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COMPOST CONTESTED: THE SCALAR POLITICS OF MONTREAL'S MUNICIPAL COMPOSTING PROGRAM

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ABSTRACT

It is a well recited figure that approximately one third of food produced globally is wasted (Turner 2019a). Many cities in the Global North have responded by rolling out new collection schemes and investing in treatment facilities for food waste. Montréal is no exception. In 2015, the city began its food waste collection program in a piecemeal fashion across the city. Prompted by provincial targets set by the waste management agency RecycQuébec, the Communauté Métropolitaine de Montréal has made ambitious organic waste management plans that increasingly espouse a "circular economy" approach. Residents are increasingly confronted with their responsibility to participate in the composting program and so to reinvent their everyday interactions with food and food waste. In this research, I employ qualitative methods to explore how the scalar politics of global food and food waste regimes shape Montréal's municipal composting program and inform the everyday governance of food waste on the ground. I show that, despite calls for food waste prevention and promises for a "circular economy", Montréal's neoliberal approach to organic waste management continues to focus on lucrative downstream treatment efforts through private-public contracts. These neoliberal approaches not only compound a public depoliticisation of food waste but also obfuscate participation inequalities, download responsibility onto individuals in uneven ways, and transform everyday relations with nonhuman processes and animals. I draw on feminist, urban political ecology, and post-humanist scholarship to present municipal composting as a form of more-than-human carework that is embodied in uneven ways along lines of inequality. In this way, neoliberal environmental governance approaches shape not only *what* people are called to care for, and *how* they care, but also *who* has the capacity to participate in caring practices.

Keywords: Food waste; everyday governance; environmental governance; circular economy; scalar politics; urban political ecology; feminism; embodied inequality; more-than-human geographies.

RÉSUMÉ

Environ un tiers des denrées alimentaires produites à l'échelle mondiale sont gaspillées (Turner 2019a), incitant de nombreuses villes du Nord mondial, dont Montréal, à mettre en place de nouveaux systèmes de collecte et à investir dans des installations de traitement des déchets alimentaires. À partir de 2015, la ville a lancé son programme de collecte des déchets alimentaires en adoptant des plans ambitieux de gestion des déchets organiques axés sur une approche d'"économie circulaire", répondant ainsi aux objectifs provinciaux fixés par Recyc-Québec. Les résidents sont de plus en plus interpellés quant à leur responsabilité de participer au programme de compostage et de repenser leurs interactions quotidiennes avec les aliments et les déchets. Cette recherche utilise des méthodes qualitatives pour examiner comment les transformations contemporaines et politiques dans la gouvernance environnementale influent le programme de compostage municipal de Montréal et façonnent la gestion quotidienne des déchets alimentaires. Malgré les appels à la prévention du gaspillage et les aspirations à une "économie circulaire", l'approche néolibérale de Montréal dans la gestion des déchets organiques se concentre sur des efforts lucratifs de traitement en aval par le biais de contrats publics-privés. Ces approches néolibérales dépolitisent l'aspect public du gaspillage alimentaire, masquent les inégalités inhérentes à la mise en œuvre de celles-ci et transfèrent inéquitablement la responsabilité aux individus, modifiant les relations quotidiennes avec les procédés non-humains et les animaux. En s'appuyant sur des perspectives féministes, d'écologie politique urbaine (UPE) et post-humanistes, cette recherche présente le compostage municipal comme une forme de travail de soin [« care »] plus-qu'humain, incarné de manière inégale. Ainsi, les approches néolibérales de la gouvernance environnementale façonnent non seulement les objets dont il faut prendre soin et la manière de prendre soin, mais déterminent également qui peut participer à ces pratiques de soin.

Mots-clés : Déchets alimentaires ; gouvernance quotidienne ; gouvernance environnementale ; économie circulaire ; écologie politique urbaine ; féminisme ; inégalités incarnées ; géographies « more-than-human ».

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LIST OF ABBREVIATIONS AND ACRONYMS

CE   Circular economy

CMM   Communauté métropolitaine de Montréal

NDG   Notre-Dame-de-Grâce

CDN-NDG   Côte-des-Neiges–Notre-Dame-de-Grâce

PMGMR   Plan métropolitaine de gestion de matières résiduelles

SE   Sharing economy

1. INTRODUCTION

When you become a parent, you must deal with choices like washable diapers, normal diapers – and when I say normal, I mean plastic – and the infamous compostable diapers, which are not compostable at all, they go in landfill. When we don't have the infrastructure to compost them it's greenwashing to the extreme. And it takes advantage of parents, it costs something like at least double the price per diaper. […] It is clearly deceptive marketing towards parents. […] But when you change eight diapers a day, of course you are going to ask, are there no other options?

[…]

Even without wanting to, you become cynical towards the people responsible, or the city of Montréal, or the neighbourhood. And it's a shame because this cynicism means that people say, for example, what's the point in continuing to compost? What does my commitment mean if the city is not doing their part?

Deborah, composter, Le Plateau.[1]

You go over two streets here on Walkley – they're trying to put food on their tables. They don't give a shit about composting. […] They don't have money for anything. […] *These* are the people that people don't see.

Daniel, environmental agent for the Côte-des-Neiges–Notre-Dame-de-Grâce écoquartier.

I used to compost, but I haven't been composting for a year now because I have a little balcony where I put the brown bin which I put the compost bags in. And the squirrels… Wow! It's really a feast for them, which means that they eat the lid and they become – I was nearly attacked by a squirrel. I never thought that could happen to me.

Jennifer, non-composter, Le Plateau.

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[1] All participant names throughout this thesis are anonymised with pseudonyms.

In March 2023, I sit with Deborah as she describes to me her frustration with Montréal's municipal composting system. Mother of two, she has recently learned that the compostable diapers sold to parents by retailers across Montreal for twice the price of standard diapers are not compostable under the current infrastructure, and therefore all end up in landfill. Daniel, a representative from a local environmental agency laments the social inequalities in his neighbourhood that pose barriers to the success of environmental programs such as composting. And Jennifer, a retired woman, describes theatrically how an altercation with some aggressive squirrels has left her fearful to tend to the compost bin now sitting empty on her balcony.

In cities like Montréal, individuals like Deborah, Daniel, and Jennifer are increasingly called upon to adopt pro-environmental behaviours, such as composting, into their everyday lives. In the context of planetary climate change, cities are tasked with taking on complex environmental agendas, responding to global concerns, and marketing themselves as pioneers of sustainable living (Bulkeley et Betsill 2005). Food waste has emerged as central to the urban environmental agenda over the last three decades. It is a well recited figure that approximately one third of food produced globally is wasted (Turner 2019a) and many cities in the Global North have responded by rolling out new collection schemes and investing in treatment facilities for food waste.

Montréal is no exception. In 2015, the city began its food waste collection program in a piecemeal fashion across the city. Today it is available in fifteen out of the nineteen boroughs (Ville de Montréal n.d.). Prompted by provincial targets set by the waste management agency RecycQuébec, the Communauté Métropolitaine de Montréal (CMM) has made ambitious organic waste management plans that increasingly espouse a "circular economy" approach. In this city of two million people, residents are therefore increasingly confronted with their responsibility participate in the composting program and so to reinvent their everyday food and food waste practices (Montréal en statistiques 2018a).

In this research, I employ qualitative methods to explore how the scalar politics of environmental governance shape Montréal's municipal composting program and inform the everyday governance of food waste on the ground. I draw on MacKinnon's (2011) definition of scalar politics to understand how urban environmental programs harness and produce scale through their discourses, imaginaries, and material relations, in emergent and contested ways. I conduct semi-structured interviews and focus groups with both composting and non-composting

participants in two neighbourhoods of Montréal: Le Plateau and Notre-Dame-de-Grâce, combining this with an archival analysis of government documents and reports at a provincial and municipal level. I adopt an everyday governance approach to food waste, drawing on critical feminist and urban political ecology (UPE) scholarship (Bee, Rice et Trauger 2015; Cornea, Véron et Zimmer 2017; Doshi 2017; McClintock, Miewald et McCann 2021a). Feminist and UPE scholars critique the transformations bought about by neoliberal capitalism not only on global food and food waste regimes, but also on how individuals view and perform their own responsibility towards the environment in their daily lives. Putting these discussions into conversation with post-humanist food and waste scholarship (Fredericks 2018; Hawkins 2006; Metcalfe et al. 2012; Turner 2019a), I approach composting as an embodied, material, and more-than-human practice and show how it is experienced differently along lines of gender, class, age, and other inequalities.

I show that, despite calls for food waste prevention and promises for a "circular economy" approach, Montréal's neoliberal approach to organic waste management continues to focus on lucrative downstream treatment efforts through private-public contracts. These neoliberal approaches not only compound a public depoliticisation of food waste on a municipal level but also obfuscate participation inequalities, download responsibility onto individuals in uneven ways, and transform everyday relations with nonhuman processes and animals. If these new political configurations have the potential to unsettle a distance to nonhuman processes and presences in everyday food waste relations, they also compound *who* has the capacity to participate in intimate more-than-human care work. Neoliberal environmental governance approaches shape not only *what* people are called to care for, and *how* they care, but also *who* has the capacity to participate in caring practices. This research seeks to shed light on the heterogeneous and contested ways that food waste is encountered by residents in their everyday lives. While rarely publicly politicised, I seek to highlight the relevance of everyday food waste encounters in environmental policy. Theoretically, I show how feminist, UPE, and post-humanist approaches provide an effective juncture to elucidate both the socio-historic and more-than-human dimensions of these encounters. To borrow Daniel's words above "*these* are the people" – and the more-than-human stories – "that people don't see".

2: LITERATURE REVIEW

2.1. Introduction

In this literature review, I summarise contributions from five broad fields of scholarship: waste studies; food waste; environmental governance; women and waste; and the circular economy. The scholarship reviewed in this section provides important theoretical and historical background to this research's focus on the management of food waste under Montréal's municipal composting program.

2.2. Waste Studies

2.1.1 Early theoretical and political engagements with waste

Prior to the 1960s, scholarship on waste was primarily concerned with its management, drawing on an environmental policy and planning approaches (Evans, Campbell et Murcott 2012; Liboiron et Lepawsky 2022). The publication of *Purity and Danger* by anthropologist, Mary Douglas, in 1966, marked a turning point for the study of waste in the social sciences. Douglas critiques the cultural construction of "dirt" and problematises accepted definitions by defining dirt in any society as "matter out of place". In this way, Douglas explores how certain matters, people, or phenomena become classified as "waste", via the "the structuring capacities of culture" (Hawkins 2006: 2). An object of waste, according to Douglas, is dependent on the time, place, and society in which it is found (Moore 2012). Dirt, or waste, is not outside of order, but rather makes order visible.

In the thirty years following the publication of Douglas' book, theoretical engagements with the social categories of waste remained limited (O'Brien 1999). Nonetheless, the 1980s and 90s saw political engagements with waste, namely by activists and scholars in the environmental justice (EJ) movement. Emerging in the United States, the EJ movement was spurred by civil rights activism and a growing awareness of environmental racism. Investigations into the impacts of hazardous and industrial waste facilities in American cities revealed instances of structural environmental racism and class discrimination (Heiman 1996; Lake et Johns 1990; Pulido, Sidawi et Vos 1996). Heiman (1996), for example, shows that quantitative risk

assessments were employed by regulatory agencies as a tool to justify the siting of toxic industries and waste facilities among minority and working-class communities in cities across the United States. Environmental justice scholars and activists exposed how ostensibly objective, positivist urban planning decisions about hazardous waste facilities were influenced by environmental racism and class discrimination, challenging the assumed neutrality of waste management science and politics.

2.1.2. Waste and Power: Capitalism, Modernity, Colonialism

In the 1990s, social scientists began to explore how systems of power, such as capitalism, modernity, and colonialism, shape how waste is constructed, managed, and experienced unevenly (O'Brien, 1999). This marked a return to theoretical engagements with waste in the social sciences, with many scholars drawing on Douglas' foundational work as a springboard for their own engagements (Evans, Campbell and Murcott, 2012; Liboiron and Lepawsky, 2022).

First, Marxist scholars consider how waste is integral to structures of capitalism and processes of capital accumulation. In a seminal contribution, Marxist geographer Vinay Gidwani (2013) describes how capitalists seek to control resources by defining them as 'wasted' within a capitalist value system. Gidwani argues that this endeavour encompasses attempts to privatise the 'commons'—resources shared within a community for the community's needs—along with the practices of 'commoning' that uphold them. Although commons and capitalism are not mutually exclusive, commons tend to embody an alternative value system distinct to that of capital accumulation. Under capitalism, commons are depicted as morally and economically wasted labour and resources, and the "commons-as-waste" becomes a moral category that is disciplined by enrolling labour and resources into the capitalist value system. Capitalists therefore constantly seek to sublate commons and their needs-oriented forms of value into capitalism's "abstracted money form of value-making" (Ibid: 779). Nevertheless, Gidwani also describes how waste exceeds these logics. Capitalism seeks to discipline and exploit waste and yet constantly produces it through extraction, production, and consumption. Waste therefore presents both a potential and a threat to capital accumulation. He explains "on the one hand, 'waste' is an untapped potential for capital. […] But it is also an excess or exudation that is prior

to and product of capitalist accumulation that capital, try as it might, can never fully capture and which therefore is an ever-present threat to it" (Ibid: 779).

To nuance and respond to Marxist theories of waste, Liboiron and Lepawsky (2022) contend that all economic systems driven by growth inevitably result in unsustainable waste regimes. Rather than directly attributing waste to capitalism, they contend that any system driven by accumulation and extraction generates waste, irrespective of the organization of labor, value, and production.

Attempts to discipline and capture waste for capital accumulation have been explored further in neo-Marxist scholarship on the "new global resource frontier" (O'Neill 2019). Environmental scientist Kate O'Neill (2019) builds on Gidwani's analysis by exploring how capitalism seeks to capture waste's value through processes of enclosure and privatisation. By using the term "frontier", O'Neill emphasises the competition, conflict, violence, and displacement that capitalist enclosure and privatisation entail in pursuit of capital accumulation. She explains that, as with the extraction of natural resources, enclosing waste – for example through "capping a landfill or fencing it off" (Ibid: 10) – often displaces communities who depend on it or who treat it as a common resource and livelihood. Zapata Campos, Zapata et Pérez Reynosa (2022) illustrate this concept in their research into La Chureca city dump in Managua, Nicaragua. The dump initially served as an urban common for marginalized communities who built their livelihoods around it. But when the municipal government enclosed the dump with the intention of privatizing it for profit-driven initiatives, these communities were displaced. Similarly, in his research on e-waste, Reddy (2016) examines how global environmental and development organisations construct discursive frameworks that portray e-waste as "urban mines", rich in valuable resources. This provides grounds for international organizations like the United Nations to intervene by attempting to formalise and regulate informal e-waste economies to capture their value, thereby disrupting and uprooting local livelihoods that depend on them.

Second, postcolonial scholars also theorise how waste discourses and practices are mobilised within structures of power, this time in the Global South in ongoing histories of colonialism. Some of this scholarship draws on and extends Marxist theories to show how structures of colonialism and capitalism work hand in hand to "waste" people and land in the Global South to the structural advantage of the Global North. Gidwani et Reddy (2011), for example, explore the mobilisation of waste discourses in colonial and post-colonial India. They describe how colonised lands and people in India were portrayed as 'wasted' and 'wasteful' to

justify their settlement and exploitation for capital accumulation by the British colonisers. They explore the role of liberal philosophers in seventeenth-century England in constructing discursive associations between waste, colonised people and land, and the drive for modernisation. John Locke's political theory, for example, discursively constructed waste and all that was 'backward' as modernity's antithesis, "that which must be continuously acted upon and improved, first to enable passage from the state of "nature" to the state of "civil society" and subsequently to preserve the order of that society" (Ibid: 1628). These binaries justified physical acts of 'wasting' through colonial exploitation and extractivism, practices that scholars assert also endure today under the guise of development (Gidwani and Reddy, 2011).

Drawing on similar postcolonial and neo-Marxist analysis, Li (2014) and Voyles (2015) investigate how waste discourses and practices are mobilised within neo-colonial extractivism. In her research into uranium extraction and the dumping of toxic waste in Navajo Country in the United States, Voyles (2015) employs the term 'waste-landing' to describe the process by which indigenous lands are re-assembled discursively, imaginatively, and materially, for the purpose of extraction (see also Li 2014). She describes how the term 'wasteland' was employed by colonisers to depict Navajo Country as undesirable and unproductive, therefore justifying extraction. Through surveying and cartography techniques, settler-colonisers re-wrote capitalist value onto the land, displacing Native land values and people. Discursive waste-landing techniques preceded a physical waste-landing, as uranium mines and other polluting industries moved into the area, employing the local Native population who subsequently suffered with physiological consequences of uranium exposure. Voyles (2015) demonstrates how colonial extraction projects in Navajo Country thereby "waste" not only the land, but also the cells, lungs, respiratory tracts, worldview, culture, and religious practices of the Navajo people.

Third, critical scholars such as Moore (2012), Speer 2016), and Unnikrishnan et al. (2021) delve into the ways waste is strategically mobilized within discourses of modernity. Geographer Sarah Moore theorises waste as modernity's 'excess'. She explores the contradiction apparent in modern cities between expectations of cleanliness and systems of production and consumption "that create more and more garbage" (Moore 2012: 429), describing it as a "dual process" through which modernity is imagined as clean, rational, and ordered, and yet depends on "ever-expanding consumerism" (Ibid: 427). The removal of garbage is imperative to the vision of the modern city but also a constant threat that reminds modern urbanites of their relationship with the nonhuman, nature, and the outside world. Jessie Speer (2016) considers how waste discourses were mobilised in urban modernisation projects in

Fresno, California. Modern development discourses framed downtown Fresno as a "sanitised" space, while the homeless were framed as unsanitary and unhygienic. She describes how this culminated in the eventual bulldozing of homeless shelters in the downtown area and the exclusion of homeless people from sanitation facilities such as public bathrooms. Waste or dirt in these examples are theorised as both modernity's 'other' and a threat to be disciplined.

The scholars above examine how waste is mobilised within power structures of capitalism, colonialism, and modernity. But critical scholars also explore the transformative potential of waste as a tool of resistance against these same structures (Fredericks 2018; McTague and Janson 2013; Moore 2009; Zapata et al. 2022). Rosalind Fredericks (2018: 130) describes how waste workers in Dakar, Senegal, for example, leveraged the material affordances of waste as a political tool for resistance in a series of garbage strikes between 2006 and 2009, during which the city was "[held] captive to its own garbage". She describes the strikes as a "strategic alliance" between waste workers and "natural processes of decomposition" (Ibid: 132) which eventually led to important political concessions for informal waste workers from the Mayor of Dakar. Returning to Moore (2012), she explores urban garbage strikes as acts of resistance that threaten the established order in the modern city. The presence of waste in public space is a material reminder of the contradiction and danger of modernity's excess. Moore describes waste as a 'parallax object': "that which disturbs or disrupts sociospatial norms" due its hazardous material qualities, and its indeterminacy as out of place or going against the given order. She contends that, as a parallax object, marginalised urban citizens can mobilise waste's material qualities and indeterminacy to resist urban exclusion.

Finally, a new subfield of waste studies, Discard Studies, understands waste – or discards – as integral to the very definition of power, rather than simply mobilised by it. In a co-authored book on Discard Studies, Liboiron and Lepawsky (2022: 61) define power as a collection of techniques that sustain certain systems over others, shoring up some centres of power while pushing other people, ideas, and discourses, to the periphery. For these authors, power is therefore "about how some things are maintained, counted as good, become normal, and thus become uneventful while others struggle for recognition, are debated, or are discarded" (Ibid: 62). Discarding, as a technique of power, is not inherently good or bad, but rather involves processes of ordering and erasing that are necessary to maintaining any system of power. Liboiron and Lepawksy (2022) point out that to alter discarding therefore always necessarily involves re-organising systems of power, not just symptoms. With regards to the example of

food waste, Liboiron and Lepawsky (2022) argue that this would involve an interrogation of where food waste is produced discursively and materially in systems upstream and for what or who's advantage, rather than focussing on downstream management.

2.1.3. Materialist approaches to waste

The previous section draws on scholars that emphasise the discursive mobilisation of waste within structures of power and its unequal material consequences. In this section, I consider materialist engagements with waste, which shift the focus to examine the material, embodied, more-than-human agencies and experiences of waste. Materialist approaches have evolved from an engagement with materialist perspectives in Marxism, feminist materialism, and 'new materialism' from science and technology studies (STS) and non-representational theory.

Since the turn of the twentieth century, scholars have embraced waste as a subject for material analysis; as Myers (2005: x) points out, "After all, what is more material than garbage?". Gay Hawkins' (2006) book The Ethics of Waste offers an early example of such an approach. She interrogates the agency of waste and its capacity to provoke emotional and embodied affects among humans, writing: "Waste is provocative, as much as we might like to think that it is just the redundant and rejected context to our lives, it can catch us in networks of obligation that reverberate across our bodies and invite us to live with it differently" (Hawkins 2006: x). Hawkins breaks down dominant human/nonhuman binaries by understanding waste as lively matter (drawing on Bennett 2010) and investigates the ways in which agency is shared between human and nonhuman actants in waste management. Responding to and building on Hawkins' early engagement, a special issue in Environment and Planning A: Economy and Space, edited by Gregson et Crang (2010: 1026) seeks to "[move] waste scholarship to a fuller engagement with materiality". In this issue, waste is taken as "intrinsically, profoundly, a matter of materiality" (Ibid: 1026). Furthermore, Sarah Moore, in (2012: 140), reviews 'concepts in new geographies of waste', concluding that waste represents a vector with which to contribute to new more-than-human geographies, by "examining, defining, and animating the material".

Some of these scholarly approaches to waste's materiality represent engagements with 'new materialism' and more-than-human geography, with their origins in STS and non-representational theory. Sarah Whatmore (2006) explains that 'new materialism' challenges the

idea of the material world as indifferent and 'out there', influenced by theorists such as Jane Bennet and Bruno Latour. Instead, it envisions the material world as co-fabricated and intertwined with human corporealities and subjectivities. In the field of Geography, more-than-human geographies have emerged as part of this 'return' to material engagements (Whatmore 2006), contributing to an interrogation of categories such as the 'human', 'nonhuman', and 'landscape'. The Cartesian separation between humans and nonhumans is problematised (Cresswell 2013) and the human is considered "no less a subject of ongoing co-fabrication than any other socio-material assemblage" (Whatmore 2006: 603). Clement and Bunce (2022) and Narayanan (2021), for example, explore more-than-human constructions and experiences of waste in the city, with Narayanan offering a case study of multispecies waste discourses in Indian cities.

I continue to draw on new materialist and more-than-human scholarship in the following sections on food waste, environmental governance, and the circular economy. This includes, for example, scholarship by Turner (2019a) and Christopher Neubert (2020) who discuss sensorial relationships with waste and how waste's "very viscerality" structures "ongoing encounters among humans and nonhumans" (Turner 2019a: 140).

In later sections on Women and Waste (2.5.), I also draw on feminist materialist engagements with waste which explore the political economy through the scale of the body and the everyday (Parker 2011). Brenda Parker (2011: 433), for example, offers a review of feminist materialist approaches to the city which she describes as being "attentive to embodiment, encompassing of intersectionalities, focused on the everyday and beyond, and attuned to social justice and feminist praxis". In a paper co-authored with Oona Morrow, Morrow and Parker (2020) emphasise the importance of material urban environments in fostering more just gender and environmental relations in the city. By drawing on materialist feminist approaches that emphasise the material conditions of women's lives and how they intersect with structures of power, they highlight how alternative social relations might be developed in space. They consider how these might be enacted at the scale of the everyday, through embodied feminist praxis of care, commoning, and collectivity.

In the following sections, I continue to unpack materialist approaches – from both 'new materialist' and feminist traditions – to food waste, environmental governance, women and waste, and the circular economy.

2.3. Food Waste

2.3.1 The rise of food waste

Food waste has emerged as a topic of concern among scholars, activists, and political actors. Several "well-rehearsed" statistics (Reynolds et al. 2020: 1) characterise food waste's rising visibility on the global stage. A UNFAO report in 2013, for example, announced that if food waste were a country, it would be "the third largest greenhouse gas emitter in the world after the US and China" (O'Neill 2019: 122) and the Institute of Mechanical Engineers' estimate that 30-50% of all food produced goes to waste (Reynolds et al. 2020: 1). In a special edition of The Sociological Review dedicated to sociological approaches to food waste, editors David Evans and colleagues (2012: 5) describe food waste as a "compelling and yet hugely under-researched area of interest for social scientists" that "has recently re-emerged as a priority in the realms of food policy and regulation, cultural politics and environmental debate". Eight years later, in the Routledge Handbook of Food Waste, edited by Christian Reynolds, Tammara Soma, Charlotte Spring, and Jordan Lazell (2020), the prevalence of food waste continues to be documented. The latter arises from the collaborative efforts of the Food Waste Studies group, comprised of over 200 students, academics, and practitioners united by a desire "to further develop and act upon their interests in this critical field for addressing more sustainable and just food futures" (C. Reynolds et al. 2020: 14).

Scholars in both these volumes and beyond offer several explanations for the rising visibility and public alarm surrounding food waste. Evans et al (2012) argue that events such as the 2008 global food crisis and the 2011 financial crisis undermined formerly taken-for-granted certainties regarding middle-class household security and the cost of food, compounding public concern regarding food waste. Policy shifts and targets have also put food waste on the mainstream political agenda at municipal, national, and international scales (Evans, Campbell et Murcott 2012; Reynolds et al. 2020). At the international scale, for example, Goal 12 of the United Nation's 2015 Sustainable Development Goals includes the aim to "halve per capita food waste at the retail and consumer level and reduce food losses along production and supply chains by 2030" (quoted in O'Neill 2019: 117). Activist and cultural politics have also contributed to food waste's rising visibility, with an increasing number of organisations and social movements seeking to combat food waste at different points in the food chain (Reynolds et al. 2020). Finally, the context of climate change has been cited by food waste scholars as

precipitating increased visibility around food waste (Evans, Campbell et Murcott 2012; Reynolds et al. 2020), with the environmental impacts of food waste increasingly recognised. The environmental impacts of food waste are increasingly recognised and include the unnecessary burning of fossil fuels in a regime of overproduction as well as the decomposition of food waste in landfill which generates methane – a gas with a warming capacity twenty-five times greater than carbon dioxide (Reynolds et al. 2020).

Social scientists addressing food waste also consider how its visibility is compounded by public concerns surrounding local, regional, and global inequalities. Wasted and excess food in the Global North, for example, is contrasted with food insecurity in some parts of the Global South. Stuart (2009) explains that the food requirements of one billion food-insecure people worldwide could be satisfied by the 40 million tonnes of food wasted in the United States annually. Scholars such as Giles (2014) highlight that socio-economic inequalities structuring food excess and insecurity also play out within cities and countries, not just between the Global North and the Global South. This is evidenced by the number of activist groups seeking to address food excess and insecurity from the neighbourhood to the global scale (Reynolds et al. 2020).

Nevertheless, recent scholarship has sought to nuance simplistic analyses of a transition from food waste invisibility to visibility (Evans, Campbell et Murcott 2012; Reynolds et al. 2020; Weber 2013). Some scholars contend that the heightened visibility of food waste stems not solely from unprecedented quantities but is also influenced by cultural representations and political discourses. These scholars interrogate the processes by which food waste becomes culturally and politically meaningful. Weber (2013) and Evans et al. (2012) both draw on the example of food waste stewardship in World War Two to argue that food waste becomes more visible in historical and political contexts where "its prevention is being counselled" (Evans et al 2012: 12). While contemporary food waste regimes do pose novel challenges, this approach warns against "the tendency to moralise and panic over waste as a 'crisis'" (C. Reynolds et al. 2020: 1-2) and instead calls for different understandings "of where the roots of 'crisis' might lie" (Ibid: 2).

2.3.2 A history of global food regimes

An important way in which the socio-historical roots of the food waste crisis have been examined is through the concepts of the global food regime (Friedmann and McMichael 1989) and the global food waste regime (Gille 2012). Both contextualise global food and food waste by considering its social and historical relations, and emphasise how neoliberalism as a social, political, and economic system dominates food and food waste regimes today.

Rural sociologists Friedmann and McMichael first proposed a 'food regime' approach to the global food and agriculture industry in 1989. This approach understands food systems as built on social relations and subject to change through time and across space. In their analysis of Friedmann and McMichael's seminal contribution, Pechlaner and Otero (2010) explain that Friedmann and McMichael identify two global food regimes and suggest that we are transitioning to a third, with each regime becoming a precondition of its successor. The first food regime is typified by settler-colonialism from 1870-1914, during which the food system became shaped by the "extensive accumulation strategies" of Western colonial states (Penchlaner and Otero 2010: 182). This set the groundwork for an internationally organized food system to the structural advantage of Western states. Plantations produced food for export in colonies in the Global South, meanwhile Western colonial states organized their labour power to facilitate industrialization. Decolonization and the collapse of empires saw the transition into a second food regime in the post-World War II period and into Cold War, from 1945-1973. Friedmann and McMichael term this regime the "surplus regime" (Penchlaner and Otero 2010: 183). Governments in Europe and the United States invested heavily in modern farming practices, industrial infrastructure, new technologies and food commodities (Evans et al 2012), precipitating in falling food prices in the Global North. America emerged as a global agricultural hegemon with agriculture designated a nationally regulated sector, and the government introducing numerous subsidies and supports for farmers (Penchler and Otoro 2010).

Market instability in the 1970s and 1980s gave rise to a 'third food regime', which McMichael (2009) refers to as a "corporate food regime" and Pechlaner and Otero (2010) refer to as a "neoliberal food regime" (Penchlaner and Otoro 2010). This saw power, control, and capital in the global food system concentrated in the hands of corporations from the Global North. C. Reynolds et al. (2020: 13) summarizes this transition, describing how neoliberalism has restructured the global food system "through the liberalization of global agricultural

economies under structural adjustment policies, corporatization, and regulations that promote unjust international trade". Food is treated as a commodity rather than a human right and is abstracted from its environmental, social, and political contexts (Reynolds et al. 2020). Other consequences of a corporate food regime include the overproduction of food for markets in the Global North as an economic risk avoidance strategy, leading to a surplus that must be sunk somewhere. Waste is systemically entrenched, as explained by Gille (2012) in her "food waste regime" framework which I explore in the following section.

2.3.3 Food waste regimes

Sociologist Zsuzsa Gille (2012) builds on Friedmann and McMichael's (1987) "food regimes" as well as Young's (1982) "resource regime" in her "food waste regime" framework. Like Friedmann and McMichael's (1987) food regime, her framework also seeks to conceptualize food waste as "a social relationship … produced materially and conceptually by profoundly social relations" (Gille 2012: 29). Gille describes waste regimes as consisting of social institutions and conventions that structure how different wastes are valued, produced, and distributed. Tracing the transition from subsistence to market societies, Gille describes three ways in which a contemporary neoliberal regime entrenches systemic food waste across scales and at every point of the value chain.

First, she describes how farmers, retailers, and governments in the Global North have been able "to organize their uncertainties into risk institutions" (*Ibid*: 31). Economic risk avoidance strategies in the Global North encourage farmers to overproduce, buttressed by state investment and subsidies. If the market is unfavorable, in the case of good harvests for example, many farmers do not even bother harvesting their surpluses, letting their crops rot in the fields (Gille 2012). In the United States, Gille explains that the state buys food surpluses to send to countries in the Global South as food aid, with government mechanisms and international agreements therefore shoring up overproduction for farmers in the United States. Meanwhile, food aid floods markets in the Global South, making "local produce superfluous" (Gille 2012: 33). Furthermore, neoliberal reforms and structural adjustment programs imposed by Western dominated financial institutions such as the World Bank and the International Monetary Fund have forced governments in the Global South "to get out of the economy, leaving their farmers

with no corresponding risk-absorbing institutions" (*Ibid*: 33). Any former capacity for post-colonial states to shoulder some of the costs of agricultural modernization and investment in seeds and technologies is eliminated by structural adjustment programs. As a result, many food producers in countries in the Global South see their produce going to waste or avoid the risk of farming altogether. The result is a global system of regional over- and under-production, in which excess food is systematically wasted in the Global North, regardless of the weather conditions, while much of the Global South experience underproduction and food dependance.

Secondly, Gille (2012) explains that risk is disproportionately shouldered by producers in business relationships with retailers in the Global North, resulting in systemic food waste. One example is the safety and aesthetic standards that are imposed by retailers on contract farmers who bear the associated costs. These standards are also enforced by international organizations such as the European Union who aim to protect retailers "from risks associated with perishability and hygiene" (*Ibid*: 35). Gille (2012: 35) describes the absurd nature of some of these standards, taking the example of the European Union's rules concerning bananas which stipulate that bananas sold in the EU must be at least 14 cm long and 'free of abnormal curvature'. Such standards precipitate in food going unharvested or abandoned in warehouses, resulting in not only economic loss but also wasted energy, labor, and natural resources. Finally, Gille considers the *legal* risks in the corporate food waste regime. Attempts to manage legal risk in food markets entrench food waste where retailers seek to avoid liability for the "biological and technological hazards" of eating. This has led to the proliferation of "best before", "use by", or "sell by" food labels. Both retailers and consumers "tend to err on the side of caution" faced with such dates, leading to the unnecessary disposal of food in both shops and homes (Gille 2012: 36).

Gille's (2012) food waste regime theory counters dominant understandings of food waste as contained within certain scales and resulting from production issues, individual consumption habits or technical inefficiencies (Reynolds et al. 2020). Instead, as highlighted by Penchlaner and Otoro (2010: 628), both food regime and food waste regime approaches understand food and food waste as shaped by systematic "command and control issues", thus changing the terms of debate to shift focus towards concentrations of power and equity in the food system. Evans et al (2012) further contend that taking a regimes approach to the current neoliberal food system is important for understanding the current, dominant system not as 'natural', but as socially and politically constructed over time and shaped in large part by powerful Western actors and corporations.

2.3.4. The Plantationocene / Racialised Capitalocene

Recent scholarship on the Plantationocene presents another theoretical engagement with the history of the global food system that connects the global food system and its colonial history to contemporary environmental collapse. The main argument is that the relationships and categories developed and experimented on the colonial plantation have been scaled up within the global food system and beyond, giving rise to planetary environmental collapse.

If the Anthropocene is defined as a new geological epoch "characterised by the human domination of the planetary system" (Malhi, 2017: 77), the *Plantationocene* has been proposed by critical scholars as an alternative nomenclature that positions the "plantation" and its ongoing legacies at the centre of ecological crises. In so doing, scholars simultaneously decentre and trouble the homogenous marker of the "Anthropos" as the indiscriminate driver of planetary environmental change. Ana Tsing and Donna Haraway, the original proposants of the concept, instead argue that contemporary environmental collapse has its foundations in the more-than-human relations and categories of modernity developed on colonial plantations, dating back to the seventeenth century European colonisation of the Americas (Mitman, 2019; see also: Davis and Todd, 2017; Lewis and Maslin, 2018a, 2018b). Plantationocene approaches resonate with and draw on theories of racial capitalism, such as Patel and Moore's (2017) concept of "cheap nature". Patel and Moore (2017) trace the history of post-feudalist and early capitalist societies in Europe, during which Nature-Society and Human-Nonhuman dualisms emerged within Enlightenment Cartesian philosophy as a means to both understand the world and "to organize it and ourselves" (*Ibid*: 47). Under this dualism, Nature came to encompass not only nonhuman organisms, but also less-than-human humans: Indigenous people, people of colour, and most women. The authors conceptualise "cheap natures" as a series of strategies for capital accumulation that leverage the Human-Nature binary to systematically undervalue the bodies and work of certain humans and nonhumans. This devaluation, in turn, serves to justify the extraction, ownership, and colonization of non-human or less-than-human entities and processes, as evidenced on the plantation.

Human/nonhuman binaries shaped the organisation and development of the plantation. Haraway and Tsing define the main features of the Plantationocene as: 1) the radical simplification of life, including the forced removal and disciplining of certain humans and nonhumans; 2) the organisation of human and nonhuman labour, including slavery; 3) the

loss/erasure of other modes of being, such as repressed cultures, languages, and farming practices (Mitman 2019). Human and nonhuman life were governed in this way for the benefit of capital accumulation. They argue that these logics have historical legacies in how we order human and nonhuman life today, in the Plantationocene. Plantation logics contribute, for example, to the emergence of intensive industrial agricultural systems motivated by profit, as McMichael (2009) describes in his "corporate food regime" framework, described above. Intensive globalised agricultural systems, born on the plantation, have important environmental legacies today and have been identified as a major contributor to the ongoing ecological crisis (Willett et al. 2019).

Other scholars contribute to these conversations by considering how binaries (developed on the plantation) reverberate in wider modes of managing life today. In what echoes with Plantationocene diagnoses of environmental collapse, Lorimer (2020) describes how changes to agriculture since the seventeenth century have instated and normalised "antibiotic relations", involving a simplification of life in intensive livestock systems and monocultures. This has involved, for example, the use of chemicals to kill certain organisms, and a general program of smoothing and controlling ecological systems so that they are configured to deliver a small set of commodity crops and lifestock. Lorimer traces how such modes of managing life, from large-scale ecological systems to small-scale bodies and homes, have led to a number of "Anthropocene blowbacks", including biodiversity loss, changing climate, poor animal welfare, conditions for the emergence and spread of disease, pesticide resistance, and flooding or fire events. In other words, efforts to simplify and rationalise nonhuman life and systems create conditions for disastrous events, while naturalising a capitalist model of economic growth.

Lorimer's (2020) analysis echoes with diagnoses of the Plantationocene and its roots in modern, capitalist, and colonial categories of human/nonhuman and society/nature. However, Lorimer also suggests that moves to resist antibiotic models on both the micro-scale, in health, hygeine, and food, as well as on the macro-scale, in agriculture, conservation, and environmental management, for example, manifest in what he refers to as an emerging "probiotic turn". While still marginal and mostly in the Global North, Lorimer suggests that this probiotic turn "begins with food and agriculture" (*Ibid:* 51), including through composting practices: "such probiotic approaches are well established in waste management, where beneficial microbes are deployed to break down unwanted food and sewage, with the aim of reducing landfill and incineration" (*Ibid:* 49).

2.3.5. Centralized urban food waste governance

The food regime, food waste regime, and Plantationocene frameworks outlined in the preceding sections elucidate how food waste has become ingrained in global systems. In this section, I summarise scholarship investigating approaches to how food waste is managed and treated on the ground. Food waste scholars show that food waste management and reduction is increasingly incorporated into urban environmental agendas, with local and municipal authorities playing a longstanding role in waste management (Hoornweg et al). City-scale responses also reflect national and international climate change discourses and targets (Evans, Campbell et Murcott 2012). This has seen a turn away from the predominant reliance on landfilling organic waste, prompted by heightened awareness of the adverse environmental consequences associated with its decomposition in landfills (Adhikari et al. 2010). Instead, several centralized and decentralized options for municipal management have emerged that divert organic waste from landfill. Centralized approaches to municipal food waste management, in which local governments or private contractors collect, separate, and treat food waste on a municipal scale, are most popular. Meanwhile, decentralized waste treatment options are growing but still marginal (Hoornweg et al. 2020) (see section 2.3.6).

Waste scholars explore how centralized urban responses are structured by different environmental governance approaches and discourses. These include the "circular economy" (CE) (which will be discussed in length in section 2.6) and the "food waste hierarchy" (see Figure 1). The food waste hierarchy offers a framework with which to prioritize management efforts, presented in order from the most preferable in terms of environmental impact to the least. Upstream methods are the highest priorities, including: 1) food waste prevention, and 2) redistribution of surplus to humans or animals. Downstream methods are the next priority, including 3) the recycling of food waste through composting or energy-producing anaerobic digestion; and 4) the disposal of food waste via incineration or landfill (Hoornweg et al. 2020).

