a five-minute process of calculating their plastic footprint. By paying a certain amount of money, they can help offset their plastic footprint to be plastic neutral. The money goes to a welfare association in Mumbai to enable them to recycle “low-value” plastics among other recyclables. The plastic is considered low-value, the creator of the credit platform explained, because the multi-layer packaging and foam polystyrene are too light-weight and low-density, respectively. Filling a truck would take a lot of labor and a long time for relatively little return. In other words, recycling these plastics is just not profitable because of investments in labor and transportation logistics.

Such “low-value” plastics have increasingly become the focus of national policy. The United Nations Development Programme has been the convener for a national framework on Extended Producer responsibility initiatives, which have focused heavily on “non-recyclable” plastics such as multi-layered packaging. A committee from the Ministry of Environment, Forests and Climate Change examining challenges to the Implementation of the Solid Waste Management Rules debated the recyclability of multi-layer packaging. One member suggested that smaller satchets should be completely banned, but others challenged the idea that MLP is not recyclable:

Representatives mentioned that there is lack of clarity on categorization of items- CPCB guidelines treat MLP used for packaging as non-recyclable plastic waste and hence needs to be phased out though it is considered as recyclable product by the industry. Other countries are developing technologies that can be used to recycle MLP e.g. Pyrolysis. If there are solutions for reuse like cement manufacture/ waste to energy/ use (brick kilns etc), there would be little justification for phase out in view of utility of the products. (Hazardous Substance Management Division MoEFCC 2017, 7).

Recyclability, representatives argued to the committee, is merely a matter of having the proper technologies to recycle. “Practically, the report states, there is no plastic which is not recyclable or non-energy recoverable” (Hazardous Substance Management Division MoEFCC 2017, 7). The committee also added that the revised Extended Producer Responsibility guidelines could further encourage the recycling of MLP by charging companies more for the production of MLP than other kinds of plastic.



**Figure 12.** “Low-value” plastics in one of the NGO’s trucks collected from society recycling bins

Previous formulations of EPR expected companies to set up infrastructure for collection, but the committee concluded that this would be “very impractical and inefficient” (Hazardous Substance Management Division MoEFCC 2017, 6). In June 2020, this recommendation made its way into the new MoEFCC Uniform Framework for Extended Producers responsibility. The new framework imagines a plastic credit system whereby producers support processors/recyclers to ensure that an amount equivalent to the amount of plastic produced is recycled.

Other NGOs in the city have also received support as a result of the Extended Producer Responsibility guidelines. One such NGO was established in 1993, but began work in solid waste management in the late 90s. The daughter of the NGO’s founder, Jignyasa, explained that the organization started with a large-scale survey of women who take recyclable waste from garbage bins along the western line of Mumbai. In 2014 with support from the United Nations Development Programme and Hindustan Unilever, the BMC and other municipal corporations around the country set up seven dry-waste segregation centers to be run by the NGO and others across the city. The NGO has since partnered with other companies such as Bisleri, a plastic bottle producer, to similarly emphasize that nothing is not recyclable.

These partnerships by virtue of their scale open up new supply chains with which to recycle these plastics. Through the plastic crediting program, the welfare association hopes to buy a machine to process low-density polystyrene. The other NGO has partnered with a cement company to co-process multi-layer packaging as per government best practice guidelines for recycling MLPs. Their collection centers and transportation mechanisms enable them to store light-weight plastics at a larger scale, which they send to a cement company. To this end the NGO primarily collects pre-segregated waste from already-serviced households and societies

with bins. The BMC has offered tax rebates and threatened fines to encourage waste segregation in many housing societies.



