Gendered-environmental transformations in global production networks: a study of the disposal of menstrual products in India

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Table of Contents

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List of Figures

List of Tables

List of abbreviations

CAGR	Compound annual growth rate
CSR	Corporate social responsibility
FGD	Focus group discussion
FPEcol	Feminist Political Ecology
FPEcon	Feminist Political Economy
GCC	Global Commodity Chain
GHG	Greenhouse gasses
GPN	Global Production Networks
GVC	Global Value Chain
IDI	In-depth interview
LCA	Life Cycle Assessment
MHM	Menstrual Hygiene Management
PMC	Pune Municipal Corporation
PWMR	Plastic Waste Management Rules
SWaCH	Solid Waste Collection and Handling
SWMR	Solid Waste Management Rules
WASH	Water, Sanitation and Hygiene
WIEGO	Women in Informal Employment: Globalizing and Organizing

Abstract

The introduction and evolution of menstrual products in the market have had positive implications for the role of women in society, but today, the disposal of this commodity is also generating significant adverse impacts on the environment. The objective of this study is to explore the connection between commercial activities, gender norms, and environmental impacts with a focus on India. Analytically, I developed a conceptual framework that brings a gender perspective to the Global Production Networks framework by drawing insights from Feminist Political Economy and Feminist Political Ecology. For the empirical analysis I carried out a qualitative investigation of the disposal practices of menstrual products in India. The main research question that this study answers is: *How do tensions between gender norms and commercial activities configure environmental impacts, and what are the implications for the disposal of menstrual products in India?*

This analysis reveals that adverse environmental impacts associated with commodities reflect tensions between gender norms and commercial activities that are inherent to the process of commodification of menstrual products. My findings show that these tensions manifest in disposal and waste management practices and perceptions; such as washing products and wrapping them in plastic and being reluctant to engage with menstrual waste. I also found that these practices can generate adverse environmental impacts that are different and arguably additional to those already identified in quantitative assessments such as Life-Cycle Assessments. Therefore, relying solely on quantitative indicators to measure the environmental impacts of commodity chains can mask less visible, but equally critical, practices through which the environment is affected at the local level.

To expand the investigation of these tensions I also conducted a gendered analysis of power relations. I found that the distribution of power in the chain shapes the ability of different actors (i.e. firms, civil society, and the government) to reproduce gender norms in line with their interests. In addition, the power of consumers and waste pickers to challenge the gender norms that shape their practices is determined by their individual agency. For these reasons, I argue that the environmental governance of GPNs needs to adopt a multi-dimensional gendered approach that integrates the influence of gender norms in public, private, and social governance and that opens up new channels for collective and individual contestation.

This analysis demonstrates that the processes of commodification can be insufficient to challenge gender norms, which become embedded in commercial activities in varied and often contradictory ways. Achieving transformative change requires contesting the gendered power asymmetries that reinforce gendered inequalities and compound environmental impacts in commodity chains. The impending environmental burden associated with the growing sales of menstrual products in India underscores the urgency of investigating the gendered transformations in global production to prevent environmental impacts from becoming seriously aggravated.

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1 Introduction

1.1 Introduction and statement of the problem

> "Gender runs like pink and blue threads through every commodity chain, structuring production and consumption, invention and desire" (Fraser, 1989, p. 127).

In Jharkhand, India, a recent study found that women dispose of used menstrual pads in the same pond where they bathe. In their words: "We place the soiled napkin in between the fingers of our legs, and while we dip inside the water to take bath, we release it then and it sinks down to the ground. If you search the bottom of the lake, you will find the whole bed covered with napkins" (Mukherjee, 2017). The ways in which individuals engage with menstrual products[1] is currently (and has historically been) shaped by the gender norms that inform the symbolic meanings that menstruation has across cultures, as well as by commercial activities that promote the use of these products (Buckley and Gottlieb, 1988; Punzi and Werner, 2020; Van de Walle and Renne, 2001). Today, there is increasing evidence of the adverse environmental impacts of menstrual products and of their potential to scale as consumption continues to grow, especially in developing markets (Chockman, 2018; Lynn, 2018; Mohanty, 2014; *Spot On!*, 2015). India, for example, is the market with the greatest unmet potential for sales of these products (*Sanitary Protection in Asia Pacific*, 2019), and is already seeing the build up of huge quantities of discarded menstrual products (Walkling and Miedema, 2015). This study estimates that by 2070, when the market is expected to reach a saturation point at 100 billion units, the number of tons of waste in India could be equivalent to 800,000 per year. Nonetheless, the relation between the environmental impacts associated with menstrual products, and the commercial activities and gender norms that shape how these are used and disposed of, is yet to be sufficiently investigated.

Various literatures have recognised that in a globalising world, the process of commodification is intertwined with social and environmental changes, and that the potential social and environmental impacts of commodification expand as the scale and scope of economic production continues to grow (Gereffi and Korzeniewicz, 1994; Hartwick, 1998, 2016; Leslie and Reimer, 1999; Robbins, 1999; Winson, 1993). Commodification is defined by Page (2005, p. 295) as "the process during which a thing that previously circulated outside monetary exchange is brought into the nexus of a market." These processes are increasingly complex and defined by the continuous expansion of relations of exchange,

[1] In this study, the term *menstrual products* will be used to refer to digital and applicator tampons and synthetic pads, unless otherwise specified.

production, consumption, and disposal across greater distances of space and time. This expansion is also creating new perceptions and uses for commodities that are influenced by a desire to satisfy local socio-cultural perceptions, as well as globalised ideas about comfort, beauty, entertainment, cleanliness, etc. (Prudham, 2009). From an environmental perspective, the production of these commodities can be resource-intensive and their use and disposal can generate waste and pollution (Hansen et al., 2016).

In this study I refer to the configurations between gender norms and commercial activities that result from processes of commodification, as *tensions*. These can be explored analytically by drawing on the work of Karl Polanyi (1944), who argued that there are inherent tensions between the advancement of market exchange relations and their social underpinnings. While Polanyi's original proposition does not have a gender perspective, feminist political economists have applied it with a gender lens to explore how the expansion of global production can both challenge and perpetuate gender norms (Beneria, 2007; Elson, 1999). These studies have made valuable contributions to the analysis of women's participation in labour markets (Barrientos, 2013; Dolan, 2004). However, these insights are yet to be applied to study the implications of these tensions for the environment.

The impending growth of menstrual waste underscores the importance of exploring how gender norms are transformed by the introduction of new goods and services, and how these transformations are connected to environmental impacts. The unhygienic ways and unsafe conditions under which many women in India manage their menstruation has increasingly gained traction as a social issue and has positioned access to menstrual products as a solution for women to manage their menstruation with dignity (Bobel, 2018). However, in many instances the environmental risks are overlooked. For these reasons, the analysis of tensions between gender norms and commercial activities that result from the commodification of menstrual products can provide important analytical and empirical insights on the opportunities and challenges of achieving more positive outcomes on the environment and more gender-equitable gains from commodity chains.

1.2 Aims and research question

In this study I investigate the connection between gender norms, commercial activities, and environmental impacts to answer the following research question: *How do tensions between gender norms and commercial activities configure environmental impacts, and what are the implications for the disposal of menstrual products in India?*

The research question includes analytical and empirical dimensions. Analytically, this study leverages the Global Production Networks (GPN) framework and its concepts of *embeddedness* and *power* from a gender perspective. I selected the GPN as the framework to study commodity chains because it conceptualises a greater diversity of stakeholders (beyond commercial actors) that participate in global production and recognises the increasingly varied and flexible connections between them (Neilson and Pritchard, 2009). Unlike other approaches this provides visibility of the diverging stakeholder perspectives that cut across the various stage of these chains (Bair, 2009). This approach also considers the social and institutional contexts in which the production of commodities, knowledge, capital, and labour are grounded (Coe et al., 2008a).

To bring a gender perspective to the GPN analysis and extend it to the environment, I draw insights from Feminist Political Economy (FPEcon) and Feminist Political Ecology (FPEcol) literatures. As mentioned, feminist political economists have applied gendered perspective to Polanyi's work to analyse markets as gendered institutions. These insights can be brought into the GPN framework to add a gender lens to the concept of societal embeddedness and investigate how different actors understand, experience, and prioritise gender norms. This is central for this study as I seek to investigate the influence of these norms on the processes and relations that constitute commodity chains.

To further explore tensions, I conduct an analysis of power relations from a gender perspective. A strength of the GPN framework, particularly compared to other approaches to study commodity chains, is that it can provide a more nuanced exploration of power relationships between both commercial and non-commercial actors (Coe et al., 2008a). FPEcon insights have been integrated to the GVC/GPN literature to investigate how the power relations between actors in the chain become inextricable from the gender norms that prevail in the context where the chain operates (Barrientos, 2019; Barrientos and Evers, 2014). Feminist literature has also advanced the study of gendered power relations by exploring how organisational rules, cultural norms, and routinized practices constrain individual and collective forms of agency and sustain unequal relations across society (Kabeer, 1999). In FPEcol literature, power has also been approached from a gender perspective to explore how environmental issues are the result of gendered asymmetries of power that shape individuals' identities and their everyday practices (Nightingale, 2006). Building on these literatures, I explore how gendered power relations in GPNs shape the relations between actors in the chain at various levels of interaction and in turn, the outcomes of the chain on the environment.

The conceptual framework I developed with these insights bridges the commercial, social, and environmental dimensions of GPNs and facilitates the analysis from a gender perspective. This framework also guides the empirical exploration of the gendered transformations that take place through the processes of commodification and how these relate to the environment. In addition, bringing closer together the GPN, FPEcon and FPEcol approaches serves to address the insufficient analysis across these literatures of the ways in which the relation between gender norms and environmental issues unfolds through commodity chains; as well as the limited understanding of how the varied roles that women play in economic production can lead to environmental impacts.

The empirical dimension of the research question is answered by looking at the tensions in the menstrual products chain in India and how they relate to environmental impacts. The empirical analysis is undertaken through a qualitative approach that combines a GPN mapping with a comparative case study approach. I explore tensions by conducting a GPN mapping with a focus on the disposal stage of the menstrual chain. This mapping allows me to explore the interests of different actors in the chain and how gender norms influence their actions. I also investigate the practices and perceptions associated with the disposal and waste management of menstrual products by conducting a comparative analysis of two different locations in India. A comparative analysis is important because it brings out differences and similarities in the ways gender norms related to menstruation are experienced by individuals with different backgrounds, identities, and different roles in the chain, namely, consumers and waste pickers.

This empirical analysis provides the basis for the analytical discussion and can also bridge two important gaps. The first gap is the insufficient study of the ways in which gender norms can shape disposal practices of menstrual products, including those related to the management of menstrual waste. The second is the understudied connection between these disposal practices and environmental impacts, which is yet to be included or investigated in existing environmental impact assessments of menstrual products.

In sum, I argue that tensions between gender norms and commercial activities need to be further investigated to better understand and address the consequences that the gendered transformations associated with the increased production, consumption, and disposal of commodities have for the environment. The main research question of this study is: *How do tensions between gender norms and commercial activities configure environmental impacts, and what are the implications for the disposal of menstrual products in India?*

In order to address this question, I also investigate the following sub-questions:

1. *Are there tensions between commercial and gender norms in the menstrual products chain in India and how are these related to adverse environmental impacts?*

This sub-question provides context for the analytical and empirical investigation of this study by addressing the tensions between the commercial activities that constitute the menstrual products chain and the gender norms around menstruation; as well as how these appear to be linked to adverse environmental impacts. Empirical evidence indicates that the process of change that links commercial activities and gender norms can be observed in India, which is a market with fast-growing sales of menstrual products and also a country where menstruation remains a strong taboo. This empirical exploration aims to gather evidence of the gender norms that shape how individuals manage their menstruation; the processes and relations that constitute the menstrual products chain, and the environmental impacts associated with these products.

2. *How can the Global Production Networks framework be used to analyse tensions between gender norms and commercial activities that lead to environmental impacts?*

This is the main analytical sub-question, which explains how tensions and their relation to the environment can be explored by strengthening the GPN framework. The GPN offers the possibility of conducting an analysis of the processes that constitute commodity chains and of a wide range of actors and their relations in differing social and institutional contexts. However, it doesn't explore the social and environmental dimensions of global production from a gender perspective. I draw insights from FPEcon and FPEcol literatures to bring a gender perspective to the concepts of societal embeddedness and power in this approach. This is done to explore how commercial activities become embedded in gender norms and how, by virtue of this embeddedness, gendered power relations shape the interactions of actors and the outcomes of the chain on the environment.

3. *How do tensions between gender norms and commercial activities shape consumers' disposal practices and perceptions of menstrual products in India, and what is the connection between these practices and adverse environmental impacts?*

With this question I seek to explore how tensions manifest in consumers' disposal practices and perceptions of menstrual products and how these are linked to adverse environmental impacts. To do

so I unpack the empirical findings from the comparative analysis of two locations in India to explore the taboos and social perceptions that inform consumers' understanding of menstruation and their perceptions of menstrual products. I also use the GPN mapping to examine the diverse interests of actors in the chain (i.e. firms, the government, and civil society) and the extent to which they address the disposal of menstrual products. Lastly, I investigate how the disposal practices of consumers are connected to adverse environmental impacts. From an analytical perspective, this question explores how the gendered societal embeddedness of the chain shapes the actions of actors, including their everyday practices.

4. *How do tensions between gender norms and commercial activities shape waste pickers' perceptions and practices of menstrual waste management in India, and what is the connection between these practices and adverse environmental impacts?*

This question continues to guide my examination of the findings from the comparative analysis to explore how tensions manifest in waste pickers' practices and perceptions and the connection between these practices and adverse environmental impacts. Through this analysis I investigate the taboos and social perceptions that shape waste pickers' engagement with menstrual waste; as well as how other forms of social differentiation, such as caste, can enhance the challenges that waste pickers face to manage this waste. I also use the GPN mapping to explore the extent to which the management of menstrual waste is addressed by different actors in India. Lastly, I look at how waste pickers practices and perceptions are related to environmental impacts. From an analytical perspective, this question also allows me to examine the gendered societal embeddedness of the chain and to bring forth the value of an intersectional perspective to analyse how gender norms, in conjunction with other forms of social difference, shape the identities of individual who participate in the chain and their engagements with commodities.

5. *What are the implications of analysis of tensions in the menstrual products chain in India for the environmental governance of GPNs?*

With this question I bring together the empirical findings to draw out the analytical contributions of this study. The analysis of tensions shows that the ways in which gender norms become embedded in commodity chains is not a linear process, but a contested one that cuts across multiple levels of interaction in the chain. By virtue of this embeddedness, the social asymmetries that gender norms embody can be both reproduced and challenged through commercial activities. I argue that these

gendered power relations need to be challenged to change the practices that generate adverse environmental impacts. Thus, environmental governance in GPNs requires a multi-dimensional gendered approach that enables collaboration between private, public and social actors, and opens spaces for collective and individual forms of contestation. These different forms of contestation can be complementary avenues through which gender norms can be challenged, and which are central to the implementation of environmental governance in local contexts.

1.3 Empirical and analytical contributions

This study expands on Polanyi's (1944) notion of the social construction of markets by investigating tensions between markets and societal dynamics from a gender lens and in relation to the environment. In line with the work of feminist political economists (Beneria, 2007; Elson, 1999), I examine tensions as gendered; meaning that the processes that constitute global production are configured by gender norms and are also able to transform these norms in ways that can intensify or redefine them. By drawing on insights from feminist political ecologists, I take the analysis of tensions in a new direction by exploring the implications that gendered transformations associated with global production have for the environment.

This study demonstrates that adverse environmental impacts associated with commodities reflect tensions between gender norms and commercial activities, which pose important challenges for the environmental governance of GPNs. The analysis of tensions shows that the power of actors in commodity chains can enable them to both challenge and reproduce gender norms in line with their interests. These interests, I argue, are an important factor that shapes practices that lead to adverse environmental impacts. Yet, the choice of practices is also dependent on the ways in which individual actors understand gender norms and feel able to challenge them. For this reason, I conclude that achieving less negative outcomes on the environment requires challenging the gendered relations of power that hamper individuals' ability to contest gender norms and change their practices. This requires a stronger theorization of power in the environmental governance of GPNs, which recognises that the influence of gender norms traverses the multiple dimensions of global production (i.e. social, commercial, and environmental).

The analysis of tensions also points out that change is needed in the ways in which the relation between gender norms, commercial activities, and the environment is understood in GPN literature. It illustrates that gender norms need to be considered as both a cause and a consequence of environmental impacts because they are inextricably linked to the ways in which commodity chains

operate; shaping the relations between actors, the practices they follow, and the outcomes that chains have on the environment. Moreover, this analysis also leads me to make broader reflections on the need for transformative change in global production. In line with Polanyi's (1944) criticism that a society driven by the logic of the market will eventually destroy the social and environmental relations that sustain it; I argue that failing to achieve transformative change in global production risks compounding gendered inequalities and adverse environmental impacts. Seeing the gendered and environmental aspects of global production as unrelated, can lead to the endorsement of commodities as solutions for social issues, without full consideration of how these can generate adverse environment impacts and reinforce unequal relations.

Lastly, an important empirical contribution of this study is elucidating why gender norms need to be considered when assessing the environmental impacts of systems of production. My findings show that environmental impacts that result from gendered disposal practices are different and can be considered additional to those identified with quantitative methodologies, such as Life Cycle Assessments (LCA). This analysis serves to demonstrate that relying solely on measurable indicators and technical solutions can lead to overlook some environmental impacts and mask less visible, but equally critical, practices through which the environment is affected at the local level.

1.4 Structure of the study

The study is structured according to the research sub-questions presented in section 1.2. Chapter Two is a review of existing literature used to discuss the relation between taboos around menstruation; the operations of the menstrual products chain, and the different environmental impacts associated with menstrual products. It also explores how these dynamics unfold in India. Chapter Three addresses the main analytical sub-question of the study and explains the conceptual framework that was developed by combining a Global Production Networks (GPN) approach with insights from FPEcon and FPEcol literatures. In this chapter I also explain why combining these different approaches is critical to bring a gender perspective to the analysis of commodity chains and to extend this to encompass the environment. Chapter Four presents the research methodology and how it serves to conduct an empirical investigation in line with the conceptual framework. It also provides a description of the research methods used for collection, analysis, and interpretation of data. In Chapter Five I explore tensions empirically by looking at the findings from the comparative study and the mapping of the chain. I investigate how tensions manifest in the disposal practices and perceptions of consumers and how these practices generate adverse environmental impacts. Chapter Six continues to address tensions empirically and how they manifest in waste pickers' practices and perceptions. In this chapter

I also explore how these practices lead to environmental impacts in India. In Chapter Seven I bring together the findings from the empirical investigation to draw out the analytical contributions that the analysis of tensions yields on the environmental governance of GPNs and on the importance of different forms of contestation. Chapter Eight highlights the links between the thesis' analytical and empirical findings and summarises how the thesis answered the research sub-questions. It also provides policy recommendations to mitigate the adverse environmental impacts that result from disposal practices and perceptions, as well as suggestions of further research areas.

In sum, this study contributes to the GPN, FPEcon, and FPEcol literatures by examining how tensions between commercial activities that constitute global production and the gender norms in the societal contexts in which commodity chains are embedded can have negative implications for the environment. I argue that failing to recognise and investigate the ways in which gender norms configure and are configured by commercial activities, conceals the extent of their influence across social, commercial, and environmental spheres. This analysis underscores that better analytical tools are needed to understand the complexity of contemporary economic and social transformations and to address their impacts on environment. In India, the impending environmental disaster from the growing quantities of menstrual waste highlights the urgency of transformative change in global production that challenges the gendered power asymmetries that can aggravate environmental impacts and reinforce gender inequalities.

2 Tensions in the disposal of menstrual products and the implications for the environment

2.1 Introduction

To provide context for the analytical and empirical investigation to follow, in this chapter I discuss why tensions between gender norms and commercial activities and their relation to environmental impacts can be investigated through the disposal of menstrual products in India. In doing so I answer the first research sub-question: *Are there tensions between commercial and gender norms in the menstrual products chain in India and how are these related to adverse environmental impacts?*

The processes of commodification transform and are transformed by gender norms. I refer to these configurations between gender norms and commercial activities as *tensions*. The commodification of menstrual products is reflective of this process of change: since they were introduced in the market, menstrual products have challenged and redefined some of the gender norms that shape how individuals manage their menstruation (Punzi and Werner, 2020). I argue that tensions are not inherently good nor bad; there can be both positive and negative implications to the transformation of gender norms through the expansion of global production and the increased access to commodities. For example, access to menstrual products has given women more physical mobility and led to positive benefits on their health and education (Hennegan et al., 2019; Vostral, 2020). There is, however, limited understanding of the ways in which these tensions shape the impacts of these products on the environment.

The review of literature in this chapter suggests that tensions can be observed in India because, while some taboos remain prevalent in the country, individuals are increasingly gaining access to menstrual products due to efforts of various actors including firms. What is more, taboos and societal expectations appear to be an important consideration in the disposal of menstrual products. These practices also appear to have impacts on the environment that remain unexplored. Moreover, this review indicates that waste pickers play a central role in waste management in India, but the influence of gender norms on their practices and the ways in which these can contribute to address environmental impacts also remains unexplored. For this reasons, I argue that tensions can be empirically investigated through the disposal and waste management practices of menstrual products in India.

The second section of this chapter provides a discussion on how gender norms can be transformed through processes of commodification, including by increasing access to commodities. The third

section reviews evidence of the different dimensions of tensions in the menstrual products chain by looking at literature on the taboos around menstruation and exploring how some of these have been challenged and redefined by commercial activities related to the commodification of menstrual products. It also reviews existing evidence on the environmental impacts associated with the processes of commodification of these products. In the fourth section I discuss how tensions manifest in India and why disposal-related practices can provide important insights on the connection between tensions and environmental impacts. The fifth section concludes.

2.2 Exploring gendered transformations in commodification

Gender as a concept does not refer to the differences between men and women, but to the process through which differences are defined and become significant in specific contexts (Butler, 1997; Mahoney and Yngvesson, 1992; Scott, 1991). Gender differences reflect a social system that allocates resources, roles, and power according to whether a person or practice is perceived as male or female, masculine or feminine (Ridgeway and Correll, 2004). Most gender systems are hierarchical and privilege the male or masculine over that which is considered female or feminine (Heise et al., 2019). Gender norms are the social rules and expectations that sustain the gendered social system. These norms only take meaning by being performed and contested through social interactions (Butler, 1997; Mahoney and Yngvesson, 1992). As Pearse and Connell (2015, p. 41) argue, gender norms "do not float free" they are embedded in personal attitudes and conducts and in formal and informal institutions. What is more, gender norms can shift over time and across societies, and are in constant interplay with other processes of change, including economic ones (Detraz, 2017; Pearse and Connell, 2015).

The processes of commodification, as a dynamic form of economic change, can transform gender norms. Page (2005, p. 295) defines commodification as "the process during which a thing that previously circulated outside monetary exchange is brought into the nexus of a market." Similarly, Jackson (1999) argues that 'commodification' entails a process of transformation of goods and services that were not previously commodified. These processes entail various stages, from inputs of raw materials and labour, through transportation and distribution, and ultimately consumption and waste disposal. Various studies have called attention to the negative social and environmental implications that result from the continuous expansion of these processes across greater distances of space and time, and from the growing number of goods and services that keep taking on a commodity-form (Gereffi and Korzeniewicz, 1994; Hartwick, 1998, 2016; Leslie and Reimer, 1999; Robbins, 1999; Winson, 1993).

Feminist analyses of these processes of commodification have shown that these can disrupt long-established gender norms but also recreate gendered forms of subordination (Dunaway, 2014; Ramamurthy, 2014). For example, the expansion of global production and the commercialization of many activities previously undertaken by women in the home is increasingly drawing women to different types of waged worked that can contribute to their financial independence (Barrientos, 2019, 2001; Dolan and Sorby, 2003; Hale and Wills, 2005; Tinsman, 2000). As Barrientos (2014a, p. 793) argues "the expansion of global production 'touches down' across countries and regions where women have long played diverse but subordinate roles, but are increasingly being drawn into commercial activity as consumers and producers." However, the feminization of the workforce can also reinforce gendered divisions of labour that undervalue women's work and reinforce their low remuneration (Bain, 2010; Barrientos, 2014a; Dolan, 2004; Fernández Kelly, 1989; Kabeer and Mahmud, 2004; Wright, 2006).

Gender norms can also be challenged and reproduced by the increased access to commodities and new ideas about how to use them. For example, Wilhite (2014) finds that in India household appliances such as vacuum cleaners, washing machines and refrigerators are replacing brooms, washcloths and wood-fired ovens and relieving women from housework which is traditionally deemed female. In Uganda, Dolan et al., (2020, p. 102) find that women can view beauty products as empowering and argue that in purchasing these products and defying men's opinions, some women challenged "the structure of constraint by which they were traditionally bound, as well as the conception that women's interests were commensurate with those of their husbands." On the other hand, commodities can also reproduce gender norms and accentuate existing gender inequalities (von Werlhof, 2007). For example, Hansen et al., (2016) found that women are using beauty products to comply with beauty ideals and enhance their eligibility as brides. In India, where white skin can be considered a mark of class and caste, women have traditionally used turmeric as a skin lightening technique; but they are now using a wide range of fairness-oriented powders, creams, and oils.

Gender norms are dynamic and evolve with socio-economic changes, yet, they are also hard to change because they are deeply embedded in relations, ideologies, and institutions (Cislaghi and Heise, 2019; Pearse and Connell, 2015). As argued by Ramamurthy (2014, p. 45) "gendering takes place within and through the process of production and gendering dynamically changes and is changed by the process." In this study, I refer to the configurations, i.e. the pushes and pulls, between gender norms and the commercial activities as *tensions.* I argue that *tensions* are an integral part of the process of commodification and that they can be positive or negative. As discussed, access to different

commodities can both challenge and reproduce the gender norms in ways that are positive and negative for individuals' role in the economy and society.

From an environmental perspective, these tensions are relevant because the processes of commodification entail the use of natural resources and can also lead to waste and pollution. According to Bolwig, et al. (2010) the activities that constitute commodities interact with the natural environment in two major ways. Firstly, in terms of the inputs that production utilises from the local resource base (for example, biodiversity, soil, and water). Secondly, in terms of outputs to the natural environment in the form of emissions of toxic substances and greenhouse gasses (GHG) from various activities. Environmental impacts can differ in quantity, quality, and spatial distribution. Nonetheless, there is limited understanding of how the transformations of gender norms through the processes of commodification, and specifically from increased access to commodities, relate to environmental impacts. In other words, the impacts that tensions between gender norms and commercial activities have on the environment are unexplored. This gap is becoming pressing to address in light of the rapidly growing population and increasing purchasing power of many individuals, including women, who remain important decision makes of consumption at the household level (*Global Mega Trends to 2030*, 2019; *Women: The next emerging market*, 2013; King, 2017).

The remaining sections in this chapter will elaborate on why the commodification of menstrual products provides an opportunity to explore how tensions between commercial actives and gender norms relate to the environment. The discussion highlights the importance of investigating this connection to better understand and address the adverse impacts that commodities can have on society and the environment.

2.3 The gendered transformations and environmental impacts associated with menstrual products

Around the world there are many and varied ways in which women manage their periods, which include commercially available products, as well as 'traditional alternatives' such as cloth, sand, chicken feathers, leaves, rags, etc. In Uganda, for example, some women use a 'menstruation skirt' made of goat skin, and in Zambia some use powdered cow patties wrapped in cloth ("How women around the world manage," 2019). Menstrual products (also called feminine hygiene products, sanitary protection, femcare products) are personal care products used during menstruation, vaginal discharge, and other bodily functions related to the vulva (Ajmeri and Ajmeri, 2010). Today, there is a wide range of products available for sale in different markets (see Appendix 1 for an overview). In this

study, I use the term *menstrual products* to refer to disposable pads and to digital and applicator tampons. In this section I review evidence that indicates the disposal practices of menstrual products provide an opportunity to explore tensions empirically and to better understand how these are related to the environment. The ways in which gender norms shape these practices remains a gap in literature that is especially important to address in the context of increased availability and use of menstrual products and growing quantities of menstrual waste.

2.3.1 Exploring the gender norms around menstruation

Various authors have argued that taboos around menstruation are patriarchal instruments of power that reinforce the hierarchy between men and women. Although there are many women who don't menstruate and many individuals who are not women who menstruate, menstruation can be considered a unique female experience that reflects women as the antitheses to the male norm, and which reinforces women's lower social standing compared to men (Dahlqvist, 2018). Young (2005) for example, argues that menstruation becomes a source of oppression by imposing rules of menstrual etiquette that require women to conceal their menstruation if they want to occupy public spaces along with men. Similarly, Roberts (2016) argues that societal attitudes towards menstruation determine the social and political status of women, making understandable, if not justifiable, the great lengths to which many undergo to avoid revelation or discussion of their menstrual status. As explained by Bobel (2018, p. 226), "menstrual stigma undermines individuals' agency leading them to adopt practices to fulfil a gendered, racialized, and classed menstrual mandate, under threat that failing to meet the mandate is to lose status, legitimacy, and cultural capital, all of which are forms of power." Paraphrasing Simone de Beauvoir (1949), just as the penis symbolizes virility, menstruation can be seen as representing femininity; yet, because femininity means alterity and inferiority, its revelation is met with shame.

In many cultures menstruation is a phenomenon that evokes fear and disgust. Unlike other bodily fluids such as breastmilk or semen, menstrual blood can be viewed as more disgusting or aversive (Bramwell, 2001; Goldenberg and Roberts, 2004). The association of menstrual blood with pollution can result in practices that restrict the behaviors of menstruating women, as well as that of others in relation to them (Buckley and Gottlieb, 1988). For example, in some regions of Nepal, a practice called 'chhaupadi' requires Hindu menstruating women to sleep in small sheds that are excluded from the community (Amatya et al., 2018; Baumann et al., 2019; Ranabhat et al., 2015; "WaterAid saddened," 2017). Beliefs around menstruation can also mark menstruating women as disabled, imbalanced, and out of control (Chrisler and Caplan, 2002).

Nonetheless, the different beliefs around menstruation are historically and ethnographically diverse, and have different symbolic meanings that can change over time (Buckley and Gottlieb, 1988; Van de Walle and Renne, 2001). Existing studies have found a wide range of rules related to menstruation management that have very different purposes and meanings. In some cultures, menstrual blood is believed to be a source of power and used as a key ingredient of love charms and potions to heal wounds (Buckley and Gottlieb, 1988). For example, in West Africa, the Beng people believe that the red palm nut sauce when cooked by a menstruating woman is a delicious of local cuisines (Gottlieb, 1982). Menstruation can also be considered a symbol of fertility and celebrated accordingly (Gottlieb, 2020; Tiwari et al., 2006).

The explanation that all menstrual taboos result in women's oppression is reductionist and fails to consider the historical and ethnographic diversity, and biological and symbolic complexity that these taboos entail (Buckley and Gottlieb, 1988). Nonetheless, studies have found that taboos can have a negative effect on women's lives by preventing them from accessing information about menstruation and leading them to experience feelings of shame, anxiety, embarrassment, and low self-esteem, and even fears of being cursed (Crawford et al., 2014; Crichton et al., 2013; Kowalski and Chapple, 2000; McMahon et al., 2011; Rheinländer et al., 2019; Sommer, 2009; Umeora and Egwuatu, 2008). Social expectations can also restrain behaviours of menstruating women; these range from prohibitions to enter agricultural fields (to avoid spoiling the harvest) to touching a corpse (because otherwise it may suffer a state of perpetual menstruation) (Gottlieb, 2020).

Moreover, taboos around menstruation have also been found to have negative consequences for women when they lead them to follow practices that can cause physical health risks, such as urogenital and reproductive tract infections (Caruso et al., 2017; Das et al., 2015; Lahme et al., 2016; Mahon and Fernandes, 2010; Morrison et al., 2016). For example, 51% of girls in Iran reported not taking a bath for eight days after the onset of their period (House et al., 2012). In Nepal, the 'chauppadi' practice can expose women to poisonous animals, hypothermia, dehydration, pneumonia, asphyxiation from fires, and rape (Baumann et al., 2019). Taboos can also explain why women have a reluctance to discuss health issues relating to menstruation (McLintock, 2018; Seear, 2009). For example, in Sweden, a recent study found that only 38% of women who suffered from excessive menstrual bleeding reported their condition to their doctors (Kadir et al., 2010). Health issues related to menstrual practices have been explored in various literatures and are considered an important reason why it is pressing to enable women to access education on menstrual hygiene and menstrual products (Bobel, 2018).

So far this discussion has showed that taboos and social perceptions of menstruation have different impacts on women's lives and can be considered expressions of gender norms because they define the expected behaviours of individuals. These norms can inform how menstruation should be managed and the socially appropriate practices to follow. The next subsection continues the review of existing literature to discuss the commercial activities that drive the use of menstrual products and how these have interacted with these gender norms related to menstruation.

2.3.2 Investigating the processes of commodification of menstrual products

The introduction of menstrual products in the market has been closely associated with socio-economic transformations and changes in the role of women in society. Boosted by the hasty entrance of women into the workforce during the Second World War, menstrual products became rapidly seen as the solution that finally allowed women to engage in activities such as swimming, horse riding and others, which were previously restricted due to menstruation (Hicks and Robertson, 2012). For example, one of the first Tampax ads in 1938 stated, 'A man's job doesn't allow for feminine disabilities. Luckily, tampons can combat disability, coming to the rescue of thousands of women on service' (Hicks and Robertson, 2012). These products have given women more physical mobility and bodily freedom, but the argument that they have contributed to women's liberation has been widely criticised (Bobel, 2018; Vostral, 2020).

Over the years, the marketing campaigns of global firms have been celebrated for challenging taboos around menstruation and dispelling certain flawed notions such as tampons' threat to virginity. The branding and advertising of menstrual products play an important role in shaping how individuals perceive and manage their menstruation. As argued by Punzi and Werner (2020, p. 59), "the brands selling menstrual products have a powerful role in shaping the way society feels about periods." The language used to communicate the benefits of menstrual products has also evolved significantly. In 2017, for the first time, BodyForm debuted an advertisement featuring red liquid to represent menstrual blood, as opposed to the blue liquid that has often been used to demonstrate absorbency (Kiefer, 2017). Today, more established menstrual product brands are launching campaigns to celebrate body positivity and encourage women to become knowledgeable about their menstrual cycle.

Nonetheless, the notion of women in need of protection and secrecy continues to guide many communication messages (Malefyt and Mccabe, 2016). Some studies have found that advertisements

build a fear of embarrassment that lead women to feel that using 'the wrong' menstrual product can have dire consequences (Coutts and Berg, 1993; Simes and Berg, 2001). Advertisements have also been criticised for retaining negative connotations around menstruation and portraying it a as shameful process that makes women vulnerable (Berg and Coutts, 1993). As argued by Vostral (2008, p. 80), global firms associated menstrual products with an act of emancipation, while also reinforcing the view of menstruation as a liability; "they beckoned women to fulfil their modern roles by emancipating their bodies with disposable sanitary napkins."

Various academic studies have also examined the ways in which manufacturers redefined the meaning and treatment of menstruation by employing medical authority to create a perception that menstruation is a 'hygienic crisis' that needs to be actively management through the use of products (Bobel, 2018; Erchull, 2013; Malefyt and Mccabe, 2016; Mandziuk, 2010; Simes and Berg, 2001). It has been argued that global firms create new needs and insecurities around menstruation to then suggest that the purchase of certain products will solve them (Karzai, 2010; Newman, 2010; Park, 1996; Vostral, 2008). What is more, by positioning menstrual products as the only hygienic way to manage menstruation, commercial activities can also delegitimise the use of traditional alternatives to manage menstruation (Lahiri-Dutt, 2015).

The use of menstrual products in developing countries

As mentioned at the beginning of this section, women around the world use different methods to manage their menstruation, including but not exclusively, menstrual products. To date, not all women around the world can access menstrual products. Affordability of menstrual materials is a widespread problem, sometimes referred to as 'period poverty' (Weiss-Wolf, 2017). In the UK, one in 10 girls between the ages of 14 and 21 have been unable to afford sanitary products (Tingle and Vora, 2018). In Kenya, girls have been found to engage in transactional sex for goods such as disposable pads (Sagala, 2019).

The growing attention to Menstrual Hygiene Management (MHM), has led to extensive research on women's and girls' experiences of menstruation in low-and middle-income countries (Behera et al., 2015; Budhathoki et al., 2018; Hennegan et al., 2019; Rheinländer et al., 2019; Schmitt et al., 2017).[2]

[2] Many interventions and polices have been developed using this growing body of qualitative literature. Yet, many of these studies have limitations, including the generalizability of the findings and the insufficient focus on the experiences of adult women (Hennegan et al., 2019).

Various studies have found that the lack of access to products can have negative physical health issues for women by forcing them to rely on materials which are not hygienically treated and which may cause them to experience rashes, soreness, and infections (Behera et al., 2015; Lahme et al., 2016; Mason et al., 2013). The links between menstruation and school attendance have also received a lot of academic attention recently. The lack of information about menstruation, and the insufficient access to menstrual products and spaces to clean and change them have been found to be important barriers to school attendance and engagement (de Albuquerque, 2013; Dolan et al., 2014; Ellis et al., 2016; Girod et al., 2017; Montgomery et al., 2016; Sommer, 2010; Sommer et al., 2015).

Research has also found that societal perceptions around menstruation and the cultural acceptability of products can affect women's ability to access and use them. In Sierra Leone for example, these products are believed to cause sterilization (Tjon A Ten, 2007). In Iran, many women remain reluctant to use tampons due to religious concerns about virginity (*Sanitary Protection in Iran*, 2017). Disposing of menstrual products can also have social and cultural considerations. A recent review of literature found that there is a wide variety of ways in which menstrual products are disposed of, such as throwing them out in the open and in latrines, but also burning and burying them (Elledge et al., 2018). The complexity of some of these practices leads to question whether there is a relation between them and societal perceptions around menstruation. For example, in many contexts the silence and shame around menstruation is centred on the notion that menstrual blood is impure and all traces of it need to be hidden and destroyed (Chandra-Mouli and Patel, 2017). The growing literature around menstruation is yet to pay sufficient attention to the disposal of menstrual products. Exploring the breadth of practices and the factors that shape them is increasingly relevant as menstrual products become more accessible, especially in countries that have poor waste management systems.

This part of the discussion indicates that gender norms around menstruation are in constant interplay with commercial activities related to the consumption of menstrual products. As the review of different studies shows, commercial activities have contributed to redefine some societal perceptions of menstruation. While various authors have questioned the extent to which gender norms are really contested by these activities, over the years the processes of commodification of menstrual products have changed how menstruation is perceived and managed. What is more, studies have found that there are various negative implications of the lack of access to menstrual products and that taboos can be an important factor that hampers this access. A noteworthy gap in this literature is exploring whether taboos and societal perceptions also shape disposal practices of menstrual products. I argue that addressing this gap can provide relevant insights of the ways in which tensions relate to the

environment because these practices reflect how the processes of commodification collide with gender norms in ways that can lead to negative outcomes on the environment. In the next subsection I will further discuss how the processes of commodification of menstrual products, including disposal practices, are creating negative environmental impacts.

2.3.3 Reviewing evidence of the adverse environmental impacts of menstrual products

As mentioned in section 2.2, the processes of commodification interact with the environment in different ways and the results of these interactions can be appraised in different forms. This study draws from Commoner's (1971) work which is seminal to industrial ecology and to the development of a more interdisciplinary approach to analyse the material and energy flows that enable production and consumption activities (Bai and Schandl, 2010). He argues that ecological cycles have been altered by the use of new technologies in industrial processes that extract material from the environment and discharge them back in new forms. In his view, the introduction and accumulation of new materials and substances that are foreign to the environment can interfere in dangerous ways. For this reason, when analysing environmental impacts associated with menstrual products, this study considers the various resources that are used for disposal, as well as the different materials that are reintroduced into the environment throughout various activities.

In terms of resources used, existing assessments of the environmental impacts of menstrual products have found that their production requires the use of fossil fuels to process low-density polyethylene (LDPE). Mazgaj et al. (2006) found that even though cellulose constitutes almost double of the weight percentage of a disposable pad compared to plastic, 63% and 35%, respectively, foresting and cellulose processing doesn't have as big an impact as plastic production. Other studies have also found environmental impacts resulting from plastic used in the packaging, the backing of pads, and tampon applicators (Peberdy et al., 2019). Leroy et al., (2017) found that for both tampons and pads, the product itself accounts for up to 17% of the overall impact, while the packaging is responsible for 70% to 95% of the environmental impact.

Regarding the waste that influences ecological cycles, these products can release toxins when they are incinerated after disposal. A study by the World Health Organization found that when incinerators do not reach the necessary temperature of 600 degrees Celsius, toxic gases are released into the atmosphere (*Technical Assessment of Incinerators*, 2018). The furans and dioxins that cotton absorbs during the bleaching process are released if incineration does not take place in an adequate environment (Mohanty, 2014). If not incinerated, these products can also become waste in landfills

and can take between 500-800 years to decompose (Muralidharan, 2018). On average, it is estimated that one individual will consume between 11,000 and 16,000 items in her lifetime, which can amount to 125-160 kilos of waste (Maynard, 2019). In the UK alone disposable menstrual products create over 200,000 tons of waste per year (Lynn, 2018).

As for disposal practices, in many instances menstrual products are flushed down toilets and eventually make their ways to rivers and the ocean (Lynn, 2018; "Managing menstrual waste in India," 2019; "Masika," 2014). According to a recent report by the European Commission, pads are the fifth most common plastic item on European beaches (*Reducing Marine Litter*, 2018). Moreover, when thrown in pit latrines products can complicate the functioning of septic tanks by getting mixed with faecal sludge and clogging drainage (Garikipati et al., 2019; Kaur et al., 2018; *Pushing the Boundaries*, 2017). For example, in Eastern Kenya, the Mavoko Water and Sewerage Company reported that menstrual products constitute about 40 percent of the material that has to be cleared from blocked sewers. In Durban, South Africa, frequent blockages of the hoses used for pit emptying are due, in large part, to the presence of menstrual materials in the latrines (Kjellen et al., 2012; Sommer, 2013). These findings further highlight the importance of investigating the disposal practices of menstrual products and their environmental impacts in different contexts.

This review concludes that there is limited evidence of the different impacts that the commodification of menstrual products has on the environment, and especially on the impacts resulting from different disposal practices. Nonetheless, existing evidence indicates that these practices can have significant impacts on the environment. Building on these different literatures, I argue that the relation between tensions and the environment can be explored by looking at the extent to which societal perceptions around menstruation shape the ways in which individuals dispose of menstrual products, and whether in doing so these configurations also affect the impacts of these products on the environment.[3] Although there are other activities in the chain that also generate adverse environmental impacts, it is at the disposal stage where tensions between commercial activities and gender norms appear to be more directly linked to the environment. The next section of this chapter reviews evidence of the presence of these tensions in the disposal stage of menstrual products in India and how these appear to be related to environmental impacts.

[3] The environmental impacts of disposing traditional alternatives, such as disposing of cloth in open spaces, can also have adverse environmental impacts; but these, if any, are not related to the process of commodification of menstrual products, which is why they are not relevant to the main research question of this study.

2.4 Tensions in the menstrual products chain in India

"India is a land of multiple hierarchies rooted in caste, class and gender. Patriarchal hierarchies rank men above women in most spheres of life and assign them different social roles and responsibilities" (Nielsen and Waldrop, 2014, p. 2). The pace of socioeconomic transformation over the last decades has led to various changes in gender norms, creating new opportunities for women, while also reinforcing old patterns of gendered exclusion that lead to their subordination in new ways (Harriss-White, 2015). The global flows of commodities that are entering the Indian market have become an important driver of aspirations and "new gendered ways of being both Indian and modern" (Nielsen and Waldrop, 2014, p. 10).

The introduction of menstrual products in the Indian market dates back to the 19th century; the first advertisement of pads featured in The Times of India as early as 1885 (Chattopadhyay, 2016). Yet, many women continue to manage their menstruation with traditional alternatives, which include old cloth, ash, dust, sand and sawdust (*Sanitary Protection in India*, 2019). This section looks at how the taboos and societal perceptions around menstruation in India shape women's engagement with menstrual products, including how they dispose of these products. In it I also analyse the commercial activities that constitute menstrual products and review existing evidence on the environmental impacts of these products.

2.4.1 Investigating the gender norms around menstruation in India

Anthropological literature has shown that in India, practices around menstruation are repositories of various cultural traditions (Lahiri-Dutt, 2015). The notions of purity, which are the basis of the caste system in Hindu culture, and religious restrictions imposed by Islam play an important role in informing beliefs around menstruation (Guterman and Mehta, 2007). Many of these beliefs render menstrual blood and menstruating women as 'polluting' (Bhartiya, 2013; Eichinger Ferro-Luzzi, 1974; Garg and Anand, 2015). However, these views vary by ethnic grouping and geographical area. Menstruation is celebrated in some regions (Dugani et al., 2016; Shanbhag et al., 2012; Tiwari et al., 2006), and in others menstruating women are seen as embodying power and immense energy (Chawla, 2002, 1992; Zsigmond, 2012). Notwithstanding, a systemic review of recent studies in India found that for the majority of women and girls in the country menstruation represents both a physical and psychological burden (van Eijk et al., 2016). Among sampled adolescent girls across 138 studies, 77% observed restrictions when visiting places of worship; 50% observed restrictions on touching people or special foods (e.g. curd, tamarind, and pickles), and 26% girls slept separately from household members

during menstruation to avoid the perceived risk of contamination. A lot of these restrictions have been attributed to the belief that menstruation is an process which renders menstruating women unclean (Garg and Anand, 2015).

Other restrictions that women in India face are related to work activities, praying, sexual intercourse, bathing, and washing their hair (Chothe et al., 2014; Garg et al., 2001; House et al., 2012; Kaur et al., 2018; Kumar and Srivastava, 2011). The aforementioned systematic review (van Eijk et al., 2016) also found that school absenteeism associated with menstruation was reported in 64 studies, with one in four girls missing one or more school days during menstruation. The reasons for this include lack of access to menstrual products and to water and disposal facilities in school, the fear of staining their clothes, as well as restrictions imposed by teachers or relatives.

The perceived shame around menstruation can also lead women to follow poor menstrual hygiene practices, such as not changing their cloth or disposable pad often, or not drying out their cloth in the sun light after washing it. These practices can then cause health issues such as infections, itching/burning, ovaries swelling, and frequent urination (Caruso et al., 2017; House et al., 2012; Thakur et al., 2014). Various studies have found that women who use cloth during menstruation are more likely to have symptoms of urogenital infection (bacterial vaginosis or urinary tract infection) than women using disposable pads (Anand et al., 2015; Das et al., 2015; Kansal et al., 2016; Khanna et al., 2005).

There is limited research on the disposal of menstrual products in India. For example, two different studies, one in Jharkhand and the other in West Bengal, found that women dispose of used pads in the same pond where they bathe (*Exploring MHM in Schools*, 2013; Mukherjee, 2017). In Jharkhand, one interviewee explained: “We place the soiled napkin in between the fingers of our legs, and while we dip inside the water to take bath, we release it then and it sinks down to the ground. If you search the bottom of the lake, you will find the whole bed covered with napkins” (Mukherjee, 2017).

The aforementioned systematic review and meta-analysis study found that only 45% of women dispose of these products with their household waste: 23% throw these products away in open spaces, such as rivers, lakes, roadside; 17% dispose of them by burning; 25% burry them; and 9% throw them in toilets and pit latrines (van Eijk et al., 2016).[4] The use of these different methods differs between

[4] This estimates include data from 138 studies involving adolescent girls in India.

urban and rural areas (as illustrated in Table 2.1 below), in the latter, products are more likely to be buried and thrown in open spaces (Kaur et al., 2018; *Pushing the Boundaries*, 2017).

Table 2.1 Menstrual waste disposal practise among adolescent girls in India

Disposal of menstrual absorbent	Total pooled proportion (%)[5]	Rural pooled proportion	Urban pooled proportion
Throw with routine waste/dustbin	45	28	70
Throw away in the open (open spaces, rivers, lakes, wells, roadside, etc.)	23	28	15
Burning (open)	17	15	23
Burying	25	33	12
In toiler (flushing down the toilet, throwing in pit latrine)	9	10	7

Source: Adapted from *Pushing the Boundaries*, 2017

An important observation that can be made from this review of literature is that taboos and societal perceptions continue to inform how women in India understand and experience their menstruation and, by extension, how they access and use menstrual products. This reviews also indicates that the different disposal practices that women follow remain understudied, yet existing evidence suggests that these can be varied and that not all products are discarded via waste management systems. The next part of this discussion examines the commercial activities related to the commodification of these products in India, including the actors and processes that shape how these products are accessed and used.

2.4.2 Analysing the commercial activities behind menstrual products in India

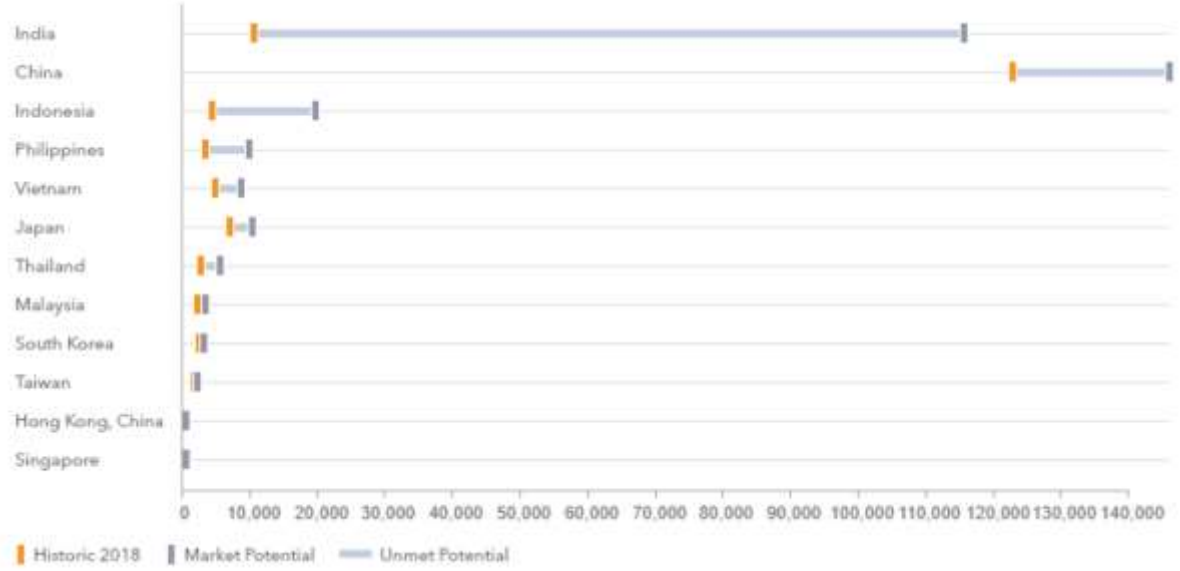
Today, India is the second biggest market for these products in Asia Pacific and the one with the greatest unmet potential for volume growth (see Figure 2.1 below) (*Sanitary Protection in Asia Pacific*, 2019). Sales of menstrual products in the country grew by 20% in 2018 to reach INR 48.7 billion.[6] Sales have grown 41% over 2012 to 2017 and are expected to achieve a 21% CAGR (compound annual

[5] Pooled proportion is a percentage that has been derived from the relevant studies included in the systematic review.

[6] The global menstrual products industry is worth USD $31.3 billion and is relatively consolidated with five manufacturers jointly accounting for almost 50% of global value sales (*Sustainability in disposable hygiene*, 2019).

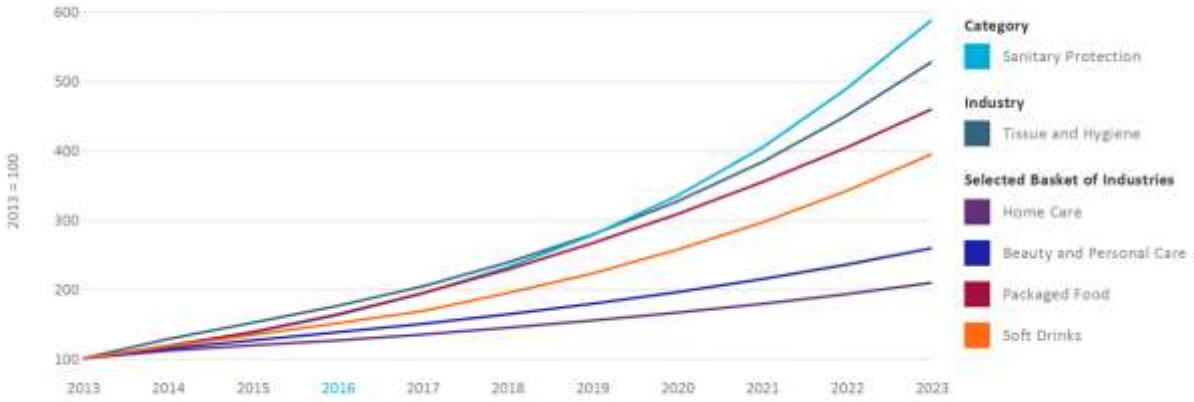
growth rate) by 2023. Disposable pads represent the majority of these sales, with tampons accounting for less than of 2% of the total (*Sanitary Protection in India*, 2019). The low use of tampons and menstrual cups has been attributed to concerns about virginity and breaking the hymen upon insertion of the products (van Eijk et al., 2016). As Figure 2.2 shows, the category of Sanitary Protection has, and is expected to continue to grow faster than other fast-moving consumer goods (FMCG) industries.

Figure 2.1 Retail volume sales of menstrual products in million units, 2018-2023



Source: Sanitary Protection in India, 2019

Figure 2.2 Sanitary Protection vs. selected FMCG Industries in India



Source: "Market Sizes", 2020

On the other hand, the per capita consumption of menstrual products in India remains lower compared to developed countries. The main challenges for volume growth are affordability of

products and accessibility to them, particularly in rural areas (Mudey et al., 2010; *Sanitary Protection in India*, 2019; Thakre et al., 2012). Nonetheless, India is an important market for global firms because the growing rates of education and employment among women are expected to increase their decision-making as consumers and to enable them access to products they may not have been able to afford previously. Unlike developed markets that are reaching a saturation point due to ageing populations, increased contraceptive usage, and a growing demand for reusable products, in India there is potential for growth. "As disposable incomes rise, an increasing number of consumers will be able to afford to adopt these same habits" (*Feminine Care Industry*, 2018, p. 12). India is expected to follow the *premiumisation* trend that is already being witnessed in China, where more consumers are choosing to buy higher priced products that are considered premium (*Sanitary Protection in Asia Pacific*, 2019).

An important limitation in the analysis of the use of menstrual products in India is that there are no reliable statistics of the number of individuals who use these products. India's National Family Health Survey 4 (*NFHS-4*, 2017) included questions on this topic for the first time in 2015. The data was published in December 2017, but the survey only considered women between 15-24 years of age, and asked whether they used a hygienic method of menstrual protection defined as 'locally prepared napkins, sanitary napkins, or tampons.' This question did not cover the frequency of product use. These results show that 48 percent of rural women use a 'hygienic method of menstrual protection,' compared to 78 percent of urban women. PSI analysis of these data concluded that as of 2015, 38% of the 93 million girls of ages 15-24 use commercial products exclusively, while 21% use a mix of commercial and homemade products (Aylward et al., 2018). These numbers differ significantly from one of the most widely quoted estimates from a report conducted by Nielsen, which states that only 12% of women in India use pads.