Figure 27.1 The food waste hierarchy.
Source: Adapted from WRAP (2016b).
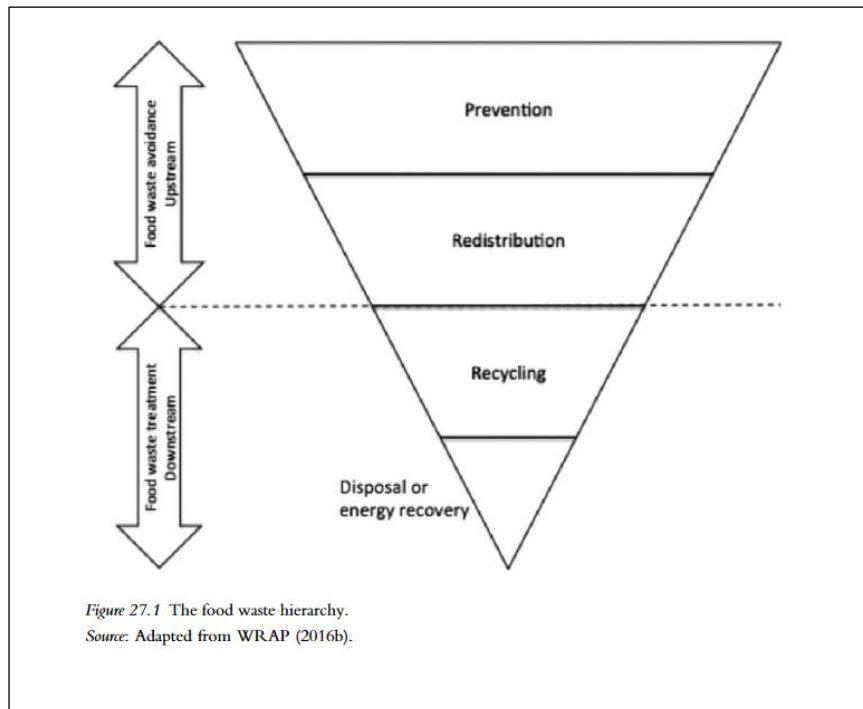
Figure 1 : Chart showing the "food waste hierarchy".
Source : (Hoornweg et al. 2020)

Despite this order of priority, scholars such as Davies (2009), Hird (2021), and Liboiron and Lepawsky (2022) critique a tendency within urban waste management to focus efforts disproportionately on downstream methods, often through public education campaigns and new treatment technologies. (Hoornweg et al. 2020) split downstream methods into three further categories, which represent the most popular urban governance options for food waste. Firstly, biological treatments seek to recycle the nutritious value of food waste back into the food chain and use it to grow new food (Hoornweg et al. 2020). Biological treatments include composting, in which food is broken down aerobically to produce fertiliser, and anaerobic digestion, in which food is broken down with an absence of oxygen to produce biogas and a "nutrient-rich solid or liquid output … that can be used as a soil improver and substitute synthetic fertiliser" (Hoornweg et al. 2020: 448). Secondly, thermal treatments seek to recover energy through the incineration of food waste often mixed with other municipal wastes with the heat produced used to generate electricity. Although thermal plants have a relatively low energy efficiency, incineration has become an important treatment method in countries with less available land (Hoornweg et al.

2020). Finally, the cheapest, the least environmentally friendly, but still the most common method of municipal food waste management worldwide is disposal in landfill or down the sewer (Hoornweg et al. 2020).

Hoornweg et al. (2020) explain that the most environmentally sustainable option for municipal food waste management is difficult to determine. One reason for this is due to data uncertainties which complicate projections. The future energy mix and decarbonisation efforts in different countries is difficult to determine and could change the environmental merits of an energy-intensive anaerobic digestion plant, for example. Furthermore, Hoornweg et al. (2020: 452) highlight that food waste management approaches must be suitable to local contexts, including local environmental and economic factors. As mentioned in section 2.1.2., Liboiron and Lepawksy (2022) highlight that the waste management choices of municipalities are often structured by other factors that are not environmental. For instance, the merits of municipal food waste management systems, such as composting programs, are often *not* the most environmental option - particularly in comparison to upstream efforts. Nevertheless, municipalities might esteem that the changes invoked in the way citizens feel towards their food waste and towards their municipality make downstream composting programs worthwhile, and that this scale of intervention is easier than tackling industrial-scale food waste. In this way, critical scholars such as Liboiron and Lepawksy (2022) remind us that urban waste management decisions are often imbricated in efforts to shore up systems of power, and do not always represent the most environmentally beneficial option.

2.3.6 Decentralized urban food waste governance

Decentralized food waste management approaches have been described by scholars as emerging both in response to the perceived failures of centralized governance (Adhikari et al. 2010; Morrow et Davies 2021; Pai, Ai et Zheng 2019) and with the desire to campaign against and resist dominant food waste regimes in the city (Giles 2014; Reynolds et al. 2020). Decentralized food waste management approaches involve home composting, animal disposal, and community composting (Hoornweg et al. 2020), as well as dumpster diving, meal sharing, and public kitchens (Giles 2014).

Scholars advocating for decentralized food waste management approaches highlight their benefits in comparison to centralized systems. They describe centralized food waste management systems as limited for several reasons, including the need for specific energy-intensive equipment for collecting and processing food waste, such as trucks, transfer stations, and treatment facilities. Municipalities must therefore have sufficient financial and political means to procure and maintain this infrastructure. Efficiency is maximized by organizing collection over large geographies, meaning smaller municipalities may struggle to establish a centralized system, especially where landfilling remains the cheaper option (Pai, Ai, and Zheng 2019). Barriers in public acceptance include concerns regarding odor and pests, often requiring public campaigning and education (Hénault-Ethier, Martin et Housset 2017). Furthermore, Morrow and Davies (2021: 2) highlight that the benefits of centralized composting programs can feel far-removed for urban residents and that social and environmental inequalities mean that low income and minority communities are often burdened with living in proximity to waste treatment and transfer stations.

Community composting has been explored as an economically, environmentally, and socially beneficial alternative to centralized programs (Adhikari et al 2010; Pai, Ai, and Zheng 2019; Morrow and Davies 2021; Turner 2019). Community composting refers to the practice of collectively managing organic waste within the communities that produced it, with the aim of locally capturing the benefits of both the finished compost as well as the process with which it is made (Morrow and Davies 2021). Morrow and Davies (2021: 2) explain that community composting operates at a variety of scales, and with different business models and partnerships, but is united by "a socio-material configuration that is designed to maximize community involvement and community benefits". Adhikari and colleagues (2010) offer a quantitative analysis of the economic and environmental impacts of community composting and home composting in Europe and Canada, as an alternative to landfilling. Their projections found that these on-site practices could reduce costs by 34 to 50% and greenhouse gas emissions by 40% compared to landfilling. In an investigation of decentralized community composting feasibility in Chicago, Pai, Ai, and Zheng (2019: 2) find that community composting not only "alleviates some of the challenges for centralized composting but also provides additional benefits for the community".

Morrow and Davies (2021) argue that community composting programs enact an alternative waste paradigm in the modern city. They offer a case study of community composting in New York City, drawing on feminist theories of care and more-than-human relational ethics, to

describe the emotional, visceral, and relational processes by which composting volunteers 'fall in love' with compost (*Ibid*: 2). This love and care for both their community and for nonhuman animals and soils offer an alternative economy of value that moves beyond dominant capital-centric urban economics. Nonetheless, Morrow and Davies (2021) also warn that the labour that goes into community composting is a form of care work that is undervalued. They explain that this care work is often performed voluntarily "by people with the socio-economic privilege to do so", which risks excluding those without the time or resources to contribute and leading to potential "blind spots around racial and economic justice" (*Ibid*: 10).

Other decentralised food waste approaches, such as dumpster diving, are explored by scholars who describe their imbrication in more explicit social movements that seek to resist dominant neoliberal waste regimes (Giles 2014; Reynolds et al. 2020). Reynolds et al. (2020: 6) describe how these movements attempt "to situate food's wastage within a critique of the logics of neoliberal capitalism, where food's profitability exerts a greater influence on its journey than its capacity to nourish". Emerging literature and public campaigning surrounding dumpster diving and the 'freegan' movement, for example (Giles 2014), describe how these practices resist the structuring logics of neoliberalism by "re-valuing what others have deemed invaluable", "[reclaiming] the discards of consumer culture", and "[making] the political choice to challenge excess consumption" (C. Reynolds et al. 2020: 5). Giles (2021), for example, offers an ethnography of the international organization *Food Not Bombs*, which operates in cities in over 65 countries. She explains that this organization runs anarchist kitchens, offers shared meals, and practices dumpster diving to redistribute good food wasted under neoliberal food waste regimes with those less able to participate in dominant food markets. Such practices and movements represent more radical and marginal decentralized approaches to urban food waste management with political objectives that seek to enact an alternative, more socially and environmentally just food and food waste systems.

2.3.7. More-than-human approaches to food waste and relational ethics

As described in Section 2.1.3, materialist approaches to waste emphasize its lively materiality and agencies, and the ways in which humans are co-constructed in their engagements with it (Evans et al 2012; Turner 2019). Materialist approaches to *food* waste have

become particularly prominent. While former, dominant approaches assumed self-evident categories of food and food waste as a resource, commodity, or management problem (Reynolds et al. 2020), material provocations and recent theoretical engagements have led Evans et al (2020: 11) to contend that food waste studies have "departed from their origins" to "arrive at a posthumanist reading".

Sociologist Alan Metcalfe and his colleagues (2012) underscore the significance of examining the *materialization* of food waste management to comprehend its success on the ground. They offer a material reading of the food waste bin and the ways in its agencies are managed by households through every day "practices of accommodation and resistance" (*Ibid*: 135). The authors describe how the food bin's agency interweaves 1) its symbolic representation of the environment, cleanliness, and order, 2) its relational importance as a bridge between the home and public waste management systems, and 3) its material capacities and affordances. Metcalfe et al (2012) describe the latter – the material agency of the bin – as the most disruptive factor impeding the success of the municipal composting program. The "smell, hygiene, size, aesthetics, order and respectability" prompted both practices of accommodation among urban residents but also resistance, even where residents held pro-environmental attitudes (*Ibid*: 135). They draw on this analysis to suggest that the success of waste management policy should also be examined materially, recognizing the "extent to which objects that materialize policy can be helpful in the implementation of that policy" (Metcalfe et al. 2012: 138).

Bethaney Turner (2019a, see also 2019b) adopts a new materialist approach in her case study of thirty-eight "food-producing gardeners and Alternative Food Networks (AFNs)" in Canberra, Australia. Turner (2019a) contextualizes her research with reference to the Anthropocene, which both necessitates and precipitates an awareness of the increasing entanglements between humans and nonhumans. In this context, she suggests that "encounters with excess food are shown to be capable of assisting in training sensitivities to become attuned and responsive for our more-than-human entanglements and mutual vulnerabilities" (Turner 2019a: 770). Turner argues that the affective force of food and food waste in the home requires management through intimate corporeal engagements. Through her case study with gardeners and AFNs, she investigates "experimental, playful interactions" with food and food waste, arguing that these have the potential to transform human subjectivities, ecological sensitivities, and ethics (Turner 2019a: 770). She describes actions taken by her interviewees to respond to food's materialities, including the monitoring of decomposition rates through sensorial engagements and the adaptation of meals to avoid waste. Turner also describes how

participants sought to adapt to uncertainties such as not knowing what food would be available to harvest, explaining these processes of adaptation were a "source of excitement and pleasure" (Turner 2019a: 776). Through tuning into and practicing responsiveness to food's affective force, she contends that these engagements take on an ethical register in the context of the Anthropocene. As eaters are reminded of their mutual vulnerabilities with nonhuman others, this "can induce ethico-political beliefs and practices that have the potential to disrupt anthropocentric thinking" (770).

In a similar approach, Maria Puig de la Bellacasa (2019) considers the ways in which transforming "contemporary human-soil affections" has the potential to induce alternative environmental ethics founded on more-than-human connectedness. She argues that engagements with soil such as practices of composting can overturn dominant anthropocentric visions of soil as a resource to be harnessed. Instead, soil becomes felt and recognized as alive and as entangled in mutual becomings with human beings. In composting, for example, these transformations arise in practices that attend to the material needs of compost and recognition of its importance for food production and sustenance. Like Turner's (2019a, 2019b) theorizations regarding the importance of alternative environmental ethics and sensitivities in the Anthropocene, Puig de la Bellacasa (2019: 391) argues that through engagements with soil, an ethics of more-than-human care and a "shared sense of aliveness" is cultivated.

Composting has, in this way, been drawn upon as a powerful metaphor with which to imagine alternative futures for the Anthropocene in experimental scholarship (Haraway 2016; Puig de la Bellacasa 2019a). Puig de la Bellacasa (2019a: 401) asks "What better metaphors than composting for stories that transform destruction and fear of decay into a sense of earthy rebirthing?". The *Camille Stories* is a collaborative piece of speculative fiction by posthuman theorist Donna Haraway (2016), developed alongside filmmaker Fabrizio Terranova and psychologist, philosopher, and ethologist Vinciane Despret. It follows the imaginative community of the *Children of Compost* through five generations, starting from the present and extending five hundred years into the future. In this story, the 'children of compost' are imagined as "communities of healing … settling in a devastated landscape", who live according to a philosophy of 'making kin, not babies', with the aim of reducing the size and impact of human populations. Instead, they seek to advocate for and co-become with nonhuman species. The metaphor of compost here is once again employed in an ethical register to imagine alternative ways of relating to nonhuman others in the Anthropocene.

Sociologists Sebastian Abrahamsson and Filippo Bertoni (2014: 125) also consider the importance of experimentation and play with regards to food waste, however they seek to nuance 'cozy' approaches to more-than-human ethics and scholarship. In their case study of vermicomposting, they respond to what they describe as "a pleasant and 'nice' version of coexistence" in more-than-human approaches, arguing that in "dealing with composting, it becomes clear that relations with the environment are never so neat and clean" (Abrahamsson and Bertoni 2014: 125). By looking at "practices of composting-with earthworms" they explore the "non-relations and asymmetries of the transformations of more-than-human materialities" (*Ibid*: 125). By explaining how the compost bin is set up, for example, they consider how vermicomposting entails both attempts to bring together and to separate. Vermicomposting calls upon relations between "all sorts of bacteria, fungi, molds, and arthropods" – and, of course, the worms themselves - and yet is also structured by attempts to keep undesirable molds, odors and bacteria at bay (*Ibid*: 128). Caring for the vermicomposter involves monitoring and responding to its "temperature, moisture levels, pH levels, light, and food types and quantities" (*Ibid*: 30), and therefore entails a process of tinkering in which 'knowing' is relational, ongoing, and contingent. They explain that these processes necessarily entail care and even love for the worms and for compost, however "it is a love that is about asymmetric relations, about profound differences, about irreducible otherness. Care might need the language of love, but of a love that is dirtier and not easy" (*Ibid*: 140). They argue that embracing rather than ignoring such divergencies and frictions strengthens conceptions of togetherness by encouraging actors to *stick with* such practices despite their discomfort.

2.3.8. Alternative waste ethics

The scholarship above, advocating materialist approaches to waste and relational ethics, has encountered criticism from certain critical race and Indigenous scholars. These scholars appraise materialist approaches on several grounds, including: 1) for how they flatten out *human difference* in waste relations (Resnick 2021; Soma et al 2020) and 2) for overlooking indigenous relational philosophies (Lobo 2019; Miller et Pointer 2019; C. Thomas 2015). The implied Euro-centricity and whiteness in much materialist scholarship has prompted scholars such as Amanda Thomas (2015: 974) to call for "more-than-human (MTH) and post-human geographies to shift their gaze beyond Anglo-European ways of knowing the world".

While acknowledging the importance of moving beyond anthropocentric perspectives on the environment, scholars have critiqued the tendency to omit or oversimplify *human* differences within more-than-human scholarship. Hecht (2020: 112) warns of a fetishization of waste's materiality, contending: "Metaphors matter. And those particular metaphors enchant: they make materials appear mystical and mysterious. Their joyful connotation can all too easily erase the brutal histories and ontologies that produce new biophysical phenomena". Anthropologist Elana Resnick (2021) critiques approaches that romanticize relational entanglements with waste, instead arguing that waste relations in the Anthropocene should also be critically and historically situated in racial capitalism. She contends that "far too many accounts [of more-than-human approaches] omit race in theorizations of the Anthropocene, thereby reifying an unmarked whiteness in the speciesization of "the human"" (Resnick 2021: 224). Instead, in her case study of Romani waste laborers in urban Bulgaria, she explores the ways in which histories and systems of colonialism and racism disproportionately expose racialized bodies to waste's materialities. This begs an interrogation of environmental privilege and racism in the exposure to different kinds of waste, including the choice that people have in exposing themselves. Relational encounters with waste should not be uncritically romanticized as fostering an alternative environmental ethics. Instead, these encounters should be recognized as often harmful, shaped and imposed by structures of environmental racism.

Exploring this within urban scholarship, Sue Ruddick (2015: 1113) refers to this debate as a tension between "more-than-human dreams" and "less-than-human nightmares", in which more-than-human scholarship risks elevating nonhumans to ethical issues of concern, while overlooking structures that reduce some urban inhabitants (human and nonhuman) to less-than-human. Recent scholarship in feminist political ecology, including Sapana Doshi's (2017) call for an embodied Urban Political Ecology, seek to move past such tensions by putting intersectional analyses into conversation with attention to the embodied and intersectional material realities of urban life (literature I engage with further in section 2.5.; see also Harcourt and Nelson, 2015).

Scholars such as Lobo (2019) and Thomas (2015) have also accused more-than-human scholarship of obscuring Indigenous cosmologies. Where more-than-human scholars present a new environmental ethics, calling upon a relational politics and sometimes even drawing on spiritual language, these scholars highlight that indigenous cosmologies and ways of life have been founded on rich histories of relational approaches for millennia. By overlooking these histories, critical scholars suggest that more-than-human scholarship risks perpetuating euro-American ontological domination, colonialism, and whiteness in both the academe and in

environmental governance. Responding to recent provocations by indigenous and critical post-development scholars (see, for example, Escobar 2018), waste and food waste scholars have recently recognised "the need to include and (re)learn from paradigms, scholarships, cultures, and worldviews that might counter and challenge the industrial food system, while serving to reconnect identity, well-being, and relationships to food and land" (Reynolds et al. 2020: 9). Tammara Soma and colleagues (2020), for example, consider the North American Indigenous worldview of 'All My Relations' and the challenge it poses to dominant neoliberal food regimes. 'All My Relations' "offers an interconnected framework of rights and responsibilities that is premised on the values of being in balanced relations with all creations" (Reynolds et al. 2020: 12). Soma et al (2020) consider the challenge that the 'All My Relations' indigenous ontology poses the current neoliberal food system, which distances and detaches humans from food and food waste. By challenging Western actors to reconsider their responsibilities towards and co-dependencies on both human and nonhuman kin, Indigenous ontologies challenge the "status quo and neoliberal paradox of the commodification that perpetuates wastage alongside hunger" (Reynolds et al. 2020: 12).

2.4. Environmental Governance

Where the previous sections have touched on various managerial and theoretical approaches to food waste, this section contextualises these within broader trends in environmental governance scholarship. Over the last 30 years, 'governance' has been mobilised to understand "the shifting power relations between the state, interest groups and civil society" (Griffin 2012: 208). Within Geography and environmental studies, and in the context of planetary climate change, many such discussions have concerned the shifting power relations in environmental decision making and sovereignty. Environmental governance scholars have asked, for example, *who* should address environmental problems? What is the appropriate scale of decision-making? Whose interests are served by reconfigurations of governance arrangements? And how are different actors socially and politically empowered or disempowered by different contemporary governance arrangements? (Benson et al. 2013; Davies 2009; Himley 2008).

Recent debate over how governance should be conceptualised has emerged in what scholars have referred to as the 'governance turn' (Bulkeley, Watson et Hudson 2007; Davies 2009; McCann 2017). In response to both empirical and conceptual challenges to the authority and power of the nation-state, scholars have undertaken a re-scaling of their analysis of issues previously taken to be the preserve of the nation state (Davies 2009). A nexus of empirical contexts such as globalisation, neoliberal capitalism, and planetary climate change, for example, have seen the emergence of transboundary environmental problems which have forced greater co-operation beyond the state, including through supra-national organisations such as the United Nations and the World Bank (Callon, Lascoumes et Barthe 2011). On a national scale, a politics of economic austerity and neoliberal capitalism in countries such as the UK has also seen social and environmental care downloaded onto private and third sector actors through a rolling back of the state. Theoretically, scholars have drawn on post-structural theorists such as Michel Foucault and Bruno Latour to re-work taken-for-granted conceptions of governance. They emphasise the fluidity of knowledge, meaning, and power and seek to understand how environmental decision-making and policy-implementation involve multiple stakeholders, working independently or in partnership, extending beyond the state (Davies 2009).

Nevertheless, other scholars have critiqued the governance turn for its "oversimplistic" diagnosis, and instead choose to describe contemporary shifts as "new geographies of governance" (Davies 2009: 25). Cornea, Véron and Zimmer (2017) caution that the "governance turn" carries the risk of depicting governance as apolitical and non-hierarchical. This may lead scholars to focus solely on identifying and describing new institutional arrangements, rather than upholding a critical perspective on the power relationships that contribute to their emergence (Whitehead 2013). Other scholars underscore the ongoing significance of the state in environmental governance. They argue that while the state is not the exclusive locus of political power, it equally cannot be overlooked in multilevel governance analyses (Bulkeley, Watson et Hudson 2007). Instead, these scholars reject scalar binaries and argue for a pluralistic approach that incorporates analysis the state's role in environmental governance.

2.4.1. Waste Governance

Scholarship investigating the governance of *waste*, as a subset of environmental governance scholarship, has emerged alongside anxieties surrounding the growing volume of waste produced at municipal, national, and international scales. In keeping with trends in the

environmental governance literature described above, scholars such as Anna Davies (2009: 4) consider the "multitude of actors involved in waste". In her book, *The Geographies of Garbage Governance*, Davies (2009: 30) describes how non-state actors are increasingly involved in the waste debate and its management, so that:

> while traditionally seen as a matter of disposal for the local state, the production, transport and treatment of waste, with its identified impacts on social, political, economic and environmental realms, is now also an issue of concern for nation states and supra-national entities, the private sector and civil society.

Bulkeley, Watson and Hudson (2007) offer a strong example of a multi-actor, post-structural approach to waste governance in their 'modes of governing waste' framework. Drawing on neo-Foucauldian theory, they define a mode of governing as "a set of governmental technologies deployed through particular institutional relations through which agents seek to act on the world/other people in order to attain distinctive objectives in line with particular kinds of governmental rationality" (Bulkeley, Watson and Hudson, 2007: 2739). Each mode is composed of a governmental rationality, which defines what should be governed and how; associated policies, agencies, and their institutional relations; technologies of governing which make the rationalities visible; and finally, the human and nonhuman entities which are governed. Multiple modes of governing often co-exist and can come into conflict. Bulkeley and colleagues (2005: 34) explain that the aim of this approach is to "illustrate the dynamic and multifaceted nature of waste governing as well as describing the modes of governing that currently shape the policy and practice of waste management".

With regards to *food* waste, there is a breadth of scholarship investigating both state and non-state actors involved in its governance, as already evidenced in preceding sections. This includes research into decentralised municipal approaches to food waste, such as community composting, dumpster diving, and collective kitchens, as discussed in section 2.3.6, as well as post-human scholarship emphasising the distribution of agency in food waste governance between both humans and nonhumans, as discussed in sections 2.1.3. and 2.3.7.

2.4.2 Everyday Environmental Governance (UPE and Feminism)

Some scholars adopting a post-structural approach to governance, as outlined in the preceding section, have considered the "everyday" as a lens which with to understand environmental governance. This has emerged particularly within feminist and urban political ecology (UPE) scholarship, notably as a critique of neoliberalism.

UPE emerged in the 1990s and rejects understandings of urban governance that emphasise social constructivism or rely on nature-society binaries. Instead, it conceptualises the city as shaped by capitalist relations and urban metabolisms that forge "socionatures" which are experienced and distributed unequally (Swyngedouw 1996). In its original form, UPE drew heavily from Marxism to offer a historical and material understanding of the city, its power relations, and the transformations of nature involved in urbanisation. In contemporary UPE scholarship, Natasha Cornea, Anna Zimmer, and René Véron (2016: 1) explain that the field's "increasingly poststructuralist orientation demands the questioning of received categories and concepts, including those of (neoliberal) governance, government, and of the state".

As part of this post-structural reorientation, certain scholars within Urban Political Ecology (UPE) have integrated an everyday approach into their examinations of government, the state, and neoliberalism (Cornea 2020; Cornea, Zimmer and Véron 2016; Cornea Véron, and Zimmer 2017; Zimmer 2012). Cornéa, Véron, and Zimmer (2017) trace the concept of everyday governance back to post-structural anthropologists working in West Africa. They cite Le Meur and Lund (2001: 2), who define everyday governance as "the actual practices of how interests are pursued and countered, authority exercised and challenged, and power institutionalised and undermined". This understands power as diffuse and dispersed through different actors, albeit with some "centres" (Cornea, Véron, and Zimmer 2017). Drawing on its origins in post-structural anthropology, Cornea, Véron, and Zimmer (2017) adopt an everyday governance approach to understand *neoliberalism* as a system that shapes centres of power while also being negotiated in the practices and norms of everyday life. They write (*Ibid*: 8) "everyday governance points to the divergences between an imaginary (neoliberal) governance project, or steering of society and the environment in a particular direction, and the heterogeneous on-the-ground realities of policy implementation and resource use".

Feminist scholars also prove well-positioned to contribute to theories of everyday governance. Beth Bee and colleagues (2015: 3-4) describe how feminist philosophies of science

challenge "the masculinist underpinnings of positivist science that frame scientific knowledge as valid only if it is produced through objective and value-free research". In the contemporary context of climate change, this tradition offers a theoretical springboard for critiquing techno-scientific framings of environmental governance and the objectivity of climate science. Instead, feminist scholars emphasise the importance of the body, the home, and the everyday as political spaces that (re)produce and contest knowledges, imaginaries, norms, and practices of environmental governance. Recognising "the materiality and partiality of climate science" (Bee, Rice and Trauger 2015: 4), they examine how environmental knowledge and politics is situated, embodied, and negotiated on an everyday scale. In so doing, feminist scholars also trouble human/nonhuman binaries in environmental governance. Bee et al. (2015: 5) explain that feminist analyses of trans-corporeal climate change "places the problem, and thereby its solutions, within and on our bodies; it recognizes its existence as an extension of our bodies, and reimagines climate change as something visceral, material, embodied and part of the everyday".

2.4.3 Everyday Environmental Governance and Critical Approaches to Neoliberalism

Scholars have taken on everyday governance approaches to critique neoliberal environmental governance, including in waste management.

Critical scholars describe how neoliberal approaches to environmental governance focus attention on the everyday as a scale of intervention and action. Joshua Long and Jennifer Rice (2019) consider how science is mobilised to individualise environmental responsibility and action. They conceptualise urban approaches to climate change as increasingly oriented towards 'carbon governance', focussed on the scientific measurement and targeting of carbon. Urban policies respond to carbon targets by focusing on fields that are easy to measure, including transportation, energy, building regulations, land use, and awareness campaigns. Bee et al (2015) explain that this policy focus disproportionately targets individuals, given that they "lie in close proximity to people's everyday lives, as they seek to influence and regulate mobility, the way people live in their homes" (Bee et al 2015: 7). Carbon reduction and wider

environmental responsibility therefore becomes an individual responsibility, shifting the responsibility "from the state to the body" and the scale of the everyday (Bee et al. 2015: 7).

Elizabeth Shove (2010) refers to this individual responsibilisation under environmental governance as an 'ABC approach' to climate action, in which the *attitudes* of individual citizens are targeted, to prompt them to adopt alternative *behaviours*, as a rational, individual *choice*. This framework creates a clear political agenda which involves identifying and targeting "the determinants of pro-environmental behaviour" (Shove 2010: 1275), while simultaneously "[obscuring] the extent to which governments sustain unsustainable economic institutions and ways of life" (Shove 2010: 1274). Sociologist Catriona Sandilands (1993) critiques green marketing efforts (greenwashing) which target lifestyles, behaviours, and consumer choices at the scale of the home. She explains that green marketing strategies co-opt environmental responsibility into capital markets and accumulation, and forward individual consumption behaviours and choices as the primary solution for climate change. Like Shove (2010), Sandilands (1993: 46) critiques how these individual choices and behaviours "tend to be incorporated fairly unproblematically into daily household routines without other significant changes, and without planting the seeds of broader social or environmental transformation". She describes this focus on individualised lifestyle or consumption changes as depoliticising environmental action. Environmental politics becomes "subtly reduced to activity in the private sphere" (*Ibid*: 46) without challenging pro-growth agendas or the very capitalist regimes that have bought about environmental crises. Sandiland (1993) goes on to examine how women, mothers, and the 'family' are particularly targeted and responsibilised by this privatisation of environmental action.

Other critical scholars have appraised the ways in which an individualisation of responsibility under neoliberal climate governance obscures structural socio-economic inequalities. They argue that the normative individualisation of environmental responsibility assumes a homogenous ability to participate in pro-environmental behaviours and obfuscates embodied and social differences among the population. Bee et al (2015: 10) describe the importance of a critical feminist approach to the 'everyday' in this context, arguing that "feminist theory critiques universalising and totalizing narratives that erase important aspects of social and spatial different, which is useful to bring to bear on the totalizing nature of much climate change discourse". Jennifer Rice (2014: 381) also makes a similar intervention, arguing that neoliberal environmental governance erases and undermines social and environmental justice agendas. Interventions by Bee et al (2015) and Rice (2014) reflect approaches within intersectional

feminism that emphasise the multiplicity of structures of inequality that are often hidden within dominant, neoliberal environmental governance: approaches that I return to in section 2.5.

Myra Hird (2021), combines some of the critiques above in her consideration of how neoliberal environmental governance approaches shape waste governance in Canada. In her book, *Canada's Waste Flows*, she describes how public perceptions of waste are shaped by discourses of individual responsibility and techno-scientific innovation. Despite most waste discourse and policy targeting individuals and households, Hird (2021: 15) explains that households only produce 2.6% of Canada's total waste, while "industry (only including oil sands, mining, and agriculture) produced 97.4%". She goes on to argue that both municipal governments and industries produce an "environmental citizenship" identity "based on individual and household waste diversion (e.g. recycling), even though this accounts for a small percentage of the waste Canada produces" (Hird 2021: 25). The normative construction of this "environmental citizenship" identity serves to sustain capitalist production and accumulation and obscures the ways in which waste governance intersects in important ways with inequality. Hird (2021: 20) therefore critiques the way in which neoliberal approaches to waste isolates it from issues of inequality, instead showing that "waste is a profound and enduring *symptom* of inequality".

2.5. Women and Waste

In this section, I take a deeper dive into feminist waste scholarship to consider how gender intersects with experiences with and the governance of waste. This builds on discussions of feminist approaches to everyday environmental governance explored in section 2.4.2. I draw on scholarship from both the Global North and the Global South to consider how women are disproportionately responsibilised for waste management, both throughout history and in contemporary neoliberal contexts.

2.5.1 Women and Waste in the Global South

Critical scholars in and from cities in the Global South have critiqued ways in which waste inequalities intersect with gender inequalities. Rosalind Fredericks (2018) in her case study in

Dakar, Senegal, critiques how municipal waste management approaches introduced under neoliberal development initiatives essentialise and responsibilise local women. Her case study centres on participatory community projects which were spearheaded by ENDA, one of Senegal's best-known NGOs, from the 1990s. The projects aimed to improve waste management in hard-to-reach neighbourhoods using small-scale, off-grid, alternative technologies. Fredericks critiques the way in which ENDA drew on essentialised notions of womanhood to enrol them into the project. Women were responsibilised for the social reproduction of public space and yet the value of their labour in the waste sector was unrecognised. Fredericks (2018: 105) described how the six women enrolled in the project to help with the neighbourhood waste collection were originally volunteers, before receiving a small "reward" for a few months, "until community contributions waned and they received next to nothing". In contrast, the male horse-and-cart owners, who were also a part of the collection service, received a regular wage. Fredericks (Ibid: 111) situates this initiative within development movements at the time that "idealize[d] women as participants". She explains how "Women's "natural" attributes, including diplomacy, nonconfrontational style, and intimacy with the community, as well as their altruistic choice to work for "the common interest" in lieu of making money, were celebrated as their key skills" (Ibid: 112). Exposed to social stigma and precarity for no reward, women's characteristics were essentialised and their value devalued by ENDA's project.

2.5.2. A history of women and waste in World War Two

Scholars writing from the Global North have also investigated how women are responsibilised for waste management. Most recently, scholars explore how this occurs within neoliberal approaches to environmental governance, showing that "neoliberal ideologies interact with ideas of labor, responsibility, and gender" (Altan-Olcay, 2014: 1). However, feminist scholars also reveal a longer history of assigning responsibility to women for household waste management in the Global North. Heike Weber (2013), for example, describes how women were responsibilised in wartime Imperial Germany and the National Socialist era, in government initiatives that encouraged them to salvage waste for the national economy and to bolster morale. In this case study she unpacks how wartime and patriotic rhetoric drew on normative notions of female domestic frugality to responsibilise women in their everyday lives. She

describes how domestic waste management became defined as a female responsibility, and the sorting, collection and storage of reusable materials became "a pervasive element of their everyday lives" (*Ibid*: 372). Weber (2013: 372) explains: "these waste recycling efforts were a pivotal aspect of – a highly gendered – wartime mobilisation aimed at the so-called 'home-front'".

A wartime, feminised responsibilisation of waste management in the home was also evident in both America and Europe during World War II, in government campaigns that encouraged households to re-use and donate animal cooking fats and to reduce food waste. A digital exhibit on the history of food waste by Utah State University (2023), for example, shows a poster by the US Department of Agriculture produced in 1942, that calls on citizens to "Fight food wase in the home", featuring three American women (see Figure 2). Also featured in the digital exhibit is a promotional video, titled "Out of the frying pan and into the firing line", produced by Disney in conjunction with the War Activities Committee of the Motion Picture Industry; a group formed by the US motion picture industry to assist in the distribution of government propaganda films. The film, featuring Disney characters Minnie Mouse and Pluto, targets American women and housewives to encourage them to donate excess animal fats produced in cooking (see Figure 2). It further underscores the nexus of wartime state initiatives, popular culture, nationalism, and the shaping of collective imaginaries related to citizenship, femininity, and household roles.

Historical analysis thereby reveals that women in recent history have been consistently targeted and burdened with waste management responsibilities in their daily lives, and that this assignment of responsibility becomes especially pronounced during times of national crisis or emergency. This historical analysis contextualises more recent analysis of gendered waste practices in the context of environmental action and climate change.

Figure 2: Materials from a digital exhibit by Utah State University

1) A World War Two poster by the US Department of Agriculture, discouraging domestic food waste and targeting women; 2) A promotional video, produced by Disney in conjunction with the War Activities Committee of the Motion Picture Industry, that targets American housewives in a campaign that encourages them to save and donate cooking fats.

Source: (USU Digital Exhibits 2023)

2.5.3. A "feminization of environmental responsibility"[2] under neoliberalism

Building on the everyday environmental governance literature discussed in sections 2.4.2 and 2.4.3, in this section I unpack scholarship investigating how women and mothers are disproportionately responsibilised in contemporary neoliberal approaches to waste management.

Critical feminist scholars show that women are disproportionately responsibilised in responses to planetary climate change. Liz Dzialo (2017) describes this as the "feminization of environmental responsibility". Taking a quantitative approach, she draws on data from thirty countries to show that women across the Global North and the Global South consistently engage in more "pro-environmental behaviours (PEB)" compared to men. Based on these results, she argues that "private-sphere environmental behaviours (recycling, saving energy, saving water, driving less, buying organic, and avoiding products for environmental reasons) are clearly feminized tasks throughout the industrialized world" (*Ibid*: 8). Echoing trends in qualitative literature, she also found that this feminization is greater in countries that more closely abide by the tenets of neoliberalism. Dzialo explains that this is because neoliberal countries put greater emphasis on consumption in the home – a domain traditionally coded as feminine – rather than focusing on systemic environmental action. Elicia Cousins (2021) similarly interrogates the "gendered burden of environmental action", arguing that neoliberalism has led to a privatisation of environmental action in which solutions are focused on consumption and individual behaviours, thereby shifting the burden away from governments, private corporations and neoliberal regimes and onto individuals, households and non-state actors (echoing the critical scholarship discussed in section 2.4). She argues that the individualisation of environmental responsibility "[intersects] with persistent, unequal gendered structures of labor in a way that places the burden of environmentalism and environmental risk management on women and mothers" (*Ibid*: 1).

Catriona Sandilands (1993) also explores how the portrayal of environmentalism as an individual domestic responsibility under neoliberalism places disproportionate burden on women. She describes how failure to comply with these expectations "puts women in particular danger of transgressing the new eco-moral code of "responsible" household behaviour", leading to

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[2] Dzialo, 2017: 1.

emotions of guilt and anxiety (Sandilands 1993: 3). A feminisation of environmental responsibility calls upon and reifies a singular, conservative notion of womanhood, which tends to be white and middle class. This notion of womanhood is upheld as an environmental ideal towards which all women are expected to aspire.

Other feminist scholars have interrogated how gendered waste practices intersect with notions and experiences of motherhood (Cousins 2021; Krauss 1993; Morrow et Parker 2020; Sandilands 1993). Krauss (1993) and Morrow and Parker (2020), for example, describe how a maternal framing has been mobilised in successful and empowering environmental campaigns. Krauss (1993 : 247) offers a case study of toxic waste protests from the environmental justice movement in the United States (see also section 2.1.1) which shows how mothers drew on their "traditional role as mothers [as] a resource for their resistance". Morrow and Parker (2020: 609), similarly discuss women's roles in urban transformations, drawing on Dolores Hayden's (1982) research into female activists in late nineteenth and early twentieth century America. They describe how these female urban transformers drew on their identities as mothers and home-keepers to "launch a "municipal housekeeping" agenda that transformed urban spaces, services, and politics". By arguing that the city represented an extension of the home, these women legitimated their roles as activists in public space and sought to transform their neighbourhoods and cities.

While motherhood can therefore be empowering in the context of environmental campaigning, Krauss (1993) and Morrow and Parker (2020) describe how it is experienced in ways that are mediated by intersectional experiences. Krauss (1993), for example, describes how class and race shape how mothers mobilised as activists against toxic waste. Morrow and Parker (2020), describe how most women in their case study of urban campaigning were "white and elite". This form of activism was not adopted in the same way by working-class, racialised, or disabled mothers. Krauss (1993) and Morrow and Parker's (2020) research highlights the ways in which mobilising motherhood for environmental action can risk reifying inequalities between women with different levels of privilege, ability, and resources.

In the contemporary context of neoliberalism, scholars have discussed how maternal discourse is mobilised by the state and private businesses in their approaches to environmental action. Cousins (2021) describes how the individualisation of environmental action under neoliberalism mobilises maternal discourse in ways that are depoliticising and demobilising, explaining: "the increasing individualization of the environmental movement is intersecting with

persistent, unequal gendered structures of labor in a way that places the burden of environmentalism and environmental risk management on women and mothers" (*Ibid*: 1). Encouraging individuals to respond to environmental risk by adopting pro-environmental behaviours in the home represents what Cousins (2021) describes as a 'third shift' for women, where they are already disproportionately charged with household labour and care work. Wilson and Chu (2020: 1086) similarly argue that encouraging environmental behaviours in the home results in a 'double day' for many women. Cousins (2021) draws on Carreon and Moghadam's (2015) concept of 'maternalism-from-above' to argue that maternal frames are deployed by the state in ways that serve patriarchal and neoliberal purposes: keeping women in the private sphere and pushing approaches to climate change that are focussed on consumption and growth.

Cairns, Johnston and Mackendrick (2013) offer an example of 'maternalism-from-above' in their case study of neoliberal environmental campaigns and expectations that encourage women and mothers to adopt ethical food practices. Their concept of the 'organic child' refers to an idealised vision of childhood which charges mothers with adopting ethical consumption practices such as buying organic, 'ethical' food for their children and family. In a summary of this concept by Liz Dzialo (2017: 4), she describes how neoliberal ethical food discourses "combine with normative expectations of motherhood to place responsibility for protecting children as well as the planet on women's shoulders".

The implicit gendering of ethical food practices is also described by Fraser and Parizeau (2018) in their feminist food studies approach to household food waste in Canada. They conceptualise domestic food management as gendered "food work", comprising of tasks such as budgeting; managing human and material resources; planning and preparing meals; purchasing food and assessing its quality; and managing family like, dislikes, health concerns, and dietary requirements (*Ibid*: 40). Mothers are disproportionately confronted with the tension between generating waste through consumption to provide and care for their family members on one hand, and the responsibility to minimize waste on the other. Tensions also exist where embodied, visceral reactions override intentions to be rational or environmentally friendly, such as in experiences of disgust at old leftovers or at foul-smelling compost.

Unlike the food waste campaigns in World War Two described by Weber (2013) (section 2.5.2.), neoliberal environmental governance is "a seemingly gender-neutral phenomenon" (Dzialo 2017: 4) and the gendering of ethical food discourses is implicit (Cairns, Johnston and

Mackendrick, 2013). Feminist scholars such as Cousins (2021) explain why this covert feminisation of environmental behaviour risks depoliticising environmental action and reproducing inequalities. Rather than mobilising women in the public sphere to claim urban space or forge collectives, it "pushes them back into the household and urge[s] them to engage in more household labor and consumerism" (Cousins 2021: 3). This reproduces gender inequalities in the household, the workplace, and public space.