**Figure 13.** One of the NGO's storage sites and segregation centers Credit: Siddharth Chitalia

The NGO currently works with 1800 women who collect waste across the western line of Mumbai. They either have the choice of getting paid a daily wage of 400 rupees or by the weight of plastics they collect. The daily wage provides a guaranteed income and actually values the labour time of the women collecting. Without the sustained financial support of something like a plastic credits system, however, Jignyasa expressed her frustration with meeting costs. The cement company has also asked that they pick up the multi-layer packaging and other plastics in larger weight amounts to reduce their number of trips, but the NGO's storage capacity is already

full with such plastic. In the future, Jignyasa said they hope to extend their system of at-source collection across the entire western line and to welcome new members. She also expressed her frustration with what she saw as the “old” system of plastic recycling whereby people expect payment in return for plastics. Since the women collect from public bins, much of the higher-value plastics have already been sold to waste buyers. There needs to be a new system implemented, she argued, whereby people feel compelled to donate their plastics and to segregate them to ensure that they are clean. One of their most recent expansions in partnership with the UNDP has been to an informal settlement with a community collection bin instead of the standard wet and dry-waste recycling bins. Emphasizing in partnership with Bisleri the importance of clean waste through segregation, they attempted to cover the community bin. If members of the society try to claim waste in the bin, Jignyasa said, they will argue that the waste is rightfully the women’s because they are segregating it.

Currently, the waste centers have also somewhat altered local supply chains. They coordinate with the BMC to change the arrival time of trucks, so that women can take plastic before it is dumped in the truck or otherwise taken by formal waste employees. They sell plastic directly to larger vendors and waste pickers also sell directly to them rather than small-scale scrap dealers. Jignyasa acknowledged the potential harm to scrap-dealer business, but, as I mentioned before, claimed that scrap dealers often steal the women’s “weight.”

Within this imaginary of waste management, particular kinds of waste work are considered illegitimate. Jignyasa positions itinerant buyers like Vimal as part of an outdated system. People should instead be compelled to donate their waste out of civic obligation. Scrap dealers are also positioned as exploitative figures that offer unfair rates to women collectors. While the “informal” plastic chains are likely not free of exploitation, and I certainly cannot comment on

the experiences of women at the NGO, as other scholars of waste economies have shown, nor are they totally and uniquely exploitative. Here I also think of the buying and segregating arrangements of which Dilip Chavan is part of, where the image of the lone scrap dealer that contributes no labor and merely profits off everyone's collection by virtue of having storage space may not encompass all buying and working arrangements. While both itinerant buyers and scrap dealers might command a higher status, have more resources and be more distanced from particular kinds of waste, they too can be in a position of precarity (Gidwani 2015).

Acts of segregating— of making “clean plastic” and handling waste properly— also become ways of laying claim to particular infrastructures of collection. Before being recorded on camera, Jignyasa explained that during the formation of the NGO, they sought to work with Valmiki workers involved in cleaning recyclables. They soon realized that unlike Valmiki workers, who would not touch the garbage directly, there were also women “below” them taking recyclables from public mixed garbage. As Jignyasa indicates, the cleanliness of waste— and the infrastructures and practices that enable cleanliness— is not just a matter of making the recycling process more efficient to enable the circulation of waste such as “low value” plastics. Cleanliness is also an important aspect disabling different divisions and stigmas of labor within the many forms of waste work. Jignyasa's desire for “clean plastics” is in one sense a material desire to reduce the bodily burdens of waste work. It is also an effort to make the work of waste more respectable.

Scholars have also analyzed these tensions of efficiency and legitimacy within waste cooperatives and NGOs. Like many waste collection (semi)-formalization efforts in India, the NGO created their own identification cards with photos and stamps, which women can produce to legitimize their claims to waste and avoid harassment from residents and police. Aman Luthra

has similarly asked whether the aesthetics and technologies of respectability and legitimacy such as ID cards and uniforms also serve to de-legitimize those without them (Luthra 2015). Kathleen Millar similarly examines the efforts of waste workers to form a cooperative and operate at a larger scale (Millar 2018). The cooperative in her ethnography had received funding from a petrol company and with the funds built a building and paid for a truck driver, utilities and diesel to transport recyclables directly to buyers, bypassing the scrap dealer. She describes how “an increasing concern for viability,” comes into tension with “counter-hegemonic claims and practices” (Millar 2018, 126). The coop implemented a weekly pay schedule (rather than the daily pay people were used to at the dump), required uniforms and had a rule against selling recyclables to scrap dealers. The lack of daily pay and inability to sell to a scrap dealer meant many people left the cooperative and it remained very small. As Millar argues: “In a neoliberal context in which social activism has increasingly taken the form of the professional NGO, this meant adopting market-based rationalities of instrumentalism, efficacy, and accountability so as to be visible to the state and to potential funders” (Millar 2018, 165).