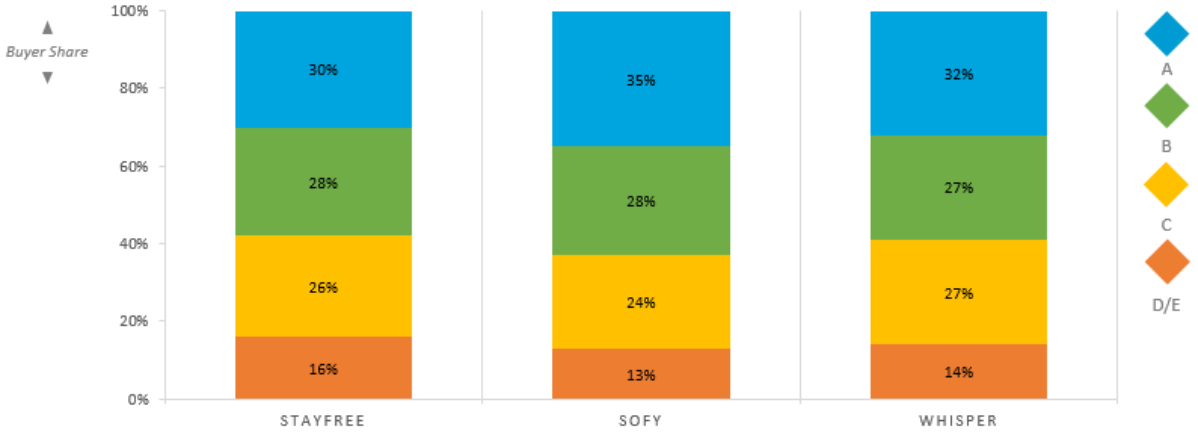
To overcome the limitation in these estimates and to better understand the trends behind the continued growth of this commodity in India, I conducted an analysis of household panel data.[7] This analysis focused on the three main brands of menstrual products in the country, which represent over 86% percent of the retail value (*Sanitary Protection in India*, 2019).[8] This analysis shows that the consistent growth of this commodity is coming from increased usage of products from current consumers, as well as from significant levels of trade up from both current and new consumers.

[7] The composition of the panel and some important considerations for this statistical analysis are explained in Chapter Four.

[8] These brands are Whisper, manufactured by Procter & Gamble; Stayfree, manufactured by Johnson & Johnson), and Sofy, manufactured by Unicharm.

Findings show that for the three main brands in India, over 50% of total consumers belong to households in SEC's A and B. This indicates that affordability continues to a barrier to access these products because the majority of consumers are from affluent households (see Figure 2.3).[9] Trade up to higher quality and/or more expensive brands was also more likely to occur among SEC's A and B.

Figure 2.3 Share of category buyers of main brands in India by SEC, 2017

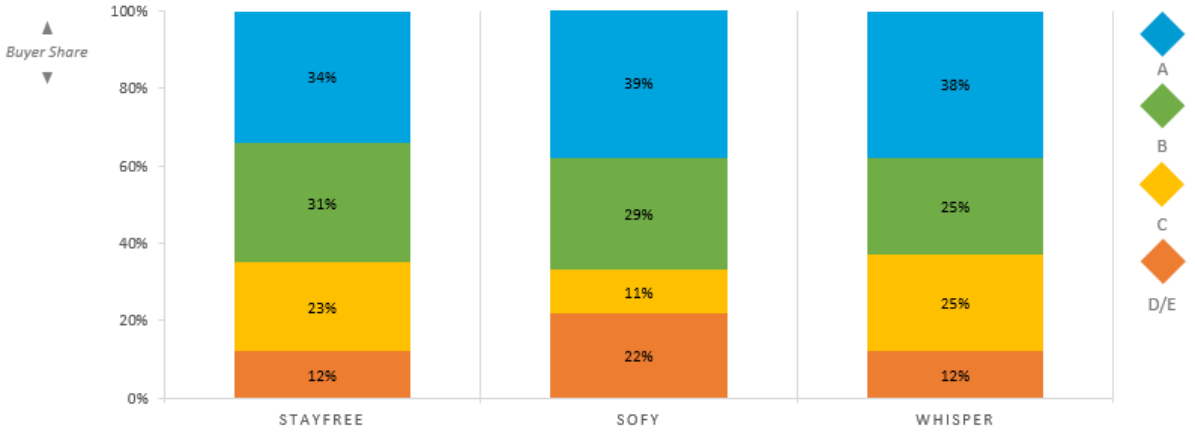


Source: Author, 2020

However, the analysis also reveals that over 30% of new category buyers (i.e. new consumers) for each of these three main brands come from SEC C and D/E (see Figure 2.4). This indicates that menstrual products are becoming more accessible and popular among consumers from less affluent households. Moreover, while entry level products are helping brands to reach new consumers, a large amount of the spend of these consumers also comes from the mid-premium level (see Figure 2.5). This means that even new consumers are moving beyond the cheapest alternatives and starting to spend more on those products that are perceived as being of higher quality.

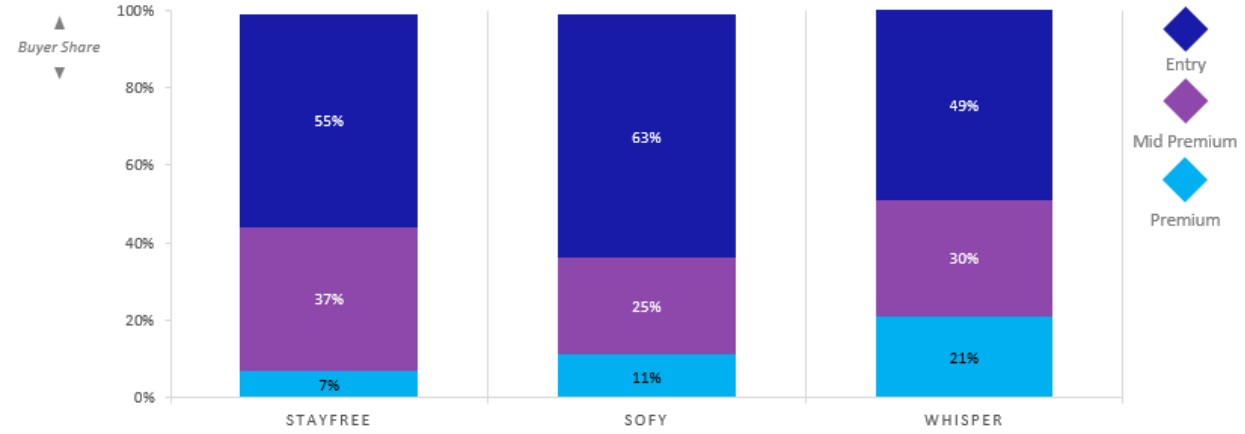
[9] The SEC classification was created in 1988 to measure socio-economic class and continues to be a commonly used market segmentation tool in India (Srivastava, 2012).

Figure 2.4 Share of new category buyers of main brands in India by SEC, 2017



Source: Author, 2020

Figure 2.5 Share of new category buyers of main brands in India by product tier, 2017



Source: Author, 2020

The actors and processes behind the commodification of menstrual products

As discussed in section 2.2, commodification entails various processes, from inputs of raw materials and labour, to transportation and distribution, and ultimately consumption and waste disposal. These processes can span multiple geographies and often involve multiple actors, such as global and local firms, the government, civil society organisations, consumers, and workers. This next part of the analysis looks at the processes that constitute menstrual products which take place in India, and the actors that participate in them.

The actors

In India, global firms dominate the market. Procter & Gamble is the market leader with 53.8% market share. P&G is followed by Johnson & Johnson with 32.2%, Unicharm with 1.3%, and Kimberly-Clark with .2%. In 2017, Hindustan Unilever Ltd (HUL) sold its 50% stake in its joint venture with Kimberly-Clark, which included Huggies diapers and Kotex disposable pads in India (*Sanitary Protection in India*, 2019). Furthermore, in recent years, a growing number of local enterprises have started to offer low-price menstrual products, mostly in rural areas. Some of these smaller manufacturers have received significant attention from the media. Examples include the Oscar winning documentary, 'Period End of Sentence,' and the Bollywood movie 'Padman' based on the story of the founder of Jayasheree Industries, Arunachalam Muruganantham. Muruganantham is said to be the inventor of a low-cost sanitary pad-making machine, and is credited by some as responsible for kick-starting 'a menstrual hygiene movement' in rural India. More than 500 of his machines have been installed across 23 states (Matharu, 2017). Similar businesses and social enterprises, such as Aakar Innovations and Eco Femme are also now developing low-cost pad manufacturing machines that are sold to NGOs and women self-help groups. The main competitor for these small-scale manufactures are low-cost unbranded products from China, Ukraine, and Malaysia (Geertz et al., 2016a).

Another recent change in this market is the growing number of enterprises that are manufacturing reusable and biodegradable alternatives to meet the increasing demand for more 'environmentally-friendly' products. Smaller manufacturers are now offering single-use products made of natural ingredients, such as agri-waste (Aakar Innovations), banana fibers (Go Pad and Sattahis), papyrus plant (MakaPads), crustacean shell-based resins (Village Volunteers), bamboo (Heyday), among others. There is however, little data validating these claims on biodegradability and testimonies of their effectives can be contentious (Bobel, 2018). Some start-ups are also starting to sell menstrual cups because they recognise the potential of the market in India to open up to new alternatives in the near future (IDI-K28).[10]

In addition, in India there are over fifty NGOs, development agencies, and civil society associations working on issues related to menstruation and indirectly participating the processes of commodification of menstrual products by delivering education, distributing products, supporting women's self-help groups to manufacture products, raising awareness on sustainable alternatives,

[10] This source is an interview conducted during this study; the objective, coding and methodology for this and other in-depth interviews with key stakeholders is explained in detail in Chapter Four.

etc. Some of these include Gandhigram Trust, Goonj, Centre for World Solidarity (CWS), Swayam Shikshan Prayog (SSP), Vatsalya, Binti Period, the Sustainable Menstruation Kerala Collective (SMKC), among many others. Most of these organisations work in partnership with other stakeholders such as the government and international development agencies and research institutions like WaterAid, the Bill and Melinda Gates Foundation, the Water Supply and Sanitation Collaborative Council (WSSCC), UNICEF, among others.

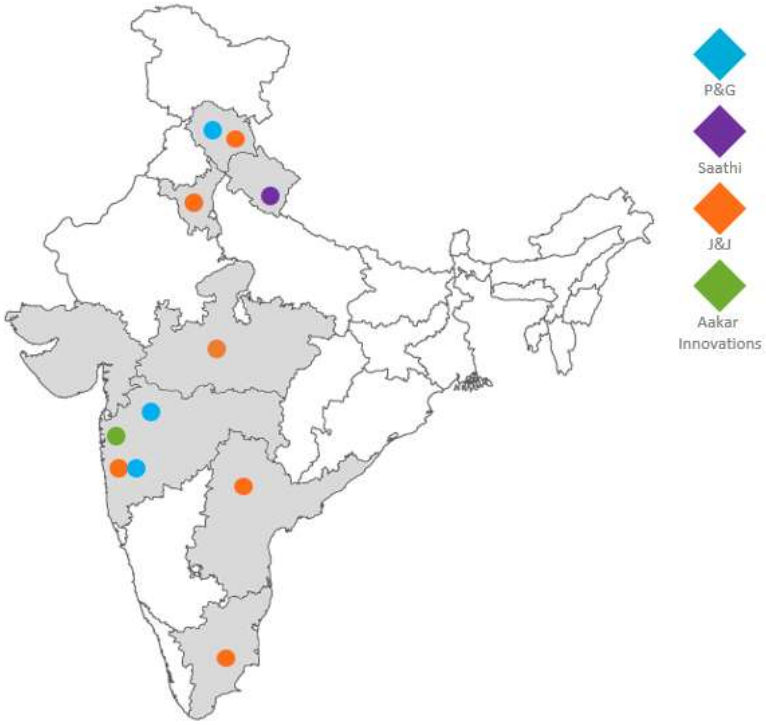
Lastly, India is one of the few countries that have developed policies to address Menstrual Hygiene Management (MHM).[11] A recent review of government policies found that the various programmes focus primarily on infrastructure and the provision of products and health education at the school level (Muralidharan et al., 2015). There are various ministries working on these programmes, each addressing different issues. The Ministry of Health and Family Welfare focuses on the provision of products and education to enhance the reproductive health of adolescent girls; the Ministry of Women and Child Development addresses awareness about health and hygiene; the Ministry of Drinking Water and Sanitation and the Ministry of Human Resource Development focus on the availability and accessibility to sanitation facilities, especially in schools. This comes to show that global and local firms, the government, and civil society play a role in the way menstrual products are accessed and used in India and, therefore, have to be considered in the analysis of tensions. The role of the government and other non-commercial actors and the relevance of their efforts will be further discussed in Chapters Five and Six.

The processes

Transportation costs and the reliability of distribution networks are a key challenge in India, this is an important reason why menstrual products are not always available in rural areas in the country (Geertz et al., 2016b). This also contributes to explain why the main production facilities of global manufactures and some medium seized local firms are located near large urban areas and in states with higher per capita incomes, such as Delhi, Maharastra, and Tamil Nadu (Aylward et al., 2018). Figure 2.6 below shows the locations of some facilities of selected firms.

[11] Menstrual hygiene management (MHM) is defined by the World Health Organisation and UNICEF Joint Monitoring Programme (JMP) for drinking water, sanitation, and hygiene as: 'Women and adolescent girls are using a clean menstrual management material to absorb or collect menstrual blood, that can be changed in privacy as often as necessary for the duration of a menstrual period, using soap and water for washing the body as required, and having access to safe and convenient facilities to dispose of used menstrual management materials. They understand the basic facts linked to the menstrual cycle and how to manage it with dignity and without discomfort or fear' ("Consultation for Future Global Monitoring of WASH," 2012).

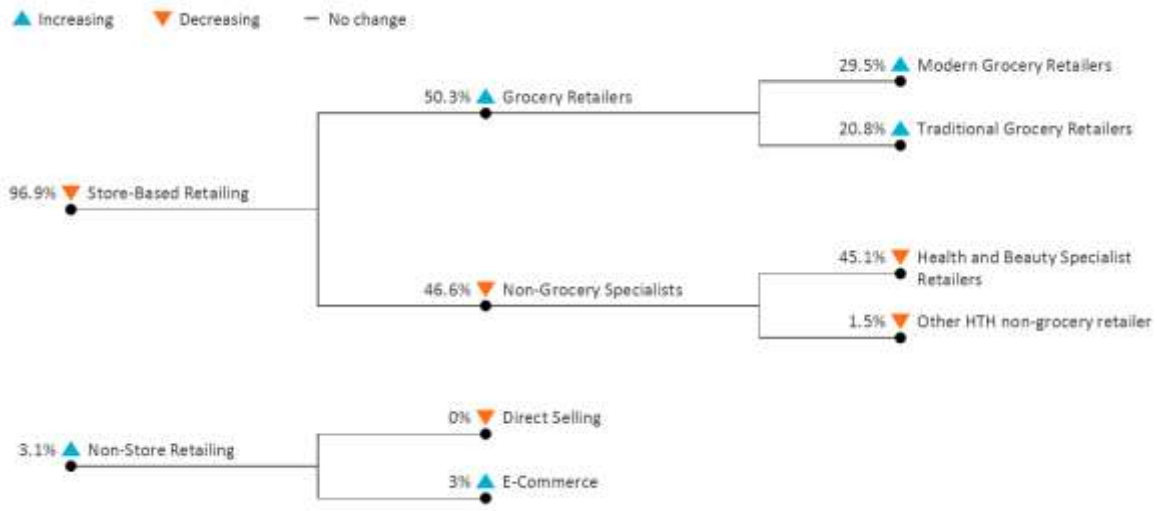
Figure 2.6 Manufacturing sites of selected global and local firms in India



Source: Author, adapted from Aylward et al., 2018

Chemists (pharmacies) are the major channel for sales of menstrual products in India. As depicted in Figure 2.7 below, over 45% of sales happen through these channels. The statistical analysis I conducted showed that Kiranas (local neighbourhood stores) are also an important channel for sales of menstrual products (see Figure 2.8). Industry estimates indicated there are about 10 to 15 million Kirana stores in India which remain relevant due to their convenience, the personal relationship between seller and customers, and, in some cases, the availability of credit for regular customers (Rajamani, 2019). These products are also becoming increasingly available in modern grocery retailers. Supermarkets and hypermarkets are growing in popularity because they offer the wider range of options and sizes. Internet retailing is also quickly emerging as a new channel for sales of menstrual products; e-commerce channels are being used by small manufacturers that sell premium and niche products such as eco-friendly products (*Sanitary Protection in India*, 2019).

Figure 2.7 Distribution channels for menstrual products in India, 2013-2019, percentage point growth of retail value



Source: "Market Sizes", 2020

Figure 2.8 Dominant channels for main brands in India, 2017

Source: Author, 2020

Furthermore, to reach a broader base of consumers, global firms in India are focusing their marketing strategies on increasing awareness and access to menstrual products. These efforts include offering free product samples in schools; strengthening distribution networks to reach women and girls in rural communities, and developing campaigns to tackle menstruation taboos. For example, P&G's "Touch the Pickle" campaign encouraged girls to break restrictions related to menstruation, and has been acclaimed for leveraging mass media to encourage women to talk openly about menstruation. This campaign was awarded at the Cannes Film Festival 2014 ("Touch The Pickle," 2015). Procter & Gamble also recently launched the "Check Check" campaign to drive use of menstrual products among non-users and entry-level consumers in their early-teenage years (*Sanitary Protection in India*, 2019).

Johnson & Johnson is also leveraging consumer education and outreach programmes to boost their market presence and increase usage. The "Dreams of Progress" campaign for Stayfree appointed P.V. Sindhu, an Olympic medallist and female badminton player, as its brand ambassador to encourage girls to realise their dreams and not let periods hinder their progress ("'Dreams of Progress' campaign," 2018). P&G and Johnson & Johnson also have school outreach programmes in partnership with NGOs and local governments in rural areas (*Sanitary Protection in Asia Pacific*, 2019). Both manufactures also run special programs in partnership with established non-profits and government Ministries.

Local firms are also starting to make important investments in their marketing efforts to drive awareness of their products. For example, in 2020 the Rajasthan Royals became the first Indian sports team to become sponsored by the Indian menstrual products brand Niine (Ellis-Petersen, 2020). This same year, another Indian firm, Nobel Hygiene, became known as the first company to show menstrual blood on Indian TV. The add received various complains and was temporarily taken down by Advertising Standard Council of India (Joshi, 2020). These efforts indicate that both local and global firms are making various investments in campaigns, programmes, and initiatives that aim to challenge some taboos around menstruation in the country in order to drive sales.

This part of the discussion establishes that the market for menstrual products is rapidly growing in India, with different commercial and non-commercial actors playing a role in driving access to menstrual products. Drawing from the findings presented so far, I argue that tensions between commercial activities and gender norms can be observed in India because commercial activities play an important role in driving access to these products, including through efforts that are aiming to change some of the societal perceptions about menstruation. This review also indicates that the environmental impacts associated with the disposal of menstrual products in India are likely to be significant, especially as sales continue to grow. In the next sub-section, I look at existing evidence of the adverse environmental impacts that menstrual products have in India and the local challenges to manage this type of waste.

2.4.3 Exploring the environmental impacts of menstrual products in India

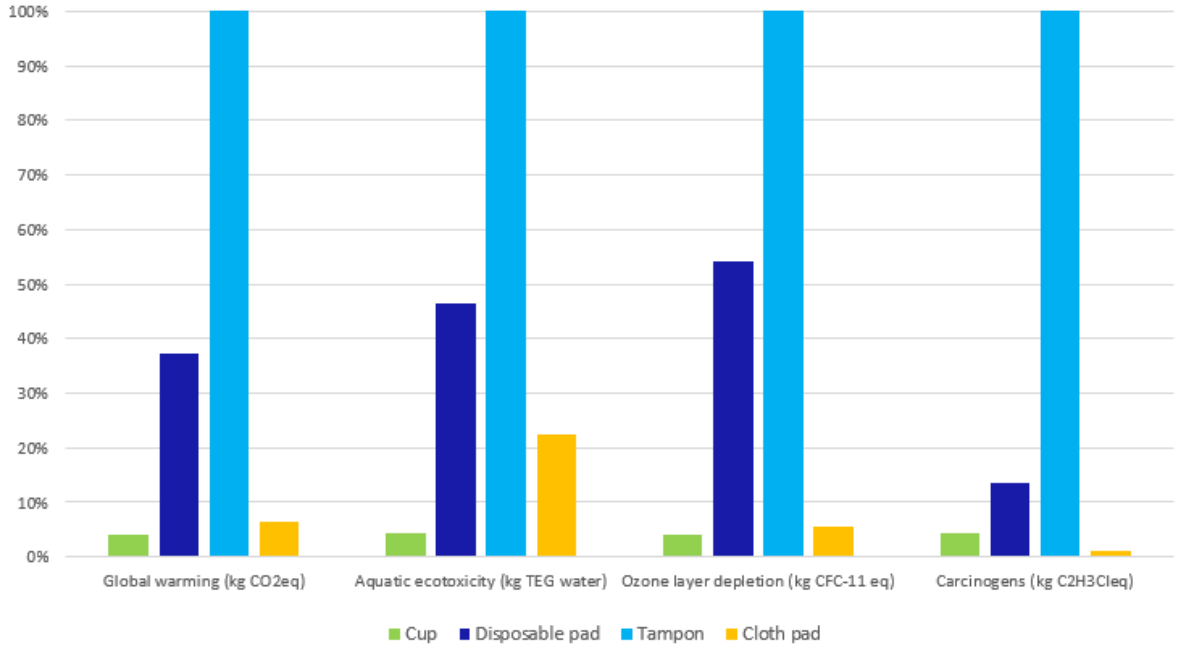
In *The Waste of a Nation*, Doron and Jeffrey (2018), argue that the combination of population growth, urbanisation, and the embrace of consumer capitalism is straining India's capacity to handle waste. Every day, Delhi produces 9,000 metric tonnes of garbage, most of which end up in four landfill sites

in the city; three of these sites already operate beyond capacity and are beyond 40 metres high (Iqbal, 2019). There are, however, limited estimations of the environmental impacts that menstrual products generate in the country.

In line with the discussion in section 2.3.1, this part of the discussion classifies environmental impacts associated with the commodification of menstrual products into (1) increased use of resources and (2) additional waste and substances in ecological cycles. I only found one environmental impact assessment of these products in India. This was conducted by Leroy et al., in 2017 and considered four products: disposable pads, tampons, reusable/washable pads, and menstrual cups.[12] The results, shown in Figure 2.9, indicate that the extraction of raw materials, the production, the distribution, the use, and the disposal phase of these four products generate negative adverse impacts across different categories: global warming, aquatic ecotoxicity, ozone layer depletion, and carcinogens. Said analysis takes into account the Indian context when measuring the impacts that these products have on the environment and relies on two important assumptions. The first is that all disposable pads and tampons would go to a landfill. The second, that the impacts from the use phase only entail the use water for hand washing. However, based on the discussion of the various disposal practices in section 2.4.1, it can be argued that some of these assumptions are not valid, and that failing to consider all the ways in which these products are disposed of can lead to underestimate their impacts on the environment.

[12] The environmental impacts per category are examined in relative values compared to the most impacting solution, which is expressed as 100%.

Figure 2.9 Environmental assessment of menstrual products for India



Source: Leroy et al., 2017

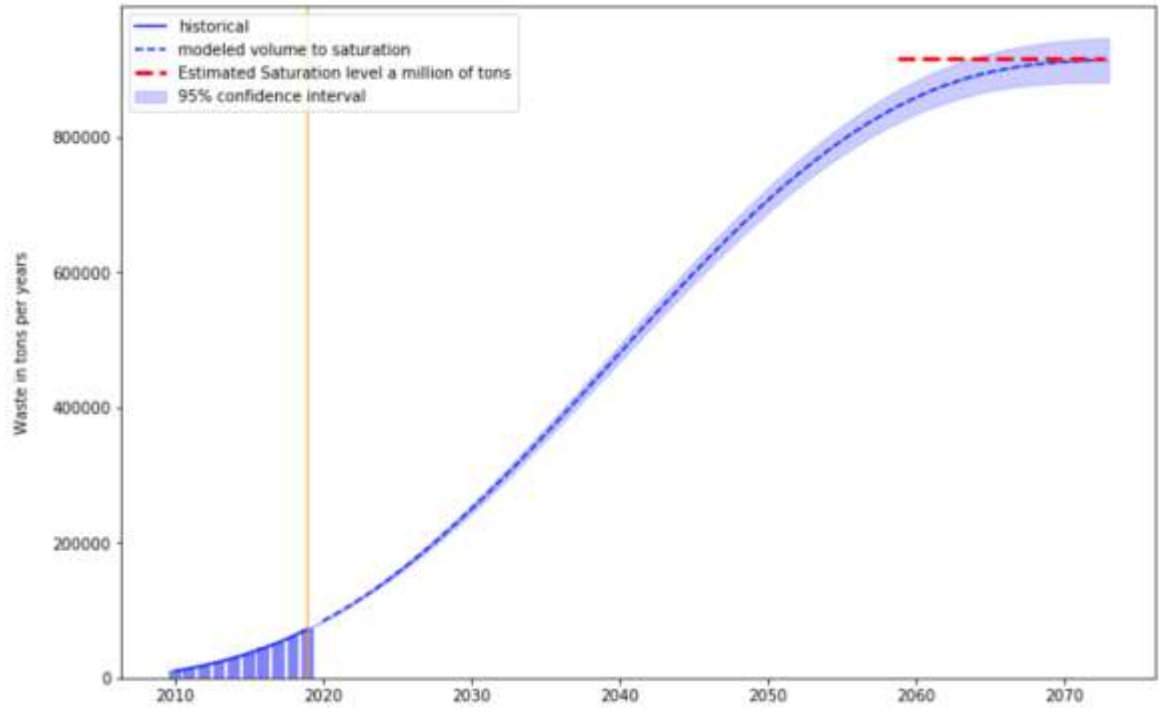
Another way in which menstrual products in India have been found to negatively impact ecological cycles is through waste. The estimates on the existing and potential waste from disposed menstrual products in India are dissimilar. A recent study estimates that if the 121 million women that currently use menstrual products used an average of eight sanitary pads per month there would be 1.021 billion pads disposed monthly, which would amount to 113,000 tonnes of menstrual waste annually (*Pushing the Boundaries*, 2017). Another analysis estimates that 432 million items are discarded every month, which if brought together could be spread over 24 hectares (Basu, 2015). A third estimate indicates that if disposable pads were made available to all women, India would produce 580,000 tons of menstrual waste every year (*Spot On!*, 2015).

The limited availability and questionable reliability of the different assessments of the quantities of menstrual waste is an important limitation to estimate the impacts that these products have and how said impacts can increase as sales continue to grow. Drawing on existing market data and population growth estimates, I conducted an analysis of the potential growth of menstrual waste over the next five years in India.[13] Figure 2.10 shows the results by drawing the trajectory of the waste from the

[13] These projections were calculated using a Bass curve to project product sales from 2023 to the market saturation point. Saturation was assumed to be per capita of approximately 300 units per person as reported by Aylward et al., (2018). Sales data was sourced from Euromonitor ("Market Sizes," 2020) and population data

expected growth in sales of menstrual products. As seen, by 2070, when the market is expected to reach a saturation point at 100 billion units, the number of tons of waste in India could be equivalent to 800,000 per year. These estimates are only indicative of waste from discarded disposable pads and do not reflect any additional substances and materials that would be introduced into ecological cycles as a result of disposal practices.

Figure 2.10 Projected waste of menstrual products in India



Source: Author, 2020

This review has so far shown that there is limited evidence of the environmental impacts associated with the disposal of menstrual products. Existing assessments are limited in their efforts to contextualise impacts for various reasons, including the fact that disposal practices and the factors that shape them remain understudied. Nonetheless, existing evidence does provide a clear indication that adverse environmental impacts are growing and have the potential to scale, further highlighting the need to explore them. The following and last part of this section is an examination of the

from The World Population Prospects (2017), published by the UN Department of Economic and Social Affairs. These estimates are based on the average weight of a pad. This weight includes all materials and packaging, which amount to ~ 6.8 grams (Mazgaj et al., 2006); as well as the additional weight of menstrual flow which amounts to ~3.9 grams per pad (Gudmundsdottir et al., 2009).

management of menstrual waste in India which aims to further assess how the local context is linked to environmental impacts.

The management of menstrual waste in India

In India the government recognises two solutions to manage menstrual waste. The first is incineration, which is endorsed by the Ministry of Drinking Water and Sanitation as the best option, particularly for schools. The second alternative, which has emerged in some cities like Bangalore and Pune, is the segregation of menstrual waste during waste collection so that it can be contained and treated (*Pushing the Boundaries*, 2017). The Solid Waste Management Rules in India (2016) indicate there are three waste streams: wet (biodegradable waste), dry (e.g. plastic, paper, metal, wood, etc.), and domestic hazardous waste (e.g. empty containers of cleaning agents, mosquito repellents, etc.). Menstrual products are part of the 'domestic hazardous waste' category, which means that they can be disposed with household waste, but this requires consumers to segregate them and that public waste collection processes are in place to collect and transport them.[14]

Waste pickers play an important, yet unrecognised role in the process of collection, segregation, and recycling of waste in India, including menstrual waste or waste from menstrual products. It is estimated that there are around 1.5 million waste pickers in India and approximately a 100,000 of them in Delhi ("Waste Pickers in India," 2014). In Delhi, a single waste picker is estimated to collect, sort, and transport between 10-50 kilograms of waste per day, most of which does not enter the municipal collection stream (Majithia, 2020). In Bangalore, it has been estimated that waste pickers collect 1,050 tonnes of recyclable plastic every day (Thompson, 2019).

Nonetheless, waste picking in India ranks very low in the hierarchy of urban informal occupations. A significant number of waste pickers belong to socially marginalized populations. Waste pickers are usually individuals who are unable to find any other kind of employment, such as illiterate and unskilled individuals, immigrants from rural areas or countries like Bangladesh, or individuals who are from the lowest castes ("Waste Pickers in India," 2014). In India, approximately 95% of waste pickers are Dalits, the lower caste in the Hindu system, previously known as "untouchables" (Thompson, 2019). The link between caste and occupation is not incidental but an outcome of deeply entrenched beliefs. For example, in Delhi there is historical evidence that low-caste workers were brought to the

[14] It must also be noted that even if segregated, this waste will be subject to the same treatment as other solid waste if placed in landfills to disintegrate (*Pushing the Boundaries*, 2017).

city from the rural villages to work on waste (Sinha, 2018). Today, many individuals continue to be locked into this profession because caste dynamics limit the occupations available to them and permeate their social interactions with prejudice and discrimination (*Supporting Southeast Asia's informal waste sector*, 2019; Sinha, 2018). As explained by Dolon and Jeffery (2018, p. 3) "it's not that the citizens of New York, Seoul, or Berlin necessarily greet their sanitation workers with sweets and garlands when they do their work, but such workers do not experience the indignities, so often seen as justified by birth, that sanitation workers in India do." Furthermore, waste pickers usually face challenges such as the lack of access to healthcare, aggression from citizens and the police, and corruption in the recycling supply chain, which is largely unregulated and subject to volatile pricing (Routh, 2014; Samarth, 2014; Thompson, 2019). In addition, women engaged in waste management can also face sexual harassment, enhanced health risks when working pregnant, among other challenges (Chikarmane and Narayan, 2009; *Sanitation worker safety and livelihoods in India*, 2018; *Wastepickers*, 2018). In light of these challenges, many trade associations and cooperatives in the country are advocating for the formal integration of waste pickers into public waste management systems in order to improve their working conditions and the social status of the occupation from scavenging to service provision ("Waste Pickers in India," 2014).

There is little research on the ways in which waste pickers engage with menstrual products in India, but some reports indicate that they face various risks when engaging with menstrual waste. According to the Chief of Laboratory of Virology at the National Institute of Immunology in New Delhi, improperly disposed menstrual products can expose waste pickers to various diseases, like staphylococcus, hepatitis, e-coli, salmonella and typhoid (Basu, 2015). It is important to note that in many instances waste pickers collect and sort soiled products bare-handed. For example, Mohanty (2014) brought to light the story of an Arundhatiyar, a female waste pickers who lost her arm after catching an infection from removing piles of used menstrual products from a public restroom with her bare hands. The role that waste pickers play in India is important for this study because they are key actors in the disposal of menstrual products and because it can be argued that they hold a strategic position to help mitigate some environmental impacts from this waste. However, research is yet to explore the challenges they face to manage discarded menstrual products. There is also limited evidence on whether these practices are shaped by gender norms related to menstruation.

In sum, this section demonstrates that the disposal of menstrual products in India provides an opportunity to explore tensions between gender norms and commercial activities, as well as how these relate to environmental impacts. In India, tensions appear to be shaping disposal and waste

management practices that are directly linked to adverse environmental impacts. For this reason, I argue that exploring the processes of commodification of menstrual products and the ways in which these are connected to the transformations of gender norms in India can lead to a better understanding of the environmental impacts that derive from the expansion of global production. The growing quantities of menstrual waste and the potential negative consequences that discarded menstrual products can have for waste pickers underscore the urgency of investigating these tensions. Lastly, this discussion shows that exploring tensions in relation to the environment requires an integrative framework that can bring together the commercial, gendered, and environmental dimensions of global production. I discuss this framework in the next chapter.

2.5 Conclusion

In this chapter I discussed why the disposal practices of menstrual products, including those related to the management of menstrual waste, provide an opportunity to answer the first research sub-question in this study: *Are there tensions between commercial and gender norms in the menstrual products chain in India and how are these related to adverse environmental impacts?*

This discussion provides arguments to contend that the tensions between gender norms and commercial activities that take place through the process of commodification can have different social and environmental implications. The environmental implications of these tensions, especially those that result from the increased access to commodities, are understudied. This connection can be explored empirically by analysing the disposal practices of menstrual products in India. Since menstrual products were introduced in the market, commercial activities have sought to challenge and redefine some of the gender norms that influence how individuals manage their menstruation and the ways in which they engage with these products. I argue that the disposal practices of these products reflect these tensions and also appear to be directly related to adverse environmental impacts.

In India, there is limited research on the breadth of these disposal practices, including those related to waste management; yet, existing evidence from various sources indicates that these practices are complex and can have different and significant impacts on the environment. The importance of addressing this gap is highlighted by the increased access to menstrual products in the country, the growing quantities of menstrual waste, and the potential negative consequences that discarded products can have for individuals who depend on waste management for their livelihoods.

The investigation of tensions through the analysis of disposal practices in India can contribute to better understand the adverse environmental impacts associated with the expansion of global production, and to identify the dynamics that need to be changed to achieve less negative outcomes on the environment. It can also help to fill empirical gaps in literature. The first gap is the insufficient study of the ways in which gender norms shape disposal practices. A growing body of literature has investigated the negative impacts that taboos around menstruation can have for women, such as preventing them from attending school and leading them to follow practices than can have negative consequences on their health. There are, however, insufficient studies on how women dispose of menstrual products and whether these practices are shaped by taboos and societal percetions. The second is the limited evidence on the impacts that menstrual products have on the environment, as discussed existing quantitative assessments often fail to take into account how local contexts shape the ways in which individuals use and dispose of these products.

In the next chapter I will further discuss different literatures that can be combined to develop a conceptual framework to explore how tensions manifest in the disposal practices of menstrual products and to draw out analytical insights on the connection between gender norms, commercial activities, and environmental impacts.

3 The conceptual framework to explore gendered-environmental transformations in GPNs

3.1. Introduction

This study explores how the expansion of global production is intertwined with gendered and environmental transformations. In Chapter Two I discussed that commodification is characterised by processes of change through which gender norms are configured and themselves configure the diverse ways in which goods come to be produced, circulated and exchanged. I argued that these dynamic configurations or *tensions* can have both positive and negative implications for society and the environment. The menstrual products chain provides evidence of this process of change and how the commodification of goods leads to tensions between gender norms and commercial activities. What is more, evidence indicates that there is a connection between these tensions and the environment. Said connection needs to be further investigated, especially as the consumption and disposal of these products continue to grow.

To analytically explore tensions in the process commodification, I build on the work of Polanyi (1944) who argued that markets are societally constructed and that there are inherent tensions between the advance of market exchange relations and their social underpinnings. The implications of these tensions from a gender perspective have been explored by feminist political economists, particularly in relation to women's participation in labour markets (Barrientos, 2014a; Beneria, 2007). However, this analysis is yet to be expanded to the environment. The main analytical sub-question that this study aims to answer is: *How can the Global Production Networks framework be used to analyse tensions between gender norms and commercial activities that lead to environmental impacts?*

In this chapter I discuss how the Global Production Networks (GPN) framework can be strengthened to explore tensions between gender norms and commercial activities and their implications for the environment. The conceptual framework developed for this study enables the investigation of the commercial, social, and environmental dimensions of commodity chains from a gender perspective by drawing insights from Feminist Political Economy (FPEcon) and Feminist Political Ecology (FPECoL). The objective of combining these different approaches is to explore how, by virtue of the societal embeddedness of commodity chains, gendered power asymmetries shape the relations between actors in the chain and its outcomes on the environment.

The next section of this chapter introduces the GPN framework and discusses how the concepts of *power* and *societal embeddedness*, as used in this literature, can be used to explore tensions. The third

section of this chapter dissects insights from Feminist Political Economy and Feminist Political Ecology that can be used to bring forth the social and environmental dimensions of commodity chains from a gender perspective. The fourth section introduces the combined framework of this study and the concepts that are central for its implementation in subsequent chapters. The fifth section concludes.

3.2. Exploring tensions from a gender perspective and in relation to the environment

In contrast to conventional economic analysis, Polanyi argued that economic activity is always "embedded and enmeshed in institutions economic and noneconomic" (Polanyi, 1957, p. 250). He saw markets as socially constructed, rather than autonomous forces, and recognised the inherent tensions between the advance of market exchange relations and their social underpinnings (Polanyi, 1944). For Polanyi, an economy based solely on market exchange becomes separate or 'dis-embedded' from society. A prominent aspect of his criticism to modern capitalism is that the commodification of man and nature that results from "allow[ing] the market mechanism to be sole director of the fate of human beings and their natural environment [...] would result in the demolition of society" (Polanyi, 2001, p. 76). Thus, to prevent markets from becoming separate or 'dis-embedded' from society, these need to be curbed by social forces or the state, in what Polanyi described as a 'double movement'.

I argue that this analysis of tensions between economic production and societal dynamics can be used to investigate the configurations between gender norms and the processes of commodification. While Polanyi's original proposition does not have a gender perspective, feminist political economists have built on his work to criticise traditional economic analyses that isolate market interactions from their social context (Beneria, 2007; Elson, 1999). They bring a gender lens to the notion of the social construction of markets to examine the gender division between productive and reproductive labour and gendered social relations of production. For example, Beneria (2007, 1999) argues that the separation of market forces from social relations rules out the contribution of women's unpaid work and contributes to the separation of productive (market) and reproductive (domestic) economies to the detriment of those that work in the latter. This literature also uncovers how economic processes can transform gender norms in ways that intensify or redefine them. For example, research from Elson and Person (1981) made a seminal contribution by demonstrating how firms deploy gender ideologies to advance their production and labour strategies. An important insight from this literature is that gender ideologies can align or clash with economic processes, resulting in different outcomes that are not solely economic. Nonetheless, FPEcon studies are yet to explore the implications that the transformations of gender norms through economic production have for the environment.

This study posits that it is crucial to further investigate and theorise tensions between economic production and societal dynamics from a gender perspective and in relation to the environment. This is in order to better understand, and potentially mitigate, the implications that the increased production, consumption, and disposal of commodities have for society and the environment. To explore the relation between gendered tensions and the environment, I develop a framework that can be used to explore how gender norms configure and are configured by the different commercial activities and how these configurations relate to environmental impacts. This framework builds on the GPN approach to study 'commodity chains,' which is the term I will use to refer to the "network of labour and production processes whose end result is a finished commodity" (Hopkins and Wallerstein, 1986, p. 159). The following sections in this chapter describe this conceptual framework in more detail by exploring the strengths and limitations of the GPN framework, as well as the insights from FPEcon and FPEcol literatures that can be used to expand its analytical reach.

3.3. Global Production Network Analysis

The GPN framework was chosen to explore tensions because it helps to explore the complex web of processes, outcomes, and relations through which commodities are produced, exchanged, consumed, and disposed of, and how these become grounded in geographical, societal, institutional, and historical contexts (Henderson et al., 2002). The analytical origins of the Global Production Network approach are multiple and diverse. The term 'commodity chain' was first used to expand the research agenda for world-systems theory by (1) elucidating how the global division of labour had evolved over time; (2) enabling an analysis of the distribution of wealth and power, and (3) showing how the spatial and social configurations of chains are linked to cyclical shifts in the world economy (Bair, 2009). As it developed, commodity chain analysis moved from a systemic approach to a firm-centred conceptualisation of governance. To date it has developed along four directions: the original world-systems approach; the global commodity chain framework (GCC) developed by Gereffi and his colleagues as a combination of organizational sociology and comparative development studies (Gereffi and Korzeniewicz, 1994); global value chains (GVC) which draw from transaction costs economics (Gereffi et al., 2005), and global production networks (GPN) with origins in economic geography (Hess and Yeung, 2006).

The GCC framework defines global commodity chains as functionally integrated but dispersed systems of production. This approach shifted the focus from the world capitalist economy to the activities of powerful economic actors in order to understand how they configure the activities in which they participate. In this framework, the key to understanding the distribution of value is the governance of

the chain, which refers to the relative power of firms and their ability to influence other firms in the chain. This led to a seminal distinction of two types of governance: producer-driven chains and buyer-driven chains. In producer-driven chains, powerful manufacturers control production through vertically organised suppliers. This type of governance is common in capital and technology intensive industries, such as automobiles and electronics. In buyer-driven chains lead firms hold power and control over the chain through their ability to set prices, product specifications, quality standards, delivery schedules, etc. This type of governance is most commonly found in industries where large retailers and brand-name merchandisers are the key actors (Gereffi and Korzeniewicz, 1994).

Building on this, Gereffi, Humphrey, and Sturgeon (2005) developed a formal theory of global value chain (GVC) governance to explain inter-firm relationships and their upgrading potential. This theory aimed to describe and predict exchanges along the chain by identifying three independent variables that explain the variation in governance structures: the complexity of transactions, the codifiability of the exchanged information, and the capabilities of the supply base. The combination of these variables results in five-fold typology of governance relationships: market, modular, relational, captive, and hierarchy (Gereffi et al., 2005). The goal of GVC theory is to operationalise the concept of governance by focusing on the industry characteristics and coordination mechanisms that allow exchanges along the chain. Just as Gereffi's GCC analysis intended to scale down the holistic chain construct of world-systems theory, GVC analysis breaks down the characterization of governance to focus on the modes of coordination at particular links in the chain (Bair, 2008). The influence of international business literature in the analysis of the chain, as opposed to a sociological orientation, is one of the more important distinctions between the GVC approach and the GCC paradigm (Bair, 2005).

The GVC approach provides important insights to investigate the operations of commodity chains through an analysis of various forms of power and governance that guide their interactions. Nonetheless, recent analyses have questioned whether the typologies in this framework are sufficiently reflective of the complex and evolving nature of production arrangements (Appelbaum, 2008; Dicken et al., 2001; Nadvi, 2008; Sabel and Zeitlin, 2004). The GVC framework has been criticised for its exclusive focus on the linear commercial dynamics of production and its lack of attention to broader aspects of the chain's configuration (Henderson et al., 2002). By shifting attention to specific chains or even particular links in a given chain, the GCC and GVC framework substantially narrowed the scope of the analysis and undermined the inter-related actions of actors that often reconfigure the organization of global production on an ongoing basis (Bair, 2005; Coe et al., 2008a). What is more, the strong focus on commercial actors makes it only useful peripherally for this study which seeks to

go beyond the exploration of commercial dynamics. As the discussion in Chapter Two indicated, exploring the tensions in the menstrual products chain warrants a framework that takes into account the diversity of actors who participate in global production.

The GPN framework was developed in response to the increasingly complex functions and operations through which goods and services are produced, distributed, and consumed in a global context; and in order to account for new organisational structures, and for the influence of national economies on such arrangements (Henderson et al., 2002). This framework has gained increasing prominence for its heuristic approach and simplified representation of complex and dynamic situations, and its ability to analyse how different types of stakeholders interact at multiple levels and across the various processes related to a good or service. The choice of the term 'network' in GPN analysis is not mere semantics; it reflects a particular ontological understanding of production as an inherently dynamic system (Coe et al., 2008a). While the chain metaphor serves to map the sequence of events behind the production of commodities, the network recognises that these chains also form part of broader layers of economic activity (Henderson et al., 2002).

Embeddedness, and *Power* are two of the main conceptual categories on which the architecture of the GPN framework is raised.[15] Although GPN scholars recognise that the commercial dynamics along the value chain are a critical element of the production process, they seek to also incorporate the social, institutional, and territorial arrangements in which the chains become embedded (Coe et al., 2008a; Dicken et al., 2001). As Henderson et al. (2002, p. 444) note, this framework places special emphasis on the social processes involved in producing goods and services and reproducing knowledge, capital, and labour power. In doing so, this framework draws attention to the variety of non-commercial actors that shape the organization of global production (Coe and Yeung, 2015; Dicken et al., 2001; Hess and Yeung, 2006). What is more, the adoption of a network discourse also allows for greater variation in the analysis of the dynamics of power between actors in the chain and their ability to create and capture value (Weller, 2008). This framework recognises the power of lead firms to influence decisions and resource allocations vis-à-vis other firms; the power of different institutions, including the state, to influence the strategies of firms, and the power exercised by collective agents who can also take actions to influence firms and their respective governments (Henderson et al., 2002). These struggles of power are significant to analyse why economic activity takes particular forms, and how it accrues advantage and disadvantage in different measures (Neilson and Pritchard, 2009). Both of these concepts (i.e. embeddedness and power) are central to the analysis of tensions

[15] *Value* is the third main conceptual category in this framework, but this is not central to this study.

and how these unfold in different social contexts and shape the relations of different actors who participate in commodity chains.

3.3.1. Embeddedness in GPNs

The concept of *embeddedness* refers to the multiple social, cultural, economic, political, historical, and personal relationships that situate stakeholders within networks, territories, and societies (Weller, 2006; Zukin and DiMaggio, 1990). Much of the conceptualisations of embeddedness originates from the work of Karl Polanyi. Granovetter (1985) built on this approach and shifted the analytical focus from the abstract notions of economies and societies towards an inclusion of actors and networks of interpersonal relationships. Hess (2004) then re-assesses the seminal work of Polanyi and Granovetter in the GPN context to show that embeddedness plays a crucial part in elucidating the role that social interactions have in shaping the nature of economic production. He argues that a valid conceptualisation of 'embeddedness' requires a spatial-temporal consideration that recognizes that firms are connected functionally, territorially, and in terms of the societal structures in which they operate and from which they originate; all of which shape the strategies, values, priorities, and expectations of actors, networks, and societies.

When applied in the GPN framework, this concept makes a distinction between three dimensions. The first is *societal embeddedness* which draws directly from the seminal thesis of Polanyi and refers to how actors are formed by the social, cultural, and institutional contexts from which they originate, and how these contexts influence their actions. Societal embeddedness also reflects how business systems and institutional frameworks determine actors' behaviours at an individual and aggregate level. The notion of *territorial embeddedness* is used to encompass the ways production networks constitute and are re-constituted by the particular territories or places in which they are based; as well as how the 'anchoring' of the firm influences the economic and social relations in such locations. Last but not least, *network embeddedness* refers to the structure of relationships among a set of actors and its degree of connectivity; the stability and evolution of these relationships, and the importance of the network for the agents who constitute it (Hess, 2004).

The concept of societal embeddedness as used in the GPN framework can be applied to explore how firms in specific social contexts organise their activities and their relations with other actors. This concept serves to identify the interdependencies between commercial and non-commercial actors and recognises that actors are engaged simultaneously in multiple, and potentially competing, personal, organisational, geographical, and political associations (Hess and Yeung, 2006). The notion

of embeddedness is neither static nor linear, but a contested process that is constantly evolving (Alford et al., 2017). In this study, the concept of societal embeddedness can be used to unpack tensions by exploring how the different actions and interests of actors in commodity chains are shaped by social norms present in the context where these chains operate. Section 3.4.1 in this chapter examines how this concept can be applied with a gender lens to explore the environmental outcomes of GPNs.

3.3.2. Power and governance in GPNs

Power, as a foundational concept in GPN analysis highlights the capacity of actors to shape the formation and functioning of the chain by affecting the behaviour of others or resisting their unwanted impositions. As discussed, in the GPN framework the analysis of power includes power between firms, as well as that exercised by other actors in the context in which the chain is embedded. To break down these different forms of power, Henderson et al., (2002) proposed a distinction between corporate, institutional (largely state-led), and collective (non-firm, non-state) power. More recently, Dallas, Ponte and Sturgeon (2019) proposed a new typology of power in commodity chains, which distinguishes between firm and non-firm actors and considers that power can be exercised individually and collectively, and transmitted directly or diffusely. The combination of these dimensions yield four ideal types of power: bargaining, demonstrative, institutional, and constitutive.[16] These selected examples illustrate that the analysis of power in GPNs is not systemic, yet this framework has the potential to investigate relations of power in commodity chains that are complex and variable over time (Mayer et al., 2017).

The different forms of power identified by Lukes (1974) have also been applied in this framework. The first dimension refers to how resources can be mobilised in the making of decisions, that is to say, how actors with power are able to modify the behaviour of others. The second dimension of power involves the control of the production of knowledge as a way of setting the agenda by including or excluding certain voices. In the third dimension, the emphasis is on the way in which power shapes consciousness and, in turn, capacities for action. This power in the form of ideology sees the dominated as potentially not being able to recognise the power being exercised over them.

[16] *Bargaining* refers to firm-to-firm relations, such as firms coordinating the activities of suppliers. *Demonstrative* power is not explicit and operates through informal transmission mechanisms between buyers and suppliers, or aspiring value chain actors. *Institutional* is that which is exercised by collectives with some level of formal organization such as business associations or the state. *Constitutive* power is not embodied in particular actors, it emerges from collective action and lacks institutionalisation and direct forms of enforcement (Dallas et al., 2019).

In GPN analysis 'power over' has been used to focus on the varying strategies that allow certain firms to exert dominance in the market and alter the status quo through their resources and their ability to leverage them. This conceptualisation of power is frequently used to describe inter-firm relationships where lead firms have power over their suppliers as a result of financial assets, corporate strategies, technological leadership, brand development, etc., and which enhance their ability to capture value (Hess and Coe, 2016). This form of power is generally seen to lead to negative outcomes for those over whom it is exercised but it is limited to account for forms of resistance and negotiation (Allen, 2003; Gaventta, 2007).

'Power to' as applied in GPN analysis, recognises the emergence of new and increasingly powerful actors that are constituent parts of the production systems and an important force in supporting or challenging the governance of GPNs (Coe et al., 2008b; Hess and Coe, 2016). For example, the growing influence of intermediaries that organise and manage the flows of goods and services, and civil society organisations and labour (Barrientos and Smith, 2007; Dicken, 2003; Scott, 2006; Weller, 2006). This form of power takes a relational or networked approach that considers the contingent and contested nature of GPNs and the possibilities for various actors to pursue different goals (Hess, 2004). In contrast with 'power over', 'power to' is not the possession of assets and capabilities, but the ability of actors to mobilise across networks. In this sense, 'power to' refers to the potential to create new possibilities for participation without using relationships of domination (Rowlands, 1997). Contrarily to the winner-loser dichotomy of 'power over', 'power to' recognises that collaboration can enable the simultaneous empowerment of various actors (Allen, 2003). This understanding of power is aligned with the Foucauldian view of power as a form of distributed agency (Gaventta, 2007).

Nonetheless, the concept of power remains insufficiently theorized to fully grasp the tensions and struggles in GPNs (Arnold and Hess, 2017). As Levy (2008) argued, GPN analysis is yet to pay sufficient attention to the ideologies and discourses legitimizing particular forms of power that go beyond economic coordination. In GPNs, power is not reducible to a firm's position within the network, it depends on relational ties which are dynamic and that make the relationships between actors liable to be disrupted and contested (Dallas et al., 2019). Both of these forms of power, i.e. 'over' and 'to', are used in this study to question whose interests and influences are most prominent in the menstrual products chain and what end they serve. Section 3.4.2 in this chapter will address how these and other forms of power in GPNs can be analysed from a gender perspective and how gendered power relations can be connected to environmental issues.

Governance and contestation

Power as a conceptual category in GPN also has important implications for the analysis of governance. As argued by Neilson and Pritchard (2009), lead firms do not deploy their strategies in a vacuum, but in contexts with concrete economic and political circumstances. These 'institutional contexts' define the rules that shape how production is organized, which can trigger conflict and power struggles. The constant evolution of commodity chains has given rise to various approaches to governance that place different emphasis on sub-national and regional institutions; the role of non-commercial actors, including national states; the relative importance of geographical and organisational complexity, etc. (Coe and Yeung, 2019). For example, Coe et al., (2008b) argue that different modes of governance can exist in the same commodity chain. They divide it into three analytical categories: intra-firm governance; inter-firm or corporate network governance, and institutional and political governance. On the other hand, Mayer and Phillips (2017) advance a typology of three modes of state governance: facilitative, regulatory, and distributive to attempt to better integrate the role of states and public authority. Recently, attention has also been paid to multi-scalar governance to elucidate the diverse leverage points across global, national, and local levels that provide an opportunity to challenge dominant forms of GPN governance (Alford, 2016). This approach also gives greater weight to the role of governments in mediating tensions between commercial and social actors and highlights that power needs to be contested by different actors and at different spaces (Alford et al., 2017). Until recently, the role of these actors had received limited attention in GVC/GPN analysis (Alford, 2016; Mayer et al., 2017; Neilson and Pritchard, 2009; Smith, 2015).

In relation to the social and environmental impacts of global production, research on governance has focused greatly on private forms of regulation exerted by firms, e.g. private standards and social auditing to avoid harmful working conditions or unsustainable practices (Bird and Soundararajan, 2020; Dolan and Humphrey, 2004; Pedersen and Andersen, 2006; Ponte et al., 2017). As a result of globalisation firms have become both more alert to reputational risk and more responsive to the changing awareness and social values of consumers (Barrientos, 2013). Many of these initiatives are intended to strengthen accountability and the capacities of businesses to address the consequences of their operations. Yet, research has pointed out that there are important limitations on the positive influence that these initiatives can have, including the exclusion of certain issues and entities, and the difficulty of separating the interests of firms from the selection of beneficiaries (Blowfield and Dolan, 2008; Henson and Humphrey, 2010; Soundararajan and Brown, 2014).

Research has also looked at how the expansion of global production is opening channels for civil society organisations, such as labour groups and other non-governmental organisations, to challenge the power of commercial actors especially in spaces where multilateral institutions and states often have limited scope to regulate (Alford, 2020; Arnold and Hess, 2017; Bair and Palpacuer, 2015; Levy, 2008; Moon, 2002). Attention to collective forms of agency in this literature has raised important questions on how to organise production in a fair and sustainable way, in some cases even challenging the very rationale for a product itself (Kleibert et al., 2020). Many of these studies have explored the various strategies of collaboration and contestation carried out by NGOs and trade unions to challenge commercial interests and improve workers' rights (Cumbers et al., 2008; Franz, 2010; Rainnie et al., 2011; Wad, 2013). This research has shown that due to firms' societal embeddedness they interact with social actors that can influence their commercial operations. While civil society actors often lack the resources of firms, they can exploit different leverage points and contribute to make firms accountable for the social and environmental issues associated with their operations (Barrientos and Evers, 2014).