In a critical discourse analysis of UK climate policy, Wilson and Chu (2020: 1085), investigate the covert gendered divisions of labour within the so-called "green economy". They show that, in the UK's 'green economy', male-dominated sectors, such as science and technology, are portrayed as the "good" jobs of climate change. Sectors and jobs dominated by women, migrants, and minorities, such as so-called "dirty" industries (e.g., recycling), on the other hand, are undervalued and underpaid. This compounds the free labour that many women perform through everyday pro-environmental behaviours in the home. They therefore argue against the assumption that gender and climate change "can or should be separated" (1085).

2.6. The Circular Economy

2.6.1 Definitions

In this final section, I return to an approach to organic waste management mentioned in section 2.3. The circular economy (CE) has emerged as a popular discourse and buzzword within government and private sectors over the last two decades (Calisto Friant, Vermeulen, and Salomone 2020). Scholars have referred to the CE as the latest "go-to concept" in environmental governance and sustainability (*Ibid*: 1). Calisto Friant, Vermeulen, and Salomone (2020: 1) report, for example, that while in 2008, an online search for "circular economy" would show 20,570 results, in 2020 the same search returned over 5.74 million results.

The CE refers to an economy in which waste streams are reinserted and recycled back into production, thereby 'closing the loop' between production, consumption, and disposal. Swagemakers and colleagues (2018: 1) define the CE as:

[An economy] in which resource efficiency is improved by eliminating avoidable wastes and minimizing demands on (natural) resources, thereby reducing costs. It is built upon creating feedback loops that use waste and residual materials from the end of production processes as 'resources' turning them into valuable inputs.

The CE has particularly emerged as a "matter of urban development", with cities across the world vying to position themselves as leading 'circular' cities (Kębłowski, Lambert, and Bassens 2020: 142), including through waste management plans and technologies (Morrow and Davies 2021; Swagemakers, Dominguez Garcia, and Wiskerke 2018; De Lorenzo, Parizeau and von Massow 2019; Lehtokunnas et al 2020). Tudor and Dutra (2021: 2) refer to the CE as an "umbrella concept" with many annex concepts subsumed within it. The concept of zero-waste, for example, is often mobilised alongside the CE as a concept that represents a similar "preoccupation with the return of waste into the economy" (Boetzkes 2016). Cradle-to-cradle is another example of an annex concept, referring to the idea that companies should take responsibility for the distribution and recycling of their products (Boetzkes 2016; McDonough et Braungart 2002).

Calisto Friant, Vermeulen, and Salomone (2020) offer a comprehensive timeline of circularity thinking and a typology of circularity discourses. They break the timeline into three phases, starting with the preamble stage (1945-1980), in which rising sensibilities to the earth's limited resources and the environmental impact of human life led to an increasing problematisation of waste as a (largely technical) management issue. The second phase, or the 'excitement period', spans from 1980-2010, in which the CE term was first coined by Pearce and Turner (1989). This marks a period during which waste started to be recognized as a valuable input for production. Calisto Friant and colleagues (2020: 8) describe how this coincided with the rise of neoliberalism and therefore most of the innovations were "established and implemented through market-driven approaches and public-private partnership". In the third and final phase of circularity thinking, which overlaps with the second, from 1990 to the present, the authors describe the emergence of "a comprehensive socio-economic approach to waste, resources, production, and consumption" (*Ibid*: 8) . This has seen the emergence of holistic social, environmental, and economic approaches to the CE, in line with more comprehensive sustainability thinking. In the latter half of this phase, critical scholars began to challenge the CE for its inconsistencies and conceptual validity, as I explore in further depth below.

2.6.2. Critical Approaches to the Circular Economy

As a concept most often mobilised by political and private actors, social scientists have appraised the CE in what Calisto Friant and colleagues (2020: 12) describe as a "slowing faith in the market and a re-examination of the socio-political dimensions of circularity".

Firstly, critical scholars have described the scientific contradictions inherent in the CE. Song (2016) and Calisto Friant, Vermeulen, and Salomone (2020), for example, summarise critique regarding thermodynamic entropy and the presumed co-existence between the CE, capitalism, and growth. They explain that according to the laws of thermodynamics, materials cannot be recycled indefinitely or perfectly, making zero-waste and CE agendas "impossible deal[s]" (Song 2016: 15). Furthermore, recycling is energy intensive, requiring electricity, infrastructures, and producing greenhouse gas emissions. As Song (2016: 17) explains, "no matter how efficient we become, no matter what energy sources we use, some of that energy will be lost every single time". Therefore, Calisto Friant and colleagues (2020: 4) explain that to establish a scientifically achievable circular economy, were all inputs come from waste streams, a politics of de-growth is necessary. Espousing economic growth interests along CE agendas is paradoxical. Song (2016: 22) argues that despite its adoption in techno-scientific discourse – according to which we can 'save ourselves through science' – the CE is a scientifically contradictory idea. He calls for greater examination of the role of institutional science and technology in society, which he contends serves primarily "to increase capital, not to serve the needs of humans".

Secondly, and despite its scientific contradictions, critical scholars highlight the ways in which the CE continues to be mobilised by private and political actors to advance pro-growth agendas. Drawing on Valenzuela and Böhm (2017), Corvellec, Stowell, and Johansson (2020: 97) refer to the CE as an "empty signifier", in the name of which "a whole range of interpretations and approaches [are] bundled together". Dominant among such approaches are pro-growth agendas forwarded by powerful political and economic actors, which Corevellec and colleagues (2020) describe as hegemonizing the CE discourse. Therefore, despite being presented as a revolutionary idea, Corvellec and colleagues (2020: 98) contend that the CE is "a child of the less than radical neo-classic economic theory and ecological modernization paradigm". They describe the circle as an "enticing metaphor" symbolising "totality, wholeness, original perfection, the Self, the infinite, eternity, timelessness, all cyclic movement, [and] God" (*Ibid*: 100, citing

Protas, Brown, and Smith 2001). And yet, however enticing the metaphor, the authors suggest that the term is "empty" and "more a matter of faith than of facts" (*Ibid*).

Kębłowski, Lambert, and Bassens (2020: 142) also critique how the CE is incorporated into the "urban political economy agenda", arguing that "the rise of the CE may be simply about re-framing and re-classifying existing policies rather than about genuinely altering urban agendas" (*Ibid*: 143). They describe the CE as an "urban sustainability fix", which marries "the idea of sustainability with the imperative of sustaining urban growth" (*Ibid*: 146), allowing capitalists to maintain their dominance. Valenzuela and Bohm (2017) understand zero-waste and CE discourses as *depoliticising* projects which shore up capitalist agendas. They describe such discourses as "a fetishizing narrative within a capitalist order" (Valenzuela and Böhm, 2017, p. 26), while Calisto Friant et al (2020: 1) similarly refer to the CE as "a narrative device for greenwashing".

Finally, scholars have critiqued a focus on techno-scientific approaches in dominant CE research and the consequent lack of consideration for social justice and the everyday. Calisto Friant et al (2020: 6), for example, argue that mainstream CE discourses are overly optimistic regarding the speed of technological transitions. Meanwhile, the socio-cultural change necessary to enact CE agendas as well as the power relationships involved in decision making are overlooked. By focusing on technologies, political and economic agendas are hidden, and it is assumed that the socio-cultural realm is unproblematic and easily adjusted.

Hobson (2016) makes similar claims, arguing that everyday social dimensions are rarely considered in dominant CE approaches. He argues that the everyday is particularly important to study in CE literature, due to the ways in which the CE targets individuals as agents of change. The individual is imagined in dominant neoliberal CE approaches as homogenously willing and capable of making rational consumption choices and adopting the correct waste practices for the environment. Responsibilising individuals in this way compounds the depoliticization of environmental governance discourses by focusing attention away from government and industry. Lehtokunnas et al. (2020: 227) draw on Marxist historian and political activist E.P. Thompson's (1971) concept of the "moral economy" (also used by Gregson *et al.*, 2015) to understand how CE practitioners employ moralising discourses to responsibilise individuals in their everyday food consumption. Nonetheless, they describe how this individualised ethical work is often unachievable in the messiness and "moral complexity" of everyday life (Lehtokunnas *et al.* 2020: 227). They understand everyday waste management as constituted in

ongoing ways in everyday, messy practices. They describe how moral economies of sustainability espoused by ethical food initiatives come into conflict with a myriad of other ideals and practices, such as concerns about the health and safety of food and the unpredictability of childcare. Rather than moralising individualistic CE discourses, they argue for a focus on local solutions and re-politicising decision-making.

2.6.3. Alternative Circularities

Alongside critiques of the CE, alternative concepts and approaches have been proposed that respond to some of the key appraisals discussed above. Calisto Friant et al (2020) for example, describe the emergence of alternative circularity approaches, including "transformational circular society" discourses (see Figure 3). They propose the term "circular society" to distinguish discourses "that go beyond market-based solutions and economic considerations and see circularity as a holistic social transformation" (Calisto Friant et al 2020: 8). They define Circular Society discourses as considering not only the circulation of material resources, but also the circulation and distribution of "wealth, knowledge, technology and power" (*Ibid*: 9). Calisto Friant et al. categorise 30 concepts as belonging to "transformational circular society" discourses, including de-growth; buen vivir; convivalism; voluntary simplicity; and the pluriverse.
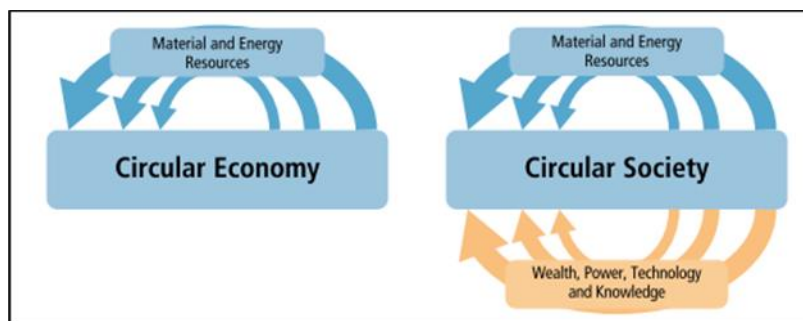
Figure 3: "Conceptual Differentiation between Circular Economy and Circular Society".
Source : Calisto Friant et al. 2020: 10.

Composting has been proposed by some scholars as an activity that might enact and engender alternative circularities (Morrow and Davies 2021; Swagemakers, Dominguez Garcia, and Wiskerke 2018). Morrow and Davies (2021: 2) argue that composting might be understood as "the original circular economy", representing "the kinds of regenerative metabolic cycles that circular economy innovations aspire to". They offer a case study of community composting initiatives in New York City. Adopting a feminist materialism approach, they propose that the practices, ethics, and materialities of care involved in community composting could constitute an alternative CE paradigm they term "careful circularities" (Ibid: 1). This paradigm "attend[s] to the transformations that occur at emotional, visceral, affective, and embodied levels", to establish alternative food politics and ethics (*Ibid*: 6). Although frequently disregarded in mainstream capitalist interpretations, they contend that centring on practices of *care* sheds light on the social dimensions of the circular economy.

Swagemakers, Dominguez Garcia and Wiskerke (2018) similarly consider how composting enacts an alternative approach to mainstream circular economy agendas. They investigate projects within commoners' associations in Galicia, Spain, to turn biomasse into compost with the objective of channelling "urban green waste into food production" (Swagemakers, Dominguez Garcia, and Wiskerke 2018: 2). They suggest that *commoning* is an important concept for alternative circular economies, in which "local stakeholders [work] collectively to preserve or restore their natural resource base to generate benefits that are locally shared" (*Ibid*: 1). The authors offer four social dimensions which they suggest are central to practices of commoning in the circular economy. First, raising awareness of the local benefits of small-scale composting encourages participation among citizens and local business. Second, collaborative decision-making allows for democratic and inclusive participation. Third, benefit sharing allows all participants to benefit directly or indirectly from the behavioural changes they make. Finally, "a supportive institutional environment" (*Ibid:* 15) is necessary to enact commoning- based composting initiatives.

Sawgemakers et al (2018) cite this last social dimension as presenting a sticking point for the commoners' associations in Garcia. Regional administrations preferred larger-scale, capital-intensive waste management solutions. This led to an administrative disconnect between local commoning projects and centralised regional approaches. As a result, the commoners associations eventually became unviable and collapsed. This case study resonates with Marxist analyses and O'Brien's (2013) argument that, within a capitalist framework, waste is construed as surplus capital, consequently rationalizing its appropriation by capitalists. Rather than being

left for the 'commons', capitalists seek to transform and revalue food waste, for example via combustion to produce heat or electricity. Pro-growth agendas, adopted in government policy, therefore often pose jurisdictional barriers to alternative circular economies.

More recently, scholars have explored how indigenous ontologies challenge dominant circular economy approaches. Scholars have noted parallels between Indigenous worldviews and certain aspects of circular thinking. This is highlighted by Curkpatrick (2023: 1), who asserts that circular thinking can be "attributed to patterns of Indigenous knowledge, characterised as distinct from the supposed linearity of Western epistemology". Wuyts and Marin (2022: 1257) argue that minority actors that enact alternative circularities are "systematically muted, suppressed or eliminated in mainstream CE policy and practice". They describe how actors in the Global South are marginalised from their own CE approaches and coerced into industrial versions of the CE due to the ongoing dominance of Western ontologies and economic systems on the international stage. The authors argue that adopting an intersectional environmental lens is necessary to render marginal actors more visible and to develop alternative circularities that resist dominant, Western, pro-growth projects.

Beamer et al (2023: 8), offer an example of intersectional efforts to re-visibilise alternative Indigenous circularities in their research into the Hawaiian indigenous philosophy of aloha 'āina – or the "ancestral circular economy". They propose that circular economy practitioners might learn a lot from indigenous ontologies such Hawaii's ancestral circular economy, which have "enabled communities to thrive while achieving circularity" for many generations (Beamer et al 2023: 9). For example, the Indigenous population developed a set of place boundaries to demarcate people's rights to resources, allowing for adaptive bottom-up management within these boundaries. A second feature is the regular redistribution of resources under a system called *Kālai'āina*, which is inspired by the water cycle. Under this system, land is redistributed "at the beginning of the reign of every new mō'ī (supreme sovereign of an island)" (*Ibid*: 9). Regular redistributions ensure that no individuals or families accumulate a disproportionate amount of land or resources, preventing the development of a wealthy class. This circularity reflects the regular evaporation and precipitation of water. Beamer et al (2023) suggest that these principles offer an alternative framework of governance and environmental ethics which might decentre Euro-American ontologies and pro-growth narratives within dominant CE approaches.

In conclusion, this section has explored marginal circular practices which challenge the techno-scientific, pro-growth emphasis in mainstream, neoliberal CE discourse. These marginal

practices are found in local commoning associations, community compost groups, and Indigenous ontologies, and they demonstrate a diversity in CE thinking that is often overlooked in CE policy and scholarship.

2.7. Conclusion

To conclude, this literature review has summarised contributions from five broad fields of scholarship: waste studies, food waste, environmental governance, women and waste, and the circular economy.

I traced the rise of conceptual engagements with waste, from Douglas' seminal contribution in the 1966 to the emergence of Marxist and post-colonial critiques from the 1990s onward. In the social sciences, a key theme in waste and food waste scholarship is an examination of how waste and food waste coincide with and are mobilised by structures of power, including capitalism, modernity, colonialism, and development. Scholars investigate how waste as a discourse and a practice is central to shoring up centres of power, including at a planetary scale in the global food system. According to Gille's (2012) "food waste regime" framework, for example, neoliberalism shapes the global food system through economic risk avoidance strategies, resulting in the entrenchment of food waste at every stage of production. In recent Plantationocene scholarship, the global food system and its inherent wastefulness is rooted in more-than-human hierarchies, structured by capitalism and colonialism, and precipitating in contemporary environmental crisis.

A second theme in waste and food waste scholarship is the emergence of materialist approaches, stemming from traditions in feminism, Marxism, and science and technology studies. These approaches emphasise the material agency of waste, and how people interact with it in embodied ways. It has been used to unveil inequalities in how waste is embodied and experienced by different people, along lines of gender, race, and class, for example. Posthuman approaches are also mobilised to challenge dominant human/nonhuman binaries and techno-scientific approaches in dominant environmental governance programs. Instead, they propose alternative relational environmental ethics and knowledge.

A focus on materiality and the body has also re-scaled approaches to environmental governance. Where environmental governance was previously considered the domain of government, scholars increasingly explore the *everyday* and the body as a site of experience with and governance of waste. In the contemporary context of neoliberal capitalism, critical scholars argue that a focus on the everyday is particularly important as environmental responsibility is increasingly downloaded onto individuals. Emphasis is placed on behaviours in the home and changes to consumption, which disproportionately targets women and mothers, depoliticises environmental governance, and precludes systemic change.

Finally, the circular economy has emerged as a mainstream approach to waste management within government and industry. Critical scholars in the social sciences describe how the CE is co-opted into neoliberal pro-growth agendas in ways that are incompatible with stopping climate change. More holistic, transformational circular approaches are evident in Indigenous ontologies, for example, but are often overlooked in mainstream neoliberal CE practice and scholarship.

This literature review sets the stage for my own research, which explores food waste governance in Montréal's municipal composting system. I seek to contribute to existing bodies of scholarship by investigating how the city of Montréal's approach to municipal composting intersects with the scalar politics of environmental governance under neoliberal capitalism (objective 1). I also explore how embodied differences, along lines of gender, class, and more-than-human relations, might shape the ways in which Montréal's composting program is received, adopted, rejected, or contested among residents (objective 2). Practically, I hope this research informs more holistic CE approaches to food waste governance in Montréal and other municipalities, that take the everyday embodied experience of citizens seriously. Theoretically, I seek to combine insights from both post-humanist scholarship and critical feminist and Marxist scholarship, to explore composting as both a more-than-human collaboration and a cultural, political, and embodied task that is experienced in uneven ways.

3 : CONCEPTUAL FRAMEWORK

(Food) Waste Studies

Food and food waste restructured by neoliberalism:
'Neoliberal food regime' (Penchlaner and Otero 2010)
'Food waste regime' (Gille 2012)

Discard studies: Waste & wasting "as a technique of power" (Liboiron and Lepawksy 2022: 7)

The Plantationocene (Mitman 2019)

Urban Environmental Governance

"new geographies of governance" (Davies 2008)

Waste as a symptom of inequality (Hird 2021)

Neoliberal individualisation of responsibility (Cornea et al 2017; Long and Rice 2019; Shove 2010)

Critique of dominant neoliberal approaches to urban environmental governance (Long and Rice 2019)

Moral economies of composting (Lehtokunnas 2020) & construction of "environmental citienship" identity (Hird 2021: 25)

Everyday Governance

Critical approaches to circular economy (Song2016; Calisto Friant et al 2020; Kębłowski et al 2020)

Waste infrastructures as "objects that materialize policy" (Metcalfe et al 2012: 138)

Environmental gov., knowledge and practice as embodied & situated (Bee et al 2015)

Food waste encounters -> more-than-human ethics (Turner 2019) & alternative circularities (Morrow and Davies 2021)

Informal waste practices (Millington and Lawhon 2018)

Deconstructing binaries between human/nonhuman, city/nature in climate gov discourses (Bee et al 2015)

"vital infrastructures of labor" (Fredericks 2018)

'sticky', conflictual more-than-human relations (Abrahamson and Bertoni 2014)

"After all, what is more material than garbage?" (Myers 2005: x)

More-than-human urban exclusions (Narayanan 2021; Resnick 2021)

Urban animal geographies (Barua and Sinha 2017; Wolch 2002)

"posthumanist reading" of food waste (Evans et al 2020: 11)

New Materialism

Figure 4: Venn diagram to represent the approaches and concepts mobilised in this research.

3.1. Introduction

The concepts mobilised in this research hail from three broad fields of scholarship, as represented in Figure 4: 1) urban environmental governance, 2) everyday governance, and 3) new materialism. These categories and their junctures can be conceptualised as falling under the broader umbrella of waste and food waste studies, insofar as the concepts I draw on contribute to conversations in (food) waste studies or are mobilised to do so in this research. The concepts placed outside of the Venn diagram provide context to this research by situating it within the broader scalar transformations of the food system and food waste management under neoliberal capitalism.

In the subsections that follow, I start by defining "scalar politics", which structures the empirical scope of this research. I then situate this research within histories of neoliberalism and its influence on food and food waste systems. In sections 3.4. – 3.6., I then move on to discuss the concepts I mobilise in each of the three broad fields of scholarship, represented as intersecting circles in Figure 4.

While I hesitate to include feminism as a category unto itself, many of the concepts within each category and their junctures draw on feminist provocations, which will be reflected in my analysis. These include, for example, a challenge of public/private and human/nature dualisms within dominant neoliberal environmental governance narratives and policies. Feminist scholars, such as Bee, Rice and Trauger (2015), have instead sought to interrogate environmental knowledge and practice as embodied, situated, partial, and more-than-human: an approach at the centre of this project's conceptual framework.

3.2. "Scalar politics"

The empirical scope of and analytical approach to this research is informed by MacKinnon's definition (2011) of "scalar politics". The traditional notion of scale as comprising distinct, immutable, and naturally existing units underwent significant scrutiny in the 1990s, particularly with the emergence of a political economy perspective. Scholars in this field started to conceptualize scale as socially constructed, heavily influenced by Marxist insights into how

conceptions of scale shape capitalist systems (Haarstad 2014; MacKinnon 2011). More recently, post-structural scholars have challenged socially constructed definitions of scale, instead arguing that scale should be understood as materially produced, relational, and becoming. In this sense, post-structural scholars seek to deconstruct territorial or hierarchical notions of scale, with some even seeking to do away with the term altogether in favour of 'flat ontologies' (Marston, Jones III et Woodward 2005). MacKinnon (2011) describes his "scalar politics" as a productive juncture between these two approaches.

Mackinnon's scalar politics approach understands scale as an important dimension of political activity rather than its prime focus, emerging, often contentiously, as a consequence and repercussion of political projects rather than "existing as a pregiven area" (Mackinnon 2011: 29). He also highlights how scale can emerge in this way as part of strategic moves by actors who mobilise "discursive and material dimensions of scale" to forward and naturalise their own agendas (*Ibid*: 30). For instance, a political activity such as a municipal composting program, through its discourses, performances, and materialities, performs the city and its participating individuals just as much as the municipality and its citizens perform the composting program. This interplay between the politics of the composting program and scales of the city and the individual (to give just two scalar examples) can be also mobilised to serve political ends, albeit in contested ways. For example, mobilising individual-scale participation and responsibility in food waste governance might obfuscate the role of industry and production upstream, thereby deflecting criticism of the prevailing pro-growth model of the food system.

MacKinnon also describes the interaction between "inherited scales and emergent social activities" (*Ibid:* 31). He highlights how past processes of scalar construction can be carried forward and reproduced by material, discursive, and imaginative legacies. Nonetheless, these inherited scales are also in constant flux and contestation as they interact with evolving social and material relations. At this point of interaction between inherited and emergent scales, MacKinnon argues that "new scalar arrangements and configurations" are created (*Ibid*: 31). In this context, the everyday can become a dynamic and transgressive space where scales collide and reform. This is recognised by and echoes with attention to the everyday within feminist and UPE scholarly scholarship, as expanded upon in section 3.4. Moreover, some post humanist scholars argue that everyday more-than-human relations can transform scalar sensibilities, particularly in face of climate change (see section 3.6.2).

Politically, mainstream environmental actors are, also, increasingly forwarding local and individual scales as central to environmental action. Lawhon and Patel (2013: 1048) describe how the local is increasingly framed as "a key scale for action" in sustainability discourse and critical scholars describe how neoliberal environmental governance harnesses an individualisation of responsibility and a scrutiny of on the local scale (see section 3.4.1). Critical scholars argue for the need to examine why the local scale is being mobilised within sustainability discourse and for what purpose. This includes examining "when, where, and for whom a focus on local sustainability may be relevant and ethical" (Lawhon and Patel 2013: 1049). A scalar politics approach, as I employ in this research, asks to what end are individual and local scales mobilised? How are local and individual scales co-constructed alongside other scales in mainstream environmental governance? How might these scalar politics reproduce centres of power, including in neoliberal food and food waste regimes (see section 3.3.)? And how are these conceptualisations of scale experienced or challenged in everyday social and material relations?

Mackinnon's (2011) scalar politics informs my methodological and analytical approach to the empirical material of this research. I examine how ideas and discourses surrounding organic waste management in environmental governance mobilise and responsibilise different scales of action. I also consider how these ideas and scalar constructions are performed and contested materially and relationally in the everyday.

3.3. Neoliberal context: transformations to food and food waste regimes

To contextualise this research historically, I draw on neo-Marxist scholars who trace the scalar political transformations of food and food waste under neoliberalism.

I draw on David Harvey's (2005: 2) definition of neoliberalism, which he describes as a worldview, a policy programme, and a historical-geographic phenomenon emerging in the 1970s, which proposes "that human well-being can best be advanced by liberating individual entrepreneurial freedoms and skills within an institutional framework characterized by strong private property rights, free markets, and free trade." This philosophical, political-economic and cultural project has precipitated in "[d]eregulation, privatization, and withdrawal of the state from

many areas of social provision" (Harvey, 2005: 3), in nation-states across the Global North and the Global South (spurred by ongoing neocolonial development projects). Environmental geographers argue that neoliberal capitalism also impacts human-nature relations. Castree (2010), for example, describes how neoliberal capitalism commodifies the biophysical world to create jobs and profits. Moreover, neoliberal capitalism comes to mediate how people relate to the biophysical world, as individual producers and consumers.

One of the ways in which human-nature relations have been transformed under neoliberalism is through the restructuring of global food and food waste regimes. I draw on Friedmann and McMichael's (1989) Marxian 'food regime' approach to the global food and agriculture industry, and later redevelopments of the concept including McMichael's (2009) 'corporate food regime' and Pechlaner and Otero's (2010) 'neoliberal food regime', to situate this research within the historical context of neoliberalism (see also Section 2.3.3.). This has seen the development of a global food system in which power, decision-making, and capital have become concentrated in the hands of multinational corporations in the Global North, to the benefit of the minority world. Gille (2012) develops a 'food waste regime' approach to conceptualise how neoliberal transformations of the global food system systemically entrench food *waste* along global supply chains. Through her food waste regime framework, Gille critiques dominant diagnoses of food waste that blame individual consumer behaviours and technological inefficiencies. She argues that food waste is systemic to neoliberal capitalist transformations of the global food system, describing, for example, how state investment and subsidies in the Global North seek to manage economic risk by encouraging farmers to overproduce, leading to food surplus and waste. Contract farmers in the Global North are further charged with abiding by legal safety and aesthetic standards imposed by retailers and international organisations such as the European Union, leading to rejected produce that goes to waste.

Another way in which I contextualise urban environmental governance within historical transformations to the global food and food waste systems is by drawing on recent Plantationocene and racialised Capitalocene scholarship. Much like McMichael's (2009) "food regime" and Gille's (2012) "food waste regime" frameworks, Plantationocene scholars also situate the current global food system within its histories of capitalism. However, Plantationocene scholars understand these histories as shaped by not only social relations but also more-than-human relations and hierarchies that have their roots in the seventeenth century 'plantation'. Anna Tsing and Donna Haraway were the original proponents of the

Plantationocene concept (see their discussion with Gregg Mitman (2019)), which others have put into conversation with ideas already discussed by Black geographic and racialised Capitalocene scholars (J. Davis et al. 2019; Patel et Moore 2017b). Plantationocene scholars trace current environmental crises back to the modes of managing life experimented on the colonial plantation in early capitalism. Patel and Moore (2017) describe how Cartesian Enlightenment binaries between humans and nonhumans and society and nature set the stage for colonialism, extractionism, systemic environmental racism, and capitalist accumulation in seventeenth-century plantations in the Americas. They argue that this binary thinking informed a global value system in which certain humans (white, Europeans) and nonhumans (cash crops and livestock) were positioned as superior to other nonhumans (indigenous people, native plants, people of colour). This hierarchy informed modes of managing human and nonhuman life on the plantation and have led to the development of modern agricultural and labour practices in the global food system today.

I am attentive to criticisms regarding the utilization of the Plantationocene concept by its original proponents, Donna Haraway and Anna Tsing; namely, how they neglect environmental racism and Black scholarship on the colonial legacies of the plantation (J. Davis et al. 2019). In this research, I seek to put Plantationocene scholarship into conversation with other approaches to the food system, as it is experienced in cities in the Global North, to offer a deeper understanding of the human *and* more-than-human inequalities and the historical legacies that inform food governance and its inequalities today.

To contextualise this research on a national scale, I draw on Myra Hird's (2021) analysis of Canada's waste flows, to understand how waste governance in Canada is shaped by neoliberal policy and discourse. Hird (2021: 20) treats waste as "a profound and enduring *symptom* of inequality" (original emphasis). Similar to Gille's food waste regime intervention, Hird critiques dominant framings of waste by industry and governments (municipal and national) that govern public participation in waste discussions "such that it begins and ends with individual responsibility and better technological innovation" (Hird 2021: 17). Instead, she describes how upstream waste produced at the extraction and production stages are responsible for 97.6% of Canada's total waste, and yet are invisibilised by dominant discourses that "focus the public's attention on post-consumption waste … and individuals' responsibility for this waste" (*Ibid*: 16). She describes how neoliberal capitalism in Canada, which is oriented towards "a market economy, enhanced privatisation, an overall decrease in government control of the economy, and a general entrepreneurial approach to profit maximisation" (*Ibid*: 17), structures

technoscientific diagnoses of waste problems and shores up lucrative contracts between municipal governments and the waste management industry.

3.4. Urban Environmental Governance

3.4.1. Neoliberal individualisation of responsibility in urban environmental governance

On a municipal scale, I draw on scholars who critique an individualisation of responsibility in neoliberal approaches to urban waste management. I mobilise concepts such as Hird's (2021) "environmental citizenship identity", Lehtokunnas et al's (2020) conception of food practices as "ethical work", and Shove's (2010) "ABC approach" to climate action.

As alluded to above, Hird (2021) critiques neoliberal waste discussions in Canada that maintain a focus on "individual choices and responsibility". This research draws on Hird's (2021: 25) argument that an "environmental citizenship identity" is fostered by municipal governments and industries that target individuals and households as environmentally responsible agents through recycling programs, "even though this accounts for a small percentage of the waste Canada produces." She describes how this identity shapes discourses and imaginaries such that residents are encouraged to discipline their own waste practices, as well as those of their neighbours, friends, and family members, rather than scrutinizing the production and management of industrial and military waste, for example, which are greater in volume and toxicity.

In a similar vein, I also draw on Lehtokunnas et al.'s (2020) analysis of how everyday practices of food waste reduction in circular economy initiatives (see section 2.6.2) represent *ethical work* that involves complex moral economies (drawing on Thompson, 1979). They draw on Foucauldian theories of ethical subjectivity, to argue that neoliberal approaches to food waste management, such as the circular economy, "create moral categories in the mundane practices of everyday life" (Lehtokunnas et al. 2020: 231). The authors describe how current food consumption practices are portrayed as unethical and wasteful in neoliberal environmental discourses, and how "[f]rugality with food is seen as a moral duty" (Lehtokunnas et al 2020:

233). Lehtokunnas et al. (2020: 241) trouble these simplistic moral categories and subjectivities by drawing attention to the "moral complexity of everyday life" in their research. This sees consumers confronted with multiple, competing moral motives in their everyday interactions with food waste, including the desire for a varied diet which might include buying a greater range of products that are likely to expire before being consumed, or caring for family members by erring on the side of caution when deciding if a food is still safe to eat.

This research similarly draws on Elizabeth Shove's (2010) "ABC approach" to understanding how individuals are framed as the primary agents of change in dominant urban climate policy and scholarship. I draw on this framework to interrogate how the *attitudes* of residents in Montréal are targeted, to prompt them to adopt alternative *behaviours*, by free and rational *choice* in neoliberal approaches to waste management. Like Shove (2010: 1273), I seek to consider the "blind spots" this individualisation creates as well as "the forms of governance it sustains".

3.4.2. Critical approaches to the circular economy

In this research, I put the critiques above into conversation with scholarship that interrogates the "circular economy" (CE) as a new organising concept for contemporary neoliberal approaches to waste management (Song 2016; Valenzuela et Böhm 2017; Bassens, Kębłowski et Lambert 2020; Calisto Friant, Vermeulen et Salomone 2020; Kębłowski, Lambert et Bassens 2020; Lehtokunnas et al. 2020).

Most notably, I draw on Wojciech Kębłowski *et al's* (2020: 146) provocation that the CE represents an "urban sustainability fix", which espouses both continued economic growth in municipal agendas on the one hand, and the idea of sustainability on the other. By marrying both goals, Kębłowski et al (2020: 143) suggest that dominant approaches to the CE shore up power among the urban elite and perpetuate accumulation agendas rather than "genuinely altering" these power structures. Kębłowski et al (2020), and other scholars such as Valenzuela and Böhm (2017), critique the way in which this depoliticises environmental action and obscures the central role of capitalism in environmental crises. Meanwhile, as noted above, Lehtokunnas (2020) show how the CE constructs ethical subjectivities that morally responsibilise individuals.

At the junction of urban environmental governance and everyday governance literature, I also draw on scholarship that critiques the CE by mobilising an *everyday* approach. Kersty Hobson (2016: 88) examines the reconfiguration of everyday spaces, practices, and socio-materialities by Circular Economy (CE) discourses and policies. She contends that there is productive potential in engaging these ideas in conversation with current human geographical research on 'everyday activism'. Attention to everyday, situated experiences furthermore reveals socio-economic inequalities that are overlooked in dominant CE discourses, as addressed by Calisto Friant, Vermeulen and Salomone (2020).

3.4.3. Wasting "as a technique of power"[3]

Finally, in my analysis of environmental urban governance, I draw on notions of power as forwarded by Liboiron and Lepawsky (2022) in their 'Discard Studies' theoretical framework. In this framework, they challenge self-evident definitions of waste by forwarding an understanding of wasting "as a technique of power" (Liboiron and Lepawsky 2022: 7). They refer to power as a set of strategies to shore up and maintain some systems at the expense of others, thereby working to push some people, ideas, and discourses, to the periphery (Liboiron and Lepawsky 2022: 61). Power is therefore "about how some things are maintained, counted as good, become normal, and thus become uneventful while others struggle for recognition, are debated, or are discarded" (*Ibid*: 62). Discarding, in this context, is just one technique of power, that is not inherently good or bad, but includes "the ability to classify and eradicate" (*Ibid*: 127). Discarding is a necessary part of maintaining systems of power, following that "differently organized systems are needed to fundamentally alter discarding and their power relations" (*Ibid*: 127).

Liboiron and Lepawsky (2022: 7) go on to propose a four-part methodological approach to Discard Studies scholarship that seeks to interrogate discarding "as a technique of power": defamiliarization, denaturalization, decentring, and depurifying. First, defamiliarization seeks to problematise taken-for-granted understandings of waste: "to interrupt popular, intuitive, expected, and common narratives about waste and wasting" (*Ibid*: 11). They suggest that scholars do this by questioning the underlying premises of waste discourse and by probing the

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[3] Liboiron and Lepawsky, 2022: 7

history of "how something became normal and even desirable in the first place" (*Ibid*: 13). Second, denaturalisation involves recognising wasting behaviours as learned, rather than innate, and interrogating how waste practices become adopted, including by what infrastructure, policy, or discourse. Third, decentring recognises wasting as important to how systems of power create and maintain centres and peripheries, with "the coherence of the center [depending] on the periphery" (*Ibid*: 21). Waste systems depend on an "away", creating externalities and peripheries which are normalised and allow for the preservation of the centre. By exploring the "away" of power, discard studies bring to the fore questions of inequality and justice, questioning "what is understood as right and good and how those ideas hold, at whose expense, and for what center(s)" (*Ibid*: 24). Finally, depurifying seeks to challenge universal theories regarding waste or dirt. Historically, scholars like Mary Douglas (1966) have proposed universal waste theories, classifying acts of recycling alongside crimes like genocide as examples of symbolic systems designed to regulate "matter out of place". A depurifying approach critiques theoretical generalisations, instead focuses on "contexts, materialities, politics, and differential effects" (Liboiron and Lepawsky 2022: 28).

In their book, Liboiron and Lepawksy (2022) draw on the example of *composting* to exemplify the methodological approaches summarised above. They contend that a discard studies approach to composting would interrogate the systems of food waste, rather than the symptoms. In other words, it calls us to look beyond downstream management of food waste to ask how and why food waste is produced, materially and discursively, upstream. It would consider how downstream management, such as municipal composting programs, "might allow agricultural waste to continue unremarked upon and unabated" (Liboiron and Lepawsky 2022: 130). Recognising that most food waste originates in industrial spaces, they suggest that "Much like personal or household recycling, composting does not reduce waste arising upstream in resource extraction or manufacturing. But it might matter in other ways – this is a research question" (Libioron and Lepawsky 2022: 131). Therefore, if not to transform waste regimes, the primary goal of composting programs might instead be to change the way citizens feel toward their food waste and their municipalities, for example. They further suggest that a discard studies approach to composting would also recognise and account for *what is discarded* when systems change; in this case, "What is wasted when municipalities compost?" (Liboiron and Lepawksy 2022: 131). Responses to this question might consider the imaginative and discursive erasure of industrial-scale food waste, and the plastics spread into the soil when contaminated compost is distributed, for example. These are questions that I consider in the aims and objectives of this

research (see section 4). The definition of power and methodological approaches forwarded by Liboiron and Lepawsky's (2022) Discard Studies framework shapes my own approach and analysis throughout this research.

3.5. Everyday Governance

This research also draws on an 'everyday governance' approach, as it has been defined within urban political ecology (UPE) and feminist geographies, to critique neoliberal environmental governance and to understand urban environmental knowledge and practice as embodied, situated, partial, and more-than-human. Everyday governance offers a lens through which to explore "new geographies of governance" (Davies 2009: 25). This approach recognises the plurality of governance, with power distributed and negotiated between a multitude of actors, while identifying the continued importance of the state in shaping certain 'centres' of power (Bulkeley, Watson and Hudson, 2007; Cornea, Véron, and Zimmer, 2017).

3.5.1 Everyday governance in UPE

I draw on Cornea, Véron, and Zimmer's (2017: 8) mobilisation of everyday governance. They argue that an everyday governance approach "points to the divergences between an imaginary (neoliberal) governance project, or steering society and the environment in a particular direction, and the heterogeneous on-the-ground realities of policy implementation and resource use". The authors posit that an everyday governance approach reveals the implementation of urban governance by local actors, elucidating their rationalities and interactions with city dwellers. It also serves to identify and explain how environmental projects manifest locally and, more broadly, how environmental governance steer both society and the environment. They seek to understand how individuals and social groups link up with or resist state projects, or negotiate them differently across time and space, giving a more nuanced analysis of how neoliberal governance manifests across lines of inequality.

McClintock, Miewald and McCann (2021) also mobilise an everyday governance approach in a UPE case study on urban agriculture. Like these authors, I seek to investigate the "prosaic nature of formal governance" on the ground, including ways in which it can be resisted and negotiated through everyday practices. They draw an everyday approach to understand the "wide range of actors in the promotion of, negotiation with and resistance to the formalization of a particular definition of appropriate urban landscapes and their associated practices" (502).

3.5.2 Everyday governance in feminist scholarship

I also draw on feminist geographies of everyday governance, particularly Bee, Rice and Trauger (2015), who build on theories in environmental feminism and environmental governance to critique dominant approaches to neoliberal environmental governance. I adopt their "feminist lens of the 'everyday'" as central to my own conceptual approach (see Figure 4), which seeks to direct attention to "embodiment, difference, and inequality" in environmental knowledges, practices, and governance (Bee, Rice, and Trauger, 2015: 1). Their approach also echoes with efforts in within feminist political ecology to adopt an embodied approach to UPE. In her fivefold proposition for an embodied UPE, Doshi (2017: 1), for example, calls for "a more rigorous treatment of the body as a material and political site within the sub-field of urban political ecology".