Similar desires to encourage segregation at source and to encourage residents to donate plastics out of civic obligation have been a part of municipal waste-to-energy schemes in Delhi that are also proposed as a solution to low-value plastics (Luthra 2020a). One of the most successful cooperatives encouraging segregation at source in the country has been SWaCH based in Pune, Maharashtra. According to the cooperative’s website, they now cover 70 percent of Pune and collect user fees from over 800,000 households, including many informal settlements. Waste pickers are paid a wage to collect this waste and can also sell recyclables that they recover.

At the same time that SWaCH formed and partially in response, the coop notes, “there was also a push towards reducing containers on the street and making the city ‘container-free’.” A



2015 study tracing waste flows in Pune noted that while increased door-to-door collection did not affect “itinerant waste buyers” who still bought directly from household, the reduction in “skips” reduced access to waste for some: “Door to door collection also meant that there was less scrap being deposited in the municipal skips. There was intense competition among itinerant waste pickers and between SWaCH collectors and itinerant waste pickers” (Narayanan and Chikarmane 2015, 18). The removal and cleaning of community bins with the increase of door-to-door collection and segregation also removes an important point of collection for some, maybe even those for whom waste is supplemental and for different reasons do not want to be integrated into regular wage work. In Delhi, dhalaos, which act as transfer points between households and landfills, were originally implemented to monitor activities of sweepers during the colonial period (Luthra 2017). Now they often act as spaces for collection, segregation and business for scrap dealers and also act as places of shelter and protection.

At the moment, these enterprises in Mumbai are pretty small scale. They also provide many waste workers with reliable wages and connect them to other important social services. I do not wish to overdetermine their power over the current large and established waste economies, including their ability to regulate the circulation of plastics in the private sphere, something which SWaCH has not so much affected. These coops and NGOs offer a diverse range of services and cover a diverse range of organizations, funding mechanisms, payment structures and requirements (uniform or no uniform) for people involved in waste work. The organization of waste workers (and also waste worker’s self-organization in the case of SWaCH) is also often in response to efforts which still threaten access to waste through different infrastructures— public private partnerships and waste-to-energy plants— but which also do not include waste workers at all. Interviews of SWaCH workers also showed that some garbage truck drivers would not help

them lift wet waste into trucks unless they gave up their recyclables. Complaints from residents about uncollected garbage fueled recent efforts to privatize waste collection services in Pune completely. In Mumbai, plans are in place to again attempt the operation of two waste-to-energy plants.

Attempts to organize informal waste work may or may not grow or succeed in their aims, especially with the nascent influx of plastic neutral capital under extended producer responsibility requirements, which, if properly enforced, are supposed to intensify in the coming years. How and why people involved in various kinds of waste work do or do not engage with and/or are or are not taken up by these efforts is an important question, and not irrelevant to whether these imaginaries are successful in their implementation. We notably do not have any perspectives from women engaged with these initiatives to understand how they value these organizations. As Kathleen Millar also notes in her description of attempts to regulate labor at the landfill in Rio, these kinds of efforts are often spoken of as if they are going to imminently subsume existing organizations of labor (Millar 2018). Rather these organizations are also “plastic,” finding new ways to take different shapes and make things work amid new regulations.

## Conclusion: Returning to the Shore



**Figure 14.** Plastic returning to Mumbai’s shores Credit: Helen White

Returning briefly to the shore, the return of plastics discarded into or otherwise taken and carried by waters of the city is no less concerning after a brief look into the city’s other plastic circulations. But the actors disparately cited as a problem and their attendant solutions—behavior change for people living in informal settlements, reduced plastic consumption, the enforcement of extended producer responsibility guidelines, lack of collection of “low-value” plastics by waste collectors— can perhaps be brought into conversation in more productive ways. The reduction of consumption, for example, would render recycling enterprises that sustain many people less viable. Guilt over consumption, as the plastic credit platform shows,

enables the financing of new recycling operations. This capital and its reorganization of infrastructures also might have potential to disrupt diverse organizations of waste work and living. There are lots of ambiguities beyond just the space of the nala, where addressing multiple forms of both slow and spectacular violence still within the space of capitalism come into tension and contradiction. Obviously my brief engagement with these waste circulations offers no resolution, especially to people that have been thinking and struggling with these issues much longer, but maybe it raises some issues for further examination and reflection.