In GPN literature, individual agency has also been explored by examining how workers who are not able to bargain collectively, such as unorganised workers, migrant workers, and forced labour, exercise agency through every day practices (Carswell and De Neve, 2013; De Neve, 2014; Rogaly, 2009). Recently, the conceptualisation of a 'horizontal' dimension of labour agency has been used to recognise that agency is not only configured by 'vertically' linked production networks but also by social relations that are embedded in a wider economic and cultural context (Carswell and De Neve, 2013). This 'horizontal' approach accounts for how gender, age, caste and other factors constrain workers' agency and has expanded the conceptualisation of labour agency beyond the focus on trade unions and workers' collectives (Coe and Jordhus-Lier, 2010; Cumbers et al., 2010). An important contribution of the analyses of individual agency in GPNs is that these demonstrate that opportunities for individual contestation need to be assessed in terms of workers' positionality with respect to global production networks and in relation to wider social relations (Coe and Jordhus-Lier, 2010). This is important for my study as I seek to explore how individuals who participate in the menstrual products chain as consumers and waste pickers are able to contest the influence of gender norms on their practices. I will continue this discussion on individual and collective agency in section 3.4.2 by drawing insights from feminist theory.

This discussion has shown that within GPN literature there are various approaches to study the power relations that govern global production systems and the ability of different actors to drive contestation

of these relations and change the social and environmental outcomes of GPNs. To conceptualise governance, I focus on these three types: *private governance* exercised by firms, *social governance* exercised by civil society organizations, and *public governance* exercised by governments. I use *private governance* to refer to the policies adopted by firms in the form of standards, corporate codes of practice, Corporate Social Responsibility (CSR) initiatives, etc. (Gereffi et al., 2005; Nadvi, 2008). *Public governance* includes government rules, regulations, and policies that shape the operations of the chain (Horner, 2017; Mayer et al., 2017; Neilson and Pritchard, 2009). *Social governance* relates to the ability of social actors, usually civil society organizations such as trade unions and NGOs, to influence business practices and policies (Barrientos, 2019; Mayer and Posthuma, 2012). I analyse social governance by exploring different forms of agency: collective and individual.

So far I have focused on the GPN framework's various strengths, especially in comparison with the GVC approach. These include the variety of actors it can account for, the importance it places on socio-spatial contexts, and the possibility of a more nuanced analysis of power relations and governance. The focus on societal embeddedness helps understand the complexities of actors' multiple interests and how these are shaped by the societal contexts in which the chain operates. Moreover, this framework recognises the multiplicity of power relations in GPNs and the possibility to challenge them through different forms of agency (i.e. individual and collective). This analysis of power also allows an exploration of different types of governance and the role these play in mitigating some of the negative consequences of global production. Later subsections in this chapter describe how I expand the analysis of embeddedness and power to explore the relation between gender norms, commercial activities and environmental impacts in a commodity chain context. The next subsection elaborates on the limitations that the GPN framework has to analyse the social and environmental dimensions of commodity chains from a gender perspective.

3.3.3. The limitations of the GPN framework to analyse gender and the environment

The GPN framework has been praised for its openness and flexible analytical boundaries (Sunley, 2009), yet, existing studies continue to be too centred on the economic dimension of commercial production. In recent years, Coe and Yeung (2015) proposed 'GPN 2.0', a new theory of GPNs which offers more conceptual clarity on the links between global production networks and uneven development within the global economy. However, as McGrath (2018) points out, this theory provides a partial understanding of development because it brackets it from its social, cultural, and environmental dimensions.

To date, there are limited analyses that unpack the gender dimension of commodity chains from a GPN or GVC perspective (Barrientos, 2019; Collins, 2014).[17] As Bair (2010, p. 205) puts it, GVC/GPN frameworks share a 'degendered' approach because they fail to "look at how gender, as a set of context-specific meanings and practices, intersects the structure of global capitalism and its systemic logic of value extraction and capital accumulation." As argued by McCarthy et al., (2020) GVCs/GPNs not only thrive from systems of differentiation, but shape them by associating masculinities and femininities with different forms of work and worth. A gender perspective is necessary for a full understanding of how the expansion of global production can perpetuate or challenge the historically subordinate roles that women play in the economy; as well as to conduct a deeper exploration of the interaction between commercial activities and social norms that shape gendered patterns of consumption and production (Barrientos, 2014a).

A traditional approach to commodity chain analysis fails to capture the role of gender norms within commercial dynamics for various reasons. Firstly, it creates an analytic divide between production and reproduction spheres, and disregards that it is within the latter that workers are socialized into acquiring specific skills, and where interpersonal relationships that are essential for production take place (Collins, 2014). Secondly, it dismisses the role of household activities in markets and the indirect benefits that these provide to firms by absorbing the costs of reproduction and maintenance of labor (Carr, 2008; Prugl and Aneesh, 2003; Wallerstein and Smith, 1992). This omission also results in failure to consider the burdens of unpaid household labor as a deterrent for women to enter the workforce or to engage in productive self-employment (Collins, 2014). Moreover, traditional analyses fail to acknowledge that households are the end points of commodity chains and how consumption patterns can accentuate and exploit existing gender inequalities (Dunaway, 2014). This analysis also misses the informal sector and the significant contributions of women's invisible labour to the production of commodities and services (Antonopoulos and Hirway, 2010).

Collins (2014) argues that a gender analysis of commodity chains offers new possibilities to critically engage the global processes that generate inequality by tracking the circulation of gender ideologies and exploring the congruence and clashes between these and economic processes. However, gendered approaches to commodity chain analysis are yet to explore how gender norms configure commercial activities in ways that generate outcomes on the environment. To date, the relation

[17] In preparation for the book *Gendered Commodity Chains: Seeing Women's Work and Households in Global Production,* Wilma Dunaway spent two years researching commodity chain literature and found that less than one percent of the total research between 1980 and 2012 integrated gender, women, or households into the analysis.

between gender norms, commercial activities, and the environment has so far only been explored by examining how the environmental impacts that result from economic production affect women differently than men. For example, Ferolin's (2014) research on the Philippine seafood sector demonstrates how the reallocation of public funds to the fishing industry resulted in the loss of ecological resources for household subsistence, which pushed women to engage in self-deprivation to survive.

On the other hand, the environment also remains a dimension that is yet to be sufficiently integrated into the GPN framework. This was recently highlighted in Coe and Yeung's (2019) evaluation of the underdeveloped areas in GPN literature.[18] In the past, other authors had noted the need to enhance the understanding of the connection between processes of production, distribution, and consumption and the natural environment (Coe et al., 2008a; Hudson, 2001). Existing studies have explored the characteristics of certain natural resources and how their processes of extraction and growth can restructure the operation of global production networks (Baglioni and Campling, 2017; Bridge, 2008; Santos and Milanez, 2015). Beyond the focus on extractive and agro-food industries, research has also been conducted on the challenges of implementing environmental upgrading strategies and sustainability initiatives aimed at reducing the environmental impacts of commodity chains (Alexander, 2018; Khattak et al., 2015; Marchi et al., 2013; Poulsen et al., 2016).

These studies have raised important questions on the ways in which the environment is valued in economic systems; the conflicts between socio-economic, commercial, and environmental priorities, and the limitations of standard notions of upgrading and governance to integrate an environmental vision across GPNs (Coe and Yeung, 2019; Krauss and Krishnan, 2018). An important gap in this literature is the insufficient study of the interplay between chain governance and environmental governance (Clapp and Helleiner, 2012; Dauvergne and Lister, 2013). In economic geography, 'environmental governance' is defined as the various institutional arrangements that shape human–environment interactions, including environmental regulation at global and local scales (Havice and Campling, 2017). In GPN literature, the majority of existing studies in relation to environmental governance focus on the self-regulation of firms (Kleibert et al., 2020). For example, how buyer power enables big brands to leverage corporate sustainability to advance their own commercial priorities (Dauvergne and Lister, 2013). As well as how, firms can enhance their position in the chain by using the environment to appropriate value and pass on risks and costs to other firms (Havice and Campling, 2017). Inter-firm relations have also been explored to examine how environmental upgrading

[18] The other areas are the state, finance, labour, and development.

opportunities can become a source of competitive advantage, especially for suppliers in less powerful positions (Goger, 2013; Khattak et al., 2015; Marchi et al., 2013). It is also important to note that these studies often fail to sufficiently consider the social context where the chain is embedded, including its gender norms. This literature also rarely explores how environmental impacts unfold at the individual level, namely through consumption and disposal practices. Section 3.4.3 expands this examination by looking at how FPEcol literature analyses the relations between the environment and gender norms and how these insights can be used to address the aforementioned gaps in GPN literature.

Furthermore, a common trend in private governance in relation to the environment has been the adoption of standards to improve the environmental performance of products, which are then implemented throughout the supply chain (Seuring and Müller, 2008). Nonetheless, in light of the growing number of standards, many firms are gradually moving away from these in favour of other tools, such as environmental impact methodologies. Life Cycle Assessment (LCA) is one method for the environmental appraisal of systems of production along an entire value chain.[19] The main strength of the LCA and an important reason why it has gained relevance is its ability to provide a comprehensive assessment of environmental impacts along an entire commodity chain, which can be difficult to achieve through other means (Boons et al., 2012). Some of the limitations of this approach include its technical complexity, the insufficient availability of data, and the various methodological assumptions used to model complex environmental cause-effect chains (Brandão et al., 2012; Hellweg and Milà I Canals, 2014). This approach has been criticised because it does not reflect the dynamic nature of production systems and because it relies on broad assumptions about user behaviour (Brandão et al., 2012; Curran, 2015; Hellweg and Milà I Canals, 2014; Vinz, 2009). Despite that, these quantitative assessments are being increasingly perceived as more comprehensive than individual certification standards, and as a way to addresses companies' needs for a "suitable 'framing' of goals and solutions" (Freidberg, 2013, p. 583).

With the global dispersion of economic activities, the investigation of the social and environmental impacts of commodity chains is becoming increasingly relevant (Boons et al., 2012). Yet, the simultaneous exploration of the social and environmental dimensions of commodity chains from a gender perspective remains a knowledge gap in GPN literature. This approach needs to be enhanced to explore tensions between gender norms and commercial activities and their implications for the environment. The next section discusses how insights from two different strands of feminist literature can be used to strengthen some of the key concepts in the GPN architecture.

[19] Life Cycle Assessment (LCA) can also be referred to as Environmental Life Cycle Assessment (E-LCA).

3.4. The gendered and environmental dimensions of GPNs

So far the discussion in this chapter has centred on the GPN as a valuable approach to unpack how commercial activities take place in a given social context and to examine the power relations within and between commercial and non-commercial actors. Yet, I argue that the GPN can be strengthened by bringing it closer to feminist approaches to political economy and political ecology that emphasise the gendered aspects of economic process and environmental relations, but rarely investigate how these play out in a commodity chain context.

The literatures on Feminist Political Economy (FPEcon) and Feminist Political Ecology (FPEcol) have made different advances in the study of gender norms and economic relations, and gender norms and environmental relations. At a wider level, a common aspect in both is the view that economy, society, and environment are integrally interlinked, and are all permeated by gender norms. These literatures posit that an analysis of gender cannot be separated from the interplaying regimes of social, economic, political, ecological, and cultural power (Harcourt and Nelson, 2015). Both FPEcon and FPEcol conceptualise gender as a social category of inequality and seek to unravel the ambivalences of inclusion and empowerment associated with neoliberal transformations (Wichterich, 2015).

FPEcon studies have analysed the implications of the expansion of global production for the gender division of labour and for women's reproductive roles, which conventional economic studies tends to ignore (Elson and Pearson, 1981). FPEcol analyses gender as a central category that shapes societal–nature relations through agency, knowledge, and politics related to the environment (Harcourt and Nelson, 2015). FPECon has ignored to a large extent environmental issues, whereas feminist political ecologists have not paid sufficient attention to dynamics related to economic growth and commercial production (Wichterich, 2015). With some exceptions, both largely overlook commodity chains.

FPEcon and FPEcol literatures are relevant to this study because they question the discourses and strategies that are related to the social and environmental 'costs' from global production, as well as the risks that commercial activities pose to nature and to the weakest segments of society (Muraca, 2012). Both approaches recognise that gender norms reflect societal asymmetries of power that can have meaningful implications for the economy, society, and the environment. Therefore, by combining them with a GPN approach, I aim to explore how gendered social power relations coalesce with the dynamics of power in commodity chains, shaping the relations between actors and the outcomes of the chain. The remaining part of this section distils the various insights from these

literatures that can be integrated into the GPN approach to enhance the analytical reach of this framework.

3.4.1. Gendered societal embeddedness and the environment

As indicated in section 3.3.1, the analysis of societal embeddedness in GPNs helps to unpack the diverse ways in which global production unfolds in different contexts with varying social norms and practices (Hess, 2004). When combined with FPEcon literature, this concept can be applied with a gender lens to explore how firms reproduce gender norms through their activities, including production and labour processes. As argued by Barrientos (2014a), the concept of gendered societal embeddedness captures how the expansion of global production is embedded in gendered social norms and institutions.

In section 3.2 I discussed that feminist political economists have introduced a gender perspective to Polanyi's proposition on the social construction of markets and theorise markets as gendered institutions. For example, Beneria (2007, 1999), argues that separating economic relations from their social context hides the gendered dynamics that take place through production processes. Similarly, Elson (1999) argues that labour markets are dependent on reproductive activity and that by failing to recognise this dependency the operations of labour markets can reinforce gender inequalities. In recent years, these insights have been combined with GPN/GVC frameworks to analyse the embeddedness of labour, consumption, and governance in gender norms (Barrientos, 2014a; Barrientos and Evers, 2014; Sifaki, 2019). The recently developed Global (re)Production Networks (G[r]PN) approach is a clear example of how these literatures have been combined in order to explore the connections between commercial production and social reproduction through women's participation in value chains (Kelly, 2009). Studies that combine both of these literatures have made important contributions; for instance, by examining how the expansion of global production has opened opportunities for women to engage in paid work while also reinforcing gender norms that undervalue women's work and reinforce their low remuneration in order to meet production requirements of low cost and high quality (Barrientos, 2014a; Dolan and Sorby, 2003; Dolan, 2004; Kabeer and Mahmud, 2004; Wright, 2006). Nevertheless, this approach is yet to be used to unpack how the embeddedness of commodity chains in gender norms relates to environmental impacts.

In other literatures, societal embeddedness has been explored in relation to the environment but not from a gender perspective. The concept of societal embeddedness has been used in the field of Industrial Ecology to explore how human action and the material and energy flows that result from it,

are shaped by the social context in which they occur. “The cognitive maps that people have on their natural and social environment, the cultural values to which they aspire, the relational patterns in which they find themselves and the power asymmetries within these patterns, all contribute to their impact upon their natural environment” (Boons, 2009, p. 42). Some of these studies have explored how the embeddedness of commodity chains can result in local values and knowledge constraining the introduction of potentially valuable practices that seek to alter the environmental impacts of products and their production (Blowfield, 2003; Koponen, 2009). Morris and Kirwan (2011) argue that societal embeddedness can also be used to explore the interconnections between economic actors and the natural environment. They apply it to analyse how commitments to the conservation of the environment can help producers to capture value by satisfying the demands of certain consumers, while contributing to improve environmental management.

This discussion has shown that the concept of societal embededness can be used to explore how the commercial activities that constitute commodity chains configure and are configured by gender norms, as well as how environmental impacts (i.e. energy and material flows) realted to these environmental imapcts are shaped by social norms. This concept has the potential to explore the environmental implications of the transformation of gender norms through the expansion of global production; or in other words, to explore how tensions between gender norms and commercial activities in a commodity chain context unfold in a given social context and lead to outcomes on the environment.

3.4.2. Gendered power relations in GPNs

As discussed in section 3.3.2, GPN analysis considers different forms of power that shape the relations between actors, as well as the collective and individual forms of agency that can challenge these relations. However, these different forms of power in GPNs are rarely studied from a gender perspective. Research on gender norms has been traditionally concerned with issues of power and the role of power-holders in protecting existing power asymmetries (Agarwal, 1997; Harper and Marcus, 2018). Gender norms can be the means through which inequitable societal power relations are reflected and perpetuated because the performance of these norms leads subjects to exert and internalise different aspects of domination (Butler, 1999; Mahoney and Yngvesson, 1992; Ridgeway and Correll, 2004). Gender norms are difficult to challenge because they are embedded in personal attitudes and conducts, as well as in institutional arrangements and organizational structures (Gammage et al., 2015). From a gender perspective, Lukes (1974) conceptualisation of ‘power over’ can be seen as wielded by institutions and ideologies and taking the form of rules governing social

behaviour. This means that 'power over' can operate in the absence of any explicit agency by taking the form of dominant gendered norms in society that constrain individuals' capacity to define their own life choices and to pursue their own goals (Kabeer, 1999).

Feminist theory also has long dealt with issues of the internalization of powerlessness and the acceptance of the status quo, as well as the connection between agency, empowerment, and social change (Kabeer, 1999; VeneKlasen and Miller, 2007). In this sense, an important driver of change is the ability of individuals to engage in different forms of resistance, such as negotiation and manipulation, as well as more intangible cognitive processes of reflection (McNay, 2016). To further reflect on individuals' ability to define their own goals and act upon them, Kabeer (1999, p. 438) defines 'power within' as "the meaning, motivation and purpose that individuals bring to their activity, their sense of agency." This form of power resonates with the third dimension of Lukes conceptualisation (1974), and underscores that gaining a sense of self-identity, confidence, and awareness is a precondition for action (Gaventta, 2007).

An important contribution of the feminist analyses of individual agency is that women make strategic choices in relation to their background, tastes, and preferences; as well as in relation to the larger structures of constraint that position them as subordinate to men (Martha Nussbaum 2003; Kabeer, 1999). This means that individual agency cannot be conceptualized only in terms of choice, it needs to incorporate an assessment of the structural conditions in which choices can be made. Relatedly, the potential of individual agency to lead to change depends on the extent to which choices challenge such structural conditions (Kabeer, 1999). Thus, agency is commonly conceptualized as 'relational' because it does not exist in a vacuum and it can only be understood by considering the cultural and social context in which it can be exercised (Mackenzie and Stoljar, 2000; McNay, 2016).

Moreover, feminist literature on collective agency has explored how coming together and mobilising in different ways can enable women to challenge and overcome gendered structures that constrain their choices. These collective forms of organisation can include co-operatives, political parties, women's organizations, trade unions, etc. (Agarwal, 2000). This literature has shown that collective action can help to amplify the voices of women and increase the likelihood of successful influence in ways that would not be possible for individual women. Additionally, collective action is also critical to ensure that women acting on their own do not have to pay a high price for their autonomy (Gammage et al., 2015). As argued by Kabeer (1999, p. 457) "women's organizations, and social movements in

particular, have an important role to play in creating the conditions for change and in reducing the costs for the individual."

Collective action by women, through their autonomous organizations and in alliance with other groups, has been found to be key to promote public action on a range of women's rights (Htun and Weldon, 2010; Kabeer, 2015). The emergence of networks of women's organizations and cooperatives, often in alliances with trade unions and civil society has also contributed significantly to advance women's empowerment as workers and farmers in global production (Barrientos and Evers, 2014; Jenkins et al., 2013; Markelova et al., 2009). Lastly, it is important to note that helping women to come together may not necessarily lead to their empowerment if these organisations fail to challenge the terms and conditions of exchange in the market (Pearson, 2005). In many instances, for these forms of contestation to be successful in addressing systemic gender inequalities, their advances also need to be sustained by other actors, namely public ones.

As discussed in section 3.3.2, GVC/GPN literature has made important contributions to the analysis of collective and, more recently, individual agency. However, it has only lately begun to investigate the role of social governance in challenging the gendered power asymmetries entrenched within commodity chains. Some studies have found that social governance via collective contestation and collaboration can bring to light the limitations of public and private initiatives to address gender inequalities and have, in some instances, succeeded in improving the conditions for women workers (Barrientos, 2019, 2013; Barrientos et al., 2019; Barrientos and Smith, 2007; Hale and Wills, 2005). For example, through her analysis of the cocoa-chocolate chain Barrientos (2014a) illustrates how the growing links between consumers and producers are enabling civil society organizations to leverage the power of consumers to shape interventions that promote fairer and more gender equitable conditions for women farmers.

Thus, building on the potential of the GPN framework to bring out issues of power, a gendered analysis of power can shed light on how gender norms are reproduced or challenged in commodity chains by different actors and at different levels of interaction. By exploring individual and collective forms of agency I aim to understand the extent to which individuals are able and willing to challenge gender norms through their practices, as well as how civil society organisations can enhance this potential for change. Notwithstanding, in order to explore how gendered power relations traverse to the environmental dimension of GPNs and how these different forms of agency can have implications on the environment this analysis needs to be furthered strengthened with insights from FPEcol.

3.4.3. Gendered power relations and the environment

A gendered approach to power in relation to the environment can be found in Feminist Political Ecology. This literature provides useful insights on how to break down the link between gender norms and environmental relations in terms of power. However, it is yet to explore the connection between commercial activities, gender norms, and the environment, which is the focus of this study.

FPEcol, as a sub-field of Political Ecology,[20] grew in opposition to the women in development (WID) and Ecofeminist debates of the 1990s[21] and called for an empirically grounded, rather than ideological, theorisation of gender in the study of the environment (Agarwal, 1992; Biehl, 1991; MacGregor, 2006). FPEcol understands the environment as linked to society through relations of power and agency. This literature questions the role of gender in issues related to the environment, including environmental knowledge and practices, rights to access resources, and environmental activism (Rocheleau et al., 1996; Sundberg, 2017). An important contribution of these studies to the field of Gender and Environment has been challenging the view that women, as a largely undifferentiated category, have the same connection and understandings of environmental change as a consequence of their close connection to nature (Nightingale, 2006; Resurrecion, 2017; Sultana, 2011).

Feminist Political Ecology analyses the social construction of environmental problems by investigating how gender norms are reproduced by environmental issues and how gender norms are also part of the construction of these issues (Asher et al., 2011; MacGregor, 2017). A significant proportion of these studies have focused on the implications that gendered power relations have for women's access to and control over resources. This includes work on land titling, water access, natural resource management, among others (Agarwal, 2001; Ge et al., 2011; Razavi, 2003; Truelove, 2011). Recently, this approach has been increasingly featured in current academic and activist discussions of the gendered impacts of climate change and natural disasters (Arora-Jonsson, 2011; Dankelman, 2010).

[20] Political Ecology emerged in the 1970s as a critique of development and conservation, which sought to explore ecological problems from a political economy perspective. These problems were analysed as the result of power relations between national governments, local producers, consumers and international economic actors involved in the struggle over scare resources (Greenberg and Park, 1994).

[21] It can be argued that WID and Ecofeminism represent two extremes of the relationship between women and nature; the former disproportionately implicates women in ecological destruction, while the latter exempts them from responsibility (Zein-Elabdin, 1996). While both derive from a desire to improve the living conditions of the people who are most affected by development-induced environmental change, they also universalize the experiences of women across class, culture, and other differentiating variables (Resurrecion, 2017).

This literature sees the connection between gender norms and environmental impacts as manifesting through power-laden practices, which embody utilitarian considerations, but also other cultural and social expectations (Agarwal, 1992, 2010; Buckingham, 2010; Buckingham et al., 2005; Harcourt and Nelson, 2015). It reclaims individual everyday practices as a significant level of analysis and shows that these are neglected dimensions of environmental engagements through which gender norms can be reproduced and challenged (Gururani, 2010; Sundberg, 2017). A key insight from FPEcol is that environmental outcomes can be generated and transformed through practices that redefine gender norms and other subjectivities (Harris, 2016; Nightingale, 2011; Sundberg, 2017). For example, through her work in community forestry in western Nepal, Nightingale (2011) finds that acts of social resistance of marginalised members (mostly women from lower castes), such as poaching of timber and grazing animals during restricted times, had demonstrable ecological consequences.

FPEcol studies also place a strong focus on intersectionality and on the ways in which subjects' identities define their connection to the environment. As Nightingale (2006) argues, ecological conditions contribute to produce the material and symbolic practices that constitute gender and other subjectivities, at the same time the performance of subjectivities shapes ecological change. This means that the analysis of gender norms in relation to the environment cannot be disentangled from other social categories such as class, age, race, ethnicity, among others. An intersectional perspective is also used in this literature to explore how differences in subjectivities determine who has the right knowledge and skills to manage environmental resources (Nightingale, 2011; Sultana, 2011). This relates to another central contribution of FPEcol, which is the criticism to neoliberal forms of environmental governance which conceptualise nature as a subsystem of the economy and focus exclusively on facilitating efficiency and profitability (Harcourt and Nelson, 2015). Feminist political ecologists argue that this approach to governance tends to neglect the complexities and differences among and between women and men in their relationships to natural resources; disregarding the gendered division of labour, property, and power that determine how they engage with the environment (Arora-Jonsson, 2013; Jackson, 1998). They argue that flawed or incomplete assumptions of gender roles in governance mechanisms can reinforce social forms of difference and lead to negative environmental consequences (Arora-Jonsson, 2013; Detraz, 2017).

These findings are valuable to the discussion on gendered power relations in GPNs in this study because they show that investigating the everyday practices through which gender norms are reproduced in a given context can yield important insights on how environmental issues arise and can be transformed. Analysing the connection between gender norms and environmental impacts in

terms of power also advances the analysis of environmental governance by elucidating the centrality of gender norms to the way these mechanisms play out at a local level; as well as by investigating the potential impact that disrupting gender norms can have to change negative environmental outcomes. In addition, the intersectional perspective adopted in this literature can be used to uncover the different subjectivities that shape individuals' identities, their role in commodity chains, and in turn, their relation to the environment.

Lastly, bringing FPEcol and FPEcon literatures closer together can help to address important gaps in both. Firstly, the insufficient analysis across both literatures of the ways in which gendered power relations are connected to adverse environmental impacts associated with the production, consumption, and disposal of commodities. Although FPEcol studies bring to the forefront the gendered dimension of power in relation to the environment, this literature is yet to explore how gender norms are connected to environmental issues that go beyond access to and control of natural resources. The second gap is the insufficient investigation of the varied roles that women play in economic transformations, particularly in the Global South, and how these roles are connected to the environment in positive and negative ways. Gendered approaches to commodity chains have been criticised for providing a generalised view of women as victims of historical processes of capital accumulation, instead of providing a more nuanced analysis of the positive and negative gender implications of global production (Barrientos, 2014b). FPEcol literature has contributed to change the views that universalize the experiences of women in relation to the environment (Resurrecion, 2017); studies are yet to explore how women's participation in the chain may also lead them to develop new, and potentially negative, relations with the environment. As Simon-Kumar et al. (2018) argue, women as economic actors, travel, consume, produce, reproduce, feed and pollute in contexts permeated by social norms.

In this section I discussed why a gendered GPN approach needs to be developed further in order to explore tensions in relation to the environment. Both FPEcol and FPEcon make valuable contributions to the study of gender norms and to the need to examine these as embedded in, and intersecting with, various socio-economic and socio-cultural regimes of power in different contexts and at multiple levels. Combining various insights from these literatures expands the original GPN approach and enables an investigation of the connection between gender norms and commercial activities as a series of configurations that are dynamic and potentially contentious, and that can have outcomes on the environment in the form of adverse environmental impacts. The next section brings together the

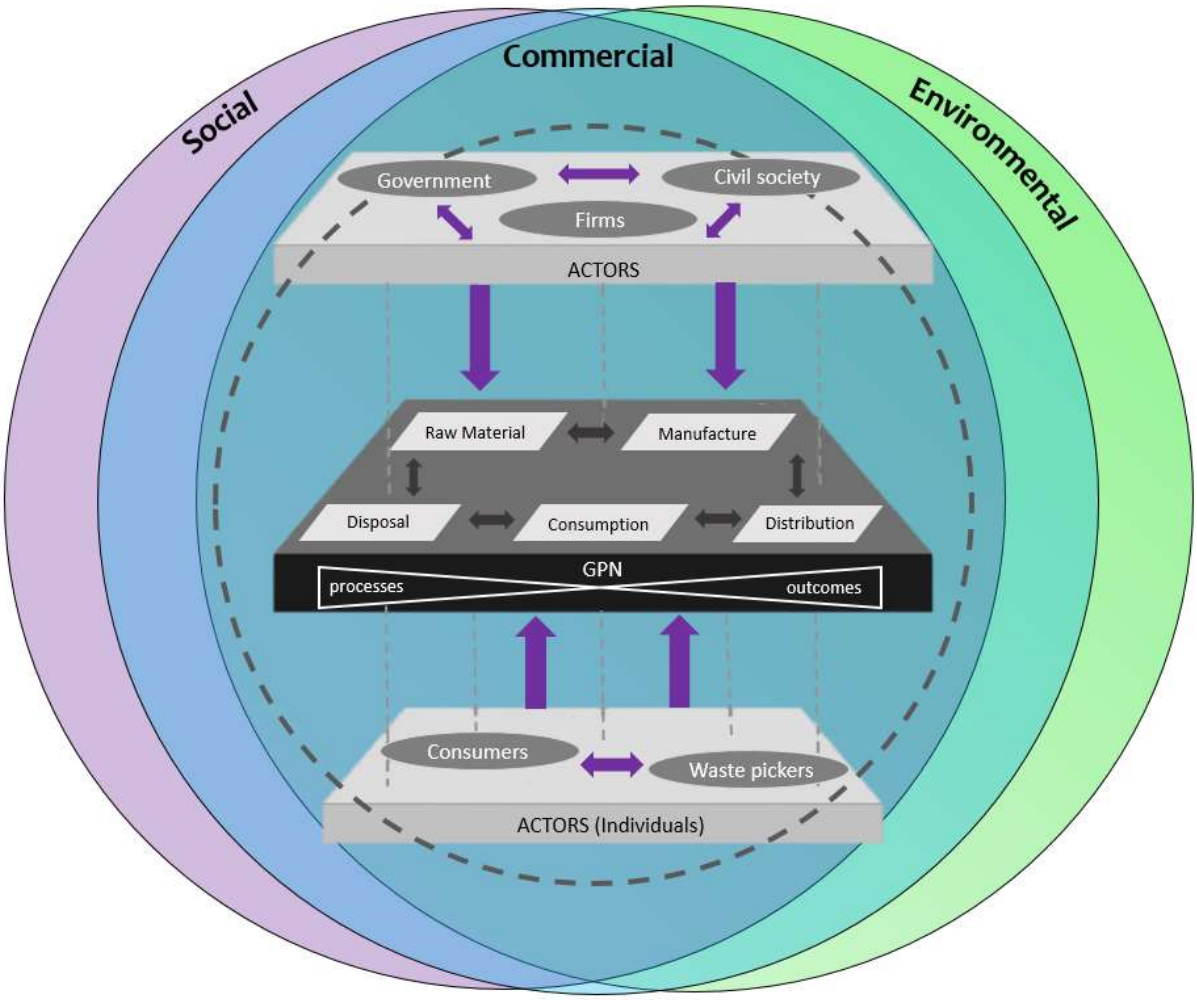
main points of the discussion in this chapter that I use to develop a conceptual framework for this study.

3.5. The conceptual framework

To explore the relation between gendered tensions and the environment, I will use a conceptual framework that adds a gender perspective to the GPN framework by drawing insights from FPEcon and FPEcol literatures. This framework can be used to explore how gender norms become embedded in commodity chains, and in turn, how the social power asymmetries that gender norms embody shape the relations and outcomes of the chain across multiple dimensions, including the environment. This framework is depicted in Figure 3.1. As shown, the GPN sits at the centre of the intersection between the three circles because for this study this is the construct that enables an exploration of the three dimensions of global production: commercial, social, and environmental. The GPN is made up of different commercial processes and outcomes (middle level), as well as the actors that participate at different levels. Firms, government, and civil society in the upper level, and consumers and waste pickers in the lower level. I place the former in the lower level because I analyse their participation in this chain as individuals.

The gendered societal embeddedness of the chain is depicted through the dotted lines that connect the processes and outcomes of the chain with the relations at various levels, and which bind together the different dimensions of the GPN. The purple arrows linking the three levels and the different actors represent the different forms of gendered power that shape the interactions of actors at and across different levels. In developing this framework, this discussion also answered the main analytical research sub-question of this study: *How can the Global Production Networks framework be used to analyse tensions between gender norms and commercial activities that lead to environmental impacts?*

Figure 3.1 The conceptual framework



Source: Author, 2020 (adapted from Coe et al., 2008).

The GPN framework was chosen because it has the potential to examine the diversity of processes and relations that constitute commodities. Beyond sequential steps in a 'chain', the 'network' metaphor expands the scope of the analysis to examine a greater diversity of stakeholders beyond commercial actors and it also considers the increasingly varied and flexible connections between them (Neilson and Pritchard, 2009). This approach also takes into account the institutional, geographical, cultural, and historical contexts in which the operations of the chain take place (Coe et al., 2008). The concept of societal embeddedness is used in the GPN framework to explore how commercial activities play out in different contexts within varying social norms (Barrientos 2014).

Insights from Feminist Political Economy (FPEcon) literature have been integrated into GPN literature to examine how global firms become embedded in the gender norms in the contexts in which they sell and source, and how this has reshaped patterns of consumption, production, and work

(Barrientos, 2019). The analysis of societal embeddedness has also been done in relation to the environment to draw attention to how social structures can shape material and energy flows related to the production and consumption of commodites (Boons, 2009). This concept is central to this study because it recognises that by virtue of its embeddedness in a given societal context gender norms are constantly configuring and being configured by different actors and their interactions in commodity chains. Applied to the menstrual products chain, it frames the investigation of how gender norms around menstruation are understood and experienced by different actors in the chain. This exploration can also help to uncover how gender norms shape the ways in which individuals perceive and prioritise the environment in their engagements with commodities.

To further explore tensions, I conduct an analysis of power relations from a gender perspective. The GPN framework directs attention to the interconnections and interdependencies between actors and has made significant contributions to the analysis of power and governance in commodity chains (Coe and Hess, 2008). Feminist literature has advanced the study of the power relations that underpin gender norms and shown that analysing these relations as gendered helps to emphasise the complex ways in which gendered organisational rules, cultural norms, and routinized practices constrain the agency of individuals and collectives and sustain unequal relations across society (Kabeer, 2015, 1999). On the other hand, Feminist Political Ecology has also contributed to the study of gender norms as an analytic of power by showing that the gendered power asymmetries that shape individuals' identities and their everyday practices can also lead to environmental issues (Nightingale, 2006).

Building on these literatures, I explore how gendered societal power asymmetries unfold at multiple levels of interaction in the chain and lead to outcomes on the environment. To do so I disaggregate power into: 'power over', 'power to' and 'power within'. The objective is to explore which actors in the menstrual products chain can exercise 'power over' others and how this power translates into their ability to challenge or reproduce the norms that shape how menstrual products are disposed of. Drawing from the discussion in Chapter Two, this form of power can be used to investigate the capacity and willingness of global firms to implement private governance mechanisms to address the adverse environmental impacts that result from the disposal of menstrual products in India.

'Power to' is used to explore the ability of social and institutional actors in the chain to challenge commercial activities. These actors can exercise power directly through mechanisms such as regulation and indirectly by coordinating and mobilising different resources. In the menstrual products chain in India, this form of power can be used to explore the ways in which civil society organisations and the Indian government support and/or challenge the commercial strategies that influence the

disposal of these products and whether in doing so they also help to address the associated environmental impacts. The analysis of this form of power also relates to collective forms of agency and can elucidate the role of social actors in challenging gendered power relations through efforts of collaboration and contestation.

'Power within' is used to capture how individual's sense of agency shapes their practices and perceptions. As discussed, this third form of power manifests in the ways in which individuals internalise forms of control which derive from the social structures that define their identities, as well as by the economic arrangements in which they participate in. In line with FPEcol literature, the analysis of this form of power is also central to uncover the factors that shape individuals' identities and the ways in which they engage with the environment. I use this form of power to investigate how consumers' and waste pickers' agency defines their ability and willingness to contest gender norms and to explore the implications of individual forms of contestation for the environment.

By introducing a gender lens to the analysis of power in GPNs, I also aim to advance the study of environmental governance in GPN literature by exploring how gendered power relations shape different types of governance (i.e. private, public and social). In the menstrual products chain, this exploration of power aims to elucidate the extent to which gender norms constrain or enable the implementations of mechanisms of governance, such as commercial strategies and policies designed to mitigate the impacts of these products on the environment. It also enables an analysis of the ways in which consumers and waste pickers can participate and support these efforts.

In sum, this framework facilitates an examination of the connection between environmental impacts and gender norms that takes place as economic production expands across different societal contexts; as well as to question the role that different types of governance of GPNs need to play to address these impacts. By developing this conceptual framework this study contributes to advance the analytical reach of the GPN framework and to show that it can be enhanced to explore multiple dimensions of global production simultaneously. Later chapters will test the value of this framework empirically.

3.6. Conclusion

This chapter has discussed the conceptual framework developed for this study and how it helps to answer the following analytical sub-question: *How can the Global Production Networks framework be*

used to analyse tensions between gender norms and commercial activities that lead to environmental impacts?

To explore tensions between commercial activities and gender norms and how these relate to environmental impacts I develop a framework that combines the commercial, social, and environmental dimensions of commodity chains from a gender perspective. While the GPN approach offers a robust framework to examine the processes, relations and outcomes of global production, it needs to be strengthened to explore the gender norms and environmental impacts. I draw from FPEcon and FPEcol literatures to bring a gender perspective to the concepts of societal embeddedness and power in order to explore how commercial activities become embedded in gender norms and how, by virtue of this embeddedness, gendered power relations shape the interactions of actors and the outcomes of the chain on the environment. This gendered analysis of power in GPNs also investigates the extent to which gender norms influence the implementation of environmental governance mechanisms and whether collective and individual forms of agency can challenge gendered asymmetries of power and lead to less negative outcomes on the environment.

This conceptual framework advances the analytical potential of the GPN approach and provides the foundation for the analysis in subsequent chapters, which examines these tensions by drawing on the empirical findings from the analysis of the menstrual products chain in India. In the next chapter I will describe how this framework informs the choice of research methodology and research methods.

4 Research Methodology and Methods

4.1 Introduction

The review of literature in Chapter Two showed that tensions between gender norms and commercial activities and their relations to the environment can be explored empirically by looking at the disposal practices and perceptions of menstrual products in India. In Chapter Three, I developed a conceptual framework to investigate these tensions analytically. I argued that the GPN approach can be strengthened with insight from FPEcon and FPEcol literature to explore how, by virtue of the societal embeddedness of commodity chains, gendered power asymmetries shape the relations between actors in the chain and its outcomes on the environment. This chapter explains the research methodology and the research methods used to collect and analyse data, as well as the ethical considerations required to conduct the empirical investigation of the disposal and waste management practices of menstrual products in India.

This study follows a retroductive research strategy as outlined by Blaikie (2000), with a combination of constructionist and structural ontologies, and a feminist epistemology. To implement this strategy, I used two qualitative methodologies in combination with a quantitative analysis of secondary data. A qualitative approach was chosen because this approach is able to capture the interactional, discursive, and performative elements of gender norms. This is key to explore how individuals in different contexts understand and experience their menstruation and how they perceive and engage with menstrual products; as well as how these norms influence the actions of firms, the government, and civil society organisations who participate in the menstrual products chain.

To explore tensions empirically I combine a mapping of the menstrual products chain in India with a comparative case study approach. The GPN mapping is used to explore the different commercial activities that constitute the menstrual products chain, as well as the relations between different actors. This is done with a focus on the disposal stage of this chain and via documentary analysis, in-depth interviews, and a statistical analysis of market data. This mapping is complemented by a comparative case study across two locations in India that focuses on the practices that individuals follow to dispose of menstrual products and manage menstrual waste. In order to collect qualitative data, two research methods are used: in-depth key informant interviews and focus group discussions.

The second section of this chapter discusses the research design and the two qualitative research methodologies chosen to investigate tensions and address the main research question of this study.

The third section describes the different research methods used for each of these methodologies, as well as the methods for participant selection and the research instruments. The fourth section centres on the ethical considerations and other challenges I faced while conducting fieldwork activities. The fifth section presents the methods for data analysis and interpretation. The last section of the chapter concludes.

4.2 Research Strategy

To conduct this research, I follow a retroductive research strategy that seeks to explore the "structures and mechanisms that are responsible for producing observed regularities" (Blaikie, 2000, p. 96). This logic is associated with a structuralist tradition which locates explanatory mechanisms in social structures (Bhaskar, 1979) and a constructionist one based on the works of Harre and Secord (1972), which is concerned with cognitive mechanisms. These two approaches are not mutually exclusive. Social reality can be seen as the product of the cognitive resources of social actors, as well as a result from material but unobservable structures that shape their relations (Pawson, 2000). Social structures are constantly changing and do not exist independently of the activities and actors they influence. On the other hand, social actors are not passive respondents to the contingencies of their social world, but agents in these changes (Blaikie, 2007).

While a structuralist approach constructs models of the structures and then explores their relative presence or absence in the lives of social actors; a constructionist one focuses on the cognitive resources that restricts individuals' decision-making and problem-solving skills, and seeks to establish the presence of these hypothesised cognitive aspects. A retroductive logic that uses these complementary ontological assumptions is an appropriate research strategy for this study because it views reality as socially constructed and subject to change through the actions of social actors. This logic enables the investigation of the ways in which commercial activities that constitute commodity chains can alter and be altered by the gender norms that are present in the context where it operates. It also recognises that individuals understand and experience gender norms in different ways which they then perform through their engagements with commodities.

Moreover, in line with the analytical focus on gender norms, this study follows a feminist epistemology which conceptualises social norms as gendered and as underpinning inequalities between women and men (Harding, 1993). This epistemology borrows from the Marxist and Hegelian idea that individuals' daily activities and lived experiences structure their understanding of the social world (Hesse-Biber, 2002). It allows an investigation of "the complicated and reciprocal processes through which

assumptions about gender and sexuality guide interactions, become embedded in institutions, and differentially affect life chances" (Smilde and Hanson, 2018, p. 333).

It is important to note that there is no single feminist epistemology or methodology, but feminist research is "connected in principle to feminist struggle" and often aims to challenge systemic structures of oppression (Sprague and Zimmerman, 1993, p. 266). Applied to this study, this epistemology guides the exploration of how gender norms become embedded in the operations of the chain and how gendered power relations traverse the commercial, social, and environmental dimensions of commodity chains. An important contribution of this feminist approach compared to other more classic paradigms is the significance it places on gender for the acquisition and justification of knowledge (Hesse-Biber, 2002).

Feminists also highlight the importance of reflexivity on the values, attitudes, and agenda they bring to the research process (Harding, 1993; Hesse-Biber, 2002).. Harding (1993) argues that throughout the research process, the researchers make subjective judgments in the formation of hypotheses, the design of research, the collection and interpretation and the way results are reported. The denial of these biases is not only unrealistic but undesirable. Reflexivity strengthens the processes of observation and data collection, as well as the development of theory from the empirical findings. To become more objective, researchers need to constantly reflect on the various ways in which their own history and positionality influence the creation of knowledge.

For these reasons, I made active efforts to focus on my positionality within the research process and to be reflexive throughout its different phases. I first developed preliminary research questions and a theoretical framework following a thorough literature review. These questions were also shaped by my identity as a female who menstruates and who has experienced some societal restrictions related to menstruation. During my fieldwork I revised and adapted my interview questions to reflect the new issues that emerged as I engaged more closely with research participants in the field. For example, the wide range of disposal practices and the challenges related to waste picking work, which hadn't come up my desk research and of which I was unaware. Moreover, I paid attention to the ways in which my identity inevitably influenced the process of data collection by shaping participants' responses and my own understanding of their contributions. To ensure participants felt comfortable, I made constant efforts to be polite, respectful, and transparent about the nature of the questions and the research. In addition, I strived to be aware of the ways in which my experience would impact the findings. For example, by documenting my emotions when hearing about the ways in which women in my sample

perceive and manage their menstruation in line with their own identities, preferences, and the resources available to them. Lastly, during the process of data analysis, I made further efforts to consider the extent to which my experience also influenced the selection and interpretation of observed trends and in turn, the main findings. An important consideration throughout the entire research process was the importance of acknowledging and accommodating different lived experiences, emotions, and feelings into the knowledge-building process, including my own.

Feminist researchers often use multiple methods to gain access to and understand the world around them. To implement the chosen retroductive logic of inquiry with a feminist epistemology, I use qualitative methods because these enable the development of knowledge about the social world and human experience that may be unattainable through quantitative analysis. Qualitative approaches can be used to describe a social phenomenon and to unpack the meanings people ascribe to activities, situations, events, or artefacts; including commodities (Levy, 2014). For this study, using a qualitative approach is key because data limitations inhibit quantitative analysis, but also because the former is better placed to capture the discursive and performative elements of gender norms that shape how individuals in different contexts understand and experience their menstruation and engage with menstrual products. The following section provides an explanation of how a GPN mapping and a comparative case study analysis align with the chosen research strategy and enable the required reflexivity and flexibility in the process of data collection.

4.2.1 GPN mapping

The first component of the research strategy is a GPN mapping. I used this to investigate the commercial activities that constitute the menstrual products chain, as well as the relations between global firms, local manufacturers, and key public and civil society actors that participate directly or indirectly in this chain. This type of mapping is useful for this study because, in line with the GPN approach, it goes beyond commercial interactions and takes into consideration the social norms and institutions in which commodity chains are grounded and which guide its operations. According to Kaplisnky and Morris (2002), given the complexity of commodity chains, when conducting a mapping of commercial interactions it is essential to select a point of entry that aligns with the primary research interest. This point of entry defines the links and activities in the chain that will be the subject of enquiry. For this study, the selected point of entry is the disposal stage. As discussed in Chapter Two, this is the stage where the relations between tensions and environmental impacts appear to be more easily observable.

4.2.2 Comparative case study analysis

This second component of the research strategy is a comparative case study analysis between two locations centred on how gender norms and commercial activities shape the disposal and waste management perceptions and practices of menstrual products. As Denscombe (2010, p. 55) puts it "the case study approach is best when the researcher wants to investigate an issue in depth and provide and explanation that can cope with the complexity and subtlety of real life situations." A comparative case study analysis extends the depth of the individual case study across several instances in time and/or space (Knight, 2015). This type of analysis strengthens the heuristic value of individual cases and the conclusions drawn from them by enabling an in-depth exploration of their shared circumstances (Hamel, 1993). However, these analyses share a common explanatory limitation, which is that they cannot prove the validity of generalisations beyond providing persuasive evidence in specific contexts (Knight, 2015). Nevertheless, it is precisely the closeness of the case study to real-life situations what makes it valuable for the development of a detailed view of the subject under study (Flyvbjerg, 2006). While results are specific for the location under investigation, this analysis can contribute to the cumulative development of knowledge if careful consideration is put into the selection of the cases; the use of multiple data collection methods; the triangulation of research methods, and post-fieldwork analysis.

A comparative analysis is of value to this study because I seek to explore how the gendered societal embeddedness of the menstrual products chain shapes the interactions between actors and, in turn, the outcomes of the chain on the environment. As discussed in Chapter Three, when exploring the embeddedness of the chain it is important to consider the diversity of geographical, social, and institutional contexts. Moreover, societal embeddedness is not linear, but a contested process constantly evolving through interactions between commercial and societal actors (Alford et al., 2017; Coe et al., 2008a; Pickles et al., 2015). Thus, selecting and comparing two locations is important in order to investigate the differences and similarities in the ways in which individuals understand and experience gender norms; as well as to shed light on the ways in which commercial activities related to menstrual products play out. A comparative analysis can also serve to explore the environmental impacts associated with disposal and waste management practices and perceptions, and the extent to which these impacts are connected to the diverse understanding of gender norms and variances in the operations of the chain.

Selecting locations in India

For this comparative analysis the aim was to select locations where the complexity of gender norms and commercial activities could be studied, and where environmental impacts could be observed and contextualized. In other words, the selection of the cases was done on the basis of their relevance to the research question and theoretical issues being examined (Yin, 2003). As discussed in Chapter Two, I selected India because evidence from various sources indicates that in this market the disposal of menstrual products provides an opportunity to explore tensions between gender norms and commercial activities, as well as how these relate to environmental impacts.

Today, India is the second biggest market for these products in Asia Pacific (Sanitary Protection in Asia Pacific, 2019) and, compared to other emerging markets that are also seeing growth in sales such as Brazil or South Korea (*Sanitary Protection in Brazil*, 2019; *Sanitary Protection in South Korea*, 2019). India is also the market with the greatest unmet potential for volume growth and where sales of these products are expected to increase even faster than other fast-moving consumer goods. What is more, in this country menstruation remains a strong taboo and societal perceptions continue to inform women's experience and understanding of their menstruation and, by extension, how they access and use menstrual products. Various studies have looked at the various restrictions that women face when menstruating, such as being forbidden from working, praying, having sexual intercourse, bathing, and washing their hair (Chothe et al., 2014; Garg et al., 2001; House et al., 2012; Kaur et al., 2018; Kumar and Srivastava, 2011). There is, however, limited research on the disposal of menstrual products. Research on the unhygienic ways and unsafe conditions under which many women in India manage their menstruation has also led to various efforts from different stakeholders to improve menstrual education and help women access menstrual products. For example, the Indian government is one of the few countries around the world to have developed national guidelines to address MHM. (Elledge et al., 2018). Lastly, different sources indicate that menstrual waste is becoming an important issue in the country, and that if sales continue to grow this waste can become a significant environmental problem. The combination of all these factors make India a sound case to study tensions empirically.

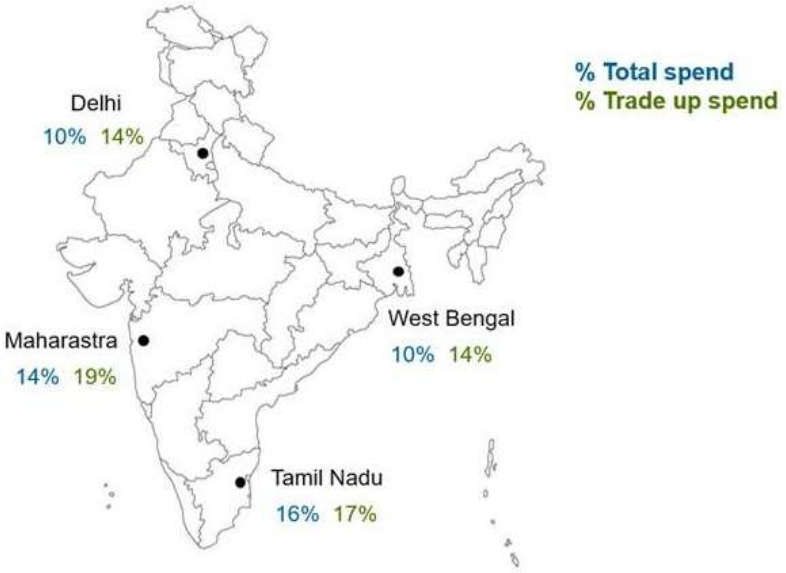
India is also an incredibly diverse country that has undergone significant changes over the last decades with the introduction of new economic reforms; yet, it also remains a country with multiple hierarchies rooted in caste, class, and gender (Harriss-White, 2015; Kapadia, 2014; Nielsen and Waldrop, 2014). Therefore, to maximise the explanatory potential of this study, sample locations were selected on the basis of the amount of expected information to be gathered (Flyvbjerg, 2006). A

purposive strategy was used to identify key interactions that could embody the patterns under study (Yin, 2003). This process of selection was informed by the GPN mapping; the statistical analysis of secondary data, and by desk-based research. The selection of locations was based on two main criteria: (1) the usage of menstrual products, and (2) the presence of menstrual waste. A location where product usage is low could shed light on the relation between gendered norms around menstruation and the challenges to access and use menstrual products. Contrarily, a location with high levels of product use is more likely to produce relevant insights on the practices and challenges around disposal and waste managements of these products. As for menstrual waste, there are limited assessments of this type of waste in India. Nonetheless, estimations of total tonnes of solid waste and evidence of the institutional or civil society efforts to address sanitary waste can be considered indicators of the growing importance of menstrual waste in different contexts. Table 4.1 illustrates how the selected locations in India i.e. Delhi and Pune, adhere to each criterion.

Table 4.1 Locations for comparative case study analysis

<table>
<tr><th>Location</th><th>A. New Delhi, Delhi</th><th>B. Pune, Maharashtra</th></tr>
<tr><td rowspan="2">Criterion 1. Significant usage of menstrual products</td><td>The percentage of urban women (aged 15-24) who use hygienic methods of protection during their menstrual period in urban areas is 90.3% (vs. the national mean of 77.5%) (NFHS-4, 2017).</td><td>The percentage of urban women (aged 15-24) who use hygienic methods of protection during their menstrual period in urban areas is 91.7% (vs. the national mean of 77.5%) (NFHS-4, 2017).</td></tr>
<tr><td colspan="2">This map shows the Indian states with the highest spend on menstrual products, as well as the highest trade up spend in this category. As can be seen Maharashtra, the state where Pune is located, ranks second, and Delhi ranks fourth.[22]</td></tr>
</table>

[22] This map was created using the statistical analysis described in section 4.3.1, the highlighted states are the top four from the 17 included in the dataset.

		
Criterion 2. Significant presence of menstrual waste	As of 2016, Delhi was the top solid waste generating city in India, producing 9,260 (tonnes per day). East Delhi's Ghazipur garbage dump stands at 65 metres tall is amongst the 50 biggest dumpsites in the world (Ahluwalia and Patel, 2018). Evidence suggests that the state is facing difficulties to cope with the environmental and financial sustainability of waste management, including sanitary waste (Kumar et al., 2017).	According to the Pune Municipal Corporation 5-6 tonnes of biomedical waste are generated in the city each day ("Waste Management Pune," 2016). In 2017, the SWaCH cooperative of waste pickers launched the Red Dot campaign to raise awareness of the hazards of unwrapped sanitary waste and to call for pads and diapers to be marked when disposed (Agarwal, 2017). SWaCH also reports that waste pickers in the cooperative handle approximately 20,000 kilograms of dirty diapers and sanitary pads every day (Karelia, 2017).

Source: Author, 2020

It is important to note that these two locations are different in important ways. Pune is a city in the western Indian state of Maharashtra, with a population of over six million. Delhi is India's capital territory in the north of the country, with a population of over 30 million ("World City Populations," 2020). What is more, it is estimated that only 25% of the population of Delhi lives in planned areas, and that approximately 50% live in slums and unauthorised colonies (Ganguly, 2019). Furthermore, in Pune the most common language is Marāṭhī, whereas in Delhi, Hindi is the most spoken language, followed by Punjabi, Urdu, and Bengali. These differences posed challenges to conduct fieldwork activities, including the need to expand the research team to include interviewers that spoke the main

spoken language, and to work closely with local partners to navigate the complexities of urban structures. These and other challenges, and the measures to overcome them are discussed in the next sections, especially in section 4.4.

This section provided an explanation on how a GPN mapping and a comparative case study analysis enable the investigation of tensions in the menstrual products chain in India. The GPN mapping is used to identify and explore the different commercial activities and the roles of different actors in the disposal stage of menstrual products chain. The comparative case study analysis investigates how these activities and gender norms shape the ways in which individuals dispose of menstrual products and manage menstrual waste in two different locations in the country. In addition, by exploring these practices I am able to investigate if and how they are related to environmental impacts. It is important to highlight that these findings are specific to the two locations under study and therefore cannot be used to generalise beyond this case. Nonetheless, they can yield important empirical and analytical insights that can advance the analysis of implications that gender transformations associated with the processes of commodification have for the environment. The next section will present the different research methods used for fieldwork for these two qualitative methodologies.