Feminist authors critique dominant neoliberal approaches to urban governance for their responsibilisation of individual citizens in efforts to mitigate climate change, their recourse to techno-scientific solutions, and their obfuscation of "the experience of differently situated subjects" (*Ibid*: 1). Bee, Rice, and Trauger (2015) leverage longstanding tenets of feminist theory that critique the false binary between public and private spaces, recognizing the everyday and the home as a political space integral to capitalist (re)production. They draw attention to forms of labour that are under-valued, invisibilised, and de-politicised (see also Mitchell, Marston and Katz, 2004). They also draw on feminist critique of dominant techno-scientific framings of legitimate environmental knowledge, arguing that "dominant approaches to climate change policy often construct knowledge of the problem through narrowly defined scientific and technocratic means, rendering the issue as both universal and distance, instead of differentiated and embodied" (Bee, Rice, and Trauger 2015: 2). Instead, Bee, Rice, and Trauger (2015: 8)

engage in efforts to understand how climate change governance is embodied, understood, performed, or resisted at scales that are often invisibilised by neoliberal approaches.

Bee, Rice, and Trauger (2015: 5) further draw on feminist approaches to critique the "false nature/culture binary" in climate science and governance. They explain that the reproduction of this dichotomy "facilitates a notion of control of nature by humans that is bolstered by masculinist narratives of control and dominance" (*Ibid*: 5). They argue that by espousing this nature/society binary, neoliberal techno-scientific approaches serve to perpetuate rather than combat climate change, which has its very roots "in this false dichotomy" (*Ibid*: 5). The authors understand climate change as a trans-corporeal, embodied experience, in which climate, bodies, and knowledge are co-constituted. They contend that this approach "places the problem, and thereby its solutions, within and on our bodies; it recognises its existence as an extension of our bodies and reimagines climate change as something visceral, material, embodied, and part of the everyday" (Bee et al. 2015: 4). In conjunction with new materialist approaches (discussed below in section 3.6), I employ these concepts to recognize environmental knowledge and practice as more-than-human and embodied.

3.5.3 Across North-South binaries[4]

In its adoption of an everyday governance approach, this research also seeks to respond to Millington and Lawhon's (2018: 1045) call for greater cross-fertilisation in waste literature "across north-south binaries". Millington and Lawhon (2018: 1044) describe how "Southern waste geographies have largely focussed on case studies of informality and (neoliberal) governance", creating a dichotomy between the North as "formal, (increasingly) sustainable, and a succesful model to emulate" and the South as "informal, crisis-ridden and failing" (*Ibid*: 1046). By employing a conceptual approach that interrogates the informal, everyday food waste practices of urban residents, this research aspires to contribute to efforts to trouble the

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[4] It's crucial to acknowledge that the ongoing legacies of settler colonialism complicate any simplistic classifications implied by the terms "Global North" and "Global South". Writing from Tiohtiá:ke/Montreal, and the unceded territory of the Kanien'kehà:ka, I recognise the multiple structural injustices faced by occupied communities. For ease, I will continue to use the terms Global North and Global South throughout this thesis, recognising that these are not homogenous and territorially bound terms. In this context, the "Global South" is employed to refer to all peoples and lands, including within Canada, experiencing ongoing structural disadvantage because of colonialism and settler-colonialism.

dichotomy above. It is important to recognise that informality manifests differently in cities in the Global North; for example, it rarely represents a "marginal livelihood strategy" (Millington and Lawhon 2018: 1047). Nonetheless, drawing attention to the informal practices in municipal waste programs in the Global North contributes to broader understandings of the increasingly "complex interplay between the formal and the informal" under global neoliberalism (*Ibid*: 1049). Conceptual approaches that have formerly dominated analysis of Global South contexts might therefore be mobilised to consider how informality and everyday governance manifests in localised contexts in cities in the Global North. AbdouMaliq Simone's (2004) 'people as infrastructure' approach, for example, and Rosalind Fredericks' (2018) 'vital infrastructures of labour' (discussed in section 3.6.1 below), both seek to understand how people and/or things supplement and sometimes replace formal networks to perform the ongoing realities of urban infrastructure. While developed in and applied to urban contexts in the Global South, I consider how such concepts might be mobilised in case studies of waste infrastructure in the Global North to trouble binaries that posit the North as modern, formal, and succesful, and the South as backward, informal, and failing, and to consider how neoliberalism shapes informal practices in different ways in cities across the North and South.

3.6. New Materialism

As set out in section 2.1.3 new materialist provocations emerging in the 1980s have shaped approaches to waste in the social sciences, with Myers (2005: x) asking, for example, "After all, what is more material than garbage?" These have seen waste understood as "intrinsically, profoundly, a matter of materiality" (Gregson and Crang 2010: 1026); a lively agent with the capacity to prompt visceral effects among humans (Hawkins 2006), and structure "ongoing encounters among humans and nonhumans" (Turner 2019b: 140). In this research, I draw on three strands of new materialist waste literature, namely scholarship investigating: 1) the materiality of waste infrastructures; 2) more-than-human ethics; and 3) more-than-human conflicts. I seek to put these into conversation with critical scholarship investigating how neoliberal environmental discourses, policies, relationships, and practices manifest in everyday, situated, embodied, and more-than-human ways.

3.6.1 Materiality of waste infrastructures

First, I take inspiration from scholarship that considers the materiality of waste infrastructures, drawing on Rosalind Fredericks' (2018) 'vital infrastructures of labour' and Metcalfe *et al.*'s (2012: 136) conceptualisation of how objects, such as food waste bins, "materialize policy." In her book *Garbage Citizenship*, Fredericks (2018: 151) brings together both "a materialist understanding of infrastructure and an emphasis on the cultural politics of labor" to investigate the waste infrastructures and urban citizenship conflicts under neoliberalism in Dakar, Senegal. Fredericks (2018) coins the term 'vital infrastructures of labor' to understand waste infrastructures not as "stable edifices of power of technologies of rule", but rather as *performative* practices enrolling humans and nonhumans. Her use of the world 'vital', here, plays on its three-faceted definition as important, corporeal, and lively. Fredericks (2018: 17) asserts that vital infrastructures are "alive in all sorts of ways with the materials that compose them – including the trash and its active biological processes but also, crucially, the human labor through which they take form." In this way she understands infrastructure as a platform of encounter between humans and objects, through which infrastructures and notions of citizenship become performed. While Fredericks' 'vital infrastructures of labor' approach is mobilised in the context of informal infrastructures in the Global South, I suggest that it might also offer conceptual leverage to understanding how waste infrastructures are negotiated in everyday, informal ways in the Global North.

Second, as discussed in section 2.3.7., sociologists Alan Metcalfe and colleagues (2012) consider how objects and infrastructures "materialize policy" in everyday lives. They draw on a case study of how food waste bins are adopted or rejected among residents of a local authority in South London to consider how residents adapt to the material agencies of the bin, through everyday "practices of accommodation and resistance" (Metcalfe et al. 2012: 135). Like Metcalfe et al (2012), I seek to interrogate how composting infrastructures enact municipal policy, hold symbolic representations and imaginaries, and mediate everyday negotiations with food waste governance through their material affordances.

3.6.2 More-than-human ethics

As discussed in section 2.3.7., post-humanist readings of food waste have seen the emergence of approaches that consider how food and food waste practices might induce alternative relational ethics in the context of planetary climate change. In my research, I draw on such approaches to consider how municipal programs might forge alternative relational sensibilities, practices, and ethics through practices of composting.

I draw on scholars such as Bethaney Turner (2019a, 770), for example, who argue that "encounters with excess food are shown to be capable of assisting in training sensitivities to become attuned and responsive for our more-than-human entanglements and mutual vulnerabilities". She investigates how embodied, visceral interactions with food waste are capable of inducing "ethico-political beliefs and practices that have the potential to disrupt anthropocentric thinking" (*Ibid*: 770). Maria Puig de la Bellacasa (2019) similarly considers how interactions with soil can evoke a "shared sense of aliveness", while Morrow and Davies (2021: 2) explore how practices of care and more-than-human ethics arise in community composting initiatives, as individuals "fall in love" with compost.

I also draw on provocations in urban animal geographies, that seek to deconstruct binaries between the city and Nature, the human and the nonhuman, and to take seriously the agency of nonhuman animals in the city. Several scholars have investigated the importance of animals to urban food waste management (Abrahamsson et Bertoni 2014; Clement et Bunce 2022; Peltola, Heikkilä et Vepsäläinen 2013). Like these scholars, I seek to explore how waste becomes a vector for more-than-human relations in the city. Abrahamsson and Bertoni (2014) offer an important approach to the often-uncomfortable relations and contestations with nonhuman animals and processes involved in composting practices, for example. In their case study on composting with earth worms, they consider how the more-than-human relations involved in vermicomposting practices are often characterised by divergence, friction, messiness, and asymmetry. They maintain that such alliances can be productive, however uncomfortable or dirty, by encouraging actors to 'stick with' the trouble of living with and caring for nonhuman others (see also Haraway, 2016).

3.6.3 More-than-human conflicts

While the scholarship above emphasises more-than-human co-becomings, others have critiqued the benign and normative register of such analysis, by highlighting the ways in which a more-than-human ethics approach can flatten out *human* difference in waste relations. As explored in section 2.3.7., these scholars highlight the importance of recognising how bodies are exposed unequally to the materialities of waste along lines of race, class, gender, and ability (Resnick 2021; Soma et al. 2020; Lobo 2019; C. Thomas 2015). Co-becomings with waste in this context can be destructive, systemic, and dangerous, as much as they can incur benign, relational ethics. More-than-human scholarship, which is dominated by white Euro-American scholars, can risk overlooking the realities of these human differences "thereby reifying an unmarked whiteness in the speciesization of "the human"" (Resnick 2021: 224). I seek to draw on this scholarship by putting a more-than-human approach into conversation with attention to questions of inequality, environmental privilege, and environmental racism. I interrogate *who* has the privilege, capacity, and resources to enter into ethical - albeit often uncomfortable - relations with nonhuman processes and animals, and why? And for whom are such relations burdensome or unmanageable? Where are such ethics, sensibilities, and subjectivities fostered, and where do they fail? To respond to these questions and to the dangers of more-than-human approaches, I draw on feminist approaches, including those discussed above, that focus on embodied difference in environmental governance.

While scholars such as those discussed in the preceding section emphasise how waste practices can incur a more-than-human relational ethics, other scholars explore why more-than-human relations often fail. Lorimer's (2007, 2020) "nonhuman charisma", for example, offers a helpful framework to further understand why relations between humans and nonhumans can lead to ethics of detachment. Lorimer shows that what humans choose to or are enabled to care for produces hierarchies of concern that privilege certain species over others, structuring more-than-human attachments and detachments. He categorizes nonhuman charisma into three types: ecological, aesthetic, and corporeal. In this research, I draw primarily on the second type to deepen my analysis of the more-than-human relations experienced through composting and how and why these relations succeed or fail. Aesthetic charisma relates to an animal's physical appearance, with "cuddly charisma" associated with anthropomorphic features that are endearing to humans, and "feral charisma" linked to negative emotions like fear and disgust. Lorimer draws on psychologist Hillman (2017, originally 1988) to identify fear-inducing animal

characteristics that he associates with feral charisma: multiplicity (organisms that come in large numbers, e.g., flies), monstrosity (deviating from anthropomorphic norms), autonomy (not responding to human domestication or communication), and parasitism (feeding off human homes and lives for survival).

3.7. Conclusion

The theories discussed above and summarised in Figure 4, serve as a conceptual roadmap to this research and represent a juncture in scholarly conversation to which I aim to contribute. They situate this research within the contemporary and historical scalar politics food, food waste, and environmental governance, setting the stage for my case study on Montréal's municipal composting system.

4: RESEARCH QUESTIONS AND OBJECTIVES

The literature makes it clear that food waste regimes and dominant approaches to environmental governance are shaped in important ways by neoliberal capitalism. Where post-humanist scholarship suggests that composting practices have the potential to trouble these dominant approaches, what remains unclear is how this potential plays out within municipal composting programs and infrastructures. Where composting is imposed on a municipal scale, it remains unclear as to how this is received within everyday food waste governance practices. To address these, I pose the following research question and related objectives.

4.1. Research Question:

How do the scalar politics of contemporary food and food waste regimes manifest in Montréal's municipal composting program and shape the everyday governance of food waste among residents on the ground?

4.2. Objectives:

1. To investigate how the city of Montréal's approach to municipal composting intersects with the scalar politics of environmental governance under neoliberal capitalism.
2. To consider how the embodied experience of everyday food waste governance, along lines of gender, class, or more-than-human relations, shapes the ways in which Montréal's composting program is received differently among residents on the ground.

4.3. Operationalising the Research Objectives

This research employs a qualitative approach to address its objectives, drawing on feminist methodological principles such as a focus on intersectionality, reflexivity, embodied and co-constructed knowledge, and a critical analysis of power.

To operationalise this research's first objective, I chose to conduct an archival analysis of government documents and reports.[5] This approach allowed for an exploration of how policy and discourse move between provincial and municipal scales of governance. For example, I was able to investigate how the circular economy (CE) is mobilised at different levels of governance compared to how it is received on the ground (also relevant to objective two). I also interviewed the representatives of two neighbourhood *écoquartiers*, the associations responsible for the implementation of the municipality's composting program within the boroughs. These interviews served to explore how policy and discourse are mobilised in food waste governance on a sub-municipal (borough)-level.

I compared and analysed these documents in the context of wider scalar and political transformations in environmental governance discussed in the literature. I particularly considered how current approaches to composting in Montréal and Québec intersect with neoliberal transformations to environmental governance, as addressed in the literature review and conceptual framework. For example, I was interested in whether neoliberal approaches to composting in Montréal disproportionately responsibilise individual citizens; a trend identified in critical scholarship (see section 2.4.). For this, focus groups and interviews with residents of Montréal gave me additional insight into if and how neoliberal approaches transform the scalar governance of food waste.

To operationalise the second research objective, I conducted focus groups and interviews to understand how composting policies were received, interpreted, and implemented by residents of Montréal. I sought to understand what factors impacted the adoption or rejection of the municipal composting program, including along lines of socio-economic inequality and more-than-human encounters. To explore this objective further, I recruited from two different neighbourhoods. I did this to enable the identification of potential differences between how composting programs are received according to factors such as age, education, or immigration status. In the end, however, the two samples were not significantly different or large enough to allow for neighbourhood-level comparisons.

Another recruitment choice to operationalise Objective 2 was to carry out focus groups and interviews with both those who do participate in some form of composting (who I refer to as "composters"), and those who don't ("non-composters"). By interviewing non-composters, I

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[5] I discuss this and other methods in more detail in the following section.

sought to better understand the potential shortfalls of or barriers to participation in the city's circular economy approach to organic waste management. Doing so also responds to calls among critical circular economy (CE) scholars, such as Lehtokunnas *et al.* (2020) who emphasise the need for more research into the how the CE is received among both people who *are* interested in adopting pro-environmental behaviours and those who are *not*. The authors explain that given that CE initiatives require engagement at the individual level, it is "important to research the practices of people who are not that concerned about the sustainability issues of food consumption" (*Ibid*: 241).

5. METHODS

Between August 2022 and April 2023, I conducted semi-structured focus groups and interviews with 24 composting and non-composting residents across two neighbourhoods in Montréal: Le Plateau and Notre Dame de Grace. As outlined above, I also conducted an archival analysis of municipal and provincial level government documents relating to organic waste management and carried out interviews with two environmental agents from the neighbourhoods' respective écoquartiers. This research received and was conducted in accordance with the conditions set out in an internal ethics approval (certificate no. 22-658).

In this section I define each of these methods and detail how I carried them out in the context of this research. I also describe the study area concerned, the sampling strategy I employed, and the representativeness of the sample. Finally, I describe how I analysed the data, my own positionality, and the possible limitations to the methods I employed.

5.1 Choice of Method

5.1.1. Focus groups

Focus groups were popularised as a market research strategy, before being adopted by social geographers in the 1990s (Hopkins 2007; Robyn Longhurst 2003). They assemble a small group of participants with a shared interest or a common experience to engage in discussions facilitated by a researcher. The purpose of the discussion is to understand the diversity of opinions and experiences surrounding a topic, as well as to identify trends in underlying norms, beliefs, and discourses among the participants (Parker and Tritter 2006).

Focus groups evolved alongside the rise of more participative methods in feminist and post-structural ethnography (Bosco et Herman 2010). Scholars such as Hopkins (2007: 528) emphasise how they work "in ways which decrease, reshape or rework the power of the researcher". Compared to individual interviews, for example, participants are invited to take a greater lead in the discussion, to interact between themselves, and to take the discussion in directions they might find pertinent (Bosco et Herman 2010). They can therefore be employed in

ways that correspond with efforts in feminist geography to empower participants, to encourage them to take more of an active role in the research process, meanwhile destabilising the traditional or assumed authority of the researcher. In this way, Bosco and Herman (2010) describe focus groups as "research *performances*" (original emphasis), because they invite both researcher and participant to both do the research and be in it, and they blur the boundaries between data collection and analysis.

Knowledge-making in focus groups is democratic and, according to Goss and Leinbach (1996), can even be empowering for participants as they are encouraged to share their knowledge, learn from each other, find community, and reflect on their positionality. Goss and Leinbach (1996) argue that focus groups can therefore be generative of "emancipatory" knowledge. Participants often find solidarity in shared experiences or challenge one another to rethink or defend their positions. These characteristics speak to the goals of this research which draws on feminist insights throughout.

As a method that facilitates "access to experiential knowledge" (Hopkins 2007: 528), focus groups provide insight into my second research objective concerning the everyday governance relations that participants have with their food waste. Participants are invited to consider how their everyday experiences of the municipal composting program are affected by socio-economic factors or more-than-human encounters. Focus groups further shed light on the first objective of this research—exploring the scalar politics of Montréal's municipal composting program. Through participant discussion on municipal policy, they reveal how municipal narratives and policies are adopted and experienced on the ground.

Practically, the popularity of focus group research in the social sciences is explained in part by their cost-effectiveness and their capacity to "yield large amounts of qualitative data in exchange for relatively little face-to-face researcher contact" (Park and Tritter 2006: 23). In the context of this project, by conducting focus groups I was able to speak to a large quantity and range of people in a short amount of time.

5.1.2. Semi-structured interviews

Longhurst (2009: 580) describes the semi-structured interviews as "probably one of, if not the most commonly used qualitative method in the discipline of human geography". She defines it as a verbal exchange, unfolding in a conversational manner, in which the interviewer

or research tries to obtain information from another person through asking questions. Where structured interviews have a set list of questions that researchers do not deviate from and unstructured interviews do not have any pre-defined questions, semi-structured interviews sit in the middle. They usually involve a rough list of questions that a researcher would like to address, but the researcher also allows the conversation to go in other directions. This requires the researcher to remain flexible and attentive to ask other follow-up questions as they see fit.

I conducted eight semi-structured interviews and one semi-structured group interview with two participants. Two of these semi-structured interviews were with representatives from neighbourhood écoquartiers. One was with a composting activist and researcher and former Director of Finance and Development for Compost Montréal, Cameron Stiff, who had conducted some research into the history of composting in Montréal. For these interviews, I chose this method because a one-on-one conversation was considered more suitable for capturing the unique experiences and ideas of the écoquartier representative (compared to a group interview or a survey, for example).

The remaining four semi-structured interviews and one group interview were conducted online with non-composting residents from one neighbourhood. This method was chosen due to challenges encountered recruiting for a focus group (see section 5.2.3. for more on this). I determined that individual semi-structured interviews were an effective alternative to focus group discussions, offering similar flexibility in conversation and rich in-depth exploration of complex ideas and experiences (R. Longhurst 2009).

5.1.3. Archival research

Archival research involves the reading and analysis of documents (Kurtz 2009). A researcher identifies and reads documents with the aim of responding to certain research questions. This can be to extract precise information such as a history of laws relating to a given subject, or to identify how particular issues have been discussed discursively.

I conducted archival research into municipal and provincial policy documents regarding organic food waste management. All the documents I analysed were available online, on government websites and open-access databases. I selected the documents analysed based

how relevant they were to the key themes of this research. For instance, within provincial and municipal archives, I used a key word search to find documents mentioning "circular economy", "food waste", "composting", and other central terms. I also found documents through internet searches and where they were referenced in other reports, articles, and government documents. I did not conduct a comprehensive discourse analysis of these archives with a formal coding system, but rather read and annotated them for targeted information related to this research's objectives.

5.2. Sampling

5.2.1. Study Areas

I sampled from two neighbourhoods in Montréal: Le Plateau and Notre-Dame-de-Grace (NDG). These two neighbourhoods were selected as sample populations for both their accessibility and their relatively distinct socio-demographic characteristics, providing a more representative array of potential participants. Socio-demographic statistics from the year 2016 for the boroughs of Le Plateau–Mont-Royal and Côte-des-Neiges–Notre-Dame-de-Grace are summarised in Table 1 (Montréal en statistiques 2018a; Montréal en statistiques 2018b; Montréal en statistiques 2018c). This table also offers a comparison with city-wide statistics for the Ville de Montréal. Statistics offering a reliable comparison at the neighbourhood level (Le Plateau and NDG) were unavailable.

Both neighbourhoods' wider boroughs have similar levels of homeownership, at 28% for Le Plateau–Mont-Royal (Montréal en statistiques, 2018b) and 27% for CDN-NDG (Montréal en statistiques, 2018c), both of which remain below the city's average of 37% (Montréal en statistiques, 2018a). The median annual household salary (pre-tax) is similar in both Le Plateau-Mont-Royal and CDN-NDG; 47,816$ (Montréal en statistiques, 2018b) and 45,778$ respectively (Montréal en statistiques, 2018c). These are, however, below the City of Montréal average (Montréal en statistiques, 2018a).

Table 1: Table summarising the sociodemographic profiles of the boroughs: Le Plateau-Mont-Royal and Côte-des-Neiges–Notre-Dame-de-Grace.

	Le Plateau-Mont-Royal	Côte-des-Neiges–Notre-Dame-de-Grace	Ville de Montréal
Population Density (people per km^2)	12,792	7,766	4,668
% Age 0-14	11%	16%	16%
% Age 20-29	25.6%	17.6%	15.7%
% Age 65-79	8%	10%	11.2
% with university-level diploma (between ages 25-64)	66%	57%	43%
% born abroad or having at least one parent born abroad	53%	77%	59%
% Home ownership	28%	27%	37%
Median annual household salary, pre-tax (CAD)	47 816	45 778	50 227

Source: Taken from Montréal en statistiques (2018a, 2018b, 2018c).

Figure 5: Map showing the locations of the boroughs of CDN-NDG (in green) and Le Plateau-Mont Royal (in purple), within the city of Montréal (outlined in white).

Both neighbourhoods have a higher population density than the City of Montréal average. Le Plateau-Mont-Royal has the highest population density out all boroughs in Montréal, at 12,792 people per kilometre squared. In terms of built environment, Le Plateau-Mont-Royal has a higher proportion of multi-story apartments and triplexes, while CDN-NDG has a higher proportion of single-family homes and duplexes (Montreal en statistics 2018b, 2018c). This is likely to impact composting infrastructures and waste management practices. A higher proportion of the population of Le Plateau-Mont-Royal, for example, are likely to live in large apartment blocks which are not served by the municipal composting program. In contrast, a higher proportion of the population in CDN-NDG are likely to live in houses with gardens, facilitating participation in private and municipal composting.

Le Plateau is a central neighbourhood situated in proximity to several large universities, including the Université de Québec a Montréal (UQAM) and McGill. A quarter (25.6%) of the population is between 20 and 29 years old in the wider borough of Le Plateau–Mont-Royal;

nearly 10% higher than the average for the Ville de Montréal (Montréal en statistiques, 2018a, 2018b). The proportion of children between the ages of 0 and 14 years old, however, is the lowest out of every borough in Montréal. The elderly population, those aged 65 years and older, also represents the lowest of all the city's boroughs. The borough is highly educated, with 66% of the population in Le Plateau-Mont-Royal aged between 25 and 64 years having obtained a college or university diploma. The borough has a significant immigrant population, but still below average for the wider City of Montréal. French is the most widely spoken language in the home in the borough (*Ibid*), and therefore all interviews and focus groups conducted in Le Plateau were held in French.

Statistics for NDG's wider borough of Côte-des-Neiges–Notre-Dame-de-Grace (CDN-NDG) are likely skewed by the inclusion of the neighbourhood Côte-des-Neiges, which has a higher concentration of students due to its proximity to the Université de Montréal (UdeM), is lower-income, and has a higher immigrant population. Despite this, compared to Le Plateau–Mont-Royal, the borough has a lower percentage concentration of residents ages between 20 and 29 years old, at 17.6%, and a lower percentage of the population between 25 and 65 years old with a university-level diploma (57%) (Montréal en statistiques, 2018b, 2018c). The borough has one of the highest immigrant populations in Montréal, with 77% either born abroad or having at least one parent born abroad (Montréal en statistiques, 2018b). English is the most widely spoken language in the home in CDN-NDG (*Ibid*); for this reason, all focus groups and interviews in NDG were conducted in English.

5.2.2. A Note on the Municipal Jurisdiction of the Study Areas

The Communauté Métropolitaine de Montréal (CMM) and the Ville de Montréal have different jurisdictions when it comes to waste management. The CMM is a regional authority overseeing collaboration between multiple municipalities, including the Ville de Montréal. The Ville de Montréal is a specific municipality with its local government responsible for the central and most populous part of the metropolitan area. In the context of waste management, the CMM's functions involve planning, agenda setting, and co-ordinating between the different municipalities. As I go on to discuss in section 6.2-3, this involves drafting Montréal's waste management plan as mandated by the provincial agency Recyc-Québec. The Ville de Montréal

responds to directives from the CMM and is responsible for implementing waste infrastructure and services within its municipal bounds.

I draw my sample from two neighbourhoods within the Ville de Montréal. Therefore, where I discuss the representativeness of my sample, I reference statistics from the Ville de Montréal. The Ville de Montréal, in turn, is divided into 19 boroughs, each of which have devolved responsibilise with regards to waste management.

Montréal has 18 éco-quartiers across 16 boroughs. Éco-quartiers aim to improve environmental behaviours on the ground, including participation in composting activities. They take on responsibilities including running community composting initiatives (see section 7.5.), distributing the counter-top caddy and brown bins, and carrying out publicity campaigns to improve participation.

Within each borough there are multiple neighbourhoods. In this research I study the neighbourhood of Le Plateau within the borough of Le-Plateau-Mont-Royal and the neighbourhood of Notre-Dame-de-Grâce within the borough of Côte-des-Neiges–Notre-Dame-de-Grâce. I refer to borough-level statistics to discuss the demography of these neighbourhoods where neighbourhood-level statistics are unavailable.

5.2.3. Recruitment

In both neighbourhoods, I sought to recruit 1) residents that participate in private, community, or municipal composting programs, and 2) residents that don't participate in any form of composting.

I recruited participants via posts on social media platforms, emails sent out through third party organisations, and posters distributed throughout both neighbourhoods (see Annex 2).[6] In Le Plateau, recruitment texts were written primarily in French, while in NDG they were primarily

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[6] All recruitment protocols were approved by the INRS Research Ethics Committee (certificate no. 22-658).

English. I identified several public neighbourhood Facebook groups as platforms for recruitment and posted to these, giving a brief explanation of the project and inviting participants to respond either by contacting me on Facebook messenger or by email. I sent a message to the Facebook groups' administrators prior to posting, to explain to them the project and ask for their permission to recruit on their group. The posters invited residents to reach out via email or to scan a QR code which took them to an online survey where they could fill out their contact information if they wished to participate.

Once a potential participant reached out to express interest, I sent them a letter of invitation and a consent form (Hopkins 2007; Parker and Tritter 2006), either via email or Facebook message. Once these were filled out and returned, I sent an email to the participant to confirm the date and time of the focus group they had signed up for. An incentive of 25$ was offered to all focus group participants, as well as light food and drinks offered on the day (A. Parker et Tritter 2006).

A total of 24 participants were recruited across both neighbourhoods, of which fifteen from NDG and nine from the Plateau (see Table 2). Fifteen participants participated in private, community or municipal composting programs and nine participants did not participate in any form of composting. See table 2 for a summary of the focus groups and interviews conducted in each neighbourhood and their characteristics.

Finally, I recruited the two écoquartier representatives by reaching out to them via their websites. I recruited the composting activist and researcher, Cameron Stiff, through a mutual connection at Institut National de la Recherche Scientifique.

Table 2: Information regarding the focus groups and interviews carried out in each neighbourhood.

		Name	Sampling technique	Size	Location	Notes
Plateau	**Composters**	Focus Group 1	Convenience & snowball	3	INRS	Two of the participants were partners (hence snowball)
		Focus Group 2	Convenience	3	INRS	
		Interview 1	Convenience	1*	Online	*More in-depth interview with one of participants from focus gr 2.
	Non Composters	Focus Group 3	Convenience & snowball	3	INRS	Two of the participants were partners (hence snowball)
	Écoquartier	Interview 2	Convenience	1	Online	
NDG	**Composters**	Focus Group 1	Convenience	4	Community centre	
		Focus Group 2	Convenience	5	Community centre	
	Non Composters	Interview 1	Convenience	1	Online	
		Interview 2	Convenience	2	Online	
		Interview 3	Convenience	1	Online	
		Interview 4	Convenience	1	Online	
		Interview 5	Convenience	1	Online	
	Écoquartier	Interview 7	Convenience	1	CDN-NDG écoquartier office	
Unaffiliated		Interview 8	Snowball	1	Online	Interview with composting activist, researcher, and former Director of Finance and Development for Compost Montréal.

I encountered challenges in recruiting for non-composting focus groups in NDG and did not get enough respondents to run a focus group. This may be because this demographic is less inclined to participate in community groups which served as platforms for my recruitment. Moreover, it may simply be more difficult to recruit people to talk for an hour about an activity they do not participate in. The handful of participants who did respond explained that they were less flexible in terms of time and travel. I therefore adapted my methods by giving non-composters the option to participate in online semi-structured interviews via Zoom. This technique was more succesful. A total of six non-composters were recruited, of whom four were interviewed individually and two in a group interview.

The change in methods is likely to have affected discussions. Compared to the focus groups, online interviews offer a reduced capacity to read body language; less casual conversation that might have been informative or put participants at ease; and an inability for participants to bounce off each other. I account for such differences in my analysis. Nevertheless, the online format may offer other advantages, as discussed by Fazeeha Azmi, (2023). Azmi describes a growth in online research methods, particularly since the COVID-19 pandemic. She explains that advantages to using online methods, such as online focus groups, include offering "a confidential physical place […], minimized costs related to time and money, increased accuracy, recruiting participants from remote and diverse geographical locations and accessing excluded, stigmatized, rare, or marginalized groups" (*Ibid*: 119). I observed these advantages throughout my interviews. I found that the online interview format attracted more people for whom an in-person focus group would be less accessible, including a single mother with a baby and a wheelchair user, for instance.[7]

As recommended by Parker and Tritter (2006), most participants did not know each other prior to the focus group discussion. Nonetheless, there were two exceptions to this (see Table 2). First, in the non-composting focus group in the Plateau, two of the participants were a couple. They were recruited via snowball sampling, with one recruiting the other.

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[7] This emphasizes the importance of ensuring accessibility in geographic research, especially for participatory methods that may pose physical and time-related challenges for participants. See Chilvers, 2009; Ellard-Gray *et al.*, 2015.

Secondly, one of the two focus groups with composters in the Plateau consisted of a group of friends. This group was comprised of one student, in whose apartment we gathered for the discussion, and two other young professionals in their late 20s, who were in a relationship. This focus group transpired after one participant offered to help me with my recruitment efforts, culminating in a snowball sampling of her two friends. As my first focus group, I initially intended it to be a pilot study. I later decided to include it in my analysis because the conversation was pertinent and my questioning route did not significantly change following this first focus group. It is, however, important to recognise the atypical context of this focus group compared to my other groups and interviews. While Parker and Tritter (2006: 27) recommend that participants do not know each other prior to the focus group to avoid interactions that are based on "social relations that have little to do with the research intent of the focus group", other scholars such as Hopkins (2007) suggest that participants are sometimes more willing to share experiences or opinions if they know each other. The latter was my experience with the participants of this first focus group, who appeared more willing to express strong or controversial opinions on multiple occasions. Data from both focus groups, especially in the latter case, were analysed with attention to their distinctive contexts.

5.2.4. Representativeness of the Sample

All participants were asked to fill out an optional socio-demographic survey either online or in person, in order give an overview of the sociodemographic representation of the sample in comparison with the neighbourhood and the city. Of the 26 participants, 22 returned the survey. The results of this survey are summarised in Table 3. In general, it suggests that my sample is disproportionately female with a higher average level of education than both borough-level and city-level averages. Other factors remained roughly consistent with borough and city-level averages, but the sample was too small to make any statements about significance.

Seventeen out of twenty-two respondents identified as female, depicting an overrepresentation of women in the sample, across both neighbourhoods. Anecdotally, a significant number of these women were retired or mothers who were either not currently employed or working part-time. This was particularly the case in NDG. The median age was lower in the Plateau, at 27.5, compared to NDG, at 47.5. This is likely due to a greater number of

students and young professionals among participants in the Plateau and is further likely to be skewed by the first composting focus group for which snowball sampling was used to recruit a group of friends in their mid to late twenties.

The sample is wealthier than borough-level averages. The median household salary bracket was the same in both neighbourhoods, at 50,000 - 75,000 $. This is slightly higher than the median household salaries in both neighbourhoods, but consistent with the average for Ville de Montreal (Montréal en statistiques, 2018a, 2018b, 2018c; see Table 3). The proportion of homeowners was higher in NDG (2/9) than in the Plateau (4/13) but roughly consistent with borough averages.

An error in the online survey resulted in the omission of the question regarding level of education for participants of non-composting focus groups and interviews. Data on educational attainment is consequently only available for composting participants. A disproportionate number of composting participants hold an undergraduate degree or higher; namely, 5/6 in the Plateau and 7/9 in NDG, in contrast to the borough averages of 66% and 57% respectively, and 43% for the City of Montréal (Montréal en statistiques 2018a, 2018b, 2018c). While this data is not available for non-composting study participants, it shows that my sample is likely to be more highly educated than average, a difference I address in my analysis. This over-representation might be explained by the fact that educated individuals are more likely to be comfortable with or aware of the research process, and therefore more likely to respond to calls for research participants (Manohar et al. 2018). This was apparent from conversations I had with some participants who discussed personal experiences with undertaking postgraduate research projects.

One disadvantage of this sampling strategy is that the socio-demographic surveys were filled out by participants only after having participated in the focus group rather than as a pre-condition, and therefore I had no prior understanding of the representativeness of each group. This is contrary to recommendations by some scholars, such as Parker and Tritter (2006), who propose that the participants in each group be carefully selected so that the composition of each group is balanced in terms of ages, gender, and other socio-demographic characteristics. Instead, my sampling of each group was based on convenience and accessibility.

Table 3: Table summarising the socio-demographic composition of my sample, compared to borough and city-level averages.

Source: Montréal en statistiques 2018a, 2018b, 2018c.

	Median age	*Female*	*Homeowner*	*Median annual household salary, pre-tax (CAD)*	*Holding a university-level diploma (between ages 25-64)*
Le Plateau-Mont-Royal	34,0	49.1%	28%	47 816	66%
CDN-NDG	36,4	52.2%	27%	45 778	57%
Ville de Montréal	38,5	51.3%	37%	50 227	43%
Sample Total Averages	38.25	17/22	6/22	52500	n/a
Average composters	38	12/15	3/15	57500	n/a
Average Non-Composters	41	5/7	3/7	60937.5	n/a
Le Plateau Average	29	7/9	2/9	52500	n/a
Plateau Composters	27.5	5/6	1/6	42500	5/6
Plateau Non-Composters	35	2/3	1/3	62500	n/a
NDGAverage	47.5	7/9	4/13	52500	n/a
NDG Composters	50.5	7/9	2/9	52500	7/9
NDG Non-Composters *(N=4)	42	3/4*	2/4	59375	n/a

5.3. Carrying Out the Focus Groups and Interviews

The focus groups and interviews were conducted semi-structurally, with a questioning route consisting of ten broad questions drawn up to guide discussion. The order in which I asked the questions varied according to the flow of the conversation. To be able to compare responses, I used the same questioning route for both neighbourhoods, which was translated in French for the Plateau and English for NDG. The questions remained the same for focus groups and interviews, however they differed for composters and non-composters to correspond with their different experiences. Some of the questions posed to composters, for example, were not relevant to non-composting focus groups and interviews which sought to explore the barriers to participation in composting programs. Other questions remained relevant and therefore comparable between both groups, such as questions regarding the participants' familiarity with the concept of the circular economy and how it has been mobilised by the city of Montréal.

The focus groups lasted approximately one hour each. Five of the interviews also lasted an hour. These were the interviews with both *écoquartier* agents, the composting activist and researcher, and two interviews with residents. With regards to the two residents, this was based on their willingness to develop certain experiences or opinions in depth, as well as the time they were prepared to commit to our conversation. These two residents had interesting experiences with composting, such as experiences of composting efforts at their children's schools or nurseries, participation in community composting programs, or campaigns to introduce composting to their apartment building. An advantage of the individual interview format was that we were able to spend more time discussing such experiences. For most of the remaining interviews with non-composters in NDG, conversations lasted approximately half an hour. This is because answers tended to be shorter and less developed compared to the group setting of the focus group.

The only alteration to the questioning route occurred following my third focus group, after which I added a question regarding the gendered dimensions of composting and the impact of parenthood. I added this question upon remarking several patterns in gendered experiences of composting emerging among the previous focus group discussions (focus groups 1 and 2 in NDG and focus groups 1 in the Plateau). I noticed that women, and in particular mothers, seemed to feel a greater responsibility to participate in composting programs. The following question and sub-question were added to the questioning route for subsequent interviews and

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focus groups: "*Would you say that there are differences between men and women when it comes to composting responsibilities or practices?* [Sub-question:] *What are the influences of parenthood? Does this differ for mothers and fathers?*"

Since this question was not posed directly to participants in the first three focus groups, I re-contacted 6 women who had discussed their role as mothers in relation to composting in the first three focus groups to corroborate these findings. Of those that replied, all confirmed the patterns I had inferred from their discussions regarding the gendered experiences of composting. Such trends are also corroborated in the scientific literature on the gendered dimensions of environmental governance, as discussed in section 3.5.2.

5.4. Analysis

Prior to transcription, all interview and focus group participants were given a pseudonym to anonymise their responses. The interviews and focus groups were transcribed with the assistance of two transcription softwares: *Otter.ai* for the English transcripts and *Happy Scribe* for the French transcripts. These softwares provided a preliminary automatic transcription that I then manually reviewed and corrected as needed. The transcripts were then coded with the help of a computer-assisted qualitative data analysis software, MAXQDA Pro (version 2022) (Skjott Linneberg et Korsgaard 2019). I pasted the transcriptions into MAXQDA, where I re-read them to identify reoccurring ideas and discourses which I coded using the coding system displayed in Annex 1.

The coding system was drafted following a first read-through of the transcripts and based on the key themes that emerged relevant to this research's objectives. It was also informed by the literature review and the concepts, theories, and observations discussed by scholars. I defined each code and how I applied it in a table (see Annex 1). I continued to develop the code system throughout the coding process, as I re-read the transcripts in detail. During this stage, I clarified the codes' definitions and added new codes and sub-codes; for example, I developed the subcodes relating to "human-nonhuman relations" as I noticed how it was evoked in diverse ways by participants.

Following a second stage of coding, I analysed the codes within the context of my research question and objectives. I made a mind map to explore which codes were relevant to each objective, as well as the ways in which codes coincide with one another. During this stage, I documented any patterns I could observe from the coded transcripts which might help me to respond to each objective. I also took relevant excerpts from the transcripts to illustrate these patterns.

5.5. Positionality

Feminist approaches in the social sciences since the 1960s have critiqued positivist science as deceptively objective, politically neutral, and ahistorical (Denzin et al. 2018). They instead forward an understanding of knowledge as both situated and embodied, highlighting the importance of recognising that neither the fieldworker nor the field are neutral, but rather both are mutually affected by the research process and wider cultural and political landscapes (Krishnan 2015; Rose 1997). Cindi Katz (1994), for example, describes this as "a difficult and inherently unstable space of inbetweenness", in which the researcher can never be detached from the people or spaces of the field. Accordingly, all research knowledge is also embodied, situated, and co-constituted by these complex social, political, and cultural interactions.

Recognising these realities, the 'field' in this project also extends to include my embodied experiences and situated identities. I am a white, middle class, English woman in my 20s. The field is my everyday experiences of the unceded Indigenous territory of Tiohtià:ke/Montréal - the city this research addresses and where it has been written – as an international master's student at the Institut national de la recherche scientifique, in 2023. It is the interactions I have with my colleagues, roommates, and friends, my experiences of the city as a woman, as a white European, as an immigrant, and how I navigate places, conversations, and relationships in my second language.

As noted by Hopkins (2007: 533) this reflexivity is important to focus group research since "the dynamics of focus group interactions can also be influenced by the various positionalities of researcher and researched" While it is impossible to achieve complete "transparent reflexivity" or to claim to make visible all "extraordinarily complex power relations"

(Rose, 1997: 310), I acknowledge and consider the ways in which my own positionality impacts each stage of this research, in known and unknown ways.