## References Cited

- Anand, Nikhil. 2011. "Pressure: The Politechnics of Water Supply in Mumbai." *Cultural Anthropology*, 26(4), 542-564.
- Anand, Nikhil. 2017. *Hydraulic City: Water and the Infrastructures of Citizenship in Mumbai*. Durham: Duke University Press.
- Appel, Hannah, Nikhil Anand and Akhil Gupta. 2018. "Introduction: Temporality, Politics, and the Promise of Infrastructure." In *The Promise of Infrastructure*, 1-38. Duke University Press.
- Anand, Nikhil. Forthcoming. "ToxiCity: On Ambiguity and Sewage in Mumbai's Urban Seas." *International Journal of Urban and Regional Research*.
- Appadurai, A. 2013. *The Social Life of Things: Commodities in Cultural Perspective*. Cambridge: Cambridge University Press.
- Arora, Medhavi. 2017. "From filthy to fabulous: Mumbai beach overgoes dramatic makeover." CNN, May 22. Accessed [April 23, 2021].  
<https://www.cnn.com/2017/05/22/asia/mumbai-beach-dramatic-makeover>
- Banoub, Daniel and Sarah J. Martin. 2020. "Storing Value: The Infrastructural Ecologies of Commodity Storage". *Environment and Planning D: Society and Space*, 38(6), 1101-1119.
- Barua, M. 2021. Infrastructure and Non-human Life: A Wider Ontology. *Progress in Human Geography*.
- Baviskar, Amita. 2003. "Between Violence and Desire: space, power, and identity in the making of metropolitan Delhi." *International Social Science Journal*, 55(175), 89-98.
- Bennett, Jane. 2010. *Vibrant Matter: A Political Ecology of Things*. Duke University Press.
- Butt, Waqas H. 2019. "Beyond the Abject: Caste and the Organization of Work in Pakistan's Waste Economy." *International Labor and Working Class History*, 95, 18-33.
- Butt, Waqas H. 2020a. "Accessing Value in Lahore's Waste Infrastructures." *Ethnos*, 1-21.

- Butt, Waqas. H. 2020b. "Waste intimacies: Caste and the Unevenness of Life in Urban Pakistan." *American Ethnologist*, 47(3), 234-48.
- Carse, Ashley. 2012. "Nature as Infrastructure: Making and Managing the Panama Canal Watershed." *Social Studies of Science*, 42(4), 539-63.
- Carse, Ashley. 2014. "The Year 2013 in Sociocultural Anthropology: Cultures of Circulation and Anthropological Facts." *American Anthropologist*, 116(2), 390-403.
- Castree, Noel. 2002. "False antitheses? Marxism, Nature and Actor-Networks." *Antipode*, 34(1), 111-146.
- Cook, Ian. 2004. "Follow the Thing: Papaya." *Antipode*, 36(4), 642-664.
- Crang, Mike. 2010. "The Death of Great Ships: Photography, Politics, and Waste in the Global Imaginary." *Environment and Planning A*, 42(5), 1084-1102.
- Crang, Mike. 2010. "Materiality and Waste: Inorganic Vitality in a Networked World." *Environment and Planning*, 42(5), 1026-1032.
- Elson, Diane. 2016. *Value: The Representation of Labour in Capitalism*. Verso Books.
- Doherty, Jacob. 2019. "Filthy flourishing: Para-sites, Animal Infrastructure, and the Waste Frontier in Kampala." *Current Anthropology*, 60(S20), S321-S332.
- Douglas, Mary. 2003. *Purity and Danger: An Analysis of Concepts of Pollution and Taboo*. Routledge.
- Hawkins, Gay. 2013. "Made to Be Wasted: PET and Topologies of Disposability." In *Accumulation: the Material Politics of Plastic*, 49-67. Routledge.
- Hazardous Substance Management Division MoEFCC. 2017. "Report on Recommendations of the Committee On Issues/challenges faced by Municipalities related to Implementation of Solid Waste Management Rules, 2016 and Plastic Waste Management Rules, 2016." Accessed [April 23, 2021]. <http://moef.gov.in/wp-content/uploads/2017/06/Final-Report-on-the-Issues-related-to-SW-M-and-PWM-Rules-2016.pdf>.
- Fredericks, Rosalind. (2018). *Garbage Citizenship: Vital Infrastructures of Labor in Dakar, Senegal*. Duke University Press.