4.3 Research Methods

This section provides an overview of the research methods used for the GPN mapping and the comparative case study approach. The discussion elaborates on the methods used for data collection, the process for participant selection, and the research instruments used. This discussion also covers some of the challenges to conduct this research, including the need to coordinate and liaise with different organisations to recruit participants.

4.3.1 GPN mapping of the menstrual products chain in India

This first phase of research involved mapping the processes and actors that constitute the menstrual products chain in India. As discussed, this mapping was essential to develop an understanding of the commercial activities behind the disposal of menstrual products, as well as the actors that contribute to shape the disposal and waste management practices and perceptions associated with these products. In addition, it served to inform the selection of locations in India for the comparative case study analysis. This mapping was done through three methods: (1) documentary analysis, (2) statistical analysis, and (3) key informant interviews. The second of these methods entailed a quantitative analysis of market data.

Documentary analysis

The first step for the GPN mapping involved a documentary analysis of the global firms that operate in the country and how they organize the production, distribution, and marketing of menstrual products. Document analysis is useful to understand the explicit and hidden values in policies and organisational documents (Levy, 2014). Information was gathered by researching company websites and industry reports that offer a perspective on these firms' operations and their business strategies. A comprehensive internet search was also useful to map the presence of small scale manufacturers, NGOs, and government efforts related to menstrual products in India.

Furthermore, this documentary analysis served to collect existing information on the challenges that women in India face to manage their menstruation, as well as the environmental pressures that result from the use of these products in India. This was done via an exhaustive search of academic literature on menstruation-related issues in India, as well as a review of publications related to the environmental impacts associated with menstrual products.

Statistical analysis

The analysis of secondary market data was used to enhance the GPN mapping and complement the overall qualitative approach of this study. As discussed in Chapter Two, this analysis provides a more detailed overview of the commercial dynamics in India, including the drivers behind observed growth and market trends. It also serves to complement industry reports, which usually present these figures in an aggregated manner. Data on category penetration and trade-up dynamics is especially important to understand the role of firms in driving access to these products, as well as to provide more accurate assessments of the potential of environmental impacts to scale.

This analysis looked at household panel data, including 403,884 transactions from 31,960 households conducted between August 2015 to September 2017.[23] The data set also includes 45 product brands

[23] This data set was obtained from a global firm that manages one of the biggest consumer panels in India and tracks monthly purchases of fast-moving consumer goods (FMCG) at a household level. Permission to use this data was obtained on the conditions of not publishing its source or the results of the analysis, nor making use of these for profitable purposes. Even though the original data set covers 17 states, only limited data was shared at the state level.

with over 400 product types,[24] and households from SECs A, B, C, D/E.[25] Table 4.2 below outlines the relevant characteristics of the data set.

Table 4.2 Characteristics of panel data set

State	SEC	Age of women in household	Brand	Channel
Andhra Pradesh	A	Up to 24 years	Always	Kirana
Bihar (excluding Jharkhand)	B	35-44 years	Angela	Supermarkets
Chhattisgarh	C	45+	Be Sure	Chemist
Delhi	D/E		Bella	Door to Door
Gujarat			Besure	Online Shopping
Guwahati			Breezy	Outlet
Jharkhand			Butterfly	
Karnataka			Carefree	
Kerala			Don't Worry	
Madhya Pradesh			Feather	
Maharashtra			Femina	
Odisha			Freedays	
Punjab			Freel	
Rajasthan			Hush	
Tamil Nadu			Klin	
Uttar Pradesh			Komal	
West Bengal			Kotex	
			Kotex	
			Livefree	
			Lucky	
			Magic Touch	
			Natural Touch	
			O.B. Tampons	
			Pro-Ease Go	
			Saffy	
			Sakhi	
			Saral	
			She Comfort	
			Snowy Freedom	
			Soft Touch	
			Sofy	

[24] For example, the following 6 Whisper product types were considered: Whisper Maxi Without Wings 10 per pack; Whisper Maxi Without Wings 20 per pack; Whisper Extra Long 5 per pack; Whisper Extra Long 10 per pack; Whisper With Wings 5 per pack; Whispers With Wings 10 per pack.

[25] The SEC classification was created in 1988 to measure of socio-economic class and continues to be a commonly used market segmentation tool in India (Srivastava, 2012).

			Stayfree	
			Super Free	
			Tampax	
			Unbranded pads	
			Vneeds	
			Well Spring	
			Whisper	
			Wonder	
			WOW	

Source: Author, 2020

To analyse these data, sampling weights were used to correct for biases in the sample and ensure the collected data matched the reference population. Weights adjust the sample distribution based on key variables of interest and minimize the difference between these and 'known' population distributions (Yansaneh, 2008). In other words, weights reduce the probability that the estimates could be misleading because they do not include, or disproportionately include, certain segments of the population. These sampling weights are calculated by assuming a base weight[26] for each unit in the sample which accounts for their unequal probabilities of selection. In general, large population estimates that include a set of demographic characteristics, such as census data or high-quality government surveys, can be used for this calculation (Johnson, 2008). In this case the NFHS-4 was used as the population benchmark.[27]

Key informant interviews

The documentary and statistical analysis were also supplemented with a total of 34 in-depth interviews with 'key informants.' These interviews were selected for further data collection because they allow the researcher to gain different insights that are not usually available on secondary sources, such as opinions, feelings, emotions, and personal experiences on a given issue; as well as to discuss privileged information that only certain individuals may be privy to. A semi-structured format was used to allow a degree of flexibility that would enable interviewees to elaborate on points of interest and to speak more widely on the issues raised by the researcher (Denscombe, 2010). Semi-structured interviews also harness the knowledge-producing potential of dialogues by allowing follow up on any

[26] By definition, a probability weight is the reciprocal of its probability of being included in the sample due to its sampling design (Yansaneh, 2008).

[27] The 2015-16 National Family Health Survey (*NFHS-4*, 2017) is the fourth in the NFHS series and was designed to provide estimates of all key indicators at the national, state and district level. It covered a sample size of approximately 572,000 households and it was made public in February 2018 ("World Bank Data Catalog," 2019).

angles deemed important by the interviewee, and by giving the researcher the freedom of not being constrained by an interview guide (Levy, 2014).

Interviewees were selected using a combination of strategies, including purposive sampling and snowballing. The purposive selection was done based on the role of informants in the menstrual products chain; as well as their knowledge of the industry, waste management and sanitation initiatives in India, gender norms around menstruation, etc. Initial contact with some of the key informants was done through intermediary contacts from the University of Manchester and the Institute for Human Development (IHD) in Delhi.[28] WIEGO, a global research and policy network of worker associations, and the Global Alliance of Waste Pickers (GAWP), were also instrumental in facilitating meetings with representatives from waste pickers' associations, and NGOs working with women in India.[29] Other methods to approach interviewees included informal introductions at relevant industry events, and reaching out to individuals and organisations via online platforms such as LinkedIn and Research Gate. Snowballing techniques were used to find other key informants, including executives in lead firms and government officials, who can be harder to reach (Atkinson and Flint, 2001).

All semi-structured interviews were pre-arranged and conducted face to face at the participants' workplace or though the phone. Due to the busy schedules of most representatives from the industry and government, a flexible and persistent approach was crucial to secure these interviews. As depicted in Table 4.3 below, the interviews were conducted with nine representatives from global and local manufacturers; five government officials; 13 NGOs and civil society associations, and seven with academics and consultants. Having a wide-ranging selection of interviewees with different roles and insights also increased the possibility of source triangulation (Morgan, 1997).

Table 4.3 In-depth interviews for GPN mapping

Participant type	Interviewee type	Number of participants
Key expert	Academics	4
	Consultants	3

[28] The Institute for Human Development (IHD) is a non-profit autonomous research institution with offices in Delhi and was my host institution for the duration of my fieldwork activities.

[29] The WIEGO network has offices for their operations and finance teams in Manchester, which facilitated engagement with them and their country partners.

Public Sector	Municipal Corporation	2
	National Department	1
	International Organisation	2
Private Sector	Global Manufacturers	6
	Local Manufacturers	3
Civil Society Organisation	Association	6
	NGO	7
TOTAL		34

Source: Author, 2020

The following discussion gives more details on the type of commodity chain actors and stakeholders linked to the GPN who were interviewed and the type of data gathered:

Private actors: Semi-structured interviews were conducted with executives from three global firms in the menstrual products industry with operations in India, and three global firms with growing operations in the personal care, tissue, and hygiene categories in South Asia. The objective was to gather their perspectives on the market potential of menstrual products in India; as well as their views on the disposal challenges that consumers face and the impact that these products can have on the environment. One important limitation to note is that due to the confidential nature of company data, these interviewees were unable to share detailed figures on their sales or production costs, or information on their suppliers. These perspectives were complemented by interviews with local firms that manufacture low-cost products, predominantly in rural areas. These small scale manufacturers were also asked to share their views on the market dynamics in India; the main challenges that consumers face to access and dispose of menstrual products, and their perspective on the environmental impacts associated with these products.

Public actors: Semi-structured interviews were conducted with three officials in charge of management of waste and sanitation in India in order to understand the government's role in menstrual waste management and the ways in which local governments have engaged with waste pickers. Consultants who have worked with the local government in the assessment and deployment of waste management programs were also interviewed to gather their views on the effectiveness of the current systems, and the challenges and opportunities to improve said systems in light of the new Swachh Bharat Abhiyan or the Clean India Mission.

Civil society organisations: Semi-structured interviews were conducted with seven representatives of different NGOs working on different aspects of MHM in India. The objective was to gather their perspectives on the issues that consumers face when accessing and disposing of menstrual products in different contexts; as well as to understand the extent to which the environment is considered a priority in their existing programmes and initiatives. Semi-structured interviews were also conducted with leaders and representatives of associations of waste pickers to gather their insights on the ways waste pickers handle menstrual waste. These associations were asked to share their views on the challenges that waste pickers face to maintain their livelihoods and the opportunities to solve the management of sanitary waste in India.

Academics: Academics were interviewed to discuss their work on the menstrual hygiene agenda in developing countries, including the accessibility to menstrual products. These interviews also inquired whether disposal dynamics had emerged as a topic during their own research processes. I also asked for advice on how to approach the topic of menstruation with different groups of Indian women, especially those from lower income and educational backgrounds.

The next sub-section continues the explanation of the research methods and discusses those used for the comparative case study analysis.

4.3.2 Comparative case study analysis in India

Conducting a comparative case study approach requires gathering information about the different cases to develop explanations from this evidence. A qualitative approach allows the use of a variety of research methods to gain in-depth data; document multiple perspectives and experiences, and explore contested issues (Denscombe, 2010). This subsection explains the two qualitative research methods used to conduct the comparative case study analysis in India: focus groups and in-depth interviews. Important challenges related to these methods, such as language and interviewer effects, are discussed in the next section of this chapter.

Focus Groups

Focus groups were conducted with consumers and female and male waste pickers in both locations. The objective of these discussions was to understand consumers' perceptions of menstrual products and their usage and disposal practices. For waste pickers, the objective was to understand their waste management practices, and their perceptions of menstrual waste and menstrual products.

Focus groups were chosen as a research method because they allow participants to offer their views and opinions on a given topic while providing evidence on the similarities and differences in their opinions and experiences (Miles, 2013). As Morgan (1993) notes, the process of comparing different perceptions is a key source of insights into complex behaviours and motivations, and thus, one of the most valuable aspects of data collection in focus groups. This method offers the opportunity to analyse processes like attitude formation and decision making that are private and inherently unobservable. Focus groups also open the discussion to a wide range of topics that may not be considered initially by the researcher. An important limitation of this research method is the tendency towards conformity or polarization. In the former, participants can withhold things that they might say in private, and in the latter they might express more extreme views in a group than in private (Sussman et al., 1991). Therefore, constant awareness of these limitations is important to have during fieldwork activities and data analysis.

The following section provides an overview of the discussions conducted in Delhi and Pune, and a detailed description of the research instruments and sampling considerations.

Focus group discussions with consumers

Focus group discussions were conducted with 6-8 female consumers from urban and peri-urban areas in each location, Delhi (2) and Pune (2). Purposive sampling was used to select participants based on personal attributes that are relevant to the research (Denscombe, 2010). The main consideration for consumers was that they were females,[30] aged 15-45 (of menstruating age), and who regularly (every month) consumed menstrual hygiene products.

Secondly, participants were required to be from socio-economic levels C and D as defined by the original Indian SEC Classification.[31] This classification is based on the education and occupation of the chief wage earner of the household, which for most women is their husband or father if they are unmarried. While this classification has many limitations, it was used to identify those consumers who

[30] While this study recognizes that individuals who identify as men can be consumers of menstrual products, given the difficulty of recruiting this type of individuals in India; for the purpose of this investigation only women are considered consumers.

[31] The SEC classification was created in 1988 and ratified by Market Research Society of India (MRSI). In 2011, a new SEC system was released which considers the education of the chief wage earner but no longer the occupation. Instead, it measures purchasing power by assessing ownership of, or access to, a set of 11 different items, ranging from electricity to washing machines (Srivastava, 2012).

are able to purchase menstrual products, and who are more likely to have lower education levels. I assumed that these groups of consumers would reveal important insights because, even though they can use menstrual products regularly, they are also less likely to have enough information on menstruation and menstrual products and more likely to rely on social norms to guide their practices and choices. Moreover, the statistical analysis revealed that households in SECs C and D are most likely to become new category buyers of these products. It is expected that by 2030, India will add about 140 million middle-income households to the economy, which are expected to add $2 trillion of spend by upgrading to packaged, branded or higher priced offerings, especially in personal care (59% of the total) (*Fast-Growth Consumer Markets*, 2019). Therefore, understanding the perceptions and practices of some consumers in this socio-economic group can elucidate practices that are likely to also be followed by other individuals in middle-income households who are rapidly gaining access to these products. Exploring the adverse environmental impacts associated with the practices of consumers in this group can also help to better understand the potential of these impacts to scale.

Another important consideration in this sampling was the distinction between urban and peri-urban consumers. Immigration and the growing demand for work and residential spaces has led to an important transformation in urbanisation dynamics in India, and to the creation of a 'peri-urban' areas. This peri-urban areas are characterised by a "juxtaposition of rural and urban activities and institutions, along with institutional ambiguity, unplanned growth and poor infrastructure" (Marshall and Randhawa, 2017, p. 6). There are two ways to define urban areas in India, one is administrative and applies to 'statutory towns' and 'urban bodies.' The other is demographic and economic and recognises certain settlements which are referred to as 'census towns'.[32] These towns are not granted urban civic status and are governed by rural local bodies (Shaw, 2005). According to the latest 2011 census, 57% of the urban population in India lives in the expanding peripheries of cities in either 'statutory towns' or 'census towns' (Marshall and Randhawa, 2017). In practice, this definition means that even though a lot of these settlements are 'organically' part of neighbouring cities, they do not have the provision of services such as water supply, garbage collection, street cleaning, lighting, etc. because these services are not part of the responsibilities of rural bodies (Marshall and Randhawa, 2017; Shaw, 2005). Therefore, many of these peri-urban areas lack structures for waste disposal which results in pollution that can significantly affect residents (Aijaz, 2019; Prakash, 2004). Since the lack of waste management infrastructure could pose challenges for the disposal of menstrual products, I also

[32] Census towns are settlements with a population of more than 5,000; a population density of 450 persons per square kilometre, and where three-fourths of the male workforce is dedicated to non-agricultural activities.

expanded my sample to include individuals living in peri-urban areas. This was also meant to ensure that important findings were not overlooked by focusing only on more easily accessible urban centres.

It is important to note that gaining access to consumers in SECs C and D was not a simple task. Most of the women in these socio-economic groups have busy lives which include household chores, taking care of young children and the elderly, and sometimes part-time jobs (IDI-K6).[33] Recruitment of participants in Pune took place in local markets of targeted neighbourhoods. In Delhi, given the size and the complexities of the urban and peri-urban centres, recruitment was done with the support of two NGOs (Azad Foundation and Project Baala) working to improve women's health and their economic opportunities.[34] Contact with these NGOs was established through researchers in IHD, and through referrals from key stakeholders interviewed. Moreover, based on the assumption that social networks consist of groups with relatively homogenous social traits, snowballing techniques were also used as a strategy to recruit participants (Atkinson and Flint, 2001). In other words, the initial pool of women recruited through NGOs and at market places were asked to provide referrals to their neighbours and friends. A brief screening questionnaire was used to ensure that the referred participants met the pre-defined sample characteristics and were willing to discuss the topic (see Appendix Two). Since menstruation remains a taboo topic in India, this questionnaire also inquired for participants' willingness to discuss menstruation with the research team and/or in front of other women.

Flexibility was indispensable to conduct these discussions because participants were not always on time or had to leave before the discussion was over. It was also common for women to bring their children with them, which could be a distraction for the group, in which case they had to be asked to withdraw from the discussion. To mitigate the risk of not having enough participants for each discussion, and following Morgan's (1997) rule of thumb of 20% over recruitment, 10-12 individuals were recruited for each session. The homogeneity in the composition of focus groups was also planned to avoid wide gaps in social background or lifestyle that can prevent participants from feeling comfortable speaking in front of each other (Morgan, 1997). Lastly, when considering locations for these discussions, priority was given to spaces that were easily accessible by participants and could

[33] This source is an interview conducted during this study; the coding for this and other in-depth interviews with key stakeholders is explained in section 4.4.3.

[34] Azad Foundation aims to equip resource-poor women with knowledge and skills to help them find employment and become entrepreneurs. Project Baala conducts awareness trainings on women's health and hygiene, including menstrual hygiene. Working with NGOs to recruit participants can introduce certain biases in the sample, the ways these and other biases were identified and addressed is discussed in section 4.4 in this chapter.

guarantee privacy for the discussion. In most cases, private houses were used, which were secured with the help of the NGOs and the research team. The following table (4.4) depicts a summary of the focus group discussion conducted with consumers in Delhi and Pune.

Table 4.4 Focus groups with consumers

FGD number	Number of participants	Location
1	8	Urban Delhi
2	8	Peri-urban Delhi
3	8	Urban Pune
4	8	Peri-urban Pune
Total sample: 32		

Source: Author, 2020

A research instrument was developed for these discussions and used across all groups to ensure data comparability and to avoid compromising the explanatory power of the analysis by collecting information that was not directly relevant for the research questions (Miles, 2013). These guidelines provided a clear progression of questions to cover the topic under study (see Appendix Four). The first section included an introduction to the research project and an icebreaker to allow participants to introduce themselves and to enable the moderator to conduct a profiling of the group. The following two sections focused on the usage and disposal of menstrual products, and the social norms around menstruation. This included sample questions to help the moderator direct the discussions toward concrete accounts of participants' experiences, as well as prompts for aspects participants may have overlooked. The third and last section included questions to gather participants' views on the environmental impacts associated with the disposal of these products. Each focus group lasted approximately 90 minutes, in addition to time used to briefly explain the project and to familiarise participants with the consent form they were required to sign.

Focus group discussions with waste pickers

Focus group discussions were conducted with 6-8 waste pickers, female and male, in urban and peri-urban areas in each location, Delhi (2) and Pune (2). Purposive sampling was also used to select participants based on personal attributes relevant to the research. Participants were selected due to their occupation, and whether they had engaged with soiled menstrual products in the previous month before the discussion. This sample included both male and female waste pickers. Male waste

pickers were included in the sample because they also play an important role in waste management, and because their perspective was instrumental to assess the extent to which taboos and societal perceptions around menstruation influence practices related to the management of menstrual waste. Collecting perspectives from different informants also allowed data triangulation and a deeper understanding of the ways in which different actors participate in waste management in India.

An important consideration in the selection of participants was urban and peri-urban distinction because, as explained above, the latter areas house a significant proportion of the population in India and often lack infrastructure, which is why environmental impacts are more likely to be observed there (Marshall et al., 2009; Prakash, 2004; Shaw, 2005). It is also common for immigrants from rural parts of the country, including waste pickers, to live in these areas (IDI-K6).[35] The growing demand for work and residential spaces has been driving the emergence of unauthorised colonies in the neighbouring areas of new developments to accommodate construction workers, domestic help, and waste managers (Aijaz, 2019).

Recruitment of participants was facilitated by local waste pickers' associations, two in Delhi (Bal Vikas Dhara and All India Kabaddi Mazdoor Mahansangh), and a cooperative of self-employed waste pickers in Pune (SWaCH). Contact with local associations was established through WIEGO and the GAWP. Participants were also recruited through Chintan, an environmental research and action group that provides training to waste pickers and that works closely with Safai Sena, a prominent association of waste pickers in North India. Moreover, in an effort to widen the composition of the sample, snowballing techniques were used as a strategy to recruit waste pickers that did not belong to any associations. In other words, waste pickers recruited through associations and groups were asked to refer their colleagues and friends who were not affiliated to any association.[36] Similarly to consumers, a screening questionnaire was used to ensure that the participants referred met the desired profile, and that they were willing to speak about menstruation and related topics with to the research team and in front of others (see Appendix Three).

Homogeneity was planned in the composition of focus groups to encourage free-flowing conversations among participants. When considering potential locations priority was given to spaces

[35] See footnote 34.

[36] Working with local waste pickers' associations to recruit participants can introduce certain biases in the sample, the ways these and other biases were identified and addressed is discussed in section 4.4 in this chapter.

that were easily accessible by participants and could guarantee privacy for the discussion. It was also important to secure a venue that was not too dissimilar to their day to day environments in order to help participants feel comfortable. In most cases, spaces were suggested and secured by the associations of waste pickers who understood the needs of their members. For these discussions, 10-12 individuals were recruited for each session; flexibility was also essential given that participants sometimes failed to be on time or to show up. It was also common for female waste pickers to bring their children with them. As explained before, this meant some women were unable to participate properly, and hence their responses could not be included in the analysis. The following table (4.5) provides a summary of the focus group discussions with waste pickers conducted in Delhi and Pune.

Table 4.5 Focus groups with waste pickers

FGD number	Gender	Number of participants	Location
1	Female	8	Urban Delhi
2	Female	5	Peri-urban Delhi
3	Female	5	Urban Pune
4	Female	7	Urban Delhi
5	Female	7	Urban Delhi
6	Female	8	Peri-urban Pune
7	Female	9	Peri-urban Pune
8	Female	10	Peri-urban Pune
9	Male	5	Urban Delhi
10	Male	8	Urban Pune
Total sample: 72			

Source: Author, 2020

Two research instruments were developed for these discussions and used across all groups (See Appendix Five for the instrument for female waste pickers and Appendix Six for the instrument for male waste pickers). The first section included an introduction to the research project and an ice-breaker to allow participants to introduce themselves and to enable the moderator to conduct a profiling of the group. The following two sections focused on waste picking activities and the management of waste from menstrual products. These included sample questions to help the moderator direct the discussions toward concrete accounts of participants' experiences, as well to

prompt for items participants may have overlooked. Female waste pickers were also asked to share how they managed their menstruation and how they dispose of menstrual products if they used them. In the last section all participants were asked for their views on the impacts of these products on the environment and on their livelihoods. Each focus group lasted approximately 90 minutes, in addition to time used to briefly explain the project and to familiarise participants with the consent form they were required to sign.

In-depth interviews

In-depth interviews were also conducted with consumers and waste pickers from urban and peri-urban areas in both locations. The objective of these interviews was to deepen the understanding of their perceptions and practices to dispose of and manage waste from menstrual products. These individual in-depth interviews were used to further explore issues that came up during focus group discussions, including the motivations behind some of the reported practices. This method also helped to better understand the day-to-day life of the interviewees based on the descriptions provided by them. In addition, individual interviews allowed for more confidentiality to study aspects of people's lives that are personal, sensitive or even taboo because it made it easier for the interviewer to create an atmosphere of trust and discretion (Levy, 2014). This was particularly important to overcome the reservations that some women had on speaking about menstruation. A semi-structured format was used because it provides a degree of flexibility that allowed interviewees to elaborate on points of interest and to speak more widely on the issues raised by the researcher (Denscombe, 2010).

The following section is an overview of the number of participants covered, and a detailed description of the research instruments and sampling considerations for these interviews. Other challenges to conduct these discussions are addressed in section 4.4.

In-depth interviews with consumers

In-depth interviews were conducted with 35 consumers from urban and peri-urban areas in each location: Delhi (18) and Pune (17). The same purposive sampling strategy used for focus groups was used to select participants for these interviews. They were also recruited in the same way as participants for the focus group discussions. A brief screening questionnaire was used to ensure participants were from the targeted SEC brackets and comfortable discussing menstruation (see Appendix Two).

To ensure data comparability and to collect relevant information for the research questions, a research instrument was developed for these in-depth interviews and used consistently for all interviews (see Appendix Four). This interview guide was structured in three main sections, the first included a brief introduction to the project and an icebreaker, which entailed discussing the participants' backgrounds, their daily routines, as well as their purchase patterns of personal care products. The second section focused on consumers' main concerns and challenges to manage their menstruation, including social considerations; as well as their purchase and usage habits. This section also addressed participants' disposal practices and the motivations behind them. The third section included questions on participants' perceptions on the environmental impacts associated with the disposal of these products. Unlike the guide for the focus group discussions, this instrument allowed more time to make participants feel comfortable; more questions to help participants elaborate on their views, as well as prompts for them to share personal stories that could help portray their feelings and behaviours.

Each in-depth interview lasted approximately 60 minutes, in addition to time used to briefly explain the project and to familiarise participants with the consent form they were required to sign. When considering potential locations, priority was given to spaces that were easily accessible by participants and could guarantee privacy for the discussion. In many occasions, these interviews took place in participants' homes or in the offices of the NGO that assisted in the recruitment. The following table (4.6) provides a summary of the in-depth interviews conducted in Delhi and Pune.

Table 4.6 In-depth interviews with consumers

Location	Number of Participants
Urban Delhi	10
Peri-urban Delhi	8
Urban Pune	10
Peri-urban Pune	7
Total sample: 35	

Source: Author, 2020

In-depth interviews with waste pickers

In-depth interviews were also conducted with female and male waste pickers from urban and peri-urban areas in each location: Delhi (18) and Pune (17). Male waste pickers were also included in the sample to collect various perspectives on the gender norms behind menstrual waste management. The same purposive sampling strategy used for focus groups was used to select participants for these interviews. They were also recruited with the assistance of waste pickers' associations and snowballing techniques. A brief screening questionnaire was used to ensure they had engaged with menstrual waste recently, and that they felt comfortable discussing menstruation (see Appendix Three).

Two research instruments were developed for these discussions and used across all groups (See Appendix Five for the instrument for female waste pickers and Appendix Six for the instrument for male waste pickers). These instruments had four main sections, the first section included an introduction to the research project and an icebreaker which entailed discussing the participants' backgrounds and their daily routines. The second section focused on waste picking activities in general, and the third on the ways participants handle waste from menstrual products, including the challenges they face and the difference in the roles of men and women. Female waste pickers were also asked to share how they manage their menstruation and how they dispose of menstrual products. In the last section all participants were asked for their views on the environmental impacts associated with menstrual waste and how this waste impacts their livelihoods. Unlike the guide for the focus group discussions, this instrument allowed more time to make participants feel comfortable; more questions to help participants elaborate on their views, as well as prompts for them to share personal stories that could also help portray their feelings and behaviours. Each in-depth interview lasted approximately 60 minutes, in addition to time used to briefly explain the project and to familiarise participants with the consent form they were required to sign. When considering potential locations, priority was given to spaces that were easily accessible by participants and could guarantee privacy for the discussion. In many occasions, these interviews took place in the offices of waste pickers' associations. The following table (4.7) provides a summary of the in-depth interviews that were conducted in Delhi and Pune.

Table 4.7 In-depth interviews with waste pickers

Location	Number of female participants	Number of male participants
Urban Delhi	7	3
Peri-urban Delhi	5	3
Urban Pune	6	4
Peri-urban Pune	5	2
Total sample: 35		

Source: Author, 2020

This section presented the research methods used to for the empirical analysis of the disposal stage of menstrual products in India. The analysis utilises a wide variety of methods, including documentary analysis, semi-structure interviews, and focus group discussions in line with the two selected qualitative methodologies. The quantitative analysis of market data is also used to complement this approach. Using different methods was key to collect various perspectives from different informants; to better capture differences and similarities, especially on the role of gender norms, and to allow for better data triangulation. The following section elaborates on the challenges that I had to overcome when implementing these methods in fieldwork activities.

4.4 Challenges and ethical issues

Reflexivity is a core concept in the qualitative research and refers to the need to consider how power and bias can affect the research process. This includes examining the validity of participants' representations and demonstrating that the researcher monitored her own values and preferences, which may have influenced participants and the collected data (Levy, 2014). This section examines the important challenges associated with reflexivity, as well as other cultural and ethical considerations that guided this research.

4.4.1 Language and gender

The semi-structured interviews with key stakeholders were conducted in English as all respondents were fluent or comfortable enough in this language. However, for the interviews and focus groups with consumers and waste pickers, eight Indian research assistants were recruited. Four fluent in Hindi (two males and two females) for the interviews and focus groups conducted in Delhi, and four fluent

in Marathi (two males and two females) for the interviews conducted in Pune. For each discussion or interview, one researcher assistant acted as the moderator, while the other translated the discussion for the main researcher. All research assistants were selected based on their qualifications in terms of experience conducting qualitative research and on their interest on the research topic. The applicants were recommended by the Institute for Human Development (IHD) with offices in Delhi. The selected research assistants were required to read and understand the UREC guidelines regarding confidentiality and to sign a Confidentiality Agreement. They were remunerated at a local rate.

In addition, since the topic of menstruation remains a strong taboo in India, to ensure that all participants felt comfortable, separate discussions were organised for female and male participants. For the focus group discussions and interviews with consumers and female waste pickers, the facilitator and translator were female. For the focus group discussions and interviews with male waste pickers, the facilitator and translator were male. This decision was informed by the understanding that men, in general, would not feel comfortable discussing the issue of menstruation with a woman or if a woman was present. It must be noted that since I am female, I was not able to be in the same room as male participants so the discussion had to be live streaming to a different room. This was meant to ensure privacy for the male participants and the moderator while enabling the main researcher to hear and observe the translated discussion, and indirectly intervene if necessary.

4.4.2 Interviewer effects

A researcher's identity inevitably influences participants and consequently the data collected from them. The researcher's age, sex and ethnicity can affect the amount of information participants are willing to share and their degree of honesty. "Interviewees and interviewers, have their own preference and prejudices, and these are likely to have some impact on the chances of developing rapport and trust during an interview" (Denscombe, 2010, p. 178). The effect of the researcher's identity is particularly important when the topic being discussed is of a sensitive nature, as this might make participants feel embarrassed, defensive, or lead them to alter their responses to what they think fulfils the researcher's expectations (Denscombe, 2010). To address this, I and the research team made constant efforts to be polite, respectful, and transparent about the nature of the questions and the research. Attention was also paid to self-presentation by adopting a passive and neutral stance and wearing clothing that did not standout or antagonize the interviewees. In addition, constant reflections on the effects of these biases were documented and referred to when analysing the collected data.

An important bias that emerged by working with NGOs and waste pickers' associations for the recruitment, is that a certain profile of participants is likely to be overrepresented in this sample. For example, working with Azad Foundation, an NGO that helps women find employment, entailed that the majority of consumers in those interviews were older, mostly married and with children. This meant that the perspectives of unmarried and younger women might not come across as strongly in the data gathered. Moreover, while snowballing techniques were also used as a strategy to recruit participants from vulnerable or hard to reach social groupings, this technique can create a biases in the sample by considering participants with similar backgrounds and perceptions (Atkinson and Flint, 2001). For example, working with SWaCH in Pune meant limited access to male waste pickers because the association has mostly female members. What is more, when recruiting male waste pickers, the majority were relatives of female members of the association, which meant they had knowledge of this type of associations or were members of one themselves. On the other hand, it is important to note that when representatives of the associations introduced the research team, participants were more likely to be open and responsive. When working with Chintan, where representatives did not take as active a role in the process, waste pickers were found to be more reluctant to engage and more impatient.

The risk of these biases was mitigated by carrying out multiple waves of recruitment of participants to ensure diversity in the sample, and by using a screening questionnaire to ensure participants met the desired profile. The composition of the sample was also kept in mind when analysing the findings. This study explicitly recognises that any observed trends pertain to these specific groups and cannot be taken to reflect the complete spectrum of experiences and opinions of consumers of menstrual products and waste pickers in India.

4.4.3 Research ethics

Ethical considerations were essential for this research, which involved direct interaction with human participants, as well as questions around potentially sensitive topics such as income, health, and menstruation. The primary research design was reviewed and approved by the University of Manchester research ethics committee (UREC). To offset this risk of potential dangers of deception or misrepresentation, and in accordance with the research ethics procedure of the University of Manchester and the Economic and Social Research Council's (ESRC) ethical framework for conducting qualitative social science research, prior and informed consent of all research participants was obtained. Participation was voluntary and participants received a Participant Information Sheet (PIS), which outlined the objectives of the research, how their personal data would be safeguarded, as well

as my contact details and those of the University of Manchester in case they had further questions or queries. They were also requested to sign or put their mark in a Consent Form indicating they had received sufficient information about the research before they took part in it. The PIS and Consent Forms were translated into local languages and verbally explained if participants had limited literacy skills. The privacy, confidentiality, and anonymity of participants were ensured at all times.

Participants were also asked to give consent for the audio recording of discussions, which only took place if they were comfortable with this process. To ensure confidentiality, all collected data was anonymised within 24 hours. Personal identifiers were subsequently removed from the final transcripts. All recordings were transcribed verbatim and translated into English by the research assistants.[37] During the research process these data was stored on software-encrypted USB devices and securely encrypted laptops. After fieldwork was concluded, the recordings were destroyed, and the collected data were transferred to password protected drives. In accordance with the University of Manchester's retention schedule, this anonymised data and consent forms will be stored for a maximum of 5 years. Table 4.8 shows the codes used to de-identify data from individuals. These participants' IDs are only known to the research team and are used to reference specific interviews and focus group discussions in the reporting of the research findings in subsequent chapters.

Table 4.8 Codes for participants' IDs

Research Method	Actor	Location	Area
Focus group discussion - 'FGD' In-depth interview – 'IDI'	Consumers – 'A' Waste pickers – 'B' Key informant – 'K'	Delhi – 'D' Pune – 'P'	Urban – 'U' Peri-urban – 'P'

Source: Author, 2020

In addition, an important ethical consideration for this study was participants' vulnerability to harm. As Sieber (1992) notes, vulnerable persons and institutions such as those who lack resources or who are stigmatized are more likely to suffer from harm, and thus, adequate measures must be taken to try to mitigate this risk. In order to address this issue, a respectful attitude was maintained by the research team at all times, and the discussions were redirected if participants showed signs of feeling uncomfortable. Participants were also reminded that they could withdraw from the session at any

[37] An important challenge in transcribing the recording of FGDs verbatim before translation was identifying the specific responses that belong to each participant. For this reason, in the analysis in the following chapters some quotes are attributed to a FGD, rather than to individual participants.

time and without any repercussions, and that they had the responsibility of respecting the privacy of other participants; they were requested not to repeat what was discussed during the FGDs outside of the session. Individuals can sometimes 'open up' about a private or sensitive aspect of their life but this might not be something they want repeated outside the context of the discussion (Denscombe, 2010).

This section has examined the main challenges of conducting research with consumers and waste pickers in Delhi and Pune. Since menstruation remains a strong taboo topic, separate discussions were needed for female and male participants, and female and male moderators and translators were required. Other important risks of bias considered include the use of snowballing techniques to recruit individuals, as well as interviewer effects when collecting the data. Ethical considerations were also in place along the research process to get participants' consent and ensure the confidentiality and privacy of their personal data.

4.5 Data analysis and interpretation

This section outlines the methods used to analyse the data gathered through the research methods outlined above. The primary data collected from interviews and focus groups was organised, coded, and classified using the data analysis software NVivo 12. Coding served to retrieve similar data units and to cluster these into segments relating to a particular research question. Afterwards the interrelationships between clusters were analysed to draw preliminary conclusions. Following Saldaña's (2016) coding manual for qualitative researchers, two types of codes were generated for this initial analysis: *descriptive* and *in Vivo*. The former serves to label data in a short way that summarises the basic topic of a passage. The latter entails using short phrases from the participants own language that reflect regularities or patterns worth analysing; these are placed in quotation marks to differentiate them from the researcher generated codes. After ensuring codes were not redundant, these were clustered into categories that identified the broader process at play. These categories were then used to establish patterns and themes that gradually became theoretical constructs (Miles, 2013). It must be noted that this was an iterative process that required repeated cross checks between the original transcripts and notes from the sessions.

Furthermore, any identified trends were cross-analysed within and across interviewees, as well as across locations via triangulation in order to detect potential contradictions. Lastly, an additional cross checking exercise was conducted with information obtained from the literature review during the documentary analysis to ensure the data from primary sources was analysed along relevant

geographical, commercial, and social considerations. Verifying data across sources was crucial to ensure the trends observed were consistent and that these findings make a valuable contribution to the wider GPN, FPEcon and FPEcol literatures. Appendix Seven illustrates the processes of condensing codes and transforming them into emergent themes by showcasing some examples from this study.

The aggregate data derived from in-depth interviews with consumers and waste pickers in Delhi and Pune is presented in Chapters Five and Six with the objective to compare the relative frequency of the different responses that were recorded. These aggregate figures are for illustrative purposes only, and cannot be interpreted as representative of the views of the wider population of women using menstrual products or waste pickers in India. The methodology used for this aggregation is described in Appendix Eight. It is important to note that when transcribing the recordings of FGDs, it was not possible to identify which responses belong to which participant. For this reason, data from these discussions is not considered in the aforementioned aggregation. Nonetheless, excerpts from the discussions in FGDs are used in following chapters to exemplify points raised by participants and support the main findings.

4.6 Conclusion

This chapter has detailed the research methodology used to empirically investigate the main research question of this study: *How do tensions between gender norms and commercial activities configure environmental impacts, and what are the implications for the disposal of menstrual products in India?*

This study follows a retroductive research strategy, with a combination of constructionist and structural ontologies, and a feminist epistemology. To implement this strategy, qualitative methodologies were chosen because these enable the development of knowledge about the social world by considering the uniqueness of specific contexts, as well as the discursive and performative elements of gender norms. For this study I used two main qualitative research methodologies and complemented them with a quantitative analysis of secondary data. The first is a GPN mapping to explore commercial activities, and the roles and relations between commercial and non-commercial actors in the menstrual products chain in India.

The second research methodology is a comparative case study analysis to investigate the factors that shape perceptions and practices around disposal and waste management of menstrual products in India, and how these are linked to environmental impacts. Pune and Delhi were selected as the two main locations for this analysis on the basis of their relevance to the analytical issues under study. In

line with the two proposed qualitative methodologies, the analysis utilises a wide variety of research methods, including documentary analysis, in-depth interviews and focus group discussions; as well as a statistical analysis of household panel data. This chapter also discussed the methods used to organise and analyse the collected data, and the measures taken to ensure the validity of the findings, such as triangulation of responses and other ethical considerations.

The next two chapters will present the findings from my fieldwork activities and discuss how these answer the research sub-questions about the ways in which tensions manifest in the menstrual products chain in India and how these are related to the environment.

5 Tensions in the disposal of menstrual products in India

5.1 Introduction

This chapter investigates how tensions between gender norms and commercial activities unfold in the disposal stage of the menstrual products commodity chain in India, and how these are connected to environmental impacts. This chapter addresses the second research sub-question of this study: *How do tensions between gender norms and commercial activities shape consumers' disposal practices and perceptions of menstrual products in India, and what is the connection between these practices and adverse environmental impacts?*

In Chapter Two I argued that *tensions* between commercial activities and gender norms can have implications for the environment that remain understudied. The review of literature in that chapter also showed tensions can be explored empirically by looking at the disposal and waste management practices of menstrual products in India. As explained in Chapter Four, this was done through a GPN mapping of the commercial activities of the menstrual products commodity chain in India and a comparative analysis of consumers' practices between two locations in the country: Pune and Delhi. In this Chapter I unpack these findings by applying the framework I developed in Chapter Three, which introduced a gender lens to the GPN framework in order to examine the relations between commercial and non-commercial actors, and how they understand, experience, and prioritise gender norms in their actions.

This analysis shows that the while the processes of commodification can transform gender norms; in India, the increased access to menstrual products is not necessarily leading consumers to challenge the societal perceptions of how menstruation should be managed. The insufficient efforts from actors in this chain to address disposal considerations is also a reason why these norms remain a prevalent influence in consumers' practices and perceptions. In this sample, the limited information and education that consumers receive makes them more likely to continue to associate these products with notions of shame, dirt, and harm. For these reasons, I argue that tensions can lead consumers to adopt new ways to dispose of menstrual products that compound the adverse environmental impacts of these products. These findings also raise questions about the reasons why gender norms prevail in this stage of the chain, and show the need to investigate the role that different actors need to play to transform these norms and change the practices that generate adverse environmental impacts.

The second section of this chapter discusses the findings of the comparative analysis of consumers' practices and perceptions in India. The third, looks at the empirical mapping of the role of actors in this chain. The fourth builds on these findings to analyse how tensions manifest in the ways menstrual products are disposed of. The fifth section then explores how disposal practices lead to adverse environmental impacts and discusses how this analysis advances the exploration of tensions in relation to the environment. The sixth section concludes.

5.2 Unpacking tensions in the disposal of menstrual products

As discussed in Chapter Three, the concept of *societal embeddedness* as applied in the GPN framework can be used to investigate how commercial activities play out in different contexts within varying social norms (Barrientos, 2014a; Coe et al., 2008a). With a gender lens it can be used to explore how gender norms are understood, experienced, and prioritised by different actors in the chain. This concept is central for this study because it recognises that, by virtue of its embeddedness in a given societal context, gender norms are constantly configuring and being configured by different actors and their interactions in commodity chains. In line with this approach, this section discusses the findings from to comparative analysis of consumers' practices and perceptions across two different locations in India. I explore the differences and similarities in the ways consumers dispose of menstrual products and how these disposal ways are shaped by taboos and societal perceptions around menstruation.

5.2.1 Consumers' usage and disposal practices and perceptions of menstrual products

As discussed in Chapter Two, in recent years, the expansion of the menstrual products commodity chain has meant that accessibility to these products has grown significantly in India. In this section I present aggregate data derived from the responses of users of menstrual products ('consumers') in in-depth interviews undertaken in Delhi and Pune. The methodology used for this aggregation is described in Appendix Eight. It is emphasized that the data is illustrative only, and serves to compare the relative frequency of the different responses that were recorded. These aggregate figures cannot be interpreted as representative of the views of the wider population of women in India using menstrual products.

In my analysis, I found that menstrual products are becoming more available and more affordable for consumers, including those from socio-economic levels C and D in urban and peri-urban areas, who are the selected sample for this study. Findings from the comparative analysis further corroborate this and show that consumers in Delhi and Pune are able to regularly purchase these products, yet they

tend to purchase only one package at a time because they cannot afford to buy more than one each month (FGD-ADU1, FGD-ADP1, FGD-APP1).[38] However, another important reason for purchasing one package at a time is that consumers feel the need to hide these products from their relatives and kids. In this sense, storing one package is easier, especially when living in closed quarters with an extended family.

The majority of the consumers in both locations also reported preferring to shop in medical stores because, unlike supermarkets, sellers in these stores wrap the pads in newspaper to conceal them. This is consistent with the analysis of household data presented in Chapter Two, which showed *kiranas* and chemists are more popular among consumers than supermarkets. Some consumers also prefer not to buy menstrual products if men are around or if there is no female attendant in the shop. This was illustrated by interviewee comments: "*Sometimes there are other customers also standing there so you feel very much shy and also there are young teenage boys at the shop so I don't like asking for the packet*." (IDI-APU4). "*I feel shy to buy it. I wait, when I hear the voice of aunty in the shop then I go downstairs and buy it*." (IDI-ADU2). "*If there are ladies then I buy it from there. If gents are there, then I won't buy it at that time. I know the time when she is standing, she stands at 10 am so I buy at that time*" (FGD-ADP4).

When asked about the reasons for buying menstrual products through in-depth interviews (IDIs), 80% of consumers shared that absorbency is one of the most relevant product attributes. For consumers in this sample, larger sizes are perceived to provide more confidence that leaks will not occur, and also reduce the need to change products as often. Table 5.1 below shows that one of consumers' biggest concerns is that products will stop absorbing and that blood will leak through their clothes, putting in evidence that they are menstruating (FGD-ADU1, IDI-ADU3, IDI-ADP3, IDI-APU4, IDI-APP7). Other attributes like packaging and brand name were not reported as important elements when choosing a product. In fact, many consumers were not able to name the brand they most frequently used (FGD-ADP1, IDI-ADP1, IDI-APU4, IDI-APU5, IDI-ADP8). These results show that in both locations consumers have similar concerns around menstruation and in turn, similar views of the attributes that menstrual products should have.

[38] Consumers in this sample reported that the cost of one package of menstrual products containing on average 8 items ranks between INR 30- 40 (~£ .4).

Table 5.1 The reasons why consumers purchase menstrual products

Response	Delhi	Pune	Total (%)[39]
It absorbs blood flow better	15	13	87%
It is cleaner and more hygienic	6	9	43%
It avoids stains on clothes	11	13	69%
It feels more comfortable	2	3	14%
It doesn't cause rashes/ irritable skin	3	2	14%
It doesn't cause infections	2	1	9%
It prevents bad odour	1	0	3%
It is easier to use than other products or cloth/rags	5	3	23%
It is easier to dispose than other products or cloth/rags	2	1	9%
IDIs total sample	34	33	

Source: Author, fieldwork 2018-2019 (-ADU; IDI-ADP; IDI-APU; IDI-APP).

Consumers' disposal practices and perceptions in Delhi and Pune

As depicted in Table 5.2, in both locations, the most common disposal method is to wrap menstrual products in newspaper or plastic bags, sometimes both, and then throw them in the household waste or in open spaces. Wrapping serves to hide the soiled product and the smell of blood, the plastic bag is added in case the wrapper opens and to prevent animals from eating it (FGD-ADP1, FGD-APP1, IDI-ADU4, IDI-APP6, IDI-ADU10). This concern was illustrated by interviewee comments: "*Blood smells, it can easily attract animals, from dogs to monkeys. In some villages you can see pads hanging from trees because monkeys steal them*" (IDI-K29). To ensure they can wrap each product, consumers store newspapers and plastic bags, and have these at hand when they menstruate.

[39] Many respondents had more than one answer for this question, which is why the sum of the percentages exceeds 100%.

Table 5.2 Consumers' preferred disposal methods of menstrual products

Response	Delhi	Pune	Total (%)[40]
Throw it along with the other waste	16	15	89%
Separate it from the other waste and then throw it	10	11	60%
Throw it in an open space like river, well, lake, roadside	1	1	6%
Bury it in the ground	3	1	11%
Burn it with the other waste	3	2	14%
Flush it down the toilet or throw in the pit latrine	1	0	3%
IDIs total sample	18	17	

Source: Author, fieldwork 2018-2019 (IDI-ADU; IDI-ADP; IDI-APU; IDI-APP).

An important difference in the disposal practices observed between Delhi and Pune is that in the latter, consumers also wash sanitary pads before wrapping them for disposal. Washing the pad means placing it under the sink and letting running water take away the blood. As explained by one interviewee: "*I put tab water on it, squeeze with hand, let the blood go out so it gets fully white, keep it on the side let it dry and then wrap. I dry it in a cupboard in the bathroom where people won't see, I have a son so have to hide it*" (IDI-APP2). Consumers explained that washing the product is meant to avoid menstrual blood from spreading, being eaten by animals, or seen by anyone, including waste pickers (FGD-APP1, IDI-APU3, IDI-ADU5). This was illustrated by interviewee comments: "*The girls wrap them in newspaper and all and put them in dustbin but they don't wash these pads, so sometimes it happens that some dogs move around by carrying them, I feel this should not happen*" (IDI-APP4). "*Some people don't like to clean it. They just directly put it in dustbin. It can cause infection to people*" (FGD-APU10). It is important to note that traditional alternatives like cloth are often washed and reused. However, menstrual products are not designed to be washed, and in fact, doing this can contravene one of their main advantages over other reusable alternatives: their convenience because they can be disposed of after a single use.

[40] Many respondents had more than one answer for this question, which is why the sum of the percentages exceeds 100%.

Another important difference to note across locations is that while plastic bags are banned in both Pune and Delhi; in the latter, consumers said they had no issues securing bags to dispose of menstrual products because the ban is not properly enforced (FGD-ADP1, IDI-ADU7, IDI-ADU8). This ban, however, has impacted consumers in Pune, some of which think there is now increased difficulty in disposing of menstrual products. In the words of one interviewee: "*Earlier we were washing them and putting them in carry bags but now you cannot use carry bags, then how to dispose it?"* (IDI-APP3).

As shown in Figure 5.2 above, some consumers in the sample also consider burning (14%) and burying (11%) as better approaches to dispose of products (FGD-ADP1, FGD-APP1, IDI-ADU9). Nonetheless, consumers also shared that these methods are becoming impractical in cities where there are limited open spaces. Other reasons for not burying or burning include the risk of being seen doing this and concerns about dogs or some other animals digging out the products (FGD-ADP1, IDI-ADU5).

When asked about the main concerns when disposing of these products, the majority of consumers in both locations (74%) shared that an important consideration is being seen disposing of them (see Table 5.3). For this reason, some consumers also hide products in household waste to make them less visible; this is often done even when products are wrapped. Other consumers prefer to throw these products out in the open (6%) and even at night, rather than to give them to waste pickers. This was illustrated by interviewee comments: "*The main challenge is where to put used napkin and how to carry to bin*" (FGD-APU1). "*I have two to three friends and they also face a problem to dispose it, when person who collects garbage goes to someone's house, we will go there [to his cart] quickly and then dispose it, so that he doesn't get to see who has put* it" (IDI-ADU4).

Table 5.3 Consumers' main concerns when disposing of menstrual products

Response	Delhi	Pune	Total (%)[41]
I don't find the proper place to dispose it	2	0	6%
It clogs the sewer lines if I flush it	2	1	9%
Menstrual blood causes unhygienic conditions/harm	9	6	43%
Others might see me disposing of it	12	14	74%

[41] Many respondents had more than one answer for this question, which is why the sum of the percentages exceeds 100%.

You can't keep menstrual waste inside the house	6	5	31%
You have to hide menstrual waste	13	11	69%
IDIs total sample	18	17	

Source: Author, fieldwork 2018-2019 (IDI-ADU; IDI-ADP; IDI-APU; IDI-APP).

Furthermore, when it comes to disposal, an important consideration for consumers in both locations is the impact that these products have on their surroundings. In both locations I found that some consumers see menstrual blood as dirty and impure and think it can have a negative impact by harming animals and spreading diseases. As expressed by one interviewee: "*It has that much bad smell and its dirty. It must be giving out germs and causing pollution. It's that harmful*." (IDI-APP5). In fact, consumers in both Pune and Delhi shared that there is risk of infertility if a woman's soiled product is stepped on by another person. As explained by interviewees: "*If someone puts the feet on someone else's pad then the lady who has thrown that pad can never get pregnant*" (FGD-ADU1). This risk of infertility is also believed to occur if animals eat soiled products. An observed difference between locations, however, is that for consumers in Delhi the belief of infertility is associated with cows; they believe that if a cow eats a woman's soiled product then she will become infertile (FGD-ADU1, FGD-ADP1, IDI-ADU1, IDI-ADU6, IDI-ADP7, IDI-ADP8). In Pune, the animal in question was a snake (FGD-APU1, IDI-APP2, IDI-APP6). In the words of one interviewee: "*The sin goes on our head if some animal eats it*" (FGD-ADU1). In spite of these differences, in both locations a significant proportion of consumers (88%) think that menstrual products have a negative impact on the environment (see Table 5.4 below). However, the reason is that they consider menstrual blood as a source of harm for others. These findings also explain why some consumers continue to prefer burning and burying as disposal practices, i.e. they see them as better ways to destroy menstrual blood.

Table 5.4 Consumers' perceptions on whether menstrual products have a negative impact on their surroundings

Response	Delhi	Pune	Total (%)
Negative impact	15	16	88%
No impact	2	0	6%
Don't know	1	1	6%
IDIs total sample	18	17	100%

Source: Author, fieldwork 2018-2019 (IDI-ADP; IDI-APU; IDI-APP).

Table 5.5 below summarizes the observed practices and perceptions among consumers in Delhi and Pune, and highlights observed differences. As shown, some of the differences across locations can be explained by the varied ways in which gender norms are interpreted. For example, in Pune many consumers considered washing a necessary practice to avoid the spread of menstrual blood, yet this was not found to be a popular view among consumers in Delhi. Moreover, in Pune, due to the enforcement of the plastic ban, women face greater challenges to secure and use plastic bags for disposal. There are also important similarities; in both locations the ways in which consumers purchase these products are informed by the notion that it is shameful to be seen buying these products. Such perceptions can also lead consumers to feel the need to dispose of menstrual products without being seen by others, which is why they hide them in household waste or throw them secretively in open spaces. Relatedly, in both locations, some consumers also preferred to dispose of these products in a way that does not allow the menstrual blood to be exposed to others and to animals. The negative perceptions of menstrual blood are an important factor that shapes their views of the impacts that menstrual products can have on their surroundings. This explains why some consumers wrap and wash menstrual products before disposing of them, and also why others prefer to burn and bury them even if this is becoming more challenging in urban contexts.

Table 5.5 Key insights form the comparative analysis of consumers' disposal practices and perceptions of menstrual products

	PRACTICES	**PERCEPTIONS**	**OBSERVED DIFFERENCES**
USAGE	• Purchasing larger sizes • Purchasing one pack of products at a time • Hiding products from kids and relatives • Purchasing in medical stores	• It is shameful to be seen buying these products • Absorbency is the most important attribute because it prevents leaks and reduced the need to change as often	*No significant differences*

DISPOSAL	• Wrapping products in plastic bags before disposal • Washing products before before disposal • Hiding products in household waste • Throwing products in open spaces	• It is shameful to be seen disposing of this waste • Menstrual blood is dirty and impure and can be harmful to animals and others (e.g. by causing infertility)	• Washing products before before disposal was only an observed practice in Pune • Wrapping products in plastic bags before disposal has become increasingly difficult for consumers in Pune due to the enforcement of a plastic ban

Source: Author, fieldwork 2018-2019.

Some of the differences observed can be explained by variations in the institutional context, as well as by individual preferences of consumers. For example, some of the different factors that inform how consumers chose to dispose of these products include the availability of disposal infrastructure; the different levels of access they have to toilets or clearing spaces; the information they receive in school and from their peers, among others (IDI-ADU3, IDI-AD5, FGD-APP1, IDI-APP4). Nevertheless, an important observation that can be made from this empirical analysis is that in both locations gender norms in the form of taboos and societal perceptions are an important factor that shapes disposal practices of menstrual products. To continue this analysis, the next subsection investigates the gender norms related to menstruation in more-depth.

5.2.2 The gender norms in the disposal of menstrual products in India

As discussed in Chapter Two, social norms around menstruation can be considered gendered because they define the expected behaviours of individuals, including the appropriate practices to manage it. The review of literature in that chapter also found that in India these norms can have negative effects in women's lives, for example, by preventing them from participating in social activities. This subsection dives into the gender norms that shape the observed disposal practices in order to explore how menstruation is understood and experienced by consumers in the two locations under study.