5.6. Method Limitations and Alternatives

Limitations related to time and resources prevented the employment of or triangulation with alternative methods. The field of food waste scholarship offers examples of other qualitative methods I might have employed. Both Turner (2019) and Ames and Cook (2020) employ semi-structured interviews during which participants showed them around their homes or gardens and showed them their food and food waste practices. Turner explains that this 'show and tell' approach allowed participants to talk about their food practices and everyday realities in their own words and environments. Ames and Cook (2020: 329) refer to this as a "visceral research method". By asking participants to reflect on their material relationships with objects such as the kitchen caddy, the authors encouraged them to demonstrate their authentic visceral reactions and to "reflect on experiences in everyday life that might otherwise be difficult to articulate" (*Ibid*: 329). Other food waste scholars such as Lehtokunnas *et al.*, (2020) use food waste diaries, in which participants document how they manage their food waste and how they experience or feel about these practices on a daily basis, in writing or through photos. Finally, Abrahamsson and Bertoni (2014) adopt an autoethnography approach in their research into vermicomposters, in which they practiced vermicomposting themselves in their own homes, recording their experiences and outcomes. This gave them hands-on, visceral insights into vermicomposting practices, which they reflected on collaboratively in their paper.

The alternative methods discussed above might have deepened or complemented the focus group and semi-structured interview methods employed in this research. A participatory food waste diary approach with the aid of a camera and/or journal, for example, would have given participants the opportunity to visually show me their food waste habits. A photovoice method would have worked to similar effect. Photos and journals may have proven interesting springboards for discussion in follow-up focus groups or interviews, empowering participants to take a greater role in steering the conversation, while further destabilising the authority of the researcher. These participatory methods might have also allowed for greater insights into the embodied, visceral relationships that participants have with their food waste. To enhance the

insights gained from participants' verbal descriptions, employing a more hands-on approach might have unveiled the material and potentially more-than-human relations involved in their food waste management practices.

Nevertheless, the alternative participatory methods discussed above are more demanding of time and resources, both for the researcher and the participants. Practically, constraints in time and resources were a limitation for gathering and analysing such data. Moreover, many of the methods described above are more demanding of the participant. Asking them to keep a food waste diary for example can represent a sustained time commitment. I anticipated that more time-intensive participatory methods might deter individuals with limited time or resources from participating and could therefore affect the representativeness of the sample recruited.

6. DISCUSSION PART 1: THE SCALAR POLITICS OF MONTRÉAL'S ORGANIC WASTE PROGRAM
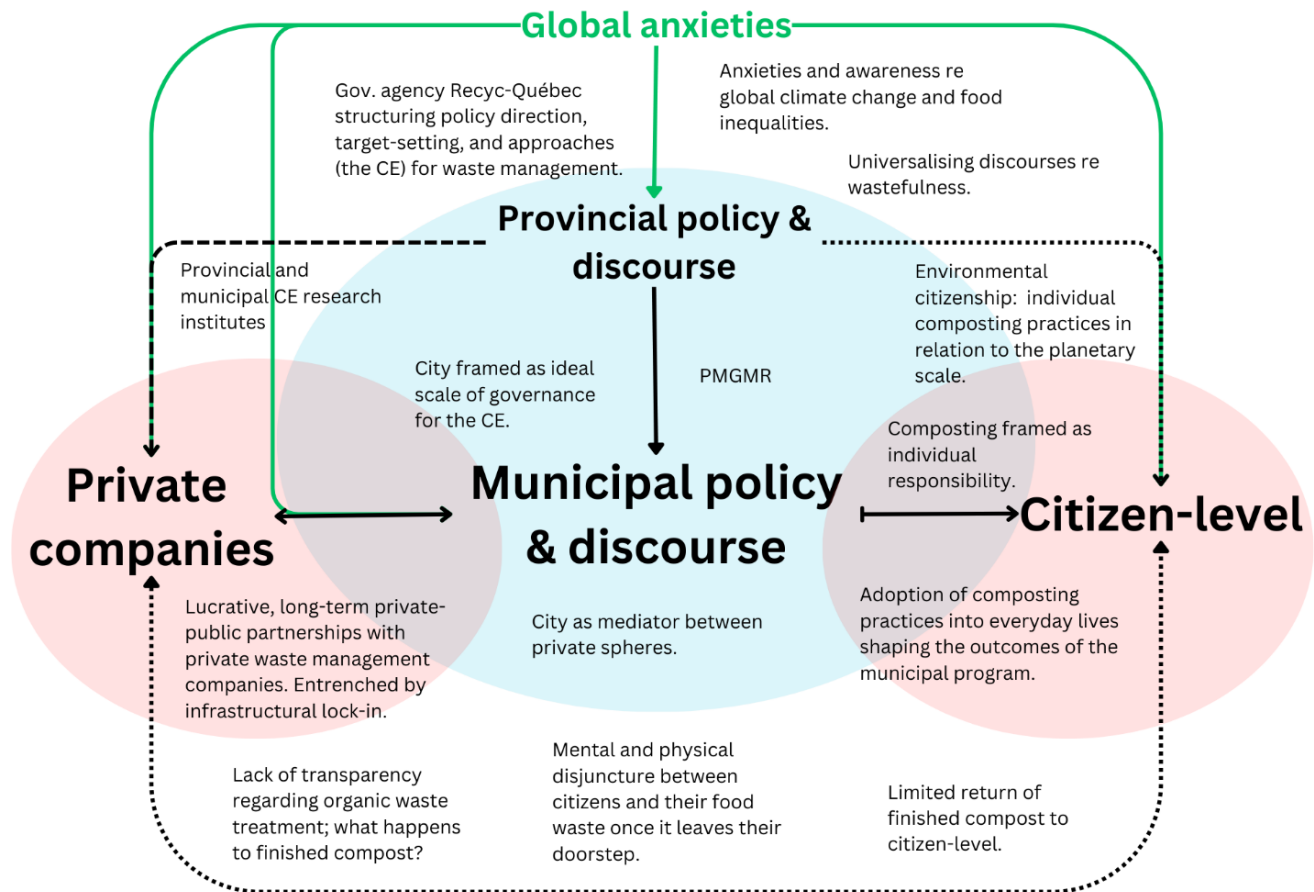
Figure 6: Diagram to show the scalar politics of organic waste management in Québec province, Canada.

The opacity of each line represents the level of communication or influence between each actor with regards to waste management (and particularly CE approaches). The blue sphere groups public actors, while the pink spheres represent private actors, with their intersections illustrating the points of contact between them. Global anxieties[8] regarding food waste in the context of

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[8] I use the term global anxieties, here and elsewhere, as shorthand for a collective atmosphere of shared fears and concerns surrounding global climate change.

climate change and global inequalities influence every level of governance; while not unpacked in detail in this research's analysis, this contextual influence is represented by a green line.

6.1. Introduction

In this chapter I unpack the scalar politics of Montréal's organic waste program through an archival analysis of provincial and municipal policy and campaign documents and a discursive analysis of interviews and focus groups with composting and non-composting residents in the neighbourhoods of NDG and Le Plateau. I also analyse interviews with representatives from the écoquartiers of the respective boroughs, and with a composting activist and co-founder of Compost Montréal, to understand how waste management policies are mobilised on a local level. In so doing, I respond to this research's first and second objectives (see section 4) to explore 1) how Montréal's organic waste program and the City of Montréal's recent adoption of the circular economy (CE) framework intersect with the scalar politics of environmental governance under neoliberal capitalism, and 2) how individuals receive, adopt, or resist dominant scalar imaginaries of organic waste management in their everyday lives.

I start by unpacking how the CE has been adopted in provincial- and municipal-level policies and discourses. In section 6.2., I show how the provincial government of Québec's approach to organic waste management has been structured by CE language and approaches since 2016. I consider how the CE, as it is fostered on a provincial level, filters down to food waste governance approaches among municipal actors, namely: the City of Montréal, private companies, and citizens. I describe the formal relationship between provincial and municipal governments, shaped by the provincial government agency, Recyc-Québec, which sets targets and objectives for the province's municipalities and has the legal mandate to guide them in drafting and implementing their waste management plans (PMGMRs). The provincial government and its agencies also target the private sector, with research initiatives and funding programs supporting CE approaches among businesses. Despite this, I show how the adoption of CE approaches in private business remains small in scale compared to the systemic food waste entrenched by neoliberal food regimes (Gille 2012), and that they do little to disrupt the latter.

In section 6.3, I interrogate how the CE had been adopted on a municipal level by the City of Montréal, and yet how it remains in its infancy and continues to be employed alongside concepts such as 3RV-E. The City of Montréal continues to invest in heavy infrastructures and lucrative public-private partnerships despite its recent CE commitments, thereby perpetuating dominant neoliberal approaches to waste management in Canada. I show how these public-private contracts lead to infrastructural lock-in and foreclose transparency with regards to the operations of private companies and their delivery of CE objectives.

In section 6.4, I describe how composting is framed by the City of Montréal and understood by citizens as an individual and moral environmental responsibility. Drawing on Rice (2014) and Hird (2021), I show how an individualisation of environmental responsibility in organic waste management is promoted through the construction of an idealised "environmental citizenship" identity, comprising a set of environmental ideals and obligations which individuals are expected to assume. Individual citizens adopt and normalize these ideals and obligations into their daily routines, leading to self-governance practices. I finish this section by considering how greater awareness of and participation in decision-making and agenda-setting processes, rather than the promotion of individual responsibility, might re-politicise the CE as a waste management approach among the public.

Section 6.5 describes a tendency among participants to link the individual responsibility to compost with planetary-scale environmental imaginaries and anxieties. I describe how citizens are poised at the intersection of 1) global anxieties regarding climate change and food inequalities, and 2) an individualisation of responsibility within municipal policy and discourse; as represented in figure 6. Drawing on Liboiron and Lepawsky (2022) I describe how such tensions precipitate in universalising discourses employed by citizens which both erase nuance and maintain difference in neoliberal waste management. Nuance is erased, for example, where participants make generalising statements about society's relationship to waste and cite ignorance, greed, or laziness as root causes, while difference is maintained by overlooking how neoliberalism entrenches food waste at every stage of the food chain. Universalising discourses and recourse to planetary scales also compound (and are compounded by) the obfuscation of the municipal scale from public imaginaries when it comes to organic waste management.

Sections 6.6-7 consider public awareness of 1) how organic waste is treated on a municipal scale and 2) how the CE is mobilised as an organising framework for provincial and municipal waste management. Most participants were unfamiliar with both. I suggest that this

reflects a lack of communication and transparency between municipal- and provincial-level management and citizen-level awareness and participation (also represented in Figure 6). I also theorise this disjuncture as representative of dominant modern subjectivities that maintain dualistic approaches to waste and the modern city (Hawkins 2006; Moore 2012; Turner 2019a). Despite a lack of awareness, I unpack examples showing that, once invited to discuss them, participants were sceptical of the CE concept and of the city as the ideal scale for effective organic waste management.

Participants proposed local alternatives to centralised municipal approaches to organic waste management. In section 6.8., I describe how, when challenged to consider alternative scales, both non-composting and composting citizens suggested that local composting practices could be more efficient, environmentally friendly, and socially beneficial. Despite limited familiarity with the CE concept, this illustrates that alternative composting methods and scales appeal to citizens, when they are given the option to consider them.

6.2. Provincial adoption of the circular economy

I start at the provincial level. If the literature review suggests that the CE concept has been co-opted into dominant neoliberal approaches to waste management, I explore how this might manifest in Québec's provincial-level policy and discourse.

The adoption of the CE as an organising concept in provincial-level waste management policy and discourse is evident in the work of Recyc-Québec. Recyc-Québec is a provincial government agency formed in 1990 with the aim of supporting the development of the recycling industry in Québec, setting and monitoring progress towards recycling objectives, and educating the public, municipalities, and businesses[9]. Analysis of the Recyc-Québec archives suggests that the first time the "CE" was mentioned by the organisation was in February 2016, in a 2016-2017 Action Plan published by the Mixed Committee for Source Reduction ("Comité Mixte dur la reduction à la source"). One year later, in its 2017-2022 strategic plan, the president of the

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[9] The establishment of Recyc-Québec also coincided with the formulation of the first waste management policy by Québec's Ministry for the Environment and Fauna spanning from 1989 to 1998 (Postacioglu, 2004).

administrative council, Karine Joizil, opened the report by saying "the circular economy perspective and the fight against climate change is an intrinsic part of all of [Recyc-Québec]'s engagements, much like the reduction at source." (Recyc-Québec 2017: ii, translated by author). It is in this strategic plan, too, that Recyc-Québec defines its Mission as "Leading Québec to reduce, reuse, recycle, and valorise waste material *in a circular economy perspective* and to fight against climate change" (*Ibid*: iv, emphasis added), a mission statement that they have carried forward since. In the following strategic plan, for the period 2022-2025, the CE was mentioned 24 times in total. Today, the CE features heavily on the organisation's website, with pages dedicated to the CE that target citizens, municipalities, and businesses (see Figure 7).

Provincial policies and discourse frame the city as the ideal scale of governance for organic waste management and CE approaches. In March 2017, Recyc-Québec received the formal mandate to advise the province's municipalities in formulating waste management plans. This was instituted by the Ministère de l'environnement, de la Lutte contre les changements climatiques, de la Faune et des Parcs, Québec's provincial environment ministry, in a modification to a law titled, *La loi sur la qualité de l'environnement* (LQE) ("law on the quality of the environment"). The modification required that all regional municipalities establish a "plan municipal de gestion des matières résiduelles" (PMGMR), a "municipal waste management plan" (Recyc-Québec 2023). Recyc-Québec became responsible for all tasks related to the monitoring of the PMGMR program in the province. Such tasks include analysing the conformity of the PMGMRs to provincial directives, accompanying municipalities in the revision of their plans, enforcing the deadlines set out in the LQE, and developing supporting materials. The support Recyc-Québec offers to municipalities under this mandate incorporates direction on how to implement an organic waste management plan that adheres to the principles of the CE and the provincial objective of recycling 60% of organic matter by 2023 (Recyc-Québec 2022). On the Recyc-Québec website, for example, on a page entitled "The circular economy: important benefits to municipalities" (Recyc-Québec 2023: n.p., translation by author), they explain: "The circular economy is a priority for Recyc-Québec and we are investing a lot in this approach to achieve a Québec without waste." They describe the city as the ideal scale for implementing a CE, saying (*Ibid*):

> Municipalities are the ideal level of governance for deploying the circular economy. Close to organisms and citizens and listening to their needs, municipal actors are very well positioned to integrate circular economy strategies for the well-being of individuals and collectives.

The CE is therefore mobilised as an organising concept by the provincial agency, Recyc-Québec, shaping the legal support offered to cities, such as the CMM, in the conception and implementation of their PGMR waste management plans.

In the private sector, provincial initiatives and funding programs also encourage the adoption of CE projects among private business. This compounds a recent surge in the adoption of CE discourses and agendas among research institutes and businesses in the province over the last decade. Québec Circulaire, for example, is a multi-sector platform of actors that serves as a forum of exchange for CE ideas and initiatives across the province. They produce educational public content and publish co-authored reports, such as the 'Toolkit for a regional circular economy roadmap' (Sauvé, Normandin, and McDonald 2016), co-authored by the Centre de transfert technologique en écologie industrielle (CTTÉI), the Conseil régional de l'environnement et du développement durable de l'Outaouais (CREDDO), the Conseil régional de l'environnement – région de la Capitale-Nationale (CRECN), and Recyc-Québec. Québec Circulaire's main founding partner is the provincial government department, the Ministère de l'Économie, de l'Innovation et de l'Énergie, evidence of the relationship between provincial-level government and private CE research initiatives. This relationship is also apparent in an investment fund by the organisation Fondaction, called the *Fond économie circulaire*, which proclaims itself "Canada's first investment fund dedicated to the circular economy" (Fondaction 2023: n.p.). The investment fund offers support to young businesses in the province of Québec who are seeking to pursue CE projects, and is financed by the municipal government of Montréal, as well as the provincial government agency, Recyc-Québec. These CE interventions may not exclusively target organic waste, but they serve as examples of the growing adoption of the concept within environmental governance dynamics between provincial-level government and private enterprises.

Various instances illustrate how CE initiatives have spurred small-scale changes in organic waste management more specifically by private companies in the province. This is evident, for example, in a competition launched by Québec Circulaire, in partnership with Recyc-Québec, as part of their program of activities for Canada's 2023 Circular Economy Month, in the month of October ("Mois de l'économie circulaire 2023"). The competition invites organisations in the province of Québec to submit case studies of how they have introduced CE strategies into their operations. The public then votes for their favourite to decide which initiative "should be the standard-bearer for circular and sustainable dynamism in the region" (Chiasson 2023: n.p.). Among the 116 entries are several food waste initiatives, such as an initiative that turns the

leftover material from pressed sunflower seeds into flour and pancake mixes. Another competition entry related to food waste is the regional composting centre, Compo-Haut-Richelieu Inc, located about 40 km away in Saint-Jean-sur-Richelieu. The composting centre is described as containing "avant-garde" technologies with the aim of producing optimal quality compost which is redistributed to contributing citizens, as well as landscapers and farmers in the region of Saint-Jean-sur-Richelieu.

These links between provincial-level discourse, policy, and funding initiatives, and private CE projects in organic waste management are represented in Figure 6 by a thicker line between "provincial discourse and policy" and "private companies". The line is not solid because these influences remain small-scale in the context of wider food and food waste regimes. They nevertheless suggest an increasing cross-fertilisation between provincial-scale organic waste management discourse and policy and emerging CE approaches among private companies.

To what extent, however, do emerging private CE approaches challenge systemic regimes of food waste described by scholars such as Gille (2012)? The private CE initiatives encouraged by provincial campaigns and financing are characteristic of neoliberal approaches to environmental governance and the CE, (Calisto Friant, Vermeulen et Salomone 2020). Corvellec and colleagues (2020: 97) define dominant CE approaches as "[coming] with a promise that circular relationships among markets, customers and natural resources (Lacy and Rutqvist 2015) have a unique capacity to combine economic growth with sustainability" (Corvellec et al., 2020, p. 97). Their definition rings with Québec's provincial approach to the CE, which emphasises market-based solutions and public-private partnerships. These provincial initiatives do little to challenge the pro-growth model of private businesses. Consequently, they fail to effectively address the systemic roots of food waste which Gille (2012) and Calisto Friant, Vermeulen and Salomone (2020) describe as embedded within neoliberal food and food waste regimes.

While provincial policies and discourse emphasize cities as the optimal governance scale for CE waste management strategies, and businesses as key players in merging capitalist growth with environmental goals, the transparency of the relationship between provincial-level governance and citizens remains somewhat unclear, as illustrated by the dotted line in Figure 6. Citizens are framed principally as service-users and consumers, responsible for participating in their municipal composting programs and for choosing compostable or recycled products. This is apparent in Recyc-Québec's publicity campaigns in which they communicate the CE concept to

citizens. On the Recyc-Québec website, a page targeting citizens explains the CE concept and encourages citizens to adopt more sustainable consumption practices (see Figure 7). They propose three actions that citizens can take to contribute to the CE, all of which are centred around consumption practices: 1) "consume less", 2) "maximise use", 3) "extend the lifespan" (Recyc-Québec 2021: n.p.). Citizens are tasked with incorporating composting practices into their everyday lives and consumption habits. As I discuss in further detail in section 6.4., this reflects individualising environmental citizenship identities enshrined in dominant neoliberal approaches to the CE and waste management (Hird 2021).

Figure 7: Screenshots taken from the Recyc-Québec website, showing the circular economy webpages targeting (in order) municipalities, citizens and businesses.
Source: https://www.recyc-quebec.gouv.qc.ca/ [Accessed: 22/09/2023]

6.3. Municipal adoption of the CE

If provincial agencies describe the city as the ideal scale of governance for the CE, the Communauté Métropolitaine de Montréal (CMM) has been slower on the uptake, and the term remains ambiguously operationalised in their waste management approach. Does the integration of the CE into municipal discourse and policy represent a paradigm shift in Montréal's waste management? Or is the concept adopted in limited ways that start and end with paying lip service to the latest concepts in mainstream neoliberal waste management discourse?

Following provincial directives from Recyc-Québec, the CMM has begun to adopt the CE concept into its PMGMRs. The most recent plan, published by the CMM for the period 2024-2030, for example, adopts the CE as an organising principle. In this plan they borrow from the Pole québécois de concertation sur l'économie circulaire, a voluntary network of leaders from public, private, and charity sectors collaborating to find CE solutions, to define the CE as a "system of production, exchange and consumption aiming at optimising the use of resources at every stage of the lifecycle of a good or service, in a circular logic, all while reducing the environmental footprint and contributing to the wellbeing of individuals and collectives" (Communauté métropolitaine de Montréal 2023: 23).

Nonetheless, the CE also seems to be evolving alongside, rather than replacing, existing notions such as "3RV-E" and "reduction at source" (Recyc-Québec 2016). The 3RV-E concept offers a hierarchy of importance for different levels of intervention in waste management, with the 3Rs standing for reduction, reuse, and recycling, the V for "valorisation" or value-production, and the E for elimination. A 3RV-E approach seeks to prioritise "prevention" above "management", and to avoid "elimination" (Recyc-Québec 2016; see Figure 8). "Reduction at source" picks up on the first R of this hierarchy, and concerns techniques that aim to prevent or reduce the production of waste material. The CMM has integrated the CE into pre-existing approaches to waste management shaped by concepts such as the 3RV-E and reduction at source. In the 2024-2030 PMGMR, for example, the CMM state: "Still in agreement with this [CE] vision, the CMM pursues its engagement towards the respect of the 3RV-E hierarchy and the achievement of zero-disposal" (CMM 2023: 23). On the CMM's (2023) webpage dedicated to the PMGMR, they continue to cite 3RV-E as the first of their seven "orientations", namely to: "Respect the hierarchy of 3RV-E, putting the emphasis on reduction at the source and re-use." The CE is mentioned just once on the webpage in a brief summary of the latest modifications to

the PMGMR, which they describe as revised "in order to take into account recent developments, such as the recycling crisis, the impacts of plastic, the circular economy, zero waste, etc." (*Ibid*).

This somewhat superficial nod to the Circular Economy (CE) and its integration into pre-existing discursive frameworks could imply that the CMM is starting to adopt only the language of the CE, rather than embracing the concepts themselves in a manner that transforms its approach to waste management. In their 2022 report, the Bureau d'audiences publiques sur l'environnement (BAPE) describe how "the concept of the circular economy has been forwarded as a new economic model that seeks to decouple economic growth from the depletion of natural resources and environmental impacts" (608). This echoes what Calisto Friant et al. (2020: 12) describe as a 'technocentric circular economy', promising both economic growth and technological innovation while also seeking to reduce environmental impact: a task that critical scholars such as (Song 2016) have shown is inherently contradictory.

As Hird (2021: 77) has shown, despite adopting concepts which emphasise the importance of upstream reduction, municipal waste management in Canada continues to rely on disposal and diversion (recycling), since "[i]t is much easier to develop and implement institutional policies and practices that do not disturb neoliberal capitalist circuits of production and consumption than to tackle upstream concerns with reducing the quantity […] of waste." In a similar fashion, rather than holistically transforming systems that entrench organic waste, the CE as it is currently adopted in the CMM's plans appears to reaffirm neoliberal waste management approaches.

Figure 1 : Les 3RV-E : Prévention versus gestion des matières résiduelles
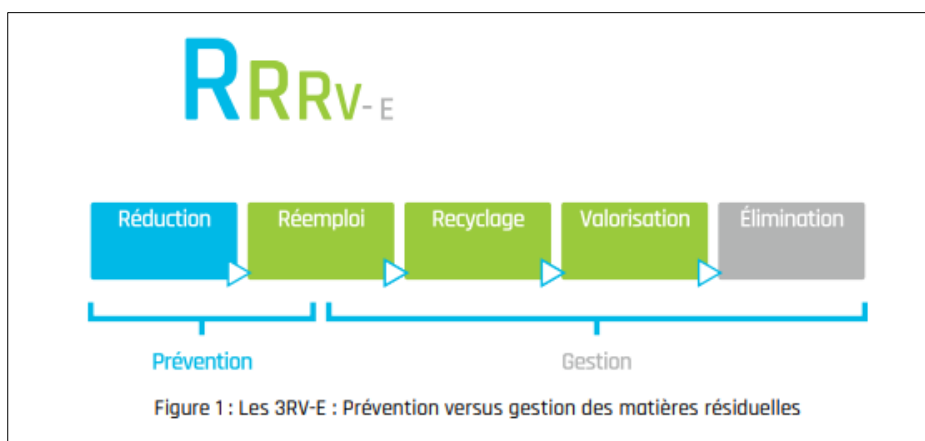
Figure 8: Infographic representing the 3R-E hierarchy.
Source: Recyc-Québec 2016: 4.

Further indications that the CMM's current implementation of the CE may be leaning toward a "technocentric" CE model is evidenced in its preference for capital-intensive, centralized infrastructures and private-public partnerships. These arrangements are typical of neoliberal approaches to waste management in Canada (Hird 2021), which is oriented towards "a market economy, enhanced privatisation, and an overall decrease in government control of the economy, and a general entrepreneurial approach to profit maximisation." In 2009, the Programme de Traitement des Matières Organiques par le Biomethanization et le Compostage (PTOMBC) was launched in a $650 million federal-provincial funding program to fund organic waste infrastructure with the aim of reducing greenhouse gas emissions in the province (Perron, 2010; Stiff, 2023, interview with author). As part of this program, the City of Montréal proposed the construction of five organic-waste treatment facilities, in different parts of the island. However, as the estimated costs ballooned the plans were later revised to consist of just two treatment plants: a composting centre in St Laurent and a biomethanisation plant in Montréal-Est. Over a decade later, the start dates continue to be pushed back in face of rising costs and public opposition to the planned construction. In 2023, the Montréal City Council awarded $25.6 million for the Montréal-Est facility and $6.1 million for the Saint Laurent facility to the company Veolia Waste Services Alberta Inc. (Magder 2023). This represents $137 million more than the original estimated cost for the two plants.

These lucrative private-public contracts are central to Montréal's approach to organic waste management. Interestingly, the CMM has continued to pursue these contracts with private service providers despite the recent provincial and municipal commitment to pursuing the CE in their waste management strategies. This suggests that the adoption of the CE into municipal plans does not represent a break in pre-existing approaches to organic waste management. The lucrative contracts described above represent a continued focus on waste treatment rather than prevention, doing little to combat systemic sources of waste. Does this approach seek to protect the environment, or does it predominantly serve the financial interests of the contracted companies and to maintain the status quo in the food and food waste industries? Moreover, long-term contracts bind the city to costly private-public partnerships, entraining an infrastructural lock-in and entrenching neoliberal approaches to waste management in space and time (Shove 2010).

These public-private partnerships in Montréal are characterised, in turn, by a lack of transparency with regards to their financial and environmental operations, evidenced by several scandals associated with Montréal's public-private waste management contracts. As of April

2023, for example, the reasons for the ballooning costs associated with the planned Montréal-Est and Saint Laurent composting facilities had not been publicly disclosed (Magder 2023). Disputes between the construction firm EBC and Veolia, both contracted by the City, are reported to have delayed the construction of both sites. The Montréal-Est and St-Laurent plants are forecast to become operational in 2025 and 2024, respectively (*Ibid*). Some of these private contracted companies have also been publicly and politically critiqued for scandals including embezzlement allegations and failures to fulfil collection commitments (Olson 2018; Jonas 2022; Shingler 2022). In June 2022, for example, it was reported that the company Ricova Services Inc., which operates Montréal's two recycling sorting centres and has recycling and composting collection contracts with several of the city's boroughs, withheld over one million dollars in recycling profits from the city (Sabrina 2022; Shingler 2022). The company has also been accused of failing to collect recycling and compost in multiple boroughs including Côte-des-Neiges—Notre-Dame-de-Grâce (Olson 2018), precipitating in the decision by the City of Montréal to block the company from bidding on contracts for five years (Shingler 2022). This has led to frustration among environmental activists such as Karel Ménard, executive director of the Québec Coalition of Ecological Waste Management, who, speaking to *CBC News*, asserted, "We need to have transparency" (Shingler 2022).

Precise information regarding what currently happens to finished compost is also difficult to find, since it is not made public by the City of Montréal nor the private composting companies contracted to process it. Therefore, while the city is framed as an effective scale for the CE by provincial and municipal discourses, efforts close the loop and reinsert food waste into local production remain obscure. The City of Montréal advertises the distribution of plants, compost, and seeds in several boroughs up to two times a year (Ville de Montréal, 2023) and several of my focus group participants in NDG referenced these giveaways when discussing their understanding of what happened to their organic waste. However, the City does not explicitly disclose where this compost comes from and whether it is a product of the municipal program, nor does it make a link between these services and their CE objectives (see Figure 9). Reports suggest that the compost produced by municipal programs are often contaminated or of poor quality (*CBC*, 2018). Such rumours were also repeated by several participants as reasons they would not want to receive compost produced by the municipal program, as well as by a composting activist and researcher and former Director of Finance and Development for Compost Montréal, Cameron Stiff (2023, interview with author).

Stiff explains that when the compost program was first introduced, the City contracted large firms, such as BFI and Laidlaw, to set up compost sites at their dumps. However, while composting was part of their operations, it remained secondary to landfilling, which continued to be the primary economic activity of the businesses. This prioritization resulted in limited focus and investment in producing high-quality compost or actively reintegrating this compost into local production processes. Instead, Stiff believes, the compost was often used onsite by companies as landfill cover. He states: "the quality – and this is often the case with large scale municipal composting programs – […] the quality is so poor, it can only really be used for landfill cover or infill and like road construction. It's not going to farms, it's not going into gardens, it's riddled with plastics, chemicals, glass, metal. You just don't know what's in there." This implies that there are several challenges in closing the loop of local organic waste management in Montréal, and it raises questions about whether large-scale private composting companies can align with the city's CE objectives.

Distribution of plants, compost and seeds

Last updated July 11, 2023

Related to **Trees and Gardens Ecological Transition Neighbourhood Life**

Would you like to spruce up your flower beds or improve the soil of your vegetable garden? Did you know that plants, compost, and seeds can be yours free of charge in Montréal? See what your borough has to offer.

Plant and compost distribution days

Many boroughs distribute annual flowers, perennial plants and kitchen herbs, free of charge each year. Others offer vegetable plants, shrubs, compost and even mulch.

In most cases, there are two distributions each year: one in the spring and one in the fall. They are reserved for borough residents.

Calendar

Figure 9: Screenshot from Ville de Montréal's website, showing information regarding the public distribution of compost and seeds.
Source: Distribution of plants, compost and seeds | Ville de Montréal (montreal.ca) [Accessed: 25/01/2023]

While the CMM has begun to integrate the CE into their PMGMR and therefore their organic waste management, the term clearly remains obscure and its use in its infancy, often adopted alongside annex concepts such as the 3RV-E. The adoption of the CE into pre-existing frameworks, as well as the continued pursuit of lucrative, public-private contracts and centralised infrastructures, suggests that the CE is not currently adopted in ways that break from dominant neoliberal approaches. These public-private contracts entrain infrastructural lock-in and shut down transparency with regards to the operations of private companies and their delivery of CE objectives. Additional research is warranted to better understand the contractual landscape, the extent to which private companies incorporate transformative CE approaches into their organisational principles and practices, and the degree to which finished products are successfully re-integrated into local production cycles. An initial examination, however, of the organic waste treatment within Montréal's compost program indicates that the system is presently marked by limited transparency and a lack of substantial evidence demonstrating efficient recycling of compost back into local production. This reflects analysis by Rice (2014: 388), who describes how private companies are rarely scrutinised or held to the same standards demanded of citizens, "leaving intact the fundamentals of carbon intensive capitalism that cause the problem in the first place."

At best, a more transformative CE is yet to come to bear at the scale of the CMM, which might be currently shackled by infrastructural lock-in, due to expensive contracts and infrastructural investment with private companies (Watson et Shove 2023). At worst, this is indicative of a CE approach that willingly perpetuates economic growth agendas, rather than seeking truly transformative social and environmental alternatives.

6.4. Moralising discourses of individual responsibility: "The little actions, the personal ones, that define us".[10]

If opaque public-private partnerships on a municipal level foreclose their scrutiny and contribute to a depoliticization of organic waste management, this is reinforced on a citizen-level by the construction of an environmental citizenship identity. Drawing on scholars Myra Hird

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[10] Quote by Katy, composter, NDG.

(2021) and Jennifer Rice (2014), I suggest that Montréal's organic waste management promotes an environmental citizenship identity that individualises responsibility of organic waste management. Hird explains that, in Canada, waste management is focused on targeting individual behaviours and downstream technology and infrastructure, rather than upstream issues such as systemic overproduction in a capitalist food system. Jennifer Rice (2014), in her theory of climate urbanism, describes how political actors construct an environmental citizenship identity to normalise individual responsibility and behaviour in face of climate change. Local governments rely on and encourage the responsibilisation of individuals to adopt certain choices and behaviours, while letting growing market-based food and food waste systems to go unquestioned. Local governments not only rely on but actively promote the individual assumption of environmental responsibility to sustain a status quo characterized by the expansion of market-based systems for food and food waste management.

To explain the how this happens politically, Hird (2021: 33) employs Latour's framework of the five ways in which politics coalesce around objects. His fifth form of politics, or Politics-5, refers to objects that become so naturalised and ordinary that they are not regarded as issues at all. It mobilises Foucault's theory of governmentality, which describes how objects are approached in such a routine manner that they do not attract sufficient attention and are not elevated to issues of concern. Hird argues that most Canadians are exposed to this form of governmentality in their everyday waste relationships. Rather than questioning the naturalised object of municipal waste and its management, individuals govern themselves by "internalizing the erroneous assumption that most waste is produced post-consumption and that waste diversion and disposal constitutes 'good citizenship'" (Hird 2021: 53). Borrowing from Latour, Hird (2021: 34) describes this form of politics as about how publics "fall back to sleep."

These forms of governance are apparent on a citizen-level in 1) provincial and municipal campaigns that target individual citizens to encourage participation in the composting program; 2) internalised ethical understandings of composting, according to which individuals come to understand their participation in the composting program as virtuous; 3) the solutions proposed by citizens themselves which emphasise the targeting of individual values and behaviours through public education campaigns; 4) the surveillance and judgement that composting participants cast on their non-composting friends, family, and neighbours.

The use of per capita targets in both municipal and provincial organic waste discourse and policy illustrates an individualization of responsibility in Canadian waste management

described by Hird (2021). The performance indicators mobilised in Recyc-Québec's 2022-2025 strategic plan (Recyc-Québec 2022), for example, are largely measured in per capita measures, thereby steering focus towards individual and household consumption. In this plan, Recyc-Québec's first strategic orientation, to "conserve resources and reduce waste", for example, is measured by the "percentage of citizens that favour the purchase of bulk or low-packaging products as often as possible" (Recyc-Québec 2022: 15), with a target set at 30% of citizens for 2024-2025. Under Recyc-Québec's fourth orientation, to "improve Québec's residual material management performance", the main indicator and objective is described as "the reduction of amounts of materials disposed per capita" (Recyc-Québec 2022: 21). The objective for disposed waste per capita is set at 525 kilograms or less for 2023. As part of their objectives for organic waste management more specifically, Recyc-Québec's strategic approach focusses on encouraging municipalities to introduce an organic material collection program and calling on individuals and households to participate. Their performance indicator for organic waste management is the "percentage of municipal organizations that implemented an organic material collection program or another method of management at the source" (*Ibid*: 19). These strategic orientations and their performance indicators show how the responsibility for sustainable waste management is put on individuals as consumers and service users, or indeed on municipalities to procure these services targeting household (food) waste. As Liboiron and Lepawksy (2022: 48) highlight in their analysis of municipal recycling initiatives, "Individualism can be naturalized through per capita waste statistics" which "gives the impression that individuals are the main generators of waste." This overlooks other systemic sources of food waste entrenched by neoliberalism, as Gille (2012) explains in her concept of global food waste regimes (see section 2.3.3.).

Posters and visual materials produced by the CMM and the provincial Québec government further exemplify a trend of individual responsibilisation in organic waste management discourse. Figure 10 shows two posters which target citizens, informing them of the organic waste municipal collection program and encouraging them to participate. The first poster, from the Ville de Montréal, encourages citizens to visit the city's website to inform themselves about the organic waste collection schedule for their neighbourhood. Poster 2, from the provincial government of Québec, shows how "easy" it is to participate. Other visual materials that frame citizens as responsible actors for organic waste management are employed in the CMM's PMGMRs. The cover page of the CMM's 2015-2020 PMGMR, for example, shows a family of two parents and their young child standing next to a brown compost bin (see Figure

11). The CMM's 2024-2030 PMGMR also features a series of photos on its cover and contents pages that frame citizens as responsible consumers and service users (see Figure 12). A woman filling a container in a zero-waste shop, for example, is featured on the cover page. The contents pages feature photos of children with recycling bins, a citizen tossing vegetable peelings into a compost bin, and a shopper carrying reusable bags filled with loose vegetables. These promotional and visual materials represent and target citizens as responsible actors for the city's waste management. Citizens are framed as consumers and service-users responsible for adopting individual behaviours including composting and sustainable consumption practices.

Figure 10: Two posters targeting citizens, encouraging them to participate in Montréal's organic waste collection program.
Poster 1 is from the Ville de Montréal, poster 2 is from the government of Québec. The posters read: 1) "Do you need to consult the collection timetable? You can do so at montreal.ca." and 2) "From the chopping board, into the compost. As easy as that." [Translated by the author]

Source: Photos by the author.

Figure 11: Cover page of the Communauté métropolitaine de Montréal (CMM)'s 2015-2020 Waste management plan (PMGMR).

Source : CMM 2016: n.p. Accessed: Plan métropolitain de gestion des matières résiduelles 2015-2020 - Projet modifié (cmm.qc.ca) [15/01/2024]
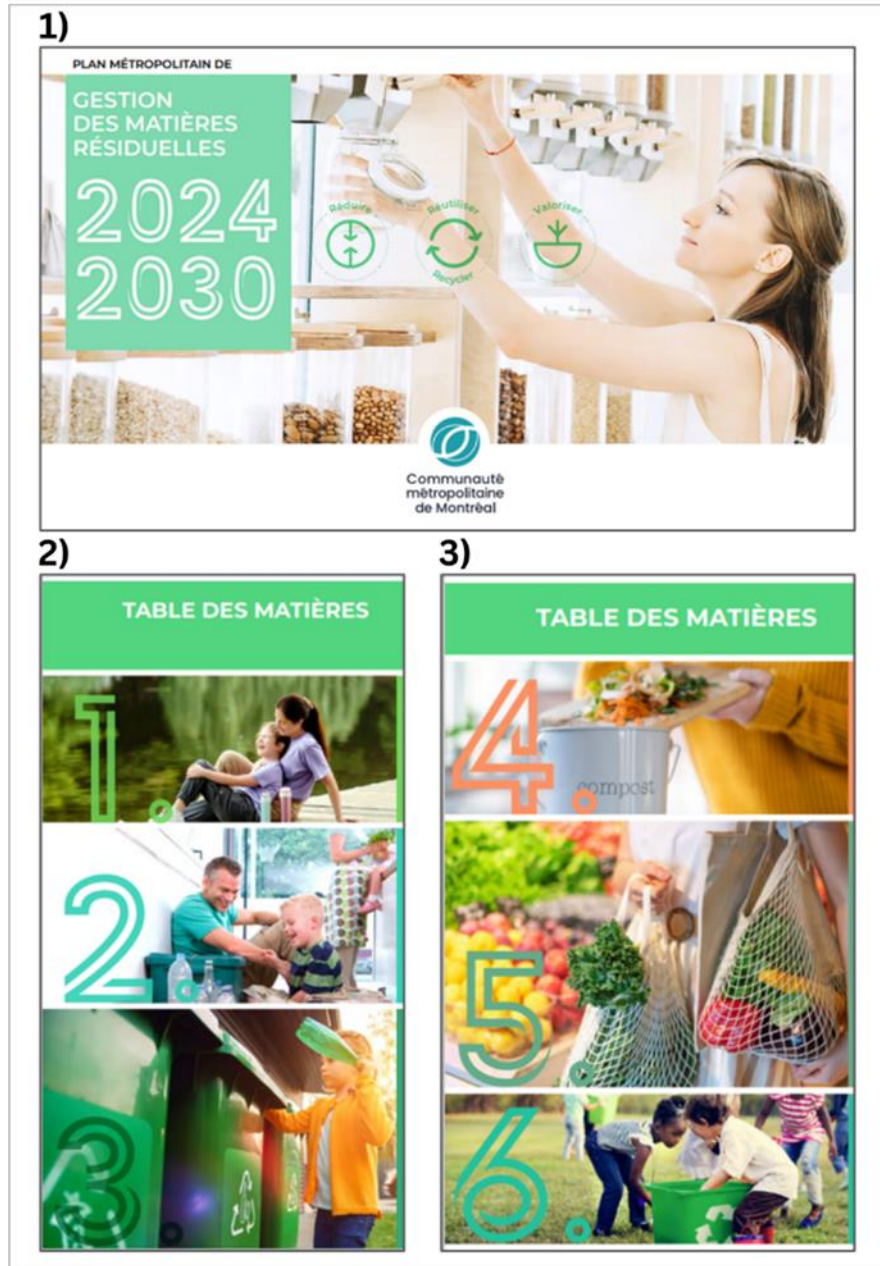
Figure 12: Visual material in the CMM's 2024-2030 waste management plan (PMGMR), demonstrating the targeting of individual citizens and households as consumers and service-users.