- Ghertner, D. Asher. 2015. *Rule by Aesthetics: World-Class City Making in Delhi*. Oxford University Press.
- Gidwani, Vinay K. 2008. *Capital, Interrupted: Agrarian Development and the Politics of Work in India*. University of Minnesota Press
- Gidwani, Vinay. 2013. "Six theses on waste, value, and commons." *Social & Cultural Geography*, 14(7), 773-783.
- Gidwani, Vinay and Joel Wainwright. 2014. "On Capital, Not-Capital, and Development: After Kalyan Sanyal." *Economic and Political Weekly*, 40-47.
- Gidwani, Vinay. 2015. "The Work of Waste: Inside India's Infra-Economy." *Transactions of the Institute of British Geographers*, 40(4), 575-95.
- Gill, Kaveri. 2007. "Interlinked Contracts and Social Power: Patronage and Exploitation in India's Waste Recovery Market." *The Journal of Development Studies*, 43(8), 1448-1474
- Graeber, David. 2001. *Toward an Anthropological Theory of Value: The False Coin of Our Own Dreams*. New York: Palgrave.
- Green, Leslie. 2020. *Rock| Water| Life: Ecology and Humanities for a Decolonial South Africa*. Durham: Duke University Press.
- Gregson, Nicky, Mike Crang, Ahamed, F., Akhter, N., & Ferdous, R. 2010. "Following Things of Rubbish Value: End-of-Life Ships, 'Chock-Chocky' Furniture and the Bangladeshi Middle Class Consumer." *Geoforum*, 41(6), 846-854.
- Gumbs, Alexis Pauline. 2018. *M Archive: After the End of the World*. Durham, N.C.: Duke University Press.
- Kornberg, Dana. 2019. "From Balmikis to Bengalis: the 'Casteification' of Muslims in Delhi's Informal Garbage Economy." *Economic and Political Weekly*, 54(47), 48-54.
- Larkin, Brian. 2013. "The Politics and Poetics of Infrastructure." *Annual Review of Anthropology*, 42, 327-343.
- Liboiron, Max. 2015. "An Ethics of Surplus and the Right to Waste." *Society & Space*. Accessed April 23, 2021.

<https://www.societyandspace.org/articles/an-ethics-of-surplus-and-the-right-to-waste#:~:text=With%20a%20degrowth%2Dbased%20ethics,anxiety%2C%20and%20instead%20becomes%20d%C3%A9pense.>

- Liboiron, Max, Manuel Tironi, and Nerea Calvillo. 2018. "Toxic Politics: Acting in a permanently polluted world." *Social Studies of Science*, 48(3), 331-349.
- Luthra, Aman. 2015. *Modernity's Garbage: Struggles Over Municipal Solid Waste in Urban India*. PhD Diss, Johns Hopkins University. Accessed [April 23, 2021]. <https://jscholarship.library.jhu.edu/bitstream/handle/1774.2/39625/LUTHRA-DISSERTATION-2015.pdf?sequence=1>.
- Luthra, Aman. 2017. "Between Obsolescence and Necessity: The Abiding Nature of Dhalao Infrastructures in Urban India." *Engagement: A Blog Published by the Anthropology and Environment Society*. <https://aesengagement.wordpress.com/2016/03/17/between-obsolescence-and-necessity-the-abiding-nature-of-dhalao-infrastructures-in-urban-india/>
- Luthra, Aman. 2020a. "Housewives and Maids: The Labor of Household Recycling in Urban India." *Environment and Planning E: Nature and Space*.
- Luthra, Aman. 2020b. "Efficiency in Waste Collection Markets: Changing Relationships between Firms, Informal Workers, and the State in Urban India." *Environment and Planning A: Economy and Space*, 52(7), 1375-1394.
- Mathur, Anuradha and Dilip da Cunha. 2009. *SOAK: Mumbai in an Estuary*. New Delhi: Rupa & Company.
- McFarlane, Colin. 2008. "Governing the Contaminated City: Infrastructure and Sanitation in Colonial and Post-Colonial Bombay." *International Journal of Urban and Regional Research*, 32(2), 415-435.
- McFarlane, Colin., Renu Desai and Steven Graham. 2014. "Informal Urban Sanitation: Everyday Life, Poverty, and Comparison." *Annals of the Association of American Geographers*, 104(5), 989-1011.
- Melosi, Marvin. 2004. *Garbage in the Cities: Refuse Reform and the Environment*. University of Pittsburgh Press.
- Millar, Kathleen M. 2007. "The Informal Economy: Condition and Critique of Advanced Capitalism." *Durban: CCS*.