The empirical findings show that women in Delhi and Pune face different types of restrictions when they are menstruating. In the sample for this study, consumers in both locations mentioned that they follow certain restrictions while menstruating, such as not being able to participate in prayers nor going to temples; abstaining from cooking; avoiding salty or dairy products, and not washing their hair (FGD-ADP1, FGD-ADP1, FGD-APU1, FGD-APU1, FGD-APP1, IDI-ADU1, IDI-APP5). Gender norms can also be seen in the notions of shame and secrecy that consumers associate with menstruation. In both

locations, all consumers in the sample shared that it is considered improper for others to know that women are menstruating, especially men. In the words of one interviewee: "*If people see it they feel insulted, people would say she is negligent, can't take care of herself*" (IDI-ADU3). Relatedly, and as mentioned in subsection 5.2.1, menstrual blood can be perceived as dirty and harmful. Thus, the notions of shame and impurity associated with menstruation not only translate into fear of being associated with it, but also into the responsibility of not letting blood be seen or exposed. These concerns were best summarised by one interviewee: "*producer [of menstrual products] should put some chemical so the red becomes fully white, so red disappears, so no embarrassment and no diseases, no one has problems then*" (FGD-APP4).

The secrecy around menstruation also means that practices and beliefs are mainly discussed by women. This is also the case for menstrual products. Consumers interviewed in this study reported learning about menstrual products from family members or friends, usually their sisters in law, when they got married and moved from their villages to the city (FGD-ADP1, FGD-APP1, IDI-ADP2, IDI-ADU9, IDI-APP, IDI-APU2). Others said they first came across menstrual products when receiving free disposable pads after giving birth at the hospital (FG-ADP1, IDI-ADP3, IDI-APP1). Some also shared that their husbands don't know for how long they bleed or how many products they need, and that they only know they should not come close to them during this time (FGD-APU1, IDI-ADP5, IDI-ADP6).

The taboos around menstruation also mean that both men and women struggle to get reliable and sufficient information about menstrual products. None of the women interviewed was able to explain why social restrictions around menstruation were needed. Yet, most feared the stigma of not complying with societal expectations. For example, one interviewee shared that on one occasion a soiled pad was left outside her house and "*he* [her husband] *shouted what kinds of people are residing here, he got very upset and I had to put it aside with broom and felt very uncomfortable*" (FGD-ADU1). While, the secrecy around menstruation means that norms are most discussed and enforced by women, the negative views around menstruation are shared by both men and women.

Nonetheless, these norms are also changing. Some younger consumers in this sample also expressed their distrust for the validity of these norms (FGD-APU1, IDI-ADU5). However, they also shared that they feel obligated to comply with them because their elders demand it and they don't want to be disrespectful. In the words of one interviewee: "*It means during those five days you cannot go to kitchen you cannot go to temple, you should not touch God during that period. Actually I don't like all these things but I do all these things for her [mother in law's] satisfaction*" (IDI-APU9).

These findings show that in India menstruation is associated with notions of shame and harm. I argue that as result of the societal embeddedness of the menstrual products chain these notions also become associated with menstrual products. This is an important reason why some consumers go to significant lengths to hide and destroy soiled products, as opposed to simply discarding them with other household waste. These findings also underscore the value of a gendered approach to societal embeddedness to explore how the operations of the chain, in this case the disposal of commodities, are shaped by local gender norms. In the next section I look at the different activities from commercial and non-commercial actors in the menstrual products chain in order to investigate if and how these also influence consumers' disposal practices.

5.3 Investigating the role of actors in the disposal of menstrual products in India

The discussion in Chapter Two showed that the sales of menstrual products in India are growing rapidly and that non-commercial actors are playing increasingly important roles in driving access to these products. In Chapter Three, I argued that these different actors and their actions could be explored with a GPN approach because, unlike other approaches to analyse commodity chains, this one conceptualises a greater diversity of stakeholders and takes into account the diversity of relations between them. Therefore, to continue to explore tensions in this chain, I will unpack the findings of the GPN mapping and discuss the roles that different actors; including firms (global and local), the Indian government, and civil society organisations play in the disposal of menstrual products in India. This analysis also continues to pay attention to the ways in which each of these actors understands, prioritises, and responds to gender norms.

5.3.1 Firms: global and local

In India, global manufacturers are investing in various efforts to create awareness of menstrual products and increase their accessibility. For example, P&G recently pledged to double the coverage of their Mother-Daughter Menstrual Health & Hygiene programme and provide education on menstrual hygiene to 50 million girls by 2022 ("P&G to double coverage of menstrual hygiene," 2019). In addition, various partnerships have been established between these firms and the government to provide free products and menstrual hygiene education to schools in rural areas. For example, in partnership with the local government of Goa, P&G distributed pads and delivered menstrual education in over 20,000 schools (Malviya and Raghavan, 2008). Unicharm has also launched a similar programme to provide menstrual education in schools, reaching over 120,000 students (*Unicharm CSR Report*, 2017). In all the interviews with representatives from global firms conducted in this study,

they highlighted their commitment to drive a positive impact in society and to continue to invest in product development to ensure the availability of hygienic and safe products (IDI-K13, IDI-K14, IDI-K15, IDI-16, IDI-17, IDI-K18).

Aside from continuing to enhance the value added of their product offerings and drive educational campaigns; another important consideration for firms in India is expanding distribution networks. As noted in Chapter Two, this is a significant challenge in the country and an important reason why menstrual products are not available in rural areas. A senior representative of a global firm shared that a challenge to continue to drive forward the Menstrual Hygiene Agenda (MHM) is the cost behind expanding supply chains to rural areas (IDI-K13). In line with these views, other interviewees brought up the need of incentives, such as tax reductions to enable the industry to continue to establish production facilities in underserved regions (IDI-K13, IDI-K14).

Other efforts by global manufactures to drive adoption of menstrual products can be found in marketing campaigns. As mentioned in Chapter Two, new marketing campaigns such as P&G's "Touch the Pickle" and other corporate social responsibility (CSR) efforts are also encouraging women to challenge some taboos around menstruation. One interviewee in particular highlighted the need to increase awareness among all women in India, in her words "awareness is making sales soar, but it has taken time" (IDI-K14). Relatedly, in a public interview, Chetna Soni, associate director of feminine care at P&G, highlighted the various challenges that firms in India have overcome to advertise these products. She shared that when the company first launched their brand Whisper in 1989, "mentioning or showing sanitary napkins was considered inappropriate and we had to seek special permission to advertise it" (Malviya and Raghavan, 2008). However, it must be noted that the focus of these campaigns is usually on girls, which can limit their influence among older women or women who are not regularly exposed to mainstream media. In the sample for this study, only one woman said she had chosen to try menstrual products after seeing them advertised on television (IDI-APU1).

As mentioned in Chapter Two, in recent years, accessibility to menstrual products has also been driven by the growing number of local enterprises that manufacture low-price menstrual products at small scale. In the three interviews conducted with representatives from these local firms, they shared that their mission is to reach women that are underserved by the main brands, especially those living in rural areas (IDI-K19, IDI-K20, IDI-K21). They also mentioned the important role they play in empowering women and creating community awareness on menstrual hygiene (IDI-K20). Like global firms, these smaller manufacturers also have ambitious plans to grow because they recognise the

market potential, especially in rural areas. Nevertheless, various civil society organisations and academics also raised concerns about the scalability of their business model and their long term sustainability (IDI-K1, IDI-K30). The quality of the products has also been questioned, particularly in terms of absorbency (Bobel, 2018; Geertz et al., 2016a).

Regarding the disposal of menstrual products, in India the Solid Waste Management Rules (2016) indicate that "Manufacturers or Brand Owners or marketing companies of sanitary napkins and diapers should explore the possibility of using all recyclable materials in their products or they shall provide a pouch or wrapper for disposal of each napkin or diaper along with the packet of their sanitary products." In addition, "all such manufacturers, brand owners or marketing companies should educate the masses for wrapping and disposal of their products."[42] The Plastic Waste Management Rules (2016) also include certain provisions of Extended Producer's Responsibility (EPR), which make producers responsible for the end-life of their products and for financing and organising an environmentally sound system for the management of this waste. However, in this analysis I found that there is limited compliance with these regulations. Global and local firms only give limited information about the disposal of these products in their packaging. There is no information about appropriate disposal ways in marketing and communication efforts. Moreover, according to some consumers in this sample, guidance on disposal is rarely covered in the trainings where free samples are distributed (FGD-ADU1, FGD-APP1, IDI-ADU8).

When interviewed for this study, the importance of addressing the potential impacts of disposal of their products on the environment was only brought up by one global firm as part of their vision to maintain their leadership position in developing markets, including India; but without highlighting any concrete measures (IDI-K13). The only significant indication of firms' awareness of the importance of disposal and its consequences for users was found in an interview conducted by PSI, where one firm reportedly stated: "'how do I deal with the disposed product?' You really have to think about that. I think it's very important, because otherwise, if you're really successful, the women in those villages are going to be knee-deep in used napkins. I mean you don't want that" (Aylward et al., 2018, p. 16). This is an important finding because it brings to light that the various efforts from global firms related to driving access to these products are not met with similar attempts to address disposal considerations and the associated environmental impacts.

[42] It has also been noted that the additional mandated wrapping could have unintended consequences in terms of increasing the burden on the environment and waste management systems (Chaturvedi, 2017).

Limited considerations around disposal and the environment were also found among smaller local manufacturers. A representative from a local firm explained that this is beyond their scope, in his words: "our sole mission is to give access to products, someone else should focus on the environment" (IDI-K33). Moreover, other firms considered in this study shared that their products are more environmentally friendly than those manufactured by the big brands because they do not contain superabsorbent gels (IDI-K9). In fact, some of these low-cost pads are being branded as 'eco-friendly', 'bio-degradable' and 'organic.' Nonetheless, most of these lower-priced locally manufactured products contain cellulose, and usually a layer of plastic to contain liquid. Their packaging is also often made with plastic (IDI-K1).

Lastly, and as noted in Chapter Two, in India smaller local firms are also starting to sell premium, eco-friendly and biodegradable products. Unlike other manufacturers, and not surprisingly, these firms are driving efforts to raise awareness on the environmental impacts of menstrual products. Yet, this is done mostly through online channels as their consumers are predominantly urban women who regularly use the internet (IDI-K20). For this reason, the influence of these firms on the consumers in the sample was not as relevant as that of other commercial actors.

This exploration of the role of firms in the menstrual products chain in India shows that the disposal of menstrual products and the associated environmental impacts are rarely included in initiatives or reflected in the communication efforts of global or local firms. These findings are important for the analysis of tensions because they show that while the efforts of global firms can contribute to challenge some gender norms, for example by promoting a more open conversation about menstruation; by paying insufficient attention to disposal considerations, they can also fail to challenge other norms. The question that emerges from this analysis is why are firms in India focusing their efforts on the norms that prevent access and not on those that affect disposal practices?

The next section explores the actions of the Indian government and civil society organisations and how these align with or contravene the efforts of firms in relation to the disposal of menstrual products. As discussed in Chapter Three, the GPN approach enables a broader analysis of commercial activities by taking into account how these activities are shaped by the institutional and social context in which the chains become embedded (Neilson and Pritchard, 2009).

5.3.2 The government

The government of India, unlike other developing countries, has taken a more active approach to address some of the challenges associated with MHM, especially accessibility. The government of India first expressed an intention to prioritise "the special sanitation needs of women," such as menstrual hygiene management, in the Delhi Declaration of the South Asian Conference on Sanitation in 2008 ("Delhi Declaration," 2008). In 2015, in collaboration with the Water Supply and Sanitation Collaborative Council (WSSCC), they published the national MHM guidelines for schools. These guidelines are the cornerstone of various public initiatives, which include the introduction of modules on menstrual hygiene in educational curriculums, and the provision and sale of subsidised products to help girls remain in school.

The majority of efforts from the Indian government are in line with their interpretation of the MHM guidelines as a primary mandate to provide menstrual products (IDI-K10). The Ministry of Health and Family Welfare (MoHFW) leads various initiatives to provide subsidised pads, including the Menstrual Hygiene Scheme (MHS) and the Rashtriya Kishor Swasthya Karyakram (RKSK).[43] One very clear statement of the government's focus on accessibility was given by the former Director of Sanitation in the Ministry of Drinking Water and Sanitation in Delhi who, when interviewed for a different study, mentioned that one of the biggest challenges to implement the MHM guidelines was convincing women and girls to use disposables (Bobel, 2018). However, it must be noted that concerns have been raised around these initiatives, including the irregular supply and the poor quality of the products supplied. A study conducted by PSI found that some girls sold these subsidised products in the markets to purchase 'higher-quality' products (Aylward et al., 2018). Another recent institutional effort to drive access to these products was the removal of the 12% Goods and Service Tax on sanitary napkins. This was the result of various protests, petitions, and court cases that questioned the designation of pads as a luxury rather than an essential item, unlike condoms, which are tax-free ("India scraps tax," 2018). The tax removal was considered a win among menstruation activists and is expected to facilitate women's access to menstrual products (IDI-K29).[44]

[43] The RKSK was launched in January 2014 to bolster the health component among adolescents through the provision of sanitary napkins and clean cloths. The Menstrual Hygiene Scheme (MHS) focuses on the sale of subsidized sanitary napkins to rural adolescents aged 10–19 years across 17 states (*Health and Family Welfare Policy*, 2017; A. Rastogi, 2018).

[44] There have been concerns that this tax removal will affect domestic manufacturers, especially small-scale producers, and potentially give an unfair advantage to imports from China, because the tax rates on inputs used in the manufacturing of sanitary napkins have not changed (Kishore, 2018). According to Euromonitor,

According to the MHM guidelines, the disposal of "commercial napkins made of plastic" is only recommended with a "good incinerator" or by "deep burial" (*The National Guidelines on MHM*, 2015). For this reason, the existing government initiatives to address the disposal of menstrual products are focused around the provision of incinerators (IDI-K1). The installation of incinerators has been made part of the Nirmal Bharat Abhiyan (NBA) campaign to improve sanitation practices and end open defecation by 2022.[45] However, most infrastructure has been built in schools. Several states such as Uttar Pradesh and Kerala are also building female-friendly toilets in public places with separate bins for the disposal of menstrual waste (IDI-K11). There are however, several reports of broken school incinerators, and concerns have been raised about stigma and taboos being overlooked in the design and placement of these incinerators (Bobel, 2018; Elledge et al., 2018). In Tamil Nadu, for example, women were found to be reluctant to leave menstrual waste in communal bins because it was unclear when the waste would be burned (*Menstrual Management and Sanitation Systems*, 2013). Other concerns include the fact that these solutions are not available for older women or girls not enrolled in school, as well as potential risks from inadequate emission control ("Breaking the silence," 2015).

Another initiative related to the government's efforts to address the waste from menstrual products is the introduction of government-made biodegradable sanitary napkins. In 2018 on the occasion of International Women's Day, the Ministry of Chemicals and Fertilisers announced that biodegradable sanitary napkins under the name 'Suvidha' would be offered at a subsidised priced of ₹2.50 per pad across 3,200 public health centres ("On Women's Day," 2018). These pads are targeted to underprivileged women, especially those in rural areas. However, as of December 2019, these products were yet to be launched.

Lastly, important differences can be observed between Delhi and Pune in terms of the local institutional efforts around waste management. In 2018, India announced its intention to eliminate single-use plastic by 2022. As of 2019, more than half of India's 29 states and seven territories have introduced new legislation to reduce single-use plastic, with plastic carrier bags being one of the main targeted items (V. Rastogi, 2018). However, this has been implemented differently by the various states. Maharastra, the state in which Pune is the second largest city, began enforcing this ban in June

manufacturers have expressed that making the products less expensive would make it unviable to manufacture them locally, thus benefiting importers (*Sanitary Protection in India*, 2019).

[45] In 2013 an amendment was introduced to this program to build incinerators in schools, women's community sanitary complexes, primary health centres, and other relevant locations ("Modification in NBA Guidelines," 2013).

2018 by imposing penalties for selling or buying banned items, which already amount to over 5 lakhs (over £5,000) (Bhatia, 2018; Sampathkumar, 2019). These efforts have been bolstered by consumer education campaigns that link single-use plastic to pollution, poor health, mosquitoes, etc. In Pune, as part of the Swachh Bharat Abhiyan or Clean India Mission, the Municipal Corporation (PMC) has made significant investments in cleanliness drives and awareness campaigns that emphasise the role of residents in keeping the city clean ("Delhi to launch campaign against single-use plastic," 2019). However, reports show that one year after the ban, plastic waste had only been reduced by 20 per cent (Welankar, 2019).[46] While criticisms have been voiced on the emphasis on fines over education, many consumers interviewed for this study corroborated that it is becoming increasingly difficult to get plastic bags.

In Delhi, a plastic ban was declared in 2017, but the city has failed to strictly enforce it (Sampathkumar, 2019). The city is also yet to implement regulation to adhere to the Plastic Waste Management Rules that came into effect in 2016, and to impose fines for plastic use in a consistent manner ("Delhi to launch campaign against single-use plastic," 2019). Fines, however, have been implemented to support the Clean India Mission; the three Municipal Corporations, East, North and South have issued more than two million fines against those who spit and defecate in the open (Yadav, 2019). An important difference to note is that in this study, in general, consumers in Pune had greater awareness of the negative effects of plastic than consumers in Delhi.

This analysis shows that the Indian government is playing a central role in the chain by making menstrual products more accessible, in some instances by supporting commercial initiatives. While the government can also implement policies that can put pressure on manufacturers, such as the recent removal of taxes; the institutional efforts related to disposal are limited and mostly focused on infrastructure. The question that arises here is why is the government in India supporting some of the efforts of firms to drive access but not challenging the lack of compliance with disposal-related regulations? And why are institutional efforts, especially those related to sanitation, not sufficiently considering or aiming to address the gender norms that shape disposal practices? The next part of the analysis explores the role of civil society organisations in this chain and how the efforts of NGOs align with or seek to challenge commercial activities, as well as institutional efforts and policies related to the disposal of menstrual products.

[46] The government of Maharastra is also facing resistance from manufacturers and wholesalers of plastic products who contend the ban is costing millions of dollars and thousands of jobs (Sampathkumar, 2019).

5.3.3 Civil society

Civil society organisations are also playing an important role in helping women become aware of and gain access to menstrual products. The recent focus on menstrual hygiene education to improve health has garnered a lot of momentum among international funders and local NGOs. Over fifty organisations, both local and international are working in India to deliver education and/or access to menstrual products to women and girls from underprivileged backgrounds. The objective of many of these organisations is enabling women to access low-cost menstrual products (e.g. Mina Mahyla) and reusables (e.g. Eco Femme, Project Baala, Goonj, Ruby Cup, GiverHerfive). Many of these organisations also advocate for more and better sanitation facilities. In some states, such as Tamil Nadu and Andhra Pradesh, NGOs are also partnering with the government to install product vending machines in schools (House et al., 2012).

Other civil society efforts in India are focused on raising awareness of 'sustainable' products and on the importance of disposing these products 'adequately.' For example, the Sustainable Menstruation Kerala Collective, it's an alliance of civil society groups, activists and manufacturers of reusable alternatives, that is collectively driving efforts to promote sustainable alternatives to menstrual products (Sathyendran, 2017). An important initiative to highlight is the Red Dot campaign led by the waste pickers association SWaCH in Pune,[47] which raises awareness amongst households on the importance of properly disposing of menstrual products and diapers by wrapping them in newspaper and marking the wrapped products with a red dot. This measure is meant to help waste pickers avoid touching soiled products, and to increase the likelihood that this waste will be segregated properly (IDI-K32). This campaign is the first in the country to inform consumers on how to dispose of sanitary waste, including menstrual waste. Recently, NGOs, like the Humjoli Foundation, have helped to promote this campaign by making marked newspaper bags and distributing them in stores so that these can be given away for free with the purchase of menstrual products (IDI-K34).

Many initiatives from civil society organisations have been criticised for taking siloed approaches that fail to look at the problem as a systemic issue (Geertz et al., 2016b). In the words of one interviewee, "pads are cheap tokenistic effort, but they don't drive real change" (IDI-K32). The different, and sometimes contrasting, views on the issues that should be prioritised, can result in uncoordinated approaches. For example, some organisations think manufactures should become accountable for

[47] SWaCH (Solid Waste Collection and Handling) is an important association of waste pickers in Pune, it is also India's first fully worker-owned cooperative of self-employed waste-collectors. The role of this association will be further discussed in Chapter Six.

their products. “Corporations are making money by throwing pads in the name of development but they don’t care about the environment” (IDI-K29). Others call for more collaboration with the private sector, and for the government to take a more effective role. This is reflected in the comments of different interviewees: “manufacturers have a privileged position, we need to collaborate with them” (IDI-K16); “the Indian government's solution to the problem is incineration, but this is not a permanent solution” (IDI-K28).

Some organisations also defend girls’ rights to have access to various choices of menstrual products, including those that can have an impact on the environment, and reject the notion that “poor girls should be grateful for poor quality products” (IDI-K1). Archana Patkar, an important thought leader of MHM in India argues, “first women’s experiences of menstruation have been denied and stigmatized… and now we’re supposed to tell them that they have to think about the environment and the Sustainable Development Goals… Why do women always have to take responsibility for everything? For the environment, the children, the families, everything!” (Bobel, 2018, p. 83-84).

Others insist on the importance of thinking about the long term impact of these products. In a blog authored by the co-founders of Eco Femme they state that “we think therefore that this is a point that starts to go beyond personal and individual preference and needs a contextual look—can India without proper waste disposal mechanisms keep embracing disposable pads as the only other option alongside old cloth? We don’t think so” (Walkling and Miedema, 2015). In line with these views, a representative for an NGO interviewed in this study commented that “products have been available since the 70’s but are only gaining traction now, we need to question who is driving the conversation and what are the bigger implications” (IDI-K1).

These findings indicate that civil society organisations are both supporting and opposing commercial strategies and institutional efforts aimed at driving access. Compared to private and public groups, they are more focused on educating consumers about how to dispose of these products and in driving awareness of the adverse environmental impacts of menstrual products. However, the diversity in objectives and priorities, and their limited resources, can hamper the effectiveness of their efforts.

In sum, the mapping of actors discussed in this section illustrates that the gendered societal embeddedness of firms is reflected on the strategies that they adopt to respond to gender norms around menstruation and on the interactions they have with non-commercial actors, which have different interests and views on the need to challenge gender norms related to disposal practices. I

argue that the insufficient attention that actors in this chain place on disposal considerations is one of the reasons why gender norms in India remain a prevalent influence in consumers' practices and perceptions. As findings from this study show, in spite of the various efforts to challenge the gender norms that can hinder access to menstrual products, some consumers continue to feel ashamed of being seen purchasing these products. Thus, it can be expected that scarce efforts around disposal will be less effective in transforming the gender norms that shape disposal, including the view that menstrual blood is dirty and harmful. As discussed throughout the section, this mapping raises various questions, mainly: why don't actors prioritise challenging gender norms related to disposal practices, as much as those related to access? and how do conflicting interests between actors prevent changes in these practices? In the next section, I build on the empirical findings discussed far to advance the analysis of tensions and how these relate to the environment.

5.4 The manifestations of tensions in the disposal of menstrual products

The empirical analysis of consumers' disposal practices in India has so far shown that as a result of the embeddedness of the chain in a societal context, the negative associations that gender norms create around menstruation are also applied to menstrual products. The prevalent influence of these gender norms in consumers' practices and perceptions can also be attributed to the insufficient efforts from actors in this chain to address disposal considerations. In this sample, the limited information and education that consumers receive makes them more likely to continue to associate these products with notions of shame, dirt, and harm. For these reasons, I argue that tensions between gender norms and commercial activities manifest in the disposal practices of menstrual products.

The first way in which these tensions become apparent is in consumers' efforts to dispose of menstrual products by following traditional practices. This analysis found that to dispose of menstrual products consumers follow practices that are similar to those that they use to dispose of traditional alternatives, such as cloth. An example of such practices is washing menstrual products that are not designed to be washed. Findings indicate that one of the reasons why consumers wash menstrual products is because they consider menstrual blood to be harmful and think that disposing products with blood poses a risk to others and to animals.

Concerns about the potential negative impacts of menstrual blood is also an important reason why some consumers prefer to burn or bury these products. As discussed, 88% of consumers think that menstrual products have a negative impact on the environment, yet, many attribute these impacts to menstrual blood rather than to products. Consumers often think that menstrual products can have a

negative impact on their surroundings because menstrual blood can harm others, including animals, and spread diseases. In addition, many consumers believe these products will eventually rot and "decompose into the earth" (FGD-APU1, FGD-ADU1). "*In village I have to go for toilets in the farm and throw there in the soil, but it's cotton only so its ok*" (IDI-ADP6). These findings suggest that while considerations related to their surroundings are important for some consumers, this is not necessarily aligned with the real environmental impacts that these products have.

Secondly, tensions can be seen in consumers' reluctance to follow and support institutional efforts around waste management. Findings show that consumers hide these products in household waste and throw them out in the open at night, even when they have regular access to disposal infrastructure because they are concerned about being seen disposing of this waste. In fact, for the majority of consumers in both locations (74%), the main concern is being seeing disposing of this waste. As mentioned in the section 5.3.3, in Pune, the Red Dot campaign led by SWaCH, is raising awareness amongst households on the importance of properly disposing menstrual products and diapers by wrapping them in newspaper and marking them with a red dot. However, in this sample some consumers expressed reluctance to support this campaign because they were concerned about menstrual waste standing out in their household trash (IDI-APU5, IDI-APU10). Consumers expressed concerns that a red mark would resemble blood, defeating the purpose of hiding menstrual products and any association with menstruation (FGD-APU1). Other consumers were worried that marking menstrual waste would not prevent the potential harmful effects of menstrual blood because this would not deter animals from engaging with menstrual waste. In the words of one interviewee: "*The dog doesn't know not to touch the mark*" (IDI-APP7). These findings suggest that even when waste management initiatives are in place, gender norms are an important reason why consumers prefer not to support them.

Another example of consumers' reluctance to support waste-related initiatives can be found in their continued use of plastic bags to wrap products even if said bags are banned. Findings indicate that in Delhi the weak enforcement of the plastic ban is not sufficient to deter consumers from using plastic bags for disposal. On the other hand, the stricter ban in Pune is making it harder for consumers to secure plastic bags for the disposal of menstrual products. This is causing frustration among consumers because of the added challenge in terms of disposal. Some consumers in this sample expressed that not being able to wrap menstrual products in plastic bags can create feelings of uneasiness and anxiety because of the belief that menstrual blood is left exposed (FGD-APU1).

In terms of tensions, my findings make evident that access to commodities does not automatically lead to changes in gender norms. Tensions can have negative impacts for consumers by leading them to invest time and energy in disposal practices in order to comply with gender norms. Many of the observed practices are increasingly harder to follow in new urban contexts and some can even prevent consumers from supporting initiatives aimed at improving the disposal of menstrual waste. Nonetheless, an important question in my investigation is whether these tensions are related to the environment. For this reason, the next section explores how the observed disposal practices in this study relate to environmental impacts.

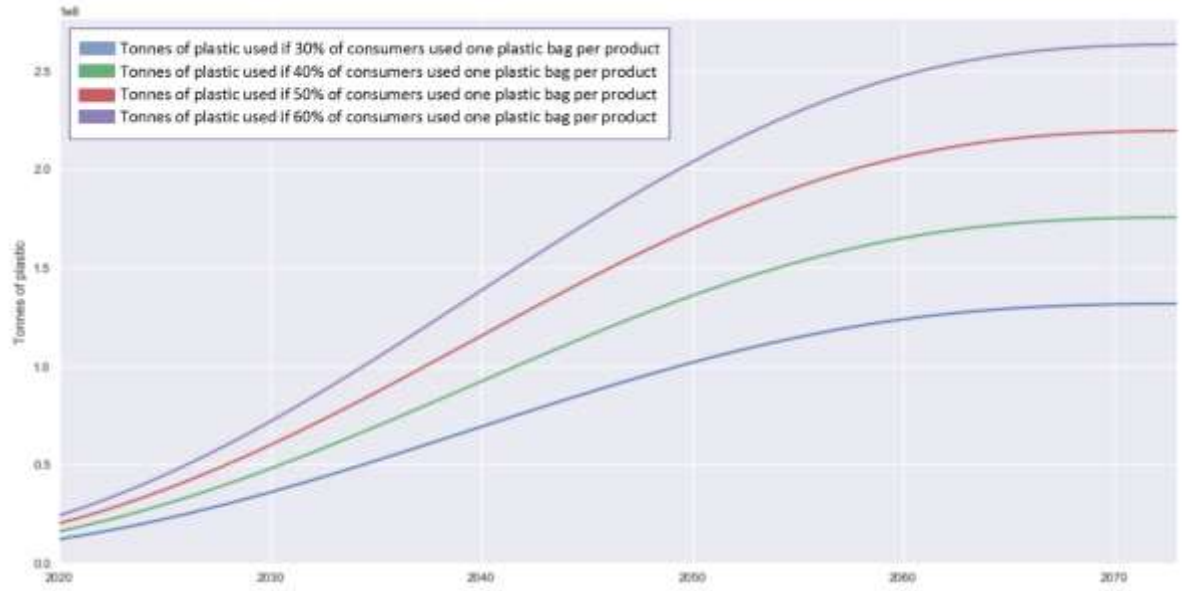
5.5 Exploring the environmental impacts from the disposal of menstrual products

This section discusses the environmental impacts associated with the observed disposal practices of menstrual products in India. As discussed in section 5.2.1, the most common disposal method in this sample is to wrap each used menstrual product in newspaper and put it in a plastic bag. This means that additional paper and plastic are used for the disposal of each product. Therefore, I argue that these practices enhance the amount of waste that is introduced into ecological cycles. As discussed in section 2.4.3, the introduction and accumulation of new materials and substances that are foreign to the environment can interfere in dangerous ways with natural cycles and is a reason why economic production can generate adverse environmental impacts (Commoner, 1971).

In the sample for this study, consumers in both Delhi and Pune wrap products in plastic bag before disposing of them in their household waste or out in the open. Since the data collected is not representative of the wider population of women who use menstrual products, I made projections of the tonnes of plastic that would be used to dispose of menstrual products per year, if different proportions of the total number of consumers in India (30%, 40%, 50%, 60%) used only one plastic bag to dispose of each product. These projections are depicted in Figure 5.1 below. For example, by 2070 when the market for menstrual products in India is expected to reach 100 billion products, if only 60% of consumers (purple line) wrap products in plastic bags, over 250 million tonnes of plastic will be used. This potential waste would be additional to the plastic that is used for products themselves and their packaging. These figures are based on various assumptions,[48] but their objective is to highlight the size of the waste that could be introduced into the system if consumers in India continue to gain access to these products and to follow this disposal practice.

[48] These estimates are based on the projections of market growth discussed in Chapter Two section 2.4.3, as well as the weight of plastic carrier bag which I estimate to be 4 grams.

Figure 5.1 Projected tonnes of plastic used to wrap products for disposal, in hundreds of millions



Source: Author, 2020

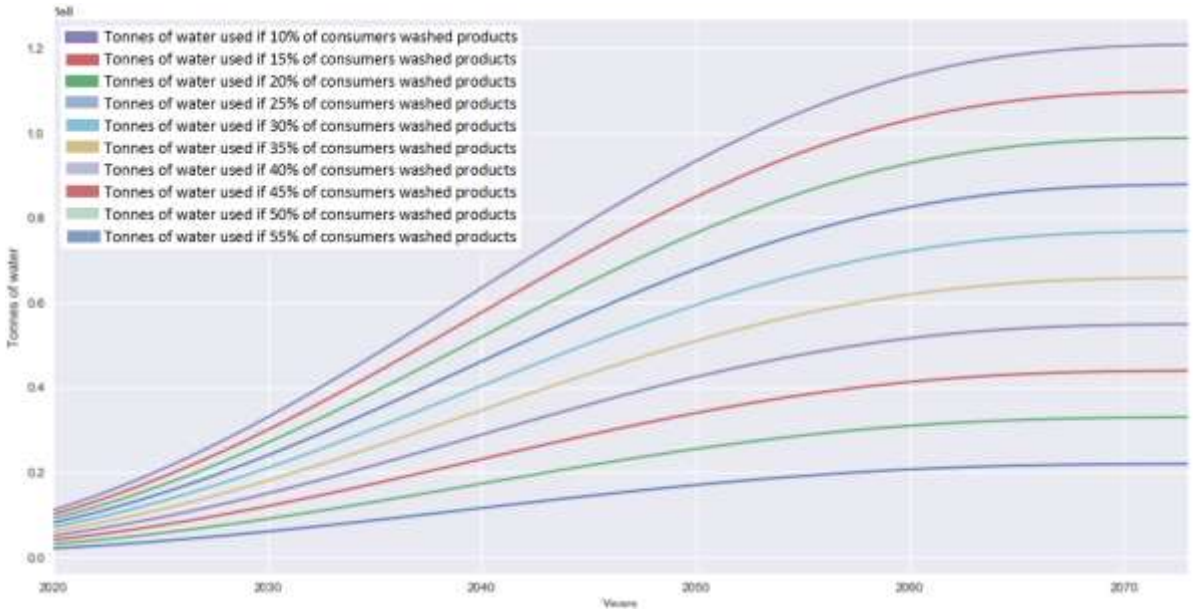
Another disposal practice observed in this analysis is washing menstrual products before disposal. These products are not designed to be washed; yet, according to consumers who follow this method, the reason for washing is to avoid menstrual blood from spreading and to prevent negative consequences for themselves and for others. "*You can wash it before throwing it in trash so it has not impact nature then*" (FGD-APU5). "*Just put one or two mugs of water on it, it gives little satisfaction that it will not be lying somewhere open and also it will not spoil the environment*" (IDI-APU3). In terms of environmental impacts, washing each product before disposing it entails the use of water resources.

The only existing environment impact assessment of menstrual products in India that I found reports that the usage of menstrual products requires two litres of water per product and that these are used for hand washing after changing products (see Leroy et al., 2017). However, the findings from this study indicate that water is also used to wash each of the products. By using the market growth projections discussed above, I also calculated the additional tonnes of water that would be used if different proportions of the total number of consumers in India followed this practice. Figure 5.2 below illustrates that if only 55% of consumers in India (dark purple line) washed products before disposal, in 2070 this would entail the use of approximately 120 million tonnes of water for this purpose alone. Once more, there are various assumptions that went into these estimates,[49] yet their

[49] These estimates are based on the projections of market growth discussed in Chapter Two section 2.4.3, as well as the litres of water used to wash each product, which I estimate to be two per product.

importance lies in revealing the extent of the additional environmental impacts that disposal practices could generate.

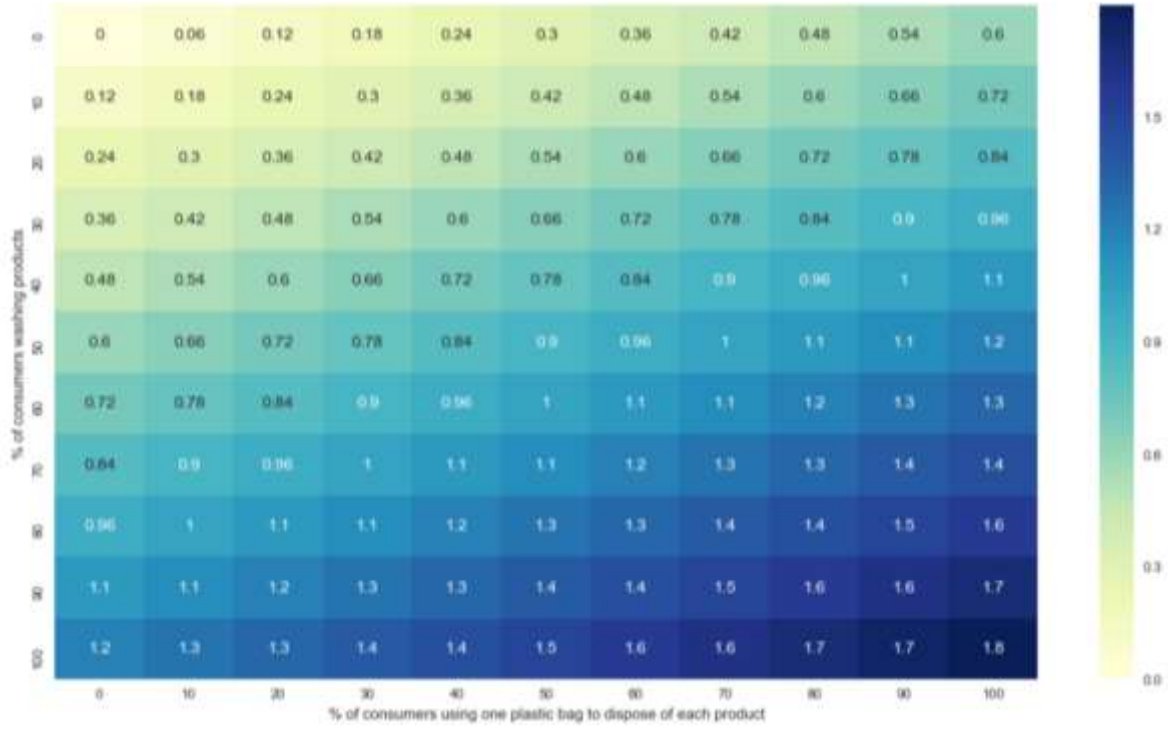
Figure 5.2 Projected tonnes of water used to wrap products for disposal, in hundreds of millions



Source: Author, 2020

To further show the potential of these environmental impacts to increase, I produced the heat map below which shows both the tonnes of plastic and water that would be generated from disposal practices by 2030 in India if consumers continue to wrap products in plastic and to wash them before disposal. Figure 5.3 shows that if sales in India reach 30 billion menstrual products by 2030 (as expected by market growth projections), and if all these products are washed and wrapped, this would result in 1,800 million tonnes of additional resources (plastic and water) used per year.

Figure 5.3 Estimated tonnes of plastic and water from disposal practices by 2030, in hundreds of millions



Source: Author, 2020

Lastly, this analysis found that as a result of the perception that it is shameful to be associated with menstrual products, some consumers hide these products in household waste or prefer to dispose them out in the open, rather than give them to waste pickers. This can increase the likelihood that these products end up in open spaces, water bodies, or public spaces. It also makes them less likely to be collected, segregated, and adequately destroyed.

The estimations presented above are useful to provide a different perspective on the additional inputs and outputs that are associated with the disposal practices of menstrual products observed in this study. There are also other impacts that can be associated with disposal practices, such as wrapping in newspaper or toilet paper or from burning these products, which need to be measured since they also entail additional use of resources and additional waste being introduced into ecological cycles. Table 5.6 below summarizes the adverse environmental impacts that result from consumers' perceptions and practices. It is important to note that these impacts are yet to be considered and quantified in environmental impact assessments. As discussed in section 2.3.1 in Chapter Two, there are limited assessments of the environmental impacts of menstrual products, and none of the studies I reviewed contemplated the impacts discussed in this section.

Table 5.6 The adverse environmental impacts that result from consumers' disposal practices

	DISPOSAL PRACTICES	ENVIRONMENTAL IMPACTS
Consumers in Delhi and Pune	• Washing products before disposal • Wrapping products in plastic bags before disposal • Throwing products in open spaces • Hiding products in household waste	• Using water for disposal • Using plastic bags for disposal • Increasing the likelihood that these products will not be collected, segregated, and adequately destroyed

Source: Author, fieldwork 2018-2019.

These findings indicate that the environmental impacts that are associated with disposal practices are different and can be considered additional to those already identified in existing impacts assessments. This leads me to argue that tensions between gender norms and commercial activities can have negative impacts on the environment. In other words, tensions matter for the environment because by leading consumers to adopt new ways to dispose of menstrual products, they can compound the environmental impacts of these products. This is an important insight because, as discussed in Chapter Two, the environmental implications of tensions, especially those that result from the increased access to commodities, are understudied. These findings also bring a different sense of urgency to the need to analyse how tensions shape individuals' engagements with commodities and to investigate how these configurations can be redirected to change practices that lead to adverse environmental impacts.

In summary, the discussion in this chapter has shown that tensions between commercial activities and gender norms manifest in consumers' disposal practices, which can generate adverse environmental impacts. The analysis contributes empirically by showing that gender norms are an important factor that shapes how consumers engage with menstrual products, including their disposal practices and their perceptions of the impacts that these products can have on the environment. This analysis also uncovers disposal practices, such as washing products and wrapping them in plastic that are not sufficiently considered in existing studies related to MHM or in environmental impact assessments. Analytically, this discussion demonstrates the value of a GPN approach to explore the role of various actors beyond firms and how gender norms shape their interactions. The analysis also shows that the concept of gendered societal embeddedness in this framework can be used to investigate how socially-formed gender norms at the local level intersect with the different activities that constitute commodity chains.

5.6 Conclusion

This chapter presented the findings from the empirical exploration of tensions through a GPN mapping and a comparative analysis of the disposal practices and perceptions of consumers in Delhi and Pune in order to address this sub-question: *How do tensions between gender norms and commercial activities shape consumers' disposal practices and perceptions of menstrual products in India, and what is the connection between these practices and adverse environmental impacts?*

This chapter began to apply the conceptual framework developed for this study in order to unpack the findings from the empirical analysis of the disposal stage of the menstrual products chain in India. By leveraging the concept of societal embeddedness in the GPN framework and introducing a gender lens, I was able to explore how different actors in the chain understand, experience, and prioritise gender norms through their actions, including their everyday practices. Building on the findings, I argue that tensions between gender norms and commercial activities lead consumers in India to adopt new ways to engage with menstrual products, including how to dispose of them, and that these new practices can compound the environmental impacts that these products have. In both Delhi and Pune, taboos and societal expectations around menstruation shape the ways in which consumers' dispose of these products, as well as their perceptions of the impacts of these products on their surroundings. My findings also reveal that these practices generate adverse environmental impacts by increasing the use of resources needed for disposal and the waste that is introduced into ecological cycles, and decreasing the likelihood that these products will be collected and adequately destroyed.

Furthermore, different actors in the chain have different and, at times, contrasting interests regarding the need to challenge gender norms related to disposal. While global firms are making significant investments to challenge some of the taboos related to access, there are limited efforts to address the disposal of these products. As for the government and civil society, there are often opposing views within ministries and organisations on the need to prioritise access over disposal. Many of the existing efforts related to disposal are also often under-resourced and lack consideration of the influence of gender norms on disposal practices.

This analysis highlights that tensions between gender norms and commercial activities have negative implications for the environment because they can lead consumers to adopt new practices to dispose of menstrual products that generate adverse environmental impacts. My findings call attention to the urgent need to analyse why some gender norms prevail in the disposal stage of the chain and how

conflicts of interest between actors can prevent the transformations of said norms to achieve less negative outcomes on the environment.

The next chapter will continue the empirical exploration of tensions by looking at how these manifest in waste pickers engagement with menstrual waste. As discussed in Chapter Two, waste pickers play an important, if understudied, role in the management of menstrual waste, which is why the investigation of their perceptions and practices can also contribute to advance the analysis of tensions and their relation to environmental impacts.

6 Tensions in the waste management of menstrual products in India

6.1 Introduction

The previous chapter presented the first part of the empirical analysis of tensions. I found that these tensions manifest in consumer's disposal practices of menstrual products and that these practices generate adverse environmental impacts. This chapter continues to explore tensions by investigating waste pickers' practices to manage menstrual waste and how these relate to environmental impacts. As discussed in Chapter Two, the ways in which waste pickers engage with soiled menstrual products and the extent to which their practices are shaped by gender norms is yet to be investigated. By exploring waste pickers' perceptions and practices in this chapter I address the fourth research sub-question of this study: *How do tensions between gender norms and commercial activities shape waste pickers' perceptions and practices of menstrual waste management in India, and what is the connection between these practices and adverse environmental impacts?*

This analysis continues to unpack the findings from the comparative analysis in Delhi and Pune, and the mapping of actors. In line with the previous chapter, I will continue to apply the framework developed in Chapter Three which leverages the GPN approach and a gendered approach to societal embeddedness to analyse the ways in which gender norms shape the actions of various commercial and non-commercial actors, including individuals working at the margins of the chain. Said framework also underscores the value of an intersectional perspective to explore how gender norms in conjunction with other forms of social difference shape the identities of individuals who participate in the chain and, in turn, their practices.

Findings from the comparative analysis between Pune and Delhi show that the prevalent influence of gender norms around menstruation shapes waste pickers practices and their perceptions of the environmental impacts of menstrual waste. Waste pickers are being increasingly exposed to these products due to the growing quantities of menstrual waste in India. The prevalent influence of some gender norms can lead them to adopt new practices to engage with this waste that can increase, rather than help mitigate, adverse environmental impacts. For these reasons, I argue that tensions manifest in waste pickers' practices and can compound the adverse environmental impacts of these products. My findings also lead to question the reasons why the influence of gender norms is prevalent in waste management activities and the role that different actors need to play to transform these norms and change the practices that generate adverse environmental impacts.

The second section of this chapter addresses the findings of the comparative analysis of waste pickers' practices and perceptions in India. The third, examines the empirical mapping of the role of actors in this chain. The fourth builds on the empirical findings to analyse how tensions manifest in the ways menstrual waste is managed. The fifth section advances the exploration of tensions in relation to the environment by looking at how the observed waste management practices lead to adverse environmental impacts. The sixth section concludes.

6.2 Unpacking tensions in menstrual waste management

This section discusses the differences and similarities in the ways waste pickers engage with menstrual waste in two locations in India and how these are shaped by taboos and societal perceptions around menstruation. The comparison of waste management practices and perceptions between two locations is important because individuals understand and experience gender norms in different ways. This analysis also considered male waste pickers, which means I am able to compare the ways in which men and women engage with menstrual waste. As in Chapter Five, this analysis leverages the concept of *societal embeddedness* to explore how gender norms around menstruation are understood, experienced, and prioritised by different actors in the chain. Moreover, in section 6.2.1 I present aggregate data derived from the responses of waste pickers in in-depth interviews undertaken in Delhi and Pune. The methodology used for this aggregation is described in Appendix Eight. It is emphasized that the data is illustrative only, and serves to compare the relative frequency of the different responses that were recorded. These aggregate figures cannot be interpreted as representative of views within the wider population waste pickers in India.

6.2.1 Waste pickers' practices and perceptions of menstrual waste

Many waste pickers in India are usually self-employed workers who collect waste door-to-door for a small fee. Their main source of income comes from the sale of recyclable materials that they get from household waste. Not all waste pickers collect waste from households, others do so from streets and landfills. Many waste pickers in India also belong to trade associations and cooperatives that play an important role in advocating for their rights and creating opportunities to engage them in recycling initiatives (*Advancing cooperation among women workers*, 2018).

Findings from this study indicate that waste pickers engage with menstrual waste in different ways, which include, but are not limited to: collecting and segregating household trash, collecting garbage from streets and landfills, and collecting garbage from public spaces including public toilets.

Nonetheless, in both locations, waste pickers reported feeling uncomfortable when dealing with discarded menstrual products (FGD-BDU2, FGD-BDU3, FGD-BPU1, FGD-BDU2). This was illustrated by interviewee comments: "*We feel dirty, we feel irritated, we don't feel its right to pick that up, it is in front of our eyes*" (FGD-BPU2). "*We are ashamed to pick such a thing and that are others who watch us pick*" (FGD-BPU2). "*When I segregate then I feel bad about it… if someone is standing there then I have to tell him to go somewhere else*" (FGD-BDP1). As depicted in Table 6.1 below, waste pickers in both locations share similar concerns about menstrual waste, such as getting sick, feeling unclean and uncomfortable, or being seen or judged by others when engaging with it.

Table 6.1 Waste pickers' concerns when dealing with menstrual waste

Response	Delhi Men	Delhi Women	Pune Men	Pune Women	Total (%)[50]
I feel I might get sick	3	6	6	9	69%
I feel I might get injured	1	5	0	3	26%
It makes me feel unclean and unhygienic	1	9	4	10	69%
It makes me uncomfortable	5	9	4	8	74%
I feel I am being seen/being judged by others	1	8	3	6	51%
IDIs total sample	6	12	6	11	

Source: Author, fieldwork 2018-2019 (IDI-BDU; IDI-BDP; IDI-BPU; IDI-BPP).

An important difference observed between women and men in both Delhi and Pune, is that while many women had a positive perception of these products, men in the sample shared that they should not have to deal with this type of waste that is 'female waste,' and which results from "*women's immodesty*" (FGD-BDU2, FGD-BPU2, IDI-BDU10, IDI-BPP7). As discussed in Chapter Five, global manufacturers are driving efforts to create awareness of menstrual products and increase their accessibility. Some of these initiatives are also reaching waste pickers and informing their understanding of menstrual products. In this study, female waste pickers in the sample shared they learned about menstrual hygiene products on TV, as well as via free samples that they or their daughters received in schools (IDI-BPP4, IDI-BDU2). Female waste pickers, especially younger women, shared that they would like to have access to menstrual products because of their perceived benefits,

[50] Many respondents had more than one answer for this question, which is why the sum of the percentages exceeds 100%.

such as increased comfort, but that these are not affordable for them (IDI-BDU4, IDI-BDP5). These findings elucidate the success of commercial efforts in driving awareness of these products among different segments of the population, even those that are not yet in a position to afford these products.

On the other hand, and as demonstrated by the following interviewee comments, male waste pickers have limited understanding of these products. Some male waste pickers in this sample reported knowing of menstrual products as a result of their exposure to this type of waste. As explained by interviewees: "*Once I see it then I get to know that it is ladies thing, I get to know why do they use it and how do they use it*" (IDI-BDP6). "*When I got it in front of me, I was not aware of this thing, then my friend said such trash should be thrown away. The married guy might tell about it. I didn't have information of it yet*" (FGD-BDU2).

A common perception among male waste pickers is that only uneducated women dispose of pads 'openly' because this is a matter of propriety. In the words of one interviewee: "*The sensible lady doesn't put pads in the trash. If the lady is not sensible then she would put it open in the trash, and say: 'you should take it away we are paying you the money*" (FGD-BDU1). Male waste pickers also shared that these products should be handled by female waste pickers: "*Why shouldn't men pick pads? Ladies should have brain and think that we shouldn't show it to anyone*" (IDI-BDU8). Their comments also reflect a perception that menstrual waste is female waste: "*This only ladies pick up, they don't feel embarrassed, it is right for the women to do it, my mother doesn't allow me to touch*" (FGD-BPU2). "*Women pick it because women are aware of it. We cannot tell a woman [waste picker] to pick up, she picks her garbage, but internally we feel she should*" (FGD-BDU2).

Women interviewed for this study also agreed with the view that this type of waste should be handled by females. While these women shared that it is uncomfortable for them to deal with this waste, they think their discomfort matters less than that of men. These views are reflected in interviewees comments: "*It is lady's thing right, how can a man pick that up? He might feel disgusted by it*" (FGD-BDU2). "*Males feel disgusted if they get to see this. Ladies don't feel so bad about it. They [men] feel disgusted and we feel shy of it because we work with them*" (IDI –BDP4).

It is important to note that no indication was found that 'male waste' (i.e. condoms) should be handled only by men. This was reflected in interviewee comments: "*In hostels bins, we get lot of condoms, we pick it up ourselves, we don't ask men to come and pick it up. The condoms too are not wrapped and*

all" (FGD-BPU3). "*If there is something of the body – man won't pick up, but us everything that comes in front of us we have to pick up*" (IDI-BDP3). As for other types of sanitary waste like diapers, waste pickers shared that while these can be disgusting to handle, there is no taboo or notions of impropriety associated with them (FGD-BPU2, FGD-BPU3, FGD-BDP1). These findings indicate that taboos and societal percetions about menstruation also apply to menstrual waste and are an important consideration for waste pickers who engage with this waste.

Table 6.2 Waste pickers' perceptions on who should manage menstrual waste

Response	Delhi Men	Delhi Women	Pune Men	Pune Women	Total (%)
Only women	6	8	5	7	74%
Both men and women	0	4	1	4	26%
IDIs total sample	6	12	6	11	100%

Source: Author, fieldwork 2018-2019 (IDI-BDU; IDI-BDP; IDI-BPU; IDI-BPP).

Furthermore, the majority of waste pickers in this sample believe that menstrual blood is a source of harm for them, for animals, and also for the users who dispose of these products. Like some consumers, waste pickers in this sample share the belief that if animals, like cows (Delhi) or snakes, (Pune) eat a woman's menstrual product she can become infertile (FGD-BDP1, IDI-BDP1, IDI-BPU6). Some male waste pickers also have the perception that if they burn menstrual products this could have negative repercussions for the women who disposed of them. As explained by interviewees: "*How can it be disposed of? Even if you burn it then also it would give harm to that lady. If you would throw it in the fire, then the lady would get weaker*" (FGD-BDU2). In addition, some male and female waste pickers believe that menstrual waste is less likely to affect them and their surroundings if it remains out of sight (FGD-BPP1, IDI-BDP5, IDI-BDU2). This can lead them to throw away collected menstrual waste in open spaces or to bury it with other waste. This is reflected in interviewee comments: "*If we throw in place where no person is living, there will be no pollution*" (IDI-BDU1). "*All ladies should use pads to not have infection, if it goes in ocean and piles there better*" (IDI-BDU3).

As a consequence of these negative perceptions of menstrual blood and menstrual waste, it is not uncommon for waste pickers to actively avoid engaging with these products when collecting waste from streets or landfills. They only engage with them if they are attached to a material they can sell (IDI-K24). On the other hand, for those waste pickers who collect garbage from households it is more common to come across these products on a regular basis (FGD-BDU1, FGD-BPU3). If waste pickers

find menstrual products in household waste, they usually place them with the rest of the materials they cannot sell, which they then throw in landfills and open areas, or burn with other waste. As explained by one interviewee: "*I set them* [menstrual products] *aside and dump them in the mud, there is a place nearby my home everybody throws the filth over there, so it's not visible*" (IDI-BPP5).

Moreover, as discussed in Chapter Five, consumers often wrap soiled menstrual products in plastic and newspaper. Since this waste is rarely marked, waste pickers have no way of knowing which plastic bags and wrappers contain menstrual waste (IDI-BPU3). This can make them less likely to want to segregate the household waste they collect. As explained by one interview: "*Once I opened one plastic bag which had lot of sanitary pads which were kept for a long time. As I opened it, the smell from it was so strong and bad I threw up and wasn't well for 15 days*" (FGD-BPU2).

In spite of these challenges, one common perception among waste pickers in Delhi and Pune is that they cannot refuse to collect this type of waste from households because otherwise they don't get access to all the waste, which can be one of their main sources of income (FGD-BDU2, IDI-BDU10, IDI-BDP8, IDI-BPU9). This is reflected in interviewee comments: "*You are taking money from us, then why aren't picking all types of trash from us they say, then they stop giving us any type of trash, then how would we earn money. We have to pick all types of trash helplessly*" (FGD-BDP1).

In this regard, an important difference between Pune and Delhi, is that in the former there appears to be greater empathy from consumers towards waste pickers. This can be explained by the official role that waste pickers play in collection services thanks to the agreement between the waste pickers' association SWaCH and the Pune Municipal Corporation (PMC). For example, having designated areas to collect waste from can lead waste pickers to establish regular rapport with households and help citizens to get to know them. The uniforms and carts provided by the association and paid for by government funds also help individuals to recognise them as official workers. On the other hand, in Delhi the majority of waste pickers don't have designated areas or a recognisable uniform, which can increase the challenges they face when interacting with consumers (IDI-K23).[51]

Lastly, as Table 6.3 shows, most waste pickers in both locations (77%) consider menstrual waste an important waste problem. Waste pickers have noticed that waste from menstrual products has

[51] In addition, another factor that increases the difficulty of consumers being empathetic towards waste pickers in Delhi is the fact that significant proportion of waste pickers in the city are immigrants from other states, who cannot find other sources of employment (IDI-K23).

increased in recent years (IDI-BPU9, IDI-BDP7). This is reflected in their comments: "*Ladies waste – we don't get such kind of waste earlier, they used to throw in a good place, now the entire tradition has gone, time is changing so ladies are disposing it*" (FGD-BDU2). "*Earlier it was like we used to get from the societies now from the slums and they throw it in anyway, at least people from the society wrap it in the paper and then throw in dustbin*" (IDI-BPP3). This is an important finding because it indicates that as a result of growing quantities of menstrual waste in India waste pickers are being increasingly exposed to it. It also underscores how some disposal practices are an important reason why waste pickers struggle to manage this waste and why they are increasingly seeing it as a relevant challenge to conduct their work.