Source: CMM 2023. 1) p1, 2) p3, 3) p4. Accessed: https://cmm.qc.ca/wp-content/uploads/2023/10/2023-09-13_PMGMR_FINAL.pdf [15/01/2024]

Both composting and non-composting citizens demonstrated a sense of individual responsibility for participating in composting programs during focus groups and interviews. Participants employed ethical language, associating non-participation in the composting program with wastefulness and complacency, while compliance was associated with care, frugality, and thriftiness. Participants defined both behaviours in normative registers, portraying wastefulness as immoral, and frugality as virtuous. Margaret, a composter in NDG, for example, refers to wastefulness as a "sin," saying: "Well, yeah, you don't want to waste stuff, right? It's a sin. Right? I mean frugality used to be a virtue." Other participants echo this idea in describing the sense of shame or guilt they feel when they waste food. Marie, a composter in Le Plateau says, for example, "There is a kind of shame when you waste food." Conversely, Gabriela, a non-composter in NDG describes the "clean conscience" that comes with composting. Laura, a composter in NDG, describes a sense of virtuousness she gets from participating in the composting program, saying: "I felt like I'm really doing an effort, you know. I think I'm doing something good."

The demonisation of wastefulness and the virtue of frugality compound individualised moral imperatives to manage food and food waste responsibly, for the sake of the environment. This is summarised well by Katy, a composter in NDG. She describes environmental responsibility in highly personal terms, comparing the importance of individual action with the ineffectiveness of global summits, which she criticises for their empty "blah blah blah words" and inaction. She says, "So these are like the little actions, personal ones, that define us. […] In the end, our actions will define the way we live, will define the future." Interestingly, even non-composting participants expressed this sense of individual responsibility, and feelings of guilt and shame for not participating in the municipal program.[11] Often, this was expressed with awkward laughter or jokes about their "little conscience" nagging them (Chris, non-composter, Le Plateau). Gabriela, a non-composter in NDG, laughs, "I feel so bad about not doing it!" She goes on to say: "it's something that I feel strongly about, I do want to do it, you know, go back to composting." This reflects analysis by food waste scholars, such as Gay Hawkins (2006: ix), who describe this feeling of doing the 'right' thing for the environment as "[showing] that contemporary waste habits have become connected to the practice of virtue or a sense of obligation to particular rules and moral codes." Hawkins explains that the demonisation of waste as an environmentally destructive practice is a recent historical development that has shaped

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[11] It is important to acknowledge that recruitment bias may have precipitated in a sample of non-composters who were more inclined to possess positive attitudes towards composting. I discuss this limitation further in section 5.6. and 8.

both municipal waste management programs and publicity campaigns that target the behaviours and practices of individuals and households (Hawkins 2006: ix).

That these normative registers were evoked even among non-composting members of the public implies that it is not for lack of moral imperative that many citizens choose not to compost, and that other factors must contribute to their non-participation. This contradicts municipal waste management strategies, which typically prioritize public education campaigns aimed at informing attitudes and altering personal behaviours (Hawkins 2006: ix; Shove, 2010). In fact, many of the non-composting participants I spoke to simply were not able to participate in the program because they lived in larger apartment blocks that were not served by the municipal collection program. Apartment blocks of twenty-one households or more in Le Plateau, and of nine households or more in NDG, are not served by Montréal's composting program. Other factors were related to social, economic, and physical ability, as well as nonhuman conflicts, which I discuss in detail in section 7. The misdiagnosis of individual attitudes and behaviours as the key axes of intervention for environmental governance is observed and critiqued by Elizabeth Shove (2010). She refers to the dominant neoliberal framework for environmental governance as the 'ABC' approach, which imagines social change as dependant on the correct Attitudes and values of individual citizens, to shape the Behaviours that individuals independently Choose to adopt. Dzialo (2017: 8) summarises: "The ABC approach to conceptualizing mechanisms of social change is reflected in the contemporary individualisation of environmental responsibility." Following Shove, this analysis suggests that an individualising approach to organic waste management in Montréal is inadequate to truly understand and transform food waste systems, and that cultural norms, structures of neoliberal capitalism and socio-economic inequality must be examined.

The notion of waste management as an individual responsibility also surfaced in some of the solutions proposed by the participants themselves to address the organic waste management challenges in Montréal. Many composting and non-composting participants emphasised the importance of education when discussing how to improve organic waste management in Montréal. These suggestions resonate with neoliberal rhetoric that often emphasise education as a strategy to address individual attitudes and behaviours. When asked how to improve the management of organic waste in Montréal, Kimberley, a non-composter in NDG, explained "awareness is key, I think, and education." Kathryn, a composter in NDG, similarly contended "they need to do an awful lot more educating […] It's all, I think, about education." These individualizing discourses resonate with the provincial and municipal

governance approaches discussed earlier, as well as with moral understandings of composting practices. In an interview with Audrey, the environmental agent for the écoquartier (neighbourhood environmental agency) in Le Plateau, she also emphasised the significance of education. She explained: "we are obligated to start with education, right, […] I think that it all has to start with education." For Audrey and other participants, it was particularly important to educate children. Audrey emphasised the need "to teach children from an early age what recycling is, what composting is, etc, the basics." Simon, a composter in Le Plateau explains that "it has to start with young people in primary school, or it has to start in secondary school […]. Students in school have to be better informed about composting, recycling, environmental problems, all of that." Zoe similarly argues, "I think that kids are really, really important with anything that involves change." Non-composters also highlighted the importance of educating children. Chris, a non-composter in Le Plateau, for example, argues, "I think that a lot of education is missing with regards to composting. […] It's not something we really learn at school."

This emphasis on education reproduces a neoliberal, individualising ABC rhetoric that understands social change as depending on attitudes and values, individual behaviours, and rational choice (Shove 2010). This shores up environmental citizenship identities and practices of self-governance. As Hird (2021: 78) explains, "The emphasis on habitual (re)education and the surveillance of others serves to remind residents of their responsibility for WM practices." Participants understand environmental education campaigns as effective conduits for shifting attitudes and values, enabling individuals to adopt new behaviours (Bellino et Adams 2017).

Despite this, as I will discuss in the following sections, when explicitly challenged to consider alternative solutions and scales for Montréal's organic waste management, participants also demonstrated some critical engagement with the prevailing neoliberal scalar politics of waste management. More than one participant even resisted the individualisation of responsibility while simultaneously calling for more public education campaigns. As I discuss in section 6.8., this shows that responses to environmental citizenship provocations may involve simultaneous acts of resistance and compliance.

Participants further exemplify their adherence to normative interpretations of individual responsibility in Montréal's composting program through the surveillance and judgment they exercise on their non-composting friends, families, and neighbours. In focus groups and interviews with composting participants, many described the negative waste and consumption

practices they observed among their friends, families, neighbours, and wider community. For some, this constituted describing the groups of people that they noticed were less likely to participate in the composting program in broad terms. The first focus group with composters in NDG, for example, described how those living in houses were more likely to participate than apartments. During a focus group discussion with composters in Le Plateau, participants shared their observations that student households, particularly groups of male students, were less inclined to participate in composting. Many composting participants also discussed the specific composting behaviours of certain neighbours, friends, and family members. For example, some composting participants, especially those residing in smaller apartment blocks where they are better acquainted with their neighbours, could readily identify all their neighbours who did not participate in the composting program. Anne (composter, Le Plateau), for example, describes observing the habits of the young man living next door. She noticed that he never put out his compost bin despite clearly being a keen gardener, saying "I've been observing him for a while." She described how she eventually realised that he was throwing his food waste into a private composter in the alleyway. She also noticed that the women living in the two apartments above hers only participated in the municipal compost program during the winter. Finally, she described the composting habits of the buildings next to hers, saying: "Well, I think the worst is the buildings next to ours, their four compost bins are piled up under the staircase, there are spiderwebs this big [gesturing] all over them."

In the same focus group discussion with composters in the Plateau, participants quite pointedly discussed the typical profiles of the kind of people who are less likely to compost. They described these peoples as "lazy" (Anne, Marguerite, and Simon) and, even, "extremely stupid" (Anne). Anne describes these behaviours as "inexcusable" in light of all the information and publicity that now exists about composting. She says:

> You still have lots and lots of… all the practical information, right. Where to get the things and everything. […] I find it really hard to hear when someone says, "I don't know why composting is important" or "I don't know the impact that it has or what it does," y'know? No. That really is denial in that case, for me, or extreme bad faith [*mauvaise foi*], but it's crazy, you know?

These comments once again reflect the normative registers with which individuals come to understand their own responsibility to participate in environmental behaviours, and the responsibility of those around them. This reflects observations by Hird (2018: 25), who describes

how "members of the public are encouraged to survey and judge their own recycling behaviours as well as those of their neighbours, families, and friends." It also echoes analysis by Fredericks (2018), who considers how urban waste management arrangements (re)configure political subjectivities, community structures, and relationships to the city. The conspicuous visual and performative act of placing the compost bin outside on a weekly basis facilitates the public scrutiny of composting practices, subjecting citizens to what Fredericks (2018: 61) terms "new forms of state discipline". Within the context of neoliberal environmental governance approaches, these new forms of state discipline are defined by normative discourses of waste and an individualisation of responsibility which redirect focus away from other waste scales.

I conclude by considering another form of politics as defined by Latour: public scepticism where governments fail to frame an issue "in terms of a clear general will or common good." In her case study of municipal waste management in Kingston, Ontario, Hird (2021) describes this form of politics (which Latour calls "Poltics-3") as closely associated with attempts to normalise and depoliticise objects like municipal waste (Latour's Politics-5). Public scepticism occurs where the public begin to doubt the discourses forwarded by municipalities in collaboration with industry, which circumscribe the parameters according to which municipal waste issues are discussed and debated. In the following sections, I show that while many participants were initially unfamiliar with the CE concept and how their organic waste is treated on a municipal scale, they also demonstrated scepticism towards both, once invited to discuss to them. This might gesture to a potential move from Politics-5 to Politics-3, as citizens challenge and re-politicise organic waste management in Montréal.

6.5. The planetary scale

Where participants adopt discourses of individualised responsibility in their organic waste management, in this section I show how these are expressed through universalising statements and planetary (rather than regional or municipal) scalar imaginaries and anxieties. As represented on Figure 6, citizens are poised at the intersection of 1) global anxieties surrounding overconsumption in the Global North, climate change and food inequalities, and 2) an individualisation of responsibility within municipal policy and discourse.

Participants employed universalising discourses to characterise Québec, Canada, and the global North, more broadly, as inherently wasteful. Numerous participants associated what they deemed to be unethical waste practices, such as food wastage, with a broader diagnosis of societal issues linked to mass consumption. For example, David, a composter in NDG, exclaimed "Canadians are spoiled!" He continues: "We have so much food that, you know, it's – we have too much. […] Québec has more water I think per capita than anywhere else. Look at the waste. [...] It drives me crazy." Anne (composter, Le Plateau) similarly deplores the mass-consumption practices among households in Québec, which she describes as "obese". Some participants compared this to more ethical attitudes in other countries. Participants of immigrant origin sometimes compared the wastefulness they witness in Canada with observations in their home countries. Beth (composter, NDG), who is of Chinese origin, describes the different attitudes she observes between her Chinese friends and her "white" Québecois friends. She described a conversation with her Chinese friends about taking uneaten food home when eating out, saying "regardless of how old, how educated, wherever they are in the world, most of our friends - unless they've travelled a lot - but most of our friends who are born and raised here will not take things home."

These critiques resonate with research by food waste scholar, Bethaney Turner (2019), who also observes that residents in Canberra, Australia, felt guilty about the "'throwaway society' mentality" they observed around them. These comparisons might have political potential if employed alongside broader systemic critiques of neoliberalism, and an awareness of how neoliberalism structures excess and deficiency across and within the Global North and the Global South (as described by Friedmann and McMichael (1989), Pechlaner and Otero (2010), and Gille (2012), see section 2.3.2). However, in this research, they were employed by participants to contextualise their individual commitments and moral imperatives to participate in the composting program, as well as to identify the moral failing of their neighbours, rather than to mount systemic critique. They therefore shore up rather than challenge individualising environmental citizenship discourses and neoliberal approaches to organic waste management.

Liboiron and Lepawsky (2022) offer a useful analysis of universalising tendencies in dominant waste discourses, in which people make broad statements about society based on local 'instances' or individual experience. The authors critique the use of "we" in universalised, moralising waste discourses, which they discuss in the context of media headlines. They describe how "we" usually refers to consumers and rarely to industries or manufacturers, and so, the rhetoric of "we" becomes "a way to shift blame, action, and accountability and let those

systems continue" (*Ibid*: 104). This analysis suggests that such discourses and imaginaries filter down to the citizen-level, apparent in the quote from David above: "we have too much." Broad statements regarding wastefulness in Québec overlook systemic regimes of food waste (Gille 2012) within which wastefulness is often "impossible to avoid" on an individual scale (Hawkins, 2006: viii). The authors also describe how universalising discourses obscure local, situated differences, inequalities, and knowledge. Regimes of food waste are navigated by individuals in embodied and situated ways, while a myriad of other moral imperatives, such as caregiving duties, the pursuit of dietary diversity, and financial limitations (Lehtokunnas et al. 2020). Universalised discourses therefore buttress moral statements regarding 'good' and 'bad' waste practices while obscuring embodied and situated differences that shape an individual's capacity to participate in pro-environmental behaviours. Universalising discourses of wastefulness can therefore both erase and maintain difference, foreclosing certain scales of intervention (Liboiron and Lepawsky, 2022: 54), a point I return to in the following sections.

Many participants described their individual responsibility to participate in composting programs with reference to planetary-scale anxieties, such as climate change and global hunger. Florence, for example, a non-composter in NDG, describes composting in the context of climate change, saying: "I think that everything we can do to fight climate change is important." In a focus group of composters in Le Plateau, participants concurred that they imagined this environmental responsibility and action on a global scale, rather than fought on the scale of the neighbourhood or the city. Simon, for example, says "It's not just for the neighbourhood or for the city, it's global." He goes on to explain:

> Simon: Because we are a part of – even if we're talking about Montréal or Le Plateau and NDG – when we talk about the neighbourhood, we do that, at the end of the day [...] for the planet. So yes, I do it for the planet.
>
> Marguerite: Yes, absolutely. I agree.

David, in a focus group for composters in NDG, similarly explains that, when thinking about the environmental action, "I think globally." In these cases, the local and municipal scales were actively rejected in favour of imaging climate change on a global scale. In other interviews and focus groups a global preference was more implicit. For example, many composting participants described composting as one practice among many that they adopt in face of global climate change, rather than as part of community values or action. Other environmentally 'ethical' consumption habits cited by participants include buying locally, buying organic, going to zero-

waste shops, and cooking with leftovers. Katy, a composter residing in NDG for example described composting as an integral part of her broader commitment to achieving a "zero-waste" lifestyle, aligning it with her cooking and purchasing practices. that this global scalar imaginary figures as part of a broader environmental citizenship identity.

For others, they contextualised their individual responsibility to participate in the composting program with reference to global hunger and food inequalities. David, a composter in NDG, explains, for example, "I've travelled in countries where I've seen, you know, hungry people and things. And, you know, I'm aware of that. It's horrible." Beth, also a composter in NDG, describes how her parents always encouraged her to appreciate the value of food by reminding her of those who laboured to produce it:

> And ever since I was a kid, my parents would always say, finish off all your food all the time, because what about all those people in the world who worked hard to grow the food, and who don't have food. […] this is the world we live in, people either made it - especially with rice, right, like labouring to pick up rice and to grow rice in the rice paddies. […] It's hard work, so you should appreciate it.

This shows how, for many participants, the global scalar imaginaries that informed their sense of responsibility to participate in the municipal composting program, was also shaped by an awareness of global food inequalities.

As I will go on to discuss below, I also found that when asked to respond to the concept of the CE, participants demonstrated a capacity to re-adjust their scalar imaginaries to consider the role of the city in climate action. Most citizens were formerly unfamiliar with the CE, but once the concept was explained to them, many engaged sceptically with its application and efficacity on a city-scale. As I argue in section 6.8., this suggests that when given the opportunity to respond to CE ideas and waste management approaches, citizens are able to look beyond the dominant scalar imaginaries promoted by neoliberal environmental governance.

6.6. Citizen awareness of organic waste treatment and returns: "You're just moving out your onion skins"[12]

All composting and non-composting participants, except for one, were uninformed about the destination of their compost once it left their front doorstep. When asked about what they thought happened to their compost, most composting and non-composting participants admitted that they had not given the topic much thought. Emily, a non-composter in NDG, for example, replied "I have no idea where it goes or where they put it or… it's just taken away." Many reported feeling "disconnected" from the wider benefits and outcomes of composting in this regard, despite deeming it a positive cause. Susanne, a non-composter in NDG, says "Even though composting is something positive, you don't really have that connection to the positivity because you're just moving out your onion skins, you know what I mean?" Even participants who talked at length about why it is important to divert food waste from landfill, who were informed on environmental issues, and who demonstrated an awareness of the challenges to the recycling industry, more generally, lacked this knowledge. This is evident in this extract from a focus group with composting residents in Le Plateau, all of whom otherwise demonstrated a general awareness of and engagement with environmental issues:

Marguerite: No, it's true, now that you say it, it's stupid because we're like it's important but we don't know where it goes.

Simon: Maybe we have too much faith in—we have too much faith in the city, or the city council, to manage it, but…

Marguerite: I admit that we don't really ask ourselves the question. I think that I also thought to myself that it went in the flowerbeds.

Anne: Yes, exactly, in the parks and everything, in, like, the botanical gardens. I thought that too, but maybe not at all. Maybe they even sell it. Maybe they make money from it and we don't even know! [Laughs].

As indicated above, many held the tacit belief that the compost was returned to the city parks, although none could say where they got this information from. For most composting and

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[12] Quote by Susanne, non-composter, NDG.

non-composting residents, the collection of their compost once a week is therefore not only the last physical contact that they have with their food waste but also represents a mental disjuncture from downstream processes. The importance of their participation was not attached to what happened to their food waste, nor whether it was returned to the individual or the city scale. Rather, the importance of their participation was often attached to their sense of moral responsibility towards the planet in the context of global climate change and hunger. This disconnect between residents and the fate of their food waste is to some extent unsurprising; the absence of information and transparency from both private composting companies and the City of Montréal regarding the treatment of Montréal's organic waste does not encourage citizens to contemplate such procedures.

Instead of pondering the fate of their food waste after it leaves their front doorstep, numerous composting participants characterized composting as evolving into an automatic and unthinking habit. Anne (composter, Le Plateau) explains, for example, "It's really—like, I'm cutting vegetables, I have things on the table, *bam*, they go straight in [the compost bin]." Marguerite (composter, Le Plateau) says, "it's psychological now, it's like, it's a reflex." Even among environmentally conscious and educated residents, the composting practices promoted by the municipal composting program are often adopted into everyday lives as habits rather than as a conscious form of environmental activism.

Some participants described this unthinking compliance in positive terms, as evidence that the municipal program was working. Isabelle explained: "But in a way that's great because it shows that the structure around you allows you to do something that is generally positive." Deborah (composter, Le Plateau) also rationalizes that where composting becomes ingrained as an unthinking habit, this is evidence of the success of the municipal infrastructure. She explains that composting should be "natural", "normal", and "easy": "If you are constantly thinking, how am I going to be able to do this? It becomes a constraint." The expectation that food waste management should be "easy" and "normal" reflects expectations of modernity in cities and homes described by waste scholars such as O'Neill (2019: 55), who explains, "Municipal trash collection should be a smooth, almost invisible service." Drawing on Coverly et al. (2008), Liboiron and Lepawsky (2022: 89) similarly describe how physical waste infrastructures serve as "smoothing mechanisms" that invisibilise waste in the city. These mechanisms comprise bins, early-morning collection times, and limited interactions with sanitation workers, which invisibilise waste, maintain order, and allow consumption to continue unabated. These mechanisms of invisibilising waste in the city also resonate with scholarship identifying how modern categories

posit the city and the human as distinct from nature and the nonhuman. Hawkins (2006), Moore (2012), Pacini-Ketchabaw and Taylor (2015), and Turner (2019b) describe how modern subjectivities create discursive binaries between what is clean, civilised, human, and modern, and what is dirty, uncivilised, nonhuman, and backward. Dominant urban planning approaches draw on such binaries in approaches that imaginatively and physically expulse waste from the modern city.

Scholars also trouble the normalisation of these waste practices for foreclosing political intervention in the dominant, neoliberal waste management approaches. Routines surrounding the management of the food waste bin – cleaning, filling, and moving it out to the curb side once a week – structure citizens' preoccupations and scalar relationships to food waste. These scalar preoccupations, which are centred around the bin, the body, the kitchen, the home, and the curb side, can leave residents materially and imaginatively disconnected from other scales of food waste management; as alluded to by Metcalfe et al. (2012: 152) when they describe how "[food waste bins] salve consciences on a relatively superficial level, so preventing further and more fundamental 'behaviour change'." Hence, participants correctly recognize that ingrained composting habits can support the success of the existing municipal composting program. However, these habits and "smoothing mechanisms" may simultaneously impede the exploration of alternative approaches and limit engagement in waste management from a political standpoint.[13] Again, this resonates with Hird's use of Latour's Politics-5, or the way in which objects such as waste are normalised and de-politicised by government approaches to waste management, foreclosing public political engagement.

Despite the prevailing patterns indicating a mental and physical disconnect between citizens and their food waste, the concern exhibited by one participant deviates from these trends. Deborah, a composter in Le Plateau, described how her experience as a mother led her to do more research into which materials were accepted by Montréal's organic waste treatment facilities. Deborah explained that becoming a mother made her aware of the increased volumes of waste her household was producing, and also magnified her commitment to environmental

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[13] Despite this, it is important to note that the material affordances of food waste and their infrastructures always exceed the smoothing mechanisms designed to invisibilise them. Nonhuman intrusions in the home can make waste visible and felt with political consequences, as I discuss in further detail in section 7.7.2.

action. This prompted her to start seeking compostable alternatives during her weekly grocery shop, one of which were compostable diapers. She explains, "when you change eight diapers a day and you see waste constantly, for sure you are going ask whether there is another option." As a member of the "parent environmental team" in her children's nursery, she also looked at compostable diapers "as something to promote among the parents." These compostable diapers were, however, frequently double or sometimes triple the price of regular diapers, which led her to conduct further research into just how environmentally sound such diapers actually are. Deborah reached out to her neighbourhood council's environmental agent for more information, whereupon she was informed that the compost facilities contracted by the city do not support the processing of compostable diapers. The compostable diapers sold in Montréal supermarkets therefore end up in landfill.

Deborah was shocked and disappointed, describing the sale of compostable diapers in Montréal as "flat-out greenwashing" and "deceptive marketing" that "takes advantage of parents." She expressed her frustration and cynicism in face of the lack of transparency and information provided to citizens, saying, "Even without wanting to, you become cynical towards the people responsible, or the city of Montréal, or the neighbourhood." She explains the importance of "understanding more about waste management" to inform personal decision-making, suggesting that if citizens had more information regarding how their organic waste was treated, they would make better personal decisions regarding their waste and consumption practices. Deborah also expressed her frustration with private contractors:

> If the facility doesn't deal with this type of waste, *make* the facility deal with that type of waste. *Obligate* them. *Obligate* the private organisation who manages the composting, who bills the city. […] if we are willing to privatise, let's put more pressure on these private businesses.

Deborah's frustration suggests that if more citizens were informed about the treatment of their organic waste, more political pressure would be put on these actors to deliver on their environmental promises. Where the processing of organic waste by private contractors remains obscure, less pressure is put on them to deliver on the environmental objectives espoused in municipal or provincial policy and discourse. This maintains a business-as-usual approach to waste management, which, despite adopting CE language, continues to pursue capital- and carbon-intensive infrastructures through lucrative private-public partnerships (Rice 2014).

6.7. Citizen awareness of the CE: "Just another idea from the champagne socialists"?

In addition to the lack of awareness regarding the fate of their food waste described above, few residents were aware of the CE or could articulate a clear definition of it.

When participants were asked about their understandings of the CE, all but three said that they were not familiar with the concept, while others confused it with other concepts. Gabriela, a non-composter in NDG, for example, who had never heard of the CE, explained: "I don't think it's well communicated to the citizens in general […] they don't explain to you exactly how their policies are working." Instead, some participants confused the CE with the "sharing economy" (SE), a concept that refers to the sharing of resources, knowledge, and skills to improve sustainability and efficiency (Hossain, 2020). Gabriela, a non-composter in NDG, for example, when asked about the CE, replied, "I think it refers to, like, reusing things and going within the community to get things, right? So, either sharing resources, sharing, you know, tools or passing things along to other people, either family, friends, or neighbours." Some also discussed the critiques of the SE, referring to businesses such as Airbnb and Uber whom they described as having exploited the sharing philosophy for capital gain. Still other residents made links between the CE and the concept of "reduce, reuse, recycle", with Susanne, another non-composter in Le Plateau saying "I've never heard of that, but it makes sense. I mean, I guess the way we would think of it is like reduce, reuse, recycle." The unfamiliarity of the CE and its confusion with other concepts such as the SE and "reduce, reuse, recycle" demonstrates how the CE has not yet filtered down into common understandings of environmental governance on the citizen-level. This is despite it increasingly structuring municipal and provincial waste policy and discourse. The confusion expressed by participants with other concepts further suggests that the CE has not yet manifested as a tangible break in waste management approaches on a citizen-level.

Three composting residents in Le Plateau, all of whom were in their mid to late twenties and had taken classes in environmental studies in which the CE was discussed, had comprehensive understandings of the CE. These residents expressed cynicism towards the concept. For instance, when asked if she was familiar with the CE, one of these residents, Anne, responded playfully: "Another idea from the champagne socialists!" She described the flaws of the concept, gesturing to the idea of thermodynamic entropy, whereby waste material cannot be

recycled indefinitely given that some energy will always be lost in the process and the quality of the material will reduce each time it is recycled (Song 2016, see section 2.6.2.). She explained that using materials for their intended function, rather than throwing them out to be transformed into something new, produces less emissions, and therefore more attention should be paid to reducing food waste before it is put in the compost bin. Anne (composter, Le Plateau) went on to criticize the concept for perpetuating business-as-usual among polluting food industries, saying:

> It's like, "Oh, what can we do to adapt capitalism to ecology?" Whereas for me, I think that it's very limited because at the end of the day, you know, the businesses, they still exist, they are still polluting in their manufacturing processes. Even, sometimes it's violent the extent to which nothing has changed but therefore they pass as green investors because they still make a tiny effort, even if this effort pollutes more and so they have crazy financial reductions because it's 'green', y'know? […] A lot of greenwashing.

Louise, another composter in the Plateau, shared a similar critique of the way in which the CE is often used to greenwash private companies: "I am always sceptical of the concept of the circular economy because I know that it is often used just to green the image of a corporation or whatever." These critical engagements with and awareness of the CE suggest that the concept may have begun to circulate among a more educated minority of the public, as well as within universities. Interestingly, despite their critical engagements with the CE, all three participants who were familiar with the CE still admitted to not having thought about how the organic waste collected by the municipal compost program was treated, or what happened to the finished product. This suggests that, even among members of the public who are familiar with the CE concept on an academic level, there remains a disconnect between individual environmental awareness and participation in environmental governance on a municipal scale.

Other residents who were *not* familiar with the CE expressed interesting and astute critiques of the concept once it was explained to them. Simon, a non-composter in the Plateau, for example, had no prior knowledge of the CE. However, once the concept was explained to him, he was cynical, saying, "I don't know how they are going to collect everything. They can't even do a good job of the recycling yet. So I don't understand. […] I don't know how they could manage to achieve a circular economy".

Laura, a composter in the Plateau, was also incredulous when the circular economy was explained to her, citing the recycling of plastic as an example of the significant challenges that still need to be overcome to achieve a circular economy. She says:

I think that it'd be really important to work on removing single-use plastics. Because, I don't know, as far as I understand, plastic is actually not that recyclable. It can only be […] down-cycled. So, you can only make less. Like the quality degrades and then eventually you just -- it's garbage, you can't use it anymore.

These critiques gesture to the logistical and conceptual challenges mounted against the CE. How can the city have complete control over all the waste streams to recuperate one hundred per cent of what is discarded? How can they valorise these waste streams and recycle all materials back into production, especially when many materials can only be downcycled?

Others resisted the individualising scale of responsibility implied in Montréal's interpretation of the CE. Participants who were not previously familiar with the CE discussed the risk of it perpetuating the disproportionate targeting of individuals as responsible actors for food waste. Interestingly it was often non-composting participants that levelled the most astute critique of individualising discourses, as illustrated in the following extract from a focus group with non-composing residents of Le Plateau:

Jennifer: But I would be curious to know the percentage impact that it has, individuals versus, you know, large industries and all of that. It's like as if they put all the responsibility and the only solution – it's the individuals. But, in fact, it's like, you know, if… I don't know, [individuals] represent five per cent, then large businesses represent 95% and they do absolutely nothing. It's like, I think to myself, you know, my eggshells here… [sighs].

Chris: Yeah, exactly. Like just the agricultural system, that farmers must throw away certain products simply because they don't work for supermarkets because they have like standards […] Why do we still have these standards in 2022?

[…]

Jeanne: But they are throwing away hundreds of tonnes of food that is still good, but that… even if it's not ideal that it's not freshly produced the same day, it still has an impact that is undoubtedly much greater than that of individuals.

Here, non-composting participants gesture to the systemic drivers of food waste, and they critique the focus on individuals. Their remarks resonate with critical scholarship, such as Gille's (2012) food waste regime analysis, which reveals how neoliberalism entrenches systemic

food waste at every stage of the supply chain. It also mirrors Hird's (2021) critical analysis of Canada's waste system, in which she highlights that upstream waste from extraction and production are responsible for 97.6% of Canada's total waste.

The scepticism expressed by citizens who were previously unaware of the CE implies that if citizens were more involved in CE discussions or better understood how the concept influences the organization of municipal waste management, they could offer valuable critiques that might reshape its implementation in the city of Montréal. Again, this underscores the importance of citizen-involvement and transparency in the establishment of CE agendas for waste management. It also rings with another form of politics theorised by Latour and discussed by Hird (2021). As discussed earlier, Hird draws on Latour's Politics-5 to describe how waste becomes normalised so that it is rarely politicised as an issue of concern on a citizen-level. However, Hird also puts waste issues into conversation with Latour's Politics-3. Where Politics-5 describes how citizens "fall asleep" with regards to waste issues, Politics-3 describes how governmental techniques to normalise an object and frame an issue in terms of a common good, fail. This can lead members of the public to become "skeptical that they are not getting the full story" (*Ibid*: 39). This section and the previous suggest that where citizens are prompted to consider where their food waste goes or how the CE is implemented at a municipal level, waste moves from Politics-5 to Politics-3 as they are prompted to politicise their waste and its management. It suggests that encouraging citizens to (re)imagine waste management on local and municipal scales has the potential to transform dominant approaches to the CE.

6.8. Scalar critiques and local alternatives: "People would be happier if it was smaller scale"

In this section, I build on the previous analysis by describing how participants question the city as an effective scale for organic waste management. Both participants with and without prior knowledge of the CE concept questioned the city as an effective scale for the CE and raised doubts concerning the quality of the compost produced, the challenges in redistributing it to citizens, and the logistical constraints of including larger apartment buildings. Marie, a composter in the Plateau who was already familiar with the CE concept, questions the quality of compost that can be produced at a municipal scale, saying, "The average human does not know

how to separate their waste, there is going to be contamination in everything. So, you know, I must admit that for me it is something that would put me off, the contamination in the municipal compost redistributed to me". In the same focus group, Louise (a composter in the Plateau) agreed, adding that the benefits and returns a CE is supposed to offer are not effective on a city scale: "[…] for me, the circular economy must have some kind of… redistribution. In any case, benefit towards the community. But I find that it is not that concrete or visible, this benefit."

Other citizens also referenced scalar critiques when discussing the fact that the program was not offered by the city to their apartment block, due to its size. The city of Montréal does not currently offer organic waste collection to apartment blocks of over nine or more households in NDG, and twenty-one or more households in Le Plateau. In an interview with Audrey, the environmental agent for the neighbourhood of Le Plateau, she explained that this was due to logistical and infrastructural challenges when it comes to collection: "Having 50 little bins lined up next to each other, it's impossible to manage. And also having large bins of two hundred or even three hundred litres of food waste, it's extremely heavy." Many non-composting citizens who came to my interviews and focus groups cited this as the reason they did not participate in the program: the program simply was not available for them. Elise, a non-composter in NDG, for example, explained, "So that's the barrier, is that it [food waste collection] doesn't exist." Non-composting citizens raised logistical concerns such as these in their critique of the city as an effective scale for organic waste management and the CE. While economy of scale is often cited as a reason for organising municipal organic waste management centrally, it therefore also poses constraints (Morrow et Davies 2021).

Participants discussed, often at length, alternative scales of organic waste management, which might see the CE operate more efficiently. In these discussions, some citizens proposed the local as a more efficient scale of organic waste management, that might encourage participation, produce a better-quality compost, and reconnect individuals to their food waste. Participants described the local as a scale that would be more likely to motivate and mobilise citizens to participate and adopt better composting practices. Deborah, a composter in Le Plateau, for example, describes the local scale as having the potential to reconnect people to the processes and end products of composting, saying:

I think maybe the mechanism of composting, and the end result, is not really well known. So, if somebody thinks of it exclusively as a waste management type, as opposed to, you

know, getting an end-product in the end, I think people would think about it a lot differently.

This reconnection to compost as an end-product for gardening and farming was raised by several participants as an important motivator for environmental awareness. Others also describe the local scale as jurisdictionally easier to manage. Melissa, a non-composter in NDG, says:

In my building, people would be happier if it was smaller scale, you know? There would be less complaints if it was smaller scale. Because if you call the city and say, "You didn't pick up our recycling!" like, they're getting 50 other calls, you know? So I think if […] we have compost just for our building kind of thing, it would be improved.

Some participants argued that the compost produced on a local scale would be of better quality, due to a greater variety of organic waste materials, the capacity to monitor the compost process more closely, and a greater sense of responsibility among participants to compost better. Emily, a non-composter, in NDG, summarises this by saying "they're going to see the effects of what they did first-hand, you know, whereas if you're just putting it in a bin and it goes off in the city, it's almost like trash."

Participants such as Chris, a non-composter in Le Plateau, emphasised the wider social and community benefits, saying:

More creating community spaces, also to be able to meet people, too, so that it's not just to take your compost, then you toss it. It's a space that's more… more welcoming maybe. Because you might receive information there, share information, like ideas, little composting or teaching activities.

In this way, Chris suggests that local composting might be part of a more holistic social and environmental project on a community scale, resembling Calisto Friant, Vermeulen and Salomone's (2020) 'transformational circular society'.

Some citizens described enacting their own small scales of composting, using private composters in their garden, for example, which they then used to fertilise their garden. Several other participants detailed their experiences with vermicomposting, a method of private household composting that utilizes both the digestive capacities of worms and microbial decomposition processes to generate compost. Margaret, a composter in NDG, for example,

describes how she tried to get involved in community composting initiatives but found them inaccessible. Instead, she turned to home vermicomposting. She explains:

> I've been wanting to compost forever and ever and ever. And I sort of called different organisations and said where is there communal composting? And it was always too far away, and it was always sort of complicated. […] And then at one point, I decided to do some compost […] I did vermicomposting.

This shows a desire and a will among some participants to enact alternative scales of circularity for their own private use. These citizens often owned a garden or a house and described their desire to use the finished compost as fertiliser for their plants. As I will discuss further in section 7, while this scale of composting is transgressive in enacting alternative circularities, it can also be exclusive to wealthier households and homeowners with a garden.

The scalar critiques posed by citizens, described above, demonstrate that when prompted, citizens question the city as an effective scale for organic waste management and for the CE. Even though most participants lack knowledge about the CE concept and what occurs with their food waste post-collection, these critiques indicates that citizen have their own notions about how waste management could be handled on different, on more localized scales, and some citizens even demonstrated a will and desire to enact these alternative scales in private composting initiatives. With reference to Figure 6, as citizens contemplate provincial and municipal directives (the CE) and the processing of organic waste, there is potential for previously ambiguous dotted lines delineating these scales to become clearer. As critical CE scholarship suggests, this might open channels for alternative circularities to develop which promote social justice perspectives (Calisto Friant, Vermeulen et Salomone 2020; Morrow et Davies 2021) and the creation of local commons where benefits are shared locally (Swagemakers, Dominguez Garcia et Wiskerke 2018), all themes that were raised by participants in this research.

6.9. Conclusion:

In this chapter I have argued that Montréal's organic waste management is shaped by the scalar politics of environmental governance under neoliberal capitalism. This aligns with

research by Hird (2021) who describes Canada's dominant approach to waste management as shaped by neoliberal, "technoscientific" discourses and policies, involving lucrative public-private partnerships, and investment in heavy, centralised infrastructures. I have shown that these dominant neoliberal configurations of waste management are maintained despite the recent adoption of CE approaches into provincial and municipal policies and discourse. On a provincial level, the CE has been adopted since 2016 as an organising concept for provincial approaches to organic waste management. As represented in Figure 6, formal directives from the provincial government agency Recyc-Québec encourage the adoption of composting programs and a CE approach into the waste management plans of Québec's provincial municipalities, including the CMM.

At the municipal level, the CMM has incorporated these directives into existing approaches to organic waste management marked by the construction of large, centralized treatment facilities and the outsourcing of services to private companies in lucrative contracts. I have shown how public-private contracts contribute to a lack of transparency and oversight with regards to how the waste collected by the municipal composting program is treated and redistributed. They foreclose scrutiny of environmental objectives, lead to infrastructural lock-in, and compound an occlusion of the city from residents' scalar imaginaries of responsibilisation. The latter is evident from the fact that all participants, except one, were unaware of the destination of their food waste once it left their front doorstep. Furthermore, the majority had never considered how the compost would be used or processed on a municipal or provincial scale. Drawing on Hawkins (2006), O'Neill (2019) and Liboiron and Lepawsky (2022), I suggest that a mental and physical distancing of residents from their food waste also reflects modern subjectivities and dominant urban planning approaches that seek to invisibilise waste in the city. The effect of these municipal approaches to the CE is to depoliticise organic waste management on a citizen level and to maintain business-as-usual food and food waste regimes.

Municipal and provincial publicity campaigns promote organic waste governance as an individualised responsibility by framing citizens as consumers and service-users, rather than including citizens in agenda-setting or decision-making processes. This reflects the construction of an "environmental citizenship" identity through which attention is focused on individual and household waste, while obscuring upstream or systemic regimes of waste (Hird 2021; Rice 2014). On a citizen-level, many participants seemed to have internalised the environmental duties and ideals that an "environmental citizenship" identity calls them to assume, leading to self-governance practices. This was apparent in the ethical language employed by many

participants when discussing their individual responsibility to participate in composting initiatives. Participants also discussed actively observing the pro-environmental behaviours of their friends, families, and neighbours. When asked how to improve the organic waste system in Montréal, many suggested solutions such as public education campaigns that target individual attitudes and behaviours. These behaviours point to an adoption of an individualised scale of responsibility for organic waste management on a citizen-level.

Participants were more inclined to associate their responsibility for composting with global concerns such as climate change and global food inequalities, rather than focusing on local, municipal, or regional scales. Montréal's composting program therefore acts as a discursive and performative bridge between global anxieties of climate change and food insecurity on the one hand, and individual environmental subjectivities on the other, with the scale of the city often occluded from citizens' scalar imaginaries of responsibility, as represented in Figure 6. This, again, forecloses political resistance to municipal or regional governance of food waste.