- Millar, Kathleen M. 2018. *Reclaiming the Discarded*. Durham, N.C.: Duke University Press.
- Moore, Sarah. A. 2012. "Garbage Matters: Concepts in New Geographies of Waste." *Progress in Human Geography*, 36(6), 780-799.
- Narayanan, Lakshmi and Poornima Chikarmane. 2015. Full circle: mapping circuits of informal labour and waste materials. Paper presented at *Resource Politics: Transforming pathways to sustainability conference 2015, Institute of Development Studies University of Sussex, September 7-9, 2015*. Accessed [April 23, 2021].  
<https://resourcepolitics2015.com/papers/>.
- Pathak, Gauri. 2020. "Permeable Persons and Plastic Packaging in India: From Biomoral Substance Exchange to Chemotoxic Transmission." *Journal of the Royal Anthropological Institute*, 26(4), 751-765.
- Pathak, Gauri. 2020. "Plastic Pollution and Plastics as Pollution in Mumbai, India." *Ethnos*, 1-20.
- Ranganathan, M. 2015. "Storm Drains as Assemblages: The Political Ecology of Flood Risk in Post-colonial Bangalore." *Antipode*, 47(5), 1300-20.
- Rathje, William L. and Cullen Murphy. 2001. *Rubbish!: the Archaeology of Garbage*. University of Arizona Press.
- Samson, Melanie. 2015. "Accumulation by Dispossession and the Informal Economy—Struggles Over Knowledge, Being and Waste at a Soweto Garbage Dump." *Environment and Planning D: Society and Space*, 33(5), 813-830.
- School of Cultural and Media Studies, Tata Institute of Social Sciences. 2017a. "Amita Bhide." *Wastelines Mumbai: Rethinking Waste and the City*, [accessed April 23, 2021],  
<http://wastemumbai.tiss.edu/interviews/>.
- School of Cultural and Media Studies, Tata Institute of Social Sciences. 2017b. "Anand Jagtap." *Wastelines Mumbai: Rethinking Waste and the City* multimedia archive. Accessed [April 23, 2021], <http://wastemumbai.tiss.edu/interviews/>.
- Schwenkel, Christine. 2018. "Waste Infrastructure Breakdown and Gendered Apathy in Vietnam." In *The Routledge Handbook of Anthropology and the City*, Routledge.

- Simone, AbdouMaliq. 2004. People as Infrastructure: Intersecting Fragments in Johannesburg. *Public Culture*, 16(3), 407-429.
- Joshi, Sonam. 2016. "Mumbai's Deonar landfill is so massive that it can be seen from space." *Mashable*, February 9. Accessed [April 23, 2021]. <https://mashable.com/2016/02/03/mumbai-deonar-landfill-fire-from-space/>.
- Star, Susan Lee. 1999. "The Ethnography of Infrastructure." *American Behavioral Scientist*, 43(3), 377-391.
- Wakefield, Stephanie. 2020. "Making Nature into Infrastructure: The Construction of Oysters as a Risk Management Solution in New York City." *Environment and Planning E: Nature and Space*, 3(3), 761-785.
- Yates, Michelle. 2011. "The Human-as-Waste, the Labor Theory of Value and Disposability in Contemporary Capitalism." *Antipode*, 43(5), 1679-1695.
- Zhang, Amy. 2020. "Circularity and Enclosures: Metabolizing Waste with the Black Soldier Fly." *Cultural Anthropology*, 35(1), 74-103.