Table 6.3 Waste pickers' perceptions of whether menstrual waste is an important issue

Response	Delhi Men	Delhi Women	Pune Men	Pune Women	Total (%)
Yes	3	7	6	11	77%
No	3	5	0	0	23%
IDIs total sample	6	12	6	11	100%

Source: Author, fieldwork 2018-2019 (IDI-BDU; IDI-BDP; IDI-BPU; IDI-BPP).

Table 6.4 below summarizes the observed practices and perceptions among waste pickers in Delhi and Pune and highlights observed differences. As shown, in both Delhi and Pune waste pickers experience notions of shame and embarrassment when dealing with these products and, like consumers, they perceive menstrual blood as harmful. In many instances this waste is considered to be more damaging than other types of sanitary waste. What is more, some waste pickers perceive menstrual waste as female waste and think it should be handled by females. For all these reasons, waste pickers actively try to avoid engaging with soiled menstrual products when collecting waste; evade segregating them when they come across them in household waste, and throw them in open spaces or burn them with other waste. In addition, in spite of the discomfort that handling this waste can bring to them, there is a perception that they cannot refuse to collect it from households because they will lose a source of income.

Table 6.4 Comparative analysis of waste pickers' usage and disposal practices

	PRACTICES	PERCEPTIONS	OBSERVED DIFFERENCES
WASTE MANAGEMENT	• Not collecting menstrual waste • Not segregating menstrual waste • Actively avoiding menstrual waste • Throwing menstrual waste in open spaces or burning them with other waste	• It is shameful to be seen handling menstrual waste • Menstrual waste is seen as female waste and as only fit to be handled by females • Menstrual waste is becoming an issue for their work and their surroundings • They cannot refuse to collect menstrual waste from households • Menstrual blood is dirty and can be harmful to others and to women themselves (e.g. cause infertility)	• In general, women have a greater awareness of menstrual products than men, and a positive perception of them

Source: Author, fieldwork 2018-2019.

My findings indicate that there are important similarities in the ways waste pickers perceive and engage with menstrual waste in both locations, and that differences are more clearly observed between female and male waste pickers. For example, compared to men, female waste pickers tend to have a greater awareness of menstrual products even if they cannot afford them regularly. Nonetheless, an important observation that can be made from this empirical analysis is that in both locations, for both women and men, gender norms are an important factor that shapes how menstrual waste is collected, segregated, and destroyed. To continue the analysis, the next subsection dives deeper into the gender norms that shape these practices, as well as how these intersect with other forms of social difference.

6.2.2 Gender norms in the management of menstrual waste in India

The review of literature conducted in Chapter Two found that caste dynamics are an important factor that can determine which individuals engage in waste picking work and that adds to the difficulties of doing this work. As for menstrual waste, there is some evidence that waste pickers face challenges to

manage this waste, such as health risks but I found limited evidence on the influence of gender norms on waste pickers' practices. This subsection investigates the norms that inform waste pickers' understanding and experience of menstruation and how these norms interact with caste dynamics.

To further understand the role that gender norms play in shaping waste picking practices, this discussion explores how gender norms are understood and experienced by waste pickers in Delhi and Pune. The empirical findings show that female waste pickers' face restrictions in their daily activities when they are menstruating. Many female waste pickers in this sample believe that women should refrain from certain activities when menstruating, such as cooking, because they are in an impure state. However, in practice, some of these restrictions are hard for them to comply with because they need to work to sustain their families (FGD-BDU1, FGD-BPU2, IDI-BDP2).

Female waste pickers also associate menstruation with notions of shame. All waste pickers in this sample think it is improper for others to know women are menstruating, especially men. This is reflected in interviewee comments: "*Why shouldn't male see it? It would burn his eyes if they see the stains in clothes*" (IDI-BDU2). "*Once there were TV commercial about pads, my husband told me to change the channel because everyone was there are at home, you should not say all this very openly*" (IDI-BDU7). "*If other person sees it then he would say bad about me, he would say that your wife is shameless woman and she doesn't know what to do*" (IDI-BPP2). As discussed in the previous section, the perception that it is shameful to be associated with menstruation also applies to being seen engaging with menstrual waste. As explained by one interviewee: "*When men see me doing it* [engaging with menstrual waste], *it makes me shy and uncomfortable*" (IDI-BDU5).

The secrecy around menstruation also means that practices and beliefs around menstruation are mainly discussed, passed on, and enforced by women. In general, female waste pickers have limited sources of information about menstruation because most of them don't get the opportunity to go to school. For many, their main source of information are their relatives and peers, who usually also lack access to reliable sources of information (IDI-K6). This is reflected in interviewee comments: "*I did not get periods so I didn't know what it was, it was all blood then I went and asked my mother, then my mother said this is dirty thing*" (IDI-BPU6). "*She folded the cloth and she gave it to me, my mother didn't tell me much, she said you have to do this thing for the rest of life. I thought it would happen every day for the rest of my life, then I asked my sister in law what should I do about it, should I take medicine to get cured, she said are you mad or what? It would get okay after four or five days*" (IDI-BPP6).

Male waste pickers were found to have even less sources of information than women. While some educational campaigns in India are now including boys in schools, I didn't find any institutional efforts to educate male waste pickers. As explained by one interviewee: "*In Delhi a lot of waste pickers are uneducated and also immigrants from other parts of the country. Many don't live with their wives who remain in their villages so are not exposed to any source of information*" (IDI-K6). In both Pune and Delhi, men interviewed were unwilling to discuss this topic. None of the male waste pickers knew how much products cost, how many women need, or how these are used. They assumed that if women use them, these should be good for them. What is more, those who are unmarried said that they cannot talk about menstruation in front of their elders, maybe only among their peers, but this is something that 'should not be discussed' (FGD-BDU2, FGD-BPU2, IDI-BPU7, IDI-BDP8).

The lack of sources of information and exposure to menstruation can explain the perception that menstrual waste is the result of women's immodesty and that, unlike other types of sanitary waste, this is exclusively female and should only be handled by women. Moreover, as mentioned in section 6.2.1, a common perception among female and male waste pickers in both locations is that menstrual blood is harmful and can have negative effects on themselves and others. Similarly to consumers, many waste pickers believe that if a person comes across a soiled product, this can cause him or her harm (FGD-BDP1, FGD-BDU3, IDI-BPU5). Another belief is that menstrual blood can be used for black magic (IDI-BDU6). For this reason, they consider disposing of products in household waste as 'improper' and 'dangerous', and they often burn or hide this waste (IDI-BDU5, IDI-BDU9, IDI-BPU4).

In congruence with Chapter Five, these findings indicate that by becoming embedded in commodity chains, gender norms and the notions of shame and harm that they entail also become associated with menstrual products and with menstrual waste. There are various similarities in the ways consumers and waste pickers experience gender norms, including the restrictions they follow and the belief that menstrual blood is harmful. However, an important difference to note is that waste pickers, both female and male have limited access to menstrual products because they cannot afford to buy them regularly. Compared to females, male waste pickers lack even more information about these products, and many only became aware of them when they came across them in the form of waste. This is an important insight for the discussion because it elucidates that tensions can take place through the use and disposal of commodities, but also through the management of waste from these commodities. In the case of India, the growing quantities of menstrual waste can be a reason why individuals engage with these products and why the ways in which they experience gender norms around menstruation become relevant for their practices, even if they do not menstruate, e.g. male

waste pickers. The next section continues this discussion by exploring how caste dynamics also influence the way in which waste pickers participate in this commodity chain.

Caste and other social dynamics of differentiation

The laws of pollution and purity of the Hindu caste system remain a strong factor that informs how individuals are perceived and treated (Kapadia, 2014). In India, it is estimated that 95% of the over 1.5 million waste pickers are Dalits, the lower caste in the Hindu system, previously known as "untouchables" (Thompson, 2019). Waste pickers' lower caste can create a societal perception that they are inferior individuals who are unreliable and dirty. This perception can be compounded by the negative association with waste management work. As explained by one interviewee: "*Waste pickers are perceived as thieves lurking in the dark*" (IDI-K23). When interviewed for this study one representative from SWaCH, commented that in the past, and before the association started working more closely with the PMC, waste pickers faced lot of harassment form police and citizens. In his words: "*The perception was that they were doing degrading work in landfills*" (IDI-K22).

These views can also hamper waste pickers' self-esteem and affect their behaviours towards others. This is reflected in the comments of interviewees: "*Nobody want to go for waste picking work because it is untidy thing. People insult us but we can't reply to them*" (FGD-BDU2). "*There are many people who have nice life style and we are living in garbage, people think that we are illiterates and they say anything, I won't be able to answer them as we are poor people, we are helpless*." (FGD-BDP1). "*It is garbage so we have to pick it up, it is in our destiny*" (IDI-BPP1).

Waste pickers interviewed for this study also shared that because consumers have a generally negative perception of them, they are not likely to listen to their requests or consider their needs. This is reflected in interviewees' comments and in quotes from other studies: "*They throw like that in our bucket even though we tell them not to*" (IDI-BDU4). "*Many times I have told to ladies of that area but they don't listen to me. They say I don't do this*" (FGD-BPU3). "*We have to pick all types of trash helplessly*" (IDI-BDP1). "*Someone had tucked a bag of napkins under a concrete slab, only for it to be pulled out and scattered on the road by a dog. 'Why do they do this? As it is we have to open each and every bag and segregate waste before putting it in the corporation truck. Now I will have to collect all this in front of all the men passing by. Have I no honour just because I am a waste picker?*"[52]

[52] This last quote was taken from Basu (2015).

What is more, caste dynamics can disproportionality affect female waste pickers by increasing their social and economic vulnerability**.** Many female waste pickers in this sample shared that they would like to have additional sources of income, such as cleaning or cooking, that but the stigma of being waste pickers and from a lower caste makes it harder for them to find other type of work. In the words of one interviewee: "*everybody knows me, I have to move to get new job, nobody will give me even mopping job*" (IDI-BDP3). In fact, a lot of women enter this occupation because there are few work opportunities for women with little education. Others do so when they get married because their husbands are waste pickers or when their husbands leave them, die, become injured, or develop an addiction (IDI-K23). As explained by interviewees: "*I told him* [her husband] *that I will not do this work, this work is not good, he said do it now, we will leave this work slowly. We never did*" (IDI-BDP2). "*We were not given any option to be something else or work somewhere else. It's not our choice to be a waste picker; there are no other means of earning or occupation*" (FGD-BDU3). "*It doesn't matter what we feel about it. We have no other choice than doing this work*" (IDI-BPP4). When asked about the benefits of working in waste picking, some said that that this is a respectable way for women to make money.[53]

The influence of gender norms on waste pickers' work can also be seen in the division of labour. Men are more often involved in collecting bigger pieces of metal, aluminium, while women collect mainly plastic bottles and glass. It is also more common for women to be involved in the manual sorting processes, while men pick up materials on the streets or at large generators (IDI-K27). These differences are also reflected in interviewees comments: "*Polythene and light trash can be picked by ladies and heavy trash should be picked by males*" (FGD-BDU1). "*We do everything men do with tools, we do with the hand*" (FGD-BPP1). Furthermore, across both locations, female waste pickers reported earning less than males, or not knowing how much they make because scrap is sold by their husbands.[54]

These findings are in alignment with the evidence I collected in the literature review in Chapter Two, which highlighted the ways in which caste is an important social differentiator in India and how these

[53] In this study, male waste pickers in general had a more positive opinion of waste picking works. This is reflected in interviewee comments: "*Better to be safe doing this work than be unsafe in factory. I want to do any respectful work*" (FGD-BDU2).

[54] Various studies have focused on the challenges that waste pickers in India face such as, including unsanitary work conditions, lack of legal protection, harassment, etc. (Chikarmane, 2012; *Wastepickers*, 2018). Relatedly, a recent study conducted by Dalberg showed that female sanitation workers usually have male supervisors, which can result in lack "empathetic" supervision and failure to understand their needs, as well as in frequent harassment (*Sanitation worker safety and livelihoods in India*, 2018).

dynamics can create additional challenges for individuals who work in waste management (who are usually from lower castes). These findings show that caste dynamics matter for the management of menstrual waste because these can reinforce waste pickers' perceptions that they are unable to refuse to collect menstrual waste or to demand better disposal practices from consumers. What is more, the combination of gender norms and caste dynamics can disproportionally affect female waste pickers by increasing the challenges they face while engaging in this type of work. It is important to note that in India a significant proportion of waste pickers are women, and that they can play an important role in menstrual waste management because as discussed in section 6.2.1, this waste is often considered 'female waste' that must be collected by females.

As in Chapter Five, this analysis underscores the value of a gendered approach to societal embeddedness to explore how the waste that results from commodities is managed in local contexts that are permeated by gender norms. Findings also elucidate the value of adopting an intersectional perspective to better understand the challenges that waste pickers face, including social discrimination based on gender and caste. Even if the main focus of the analysis is unpacking the influence of gender norms; an intersectional perspective shows that these norms are in constant interaction with other socially construed forms of difference and cannot be explored in isolation. The next section continues to explore tensions by looking at the different activities from commercial and non-commercial actors in the menstrual products chain to investigate if and how these also influence waste pickers' disposal practices.

6.3 Investigating the role of actors in the management of menstrual waste in India

The discussion in Chapter Two showed that various actors are playing an increasingly important role in driving access to menstrual products. Nonetheless, the findings discussed in Chapter Five also revealed that there are considerably less efforts aimed at supporting consumers in the disposal of these products. This part of the analysis discusses the roles that different actors play in the management of menstrual waste by leveraging the ability of the GPN approach to conceptualise a greater diversity of stakeholders. This analysis also continues to pay attention to the ways in which firms (global and local), the Indian government, and civil society organisations respond to gender norms.

6.3.1 The firms: global and local

As mentioned in section 6.2.1, the efforts of global manufacturers are succeeding in creating a positive perception of menstrual products among female waste pickers. On the other hand, efforts of smaller firms that manufacture reusable and biodegradable alternatives are rarely successful in reaching this segment of the population because their campaigns are usually done via online channels to which waste pickers have very limited, if any exposure (IDI-K20). Nonetheless, these positive perceptions of menstrual products are indicative of the ways in which commercial activities are changing traditional perceptions of how menstruation should be managed.

Still, when it comes to the management of menstrual waste, I found limited commercial efforts in both locations. In Pune, despite various efforts from waste pickers' associations, manufacturers have historically refused to engage on efforts to improve the disposal of menstrual products. In 2013, the PMC made a public attempt to contact the manufacturers and requested that they provide separate easily identifiable bags to discard the used products, but these efforts received no response (Basu, 2015). It was only until November 2019, that the PMC announced the launch of a pilot project to segregate and incinerate sanitary waste in partnership with a global manufacturer and with SWaCH. This project is yet to be implemented, but funds and equipment for the incineration plant will be provided by the firm, while SWaCH and the PMC will jointly implement segregation on the ground (IDI-K22). I found no similar projects or initiative in other parts of India, Delhi included.

As argued in Chapter Five, the efforts of global firms can contribute to challenge some gender norms; for example, by promoting a more open conversation about menstruation. However, these findings show that the efforts from global firms to take active part on the management of menstrual waste and to engage with waste pickers are scarce and only quite recent. Hence, their efforts are not only limited in terms of disposal practices, but also in relation to menstrual waste management. Related to the discussion in section 5.3.1, the question that emerges from this analysis is why are firms in India not focusing their efforts on the norms that affect waste management? The next section explores the actions of the Indian government and civil society organisations and whether these align with or contravene the efforts of firms in relation to waste management. This is done by continuing to utilise the potential for the GPN to incorporate the institutional and social context where chains are embedded.

6.3.2 The Indian government

As discussed in Chapter Five, in India the government has recently deployed various initiatives related to improving waste management and to driving awareness of the importance of keeping cities and open spaces clean.[55] These initiatives differ at a local level, and are important differences between Delhi and Pune. In the latter, in 2008 the PMC signed a memorandum of understanding SWaCH, which made official the role of waste pickers in the waste collection activities in the city. As a result of these agreement, the city "*gave waste pickers the sole right to collect waste*" by removing big dumpsters where waste could be disposed of, and encouraging households to pay a small fee to waste pickers to collect it (IDI-K5).[56] Unlike sanitation workers who are directly employed by the PMC, waste pickers remain independent workers whose role is to collect waste from households, segregate it, and give to the city's collection trucks. SWaCH estimates there are 9000 waste pickers in Pune, of which 3500 are part of the association and work under this arrangement. These waste pickers cover 80,000 properties every day, which generate approximately 65% of the city's waste (IDI-K22).

Some limitations of this partnership are that some areas are not covered, especially peri-urban or slums were waste pickers are less likely to receive a fee for collection. Another issue is that coordination can be inefficient, even when there are rules in place, because there are limited enforcement mechanisms. As explained by one interviewee: "*this is a union model, not a business model, accountability and control over the service is not very smooth*" (IDI-K5). In Delhi, the Municipal Corporations have assigned contracts to private firms to collect and transport waste from community bins to landfills, which means waste pickers don't have official public recognition of their contributions to waste management, although some have informal arrangements with household to collect waste.[57]

The analysis of the role of the Indian government in the disposal stage has shown that even though local governments are driving efforts to improve the management of waste, which technically includes menstrual waste; existing institutional efforts are not sufficiently considering the role of waste pickers in the management of menstrual waste nor the challenges they face to manage it. This also leads to question why the Indian government is not addressing the management of menstrual waste at a local level, especially given the increasing attention that is being placed on sanitation? The next and last

[55] With the exception of the plastic ban in Pune, very limited awareness on these campaigns was observed among waste pickers in Delhi and Pune.

[56] Not all local regulations allow waste pickers to collect, segregate and sell waste from landfills, in some cases they can be deemed to be committing theft under the Indian Penal Code, 1860 (Reddy, 2018).

[57] Studies conducted by NGOs and academics have found that privatization of these services has limited waste pickers' access to waste materials and hampered their livelihoods (Chaturvedi, 2017; *Wastepickers*, 2018).

part of this analysis focuses on the role waste pickers organisations in India play in challenging commercial activities, as well as institutional efforts and policies.

6.3.3 Civil Society

Civil society organisations in India also play an important role in training waste pickers and providing them with a support network. The aforementioned association SWaCH, is one example of such organisations and it is India's first fully worker-owned cooperative of self-employed waste-collectors. In Pune, as part of an agreement with the municipality, SWaCH receives financial support to conduct trainings and to provide working tools to waste pickers, such as uniforms and push carts. The association helps waste pickers learn how to segregate all types of waste. It also provides communication channels for them to raise problems, as well as support on issues such as domestic violence and children's education. The foundations of SWaCH were laid by Kagad Kach Patra Kaghtakari Panchayat (KKPKP), the union of waste pickers formed in Pune in 1993. Since its origin in 2005, SWaCH has grown by building a network of female waste pickers (IDI-K23).[58] According to a senior representative of the association, an important reason why they have been successful in securing support from the municipality is their continued focus on the concerns of women, such as education and social welfare, and their peaceful approach to advocate for the right of waste pickers. SWaCH has also played an important role in putting pressure on firms to address the disposal of menstrual products. One of such efforts included depositing bags of soiled products in the offices of three major manufactures in order to demand they take action to address menstrual waste (Najmi, 2013).

Relatedly, an important initiative to address is the Red Dot campaign. As discussed in section 5.3.3 in Chapter Five, this is led by SWaCH and aims to raise awareness amongst households on the importance of properly disposing of menstrual products and diapers by wrapping them in newspaper and marking the packages with a red dot. The objective of the campaign is to "*ensure the dignity of waste pickers*" by preventing them from being exposed directly to this type of waste (IDI-K22). This is the first of its kind in India. As part of the campaign, members of the association also manufacture and sell red-labelled newspaper bags; SWaCH estimates that over 50,000 bags are sold per month. These efforts

[58] Today the association also welcomes men but approximately 85% of SWaCH's over 3500 members are female (IDI-K27). It is important to note that a disproportionate number of waste pickers in Pune are female, interviewees explained that the reason is mainly historical. In the 1970's as a result of draughts, such as those experienced in Solapur and Ahmednagar, a significant amount of migrants came from villages to the city. While men were able to find construction work, waste picking was one of the few occupations available for unskilled women (IDI-K23).

are supported by other NGOs in Pune, such as the Humjoli Foundation, but not by the local government.

On the other hand, in Delhi, the size of the city and the number of associations makes coordination more complex. There are over fifteen associations of varying composition, as well as NGOs that work with waste pickers. As expressed by a consultant working on waste management: "*Delhi, fifteen years ago, was still much smaller than Pune is today and it is much more cosmopolitan. Having people from different backgrounds makes it so much harder to organize them*" (IDI-K23). Many of these organisations also have different views of the issues that need to be addressed and are focusing on different activities, including but not limited to the provision of support and training. In the words of one interviewee: "*In Delhi, groups may have the same objective but have different paths and constantly clash with each other to the detriment of the waste pickers they represent*" (IDI-K27).

These findings make evident that civil society organisations can provide different forms of support to waste pickers, including training on the importance of segregating sanitary waste. Yet, the divergence in interests and difficulties to collaborate with each other can hamper their ability to scale their efforts and to reach waste pickers that are not part of an association.

To sum up, the mapping of actors discussed in this section aligns with the analysis conducted in Chapter Five and shows that the gendered societal embeddedness of firms can lead them to interact with other non-commercial actors that can have different interests and views. In the case of India, there are varied approaches to the management of menstrual waste and different views on the need to challenge gender norms related to waste management. I argue that the insufficient attention that actors place on the management of menstrual waste is an important reason why gender norms in India remain a prevalent influence in waste pickers' practices and perceptions. As discussed in Chapter Five, even when efforts to challenge gender norms are abundant, these can still shape practices. Therefore, it is less likely that gender norms will be transformed if efforts are scarce and siloed. Lastly, this analysis also raises questions on the reason why actors don't pay sufficient attention to menstrual waste and on whether conflicting interests can prevent changes in the practices of waste pickers? In the next section, I build on the empirical findings discussed far to advance the analysis of tensions and how these relate to the environment.

6.4 The manifestations of tensions in the management of menstrual waste

The empirical analysis of waste pickers' disposal practices has so far shown that as a result of the embeddedness of the chain in a societal context the negative associations that gender norms create around menstruation are also applied to menstrual waste, which is increasingly growing in India. The prevalent influence of these gender norms in waste pickers' practices and perceptions can also be attributed to the lack of efforts from various actors around menstrual waste management. In this sample, the insufficient information and support that waste pickers receive makes them more likely to associate menstrual waste with notions of shame, dirt, and harm. For these reasons, I argue that tensions between gender norms and commercial activities also manifest in waste management practices.

The first way in which tensions manifest is in waste pickers' unwillingness to engage with menstrual waste. As discussed, commercial strategies and institutional efforts in India are driving access to menstrual products and consequently, increasing the amount of menstrual waste. Findings also indicate that a common perception among waste pickers is that menstruation is a shameful process and that menstrual blood is dirty and can cause different forms of harm. This is an important reason why they can experience significant stress when colleting and segregating menstrual waste. In addition, some waste pickers consider this type of waste to be 'female waste.' Unlike other types of sanitary waste that waste pickers find unpleasant to handle, they consider shameful to be seen engaging with menstrual waste. These perceptions can lead waste pickers to avoid collecting this type of waste, and to bury and burn it to destroy menstrual blood and avoid harm for themselves and for others. In fact, some waste pickers in this sample believe that these products don't have negative consequences if these are not disposed in their immediate surroundings. This is reflected in the comment of one interviewee: "*All ladies should use pads to not have infection, if it goes in ocean and piles there better*" (IDI- BPP3). For these reasons I argue that gender norms also shape waste pickers' practices and their perceptions of the impacts that these products have on their surroundings.

The second way in which tensions manifest is in waste pickers' lessened ability to support initiatives to improve the management of menstrual waste. As findings show, waste pickers' fear that they will lose their source of income is an important reason why they refrain from asking consumers to segregate menstrual waste. Caste dynamics can compound this situation by informing negative perceptions that waste pickers have of themselves and that consumers have of them. For example, the Red Dot campaign led by SWaCh, relies significantly on waste pickers as the mechanism to reach and educate consumers. As explained by one senior representative of the association: "*Since we don't*

have the money or scope to do segregation campaign and advocacy with all citizens, we train waste pickers and have them communicate the message of segregating at source" (IDI-K22). However, waste pickers' can feel unable to demand the segregation of this type from consumers; and consumers can also be reluctant to respond to their demands because of the negative perceptions that they have of them. In the words of one waste picker interviewed for this study: "*They should throw it properly it should not touch someone's hand but who would tell this to house owners? If I would tell them, then they would say you stupid you pick the trash and you take the money, for what thing do we pay to you, that's why we cannot ask question whatever you would give to us we would take it away*" (FGD-BPU2).

My findings continue to show that the processes of commodification do not automatically change gender norms. In Chapter Five I argued that the increased access to menstrual products is not necessarily leading consumers to challenge the societal perceptions of how menstruation should be managed. These findings add to this investigation by showing that the expansion of production can also lead to tensions in unexpected areas of the chain, such as waste management. As discussed, in section 6.2.2, the ways in which waste pickers experience gender norms around menstruation also becomes relevant for their practices because they engage with menstrual products in the form of waste. These tensions can have negative impacts for waste pickers by causing them to experience stress and anxiety when dealing with this waste. These impacts can be greater for female waste pickers because of the view that the waste should be handled only by females. Nonetheless, as done in Chapter Five, to expand this investigation I consider the relation between tensions and the environment. In the next section I will explore how the observed waste management practices in this study relate to environmental impacts.

6.5 Exploring the environmental impacts from the management of menstrual waste

This section discusses the environmental impacts associated with the observed practices to manage menstrual waste. As findings show, if waste pickers find menstrual products in household waste, they usually place them with the rest of the materials they cannot sell, which they then throw in landfills and open areas, or burn with other waste. If they find these products when collecting waste, they are also likely to avoid them in great part because of the shame associated with being seen engaging with them. This decreases the likelihood that these products will be collected, segregated, and eventually destroyed, and it increases the likelihood that this waste will be introduced into ecological cycles. As discussed in section 2.4.3 in Chapter Two, an important way in which economic production generates adverse impacts on the environment is through the introduction of materials that can interfere with natural cycles (Commoner, 1971).

Consumers' disposal practices can also contribute to the aforementioned adverse environmental impacts by increasing the difficulty that waste pickers face to manage menstrual waste. As discussed in Chapter Five, it is not uncommon for consumers to also feel ashamed of being associated with menstrual waste, and to prefer to not separate it from other waste. For these reason, waste pickers can struggle to segregate household waste and can even avoid collecting certain plastic bags if they fear finding used products in them.

The nature of the data collected for this study and the limited number of waste pickers that it represents makes it unfeasible to provide a reliable estimate of the current size of these identified impacts or their potential to scale. Nonetheless, this analysis elucidates that waste management practices can have previously unconsidered impacts for the environment. It also emphasizes the importance of better understanding the role of waste pickers in the disposal of menstrual waste and the challenges they face, in order to improve the management of this waste in India. Table 6.5 below summarizes how waste pickers' practices and perceptions can generate negative outcomes on the environment.

Table 6.5 The adverse environmental impacts that result from waste pickers' practices

	WASTE MANAGEMENT PRACTICES	ENVIRONMENTAL IMPACTS
Waste pickers in Delhi and Pune	• Not collecting menstrual waste • Not segregating menstrual waste • Avoid engaging with menstrual waste • Throwing menstrual waste in open spaces or burning it with other waste	• Increasing the likelihood that menstrual waste will disrupt ecological cycles, and decreasing the likelihood that it will be adequately collected, segregated and destroyed

Source: Author, fieldwork 2018-2019.

The environmental impacts associated with waste management practices in this study are different and can be considered additional to those already identified in existing impacts assessments. These findings further substantiate the argument that tensions between gender norms and commercial activities can have negative impacts on the environment by leading waste pickers to adopt new ways to manage menstrual waste that can generate environmental impacts. I argue that, while in theory the role of waste pickers should help to address these impacts by contributing to collect and segregate

this waste, tensions can lead them to adopt practices that can increase these impacts. These practices can also hamper waste pickers' ability to contribute to initiatives and policies that aim to improve the management of menstrual waste.

In summary, the discussion in this chapter has expanded the analysis of tensions between commercial activities and gender norms and shown that these also manifest in waste pickers' practices and perceptions, which can also generate adverse environmental impacts. This analysis contributes empirically by showing that gender norms influence how both female and male waste pickers engage with menstrual waste, and that these norms also inform their perceptions of the impacts that menstrual products can have on the environment. Analytically, this discussion continues to demonstrate the value of the conceptual framework developed for this study in order to unpack the roles of various actors in the chain. It especially highlights the importance of using a gendered approach to societal embeddedness to explore the complex interactions between the commercial and social dimensions of production from a gender perspective. Moreover, an important contribution of this analysis is that it brings forward the value of an intersectional perspective that considers how gender norms also intersect with other forms of social difference. As discussed, gender norms in conjunction with caste dynamics can compound the challenges for waste pickers in this chain and need to be considered when addressing the environmental impacts of menstrual waste. Lastly, this analysis points out the need to further analyse how tensions shape individuals' engagements with commodities at different stages of the chain and to investigate how these configurations can be redirected to change practices that lead to adverse environmental impacts.

6.6 Conclusion

This chapter continued to explore tensions between gender norms and commercial activities in the disposal stage of the menstrual products chain by discussing the findings of the GPN mapping and the comparative analysis of the waste management practices and perceptions. In doing so it addresses the third sub-question of this study: *How do tensions between gender norms and commercial activities shape waste pickers' perceptions and practices of menstrual waste management in India, and what is the connection between these practices and adverse environmental impacts?*

This discussion has continued to demonstrate the ability of the conceptual framework developed for this study to explore how socially-formed gender norms at the local level intersect with commercial activities. This analysis showed the value of a gendered approach to societal embeddedness and an intersectional perspective to understand the ways in which gender norms and caste dynamics shape

the actions of various actors, including those at the margins of the chain. Building on the findings, I argue that tensions between gender norms and commercial activities lead waste pickers to adopt new ways to engage with menstrual waste, and that these practices can compound the environmental impacts that these products have. This suggests that even though waste pickers have a role in the chain that can contribute to mitigate the impacts of these products, their practices can in fact decrease the likelihood that these products will be adequately destroyed and increase the probability that they will disrupt ecological cycles.

My findings also show that different actors in the chain have different and at times, contrasting, interest regarding the need to challenge gender norms related to waste management. There are very few efforts from global firms and form the Indian government related to menstrual waste management. These efforts also often fail to take waste pickers into account and the challenges they face to manage this type of waste. While various civil society organisations are helping to advocate for waste pickers' rights and their contribution to waste management, many of these efforts are often under-resourced and lack coordination with other actors.

This analysis strengthens the argument I made in Chapter Five which is that tensions matter for the environment because they can lead individuals to adopt new ways to dispose of menstrual products, which can compound the environmental impacts of these products. The discussion in this chapter has shown that waste pickers' practices can generate adverse impacts on the environment and that gender norms play an important role in shaping these practices. My findings underscore the need to explore why some gender norms can change whilst others remain prevalent and to explore how conflicts of interest between actors can reinforce this prevalence and prevent the changes that are needed to achieve less negative outcomes on the environment. The next chapter will elaborate on the analytical implications of these findings. I will continue analysing said tensions by discussing the implications these pose for the environmental governance of GPNs; well as by exploring the challenges and opportunities to change the dynamics in the chain that reproduce gender norms.

7 Challenging gendered power asymmetries to achieve transformative change in GPNs

7.1 Introduction

This chapter brings together the empirical findings of previous chapters to draw out the analytical contributions of this study and address the last research sub-question: *What are the implications of the analysis of tensions in the menstrual products chain in India for the environmental governance of GPNs?*

The main contribution of this study is showing that the tensions between gender norms and commercial activities pose important challenges for the environmental governance of GPNs because these tensions are underpinned by gendered power relations that can lead to negative outcomes on the environment. My findings show that the influence of gender norms on commercial activities that constitute commodity chains can challenge the effectiveness of existing environmental governance mechanisms, while also leading to other negative impacts on the environment. This highlights the importance and urgency of integrating gender norms as an important dimension in the analysis of environmental governance of GPNs in both practice and scholarship. I argue that the influence of gendered power relations transcends social, commercial, and environmental dimensions of production. Thus, environmental governance requires a multi-dimensional gendered approach that opens spaces for collaboration and contestation to challenge the dis-embedded nature of the chain in a Polanyian sense. I argue that collaboration efforts are not sufficient to challenge gendered power relations; both collective and individual forms of agency are needed to drive contestation and achieve more fundamental transformations in the operations of the chain and on its outcomes on the environment.

These findings also lead to a broader reflection on the ways in which the relation between gender norms, commercial activities, and environmental issues are conceptualised in GPN literature. I argue that gender norms need to be analysed in GPNs as both a fundamental cause and a consequence of environmental issues. This analysis raises questions about what really constitutes transformative change in global production and who benefits from the production and consumption of commodities in the long term?

The second section of this chapter briefly recapitulates the conceptual framework that this study developed to explore tensions between gender norms and commercial activities empirically, as well as the main empirical findings from the fieldwork in India. In the third section I discuss how gendered

power relations shape private and public types of governance in GPNs. In the fourth, I continue this discussion by unpacking the opportunities and limitations of collective and individual agency as forms of social governance to challenge gendered power relations in GPNs. The fifth section reflects on the implications that the analysis of tensions yields for transformative change and on the need to develop better analytical tools to investigate the role of gender norms in GPN literature. The sixth section concludes.

7.2 Recapitulating the conceptual framework and the empirical groundwork

In order to frame the discussion in this chapter, this section revisits the conceptual framework developed in Chapter Three and the main findings from the empirical exploration conducted in Chapters Five and Six. As discussed, to investigate tensions between gender norms and commercial activities and how these relate to environmental impacts, I build on a gendered approach to Polanyi's notion of markets as socially constructed institutions and take it further by exploring the implications that these gendered tensions have for the environment. To do so I leverage the GPN framework and two of its central concepts: *power* and *societal embeddedness*. I then apply them with a gender lens by drawing insights from FPEcon and FPEcol literatures.

Going back to the graphical description of the framework in Chapter Three, I consider the GPN as sitting at the intersection between social, commercial, and environmental dimensions. This is meant to reflect that the operations of the chain, including its relations and outcomes, are not solely commercial. In addition, the diagram showed two levels of relations: the upper level where actors such as firms, governments, and civil society organisations interact, and a lower level of individual interactions that considers consumers and waste pickers who participate in the chain. Both levels make up the relations in the chain and contribute to shape its outcomes. The embeddedness of gender norms was represented by the dotted lines that surround the intersection of the circles and the gendered relations of power were depicted by purple arrows that link the different levels and interactions in the chain and, in turn, its outcomes across the various dimensions.

This framework was applied to conduct the empirical exploration of tensions and the findings were discussed in Chapters Five and Six. The empirical analysis of waste pickers' and consumers' practices and perceptions reveals that, as a result of the societal embeddedness of the menstrual products chain, the negative associations that gender norms create around menstruation are also applied to menstrual products and menstrual waste. The prevalent influence of gender norms can lead consumers and waste pickers to adopt new ways to engage with commodities. This prevalent

influence in practices and perceptions can be partially attributed to the insufficient efforts from actors in this chain to address disposal considerations. Findings show that the limited information, education, and support that individuals receive about menstruation and menstrual products makes them more likely to continue to associate these products and their waste with notions of shame, dirt, and harm. Moreover, these practices can lead to negative impacts on the environment, which can compound the impacts that these products already have.

This analysis highlighted that tensions between gender norms and commercial activities can lead to negative impacts on the environment. This is an important insight because as discussed in Chapter Two, the implications that the transformation of gender norms through the expansion of global production have for the environment remain understudied. Moreover, an important observation that can be made from this analysis is that the processes of commodification do not automatically change gender norms. As discussed, the increased access to menstrual products and menstrual waste is not necessarily leading consumers or waste pickers to challenge the societal perceptions of how menstruation should be managed. Thus, tensions need to be further investigated to explore the reasons why some gender norms prevail and, more importantly, how can these norms be transformed to change the practices that generate adverse environmental impacts.

In this chapter I will continue to analyse said tensions by conducting a gendered analysis of the power relations in GPNs and exploring the potential that different forms of contestation have to challenge gender norms and achieve less negative outcomes on the environment. As discussed in Chapter Three, the gender norms in which commodity chains are embedded are socially configured and result from social power asymmetries between men and women (Arora-Jonsson, 2013). As a result of the gendered societal embeddedness of the chain, different actors in the chain can both challenge and reproduce socially constructed gender divisions (Barrientos, 2019). I argue that exploring these gendered power relations is important to further understand why there are tensions between gender norms and commercial activities in a commodity chain context. In other words, the analysis of power can yield important insights on the reasons why the expansion of global production can be insufficient to challenge gender norms and why the negative implications associated with these configurations can also be difficult to address.

To explore how gendered power asymmetries in the menstrual products chain shape its outcomes on the environment, I conduct a multi-levelled analysis of power from a gender perspective. An important strength of the GPN framework is that it recognises how the expansion of global production opens

channels for different forms of contestation of power relations. Following the conceptual framework developed for this study, I use the dimensions of 'power over' and 'power to' explore the ability of different commercial and non-commercial actors to challenge or reproduce gender norms present in the social contexts where the menstrual products chain operates. In addition, I look into 'power within' to investigate the agency of individuals who participate in this chain as consumers and waste pickers.

7.3 A gendered multi-dimensional approach to environmental governance in GPNs

In GPN research the analysis of governance is characterised by its complexity, dynamism, and the recognition of different forms of power (Coe, 2012). As discussed in Chapter Three, an important contribution of GPN literature to the study of governance is that it aims to capture the complexity of interactions and relations between commercial and non-commercial actors, including governments and civil society (Coe et al., 2008b; Coe and Yeung, 2019; Hess and Coe, 2016). In recognising power asymmetries and imbalances between actors, the GPN framework also enables a broader analysis of the opportunities for challenging and changing the relations, processes, and outcomes of commodity chains (Levy, 2008). The openness of the framework to look beyond commercial dynamics also means that different dimensions of governance can be explored, i.e. private, social, and public (Mayer and Posthuma, 2012). The increasing presence of non-commercial actors and the continued expansion of global production has advanced the investigation of power relations between various actors by looking at how these unfold at multiple spatial scales, i.e. global, national, and local (Alford, 2016). For example, an important insight that resulted from the adoption of a 'multi-scalar' approach to study governance is that the interaction between different dimensions of governance (i.e. public and private) can be complementary because power has to be contested by different actors and in different spaces (Alford, et al., 2017).

The focus on the embeddedness of commercial operations within societal norms has also served to explore how governance is exercised across different contexts (Hess, 2004; Ponte and Gibbon, 2005). However, as Levy (2008, p. 954) argues, ''GCC/GPN analysis has brought attention to the importance of market power in the distribution of rent and governance but has neglected discursive dimensions and wider structures of power.'' The role that gendered power relations play in GPN governance has only recently began to be explored in this literature (Barrientos, 2013). Another important arena of governance that remain understudied in GPN literature is the environment. As discussed in section 3.3.3 in Chapter Three, 'environmental governance' is defined in economic geography as the various institutional arrangements that shape human–environment interactions, including environmental regulation, and agreements at global and local scales (Havice and Campling, 2017). GVC/GPN literature

has only recently begun to explore the impact that commodity chains have on the environment. The majority of existing studies focus on the self-regulation of firms (Kleibert et al., 2020). It is also important to note that these studies often fail to sufficiently consider the social context where the chain is embedded, including gender norms. This literature also rarely explores how environmental impacts unfold at the individual level, namely through consumption and disposal practices.

In contrast to this approach to environmental governance, FPECol literature brings gender to the forefront of the analysis. In this literature, gender norms are seen as reproduced through environmental issues and also as implicated in the construction of these issues (Hawkins and Ojeda, 2011). These studies criticise neoliberal forms of environmental governance that conceptualise nature as a subsystem of the economy and focus exclusively on facilitating efficiency and profitability (Harcourt and Nelson, 2015). FPEcol also reclaims individual practices as a significant level of analysis of power relations and a space where gender norms are reproduced and contested and where environmental outcomes can be generated and transformed (Harris, 2016; Nightingale, 2006, 2011; Sundberg, 2017). Yet, these studies do not explore the role of commercial actors in environmental governance nor the ways in which commercial activities also shape the relation between gender and the environment.

This study is positioned to address gaps in both literatures by exploring how gendered power relations can shape the different types of environmental governance of GPNs and to analyse the potential to achieve less negative outcomes on the environment by contesting these gendered asymmetries of power. To do this, my analysis in the remaining sections of this chapter follows the typology of governance outlined in Chapter Three: private, public, and social. I will also discuss the limitations that collaboration efforts have to transform gendered power relations and the ways in which contestation (both collective and individual) can play a more central role in shaping the environmental governance of GPNs.

7.3.1 Private governance

Private governance in the GPN framework refers to the power of lead firms to coordinate and distribute resources along their value chains. It also refers to the strategies adopted by firms to improve the environmental and social outcomes of their operations, usually in the form of product and process standards, corporate codes of labour practice, etc.(Henson and Humphrey, 2010; Nadvi, 2008; Pickles et al., 2015). In this analysis I find that gendered power relations pose important challenges for private governance mechanisms aimed at addressing environmental impacts.

The influence of gender norms on the relations and processes that generate environmental impacts means that these impacts cannot be addressed solely by implementing strategies that are confined to the management of the environmental conditions of production, such as product standards or codes of practice. Based on the empirical findings discussed in Chapters Five and Six, I argue that an important limitation of existing approaches to private governance in relation to the environment is the focus that these have on technical solutions and quantitative approaches. As discussed in Chapter Three, global firms are increasingly relying on Life Cycle Assessments (LCAs) to guide and legitimate procurement, eco-labelling, and other production processes (Freidberg, 2013). This means that measurable indicators are becoming the key definers of progress towards the environmental efficiency in commodity chains.

However, these approaches are not designed to consider nor explore the tensions between gender norms and commercial activities. When it comes to assessing the impacts from the use and disposal of commodities an important limitation of an LCA assessment is that it often relies on non-context specific assumptions. Analysing the dynamic influence of gender norms is out of the scope of this and other similar quantitative methodologies. Yet, by failing to consider how gender norms shape practices and perceptions related to the disposal of commodities, some environmental impacts can be omitted. This is reflected in the existing assessments of menstrual products reviewed in Chapter Two, which overlook some of the impacts resulting from disposal and waste management practices of menstrual products that this study has uncovered. As demonstrated in Chapter Five, a quantitative approach is better positioned to measure these impacts, such as the additional resources needed to dispose of these products. However, the risk of using these methodologies as the sole basis to inform private governance mechanisms in GPNs is that it can lead to overlooking and oversimplifying the tensions between commercial activities and gender norms. Implementing rules and regulations based on measurable indicators can mask less visible, but equally important, activities and practices through which the environment is affected at the local level.

An important incentive for global firms to implement and adopt certification mechanisms and advertising campaigns is the increasing preference for environment-friendly products among consumers (Lemos and Agrawal, 2006). This is not the case for all commodities. In India, the overall positive perception that most actors in India have of menstrual products, including consumers, makes manufacturers less likely to experience pressure to become accountable for their disposal. Global firms are predominantly sought as partners, by both the government and NGOs, to advance MHM related efforts, such as the distribution of menstrual products in schools and rural areas. Due to this

lack of pressure and since disposal considerations are not linked to the strategies of global firms to capture value, firms have limited incentives to comply with existing environmental regulations and to address the disposal of these products in their initiatives. Global firms in the country are using their wide distribution channels and marketing campaigns and other resources to promote a more open conversation about menstruation with a view to increase sales of menstrual products. Yet, there are very few commercial efforts related to disposal and waste management of these products and there is lax compliance with regulations on Extended Producer's Responsibility and plastic waste management regulations. I didn't find information about disposal or the adverse environmental impacts of these products in any communications efforts of the four firms considered in this analysis.

In addition to the limitations and insufficiency of existing efforts, I argue that the current approach to private environmental governance in GPNs is limited because it does not consider how commercial activities reproduce gender norms. Findings show that commercial actors in India are able to use their position of power in the chain to advance different interpretations of gender norms that eventually shape disposal practices that generate adverse environmental impacts. Firms' dominant position in the chain allows them to create and advance new meanings around menstruation and menstrual products in order to drive sales. As discussed in Chapter Two, various authors have argued that the view of menstruation as a mark of women's inferiority has been reconceptualised by global firms as sickness that can be treated with solutions available in the market (Berg and Coutts, 1993; Bobel, 2018; Lahiri-Dutt, 2015). Findings from this study show that in India menstrual products are often marketed as more effective alternatives than traditional methods because they can help to better hide menstrual blood and, thus, avoid the shame of failing to comply with gender norms. By maintaining the expectation that women should avoid any links to their menstruation, commercial strategies in India can be seen as reinforcing perceptions of shame and secrecy associated with menstrual products that lead consumers and waste pickers to dispose of them in secretive ways. These practices then compound the impacts these products already have on the environment.

These findings show that the power of global firms enables them to avoid engaging in disposal efforts that are not aligned with their commercial priorities. This is an important reason why there are insufficient actions from these actors. However, the strategies of firms can also reproduce gender norms. Thus, private governance mechanisms are not likely to be sufficient to address environmental impacts if gender norms are not considered in the design of these solutions and if firms do not take into account how their strategies can indirectly shape practices that are detrimental to the environment. The next sections continue this discussion by investigating how other actors can exert

pressure on firms to change their strategies and to become aware of and accountable for the unintended impacts of their actions.

7.3.2 Public Governance

Until recently, public governance had received limited attention in GVC/GPN analysis (Alford, 2016; Mayer et al., 2017; Neilson and Pritchard, 2009). Public governance refers to government rules, regulations, and policies that shape the operations of the chain (Horner, 2017; Mayer et al., 2017; Neilson and Pritchard, 2009). Literature has found that there can be complementarities between this and private governance. For example, private labour standards can be interlayered with differing forms of regulation at global, national, and local levels (Alford, 2016; Amengual and Chirot, 2016). Historically, in environmental governance, governments have been considered as the appropriate agents for environmental action due to the view of environmental resources as public goods (Lemos and Agrawal, 2006). This study finds that pubic governance can play an important role in challenging the gendered power relations that lead to environmental impacts. However, internal conflicts of interest can prevent public actors from taking effective action to challenge these asymmetries of power.

This study finds that the ability of the government to exercise 'power over' firms, in this case to enforce regulation that makes commercial actors accountable for the end life of their products, is dependent on the extent to which environmental impacts are an important consideration for the government. As discussed in Chapter Five, the Indian government is constantly engaging and collaborating with global firms in efforts to drive access to menstrual products and has been criticised for endorsing menstrual products as the best, if not only, solution for menstruation management. However, there are limited efforts from the government to demand compliance with EPR regulation and to ensure firms implement initiatives related to disposal. As it was discussed in Chapter Five, one of the reasons why the government is not focusing sufficiently on disposal considerations is because these are not seen as directly aligned with the interpretation of the MHM guidelines. I also found that across ministries there is a lack of understanding of the adverse impacts that menstrual waste can have for the environment. Despite the growing attention to menstruation in the government's agenda, menstrual waste continues to be overlooked and there are insufficient public efforts to exercise power over firms to become responsible for financing and organising the management of menstrual waste.

What is more, findings show that an important challenge for the implementation of public governance in India is that different ministries have different mandates, which means that the government

initiatives aimed at improving environmental impacts and waste management are separate from those that aim to aim to improve access of menstrual products. Existing policies that focus on the distribution of menstrual products rarely consider the existence of disposal of infrastructure or how menstrual waste can become a challenge for individuals working in waste management; whereas environmental policies often fail to consider how gender norms can hinder the effectiveness of waste disposal infrastructure.

Nonetheless, in India the government does have power to cajole global firms to engage in solutions related to waste management, which is something that civil society has limited ability to do. In Pune, for example, despite various efforts from SWaCH, manufacturers had historically refused to engage on the disposal of menstrual products. The recently announced pilot to manage menstrual waste, in partnership with a global manufacturer and SWaCH, can be attributed to the ability of the government to pressure global firms to engage in the design and implementation of solutions related to waste management.

GPN research has highlighted that national and local governments can promote transparency and accountability among firms and that they are uniquely positioned to play a protective role of workers, including those in informal and precarious work, such as waste pickers (Alford et al., 2017; Barrientos and Barrientos, 2003). These findings show that there is potential for public forms of governance to drive change in the menstrual product chain in India. The 'power over' that the Indian government has in the menstrual products chain places it in a unique position to make firms more accountable for the end-life of their products. However, the conflicts of interest between Ministries can lead to siloed and insufficient efforts to address the challenges that the disposal of menstrual products and management of menstrual waste pose for individuals and for the environment.

In Chapter Five and Six I argued that the insufficient actions from public and private actors is an important reason why the influence of gender norms remains a prevalent in consumers' and waste pickers' practices. This discussion has shown that efforts are insufficient to address gendered power relations not only because they are limited but also because little consideration is given to gender norms in the design and implementation of strategies and polices. Additionally, public and commercial initiatives can reproduce, rather than contest, gender norms around menstruation. Even efforts to foster collaboration, such as partnerships between the public and private sector, can reproduce gender norms that then generate detrimental impacts on the environment, such as the distribution of menstrual products with limited or absent consideration of waste management systems. For this

reason, I argue that collaboration is insufficient to challenge gendered power asymmetries and that contestation efforts are needed to achieve more transformative change. The next section discusses the role of social governance in driving contestation efforts and challenging gendered power relations in the disposal stage of the menstrual products chain. I will examine this third type of governance by looking at collective and individual forms of agency and at how complementarities between them are essential to enhance the environmental governance of GPNs.

7.4 Strengthening environmental governance through collective and individual agency

As discussed in Chapter Three, agency can be exercised by individuals and collectives through purposive acts and routine practices (Bourdieu, 1977; Greener, 2002). In GPNs, civil society organizations are increasingly playing an important role in highlighting gaps in both private and public governance; demonstrating the potential of GPNs to open channels for innovative forms of contestation (Barrientos and Evers, 2014). In commodity chains analysis, social governance via collective contestation and collaboration has also been found to pressure for, and in some instances succeed in, improving the conditions for women workers (Barrientos, 2019; Hale and Wills, 2005). Studies of individual agency in commodity chains have demonstrated the potential of individual contestation to also push for change in labour markets and to lead to improvements in workers' livelihoods and their social relations (Carswell and De Neve, 2013). As Barrientos (2019, p. 259) argues "women workers are not simply 'passive victims' in global value chains; they also have agency and can agitate for more equitable outcomes." Many of these studies have noted that collective and individual forms of agency are connected. For example, by identifying and leveraging weak points in the production network, collective organisations can maximize workers' strengths and their opportunities to organise and contest commercial interests (Coe and Jordhus-Lier, 2010; Quan, 2008). In feminist literature, collective agency has also been found to amplify the voices of women and scale individuals' efforts to challenge gendered power asymmetries in ways that would not be possible for individuals alone (Gammage et al., 2015).

Building on these different literatures, in this section I look at the ways in which individual and collective forms of agency can challenge gendered power asymmetries in the menstrual products chain. First, I explore how civil society organisations, such as NGOs and waste pickers' associations, can exercise 'power to' and challenge the strategies of powerful commercial actors that reproduce gender norms. Then I investigate the potential for individual agency by focusing on consumers' and waste pickers' ability to exercise 'power within.' I look at the constraints and opportunities that

individuals in the chain face to alter their practices and perceptions and at how contestation efforts by civil society organisations can enhance this potential for change.

7.4.1 Collective agency and contestation of gendered power asymmetries in GPNs

According to my findings, the ability of civil society organisations in India to challenge commercial interests is diffuse because of the limited resources for the implementation of programmes at scale and the conflict of interest among organisations. The efforts of waste picking associations and NGOs have been central to raise awareness of the environmental impacts that result from the disposal of menstrual products, and to help waste pickers to get better conditions and recognition for their work. For example, as discussed in Chapter Six, SWaCH has played an increasingly important role in putting pressure on firms to address the disposal of menstrual products. One of such efforts includes depositing bags of used pads in the offices of three major manufactures' offices to demand they take action to address menstrual waste (Najmi, 2013). However, the limited resources and the challenges they face to coordinate with each other constrain their ability to challenge commercial interests. As expressed by an interviewee: "In Delhi, groups may have the same objective but have different paths and constantly clash with each other to the detriment of the waste pickers they represent" (IDI-K27).

What is more, the potential for collective contestation can also be negatively affected by the conflict of interest among organisations. As discussed in Chapter Five, some organisations don't consider disposal an issue that is as pressing as ensuring access and often try to collaborate with global firms. A clear example of the diversity of interests can be found in the recent removal of the 12% tax of menstrual products. This has been celebrated as the result of successful advocacy to make products more affordable. On the other hand, this initiative has been criticised because it could potentially increase the negative environmental impacts of these products. Manufacturers have also expressed concerns that these changes would make it unviable to manufacture products locally, including those made by small scale manufacturers and self-help groups, and that this would benefit importers that are seen as offering lower quality products (Kishore, 2018).

Moreover, their efforts tend to be more successful when they receive support from other actors such as local governments. For example, the success SWaCH has had in training waste pickers to handle sanitary waste and improve their working conditions can be partially attributed to the partnership that the association has maintained with the local government for several years. This has been the result of constant negotiation and has given SWaCH funds to sustain their operations. On the other hand, other efforts from this association that lack direct government support have been, arguably,

less successful. As discussed in Chapter Six, the Red Dot campaign has had limited reach among consumers due to lack of funding and the reliance on waste pickers as the main channels to reach consumers.

These findings demonstrate that the potential for social governance to be successful in shaping governance depends on the ability of actors to mobilise in a coordinated manner, as well as on the support that they receive from other actors, namely the government. Collective efforts can help to bring to light the unintended consequences of commercial strategies and policies on the environment and for individuals working in waste management. Since civil society organisations in India have insufficient resources and often struggle to collaborate with each other, their ability to contest the actions of powerful actors that reproduce gender norms can be insufficient on its own. Moreover, this analysis also found that the outcomes of collective forms of agency are not always good for the environment.

This discussion has so far shown that in light of power asymmetries and conflicts of interest between and within actor groups, collaboration can be insufficient to transform gendered power relations, hence why contestation also has an important role to play in achieving change. Opening spaces for contestation in environmental governance of GPNs requires enabling a wide range of less powerful actors to contribute their perspectives on the social and environmental challenges associated with commodities. As my findings show, an on-going interchange of views is needed not only to increase opportunities for collaboration, but also to challenge the often flawed views on the needs, wants, and concerns of consumers and waste pickers in relation to menstrual products and menstrual waste. In the next part of the discussion I continue to explore the potential of contestation efforts to drive change by looking at the ability and willingness of consumers and waste pickers to change their practices. I will also further discuss the role of collective agency in helping individuals to challenge the gender norms that shape their practices.

7.4.2 Individual agency and contestation of gendered power asymmetries in GPNs

As discussed in Chapter Three, agency can be constituted by purposive action, as well as by routine practices (Greener, 2002). The acceptance of relations of inequality and the reproduction of power can happen consciously and unconsciously through everyday acts. Yet, these routine practices, often hardly visible, can also constitute significant forms of contestation (Cleaver, 2007; Rogaly, 2009). Feminist literature emphasises that everyday practices and other innovative ways in which individuals exercise agency are important because they can both hinder and catalyse social change (McNay,

2016). Feminist Political Ecologists have also made important contributions to the analysis of individual practices as spaces where gender norms can be contested and through which environmental outcomes can be generated and transformed (Agarwal, 1992, 2010; Arora-Jonsson, 2013; Buckingham, 2010; Nightingale, 2006). In line with these literatures, the findings from this study show that it is at the individual level where everyday practices become directly linked to adverse environmental impacts that derive from commodity chains and that consumers and waste pickers are not passive actors; they can also contribute to drive change.