Nevertheless, I have also shown in this chapter how both composting and non-composting participants mounted some resistance to the CE and to the city as an effective scale for organic waste management. This resistance was often levelled when participants were challenged to consider alternative scales for organic waste management and to respond to the CE as an organising framework for waste management in Montréal. This demonstrates that citizens are able to look beyond the dominant scalar imaginaries promoted by neoliberal environmental governance when they are invited to do so, and that many have their own notions regarding how organic waste might be handled more effectively on local scales. Some even enacted these through private composting behaviours, such as home composting in their garden or vermi-composting. This suggests that environmental citizenship identities can co-exist with some scepticism towards the municipal approaches to organic waste management, even where citizens find themselves unable to engage in envisioning or constructing alternatives, or are not invited to do so (Hird, 2021). It also indicates that involving citizens, not merely as service users but as active participants in decision-making and definitional discussions, holds transformative potential for the scalar politics and structures governing Montréal's organic waste management, including emerging CE approaches.

If, as Hird suggests, there is an association between Latour's Politics-5 and Politics-3 in municipal waste management, resistance raised by the participants of this research might

suggest that there is potential for organic waste and the CE to become publicly politicised. Where Politics-5 refers to how objects are normalised and depoliticised among the public by governmental techniques, Politics-3 described how these techniques fail, thereby raising public concern and scepticism. Could greater public interrogation of Montréal's CE commitments lead to a re-politicisation of organic waste? While my research indicates that citizens have the capacity to surpass and critically examine the dominant scalar imaginaries advocated by neoliberal environmental governance when provided with the opportunity, the realization of this potential requires increased public participation in agenda-setting and decision-making at all levels of governance; approaches are foreclosed by existing governance arrangements in Montréal's organic waste management.

In the following chapter, I describe the disparities in individuals' capacity to adopt composting practices. Neoliberal regimes governing food and food waste not only perpetuate waste across every stage of production and consumption but also establish systemic inequalities, meaning that the responsibility to manage food waste is experienced differently by different bodies. I will show how inequalities are structured by socio-economic factors, including age, income, gender, motherhood, and physical ability, as well as more-than-human encounters and the material agency of food waste itself. These differences and inequalities are overlooked in neoliberal approaches to waste management, with important consequences for the overall outcomes of Montréal's composting program.

7. DISCUSSION PART 2: INEQUALITIES IN THE MORE-THAN-HUMAN CARE WORK OF MUNICIPAL COMPOSTING

7.1. Introduction

In this section, I draw insights from focus group and interview discussions with both composting and non-composting participants to show that socio-economic, gendered, and more-than-human factors shape how people adopt or reject composting practices in their everyday life. Leveraging perspectives from feminist and post-humanist scholarship, I argue that composting in Montréal's municipal program should be viewed through the lens of *care work*. Approaching composting as a form of care work highlights the physical, mental, and emotional *work* required to "stay with the trouble" of composting (Haraway, 2016). This analysis reveals the importance of an everyday approach to understand how citizens respond to waste policy; described by the participants themselves: "we find that it's really in our everyday lives that – I wouldn't say confronted but we are challenged with incorporating it into our everyday life" (Deborah, composter, Le Plateau). An everyday approach offers insight into the intersectional inequalities that determine *who* can engage in this "challenge" of caring for compost, and therefore, why Montréal's composting program often fails on the ground.

7.2. Financial inequalities and mental load

Financial inequalities were raised by most participants as a potential barrier to participation. First, many participants, both composters and non-composters, mentioned the high cost of compost bags used for the countertop bin as a significant financial challenge. Composting citizens must purchase these bags at personal cost, and many considered this a financial burden. When asked about the obstacles to participation in the composting program, June (composter, NDG), for example, responded: "I think what discourages people is that they have to buy the special compost bags. That discourages them, so they just don't bother." Deborah (composter, Le Plateau) similarly expressed "No, but the fact that you have to buy them! My god, that we are obligated to buy them. How do you expect people to spend more money on that?". Some non-composters cited the cost of the bags as a reason they do not

participate in the program. Gabriela (non-composter, NDG), for example, explained: "just, it's more expensive because you have to buy the bags, and I mean you could technically not do it with the bags, but it just gets disgusting if you don't use the bag, right?". When asked how the municipal composting system could be improved, many suggested that the bin bags be made free.

Participants also discussed other financial barriers. Emily, a non-composter in NDG, described how she stopped composting when rising quantities of food waste in her building contributed to an increase in her condominium fees. She explained that the volume of food waste produced by her condo increased during the pandemic as residents spend more time at home. This coincided with a patchy collection service, meaning that food waste often accumulated in the building, attracting pests. Emily explains: "So, people are being more careful now because that means our condo fees went up, our contingency fund was affected".

Participants also spoke about poverty in broader terms, emphasizing how it adds to the mental burden associated with participating in the composting program (or the "charge mentale"). Perhaps the strongest terms used when discussing the broader impact of poverty on participation in the municipal composting program were employed by a representative from NDG's écoquartier, Daniel. Daniel, who has worked in the écoquartier for 23 years and helped co-ordinate the introduction of the municipal composting program in the neighbourhood in 2015, described the poverty he has witnessed in areas of NDG. He cited streets in NDG such as Walkley, saying "You go over two streets here on Walkley – they're trying to put food on their tables. They don't give a shit about composting". At the introduction of the program, Daniel explained how the écoquartier and a group of volunteers went door-to-door to hand deliver 22,000 composting bins. He described his discomfort at having to inform residents that if they did not compost correctly, they would receive a fine, saying "how the hell you gonna give somebody a fine that has no money, and they're trying to put food on the table, you know what I mean?". He went on to say:

> I would see other places where I'm knocking on the door and I see only a chair and blankets on the floor with a pail. And that's all they had in the whole house. And here I am teaching them how to recycle. They don't have money for anything. […] *These* are the people that people don't see.

Having worked on a range of environmental projects, often in disadvantaged areas, Daniel also discussed a panoply of other social inequalities, from drug and alcohol addictions to

high crime rates. Discussing drug and alcohol addiction, for example, he asks "when you've got half the people drunk and stoned out of their mind, how the fuck do you expect them to compost?". He went on to expand:

> Because a lot of different other things are going on in people's lives. A lot of other issues, people going through divorces, people going through, you know, stuff like that. It's a big deal. […] A lot of people with mental disability. They can't function properly. It's all these people, all these people that make up this world, too.

Others recognised that barriers to engaging in pro-environmental behaviours extend beyond material poverty. They highlighted that limitations in time and resources, in addition to financial constraints, can heighten the challenges associated with activities like composting. Many participants explained that being busy and having other commitments and anxieties limited their capacity to participate in the composting program. Anne (composter, Le Plateau), for example, discussed the challenge of remembering to take the bins out every week when there are three different schedules to respect, alongside a busy school and work life. Deborah (composter, Le Plateau) also explains: "Adding to the mental load of any household, whether it's a household with young kids, or young adults who are roommates, whatever. Adding more things to do, or things, constraints… It's not what people naturally want to do […] especially if it stinks. [Laughs]". Laura (non-composter, NDG) describes how "some people they just don't have the resources. I don't know, they're busy, they're stressed, they have other things to think about, you know." Jeanne (non-composter, Le Plateau), likewise, explains "It adds to the worries of everyday life, plus it's a little bit always there the worry of climate change and sustainable development and all of that. So, it doesn't help when there are already other stressful things in life." These comments suggest that some participants experience pro-environmental behaviours such as composting as an additional mental and emotional burden, compounded by life's other anxieties.

Daniel's remarks, and those from the participants above, underscore that adhering to "correct" values and expressing a desire to engage in environmental practices does not invariably translate into the straightforward adoption of environmental behaviours (Shove, 2010). Rather, the examples in this section are a reminder of the inequalities inherent to neoliberal capitalism and exacerbated by neoliberal approaches to urban environmental governance (Bee, Rice et Trauger 2015). The neoliberal, moral imperative to compost can compound and overlook pre-existing anxieties along lines of inequality. As discussed by Morrow and Parker (2020: 614),

individualising neoliberal policies mean that "more and more is being downloaded onto individuals and households, who have become progressively more isolated and atomized". And yet, this individualisation of environmental responsibility confounds important embodied and intersectional differences that structure individuals' capacity to adopt environmental behaviours. An everyday governance approach, inspired by scholars such as Cornea, Véron and Zimmer (2017: 8), reveals the "heterogeneous on-the-ground realities" – including the socio-economic "blind spots" – of Montréal's neoliberal approach to municipal composting. In Daniel's words, "these are the people that people don't see".

7.3. Housing inequalities

Participants also discussed how their housing situations shaped their participation in the composting program. Both composting and non-composting participants discussed the challenges of participating in the program in an apartment compared to a house. As already discussed in section 6.4., apartment blocks of twenty-one households or more in Le Plateau, and nine households or more in NDG, are not served by Montréal's composting program. Some non-composting participants cited this as the reason for their non-participation. Florence, a non-composter in NDG, for example, explained that she was forced to stop composting when she moved from a house to an apartment not served by the collection program. The size of the apartment was also important, with Jeanne, for example, a non-composter in NDG, describing how having a small apartment without a balcony limited her ability to compost. Even composting participants cited the constraints of living in an apartment as an obstacle in their everyday composting habits. Gabriela, for example, a composter in NDG, explains "my kitchen is very small. It's really small, so I struggle with the space, I don't have counter space, I don't have space for anything!". As also discussed by Turner (2019a), participants had strategies for coping with the limited space, including keeping their counter-top bins on the floor, for example, or using smaller Tupperware boxes rather than the larger bin to store food waste.

Participants also cited having a garden as a factor that facilitates participation in both municipal and private composting. Having a garden allows people to practice private composting and facilitates the cleaning of the countertop and larger curb-side bins. Many participants pointed out that those living in houses with gardens are more likely to compost privately for use

in their own gardens. Deborah (composter, Le Plateau) asks "what will someone in an apartment who doesn't necessarily have access to a lot of plants – what will they do with it [the compost]?". Many also cited the challenge of cleaning the bins, and the space required to do this. Gabriela (non-composter in NDG) reflects "I wonder how people who live in apartments do it, because in order to properly clean it, you need some space to water it, you can't just do that in your apartment". Given that individuals with lower incomes are more likely to reside in apartments and may lack access to a garden or balcony, housing disparities are also likely to align with the financial inequalities previously described.

7.4. Physical Factors

Physical ability was raised as another factor shaping individuals' capacities to participate in the municipal composting program, representing a barrier for disabled or elderly residents. Elise, a non-composter from NDG, uses a wheelchair. She explained that program accessibility goes beyond mere availability, emphasizing the importance of having the necessary physical infrastructure to ensure full participation for everyone. This includes, for example, ensuring that residents and apartment buildings have the appropriate space to store their bins. She explained that on collection days bins were often tossed on the sidewalk, making it difficult for her to navigate:

> I use a wheelchair and so I cannot get around on garbage day a lot of the time. And I can't always necessarily move the bin out of the way. And when they're picked up, they're often just kind of tossed back. So, they're not even on their wheels, they're lying down. So, Kimberley [another participant] mentioned accessibility: to me that really doesn't just mean it exists, but that everybody, so people using mobility aids, people with strollers, wheelchairs, are able to do it, and not be sort of stuck when the bins are out.

Other participants also described the weight of the bin as a barrier on collection days. The physical act of taking the bin out, often down flights of stairs, was described as an inconvenience and a hazard, particularly in the winter when staircases and sidewalks are icy. Benjamin (composter, NDG) explains "we have to go all the way down to the basement to do the recycling and the compost". Florence (non-composter, NDG) has a similar experience, also highlighting the physically demanding nature of these routines for the elderly. She says "the

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place where we put our recyclables is very far, like you have to go down to the basement and walk to the other end of the garage. Whereas the garbage is very convenient, it's on every floor, and there are lots of older people living in the building".

The examples in this section highlight how physical barriers and inequalities structure the relationships between infrastructure, policy, and individuals. This is also an example of how the materialities of composting can exceed moral or discursive environmental or CE imperatives. The management of food waste is not solely determined by the values, identities, choices, or behaviours of individual citizens. Instead, it is also influenced by the material realities of individualized food work and waste work prescribed by municipal policies and infrastructure (Fraser et Parizeau 2018). This reflects Fredericks' (2018) 'vital infrastructures of labor' concept, which understands waste infrastructures as performative government practices enrolling humans and nonhumans. While Fredericks writes from a Global South perspective (also drawing on Simone, 2004), the examples above demonstrate that urban infrastructures in cities in the Global North, such as Montréal, are equally "alive in all sorts of ways with the materials that compose them – including the trash and its active biological processes but also, crucially, the human labor through which they take form" (17). Despite the stereotypical images of urban infrastructures in the Global North as "modern" and "functional", the more-than-human relations brought together by neoliberal environmental governance approaches can be fragile and dysfunctional. Their burdens often fall on individuals in unequal ways, including along lines of age and physical ability.

7.5. A note on community composting

While not addressed as a primary focus of this research, it is important to acknowledge the existence of small-scale community composting projects in Le Plateau and, to a lesser extent, NDG. Some scholars describe community composting projects as possessing the potential to champion radical environmental and social justice goals (see section 2.3.6.). However, as I describe in this section, interviews with two participants suggest that many of the inequalities apparent in the municipal composting program are also prevalent in community composting initiatives.

Community composting has been operational in Le Plateau-Mont-Royal since 2015, coinciding with the roll out of the municipal compost program in the same year. I discussed Le Plateau's community composting program in an interview with Audrey, an environmental agent working for the *Division de l'aménagement écologique de paysage* in the borough of Le-Plateau-Mont-Royal. At the time of our interview, in March 2022, forty-five community composting sites existed across the borough. Audrey explained that the program was established in Le Plateau alongside the municipal collection to address the lack of provision for larger apartment blocks. Communal composters installed in public spaces such as parks allowed those without access to the municipal collection service to voluntarily sign up to compost their food waste. A minimum of fifteen people is required to justify the installation of a new site. All those who sign up receive a code with which to open the locks placed on the bins, as well as information regarding what material is accepted and how to use the bins correctly (see Figure 13).

The community composting sites in Le Plateau change according to the season. In the summer months, warmer temperatures allow for onsite maturation in a rotational compost bin. Participants are informed of what food waste materials are accepted and how to load the rotating compartments of the bin with wood chip, as illustrated in the informational documents given to participants and shown in Figure 13. The participants load the bins with their food waste, add the wood chips, then rotate the bin to aerate and mix the compost together. Once the bin is full, the compost is eventually taken away to be further treated and matured in Compost Montréal's facilities. In the winter, a larger 240 litre version of the brown household bins is installed onsite and, as Audrey explains: "you just have to throw in the bags, then after the maturing process happens elsewhere," This is because low temperatures that remain below freezing for most of the winter months in Montréal hinder the natural decomposition process. Community composting participants can request a return of the compost to be used on their gardens.

In addition to my conversation with Audrey, I also discussed the community composting program with a participant in Le Plateau, Deborah, who participated in both the community composting and the municipal program. Deborah took part in a focus group discussion as well as an individual interview, during which I asked her some more specific questions regarding her involvement in the community composting initiative. The small sample size of participants involved in the community composting program is limiting, and further investigation is necessary to better understand how community composting programs differ from or intersect with the municipal composting programs. Despite this, my conversations suggest that the Plateau's

community composting initiative may be marked by inequalities, much like the municipal program.

Despite an emphasis on accessibility, the community composting initiative appears to reflect neoliberal, individualising approaches. The language employed by Audrey to describe the community composting program mobilises a rhetoric of individual responsibilisation. Audrey emphasises the *choice* the program offers to citizens to participate in composting activities regardless of whether they have access to the municipal collection, for example. She was keen to emphasise the accessibility of the project, explaining several times that composting sites were installed "in public space and accessible to everyone" and that "there are no barriers, there's nothing, it is all open". Despite this, community composting remains a self-referential, opt-in program. Furthermore, in numerous conversations with composting and non-composting participants in Le Plateau, most people were unaware of that this community composting initiative existed. While some participants recalled having noticed the green rotational composters in parks across the neighbourhood, none of them understood what these were for. The paradox of accessibility in this opt-in system was not lost on Deborah, who highlighted that few people had the time, awareness, or capacity to participate in an initiative which represents an even greater commitment and effort compared to the municipal collection. She described how, in her building, "there are only about maybe six or seven households in our building of 43 [that participate in the community composting initiative]". The onus remains on individuals to respond to provocations to adopt environmental behaviours, therefore reflecting a neoliberal approach to social and environmental change critiqued by scholars such as Shove (2010) (see section 2.4.).

Deborah further argues that rather than making composting more accessible, the community composting initiative risks putting greater physical and mental burdens on citizens not served by the municipal collection. Deborah explains that the community composting program can present physical and mental challenges. First, the community composting initiative involves a complex list of rules regarding which items are accepted and not accepted that differs from those of the municipal composting program (see Figure 13). Avocado and mango pits are, for example, too hard and take too long to break down in the bins and are therefore not accepted. However, apricot pits are accepted. Citrus fruit are not accepted due to their acidity, neither are raw meats since they are more likely to attract animals. Participants are invited to retain this information and to cut their food waste into small pieces to facilitate the decomposition

process. Deborah describes such directives as sometimes overwhelming and difficult to remember.

The obligation to sort and cut food waste into small pieces, in addition to then carrying it – often down several flights of stairs – to the park, before loading and turning the bin, therefore puts citizens into further corporeal relationships with their food waste that can be onerous to many. Deborah explains that this commitment is difficult for her elderly neighbours, saying: "half of my building are over fifty years old. Are you going to tell them to bring their waste down to the park? In winter? When the sidewalk doesn't even go that far? Come on!" She also describes the mental load this represents, explaining "adding more to the plate to be like, now you want me to walk up to the park every two days to bring up my compost. It's a little detail, but I think that for a lot of people, it's not the sort of thing that they can kind of fathom". Moreover, it is worth noting that by targeting apartment blocks of 21 households of more, the community composting program seeks to responsibilise populations who are already more likely to be disadvantaged compared to those occupying duplexes or houses.

Such reflections resonate with Fredericks' (2018) concept of the 'vital infrastructures of waste labor', in which bodies become imbricated in neo-liberal urban infrastructures through low-tech community waste management programs. By devolving the burdens of labour onto voluntary citizens, neoliberal community-scale programs such as these reconfigure "the relationship between the body, infrastructure, and the city" and subject citizens "to new forms of state discipline" (Fredericks 2018: 61). Community composting programs might therefore be imagined as an extension of neoliberal approaches to food waste governance, rather than an alternative to it. Waste management responsibilities are devolved discursively and materially onto bodies who are tasked with filling in for the shortcomings of municipal infrastructural provision and responding to a systemic focus on downstream, individualised domestic waste management.

This nuances analysis by scholars such as Morrow and Davies (2021) and Swagemakers, Dominguez Garcia and Wiskerke (2018), who praise community composting as a radical alternative to mainstream, neoliberal, centralised approaches (see section 2.3.6.), with the potential to enact alternative circularities. Morrow and Davies (2021) for example, suggest that the relations of care fostered between a more-than-human community of composting actors have the potential to engender alternative food politics and ethics. My observations of Montreal's community composting program – albeit limited in scope – suggest that community initiatives

can also be marked by inequality and inaccessibility. I thereby join with Fredericks (2018: 62) in countering "overly optimistic and immaterial portrayals of participatory infrastructures with a more nuanced analysis." While Fredericks' concept of the 'vital infrastructures of labor' is explored within the context of cities in the Global South, this case study suggests that they might also be applied to investigate local climate adaption programs in cities in the Global North. Reflecting on how such concepts might apply to a Global North context is particularly pertinent given the rise of discursive approaches to urban climate adaptation that celebrate local, participatory solutions (Audet 2016).

With regards to community composting initiatives in NDG and according to my conversation with Daniel, a representative from NDG's écoquartier, NDG used to have two community composting sites, one of which since closed. The remaining site, at Herbert-Outerbridge Park, serves 40 families. None of the participants I interviewed in NDG engaged in community composting at this location. Due to the limited scale of the community composting program in NDG and the constraints of my sample size, I am unable to perform a meaningful comparison with the program in Le Plateau. This would constitute an interesting subject for future research.

Figure 13: Sample of informational documents provided to residents participating in the community composting program in Le Plateau.
Source: Resources shared with the author by Le Plateau-Mont-Royal écoquartier.

7.6. Gender Inequalities

Some of the most apparent inequalities discussed in focus groups and interviews were related to gender and motherhood, such that while the topic was not initially anticipated in my original questioning route, it was later integrated after multiple participants raised the issue independently[14]. The analysis in this section draws on critical feminist scholars to consider how Montréal's composting program centres on downstream, individualized waste management in the home, in ways that disproportionately responsibilise women and mothers. I draw on feminist scholars to consider how gendered and maternal framings of environmental responsibility in the home celebrate singular versions of woman- and motherhood. This risks marginalising women from public space and exacerbating inequalities not only between men and women but also between women.

7.6.1. Gendered roles in composting

Several participants described how gender roles shape how composting is managed in the home. Female participants described women as generally being more conscious of food waste in the household, more likely to manage the household compost bin, and to remind others to participate, compared to men. On the other hand, participants described men as taking on different roles with regards to composting, namely the intermittent physical tasks such as taking the compost bin out to the sidewalk for collection. This aligns with feminist scholarship which shows that women are expected to bear a disproportionate bulk of the "food work" in the private sphere (Dzialo 2017; Fraser et Parizeau 2018; Sandilands 1993).

Several participants drew on their understandings or observations of traditional gender roles in the home to unpack how composting is adopted differently among men and women. Elise, a non-composter from NDG, offers the following perspective:

> Writ large, I would say the emotional labour part of it has been shown to be more female or not-male. So having the bins, organising them, making sure that kids put stuff in the

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[14] This is perhaps owing to this study's sample, which was disproportionately female. Seventeen out of a total of twenty-three participants identified as women.

right spot. But because it's a task typically that happens intermittently, so once a week or once every two weeks, the actual taking to the curb is often more coded as male. So, we find this in a lot of tasks where it breaks down to the person doing that emotional labour, the thinking and planning and reminding. So, the wife, you know, is the one that plans it all and has the bins and reminds people and asks the husband to take it out on that one day.

Susanne, also a non-composter in NDG, made similar observations about the different gendered roles that her parents took on with regards to composting when she was growing up. At first, she refuted the idea that women are disproportionately responsibilised for composting. However, upon discussing the issue further she concluded that the different roles her parents took on within composting were indeed gendered and often unbalanced. Susanne described her dad, for example, as more responsible for managing the private composter that they kept in the garden. She explained: "especially when they had their own little compost bin at the back of the house, he was the one who was dealing with it and poking at it and doing whatever you have to do with it to get the soil out of it." Susanne reflected on the physical task of private composting as coded as more masculine since it is more "of an outdoors thing" and "more of a dirty thing to do." She explained: "if you're looking at it in the traditional sense, and you're thinking, well, men are still the ones who are going to be dealing more with mowing the lawn or shovelling the walk, this is also an outside task." In comparison, Susanne described how her mum took on more responsibilities related to organising, reminding, and educating her family: "making sure everybody was putting the stuff in the right place. And making sure, like, Oh, David [pseudonym], it's time to take it out. And, y'know, washing the countertop bin". Even if her dad did the grocery shopping, Susanne reflected on the fact that it was her mum who "tells him what groceries to get" and who was responsible for cleaning out the fridge. She concluded by pondering, "So I guess he [her dad] is just doing the physical act instead of taking control of the whole thing. Now that I think of it, he doesn't deserve as much credit as he's getting! [Laughs]."

Gabriela (non-composter, NDG) also discussed the gendered differences in food and food waste management, explaining that women tend to be more observant and conscious of waste in the house and in everyday life. She says, for example: "women are more aware, in general […] unless, I guess, men are somehow involved in something that's related to the environment". She describes how her husband is less likely to notice waste and wasteful practices. Where she would notice the amount of single-use plastic packaging that is used in different stores, for example, or which stores tend to be cheaper and busier, her husband "would

have never made those observations". Gabriela attributes these distinctions to her increased responsibility for shopping, cooking, and caring for their daughter.

The interventions made by participants above echo with feminist scholarship on the gendering of environmental governance under neoliberalism, what Dzialo (2017: 1) describes as the "feminization of environmental responsibility". She shows how pro-environmental behaviours, ethical consumption, and environmentalism are more feminised in countries with a greater adherence to neoliberalism. Dzialo explains that neoliberal countries are more inclined to prioritize pro-environmental behaviours and market-based solutions in the private sphere over systemic changes. By encouraging food waste management in the private sphere, a domain that is traditionally coded as feminine, neoliberal environmental governance approaches prescribe solutions to climate change that implicitly and disproportionately responsibilise women (Cousins 2021).

In the Canadian context, Hird has critiqued a focus on the private sphere in dominant waste management approaches. Fraser and Parizeau (2018) draw on DeVault's (1991) "food work" concept to describe the covert and coded gendering of food practices, also in Canada. They define "food work" as comprising a series of domestic food management practices, including budgeting, planning, and cooking meals, purchasing groceries, assessing the quality of foods, and managing family likes, dislikes, health concerns and dietary requirements. This unpaid labour often falls within the remit of responsibilities traditionally associated to women and mothers and is mobilised by neoliberal approaches to organic waste management in Canada that concentrate on downstream behaviour change and consumption practices in the home. Wilson and Chu (2020: 1096) summarise this in the following way:

> as a result of neoliberal logics being deeply infused into climate change politics (Bee et al. 2015), we have seen a reprivatisation of care formerly provided by the state, which ultimately restricts women by assuming that there is an unlimited supply of unpaid women's labour.

7.6.2. Maternal framings of environmental responsibility

This section builds on the previous by zooming in on the way in which motherhood was discussed and experienced by participants in relation to everyday composting practices under Montréal's municipal program.

Regardless of whether they participated in the composting program or not, many of the mothers I spoke to described how becoming a mother led to an increased environmental awareness. Deborah (composter, Le Plateau) describes how she became aware of the rising quantities of food waste in her household upon having children, which in turn engendered a wider environmental awareness. She explained "the environmental component was really pushed into life when I had kids. […] With children, I found that there was a little bit more food waste than usual with the two adults. And that got me more interested in it". She explained that becoming more aware of her family's food waste also encouraged her and her partner to learn more about how it is managed, including how food waste emits greenhouse gas emissions in landfill. Deborah explains that "the more we learned about it, the more concerned we were about making sure that we had it [composting] as an option". Emily, a non-composter in NDG and single mother of one, similarly explains "when I became a mum, I became more aware of the trash. Like the diapers, the milk cartons… Just stuff like that, that start to accumulate".

The mothers in this study also described how having children made them more concerned for the future of the planet and to protect it for their children. Beth (composter, NDG), for example, gestured to this association when describing a conversation she had with a group of friends with children. She explained:

> Food waste is actually a big conversation with my friends and I. Even just Sunday, we were talking about it, because a lot of them have kids, and we're all very mindful of climate change. So, it's like thinking of the future of the children and how we need to take care of the world now.

Emily (non-composter, NDG), similarly explains "being a mum, you want to create a good environment for your child when they're older, you know. You don't want to contribute to global warming and things like that. So, this all comes into play." When asked further where this desire came from, she explained, simply, "I love my baby so much I want the best for him". Gabriela

(non-composter, NDG) similarly describes how having children "pushes you to compost", saying "the main reason is that you want a better planet for your children and your grandchildren".

Finally, mothers in this study also described how their environmental awareness and their participation in composting activities were compounded by efforts to educate their children to be responsible environmental citizens. Deborah (composter, Le Plateau) explained, "By showing my children it's also about encouraging the development of reflexes for myself and for them, it's very important". In this way, her positionality as a mother and an educator compounded her commitments to environmental behaviours such as composting. Katy (composter, Le Plateau) also discusses her role in teaching her children how to compost. She describes the "big conversations at home" she has with her children when they throw away their lunchbox leftovers without giving thought to how they might be reused or composted. For Katy, it was important to teach her children to appreciate the material value of food and not just its exchange value, and to explain to them that in wasting food "it is not just money that we are throwing, but resources".

Nonetheless, regardless of the association between motherhood and environmental awareness, few mothers translated this into forms of activism in the public sphere. For most composting mothers, their environmental action was contained to the private sphere, involving participation in the municipal composting program and efforts to educate, encourage, and remind their family members to compost. There was one exception to this trend. For Deborah (composter, Le Plateau), the desire to educate others about composting also extended to her advocacy efforts beyond the home, within the community. She draws direct links between her positionality as a mother and her involvement in campaigning projects, saying: "I really wanted to put myself in this perspective of it's not just for me, if it's available we need to talk about it in our community, our building, and also to show my kids".[15] However, Deborah was the only mother – and indeed the only participant – involved in pro-environmental campaigning in the public sphere. This suggests that environmental sensibilities (including those associated with motherhood) are channelled by environmental policies such as composting programs in ways that might foreclose participation in public sphere decision-making and campaigning.

Other mothers interviewed in this research did not participate in the composting program, despite describing the same environmental awareness associated with having children and a

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[15] This link is also evident in an anecdote explored in Section 6.6., in which Deborah describes how having children made her aware of the number of diapers she threw away each day, driving her to search for compostable alternatives.

desire to protect the planet. Some described the pressure put on mothers to adopt pro-environmental behaviours. Gabriela, for example, describes how being a parent and a mother can lead to feelings of "guilt" for not participating in pro-environmental behaviours. She described feeling "overwhelmed" due to a recent house move, her work, and her responsibilities as a mother, ultimately prompting her to discontinue the program[16]. She explained: "I feel like my mental health takes priority in this period of my life, at least." Nonetheless, she explains that the expectation to compost is forwarded by her daughter's school and other parents, saying "I think there's the idea that in school, they're composting, right? So, I feel bad that they're doing compost at school and that we're not doing it at home". She goes on to describe the "level of anxiety with parents in general" associated with the idea that "everyone wants to do their best and nobody wants to be singled out for not doing all the right things".

Gabriela considers the importance of recognising inequalities in parent´s capacity to participate. She describes a zero-waste drive promoted in her daughter's nursery, for example, through which parents were encouraged to send zero-waste packed lunches. She characterises this program as exclusionary to certain parents, emphasising how it overlooks important nuances relating to participation inequalities:

> it was a bit... I don't know [laughs]... good, but at the same time, not good, because it was the year that the pandemic started so I think a lot of parents were very stressed, so putting the added stress of, like, don't send anything that is a single container, you know. But most parents, they need to send something that's not - like, they cannot just plan the whole lunches with zero waste in mind, right? […] there needs to be some nuance on why this very good idea might not work. And it's not because people don't care. But there are many different reasons that are valid, you know?

This anecdote contrasts with that of Deborah's in section 6.6., in which she details her participation in a similar initiative as a member of the parent environmental team at her children's nursery. Unlike Deborah, for Gabriela, the discourses and initiatives promoted by schools and other parents can lead to "anxiety", "added stress", and can also risk overlooking valid reasons for which some parents are less able to participate. She articulates the sense of guilt this evokes, a burden that falls disproportionately on her in comparison to her husband, saying: "I consume more, so then I also feel more guilt. Because I'm the one who plans all the purchases

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[16] She also cites previous difficulties in managing animals attracted to the compost bin as a factor in her decision not to no longer participate in the program. I discuss this further in section 7.7.2.

and all the things." The difference between Deborah and Gabriela's experiences with composting initiatives in their children's schools demonstrates how environmental programs that target action in the home can compound inequalities not only between men and women but also between women (Cousins 2021).

Finally, Gabriela critiques the lack of nuance in children's environmental education and calls for an approach that also addresses how socio-economic inequalities intersect with people's abilities to adopt pro-environmental behaviours. She explains:

> But I think there's the mentality that, at least from the schools, to teach them […] they're supposed to do all these things for the planet. But there's no talk – I mean, they're too young, she's in second grade – about the nuances, like why some people are not able to do some things. Because there's that question of income levels, there's a question of abilities, you know, physical abilities. So, to be able to do all these eco-conscious activities, you need to have a certain ability that some people don't have, either because they might have a disability, they might not have the resources, either, you know, financial resources or time, energy... So, they don't teach the children the nuances of why things don't go exactly as planned when they're teaching them about the environment.

Gabriela highlights how an association between parenthood and environmental care can break down in light of socio-economic inequalities including income and physical ability. She challenges universalising moral discourses within children's environmental education that responsibilise individuals and obscure social inequalities.

Gabriela's experiences described above reflect work by Cairns, Johnston and Mackendrick (2013) and their concept of the "organic child", which refers to how ethical food discourses often intersect with ideals of motherhood. They describe how the constructed ideal of the "organic child", often mobilised in marketing campaigns, calls on mothers to care for their children and for the planet through ethical food practices. The authors show how such ideals represent a "gendered burden for women". Mothers are forced to negotiate such ideals in often complex ways, balancing the emotional load of normative expectations with practical obstacles. The authors describe how the "organic child" ideal "not only works ideologically to reinforce gendered notions of care-work, but also to set a classed standard for good mothering that demands significant investments of economic and cultural capital" (*Ibid*: 97). This echoes with Gabriela's description of the numerous "valid reasons" why some parents are unable to respond

to environmental imperatives, despite "caring" and having the desire to do so. The concept of the "organic child" ideal might therefore be usefully extended to understand how ideals of motherhood intersect with ethical food *waste* management.

Gabriela's experience of municipal composting and the energy, mental capacity, and work it demands also resonate with what feminist scholar, Cousins (2021), refers to as the "third shift". In feminist theory, the first shift refers to the traditional domestic care work associated with childcare and housekeeping. The second shift refers to how women continue to disproportionately shoulder such responsibilities even in dual-earner households, where they also work full-time (Hochschild et Machung 2012). Cousins builds on this by describing a "third shift", which represents another form of unpaid labour under neoliberal environmental governance – "an extra layer of work" (Gabriela) – that disproportionately falls on women and mothers. The third shift encompasses the *emotional labour* associated with engaging in pro-environmental behaviours, where women are tasked with making environmentally wise choices while also meeting the ideals of "good mothering" (Cousins 2021). The pro-environmental behaviours forwarded by neoliberal environmental governance programs are therefore "linked to women's self-evaluation of maternal competence", often leading to feeling of "stress, anxiety, and guilt" (Cousins 2021: 9). Wilson and Chu (2020: 1097) summarise how neoliberal environmental programs charge household jobs with environmental responsibility, explaining:

> women are not only expected to become a hockey-mom, full-time mum, or yummy mummy, but they must also be an eco-mom (Bates 2014) and a good green citizen who shops locally, mends clothes, and recycles religiously – all acts of free reproductive labour (social reproduction) upon which a green economy relies.

Drawing on critical feminist literature, this research suggests that Montréal's municipal composting program risks contributing to neoliberal trends in environmental governance that compound a depoliticization of organic waste management. By targeting feminised behaviours in the private sphere, non-state actors take on a greater share of environmental responsibility, at the expense of other forms and scales of intervention (Cousins 2021). Montréal's composting program may encourage women to pursue environmental action in ways that are limited to consumption habits and unpaid labour in the household. This forecloses public participation, particularly among women and mothers, in political scrutiny and decision-making with regards to organic waste management.

7.7. More-than-human relations

7.7.1. Situating food waste and it's more-than-human relations in the Plantationocene

In this section, I build earlier discussions by considering how human/nonhuman binaries in the food and food waste system structure the governance of food waste in Montréal's composting program. On a global scale, I put Plantationocene and racialised Capitalocene scholarship into conversation with McMichael's (2009) "food regime" and Gille's (2012) "food waste regime" framework, to understand these latter as not only socio-historical but also more-than-human phenomena. Drawing on Plantationocene scholarship, I trace the roots of the global food system back to the seventeenth-century European colonization of the Americas. On a local scale, I argue that historical legacies of human/nonhuman binaries reverberate in modern homes and cities in the Global North, through everyday practices of food waste management. As municipal composting programs in Global North cities become more commonplace, individuals enter into greater contact with their food waste and its materialities. My research shows that individuals respond to compost's nonhuman intrusions in the home in conflictual and uneven ways. While a minority embrace the nonhuman agencies associated with composting, the majority continue to police these binaries by adopting adaptive strategies or by abandoning the composting program altogether.

McMichael's (2009) food regime and Gille's (2012) food waste regimes situate both the global food and food waste system in social and historical relations, emerging alongside capitalism and, since the late twentieth century, neoliberalism (see sections 2.3.2. and 2.3.3. of the Literature Review). As outlined in section 3.3. of the Conceptual Framework, engaging with Plantationocene and post-humanist scholarship offers a deeper understanding of the enduring more-than-human legacies embedded in food waste governance. Histories of capitalism and colonialism not only lead to enduring social structures but also *more-than-human* hierarchies in the food and food waste system. As outlined by scholars such as Patel and Moore (2017) and Mitman (2019), a Cartesian, Enlightenment human/nonhuman binary drove early capitalist exploitation and accumulation on seventeenth-century plantations and echoes in contemporary food regimes. At a global scale, for example, binary thinking that positions nature as a resource for capital accumulation and humans as its master, justifies the overproduction of food in the Global North. The imposition of a global value system predicated on the superiority of certain

humans (white, Euro-Americans) and nonhumans (cash crops and livestock) precipitates in the erasure or 'wasting' of diverse ecosystems, domestic harvests, alternative agricultural knowledge, and more-than-human ethics (de la Cadena 2015; Lorimer 2020). The aesthetic and legal standards imposed by retailers on contract farmers reflect binaries that position nonhumans as a resource to be dominated, controlled, and commodified. In other words, certain humans and nonhumans are constructed as "cheap" inputs for growth and therefore *expendable* - or waste-able - under global capitalism (Patel et Moore 2017a).

At a local scale, human/nonhuman binaries reverberate in the modern home in cities in the Global North, such as Montréal, through the everyday governance of food waste under municipal composting programs. Food waste has been treated as a nonhuman externality and a risk under capitalist food regimes (Gille 2012) in ways that shore up capitalist accumulation and human/nonhuman hierarchies. However, some scholarship has explored how alternative waste practices at an everyday scale, including composting activities, can trouble human/nonhuman binaries and lead to the emergence of alternative environmental ethics (Abrahamsson et Bertoni 2014; Swagemakers, Dominguez Garcia et Wiskerke 2018; Puig de la Bellacasa 2019; Morrow et Davies 2021). Some alternative composting practices ring with what Lorimer (2020) terms a "probiotic turn", in which people increasingly seek more 'natural' solutions to environmental problems. Lorimer contends that probiotic approaches arise in reaction to dominant antibiotic modes of managing human and nonhuman life which have precipitated in environmental crises, or Anthropocene "blowbacks". He considers how such probiotic approaches resist received Anthropocene human/nonhuman or society/nature binaries. Composting has been explored by other post-humanist scholars who have considered how, by putting humans into closer proximity and relation to nonhuman microbes, fungi, animals, and processes of decomposition, the categories of the body, the human, and the home are challenged (Lorimer 2016; Puig de la Bellacasa 2019; Morrow et Davies 2021). Could composting activities in the modern home therefore foster a resistance to dominant antibiotic modes of managing nonhuman life (Lorimer 2020) and Plantationocene human/nonhuman binaries?

I examine the validity of these probiotic challenges to human/nonhuman binaries within the context of Montréal's municipal composting program. My research shows three distinct responses to the more-than-human provocations encountered in the home through individuals' participation. First, a minority of participants embrace nonhuman intrusions. These participants challenged human/nonhuman binaries by revaluing compost as lively and embracing its stinky alterity. Nevertheless, this initial group constitutes a minority, and notably, all but one participant

embracing such attitudes and practices had prior experience with composting beyond the municipal program, whether through home composting in a private garden, or participation in agricultural or gardening collectives. A greater number of participants responded with unease to nonhuman intrusions, demonstrating preoccupations with maintaining human/nonhuman binaries in the home (Ames et Cook 2020). For a second group of people, this led them to reject composting altogether. Many participants in this study struggled to assume the mental and corporeal labour necessary to resist Plantationocene categories and maintain alternative more-than-human relations in food waste management. A third and final group of participants were prompted to stick with (Ginn 2014) or "stay with the trouble" (Haraway 2016a) of composting by adopting strategies to adapt to and control nonhuman intrusions in the home, albeit in uncomfortable ways.

I argue that approaching composting as more-than-human *care work* allows for a better understanding of why some people are able to take on the uncomfortable labour of "staying with" and adapting to nonhuman agencies and presences in the home, while others are less capable of doing so. By framing composting as more-than-human care work, I also identify and critique a lacuna in more-than-human scholarship on food and food waste ethics, which tends to overlook how detachment and inequality structure *who* can enter into more-than-human relations and therefore *who* can challenge dominant human/nonhuman binaries and antibiotic approaches. Much of this scholarship examines benign examples of co-becoming with food and food waste through voluntary and leisure activities such as gardening and community composting – activities that only a minority of participants in this research engage in. In exploring municipal-scale composting infrastructure, I seek to understand how residents respond to the more-than-human intrusions linked to home composting in their daily lives. I unpack how these responses are shaped by inequalities in individuals' capacity to take on the labour associated with composting and with challenging Plantationocene categories and regimes through their composting behaviours. The care work involved in composting requires mental labour to trouble categories of the human, the body, and the city, as well as physical labour in adapting corporeally to the material agencies of nonhuman others, within an urban fabric that is structured socio-materially by ongoing histories of capitalism and modernity.

7.7.2. More-than-human detachments

In this section I show how human/nonhuman binaries present throughout global food and food waste regimes reverberate in the modern home. They are evident in everyday responses to Montréal's municipal composting program, as residents are prompted to enter into visceral relations with their food waste. For some participants these more-than-human relations and the care work required to manage them proved too burdensome, leading them to abandon the municipal program.

The discomfort elicited by composting practices was evident in the strong, visceral terms with which most participants described their interactions with nonhuman processes and agencies. The odour of the food waste bin was described by most participants with strong language and sometimes humour, with participants repeatedly exclaiming "it stinks!" ["ça pue!"]. Deborah explains "It rots, there are odours, then there are flies […] it's awful, it stinks, there is no air circulation at all, it's horrible!". Participants often described the odour as particularly bothersome in the summer months, with both Emily (non-composter, NDG) and Benjamin (composter, Le Plateau), for example, describing how a patchy collection service in the summer months can lead to unbearable odours. Benjamin explains "you can imagine the second week what it is. With the humidity it's terrible". In the following extract, a group of composters in Le Plateau discuss the foul smell in the following terms:

Anne: It's horrible, right, horrible. And it's true there's that juice, right, every time I empty it.

Marguerite: It's dreadful.

Anne: [Grimaces and makes a sound of disgust] It's horrible. It stinks and everything.

Simon: Yeah, exactly, it stinks.

Indeed, the compost "juice" was mentioned in numerous focus group and interview discussions. As participants in another composting focus group in Le Plateau observed:

Louise: It's really that smell, the juice – [Laughter]

Marie: The little bit of juice in the bottom!

Louise: And the smell of vomit!

Participants playfully suggested that the juice might be more usefully used for something else rather than being thrown away, such as feeding it to the plants. They even humorously asked "is it healthy?" (Simon), "is it considered a super food?" (Simon), and joked "it's a similar colour to coffee, it could pass" (Anne). These excerpts evidence the visceral disgust provoked by the stinky intrusion of nonhuman agencies and processes associated with composting in the home. The playful use of language, referring to the liquid in the bottom of the food waste bin as "juice", laughing about their own disgust, or joking about what they might do with it, gestures to the distance and detachment to disgusting nonhuman agencies that participants adopt, and the absurdity of breaching human/nonhuman binaries in the home. The use of humour may also imply that openly discussing the visceral impact of nonhuman agencies in the home playfully subverts social norms that treat modes of managing nonhuman life in the home as private, a phenomenon described by Ginn (2014: 539) as a "double detachment."

Many participants also shared personal anecdotes regarding unwanted interactions with animals, with some coming to focus group discussions with the explicit desire to discuss these encounters. Florence, a non-composter from NDG, described feeling "nervous" about interactions with animals in her previous experience of composting, describing herself as "bug-phobic". She explained that her fear of bugs led her to feel anxious about bringing the compost down to the garage. She went on to describe having to deal with "rodents, or raccoons, or groundhogs, or whatnot", which chewed through the thick plastic compost bins. She explained: "They're really thick plastic, but these animals are very aggressive and very hungry and very motivated. And they just eat through it, you know."

Again, some participants used to humour to describe their uncomfortable encounters with animals. In two separate conversations, both Benjamin (composter, NDG) and Daniel (écoquartier representative for NDG) joked that the raccoons, with their "little hands", were a particular problem for the compost bins. Margaret (composter, NDG) talked humorously about her experience of a gnat infestation after experimenting with home vermicomposting (composting with worms) on her balcony. She explained that she used the compost produced by her vermicomposter as a fertiliser for the seedlings she was germinating in her apartment:

But the problem with that is that you introduce insects, and it's a warm, humid medium, which is a breeding ground for gnats. And I have a bit of a gnat infestation. And my landlord sort of freaked out. And I thought, Oh, I better get rid of all this stuff. Like they're

already freaking out -- if they only knew that I had worms in here! [Laughs]. Oh my god! [Laughs]. That should not be a good thing!

Again, the use of humour in the examples above plays with dominant human/nonhuman binaries, by personifying nonhuman animals and by emphasising the absurdity of hosting certain nonhuman animals and agencies in the home.

Daniel, a representative from NDG's écoquartier, described a similar experience to that of Margaret's above, of experimenting with vermicomposting in the écoquartier's office. He explained how an infestation of insects, as well as mould and foul odours, led them to stop vermicomposting in the office, saying: "It was disgusting. We had fruit flies, we had all kinds of bugs that were crawling everywhere." He described how the surrounding offices complained about the insects and the smell:

This kind of place, it's an office, it's not a place to compost. Okay, it's not built for it. And don't do it here. Because they were all getting flies, too. And they were coming to me. The owner would come over and say Hey, Daniel, what's going on? You got some issues here? Yeah, we've got issues. Finally, when we stopped it, we got rid of them and did it out back and let people compost the way that they're supposed to. Only then did it work.

Even within the écoquartier, a binary persists between inside/outside, human/nonhuman, necessitating the preservation of predefined norms for composting. This implies that there are "correct" and "incorrect" approaches to composting ("the way that they're supposed to"), which involve controlling specific forms of nonhuman life and respecting these binaries.

Daniel went on to recount the frequent calls he received from composting residents in NDG with animal-related issues, such as reports of raccoons getting trapped inside compost bins: "Imagine, they open the bin and they see something […] to have an animal staring you in the face when you open the bin […] and if they make a lunge to get out, you're gonna kill people with heart attacks." Once again, the management of nonhuman life is revealed as a cause of anxiety and labour for both participants and local authorities involved in the municipal composting program. The examples above highlight how human/nonhuman binaries – present in socio-historic structures throughout the food and food waste system – reverberate in the modern home and shape everyday more-than-human interactions.

For some people, the mental and physical labour of managing these nonhuman intrusions in the home that the municipal composting program demands proved too burdensome, leading them to abandon the program. Several non-composting participants who previously participated in the municipal composting program made direct links between uncomfortable interactions with nonhuman animals and agencies and their decision to stop composting. Jennifer (non-composter, Le Plateau), for example, described an encounter with some determined and aggressive squirrels:

> I used to compost, but I haven't been composting for a year now because I have a little balcony where I put the brown bin which I put the compost bags in. And the squirrels… Wow! It's really a feast for them, which means that they eat the lid and they become – I was nearly attacked by a squirrel, I never thought that could happen to me. And they were super aggressive, and they succeeded in piercing through the lid, which means that they got everything out and it was a mess.

Gabriela also described the struggle she and her neighbours faced in defending the bins from local fauna. She explained "it was just a lot of work trying to protect the bin from the animals […] with the skunk it was just attracting it, especially in the summer, the smell was just terrible". She described how leaving her compost on the balcony "attracts squirrels and mice and it just makes me a bit nervous". Gabriela described trying many strategies to deter animals such as raccoons from emptying her compost bin onto the sidewalk on a weekly basis, before she decided to abandon the program. She describes rubbing menthol on her compost bin, for example, as well as using a brick to weigh down the lid of the bin:

> Supposedly, it's the smell that makes them [racoons] go away. So, we rub it around the bin and inside. And then, what our other neighbours did, they put a brick on top of the bin, so they don't try to open it. So, we did that. That was better than the menthol. But still, because they already chewed certain places and if it was a bit broken, they could still try to put their hands in it. […] We did all the tips that were supposed to make the animals go away but they're still very clever.

Where deterrence was unsuccesful, Gabriela describes having to pick up the compost from the sidewalk before the truck came when raccoons tipped the bin over during the summer months: "they will open the bin before the truck comes and then […] you have to pick up all the compost that was, you know, left on the sidewalk." Ultimately, Gabriela described the nonhuman

intrusions that she was forced to contend with as culminating in "just more work for me to do", contributing to her decision to stop composting.

When the more-than-human collaborations necessary for composting break down or are abandoned, Lorimer's (2007, 2020) "nonhuman charisma" (as discussed in Section 3.6.3. of the literature review) offers a useful framework for understanding why. "Nonhuman charisma" describes how the aesthetics, physiology, and behaviour of nonhuman animals engender visceral responses among humans. Drawing on Hillman (1988), he contends that animals with non-anthropomorphic characteristics possess "feral charisma" and are associated with an array of negative emotions such as fear and disgust. The insects, bacteria, fungi, and micro-organisms that propagate in the compost bin tend to match Lorimer's description of feral charisma. These are physiologically and behaviourally different to humans, they do not tend to respond to human domestication, and they feed off human lives in parasitic ways. They prompt visceral responses of disgust and acts of detachment, separation, or control among their human counterparts. Other rodents and mammals such as raccoons, rats, mice, and skunks also have parasitic characteristics, are considered difficult to control, and are often encountered in groups. Where the municipal composting program demands individuals to enter into embodied relations with nonhuman processes in the home, Lorimer's framework and the examples above elucidate why these often fail or are abandoned.

7.7.3. Adapting to and embracing compost

If the more-than-human conflicts discussed in the preceding section led participants to abandon the program, in this section I describe how some composting participants were able to adapt to and even embrace the nonhuman processes and presences encountered in composting.

Many composting participants described the strategies they adopted to adapt to and manage nonhuman agencies in the home. For example, some described putting their compost in the freezer to limit foul odours and to control the presence of nonhuman animals in the kitchen, particularly insects such as fruit flies in the summer months. Margaret (composter, Le Plateau) explains, "I have a freezer full of frozen compost stuff". Others, such as Alice and Anne, found cool, dark places to store their counter-top bin, including under the kitchen sink, to control

the smell and the rate of decomposition. Ripping up egg cartons to absorb the moisture of the food waste (Margaret, composter, NDG), or carefully folding the bag over the top of the food waste (Joe, composter, NDG) were other techniques to deter fruit flies in the kitchen. Some resorted to more drastic modes of managing nonhuman life, with Anne describing hanging strips of tape from the ceiling above the compost bin to catch and kill an invasion of fruit flies. Isabelle describes squashing the flies by hand, saying "yesterday, again, I had to squash some little flies that were on the compost", adding "it's not very pleasant".

Many composting participants also discussed their routine practice of cleaning the bin to manage the smell. Isabelle (composter, Le Plateau) describes cleaning the bin with baking soda every time she empties it. Anne, Marguerite, and Simon (composters, Le Plateau) also explain regularly cleaning their bin:

Marguerite: Oh yes, you need to. Because it's always horrible. [Sound of disgust]

Anne: Every single time, it's horrible. The bags are shit.

Marguerite: Awful.

Simon: I use Mr Clean. And afterwards I leave it overnight and the next day I rinse it and it removes everything.

Anne: Same, I leave it to soak and everything because it's horrible. And still, there are stains that I can't get out. Like, it's seeped in… Disgusting.

Where the experiences above describe practices of adapting to and therefore "staying with the trouble" (Haraway 2016a) of uncomfortable nonhuman presences, a minority of composting participants describe how their experiences with composting have led them to *embrace* the nonhuman alterity of composting and to adopt an alternative relational environmental ethics. The subtle difference with this group is that they go beyond simply finding solutions to manage the nonhuman intrusions associated with composting by discussing composting in terms that challenge and reject human/nonhuman binaries.

This was often apparent among participants who compost privately in their gardens or in community gardens. These participants emphasised the synergy between *gardening* activities

and composting and suggested that these allow for a more relational understanding and appreciation of composting and the environment. Margaret (composter, NDG), for example, while not having access to a private garden, contextualised her composting practices by talking at length about her involvement in various community gardening and urban agriculture projects, such as *Incredible Edibles*, a community group which grows food in unused public spaces. She explained that her interest in composting is therefore associated with a broader "love of agriculture and plants […] and the earth". Louise (composter, Le Plateau) described feeling as if she had lost a sense of connection to her food waste and a sense of purpose in composting after moving from an apartment with a garden, where she practiced home composting, to an apartment without a garden, where she partakes in the municipal composting program. Marie (composter, Le Plateau) responded to Louise by describing the importance of having "your hands in the dirt" ["avoir les mains dans la terre"] when it comes to composting and its links to a broader environmental conscience. Marie compared her own experience of composting as an adult with her experience of vermi-composting with her father, as a child, explaining:

> I think that comes back to, y'know, we don't have a final product which is so satisfying, and which is rich, and it's *life*, it's so important. All we see are the things that stink, with insects, and y'know, it's not pleasant. […] I don't enjoy taking my compost bin out, right, it's not a nice activity on a Tuesday evening! [Sounds of agreement.] But, for example, when I was young, it was my dad who went to feed his worms with peelings in the garden. It was far more concrete. […] Then he put compost back into the garden and everything. So, I think this is precisely what we're missing.

Joe, a composter in NDG who has experience of private composting, similarly describes compost as a "rich" resource. The practice of home-composting and of re-inserting compost into the garden is described as an activity that reconnects individuals to the value of their food waste. By recognising the vitality of compost and its potential as a source of life, these participants challenge binaries separating humans and nonhumans.

Another participant, Katy (composter, NDG), who practices private composting in her garden, similarly describes her composting practices as linked to a broader rejection of antibiotic modes of managing life in the home (Lorimer 2020). She describes the need to accept and adapt to the uncomfortable material affordances of composting, asserting "ok, it stinks, it's true, but that's what it is!". She goes on to argue "if we want to go into [composting] it cannot be like a

laboratory, clean and all white". Her rejection of sanitized approaches to composting goes as far as refusing to use bin liners in her compost bin. She explains:

> We don't use those bags at home. To me personally, it doesn't make any sense. Okay, I understand that for the need to be clean and tidy, yes. But the compost is not about something clean and tidy. Okay, it's something that is absolutely natural. And first of all, I found that why do we have to go and buy additional products that have been produced to make compost? To me that doesn't make sense. And to give money for that so it can be clean. So, instead, we are using every kind of something that is also compostable. So, the different flyers, newspapers, egg cartons... or whatever. At home, there are tonnes of things that you can use.

Katy troubles human-nonhuman binaries in her embrace of the stinky and dirty nature of composting. She adapts to and embraces the alterity of nonhuman others (Lorimer 2007) by experimenting with the resources she has in the home to wrap her food waste in compostable materials rather than using compost bags. Worth noting here, is the fact that Katy has a garden in which she practices private composting, allowing her to adopt such practices at a distance from the home and for the eventual benefit of the garden. This was not lost on other participants in the focus group, with David pointing out, for example, "But you have a garden. And that is a little bit of a difference [...] it's harder in an apartment."

Other participants described participating in composting activities beyond the municipal program or the garden, which shaped similar relational ethics and more-than-human care. Kimberly, for example, a resident of NDG who does not currently participate in private or municipal composting, reflects on her experience of composting when she worked on organic farms. She explains:

> it was easier because it was in the fields or in the garden, there was a big square, you know, with soil in it, and we just threw our stuff in that. And then with a shovel we would turn it and stuff like that. So that felt easier, in a sense, because you could see the immediate process of it. And then you could take the soil and put it in the vegetable gardens. So, it just felt more natural and more... More, like, in tune with the environment. In the city, it's a bit, for me, I don't know... awkward, I guess you could say.

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Marie (composter, Le Plateau) describes a similar experience with composting during her employment for the municipality of Matane, during which she went to visit composting sites and dumps.

> It gave me a deeper understanding, too, that it's not just we put it there then we forget about it. There's still something happening behind it all. Plus, y'know, some quite poignant images, too. In fact, I went to visit a few dumps where some people told me about how, when they moved the compost, when they mixed it, it produced so much heat that they could boil water.

Both Kimberly and Marie developed a similar recognition of and appreciation for the liveliness of compost through experiences beyond home composting or municipal collections, which they describe as "poignant", "more natural", and "immediate". Like participants with experience of private composting for their plants and gardens, they describe how physically interacting with the decomposition process and observing how compost is reinserted into food production or gardens contributes to a "deeper understanding" of its importance and a sense of being "in tune with the environment". By comparison, they describe this environmental awareness and appreciation as often missing in an urban setting, with the municipal program.

The conversations above reveal how participants come to adapt to and even to embrace the nonhuman processes of composting. For most participants involved in the municipal program, this involved adopting practices to control unwanted nonhuman intrusions in the home. These adaptations might represent important examples of learning "to stay with the trouble" of more-than-human relations. But they also represent mental and physical work. There appeared to be a fluid boundary wherein participants alternated between feeling empowered to tackle the demands of "staying with the trouble" in composting and reaching points where this endeavour became overly burdensome, prompting them to discontinue the program (as discussed in the preceding section).

The work that goes into participating in composting practices can be understood in terms of attempts to police the boundaries of the human, the body, and the home, or what post-

humanist scholars refer to as "boundary work" (Ginn et al., 2020).[17] In identifying the labour that many participants adopt to manage nonhuman life in and around the compost bin, the question remains as to whether this labour simply serves to shore up human/nonhuman binaries. Alternatively, do these practices hold the potential to resist human/nonhuman binaries and force public thought and action towards more relational futures?

Montréal's municipal composting program does little to dismantle neoliberal, accumulation-driven food regimes on a regional, and global scale (as argued in section 6). However, everyday composting practices might challenge antibiotic attitudes and behaviours in small-scale practices and attitudes. Scholars have explored how everyday boundary work can symbolize a commitment to more-than-human collaboration, potentially giving rise to alternative and more relational ways of coexisting with nonhuman animals. These practices may play a crucial role in shaping responses to uncertain environmental futures, in which humans must learn to live well with nonhuman others (Gibson-Graham 2011). Rather than modern antibiotic approaches which emphasise the banishment of nonhuman agencies such as rot in modern homes and cities, Lorimer highlights how "learning to live well with rot" includes practices of nurturing as well as tolerating and controlling (238). Ginn (2014: 532), in his case study into the management of unwanted nonhuman animals such as slugs by gardeners in the UK, describes how "uncomfortable companions … test our resolve to live convivially with non-humans". By focussing on practices through which nonhuman life is anticipated, avoided, and erased, he considers how detachment can be ethical as it works in parallel with an ethics of attachment. Christopher Neubert (2020: 736) also considers an ethics of disgust. He describes how foul smells have the potential to produce affective responses that that expose "the porousness of the body" and therefore the fragility of human/nonhuman and society/nature binaries that produce and maintain the Plantationocene.

In this way, where individuals "stay with the trouble" (Haraway 2016a) of managing foul smells and nonhuman agencies, even in their attempts to control them, they are adopting practices of more-than-human responsiveness or response-ability. Where it is impossible to care for everything equally (de la Bellacasa 2012), such scholarship calls for attention on how to "kill well" (Haraway 2008), or "waste well" (Liboiron et Lepawsky 2022). The everyday adaptation to

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[17] Also recognising the labour that goes into these practices, Ames and Cook (2020) describe this as "sustainability work". They describe how municipal composting programs require residents to "[adjust] to materials, bins, fridges, seals and cleaning practices that rework the modern, uncluttered home and kitchen into more environmentally sustainable configurations" (Ames and Cook, 2020: 337).

and management of nonhuman intrusions in the home, required by municipal composting, could contribute to more relational lifestyles with nonhuman entities in a multispecies future. The potential that these practices might have to transform neoliberal food and food waste regimes on a global and regional scale remains to be seen.

Nonetheless, in this research, those who discussed composting in terms that more explicitly rejected human/nonhuman binaries were all participants who had hands-on experiences with composting beyond Montréal's municipal program. Whether engaging in vermicomposting or in private composting for their garden, these individuals emphasized the significance of a hands-on connection with every stage of the composting process. This intimate involvement, as they narrated, fosters a more relational ethical approach to both composting and the environment. Such accounts resonate with post-humanist scholarship on food waste, as explored by scholars like Morrow and Davies (2021), Puig de la Bellacasa (2019), and Turner (2019). Puig de la Bellacasa (2019: 391) describes how interactions with compost in community composting initiatives can foster a more-than-human ethics as people are prompted to recognise its liveliness. Practices of feeding the compost, turning it, and witnessing its decomposition to produce a finished product that can be reinserted into gardens and vegetable patches thereby "[open] up a sense of earthy connectedness". Humans are prompted to interact with and value nonhuman plants and animals differently and more relationally. Morrow and Davies (2021) describe these ethics prompted through corporeal engagements with composting as a process of "[falling] in love with compost". These alternative environmental ethics are evident in the accounts of participants with hands-on experiences with composting beyond the municipal program. For participants with hands-on experience of composting, these more "concrete", "immediate", and visible interactions with food waste prompted them to think about the environment differently and to appreciate a "shared aliveness" in human-soil interactions (Bellacasa 2019: 391).

Another reason that participants with experience of composting beyond the municipal program were more likely to adopt a relational approach to composting and reject human/nonhuman binaries is because of its distance from the home. Lorimer (2020: 54) summarises this well by describing important differences in probiotic thinking in ecological landscapes "out there" compared to the ecology of the human body – or the home – "in here". He explains: "In simple terms, it is much more common to make space for awkward natures out there than it is for people to make bodies a home for nonhumans whose proximity might engender some degree of discomfort" (*Ibid:* 54). Lorimer identifies as a prevailing discomfort

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towards a probiotic embrace of nonhuman organisms and processes at the scale of the home and body. Composting in the home, rather than in the garden, in the park, or on agricultural land, requires more mental and corporeal work to "stay with the trouble" of managing nonhuman agencies and presences. Recognising this work allows for a deeper understanding of the fragility of these relations, how they break down, and how they intersect with embodied socio-economic inequalities.

While participation in Montréal's composting program may therefore elicit adaptations in the home that represent commitments to "stay with the trouble" of more-than-human collaborations, these also demanded mental and physical work. These commitments were therefore fragile and often failed. Composting practices beyond the municipal program seem more succesful at provoking alternative relational approaches to food waste and to the environment, however these remain exclusive to those with acces to private or community gardens.

7.8. Conclusion

Throughout this section I have argued that the everyday governance of food waste under Montréal's municipal composting program should be understood as *care work*. Conceptualising composting as a form of care work is useful for two reasons. First, it theoretically unites post-humanist and feminist analyses, to understand composting as a more-than-human and material collaboration as well as cultural, political, and embodied task that is experienced in uneven ways. These two approaches are complementary to analyses of municipal composting. Where more-than-human scholarship risks flattening human differences, feminist scholarship draws attention to intersectional inequalities shaping *who* is able to participate in composting practices. Where feminism overlooks the agency of nonhumans, more-than-human scholarship emphasises how the materialities of food waste and concomitant anxieties surrounding human/nonhuman binaries (stemming from Plantationocene legacies) shape the everyday governance of food waste in the home. Second, highlighting the corporeal and mental *work* required to compost well allows for better understandings of the intersectional inequalities that often cause municipal composting projects to fail.

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I have shown how economic inequalities, such as the costs of the compostable bin liners and the mental burden of poverty, for example, can limit some people's capacity to participate in pro-environmental behaviours such as composting. Housing situation or the size of one's living space can also be a barrier to adopting the care work necessary to participate in composting practices, as can physical inequalities associated with disability or old age. This corroborates critique of neoliberal environmental governance approaches, discussed in section 6, under which an individualisation of environmental responsibility obfuscates intersectional differences that structure individuals' capacity to adopt environmental behaviours.

I drew on feminist scholarship and conversations with women and mothers to understand how the care work elicited by the municipal composting program is feminised. Montréal's composting program targets behaviours in the home, a space which is traditionally coded as feminine, and therefore the responsibilities and labour associated with it falls disproportionately on women and mothers in what Dzialo (2017) calls a "feminisation of environmental responsibility".

I went on to consider how the care work associated with pro-environmental behaviours such as composting are not only socio-historic but also *more-than-human*. Theoretically, I ground this discussion in Plantationocene and racialised Capitalocene scholarship which I put into conversation with McMichael's (2009) "food regime" and Gille's (2012) "food waste regime" frameworks. In so doing, I traced human/nonhuman binaries present in the food system today back to the seventeenth-century colonisation of the Americas and the categories experimented in the plantationocene (Patel et Moore 2017a) and (Mitman 2019). I examined how these binaries are challenged or upheld in approaches to managing life in modern homes and cities today (Lorimer 2020), including through food waste management.

In the last two decades, municipal food waste collections have been introduced across the Global North in response to anxieties surrounding food waste and climate change. This has put humans into closer contact with nonhuman agencies and presences encountered through composting. Post-humanist research has already emphasized the potential development of a relational environmental ethics through private or community composting and gardening activities (Abrahamsson et Bertoni 2014; Morrow et Davies 2021; Turner 2018). This was reflected in participants of this research who participated in forms of private composting beyond the municipal program and demonstrated a rejection of dominant human/nonhuman binaries. However, further investigation is required to unpack the impact of everyday more-than-human

interactions facilitated by public *municipal infrastructures* and environmental policies. The analysis in this section suggests that food waste governance in the home continue to be shaped by Plantationocene categories and modern binaries. Moreover, an individual's ability to take on the care work of municipal composting in the home is shaped in crucial ways by a number of inequalities, falling along lines of income, gender, and housing. These inequalities determine who is able to undertake the mental and physical *work* essential to "staying with the trouble" of composting and resisting Plantationocene binaries and categories. Structural inequalities which favour certain forms of human and nonhuman life over others, shape not only what we are able to care for and how we care, but also which human bodies are able to take on the labour required to nurture alternative ways of caring.

Where both post-humanist and feminist approaches show how composting practices are embedded in practices of *care*, feminist scholars may be more effective at emphasising the embodied and uneven *work* involved in such practices. Neoliberal individualising environmental policies download responsibility onto downstream actors in ways that disproportionately responsibilise actors in the domestic sphere, overlook and exacerbate intersectional inequalities, and obfuscate systemic regimes of food waste rooted in histories of capitalism and colonialism. With environmental and social justice agendas increasingly recognised as intertwined and rooted in historical legacies of violence, both perspectives are essential to contextualising Montréal's composting program and its shortcomings.

8. CONCLUSION

This research has examined how the scalar politics of contemporary food and food waste regimes manifest in Montréal's municipal composting program and shape the everyday governance of food waste among residents on the ground. I sought to respond to two objectives: 1) to investigate how the city of Montréal's approach to municipal composting intersects with the scalar politics of environmental governance under neoliberal capitalism, and 2) to consider how embodied experiences of everyday food waste governance shape the ways in which Montréal's composting program is received differently among residents on the ground, along lines of gender, class, or more-than-human relations.

The empirical scope and analytical approach to this research has been informed by MacKinnon's definition of "scalar politics" which approaches scale as both discursively and materially produced, harnessed by political actors for their own ends, influenced by inherited constructions of scale, and, importantly, re-shaped and contested on the ground by emergent social and material relations. In taking a scalar politics approach to the topic of Montréal's municipal composting program, I have sought to investigate how discourses and practices of organic waste management move between different actors to (re)produce and contest certain scales of governance.

To investigate these junctures, I employed several qualitative methods. I combined an archival analysis of documents and reports from provincial and municipal government agencies with focus groups and semi-structured interviews with a sample of both composting and non-composting participants across two neighbourhoods (Le Plateau and Notre-Dame-de-Grâce). In my analysis of government documents and discourse, I sought to examine how formal waste policy is embodied and put into practice on the ground, shedding light on the potential disparities between governmental rhetoric and everyday practice. I conducted semi-structured interviews with two representatives from the neighbourhoods' respective eco-quartiers and with a composting activist and co-founder of the organisation Compost Montréal. Using these methods, I also sought to differentiate this research from other approaches within critical food waste governance scholarship that tend to only consider individuals participating in voluntary community or private composting initiatives. Sampling from a larger population of both composting and non-composting residents allows for a deeper investigation into how municipal environmental programs both mobilise and disengage different publics along lines of socio-

economic inequality, and why these programs often fail on the ground. This approach particularly aims to address a tendency within post-humanist waste scholarship towards benign discussions of more-than-human co-becoming and co-operation by considering how embodied inequalities in relations with food waste structure who is able to participate in composting programs. These methodological approaches are also informed by urban political ecology and feminist scholarship in their critical focus on inequality, embodiment, care, and the everyday.

An engagement with feminist methodologies could have been pushed further by employing more participatory methods such as photovoice, diaries, or 'show and tell' interviews, giving greater insight into the embodied realities of food waste practices and giving participants a louder voice. These would make interesting approaches for future research. Nonetheless, time and resource limitations in this project made more participatory approaches impractical. Other methodological improvements for future study could involve a larger sample size of composters and non-composters. The sample size in this research is small and, consequently, not representative of the populations in the neighbourhoods concerned, nor of the wider city. The over-representation of women and residents with higher education levels could bias the results, despite my efforts to address these discrepancies in the analysis. For example, where some non-composters, despite not participating in the composting program, made some astute and critical observations about food waste governance, these conversations may also be impacted by a sampling bias towards higher education levels. An alternative approach could have used a survey to reach a larger sample of participants, thereby returning further insight into how trends intersect with socio-economic factors in the wider population. A larger sample size may also allow for a comparitive analysis of how trends vary geographically across the different neighbourhoods: a level of analysis that was not possible in the project due to the small sample size.

Despite these methodological limitations, the discourse analysis of government archives and in-depth conversations with participants offered valuable insights to respond to this research's objectives. In my first chapter of analysis, I show how the city is portrayed as an ideal scale of waste and food waste governance, particularly by Circular Economy (CE) discourses. Provincial-scale agendas and targets published by the agency Recyc-Quebec call on municipalities in the province to implement their own waste management plans, including plans for organic waste. Provincial directives have led to the formulation of waste management plans by the CMM since 2017, which increasingly incorporate the CE as an organising concept. However, I questioned the extent to which the CE concept is brought to bear on transforming

pre-existing approaches to waste management. While espousing prevention and re-insertion, the CMM's approach to organic waste management continues to focus on downstream treatment. Moreover, lucrative public-private partnerships lack transparency with regards to how municipal food waste is treated or used, obfuscating public scrutiny on the extent to which the city delivers on its CE objectives. Rather, responsibility is downloaded discursively and materially onto downstream consumers. An individualisation of responsibility and environmental citizenship is reflected in the moral discourses employed by participants to talk about their own composting practices and those of their friends and neighbours.

Employing a scalar politics approach, this analysis demonstrates how certain scales are mobilised and responsibilised in organic waste governance approaches, while others are obscured. While all actors appear to be united by a broad understanding of the global importance of food waste in the context of climate change, the imagined and discursive scale of action appears to accrue at the citizen level. In fact, there seems to be a degree of deflection of responsibility at every jurisdictional level to this end. For example, while the city may be positioned as the ideal scale of waste governance in CE discourses by provincial actors, the CMM's approach to waste management continues to be characterised by downstream private treatment options that frame individuals as responsible for participating in waste collection programs.

On a citizen-level, these governance structures foreclose a public politicisation of food waste. With limited communication with private management actors or the provincial government, citizens are positioned at the intersection between individualising municipal directives and global environmental anxieties. These scalar imaginaries were evident in conversations with participants in several ways. First, there was a limited awareness among participants of what happens to their food waste once it is collected from their front doorstep. Rather than imagining their participation on a municipal scale, they discussed their motivation to compost with recourse to global environmental and social justice anxieties, referring to global climate change and global hunger or food inequalities. Moreover, few participants were familiar with the CE, barring an educated minority, despite it representing an organising concept for the city's approach to organic waste management. This disengagement with the politics of organic waste management on a municipal-scale compounds and is compounded by a lack of public scrutiny with regards to how cities are performing against their environmental promises.

In second section of analysis (section 7), I delve deeper into embodied experiences of food waste management. Where composting practices are portrayed and received by many participants as an individual responsibility, interview and focus group discussions revealed that this responsibility was embodied in uneven ways. Throughout this section I drew on both feminist and post-humanist scholarship to show how socio-economic inequalities and more-than-human relations shape how composting is received on the ground and who can participate in it. I drew on both food and food regime frameworks as well as Plantationocene scholarship to argue that these inequalities are entrenched in histories of capitalism that date back to the Columbus Exchange, settler colonialism, and European plantations in the Americas from the fifteenth century. This saw the rise of an increasingly globalised value systems predicated on capital accumulation and the ascendency of certain humans (white bodies from the Global North) and nonhumans (cash crops and livestock) over others. This value system precipitated in the erasure – or wasting (Liboiron et Lepawsky 2022) – of alternative food knowledges, ecosystems, people, environmental ethics, and non-Capitalist value systems (de la Cadena 2015; Lorimer, 2020). As put by Patel and Moore, certain humans and nonhumans are constructed as "cheap" inputs for growth and therefore expendable - or waste-able - under global capitalism.

Human/nonhuman binaries continue to echo in economic structures, global food regimes, and dominant approaches to environmental governance today. They are evident in the disgust that participants expressed towards the nonhuman intrusions associated with their food waste and their compost bins and their attempts to control them. Many participants came to focus groups and interviews with stories of contested attempts to manage animals, odours, and processes of decomposition. Drawing on Haraway, I have suggested that endeavours to manage nonhuman intrusions in the home might be understood as practices of "staying with the trouble" of more-than-human relations. Drawing on feminist scholarship, I argue that these practices require both physical and mental labour and should be understood as *care work*. Interestingly and unexpectedly, I also found that gender inequalities shaped how the care work of composting was received. Women were disproportionately responsibilised in the management of their food waste; a consequence of downloading responsibility onto individual citizens in the domestic sphere. This research shows that not everyone is capable of taking on the care work necessary to succesfully participate in municipal composting. In fact, many non-composting participants described how they stopped composting when this work became too mentally, physically, or financially burdensome. Many factors affect who can take on the care work of composting, including financial and housing inequalities and physical and mental ability. I also

found that participants who were most able to reject human/nonhuman binaries in discussing their composting behaviours were those who had access to a private composter or had the resources to participate in community initiatives beyond the municipal program, again pointing to inequalities.

The arguments above point to ways in which public engagement with organic waste management is shut down by municipal and provincial governance structures and discourses that individualise responsibility and compound socio-economic inequality. In many ways, therefore, Montréal's approach to its municipal composting program corresponds with critical scholarship concerning neoliberal waste governance in cities in the Global North. For example, as expounded in section 6.4., Hird (2021) draws on Bruno Latour's framework of five ways in which politics coalesce around objects to understand how waste is commonly managed in ways that normalise and depoliticise it among the public.

Nonetheless, this research has also highlighted several *opportunities* for political public engagement in organic waste management. Where government techniques to normalise organic waste and its management fail, the public can become sceptical of its management and aware of how it might concern them. I suggest that food waste, unlike other streams of waste, has a temporality and materiality that might prompt more junctures for public scepticism and engagement. As individuals are increasingly encouraged to enter into intimate relations with their food waste through participation in municipal composting programs, the material affordances of food waste have the potential to re-engage individuals in questioning its politics. The stinkiness of food waste and the nonhuman intrusions in the home that composting entails can force a responsiveness among composters, even where this involves attempts to control it. These are not necessarily benign or enchanting more-than-human relations (as theorised in much post-humanist scholarship), but where citizens are exposed to rotting food on the sidewalk for a week because the private collection company has failed to pick up the bins, or where citizens struggle to find solutions to keep pesky squirrels or raccoons at bay, an exposure to waste's materiality has the potential to disrupt modern categories and binaries that underlie dominant neoliberal approaches to organic waste management.

This might represent what MacKinnon (2011: 31), in his conceptualisation of scalar politics, describes as an interaction between "inherited scales and emergent social activities". The inherited, bounded Cartesian scale of the body and the human is disrupted through practices of food waste management and the nonhuman intrusions they entail. The challenges

that individuals encounter in governing these boundaries can be productive of "new scalar arrangements and configurations" (*Ibid*: 31), as individuals are forced to grapple with their place in relation to nonhuman others, as well as – for some – prompting thought on alternative scales of food waste management.

The question that remains is whether these material provocations and practices of "staying with the trouble" are sufficient to move citizens to actively engage in or resist food waste management on a political level. This research identifies several roadblocks to greater public engagement in compost politics. First, it shows that embodied inequalities foreclose a democratic engagement in composting practices and politics, with many not able to participate at all. Second, section 6.8. shows that where participants were asked directly, many had their own notions about how food waste could be governed differently or at different scales. However, under current scalar governance relations described in section 6, residents are not invited to participate in agenda-setting or decision-making stages of organic waste management. Furthermore, although some could suggest alternative governance solutions, a large proportion continued to endorse neoliberal approaches, like public awareness campaigns. This indicates that their potential engagements continue to be influenced by scalar politics espoused by dominant neoliberal discourse.

Conversations and critical research about food waste can be part of efforts to move publics towards a greater engagement with food waste governance, including calling on municipal, provincial, and state governments to take more transformative action and to democratise decision-making. Drawing on Hird (2017), this will involve intentional acts of remembering: the socio-historical and more-than-human stories that have led us to this juncture; the destination of the food we throw away (which depends on one's situated political context); and, the inequalities in not only who wastes but also who has the capacity to participate in efforts to engage in its management. "This sense of remembering calls an unknowable future into the present, and […] in this sense, is as much about the future as it is about the past" (Hird, 2017, p. 196).

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ANNEX 1: CODING SYSTEM FOR INTERVIEWS AND FOCUS GROUPS

Code	Definition	Frequency
Code System		1060
Cooking/eating practices	[Added this code halfway through analysis.] >How composting intersects with practices and attitudes towards cooking and eating. >Similar to gardening code.	5
"everyday"	> Reference to everyday routines > Habits / reflexes / becoming subconscious > The everyday governance of food waste	36
Gender Roles	> The role of motherhood in interactions with household waste > Gendered division of waste labour in the home	49
Human-Nonhuman Relations	> Animal interactions prompted by composting > Adaptation (corporeal and cerebral) to nonhuman others and processes.	45
Human-Nonhuman Relations > disgust / discomfort	> Disgust prompted by the materiality of decomposition and nonhuman intrusions	64
Human-Nonhuman Relations > enchantment	> Enchantment with the more-than-human > Examples of embracing decomposition and nonhumans encountered in composting	20
Environmental Awareness and Empowerment	> A sense of empowerment in face of climate change > An act that triggers a broader environmental awareness > "Prise de conscience" > How environmental awareness changes behaviours e.g. consumption patterns and eating habits > Campaigning / petitioning buildings, nurseries, businesses for better composting provision > Calls for increased environmental awareness	102
Gardening and Composting	> Ways in which gardening is discussed in tandem with composting > Something that encourages people to compost? > Individual and community scale	67

Alternative Scales of Composting	> Either discussed as a practice they participate in or as a solution to composting issues > Household scale (e.g. individual composters, vermicomposting) > Community scale (community composting, in parks and gardens) > Having access to finished compost	93
Education	As in formal education (compared to family upbringing and norms) - by schools, municipality, institutions > As a solution for waste problems > The need to educate people / people needing to educate themselves > Personal experiences of education influencing their composting practices > Educating children, the next generation	48
Circular Economy	> Ways in which the circular economy was discussed by interviewees > Do they know the concept? How much do they know? > Do they find it pertinent? > Critique of the concept	44
Moralising waste discourses	> Moralising discourses that responsibilise the individual > Normative attitudes towards waste and waste practices > Feelings of shame or embarrassment with regards to not composting / not composting well	115
Municipal Governance		17
Municipal Governance > Critique	Appraisals of... > Accessibility (by age, space, family size, ability, etc) > Frequency of collect > Infrastructure (bins, bags, seasonality, facilities) > Cost > Pick-up practices (how the bins are put back, lost bins, waste on the sidewalk)	84
Municipal Governance > Praise	> Praise of municipal governance of organic waste and the municipal composting program. > What works well / what is the city doing well?	8
Participation	> Who participates in composting and who doesn't?	64

	> Reasons for different participation rates. > Comments about whether neighbours or friends participate. > Reasons for their own participation / non-participation	
Participation > Physical Demands	> Physical demands of composting > In winter for example > Affecting accessibility > According to age / physical ability > The demands of private/community composting practices	10
Participation > Time / charge mentale	> Comments about how time-consuming composting is or the mental charge it demands	30
Participation > Upbringing & norms	> How composting practices are shaped by upbringing. > Experience of composting in family environment affecting participation	25
Participation > Building constraints	> Communication issues between building management/janitors, municipality, & residents > Size of apartment / kitchen > Moving house	44
Broader environmental critique	> Critique of wider waste regimes > Critique of neoliberalism / capitalism / individualism > Critique of systemic weaknesses in environmental governance > Injustices that composting + recycling programs conceal > Waste as symptom of broader tendencies in human-nature relations.	88

ANNEX 2: RECRUITMENT POSTER FOR NDG.