In India, the importance of enhancing individual agency has been evidenced by consumers' greater access to menstrual products, which does not necessarily change their perceived ability to challenge norms, nor their views of the environmental impacts that these products have. My findings elucidate that menstrual products are becoming increasingly important for consumers and beginning to be perceived as the only alternative to manage their menstruation. This is reflected in interviewees' comments: "*Napkin is important for me, like a sister or a friend*" (IDI-APU2). "*We have to buy it every month there is no other option. Once if we don't buy beauty products we can manage, but there is no other option for sanitary pads. That's why we have to buy it*" (IDI-APU7). However, increased access to menstrual products is not directly related to a more critical approach to gender norms. For instance, in this sample, younger women were found to be more reluctant to follow societal restrictions on their activities, yet they continue to follow these norms because they do not want to disobey their elders. Similarly, women living with extended families felt more pressure to comply with these norms because they feel accountable to their relatives.

This analysis also found that consumers' understanding of the impacts that these products can have on their surroundings is greatly informed by gender norms. In spite of the increased amount of information that consumers are receiving about menstrual products, including through marketing campaigns, many consumers see menstrual blood as the reason why products have a negative impact on their surroundings. As I argued, the prevalence of gender norms is an important reason why consumers adopt new ways to engage with commodities, some of which can be demanding in terms of time and energy, e.g. washing products or burning them.

As for waste pickers, the discussion in Chapter Six demonstrated that they play a central role in the collection and segregation of sanitary waste. However, gender and norms and caste dynamics can compound the challenges that waste pickers face to manage this type of waste. Many waste pickers interviewed for this study shared that because consumers have a generally negative perception of

them, they are not likely to listen to their requests or consider their needs. In addition, the combination of caste and gender dynamics can disproportionally affect female waste pickers who are the majority of waste pickers in India. For example, the perception that menstrual waste is female waste can entail that women have to deal with menstrual waste more often than men.

For these reasons, I argue that consumers' and waste pickers' agency is key to enhance their willingness and ability to change their practices and support efforts to improve the management of menstrual waste. As these findings show, multiple factors configure individuals' identities, including age, caste, and gender; and these determine their ability to challenge gender norms. What is more, in line with the conceptualisation of agency as relational, I find that individuals constantly re-interpret gender norms based on the role that they play in the chain and the influences they are exposed to, including the actions from commercial and non-commercial actors. This analysis has shown that because of the societal embeddedness of the menstrual products chain, commercial activities also become part of the broader web of relations that shape individuals' practices. Thus, even if the influence of gender norms is recognizable across the practices of both consumers and waste pickers, the ways in which they experience gender norms and perceive menstrual products, and the opportunities and challenges they face to alter their practices, are different and depend on their positionality within the chain and in society.

To better understand the dynamic ways in which individuals negotiate, adapt, and contest gender norms, in line with the other factors that influence their practices, I developed a conceptual frame that shows the various ways in which gender norms become salient in individuals' engagement with commodities. As shown in Figure 7.1, this frame is a spectrum that comprises different *strategies*. At one end of the spectrum gender norms are the sole consideration when following disposal practices, whereas at the other end the influence of gender norms is not relevant. This frame is inspired by Coe and Jordhus-Lier (2010) approach to agency in labour geography, where this type of agency is classified into forms of 'resilience,' 'reworking' and 'resistance' of capitalist relations. Nonetheless, my approach differs in that it considers agency in relation to gender norms, i.e. *reworking* (adapting gender norms) and *resisting* (rejecting other influences and prioritising gender norms). My approach focuses on the individual level, although it recognises the potential of collective forms of agency to drive change in these strategies.

Figure 7.1 The strategies that shape disposal practices of commodities

Source: Author, 2020

This spectrum can be potentially expanded to include other types of strategies.[59] However, the value of this frame is that it illustrates that there are different ways in which the influence of gender norms shapes the practices of individuals, and that even though gender norms can be a prevalent consideration, their influence is not clear-cut. Moreover, these strategies help to understand practices as the result of individuals' attempts to make sense of the different influences to which they are exposed to and the factors that constitute their identities. In other words, the different ways in which gendered power relations in the GPN affect individuals are reflected in their choice of strategies, which in turn, shape the practices they follow to engage with commodities.

In the case of India, the two strategies shown in Figure 7.1 align with the empirical findings of the disposal stage of menstrual products:

- *Resisting* strategies are those that take place when individuals refuse to alter their practices in order to comply with gender norms.

- *Reworkin*g strategies are those that take place when individuals adapt their practices to comply with gender norms.

Resisting strategies can be seen, for example, in waste pickers' unwillingness to engage with menstrual waste in spite of being aware of the importance of segregating it, because they consider it to be more harmful and dirtier than other sanitary waste. As discussed in Chapter Six, waste pickers can be reluctant to engage with menstrual waste because they feel ashamed when dealing with it and because of the preceptions of menstrual blood as harmful. Resistance is also observed in the

[59] Empirically, the ends of the spectrum might not be easily observable. The embedded nature of gender norms means that these might be present but not be easily observable or even perceptible for individuals themselves (Cislaghi and Heise, 2020).

reluctance of consumers to support institutional efforts related to menstrual waste management. The empirical analysis showed that, even when public waste management systems and disposal infrastructure are available, some consumers prefer to dispose of menstrual products in traditional ways, such as burning and burying, because they believe these are better ways to destroy menstrual blood. In Pune, some consumers who were aware of the Red Dot Campaign expressed reluctance to mark this waste because they wanted to avoid being seen disposing of this waste.

Reworking can be seen as taking place when consumers adapt their disposal practices of menstrual products to prevent menstrual blood from being exposed; for example, by wrapping products in plastic bags or washing them before disposal. The empirical findings showed that institutional efforts such as plastic bans can make it increasingly difficult for consumers to obtain plastic bags, yet these are not always sufficient to deter consumers from wrapping products. Reworking can also be seen when consumers dispose of these products in their household waste but hide them amongst other trash, and also in the secretive manner in which consumers purchase menstrual products.

Both strategies (*reworking* and *resisting*) indicate that gender norms are not being contested to the extent to which these become a non-relevant influence in practices. For this to happen, individuals would need to follow strategies at the right end of the spectrum, from *resisting* and r*eworking* gender norms to *re-negotiating* them. The term 're-negotiating,' as applied in this study, refers to the process of emancipation from social structures and the act of creating different, if not oppositional, ways to engage with menstrual products and menstrual waste. In re-negotiating gender norms, individuals are seen as becoming able to overcome the social restrictions and negative perceptions around menstruation that shape their practices.

The various factors that constrain individuals' ability and prevent them from *re-negotiating* these norms and following different strategies, underscore the need for individuals to be able to exercise 'power within. Moreover, this analysis indicates that the failure to really challenge gender norms is an important reason why, in spite of the presence of some governance efforts such as disposal infrastructure, practices and perceptions remain unchanged. Thus, this frame of strategies helps to demonstrate that individuals' agency is central to enable them to *re-negotiate* gender norms and in turn, to become able and willing to support governance efforts. In the next part of the discussion I explore how collective forms of agency can help consumers' and waste pickers' to follow different strategies that can support environmental governance.

7.4.3 Bringing together individual and collective agency

The previous sub-section highlighted the importance of individual agency in environmental governance in GPNs by showing that the likelihood that individuals will adopt new disposal and waste management practices and support local governance efforts depends on their willingness and ability to challenge gendered power relations. Since individual agency is nested in broader societal relations and in the activities that make global production networks, I argue that collective and individual forms of agency need to complement each other to successfully challenge the power asymmetries in GPNs and enhance the environmental governance of GPNs. This subsection discusses how collective agency can help to increase the ability of individuals to move from strategies of *reworking* and *resisting* to *resilience.*

Firstly, collective forms of agency can contribute to contest the power asymmetries between actors in the chain that define the influences that are more likely to shape individuals' choice of strategies. As discussed in the previous section, the influences that individuals are exposed to are key in shaping their choice of strategies. Yet, these influences can change because they are tied to the power relations in the chain that allow some actors to redefine norms and to advance new meanings in accordance with their interests. In the case of India, my findings show that global firms' dominant position of power in the chain allows them to advance different interpretations of gender norms that can reinforce perceptions of shame and secrecy associated with menstrual products. However, collective agency can play an important role in challenging the commercial strategies and policies that influence individuals' perceptions of menstruation which lead them to follow *resisting* and *reworking* strategies, as opposed to being able to *re-negotiate* these norms. In other words, social governance through collective contestation can contribute to redirect strategies by holding private and public actors accountable for their failure to recognise and/or address the ways in which their actions reproduce gender norms and generate adverse environmental impacts. For example, SWaCH has played a central role in pressuring the PMC to cajole firms to engage in the development of solutions for the management of menstrual waste that consider the local context and integrate waste pickers.

Secondly, collective agency can be instrumental to foster individual agency by opening paths that help individuals recognise and utilise their ability to challenge gender norms. Feminist literature has found that collective action is critical to ensure that individuals acting on their own do not have to pay a high price for their autonomy. In many instances, it can be more difficult for individuals to act if they feel they are acting alone (Gammage et al., 2015; Kabeer, 1999). These insights resonate with my findings. As discussed in Chapter Five, even when individuals feel inclined to change their practices, they might

feel constrained to do so by their peers and family members. For example, younger consumers were more likely to question the validity of gender norms around menstruation, but in the end, they did respect these norms to please their elders. Similarly, waste pickers often feel unable to demand better disposal practices from consumers because of the negative perceptions that consumers have of them and because they often feel that their own views are not valid or important. In the words of one waste picker interviewed for this study: "*They should throw it properly… If I would tell them, then they would say you stupid you pick the trash and you take the money, for what thing do we pay to you, that's why we cannot ask question whatever you would give to us we would take it away*" (FGD-BPU2).

In India, civil society organisations are helping consumers and waste pickers to come to terms with their ability to challenge gender norms, as well as showing them the avenues to leverage their 'power within'. For example, NGOs play an important role in raising awareness and enabling consumers to access other types of menstrual products that can have lesser negative impacts on the environment such menstrual cups. These products are currently difficult for many consumers in India to access because they don't know how to use them and/or because they can be expensive and mostly available via online channels (IDI-K20). With increased awareness, it can be expected that the role of consumers will gradually change and could potentially lead them to demand products that better align with their needs and concerns for their surroundings. In developed markets, menstrual product activists have in many ways succeed in mobilizing consumers to demand that firms disclose the ingredients in menstrual products (Valenti, 2019). Other examples of the success of consumers mobilization include the 'No Tax On Tampons' campaign and the growing number of international initiatives to break the stigma and silence about menstruation (e.g. #PeriodsAreNotAnInsult, #HappyToBleed and #FreeTheTampons).[60]

As for waste pickers, access to a network of support and access to trainings and equipment can help them to change the negative perceptions they have of themselves and to enhance their knowledge of the importance of their work. An important reason for SWaCH 's success in Pune is that its trainings don't focus only on waste picking work, they also cover other challenges that female waste pickers face, such as domestic violence and sexual harassment (IDI-K23). As discussed in Chapter Six, women face different challenges than men, most of which are related to social discrimination; for example, getting lower prices for the materials they collect. By helping waste pickers to deal with these various

[60] As a result of these efforts various countries have eliminated its national Goods and Services Tax on period products, such as Canada, France and the UK (Weiss-Wolf, 2017). In 2020, Scotland became the first country in world to make period products free (Diamond, 2020).

difficulties, the association is aiming to help increase their capacity to perform and profit from their work.

Lastly, collective forms can enhance the effectiveness of individual agency by scaling up individual efforts and increasing the likelihood that these will lead to broader change (Gammage et al., 2015). This potential is best exemplified by waste pickers' associations in India, which can play a central role in improving the working conditions for waste pickers. For example; by helping them to become integrated into public waste management systems. As discussed in Chapter Six, these organisations can also contribute to change the negative perceptions of waste pickers. For example, in Pune, the uniforms and carts provided by SWaCH have helped to build the perception among consumers that waste pickers are official state workers and deserve respect and consideration.

This discussion underscores the importance of social governance efforts, through both collective and individual efforts, to change the practices that compound adverse environmental impacts and to enable various actors to play a more meaningful role in addressing the environmental impacts of menstrual products. The need for change to be achieved at scale and the co-existence of factors that both enable and constrain individual agency are an important reason why collective and individual forms of agency can complement each other. Without individual contestation, change in the practices that generate adverse environmental impacts is unattainable; at the same time, collective manifestations of agency are needed to support and scale these individual efforts. In India, if the strategies don't change, consumers can be expected to continue to wrap products in plastic, burn, or burry them. This could be the case even with 'eco-friendly' alternatives such as the new government-made biodegradable pads; yet, doing so would cancel out any potential benefits of these new alternatives for the environment. As for waste pickers, the potential contributions that they can make to the collection and segregation of menstrual waste won't be realised if they continue to perceive menstrual waste as shameful female waste and if they continue to experience social discrimination. In Chapter Eight I further explore the policy implications of this discussion of collective and individual agency to achieve transformative environmental change in the menstrual products chain in India.

7.5 Advancing environmental governance of GPNs from a gender perspective

As discussed in Chapter Three, an important contribution of FPEcol literature to the discussion of environmental governance has been showing that these mechanisms tend to exclude the everyday practices related to environmental management and the social structures that shape them (Arora-Jonsson, 2013). Scholars in this field have brought to light the limitations of approaches to

participatory natural resource management that overlook the complexity of individual identities (Cleaver, 2007). They call for a different approach to environmental governance that uses an intersectional perspective to analyse the variety of women's experiences and their different contributions to natural resource management (Agarwal, 1992; Nightingale, 2011). They argue that increasing the participation of women or marginalised individuals in decision-making bodies does not equate to higher levels of equality in governance if power dynamics are not challenged (McCarthy et al., 2020).

By drawing on these insights, I argue that the analysis of environmental governance in GPNs needs to integrate individual agency as a dimension of gendered power. This requires understanding the various factors that configure individuals' identities, and which determine the extent to which they are able to positively drive change through their practices. As the conceptual frame of s*trategies* demonstrated, individuals' position in society and their roles in the chain as consumers or waste pickers determines the extent to which they are able to contest gender norms and adopt disposal and waste management practices that lead to less negative outcomes on the environment. For this reason, an intersectional perspective can strengthen the different types of governance in GPNs (i.e. private, public, and social) that contribute to address the negative outcomes of commodity chains on the environment. In other words, integrating an intersectional approach needs to be integrated into commercial strategies, policies, and civil society initiatives can serve to better understand how gender norms and other forms of social difference shape individuals' engagements with commodities. This will then inform better initiatives to mitigate the impacts that result from the disposal of commodities in different contexts.

For example, in the menstrual products chain, the problems that female Dalit waste pickers face, which include discrimination and other forms of oppression, matter for the environment because these subjectivities shape the extent to which they follow waste management practices that generate environmental impacts, as well as their willingness and ability to participate in institutional efforts that aim to improve the management of this waste. While in India there are some similarities in consumers' and waste pickers' perceptions of menstruation and menstrual products, the challenges they face are distinct and shaped by many factors including age, caste, marriage status, among others. Supporting consumers and waste pickers to adopt new practices, requires an in-depth understanding of what they want from these efforts and whether they feel able to support them. If the environmental governance of GPNs fails to recognise these differences it is unlikely that it will be effective in

addressing the wide range of potentially negative outcomes from commodity chains, including those on the environment.

As discussed in section 7.3.3, social governance, through collective agency, can play a role in ensuring that these differences are considered in existing and new mechanisms of environmental governance. Collective contestation can contribute to hold powerful actors accountable for the end-life of the products they produce and endorse, and to prevent them from advancing strategies that reproduce gender norms that have detrimental impacts on the environment. In addition, civil society can also contribute to environmental governance in GPNs by bringing a new perspective on the challenges associated with the use and disposal of commodities. These organisations operate in spaces that might be out of reach for public and private actors; they often have a direct connection to individuals that can inform a different, if not more accurate, understanding of their needs and challenges in a given context. This is an important reason why governance needs to open space for less powerful actors to actively contribute their perspectives. In the menstrual products chain in India, the importance of this diversity of views is highlighted by the disagreements within civil society groups about the need to prioritise social over environmental considerations. These disagreements also underscore the mediating role that pubic governance can play to enable a balanced dialogue between different actors. However, both public and private governance have a role to play in seeking out and incorporating different views and insights on the variety of ways in which menstrual products can benefit or negatively impact individuals and the environment.

Lastly, an important insight from this analysis of individual agency is that the varied roles that women play in commodity chains can have different implications for the environment. While many women have experienced a disproportionate share of the burdens of environmental change, women are a heterogeneous group that has multiple and varied types of experiences with environmental change (MacGregor, 2017). FPEcol literature challenges the view that women are a largely undifferentiated category that has a close connection to nature (Resurrecion, 2017). However, both FPEcol and FPecon have insufficiently explored how the varied roles that women play in global production, particularly in the Global South, can lead to impacts on the environment. As Simon-Kumar et al. (2018) argue, women as individuals and economic actors, travel, consume, produce, reproduce, feed, waste, and pollute in contexts permeated by social norms and limited by geographical and economic constraints.

This study contributes to bridge this gap by exploring how gendered power asymmetries in GPNs shape women's participation in commodity chains as well as their ability and willingness to contribute

to mitigate environmental impacts. This gap is becoming increasingly important to address because the expansion of global production that is enabling women to participate as workers, consumers, and activists (Barrientos, 2013) can also make them "unwittingly the conduits of [global production's] destructive systems" (Simon-Kumar et al., 2018, p. 250). As findings show, the processes of commodification are transforming the lived realities of women in India, opening new possibilities for socio-economic development, but also increasing their contribution to environmental degradation. Women are rapidly becoming consumers of menstrual products; even female waste pickers are increasingly gaining access to these products. Yet, as findings also demonstrate, without change in the disposal and waste management practices of these products, increased access can result in an economic disaster that will ultimately affect all women, and especially those working in waste management.

In sum, achieving different outcomes on the environment entails challenging power relations that shape the interactions between actors in the chain and the ways in which individuals engage with commodities. Without increasing the 'power to' of less powerful actors and the 'power within' of individuals, gender norms are likely to continue to shape actions and practices that lead to increased adverse environmental impacts. Therefore, environmental governance needs to create a balanced space for actors (private, public, and social) to hold each other accountable and open new channels for collaboration and contestation. Both individual and collective forms of agency play a key role in pushing environmental governance to evolve in accordance with the changing nature of gender norms and to ensure it meets the needs of those that are more likely to be affected by the absence or insufficiency of such mechanisms.

7.6 Reflecting on the challenges to achieve transformative change in global production

In this chapter I have so far argued that strengthening the GPN framework with FPEcol and FPEcol literature analysis enables an examination of tensions and the power relations that underpin them. This examination of power relations informs my analysis of environmental governance and the potential of individual and collective agency to drive change. However, my findings also lead to a broader reflection on what constitutes transformative change.

In Chapter Two I argued that the processes of commodification transform and are transformed by gender norms and that the commodification of menstrual products is reflective of this process of change. The findings from the analysis of the disposal stage of the chain in India confirmed that tensions between gender norms and commercial dynamics are constantly evolving and manifesting in

the different practices of disposal and management of menstrual products. However, the analysis also indicates that the process of commodification of menstrual products can be insufficient to challenge the varied and often contradictory ways in which the norms become embedded in commercial activities. What is more, my findings show that these tensions can have significant negative implications for the environment. This then raises questions about what constitutes transformative change in global production. Can change be considered transformative if gendered power relations are not being sufficiently challenged?

The potential for change is inherent in the dynamic nature of gender norms and commodification processes. The societal embeddedness of the chain brings gender norms within its orbit, which is why gendered power relations transcend the social, commercial, and environmental dimensions of production. I argue that for tensions to lead to transformative change, environmental governance requires a multi-dimensional gendered approach that opens space for collaboration, as well as contestation. As findings have demonstrated, contestation of gender norms at an individual level through changes in everyday practices matter for the broader environmental outcomes of chains; at the same time, contesting global commercial strategies that reproduce gender norms can mitigate local environmental impacts by shaping the ways in which individuals engage with commodities. By bringing forth the need for constant contestation, this analysis aligns Polanyi's (1944) notion of the 'double movement,' which refers to the attempts by market actors to dis-embed the economy from society and the counter movements by non-market actors to prevent this. In other words, this analysis shows that achieving more positive outcomes on the environment and more equitable social gains, calls for different actors, including individuals, to play a transformative role both socially and environmentally.

This discussion also relates to Polanyi's central criticism to capitalist development, which is that a society driven by the logic of the market will eventually destroy the social and environmental relations that are the basis of a sustainable use of human and natural resources. In line with this view, this study demonstrates that the notion that societal and environmental issues arising from the process of commodification can be addressed separately is flawed. The conflicts of interest between firms, the government, and civil society in the menstrual products chain indicate that actors often address social and environmental considerations in isolation from each other. This is an important reason why menstrual products are being endorsed as solutions for social issues without full consideration of how these can create gendered inequalities and generate adverse environment impacts. The critique is not against menstrual products per se, or even the process of commodification that is offering women the

possibility to switch from traditional methods to menstrual products. The problem is the lack of understanding of how the practices through which individuals engage with these products are imbued with gendered power asymmetries and that failing to transform said asymmetries can compound the negative outcomes that this commodity has on the environment.

Furthermore, this analysis indicates that change is also needed in the ways in which the analytical relation between gender norms, commercial activities, and the environment is understood in GPN literature. In GPN studies, the gendered and the environmental dimensions of commodity chains remain insufficiently considered and are rarely assessed simultaneously. Bolwig et al. (2010) made an important contribution by developing a framework for the analysis of the horizontal aspects of value chains, namely, poverty, gender, and the environment; yet they see these aspects as 'outcomes' of the chain. For example, they argue that higher product quality standards can increase GHG emissions, leading to gender-specific vulnerabilities. However, as this analysis has shown, gender norms need to be considered as both a cause and a consequence of environmental impacts because they are inextricably linked to the ways in which commodity chains operate, shaping the relations between actors, the practices they follow, and the outcomes that chains have on the environmental sphere.

The risk of overlooking the influence of gender norms is that the analysis and implementation of environmental governance of GPNs will continue to exclusively focus on technical solutions that can be insufficient and that could also reinforce unequal relations. As discussed in section 7.3.1, quantitative approaches to assess environmental impacts from GPNs cannot account for social relations and gender norms that cannot be measured. As argued by Bracking et al. (2018), the risk of relying solely on these quantitative approaches lies not only in the limits of calculability and commensuration, but also in that these valuations have implications for governance. For example, they can serve to depoliticise a particular issue by rendering the assessment of its importance and scope into an exclusively technical question. An appreciation of gender norms as potential driver of environmental impacts is vital for a truly comprehensive understanding of the contemporary dynamics of economic change, and to widen the perspective on the implications, both positive and negative, of the process of commodification upon which we are increasingly relaying as a society.

In sum, this analysis underscores the need to develop better analytical tools to understand the complexities of contemporary economic and gendered transformations and their potential impacts on the environment. As argued by (Henderson et al., 2002, p. 458), the value of the GPN framework lies in its potential to stimulate research that "contributes more effectively to the task of improving

the human condition in the age of economic and geo-political turbulence in which we now exist." Failing to achieve transformative change risks compounding the environmental impacts from commodities and even creating new social issues. Going back to the menstrual products chain, these findings beg the question of who really benefits from the production and consumption of commodities in the long run? If the disposal of menstrual products continues to grow in India, who will pay for the consequences of the environmental disaster? India today is already struggling to efficiently manage and treat waste, if the sales of menstrual products continue to grow and disposal dynamics do not change, the country is at high risk of undergoing an environmental and social crisis.

7.7 Conclusion

This chapter has brought together the empirical findings from the analysis of the menstrual products chain in India to draw out analytical insights on the relation between gender norms, commercial activities, and environmental impacts that unfolds through GPNs. This analysis answers the last research sub-question of this study: *What are the implications of the analysis of tensions in the menstrual products chain in India for the environmental governance of GPNs?*

The case of menstrual products in India has contributed to our understanding of environmental governance of GPNs by showing that tensions are underpinned by gendered power relations and that without challenging these asymmetries of power the negative implications for the environment will persist and can be aggravated. For this reason, I argue that the environmental governance of GPNs needs to adopt a gendered multi-dimensional approach that opens space for both collaboration and contestation.

The value of the conceptual frame of *strategies* introduced in this chapter is that it helps to understand disposal and waste management practices as the result of individuals' attempts to make sense of the different influences to which they are exposed to and the factors that constitute their identities. These strategies elucidate the different ways in which individuals are contesting (or failing to contest) gender norms and also shed light on the reasons why, in spite of the presence of some governance efforts, practices and perceptions can remain unchanged. Thus, addressing adverse environmental impacts requires enhancing individuals' ability and willingness to change their practices. Since individual agency is nested in broader societal relations and in the activities that make global production networks, I argue that to be effective, these efforts need to be enhanced and scaled up through collective agency and supported by public and private actors.

Whilst the findings in this study emanated from the empirical example of disposal practices in India, I argue that these observations contribute to address an important gap in environmental governance in GPN, which is the insufficient consideration of gender norms and in turn, the exclusive focus on technical assessments and solutions. Moreover, the analysis of tensions makes evident that change is needed in the ways in which the relation between gender norms, commercial activities, and the environment is understood in GPN literature. It shows that gender norms need to be considered as both a cause and a consequence of environmental impacts because they are inextricably linked to the ways in which commodity chains operate, shaping the relations between actors, the practices they follow, and the outcomes that chains have on the environment. The empirical example of menstrual products also elucidates that seeing the gendered and environmental dimensions as unrelated can replicate gendered inequalities and compound adverse environment impacts.

The next and final chapter will be a recapitulation of the main empirical findings and analytical contributions of this study. It will also present policy implications of this analysis, as well as suggestions of further areas to explore the connection between commercial activities, gender norms, and environmental impacts.

8 Conclusion

8.1 Introduction

The ways in which individuals engage with menstrual products is currently (and has historically been) shaped by the gender norms that inform the symbolic meanings that menstruation has across cultures, as well as by commercial activities that promote the use of these products (Buckley and Gottlieb, 1988; Van de Walle and Renne, 2001). These products are often championed as the only alternative for women to manage their menstruation with dignity and to solve issues related to their health and economic participation (Bobel, 2018). However, the resulting waste from discarded products is also a growing issue, with significant environmental consequences. This is a particularly pressing problem in countries like India that lack waste disposal infrastructure and where this waste can also have negative impacts on individuals working as waste pickers. The impending environmental disaster associated with the continued growth of sales of menstrual products highlights the risks of overlooking the impacts that gendered transformations in global production have for the environment. Against the backdrop, in this study I explored the relation between commercial activities, gender norms, and environmental impacts to answer this research question: *How do tensions between gender norms and commercial activities configure environmental impacts, and what are the implications for the disposal of menstrual products in India?*

The analysis reveals that the potential for change is inherent in the tensions between gender norms and commercial activities. However, I argue that for these tensions to lead to transformative change that achieves less negative outcomes on the environment and more equitable social gains, environmental governance needs to take a multi-dimensional gendered approach and enable collective and individual forms of contestation that can challenge gendered power asymmetries. The influence of gendered power relations in GPNs transcends the social, commercial, and environmental dimensions of production. The failure to appreciate this multi-dimensional nature of power can lead to the flawed assumption that these dimensions are not related and that gender norms do not shape commercial and environmental outcomes. As findings show, in the case of the menstrual products chain in India, tensions between gender norms and commercial activities can have negative impacts on the environment by leading consumers and waste pickers to adopt practices that can compound the environmental impacts of these products. Thus, enabling transformative change requires further exploration of the social, commercial, and environmental dimensions of global production from a gender perspective in order to better leverage the potential of commodity chains to open channels to contest the dis-embedded nature of markets, in a Polanyian sense.

This chapter summarises the main findings and contributions of the study. The second section presents an overview of the main findings and recapitulates how they answer the research sub-questions. The third section discusses the main contributions of this study. The fourth and last section, presents policy implications informed by this analysis and outlines areas for further research.

8.2 Main research findings

1. *Are there tensions between commercial and gender norms in the menstrual products chain in India and how are these related to adverse environmental impacts?*

This research sub-question provides context for the analytical and empirical investigation by looking at the tensions between the commercial activities that constitute the menstrual products chain and the gender norms around menstruation; and how these appear to be linked to environmental impacts.

Gender norms can be transformed through the expansion of global production and the increased access to commodities. The commodification of menstrual products is reflective of this process of change because, since they were introduced in the market, these products have challenged and redefined some of the gender norms that shape how individuals manage their menstruation. I argue that the commercial activities that promote the use of menstrual products and the taboos and societal perceptions that inform how menstruation should be managed, are constantly configuring each other. These configuration or tensions can have positive implications. For example, access to these products has helped to challenge some gender norms, giving women more physical mobility and leading to benefits on their health and education (Hennegan et al., 2019; Punzi and Werner, 2020; Vostral, 2008). There is, however, limited understanding of the ways in which these tensions affect the outcomes that these products have on the environment.

The review of literature also shows that tensions can be observed in India because, while taboos remain prevalent, due to the efforts of various actors, including firms, individuals are increasingly gaining access to menstrual products. What is more, the disposal practices of menstrual products in India appear to be informed by taboos and to be generating environmental impacts. Nonetheless, these practices; the ways in which they are shaped by gender norms, and their impacts on the environment are understudied. This is also the case for menstrual waste. Waste pickers play a central role in waste management in India, but the influence of gender norms on their practices and the ways in which waste pickers contribute to address environmental impacts remains unexplored.

In sum, this empirical investigation shows that the disposal stage of the menstrual products chain in India provides an opportunity to investigate the transformations of gender norms that are linked to processes of commodification, as well as the implications that said transformations have for the environment. This exploration can also help to better understand the environmental impacts that derive from the expansion of global production and help to address important gaps related to the disposal of menstrual products.

2. *How can the Global Production Networks framework be used to analyse tensions between gender norms and commercial activities that lead to environmental impacts?*

To explore the relation between gendered tensions and the environment, I developed a conceptual framework that brings a gender perspective to the GPN framework by drawing insights from FPEcon and FPEcol literatures. I argue that this framework can be used to explore how gender norms become embedded in commodity chains, and how by virtue of this embeddedness, the social power asymmetries that gender norms embody shape the relations between actors in the chain and in turn, its outcomes on the environment.

This study uses Global Production Networks as a framework to capture the multi-actor characteristics of global production systems (Coe et al., 2008a). This approach conceptualises a greater diversity of stakeholders beyond commercial actors and recognises the increasingly varied and flexible connections between them (Neilson and Pritchard, 2009). It also accounts for how firms engage with local economies by exploring the social and institutional processes within which the production of goods, services, knowledge, capital, and labour are embedded. Nonetheless, an important limitation of this approach is that it does not sufficiently explore the social and environmental dimensions of economic production from a gender perspective.

Feminist political economists have applied gendered perspectives to Polanyi's approach to embeddedness to analyse how gender norms can be reinforced, redefined, and challenged by the process of economic change. These insights have been used in GPN literature to bring a gender lens to the concept of societal embeddedness and examine how gender norms become embedded and reshape patterns of consumption, production, and work in the contexts in which firms sell and source (Barrientos, 2019). In this study I apply this concept from a gender perspective to investigate how gender norms around menstruation are understood, experienced, and prioritised by different actors in the chain.

To further explore tensions, I also conduct an analysis of power relations from a gender perspective and explore how these relations shape different types of governance (i.e. private, public, and social). The GPN framework directs attention to the interconnections and interdependencies between actors and has made significant contributions to the analysis of power and governance of commodity chains (Coe et al., 2008a). FPEcon insights have been integrated to the GVC/GPN literature to investigate how the power relations between actors in the chain become inextricable from the gender norms that prevail in the context where the chain operates (Barrientos, 2019, 2013). Feminist literature has also advanced the study of power in relation to the agency of individuals and collectives, which I use to inform my analysis of social governance in GPNs (Kabeer, 1999). To bring in the environmental dimensions from a gender perspective I draw from FPEcol literature, where environmental issues are studied the result of gendered asymmetries of power that shape individuals' identities and their everyday practices (Nightingale, 2011). Building on these literatures, I disaggregate power into: 'power over', 'power to' and 'power within.'

An important contribution of this study is expanding the analytical reach of the GPN approach to develop a framework that can simultaneously explore the commercial, social, and environmental dimensions of commodity chains from a gender perspective.

3. *How do tensions between gender norms and commercial activities shape consumers' disposal practices and perceptions of menstrual products in India, and what is the connection between these practices and adverse environmental impacts?*

This question explores tensions empirically by drawing on the findings from the mapping of the menstrual products chain and the comparative analysis between Delhi and Pune. The analysis finds that in India, despite having increased access to products, taboos and societal expectations around menstruation continue to inform how consumers dispose of these products. These gender norms around menstruation also shape the perceptions that consumers have of the environmental impacts of menstrual products. Many consumers in this sample think that environmental impacts derive from menstrual blood, rather than from the waste associated with products themselves. The actions of global firms, civil society, and the government also play an important role in influencing consumer's practices and their perceptions. However, the insufficient efforts from actors in this chain to address disposal considerations is an important reason why these norms remain a prevalent influence in consumers' practices.

Based on these findings, I argue that tensions between gender norms and commercial activities manifest in the ways consumers dispose of these products. These include following traditional disposal practices and refusing to support efforts related to waste management. In addition, my findings reveal that these practices generate adverse environmental impacts by increasing the use of resources needed for disposal and the waste that is introduced into ecological cycles, and by decreasing the likelihood that these products will be collected and adequately destroyed. These practices and their associated impacts are not sufficiently investigated in MHM studies nor in the environmental impact assessments of menstrual products.

From an analytical perspective, these findings demonstrate that the embeddedness of gender norms in commodity chains shapes the actions of actors, including everyday practices. This analysis also shows that tensions between gender norms and commercial activities can have negative impacts on the environment by leading consumers to adopt practices that can compound the environmental impacts of menstrual products. These findings also raise questions about the reasons why gender norms prevail in this stage of the chain and show the need to investigate how conflicts of interest between actors can prevent the transformations of these norms with a view to achieve less negative outcomes on the environment.

4. *How do tensions between gender norms and commercial activities shape waste pickers' perceptions and practices of menstrual waste management in India, and what is the connection between these practices and adverse environmental impacts?*

This question continues the empirical exploration of tensions in the menstrual products commodity chain in India by looking at the management of menstrual waste and the actors that participate in it. Findings from the comparative analysis between Pune and Delhi show that waste pickers are being increasingly exposed to these products due to the growing quantities of menstrual waste, and that the practices that they follow to manage this waste are shaped by taboos and societal perceptions about menstruation. In addition, caste dynamics can create additional challenges to manage this waste by informing some of the negative perceptions that waste pickers have of themselves and that consumers have of them. The analysis also finds that actors in the chain have different views on the need to address the management of menstrual waste and different, and at times limited, understanding of the challenges that this waste poses for waste pickers. The insufficient attention that

actors place on the management of menstrual waste is an important reason why gender norms in India remain a prevalent influence in waste pickers' practices and perceptions.

Based on these findings, I argue that tensions manifest in the ways waste pickers perform their role in the chain, such as being reluctant to engage with menstrual waste, and not supporting waste management efforts related to menstrual waste. These observed practices also have adverse environmental impacts by decreasing the likelihood that these products will be adequately destroyed and increasing the probability that they will disrupt ecological cycles. For this reason, I argue that waste pickers' practices can increase, rather than help mitigate, adverse environmental impacts.

From an analytical perspective, this study continues to show the value of using a gendered approach to societal embeddedness to unpack the ways in which gender norms shape the actions of various actors, including those at the margins of the chain. It also highlights the value of an intersectional perspective to explore how gender norms in conjunction with other forms of social difference shape the identities of individuals who participate in the chain and, in turn, their practices. This analysis further substantiates the argument that tensions between gender norms and commercial activities can have negative impacts on the environment by leading waste pickers to adopt new ways to manage menstrual waste that can compound those environmental impacts. These findings underscore the need to explore why some gender norms can change whilst others remain prevalent and to further investigate the role that different actors need to play to transform gender norms and change the practices that generate adverse environmental impacts.

5. *What are the implications of the analysis of tensions in the menstrual products chain in India for the environmental governance of GPNs?*

The case of menstrual products in India has contributed to our understanding of the environmental governance of GPNs by showing that tensions between gender norms and commercial activities are underpinned by gendered power relations that can lead to negative outcomes on the environment. This analysis finds that the conflicting interests among actors in commodity chains can pose challenges for the implementation of environmental governance, especially when powerful actors benefit from reproducing gender norms. In India, global firms' dominant position in the chain allows them to avoid complying with existing regulation and to redefine and advance new meanings around menstruation. For this reason, environmental impacts deriving from disposal practices cannot simply be addressed through commercially-focused initiatives or regulation. It is also essential to question how commercial

strategies and government policies can reproduce gender norms in ways that are detrimental for the environment.

In light of power asymmetries and conflicts of interest between and within actor groups, collaboration between actors can be insufficient to transform gendered power relations, hence why contestation also has an important role to play in achieving change. I argue that collective and individual forms of agency as different forms of social governance, are central to drive this contestation. Individual agency is needed to drive change in the practices that generate adverse environmental impacts. Since individual agency is nested in broader societal relations and in the activities that make global production networks, collective forms of agency can enhance the effectiveness of individual efforts by scaling them up and increasing the likelihood that these will lead to broader change. As findings show, in India, the different ways in which individuals are failing to contest gender norms is an important reason why in spite of the presence of some governance efforts, such as disposal infrastructure, practices and perceptions can remain unchanged. Moreover, while civil society organisations and waste pickers' associations in India are mobilizing to counter the influence of powerful actors; their success is hampered by their limited resources and conflicting interests. Therefore, environmental governance needs to open a balanced space for all actors (private, public and social) to interact and hold each other accountable; and for individuals with different roles and identities (consumers and waste pickers) to be part of these efforts.

Overall research question: *How do tensions between gender norms and commercial activities configure environmental impacts, and what are the implications for the disposal of menstrual products in India?*

Tensions between gender norms and commercial activities reflect the mutual configurations through which commodification transforms and is transformed by gender norms. This change can be observed in the menstrual products chain and in the new ways in which individuals in India are disposing of menstrual products and managing menstrual waste. This analysis also indicates that the process of commodification can be insufficient to challenge the varied and often contradictory ways in which gender norms become embedded in commercial activities.

I argue that achieving transformative change requires a multi-dimensional gendered approach to environment governance that opens spaces for collaboration and contestation that can challenge the gendered power asymmetries that compound environmental impacts. Due to the embeddedness of

commodity chains in a given societal context, the asymmetries of power that gender norms embody transcend the social, commercial, and environmental dimensions of production. These power relations are the reason why the negative implications of tensions on the environment cannot be addressed with technical solutions or even collaboration efforts that do not challenge the status quo underpinning commodity chains.

This analysis elucidates the need for constant efforts to challenge gendered power asymmetries and to ensure that different actors, including individuals, can play a more transformative role both socially and environmentally. The value of the conceptual frame of strategies that I developed in this study is that it shows that the potential for individual agency to challenge norms is a function of wider social relations, as well as the global production networks in which individuals participate in. In the case of the menstrual products chain in India, this analysis underscores the importance of public, private and social efforts that increase consumers' and waste pickers' ability to change their practices by moving from *reworking* and *resisting* gender norms to being able to *re-negotiate* them. Failing to recognise and address the various ways in which gendered power relations shape the relations between actors and the everyday practices through which individuals engage with commodities risks informing solutions that compound environmental impacts and that create new social issues.

The main contribution of this study is showing that tensions pose important challenges for the environmental governance of GPNs because they are underpinned by gendered power relations that unfold at multiple levels in the chain and which ultimately coalesce into practices that generate adverse environmental impacts. For this reason, both individual and collective forms of agency need to play a central role in contesting gendered power relations and pushing environmental governance to meet the needs of individuals at the margins of the chain that are more likely to be affected by the insufficiency of such mechanisms. India today is already struggling to efficiently manage and treat waste, if the sales of menstrual products continue to grow and disposal dynamics do not change, the country is at high risk of undergoing an environmental and social crisis.

8.3 Contributions of the study

This study builds on the work of Polanyi's (1944) and of feminist political economists (Beneria, 2007; Elson, 1999) to explore tensions between markets and societal dynamics from a gender lens and in relation to the environment. By exploring how the transformations of gender norms through the processes of commodification relate to environmental impacts, this study underscores the impending

environmental disaster that can result from changes in global production that do not challenge gendered power asymmetries.

My findings demonstrate that addressing environmental impacts from commodity chains requires challenging the gendered power relations that shape interactions at multiple levels. For this reason, I argue that the scope and the challenges for the implementation of environmental governance of commodity chains need to be seen in relation to the social structures in which the chain is embedded. This needs to include an understanding of the various factors that configure individuals' identities, and which determine the extent to which they are able to positively drive change though their practices. However, individual agency alone will not achieve transformative change. Broader shifts in gendered power relations are needed, which are only likely to be achieved through collective action that pushes for change in the commercial and societal status quo.

This analysis also calls for better analytical tools to understand the complexities of contemporary economic and gendered transformations, and their potential implications for the environment. I argue that change is needed in the ways in which the relation between gender norms, commercial activities, and the environment is understood in GPN literature. Gender norms need to be considered as both a cause and a consequence of environmental impacts because they are inextricably linked to the ways in which commodity chains operate, shaping the relations between actors, the practices they follow, and the outcomes that chains have on the environment. The gendered and the environmental dimensions of commodity chains remain insufficiently considered and are rarely assessed simultaneously in this type of literature. However, as demonstrated by this study, failing to include the influence of gender norms in the analysis and implementation of environmental governance of GPNs can lead to approaches that rely solely on technical solutions. These can be insufficient to address environmental impacts and can mask alternative, less visible, but equally critical practices through which the environment is affected at the local level. In some cases, these solutions can even reinforce unequal relations in the chain. For example, by neglecting and potentially compounding the challenges for individuals working at the margin of the chain such as waste pickers.

By uncovering the environmental impacts associated with the disposal of commodities, the revised GPN framework developed for this study provides a different perspective on the environmental impacts that derive from the operations of commodity chains and can potentially complement quantitative assessments of these impacts. An important contribution of this study is advancing the GPN approach by showing it can enable an integrated analysis of multiple power relations that cut

across the various dimensions of global production. By incorporating a gender perspective and enriching it with insights from FPECon and FPEcol, this study shows the potential that developing the conceptual categories of the GPN framework, i.e. power and embeddedness, can have to better understand the complexity of contemporary economic and social transformations, and their impacts on environment.

Lastly, this analysis contributes to the exploration of the challenges of designing sustainable and just systems of production. In line with Polanyi's (1944) argument that a society driven by the logic of the market will eventually destroy the social and environmental relations that sustain it; I argue that the notion that societal and environmental issues arising from the process of commodification can be addressed separately is flawed. The view that the gendered and environmental dimensions of global production are unrelated can lead to endorse commodities as solutions for social issues, without full consideration of how these can generate adverse environment impacts. In the case of menstrual products in India, this analysis questions who will really benefit from the commodification of these products in the long term if consumption continues to grow and menstrual waste continues to accumulate.

8.4 Policy implications: achieving transformative environmental change

As this study has elucidated, for change in global production to be transformative and achieve less negative outcomes on the environment and society, gendered power asymmetries need to be challenged through different forms of contestation. These findings show that individual agency matters for the environmental governance of the menstrual products chain because individuals' position in society and their roles in the chain as consumers or waste pickers determine the extent to which they are able to adopt different disposal and waste management practices. Moreover, collective forms of agency through efforts from NGOs and waste pickers association can enhance the effectiveness of individual efforts by increasing the ability of individuals to move from strategies of *reworking* and *resisting* to *resilience*. In this section I examine the policy implications of this analysis that can contribute to address the environmental impacts that result from the disposal of menstrual products and the management of menstrual waste in India.

Promoting collaboration between actors in the chain

As discussed in Chapter Seven in section 7.3.5, collective actors play an important role in shaping environment governance through their knowledge, leverage, and influence over other actors. This

analysis shows that firms in India have limited incentives to comply with Extended Producer Responsibility (EPR) regulations and that there are insufficient government mechanisms to monitor the activities of firms on a regular basis. This indicates that civil society organisations in India need to exert pressure on private and public actors to demand that firms and the government are accountable for the end-life of menstrual products and for financing and organising an environmentally sound system for the management of this waste. On their own, their influence can be limited, but as the recent removal of the tax on menstrual products shows, their leverage over other actors is significantly greater when they collaborate with each other. By working together these organisations can also bring to light the limitations and unintended effects of policies and commercial strategies. For example, by highlighting the need to expand EPR regulations to recognise and address the complexity of the disposal processes in different local contexts and the roles that waste pickers play in supporting these processes.

Civil society organisations can also play an important role in enhancing the implementation of policies and commercial initiatives by contributing their knowledge of local beliefs around menstruation and of the challenges that individuals face to dispose of menstrual products, including those living in slums. I found that an important challenge in the implementation of public governance is that the environmental impacts from menstrual products are not seen as an important consideration. As discussed in Chapter Five, one of the reasons why the government is not focusing sufficiently on disposal considerations is because these are not seen as directly aligned with the interpretation of the MHM guidelines. Civil society organisations can contribute to change this by sharing different, if not more accurate, insights on the needs and challenges that different consumers face. This knowledge can also contribute to improve existing initiatives to distribute menstrual products, as well as public solutions for menstrual waste management, such as incinerators. As findings elucidate, these initiatives need to be urgently reassessed in terms of operational requirements and by considering how gender norms can prevent their safe and effective implementation.

NGOs and waste pickers organisations can also pursue more expansive forms of collaboration by engaging with global and local firms and government ministries to change the societal perceptions and taboos that shape disposal practices. For example, by partnering to integrate information on disposal across all MHM public programmes and corporate social responsibility (CSR) initiatives. As this analysis has found, existing trainings often include limited information on the adequate and safe disposal practices of different products and rarely consider the challenges that women face to dispose of these products outside of the school environment. Moreover, as the pilot in Pune demonstrates,

collaboration could also take place through the development of environmentally sound waste management systems and innovations that reduce the quantities of menstrual products going to landfills (e.g. waste to energy incinerators).

Nonetheless, an important step towards strengthening the role of public governance is addressing the conflicts of interest between ministries that have different mandates and interpretations of the country's MHM agenda. As discussed in Chapter Five, government initiatives aimed at improving environmental impacts and waste management are often separate from those that focus on enhancing access of menstrual products. Internal coordination can be enhanced by appointing a central government body that leads on the implementation of the MHM guidelines and makes an assessment of the synergies and disconnection between the objectives of various government programmes.

In sum, civil society organisations can provide gender-sensitive guidance and push firms and governments to recognize and address the ways in which their policies and strategies can reproduce them. In India there could be many opportunities for collaboration that civil society can leverage to hold other actors in the chain accountable and to improve existing initiatives that often lack sufficient consideration of the local context and prevailing gender norms. Nonetheless, these collaborative approaches tend to build on the status quo in the chain. As discussed, contestation efforts are key to challenge the gendered power asymmetries and change the prevalent influences that shape individuals' practices and prevent them from being able to *re-negotiate* these norms.

Opening paths to challenge gender norms

Civil society can also play an important role in enhancing the potential of individual contestation by opening paths that help individuals recognise and utilise their ability to challenge gender norms. This can be done by helping consumers make informed choices, which entails raising awareness of the range of menstrual products available and providing sufficient information on the advantages and disadvantages of different products, including their impact on the environment. In the sample for this study, a significant proportion of consumers (88%) think that menstrual products have a negative impact on the environment, yet they attributed this to menstrual blood. By providing consumers with more information about the real impacts of these products, NGOs can help to change their practices. This awareness raising efforts could also be done in collaboration with the government and global and local firms as part of the various trainings that are delivered on menstrual hygiene for girls. However,

to be effective, these would also need to target older women and those who do not attend school. Moreover, NGOs also play an important role in enabling consumers to access other types of menstrual products such as menstrual cups that are difficult for many to obtain because they can be expensive and mostly available via online channels.

Waste pickers organisations can also provide support to waste pickers to help them change their views on menstrual products by delivering trainings and skill development opportunities. These trainings can help them to better understand the environmental impacts of menstrual waste; the appropriate ways to manage it; and the importance of the role they play in the management of this waste. However, it is important to note that the government needs to support these skills development programmes so that they can be scaled to reach waste pickers who don't belong to an association. Furthermore, an important step towards empowering waste pickers to change their practices and to demand better disposal practices from consumers is enabling them to conduct this work safely and changing the negative notions around caste and waste picking work. For this to happen, collaboration is central, waste pickers organisations rarely have the resources to provide workers with carts and plastic gloves and other tools that can enable them to better manage menstrual waste. They also need support to enhance the reach of their advocacy efforts that aim to change negative perceptions of waste pickers. It is important to note that partnerships towards these ends could also be undertaken with global firms. In India, there is evidence of CSR efforts that aim to improve the management of waste and the livelihoods of waste pickers. For example, The Body Shop in partnership with Plastics For Change and Hasiru Dala, a local Indian NGO, is buying plastic collected by waste pickers and recycling to reuse it to package haircare products (Thompson, 2019).

Driving change at the individual level requires understanding the various factors that configure individuals' identities, and which determine the extent to which they are able to positively drive change though their practices and perceptions. As the conceptual frame of s*trategies* demonstrated, individuals' position in society and their roles in the chain as consumers or waste pickers determines the extent to which they are able to contest gender norms. This is why, an intersectional perspective can strengthen the different types of governance in GPNs and contribute to inform better initiatives to mitigate the impacts that result from the processes of disposal of commodities in different contexts. Nonetheless, for these efforts to be transformative, change needs to happen on a larger scale.

Scaling up efforts

Collective forms of agency can enhance the effectiveness of individual efforts by scaling them up and increasing the likelihood that these will contribute to lasting change. For example, integrating waste pickers into public waste collection systems can contribute to mitigate environmental impacts by improving the collection and segregation of menstrual waste. To enable this, local governments need to prioritize collaboration with waste picking associations when allocating solid waste management contracts.[61] Legal frameworks also need to be in place that help to reduce the stigma associated with waste picking by safeguarding the rights of waste pickers and guaranteeing their social protection.[62] What is more, the challenges that female waste pickers face, and which are different to those of men,[63] also need to be considered when integrating them into public waste management systems. For instance, by acknowledging that female waste pickers have child caring responsibilities and thus, need more flexibility in their collection schedules. Other efforts to scale individual agency can take the form of advocacy campaigns that scale consumers' voices and concerns for their surroundings, to demand that firms take a more active approach in the disposal of these products and the management of this waste.

This discussion shows that there is a blurred distinction between collaboration and contestation efforts; both are needed to help individuals become able to *re-negotiate* gender norms and to ensure that these efforts achieve the scale that is required for transformative and lasting change. Similarly, individual and collective forms of agency overlap and complement each other. Without individual contestation, change in the practices that generate adverse environmental impacts is unattainable; at the same time, collective manifestations of agency are needed to support and scale these individual efforts. In terms of governance, this means that public policies need to create opportunities for engagement and collaboration that allow actors to remain responsive to the dynamic nature of gender norms. Collaboration is an important step towards improving the environmental governance of GPNs; however, it can only get so far. Achieving transformative change calls for constant efforts of

[61] See Parsons, et al.,(2019) for more information on the way the SWaCH and the PMC have managed the integration of waste pickers into dry waste collection in Pune.

[62] For more examples and guidance on addressing legal challenges around waste picking and sanitation work see Lalla (2019) and "Waste Pickers and the Law" (n.d.).

[63] Female waste pickers in this study usually collected less valuable materials, had less access to tools, and less control over their earnings. Other studies have found that they face challenges such as sexual harassment, health risks when working pregnant, movement limitations because they have to care of children, among others (Chikarmane and Narayan, 2009; *Sanitation worker safety and livelihoods in India*, 2018; *Wastepickers*, 2018).

contestation that simultaneously enable and pressure actors to play a more transformative role by challenging the gendered power asymmetries that compound the adverse environmental impacts of menstrual products and that create new forms of inequality in this chain.

8.5 Areas for further research

The findings from this study underscore the need to further explore the potential for transformative change in the menstrual product chain. They also indicate that valuable insights can be derived from the investigation of how tensions manifest through the use and disposal of other commodities and whether these also relate to adverse environmental impacts.

The tensions in the menstrual products chain can be furthered explored by looking at disposal and waste management practices in other contexts where the operations of the chain are also growing and appear to be influenced by gender norms. For example, China is one of the largest markets for these products and where there is a growing preference for premium products and a strong presence of domestic manufacturers, such as Hengan Fujian (*Sanitary Protection in Asia Pacific*, 2019). This is also a country where menstruation remains taboo; as an example, China's media regulator recently banned advertisements of menstrual products during prime time because there are considered inappropriate (Beattie, 2017; Yang, 2016). Other emerging markets to consider to investigate tensions and environmental impacts are Brazil, Indonesia and Vietnam, where a growing base of women entering the workforce, rising incomes, and growing product availability are expected to continue to drive significant and rapid growth in sales (*Sanitary Protection in Asia Pacific*, 2019; *Sanitary Protection in Latin America*, 2019).

In addition, the relation between tensions and environmental impacts can be further explored by looking at other commodities that appear to have a relation to gender norms and to generate significant adverse impacts on the environment, such as household cleaning products and cosmetics (Criado-Perez, 2019; "Gender-specific consumption patterns," 2020; Heise et al., 2019). For example, skin lightening creams often contain mercury which is discharged into the environment via wastewater (Al-Saleh et al., 2012; "Gender-specific consumption patterns," 2020). The use of these products is strongly associated with cultural notions that regard 'whiteness' as a key criterion of personal beauty due to it being associated with class and superior castes (Hansen et al., 2016). Multinational companies such as L'Oreal, Lancome and Clinique are rapidly making inroads into this market which has seen impressive growth in the past two decades (Picton, 2013).

Another interesting commodity to consider is women's wear. This industry was valued at USD $1,386 billion in 2018, and expects to see continued growth as a result of the rise of the 'fast fashion' phenomenon (quicker turnaround of styles and collections) (*Women Wear Market Size, Share*, 2019). Research shows that if this growth continues, total clothing sales could reach 160 million tonnes in 2050. This would result in a substantial increase in the consumption of non-renewable resources, including oil to produce synthetic fibres, fertilisers to grow cotton, and chemicals to produce fibres and textiles; as well as on the amount of plastic microfibers entering the ocean (*A new textiles economy*, 2017). These potential impacts indicate that unpacking the role of gender norms that shape the use of commodities needs to be further advanced to better understand and address the environmental impacts associated with economic production.

Female condoms are another commodity that can provide important insights on the relation between gender norms and environmental impacts that results from the usage and disposal of commodities. These products have immense growth potential in both developed and developing countries, especially in light of growing government efforts to distribute contraceptives and foster family planning (Family Planning Report, 2019; Global Female Condom Market, 2019). These products pose an interesting case study because research has found that gender norms play a central role in the extent to which women want to try or use them (Mokgetse and Ramukumba, 2018). The impacts of these products on the environment are also yet to be investigated.

Lastly, the commodification of human hair for wigs and extensions is another case where tensions between gender norms and commercial activities can be observed. The global market for hair is estimated to reach revenues of more than $10 billion by 2023 (*Hair Wigs and Extension Market*, 2018). The meanings and connotations of hair products are related to beauty standards that can be informed by gender norms. What is more, this commodity also provides an opportunity to explore the role of waste pickers play in both the disposal and raw material nodes of commodity chains. Hair collection is a common activity for waste pickers in India, Myanmar, Cambodia, Vietnam, Laos and Mongolia (Tarlo, 2016). While one kilo of hair takes between eight and ten days to collect, the final product can be sold for 100 times the price paid for the raw material (Boland, 2019). This exploration could also serve to analyse how norms around caste and other forms of social difference intersect the operations of commodity chains and whether this has consequences in terms of social impact.

Pursuing these and other avenues of research can help to explore the challenges and opportunities that the transformations of gender norms through the process of commodification pose for the

environment. As more individuals, including women, continue to participate in global production as workers, consumers, and activists it is becoming increasingly important to further investigate their engagements with commodities, as well as how their individual and collective agency can shape their ability to contribute to mitigate environmental impacts.

Concluding remarks

This study contributes to GPN, FPEcon, and FPEcol literatures by showing that the analysis of gender norms matters for the environment because these can be reproduced by the operations of commodity chains in ways that can aggravate the environmental impacts from global production. The exploration of tensions between gender norms and commercial activities and how these play out in the disposal stage of menstrual products in India underscore the importance of including a gender lens in the analysis of the environmental impacts associated with the disposal of these products. The insights presented are based on a case study in India, but can have broader implications for the analysis of the environmental impacts that result from gendered patterns of production, consumption, and disposal of other commodities.

This study also aims to contribute to the fight for menstrual equity by interrogating the context-specific factors that limit individuals' choices and forge their desires. The explanation that all menstrual taboos result in women's oppression is reductionist and fails to consider the historical, ethnographic, biological, and symbolic complexity that these taboos entail (Buckley and Gottlieb, 1988). Yet, as this study has shown, these gender norms shape the way individuals' dispose of menstrual products, and in turn, the impacts that these products have on the environment. Menstruation is a topic worth of academic inquiry that leads to broader reflections on gender equality, social change, and environmental sustainability. As this study shows, the disposal of menstrual products underscores the need for transformative change that challenges the gendered power asymmetries that simultaneously contribute to environmental destruction and systematic discrimination based on gender. As global production continues to expand and open new opportunities for more individuals to access commodities, it is becoming more pressing to strengthen the mechanisms of environmental governance in GPNs that can lead to more gender equitable gains from commodity chains and that safeguard the environmental resources that sustain global production.

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10 Appendix

Appendix 1. Menstrual products that are available for sale in different markets

Disposable pads	Most commercial disposable pads have 'wings' and a sticky backing that secures them to the underwear and prevents them from moving out of place. These are usually made with super absorbent polymers or with wood pulp. In recent years, biodegradable pads made of materials such as banana fibre, have also been introduced to the market.
Re-usable pads	Re-useable pads are usually made of cotton and include a pad holder and a range of soft materials that can be inserted into these holders. Some of these pads also come with pouches that can be used to store soiled pads until they can be washed. These pads are commercially available but can also be made at home.
Tampons with or without applicator	A tampon is a thin tube of cotton that is inserted into the vagina and acts as a plug by absorbing blood and preventing it from coming out of the body. Tampons have a cotton thread attached to them, which remains outside of the body and is used for removal. Some tampons also come with a plastic or cardboard applicator, which is used to push the tampon into place and is thrown away after insertion. Digital tampons are those that do not come with an applicator and are inserted using the fingers.
Menstrual cups	A menstrual cup is made of a medical grade silicone and is inserted into the vagina to gather the menstrual blood. After removal, the cup is emptied and washed before being re-used. The cup comes in

	various sizes and shapes. Disposable soft menstrual cups are also available in some markets.
Menstrual sea sponges	These are natural sea sponges that are inserted into the vagina to absorb the menstrual blood. They need thorough cleaning/sterilisation before and in between use.
Absorbable underwear	This type of underwear has a thin rubber lining fixed internally which absorbs the blood. These can be reused after washing.

** This table excludes the active choice of women to not use products (e.g. free bleeding) and the traditional alternatives that women use to manage their menstruation.*

Source: Author, 2020 adapted from (House et al., 2012)

Appendix 2. Screening questionnaire for consumers

STUDY LOCATION

Delhi Urban	**1**
Delhi Peri Urban	**2**
Pune Urban	**3**
Pune Peri Urban	**4**

First Name	

Respondent Profile

- **Gender:** Female
- **Location:** Delhi/Pune and one peri-urban location in each city
- **SEC:** B, C & D

Q1 Could you please tell me your age in completed number of years? **RECORD IN THE GRID BELOW**

AGE GROUP	CODE	INSTRUCTION
Less than 18 years	1	**TERMINATE**
18 – 25yrs	2	**CONTINUE**
26 – 35 years	3	
36 – 45 years	4	
Above 45 years	5	**TERMINATE**

Q2 Can you please tell me the highest level of education of the person who contributes most to the household expenses **(Chief Wage Earner- CWE)**? **(RECORD IN THE SEC GRID BELOW)**

Q3 Can you please tell me the occupation of the person who contributes most to the household expenses **(Chief Wage Earner- CWE)**? **(RECORD IN THE SEC GRID BELOW)**

		Illiterate	School Up to 4 Years	School 5 To 9 Years	SSC / HSC	Some University But Not Graduate	University Graduate	Graduate/ Post Graduate- Professional
Education		1	2	3	4	5	6	7
Occupation								
Unskilled Worker	1	E2	E2	E1	D	D	D	D
Skilled worker	2	E2	E1	D	C	C	B2	B2
Petty Traders	3	E2	D	D	C	C	B2	B2
Shop Owners	4	D	D	C	B2	B1	A2	A2
Businessmen/ Industrialist with no employees	5	D	C	B2	B1	A2	A2	A1

Businessmen/ Industrialist with 1-9 employees	6	C	B2	B2	B1	A2	A1	A1
Businessmen/ Industrialist with more than 10 employees	7	B1	B1	A2	A2	A1	A1	A1
Self-employed professionals	8	D	D	D	B2	B1	A2	A1
Clerical Grade/ Salesmen	9	D	D	D	C	B2	B1	B1
Supervisory level	10	D	D	C	C	B2	B1	A2
Officers/ Executives- Junior	11	C	C	C	B2	B1	A2	A2
Officers/ Executives- Middle level/ Senior level	12	B1	B1	B1	B1	A2	A1	A1

RECORD THE SEC CODE _____
SELECTION CRITERIA OF SEC IS C & D
TERMINATE B, A & E

Q4 Which femcare products are you aware of?

RESPONSE	CODE	INSTRUCTION
Menstrual Pads/ Sanitary Napkins	1	**CONTINUE**
Tampons	2	
Home-made pads	3	
Cups	4	
None of the above	5	**TERMINATE**

Q5 Which of the following products do you most often use to manage your menstrual cycle/period?

RESPONSE	CODE	INSTRUCTION
Menstrual Pads/ Sanitary Napkins	1	**CONTINUE**
Tampons	2	
Cloth pads (either bought or home-made)	3	**ASK Q6**
Menstrual cups	4	
Cloth/rags	5	
None of the above	6	

IF RESPONSE FOR Q5 IS 3,4,5,6 THEN ASK Q6, OTHERWISE ASK Q7

Q6 Have you ever used sanitary napkins to manage your period on a regular basis (more than three occasions)?

RESPONSE	CODE	INSTRUCTIONS
No	1	**TERMINATE**
Yes	2	**CONTINUE**

Q7 How comfortable are you discussing issues related to femcare products and menstrual cycle/periods?

RESPONSE	CODE	INSTRUCTION
I'm comfortable speaking about this topic with other women	1	**CONTINUE**
I am hesitant about speaking about it with other women	2	**TERMINATE**
I cannot speak about this to topic with anyone	3	

TO ALL RECRUITED:

We are conducting some discussions with other women regarding the femcare products they use. We want to have a deeper understanding of this topic from people like you, whose views are extremely valuable to us. These discussions are confidential and all your responses will be anonymized so that these cannot be linked back to you, as well as to allow you to feel comfortable and be open and honest. These discussions will last up to (60 minutes for semi-structured interviews, and for FGDs and in-depth interviews 90 minutes). Would you be willing to participate in this exercise?

Yes	1	**RECRUIT**
No	2	**TERMINATE**

DATE _____

THANK YOU

Appendix 3. Screening questionnaire for waste pickers

STUDY LOCATION

Delhi Urban	**1**
Delhi Peri Urban	**2**
Pune Urban	**3**
Pune Peri Urban	**4**

First Name	

Respondent Profile

- **Gender:** Female/Male
- **Location:** Delhi/Pune and one peri-urban location in each city
- **Occupation:** Waste pickers

Q1 What is your current occupation?

OCCUPATION	CODE	INSTRUCTIONS
Other	1	**TERMINATE**
Waste Picker	2	**CONTINUE**
Sanitary worker	3	

Q2 Please tell me what kind of waste do you generally pick? (Multiple choice)

TYPE OF WASTE	CODE	TYPE OF WASTE	CODE
Kitchen waste	**1**	Plastic bags, polythene covers, wrappers	**8**
Rotten fruits and vegetables	**2**	Metal items, tin cans, foils, sheets, scraps, etc.	**9**
Paper bags & newspapers	**3**	Tetra pack	**10**
Synthetic cloth/fabric	**4**	Glass bottles, bulbs, window panes, etc.	**11**
Thin sheets or pieces of wood	**5**	Sanitary pads, diapers, etc.	**12**
Cardboard	**6**	E-waste such as batteries, CDs, toys, etc.	**13**
		Others, please specify_____	**14**

CONTINUE IF CODED 12, OTHERWISE TERMINATE

Q3 You said that have picked sanitary napkins, how frequently do you to deal with this type of waste?

OCCUPATION	CODE	INSTRUCTIONS
Daily	1	**CONTINUE**
Weekly	2	
Monthly	3	

Rarely	4	**TERMINATE**

FOR MALE RESPONDENTS GO TO Q5

ASK Q4 TO FEMALE RESPONDENTS (if possible when they are alone or only surrounded by other females)

Q7 How comfortable are you discussing issues related to femcare products and menstrual cycle/periods?

RESPONSE	**CODE**	**INSTRUCTION**
I'm comfortable speaking about this topic with other women	1	**CONTINUE**
I am hesitant about speaking about it with other women	2	**TERMINATE**
I cannot speak about this to topic with anyone	3	

ASK Q5 TO MALE RESPONDENTS (if possible when they are alone or only surrounded by other men)

Q7 How comfortable are you discussing issues related to femcare products?

RESPONSE	**CODE**	**INSTRUCTION**
I'm comfortable speaking about this topic	1	**CONTINUE**
I am hesitant about speaking about it	2	**TERMINATE**
I cannot speak about this to topic with anyone	3	

TO ALL RECRUITED:

We are conducting some discussions with other women regarding the femcare products they use. We want to have a deeper understanding of this topic from people like you, whose views are extremely valuable to us. These discussions are confidential and all your responses will be anonymized so that these cannot be linked back to you, as well as to allow you to feel comfortable and be open and honest. These discussions will last up to (60 minutes for semi-structured interviews, and for FGDs and in-depth interviews 90 minutes). Would you be willing to participate in this exercise?

Yes	1	**RECRUIT**
No	2	**TERMINATE**

DATE _____

THANK YOU

Appendix 4. Research instrument for FGDs and in-depth interviews of consumers

NOTE: Questions in green are only for in-depth interviews.

SECTION 1: INTRODUCTION AND WARMUP

- Good morning/afternoon/evening! Thank you for being here with us today. My name is ……. and I am a researcher. Our job is to meet and talk to people and get their views on different subjects. All your views remain confidential and after the discussion/interview is complete, your responses will be anonymized so that these cannot be linked back to you. The information you share with us will only be used for research purposes so we ask that you be as open and honest as possible in answering the questions.
- **RECORDING**: We will record this discussion so that we can review it later and because we do not want to miss out anything you share with us. But before we move ahead let's do a quick introduction.
- **QUICK INTRODUCTION:** Please tell me a little about yourself.
    - Your name? What do you do?
    - Are you married, If yes, How long? Do you have kids? How many?
    - Where do you live? Who lives with you in your home? How long have you been living there?
    - How many years did you go to school? Are you working somewhere? If yes, what do you do?
    - What do your family members do?

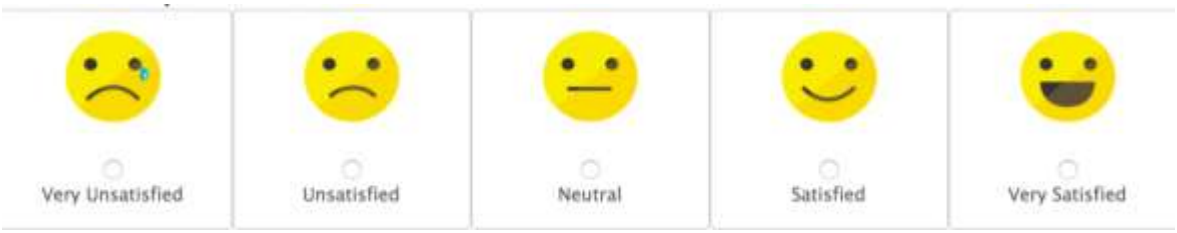
Now, we know each other's name. Help me to understand more about you:

- First let us talk about your hobbies and interests - What do you do in your free time?
- How do you keep your self-updated? From where do you get the latest information about current affairs and different issues? **[Moderator to probe the role of print media, TV channels, internet, etc. but also the role played by their friends and family members (husband, mother-in-law, relatives) and others (social workers, etc.)]**
- How is a typical day in your life, tell me how do you spend your weekdays and how do you spend your weekends? What did you do last weekend?
- What about shopping, where do you generally shop? Why do you shop in these places?
- How many times do you shop monthly? What kind of products do you shop for? **[Moderator to probe for: household purchase, purchase of apparel, purchase of personal beauty/grooming products and femcare products]**

SECTION 2: UNDERSTANDING PRATICES AND PERCEPTIONS

- What do you think are the issues/problems women face to manage their periods? Physical, emotional, both?
- What are your main concerns/challenges when managing your period? **[Moderator to ask about restrictions and other social considerations]**

- There must be other members in your family having periods, how are your needs different from them?
- How effective do you feel the current femcare products in the market are in addressing the needs of women?
- Now I have some smiles, please choose the one that reflects your feeling with the currently available products **[Moderator to show the emoticons and inquire about the reasons]**



Now let us specifically talk about the femcare product(s) that you use.

- What type of femcare product do you use? What brand do you use?
- Are you aware of any other product to manage periods? **[Moderator to probe for: sanitary napkins, home-made or pre-made cloth pads, menstrual cups, tampons, reusable cloth]**
- Why do you prefer your current product over others?
- Where did you learn about the femcare products you most often use? **[Moderator to understand the key sources of information and influences, probe: TV ads, in store promotion, peer recommendation, family recommendation, social workers, etc.]**
- Of those products which are currently available, which one would you recommend to someone who is close to you, say your own daughter? Why?
- What are the key considerations when buying sanitary napkins/femcare products? What benefits do you seek in these products? **Moderator to probe for brand name, pack size, attractive packaging, quality, additional benefits (extra-long and wide, wings, material, etc.), safe for environment, freebies, promos, easy availability of products, price, variants available, recommendation by other users, recommendation by retailers, past experience, advertisements.**
- How much do you spend monthly on sanitary napkins/femcare products?
- Have you always used the same product? If you have changes, from which product/brand/type did you shift and why did you make this change?
- If you were a magician and could create the perfect sanitary napkin/femcare product, what characteristics would it have? **[Moderator to probe for gaps in needs, focusing on functional and emotional aspects related to the disposal of products]**
- Do you think there are any downsides to using sanitary napkins/femcare products? **[Moderator to probe for price, difficult to find, cause infertility, make a girl lose her virginity, difficult to use, difficult to dispose, environmental impact, stain clothes, cause infections, irritate skin, etc.]**

SECTION 2.1 PURCHASE BEHAVIOUR

- Where do you usually purchase sanitary napkins/femcare products regularly **[Moderator to probe for kiranas, modern retailers, chemist shop, etc.]** Why do you purchase them there?
- Tell me about your experience buying them. Do you buy them yourself? Do you buy them for someone else? **[Moderator to ask about social considerations]**
- Can you tell me about the last time you bought sanitary napkins/femcare products? Please describe the store and the available choices and tell us why you chose the product you bought and how many packs/items you got?
- Where do you store your sanitary napkins/femcare products in your house? Why do you keep them there? **[Moderator to ask about social considerations]**

SECTION 2.2 USAGE AND DISPOSAL PRACTICES

- Tell me about your experience using sanitary napkins/femcare products?
- Do you share washroom/bathroom with other members at home? Can you give me an example of how you manage those days of the month, with elders, children and male member at home?
- Have you ever had a negative experience using these sanitary napkins/femcare products? Would you like to share it?

Now, let me narrate a story to you…there are three friends Radha, Reemaand Seema. They all started menstruating at the age of 13. Radha's mother told her about menstruation and the practices that she used to manage her period. Reema learned about menstruation at school, and Seema reluctantly asked to her cousin, who was her age. Over the years, the three girls developed different ways and practices to handle their periods. Now that they have grown up, Radha collects and hides the waste and then buries it in a field by her house. Reema usually flushes her napkins in the toilet or hides them in the corners of public restrooms. Seema throws the sanitary napkins in the bin and then covers them with the household garbage.

- Why do you why think these women behave the way they do? Can you think of other ways to dispose of sanitary napkins/femcare products?
- What do you think are the main challenges that women face to dispose of sanitary napkins?
- Did anybody teach you/tell you how dispose of sanitary napkins/femcare products?
- Do you think it matters how these products are dispose of? Do you think there is a better/appropriate way? **[Moderator to probe for easiest ways, practical ways, appropriate ways; the intention is to understand if women know how to "properly" dispose of these products and if so, the reasons why they choose not to do it]**
- In all honesty, how do you dispose of sanitary napkins/femcare products? **[Moderator to ask this in a very friendly and non-judgmental manner and remind participants that it is ok to be honest]**
- Have you always disposed of sanitary napkins/femcare products this way?

- Now I have some scenarios, please tell me how do you dispose the used sanitary napkins/femcare product in each of the scenario:
    - When you are at your home?
    - When you are at your friend/relatives' home?
    - When you are out-side and you only have the option of a public toilet?
    - **Ask working women only** - When you are at work?
    - When you are in rush/late?
- What are the main challenges that you face to dispose of your sanitary napkins/femcare products? What are your main concerns when you dispose of sanitary products? **[Moderator to try to understand the personal reasons behind these concerns]**
- What feelings do you associate with the disposal of sanitary napkins/femcare products? **[Moderator to probe the emotional aspects and taboos associated with the disposal of femcare products]**

SECTION 3. PERCEPTIONS ON THE ENVIRONMENTAL IMPACT

- Have you ever thought of what happens to the sanitary napkin once you dispose of it?
- Have you ever thought if waste from sanitary napkins has an impact on environment? What kind of impact do you think these products have (positive/negative, big/small)? **[This should be asked a question with no right or wrong answer, the objective is to enquire if participants have ever thought of the environmental impacts of sanitary napkins]**
- What about the impact on the lives of waste pickers, do you think we should care about how they handle and manage the pads from the garbage that we throw away? Why do you think so?
- Do you think anything can be done to improve the disposable process of sanitary napkins? What and how?
- Who do you think should be responsible for ensuring sanitary napkins/femcare products don't pollute the environment? **[Moderator to probe for the government, the manufacturers who produce them, waste pickers, women who use them]**

THANK YOU

Appendix 5. Research instrument for FGDs and in-depth interviews of female waste pickers

NOTE: Questions in green are only for in-depth interviews.

SECTION 1. INTRODUCTION AND WARMUP

- Good morning/afternoon/evening! Thank you for being here with us today. My name is ……. and I am a researcher. Our job is to meet and talk to people and get their views on different subjects. All your views remain confidential and after the discussion/interview is complete, your responses will be anonymized so that these cannot be linked back to you. The information you share with us will only be used for research purposes so we ask that you be as open and honest as possible in answering the questions.
- **RECORDING**: We will record this discussion so that we can review it later and because we do not want to miss out anything you share with us. But before we move ahead let's do a quick introduction.
- **QUICK INTRODUCTION:** Please tell me a little about yourself.
    - Your name? What do you do?
    - Are you married? Do you have kids? How many?
    - Who else is there in your family?
    - Where do you live? How long have you been living there?
    - Where were you born? **[Moderator to probe if respondent is an immigrant]**
    - What do you do in your free time?

SECTION 2. UNDERSTANDING THEIR OCCUPATION

- Tell me about your daily routine…what time do you wake up and how do you go about your day? **[Moderator to understand the daily routine of the respondents and the average time they spend doing waste picking activities]**
- So you mentioned that you are involved in waste picking activities. Tell me more about this:
    - How long you have been doing this work?
    - Who else from your family works as a waste picker?
    - Is there any member in your family who is not involved in waste picking? Why so?
- Now let us talk about waste picking in detail, what does it entail? **[Moderator to probe for segregating resalable scrap, selling the scrap, disposing off the residue waste, etc.]**
- Which area(s) do you cover? Do you pick from any particular location? How do you choose the area? **[Moderator to check if respondent(s) pick household waste from door to door, streets, dustbins, and /or municipal landfills]**
- What kind of waste do you pick?

  Moderator to probe for:

Kitchen waste	Plastic bags, polythene covers, wrappers
Rotten fruits and vegetables	Metal items, tin cans, foils, sheets, scraps, etc.
Paper bags & newspapers	Tetra pack
Synthetic cloth fabric & cotton rags	Glass bottles, bulbs, window panes, etc.
Thin sheets or pieces of wood	Sanitary Pads, Diapers, etc.
Cardboard	E-waste such as batteries, CDs, toys, etc.

- Are there any items that you don't handle while picking up waste? Are there any items that are taken care only by men or only by women? If so, why is this the case?
- How much do you earn daily and what is your monthly income?
- Why did you become waste picker?
- Do you like your occupation? Would you like to do other thing else than picking waste? **[Moderator to understand the reason/motivators for choosing waste picking as occupation over other options]**
- Would you like your children to be waste pickers? Why yes or why not?

SECTION 3. WASTE MANAGEMENT PRACTICES AND PERCEPTIONS

- How do you manage different kind of waste? **[Moderator to probe for plastic, different kinds of metal, glass, cloth, etc.]**
- Tell me how are sanitary napkins/femcare products managed? Is there a different way to handle these products compared to other types of waste?
- How do you sort femcare products/soiled sanitary napkins from scrap/waste? Do you face any issues or difficulties doing this?
- Where do you usually come across femcare products/sanitary napkins?
- Please give me an example of an occasion when you found a femcare product/sanitary napkin, where did you find it? What did you do with it? How did you feel? Can you think of any other stories that you would like to share?
- Has anybody taught you how to handle this type of waste?
- Do you think there are any specific risks for handling femcare products/sanitary napkins? If yes, what are those? **[Moderator to understand their perceptions on physical risks, as well as feelings, attitudes and opinions on handling soiled products]**
- Do you take any precautions when dealing with this type of waste? Do you handle this waste barehanded or do you use any protection? Why yes or why not?

- Have you ever experienced any health problems as a result of handling femcare products/sanitary napkins? **[This question is about health problems associated with femcare products, if participants share health issues not directly linked to sanitary napkins but to waste in general (e.g. getting cut by glass) the moderator must redirect the conversation back to handling femcare products]**
- Besides health issues, do you think this waste is also harmful for the environment? For example, by causing pollution? Why do you think so? **[Moderator to understand if the environment is an issue they have considered previously and/or care about]**

Now let me narrate you a short story about Lalita. Her husband works as a waste picker and she helps him to pick up waste material. They start the day together early in the morning. They work for the 7 am until 3pm. While picking up waste, her husband generally sorts out different products from the waste, but when he comes across a sanitary napkin, rather than handling it himself he calls Lalita to collect it and throw it away.

- Why do you think Lalita's husband asks her to do this? Is he right in doing so?
- When it comes to handling sanitary napkins/femcare products do the roles of women and men differ? Should these roles be different? Why yes or why not? **[Moderator to ask participants to elaborate on their responses and to spend as much time as needed in this question]**

SECTION 4. UNDERSTANDING USAGE AND DISPOSAL PRACTICES

- Tell me, during that time of the month, do you have to make any changes in your day to day activities? Why or why not?
- Where did you learn about the menstrual cycle? Were you also told what you should use during those days? Was it a sanitary napkin, cloth or something else?
- Is there anything that you dislike about these methods?
- **IF THE PARTICIPANTS SAYS SHE USES CLOTH/OTHER THEN MODERATOR TO ASK:** Are you aware that sanitary napkins/femcare products are available in the market and that you can use them for those days? If yes, have you ever used them? If no, why not?
- **IF PARTICIPANT SAYS SHE USES SANITARY NAPKINS THEN MODERATOR TO ASK:** What are the benefits of using sanitary napkins over other methods like cloth? Are there any disadvantages?
- As a waste picker, do you find it more challenging to manage your period while working? Do you take breaks to change your sanitary napkin/cloth? Do you have access to toilets or wash facilities?

SECTION 4.1 DISPOSAL PRACTICES

Now, let me tell you another story… there are two friends, Radha and Seema. They started menstruating at the age of 13. Radha's mother told her about mensuration and the practices involved, what to use and how

to keep herself-clean. Seema reluctantly asked her cousin, who was her age. Now after few years, they both use sanitary napkins. Radha usually flushes her napkins in the toilet or hides them in the corners of public restrooms and Seema throws the napkin in the bin and covers it with the household garbage.

- Now that you have heard the story, and their different ways of handling soiled products, why do they behave the way they do? Are there any other methods to dispose of sanitary napkins/femcare products?
- Based on your experience as a waste picker, which method of disposal do you think it's better and why?
- Do you think the best method of disposing is practical/easy? If yes, why so? **[Moderator to get an understanding of their knowledge of "adequate" disposal practices and how practical or difficult they think these are]**
- Did anybody teach you how to dispose of sanitary napkins/femcare products?
- How do you personally dispose of the sanitary napkins/femcare products? Do you face any difficulties while disposing of them? **[Moderator to ask for details and to probe the emotional aspects and social considerations associated with the disposal of femcare products/sanitary napkins]**

SECTION 5. PERCEPTIONS ON THE ENVIRONMENTAL IMPACTS

- Do you think femcare products are an important waste problem? How does it compare to other problems related to waste?
- If you didn't have to pick femcare products/sanitary napkins do you think this would be a positive or negative change in your day to day activities, or would it not make a difference?
- If sanitary napkins were free and easily accessible to every woman in India, do you think this could have consequences for your work? **[Moderator to understand how important this issue is for them and if they have thought of how the problem can grow]**
- Do you think anything should be done to improve the disposal process of femcare products/sanitary napkins? If so what?
- What about the environment, do you think these products have an impact on the environment?
- **[If the answer is yes, follow up with:]** Do you think anything should be done to prevent the consequences that waste from sanitary napkins/femcare products can have on the environment?
- Who do you think should be responsible to ensure waste from femcare products/sanitary napkins doesn't affect waste pickers? **[Moderator to prove for: government, NGOs, the manufacturers who produce sanitary napkins, women who use sanitary napkins]**
- Who do you think should be responsible to ensure waste from femcare products/sanitary napkins doesn't affect the environment? **[Moderator to prove for: government, NGOs, the manufacturers who produce sanitary napkins, women who use sanitary napkins]**
- Do you think waste from femcare products should be prioritized, or are there more important challenges that you face as a waste picker? What are these other challenges?

THANK YOU

Appendix 6. Research instrument for FGDs and in-depth interviews of male waste pickers

NOTE: Questions in green are only for in-depth interviews.

SECTION 1. INTRODUCTION AND WARMUP

- Good morning/afternoon/evening! Thank you for being here with us today. My name is ……. and I am a researcher. Our job is to meet and talk to people and get their views on different subjects. All your views remain confidential and after the discussion/interview is complete, your responses will be anonymized so that these cannot be linked back to you. The information you share with us will only be used for research purposes so we ask that you be as open and honest as possible in answering the questions.
- **RECORDING**: We will record this discussion so that we can review it later and because we do not want to miss out anything you share with us. But before we move ahead let's do a quick introduction.
- **QUICK INTRODUCTION:** Please tell me a little about yourself.
    - Your name? What do you do?
    - Are you married? Do you have kids? How many?
    - Who else is there in your family?
    - Where do you live? How long have you been living there?
    - Where were you born? **[Moderator to probe if respondent is an immigrant]**
    - What do you do in your free time?

SECTION 2. UNDERSTANDING THEIR OCCUPATION

- Tell me about your daily routine…what time do you wake up and how do you go about your day? **[Moderator to understand the daily routine of the respondents and the average time they spend doing waste picking activities]**
- So you mentioned that you are involved in waste picking activities. Tell me more about this:
    - How long you have been doing this work?
    - Who else from your family works as a waste picker?
    - Is there any member in your family who is not involved in waste picking? Why so?
- Now let us talk about waste picking in detail, what does it entail? **[Moderator to probe for segregating resalable scrap, selling the scrap, disposing off the residue waste etc.]**
- Which area(s) do you cover? Do you pick from any particular location? How do you choose the same? **[Moderator to check if respondent pick household waste from door to door, streets, dustbins, and /or municipal landfills]**
- What kind of waste do you pick?

  Moderator to probe for:

Kitchen waste	Plastic bags, polythene covers, wrappers
Rotten fruits and vegetables	Metal items, tin cans, foils, sheets, scraps, etc.
Paper bags & newspapers	Tetra pack
Synthetic cloth fabric & cotton rags	Glass bottles, bulbs, window panes, etc.
Thin sheets or pieces of wood	Sanitary Pads, Diapers, etc.
Cardboard	E-waste such as batteries, CDs, toys, etc.

- Are there any items that you don't handle while picking up waste? Are there any items that are taken care only by men or only by women? If so, why is this the case?
- How much do you earn daily and what is your monthly income?
- Why did you become waste picker?
- Do you like your occupation? Would you like to do other thing else than picking waste? **[Moderator to understand the reason/motivators for choosing waste picking as occupation over other options]**
- Would you like your children to be waste pickers? Why yes or why not?

SECTION 3. WASTE MANAGEMENT PRACTICES AND PERCEPTIONS

- How do you manage different kind of waste? **[Moderator to probe for plastic, different kinds of metal, glass, cloth, etc.]**
- Tell me how are sanitary napkins/femcare products managed? Is there a different way to handle these products compared to other types of waste?
- How do you sort femcare products/soiled sanitary napkins from scrap/waste? Do you face any issues or difficulties doing this?
- Where do you usually come across femcare products/sanitary napkins?
- Please give me an example of an occasion when you found a femcare product/sanitary napkin, where did you find it? What did you do with it? How did you feel? Can you think of any other stories that you would like to share?
- Has anybody taught you how to handle this type of waste?
- Do you think there are any specific risks for handling femcare products/sanitary napkins? If yes, what are those? **[Moderator to understand their perceptions on physical risks, as well as feelings, attitudes and opinions on handling soiled products]**
- Do you take any precautions when dealing with this type of waste? Do you handle this waste barehanded or do you use any protection? Why yes or why not?

- Have you ever experienced any health problems as a result of handling femcare products/sanitary napkins? **[This question is about health problems associated with femcare products, if participants share health issues not directly linked to sanitary napkins but to waste in general (e.g. getting cut by glass) the moderator must redirect the conversation back to handling femcare products]**
- Besides health issues, do you think this waste is also harmful for the environment? For example, by causing pollution? Why do you think so? **[Moderator to understand if the environment is an issue they have considered previously and/or care about]**

Now let me narrate you a short story about Mohan. He and his wife work as waste pickers. They start the day early at 7am and end it around 3pm. They do most of the work together and during the day they always have lunch together. At home also, Mohan helps Lalita with some household chores, but when they are picking up waste if Mohan comes across a sanitary pad, rather than handling it himself he calls Lalita to collect it and throw it away.

- Why do you think Mohan asks his wife to do this? Is he right in doing so?
- What is the main role of men and what is the main role of women when handling waste?
- When it comes to handling femcare products/sanitary napkins do the roles of women and men differ? Should these roles be different? Why yes or why not? **[Moderator to ask participants to elaborate on their responses and to spend as much time as needed in this question]**
- Is it ok for women to deal with femcare waste?
- Do you know how your wife manages her period? Do you talk about it?
- Based on your experience as a waste picker, do you think there is one best method of disposing of sanitary napkins/femcare products? What is this method? **[Moderator to get an understanding of how much respondents know about the topic]**

SECTION 4. PERCEPTIONS ON THE ENVIRONMENTAL IMPACTS

- Do you think femcare products are an important waste problem? How does it compare to other problems related to waste?
- If you didn't have to pick femcare products/sanitary napkins do you think this would be a positive or negative change in your day to day activities, or would it not make a difference?
- If sanitary napkins were free and easily accessible to every woman in India, do you think this could have consequences for your work? **[Moderator to understand how important this issue is for them and if they have thought of how the problem can grow]**
- Do you think anything should be done to improve the disposal process of femcare products/sanitary napkins? If so what?
- What about the environment, do you think these products have an impact on the environment?
- **[If the answer is yes, follow up with:]** Do you think anything should be done to prevent the consequences

that waste from sanitary napkins/femcare products can have on the environment?

- Who do you think should be responsible to ensure waste from femcare products/sanitary napkins doesn't affect waste pickers? **[Moderator to prove for: government, NGOs, the manufacturers who produce sanitary napkins, women who use sanitary napkins]**
- Who do you think should be responsible to ensure waste from femcare products/sanitary napkins doesn't affect the environment? **[Moderator to prove for: government, NGOs, the manufacturers who produce sanitary napkins, women who use sanitary napkins]**
- Do you think waste from femcare products should be prioritized, or are there more important challenges that you face as a waste picker? What are these other challenges?

THANK YOU

Appendix 7. Codes, categories, and emerging themes in data analysis

	Examples of code		Examples of categories/structural code	Examples of emerging themes
	Nvivo	Descriptive		
Consumers	• "hide" • "bad blood" • "shameless" • "wrap the pad" • "poly bag" • "wash the pad" • "bury the pad"	• Delhi • Pune • Urban • Peri-urban • Married • Single • Widow • Kids • No kids	• Drivers of product choice • Sources of information • Behaviours shaped by social norms • Behaviours shaped by commercial strategies • Perception of menstrual products • Practices that cause environmental outcomes • Perception of environmental impacts	• Preference for larger size is informed by social expectations around menstruation • Exposing menstrual blood is a central concern in disposal • Perception that traditional disposal practices are more effective
Waste pickers	• "helpless" • "ladies waste" • "disgusted" • "poly bag" • "collect from homes" • "pick from street" • "bad blood"	• Delhi • Pune • Urban • Peri-urban • Married • Female • Male • Married • Single • Member of Association • Independent worker	• Behaviours shaped by social norms • Behaviours shaped by commercial strategies • Behaviours shaped by associations • Other sanitary waste • Perception of menstrual products • Other gender dynamics • Caste dynamics • Practices that cause environmental impacts • Perception of environmental impacts	• Waste pickers are seeing increasing quantities of menstrual waste • Female waste pickers rely more on waste picking than men • There is a stigma to menstrual waste that is informed by taboos • Empowerment helps waste pickers demand menstrual products are disposed properly

Public actors	• "incineration" • "sanitation" • "remain in school" • "tax" • "fines" • "growing waste" • "subsidised"	• Municipal Corporation • National Department • International Organisation	• Implementation of MHM guidelines • Incineration and sanitation initiatives • Other MHM initiatives • Swachh Bharat • Partnerships with private sector • Partnerships with waste pickers' associations • Awareness of environmental impacts	• Ensuring access to products so girls can stay in school is the priority • Incineration is the endorsed method in line with sanitation efforts • Only limited local efforts exist to integrate waste pickers into public waste management systems
Private sector	• "distribution network" • "education" • "access" • "big brands" • "value added" • "mission"	• Global Manufacturer • Local Manufacturer	• Marketing strategies • Market insights • Challenges to expand operations • Partnerships • CSR initiatives around waste • Awareness of environmental impacts • Compliance	• Lack of awareness and distribution networks are important challenges to drive product adoption • The market is growing and is considered profitable • There is limited compliance with regulation
NGOs	• "poor quality" • "awareness" • "development" • "sustainable choices" • "empowerment" • "training"	• Waste picking association • Local NGO • International NGO • Activists	• Access to low-cost products • Raising awareness of sustainable alternatives • Disposal efforts • Training waste pickers • Collaboration with the private sector	• Limited attention to disposal in education programmes • Limited resources to train waste pickers • Contrasting views on the importance of the environment

	• "campaign" • "reusables"		• Prioritising environmental impacts	vs ensuring access to products
Key Expert	• "access" • "plastic" • "Dalit" • "disposal challenges" • "growing waste" • "Global South" • "hygiene"	• Academic on MHM • Academic on India • Consultant on MHM • Consultant on market dynamics • Consultant on waste management	• Gender norms on menstruation • Insights on disposal practices • Caste dynamics in waste picking • Gender dynamics in waste picking • Limitations of waste systems	• Social norms and taboos inform women's understanding of menstruation • Systems of differentiation define who waste pickers are, and how they behave towards others

Source: Author, 2020

Appendix 8. Methodology for numerical data presented in Chapter Five and Six

- Each table (5.1, 5.2, 5.3, 6.1, 6.2 and 6.3) shows the different responses collected for various questions asked during In-Depth Interview (IDIs).

- When transcribing the recording of Focus Group Discussions (FGDs), it was not possible to identify which responses belong to which participant. For this reason, the data presented in the aforementioned tables only includes responses collected through IDIs, which could be attributed to individual interviewees.

- Tables 5.1-6.3 were created after reviewing transcripts and categorising responses using different codes: Nvivo and Descriptive (see Appendix 7 for examples of such codes). The original questions can be found in the research instruments for FGDs and in-depth interviews in Appendix 3-5.

- A table was created for each of the selected questions, the different codes for responses are listed in columns. Rows show the IDIs, which were coded using the following guide:

Research Method	Actor	Location	Area
Focus group discussion - 'FGD' In-depth interview – 'IDI'	Consumers – 'A' Waste pickers – 'B'	Delhi – 'D' Pune – 'P'	Urban – 'U' Peri-urban – 'P'

- A '1' was recorded if the response listed in the column was mentioned in a given IDI. If respondents didn't give that response a '0' was recorded.

- The cells titled 'Total Delhi' and 'Total Pune' show the count of how many times a given response was mentioned.

- The cell titled 'Total (%)' shows the proportion of interviewees that gave each response. These % are the reported figures in Chapters Five and Six. In tables 5.1, 5.2, 5.3 and 6.1 interviewees gave more than on response per question, which is why the sum of the percentages exceed 100%.

- It is emphasized that this approach to analyse and present the data serves to compare the relative frequency of different responses obtained through IDIs in this sample. These results cannot be interpreted as representative of views within the wider population of women in India using menstrual products nor the wider population of waste pickers in the country.

Table 5.1 The reasons why consumers purchase menstrual products

Location	Code	Number of participants	*It absorbs blood better*	*It is cleaner and more hygienic*	*It avoids stains on clothes*	*It feels more comfortable*	*It doesn't cause rashes*	*It doesn't cause infections*	*It prevents bad odour*	*It is easier to use than other products*	*It is easier to dispose than other products*
Delhi Urban	IDI - ADU1	1	1	0	1	0	0	0	0	1	0
Delhi Urban	IDI - ADU2	1	1	1	1	0	0	0	0	0	0
Delhi Urban	IDI - ADU3	1	1	1	1	0	0	0	0	0	0
Delhi Urban	IDI - ADU4	1	1	0	1	0	0	0	0	1	0
Delhi Urban	IDI - ADU5	1	1	0	1	0	0	0	0	0	1
Delhi Peri-urban	IDI - ADP1	1	1	0	0	0	0	0	1	0	0
Delhi Peri-urban	IDI - ADP2	1	0	0	0	1	0	0	0	0	0
Delhi Peri-urban	IDI - ADP3	1	0	0	0	1	1	1	0	0	0
Delhi Peri-urban	IDI - ADP4	1	1	0	0	0	0	0	0	1	1
Pune Urban	IDI - APU1	1	1	1	1	0	1	0	0	0	0
Pune Urban	IDI - APU2	1	1	1	0	0	0	0	0	0	0
Pune Urban	IDI - APU3	1	1	0	1	0	0	0	0	0	0
Pune Urban	IDI - APU4	1	1	0	1	0	0	0	0	1	0
Pune Urban	IDI - APU5	1	1	1	1	0	0	0	0	0	0
Pune Peri-urban	IDI - APP1	1	1	0	1	1	0	0	0	0	0
Pune Peri-urban	IDI - APP2	1	1	0	1	1	1	0	0	0	0
Pune Peri-urban	IDI - APP3	1	0	0	1	0	0	0	0	1	1
Pune Peri-urban	IDI - APP4	1	0	1	0	0	0	0	0	0	0
Delhi Urban	IDI - ADU6	1	1	1	0	0	0	0	0	0	0
Delhi Urban	IDI - ADU7	1	1	1	1	0	0	0	0	0	0
Delhi Urban	IDI - ADU8	1	1	0	1	0	0	0	0	1	0
Delhi Urban	IDI - ADU9	1	1	0	0	0	0	0	0	0	0
Delhi Urban	IDI - ADU10	1	1	0	1	0	0	0	0	0	0
Delhi Peri-urban	IDI - ADP5	1	1	0	1	0	1	0	0	0	0
Delhi Peri-urban	IDI - ADP6	1	1	0	1	0	0	0	0	0	0
Delhi Peri-urban	IDI - ADP7	1	1	1	1	0	0	1	0	0	0
Delhi Peri-urban	IDI - ADP8	1	0	1	0	0	1	0	0	1	0
Pune Urban	IDI - APU6	1	1	0	1	0	0	0	0	0	0
Pune Urban	IDI - APU7	1	1	0	1	1	0	0	0	0	0
Pune Urban	IDI - APU8	1	1	1	1	0	0	0	0	0	0
Pune Urban	IDI - APU9	1	1	1	1	0	0	0	0	0	0
Pune Urban	IDI - APU10	1	0	1	0	0	0	0	0	1	0
Pune Peri-urban	IDI - APP5	1	0	1	0	0	0	0	0	0	0
Pune Peri-urban	IDI - APP6	1	1	1	1	0	0	0	0	0	0
Pune Peri-urban	IDI - APP7	1	1	0	1	0	0	1	0	0	0
	Total Delhi	15	6	11	2	3	2	1	5	2	
	Total Pune	13	9	13	3	2	1	0	3	1	
	Total (%)	80%	43%	69%	14%	14%	9%	3%	23%	9%	

Table 5.2 Consumers' preferred disposal methods of menstrual products										
Category	Location		Code	Number of participants	*Throw it along with the other waste*	*Separate it from the other waste and then throw it*	*Throw it in an open space like river, lake, roadside*	*Bury it in the ground*	*Burn it with the other waste*	*Flush it down the toilet or throw in the pit latrine*
Consumers	Delhi	Urban	IDI - ADU1	1	1	1	0	0	0	0
Consumers	Delhi	Urban	IDI - ADU2	1	1	1	0	0	0	1
Consumers	Delhi	Urban	IDI - ADU3	1	1	1	0	0	0	0
Consumers	Delhi	Urban	IDI - ADU4	1	1	1	0	0	0	0
Consumers	Delhi	Urban	IDI - ADU5	1	1	1	0	0	0	0
Consumers	Delhi	Peri-urban	IDI - ADP1	1	1	0	0	1	1	0
Consumers	Delhi	Peri-urban	IDI - ADP2	1	1	1	0	0	0	0
Consumers	Delhi	Peri-urban	IDI - ADP3	1	0	0	0	1	1	0
Consumers	Delhi	Peri-urban	IDI - ADP4	1	1	0	0	1	0	0
Consumers	Pune	Urban	IDI - APU1	1	1	1	0	0	0	0
Consumers	Pune	Urban	IDI - APU2	1	1	0	0	0	0	0
Consumers	Pune	Urban	IDI - APU3	1	1	1	0	0	0	0
Consumers	Pune	Urban	IDI - APU4	1	1	1	0	0	0	0
Consumers	Pune	Urban	IDI - APU5	1	1	1	0	0	0	0
Consumers	Pune	Peri-urban	IDI - APP1	1	1	0	0	0	0	0
Consumers	Pune	Peri-urban	IDI - APP2	1	1	0	0	0	0	0
Consumers	Pune	Peri-urban	IDI - APP3	1	1	1	0	0	0	0
Consumers	Pune	Peri-urban	IDI - APP4	1	1	1	0	0	0	0
Consumers	Delhi	Urban	IDI - ADU6	1	1	0	1	0	0	0
Consumers	Delhi	Urban	IDI - ADU7	1	1	1	0	0	0	0
Consumers	Delhi	Urban	IDI - ADU8	1	1	0	0	0	0	0
Consumers	Delhi	Urban	IDI - ADU9	1	1	0	0	0	0	0
Consumers	Delhi	Urban	IDI - ADU10	1	1	1	0	0	0	0
Consumers	Delhi	Peri-urban	IDI - ADP5	1	1	1	0	0	0	0
Consumers	Delhi	Peri-urban	IDI - ADP6	1	1	0	0	0	1	0
Consumers	Delhi	Peri-urban	IDI - ADP7	1	1	0	0	0	0	0
Consumers	Delhi	Peri-urban	IDI - ADP8	1	0	1	0	0	0	0
Consumers	Pune	Urban	IDI - APU6	1	1	1	0	0	1	0
Consumers	Pune	Urban	IDI - APU7	1	0	1	0	0	0	0
Consumers	Pune	Urban	IDI - APU8	1	1	1	0	0	0	0
Consumers	Pune	Urban	IDI - APU9	1	1	1	0	0	0	0
Consumers	Pune	Urban	IDI - APU10	1	0	1	0	0	0	0
Consumers	Pune	Peri-urban	IDI - APP5	1	1	0	0	0	0	0
Consumers	Pune	Peri-urban	IDI - APP6	1	1	0	1	0	0	0
Consumers	Pune	Peri-urban	IDI - APP7	1	1	0	0	1	1	0
				Total Delhi	16	10	1	3	3	1
				Total Pune	15	11	1	1	2	0
				Total (%)	89%	60%	6%	11%	14%	3%

Table 5.3 Consumers' main concerns when disposing of menstrual products

Category	Location	Code	Number of participants	*I don't find the proper place to dispose it*	*It clogs the sewer lines if I flush it*	*Menstrual blood causes unhygienic*	*Others might see me disposing of it*	*You can't keep menstrual waste inside the house*	*You have to hide menstrual waste*
Consumers	Delhi Urban	IDI - ADU1	1	0	0	0	1	0	1
Consumers	Delhi Urban	IDI - ADU2	1	0	1	0	1	1	1
Consumers	Delhi Urban	IDI - ADU3	1	0	1	0	1	0	1
Consumers	Delhi Urban	IDI - ADU4	1	0	0	0	1	0	1
Consumers	Delhi Urban	IDI - ADU5	1	0	0	0	1	0	1
Consumers	Delhi Peri-urban	IDI - ADP1	1	1	0	1	1	0	1
Consumers	Delhi Peri-urban	IDI - ADP2	1	1	0	1	1	0	1
Consumers	Delhi Peri-urban	IDI - ADP3	1	0	0	1	1	0	1
Consumers	Delhi Peri-urban	IDI - ADP4	1	0	0	0	0	1	0
Consumers	Pune Urban	IDI - APU1	1	0	1	0	1	0	1
Consumers	Pune Urban	IDI - APU2	1	0	0	1	1	1	0
Consumers	Pune Urban	IDI - APU3	1	0	0	1	1	1	0
Consumers	Pune Urban	IDI - APU4	1	0	0	1	1	1	0
Consumers	Pune Urban	IDI - APU5	1	0	0	0	1	1	0
Consumers	Pune Peri-urban	IDI - APP1	1	0	0	0	1	0	1
Consumers	Pune Peri-urban	IDI - APP2	1	0	0	0	0	0	1
Consumers	Pune Peri-urban	IDI - APP3	1	0	0	0	0	0	1
Consumers	Pune Peri-urban	IDI - APP4	1	0	0	1	1	0	1
Consumers	Delhi Urban	IDI - ADU6	1	0	0	1	1	1	1
Consumers	Delhi Urban	IDI - ADU7	1	0	0	1	0	1	1
Consumers	Delhi Urban	IDI - ADU8	1	0	0	0	1	0	1
Consumers	Delhi Urban	IDI - ADU9	1	0	0	0	0	1	0
Consumers	Delhi Urban	IDI - ADU10	1	0	0	0	0	1	0
Consumers	Delhi Peri-urban	IDI - ADP5	1	0	0	1	0	0	0
Consumers	Delhi Peri-urban	IDI - ADP6	1	0	0	1	1	0	1
Consumers	Delhi Peri-urban	IDI - ADP7	1	0	0	1	1	0	1
Consumers	Delhi Peri-urban	IDI - ADP8	1	0	0	1	0	0	0
Consumers	Pune Urban	IDI - APU6	1	0	0	0	1	0	1
Consumers	Pune Urban	IDI - APU7	1	0	0	0	1	1	0
Consumers	Pune Urban	IDI - APU8	1	0	0	0	1	0	1
Consumers	Pune Urban	IDI - APU9	1	0	0	0	1	0	1
Consumers	Pune Urban	IDI - APU10	1	0	0	0	1	0	1
Consumers	Pune Peri-urban	IDI - APP5	1	0	0	0	1	0	0
Consumers	Pune Peri-urban	IDI - APP6	1	0	0	1	0	0	1
Consumers	Pune Peri-urban	IDI - APP7	1	0	0	1	1	0	1
			Total Delhi	2	2	9	12	6	13
			Total Pune	0	1	6	14	5	11
			Total (%)	6%	9%	43%	74%	31%	69%

Table 5.4 Consumers' perceptions on whether menstrual products have a negative impact on their surroundings						
Category	Location	Code	Number of participants	*Negative impact*	*No impact*	*I don't know*
Consumers	Delhi Urban	IDI - ADU1	1	1	0	0
Consumers	Delhi Urban	IDI - ADU2	1	1	0	0
Consumers	Delhi Urban	IDI - ADU3	1	1	0	0
Consumers	Delhi Urban	IDI - ADU4	1	1	0	0
Consumers	Delhi Urban	IDI - ADU5	1	1	0	0
Consumers	Delhi Peri-urban	IDI - ADP1	1	1	0	0
Consumers	Delhi Peri-urban	IDI - ADP2	1	1	0	0
Consumers	Delhi Peri-urban	IDI - ADP3	1	1	0	0
Consumers	Delhi Peri-urban	IDI - ADP4	1	0	0	1
Consumers	Pune Urban	IDI - APU1	1	1	0	0
Consumers	Pune Urban	IDI - APU2	1	1	0	0
Consumers	Pune Urban	IDI - APU3	1	1	0	0
Consumers	Pune Urban	IDI - APU4	1	1	0	0
Consumers	Pune Urban	IDI - APU5	1	1	0	0
Consumers	Pune Peri-urban	IDI - APP1	1	1	0	0
Consumers	Pune Peri-urban	IDI - APP2	1	1	0	0
Consumers	Pune Peri-urban	IDI - APP3	1	1	0	0
Consumers	Pune Peri-urban	IDI - APP4	1	1	0	0
Consumers	Delhi Urban	IDI - ADU6	1	1	0	0
Consumers	Delhi Urban	IDI - ADU7	1	1	0	0
Consumers	Delhi Urban	IDI - ADU8	1	1	0	0
Consumers	Delhi Urban	IDI - ADU9	1	1	0	0
Consumers	Delhi Urban	IDI - ADU10	1	1	0	0
Consumers	Delhi Peri-urban	IDI - ADP5	1	1	0	0
Consumers	Delhi Peri-urban	IDI - ADP6	1	0	1	0
Consumers	Delhi Peri-urban	IDI - ADP7	1	1	0	0
Consumers	Delhi Peri-urban	IDI - ADP8	1	0	1	0
Consumers	Pune Urban	IDI - APU6	1	1	0	0
Consumers	Pune Urban	IDI - APU7	1	1	0	0
Consumers	Pune Urban	IDI - APU8	1	1	0	0
Consumers	Pune Urban	IDI - APU9	1	1	0	0
Consumers	Pune Urban	IDI - APU10	1	1	0	0
Consumers	Pune Peri-urban	IDI - APP5	1	0	0	1
Consumers	Pune Peri-urban	IDI - APP6	1	1	0	0
Consumers	Pune Peri-urban	IDI - APP7	1	1	0	0
			Total Delhi	15	2	1
			Total Pune	16	0	1
			Total (%)	88%	6%	6%

Table 6.1 Waste pickers' concerns when dealing with menstrual waste

Category	Location	Code	Number of participants	*I feel I might get sick*	*I feel I might get injured*	*It makes me feel unclean and unhygienic*	*It makes me uncomfortable*	*I feel I am being seen/judged by others*
Female	Delhi Urban	IDI - BDU1	1	1	0	1	1	1
Female	Delhi Urban	IDI - BDU2	1	1	1	1	1	1
Female	Delhi Urban	IDI - BDU3	1	1	0	1	0	1
Female	Delhi Urban	IDI - BDU4	1	0	1	0	1	0
Female	Delhi Peri-urban	IDI - BDP1	1	0	0	1	1	1
Female	Delhi Peri-urban	IDI - BDP2	1	1	0	1	1	0
Female	Delhi Peri-urban	IDI - BDP3	1	0	1	0	1	0
Female	Pune Urban	IDI - BPU1	1	1	1	1	1	0
Female	Pune Urban	IDI - BPU2	1	1	0	0	1	0
Female	Pune Urban	IDI - BPU3	1	1	0	1	1	1
Female	Pune Peri-urban	IDI - BPP1	1	1	0	1	0	1
Female	Pune Peri-urban	IDI - BPP2	1	1	0	1	1	1
Female	Pune Peri-urban	IDI - BPP3	1	1	0	1	1	0
Female	Delhi Urban	IDI -BDU5	1	0	0	0	1	1
Female	Delhi Urban	IDI -BDU6	1	1	0	1	0	0
Female	Delhi Urban	IDI -BDU7	1	1	0	1	0	1
Male	Delhi Urban	IDI -BDU8	1	1	0	0	1	0
Male	Delhi Urban	IDI -BDU9	1	1	0	0	1	0
Male	Delhi Urban	IDI -BDU10	1	1	0	0	1	0
Female	Delhi Peri-urban	IDI - BDP4	1	0	1	1	1	1
Female	Delhi Peri-urban	IDI - BDP5	1	0	1	1	1	1
Male	Delhi Peri-urban	IDI - BDP6	1	0	0	0	1	0
Male	Delhi Peri-urban	IDI - BDP7	1	0	0	0	0	0
Male	Delhi Peri-urban	IDI - BDP8	1	0	1	1	1	1
Female	Pune Urban	IDI - BPU4	1	1	0	1	0	0
Female	Pune Urban	IDI - BPU5	1	1	1	1	1	1
Female	Pune Urban	IDI - BPU6	1	1	1	1	1	1
Male	Pune Urban	IDI - BPU7	1	1	0	1	0	0
Male	Pune Urban	IDI - BPU8	1	1	0	1	1	1
Male	Pune Urban	IDI - BPU9	1	1	0	0	1	1
Male	Pune Urban	IDI - BPU10	1	1	0	1	1	1
Female	Pune Peri-urban	IDI - BPP4	1	0	0	1	0	0
Female	Pune Peri-urban	IDI - BPP5	1	0	0	1	1	1
Male	Pune Peri-urban	IDI - BPP6	1	1	0	0	0	0
Male	Pune Peri-urban	IDI - BPP7	1	1	0	1	1	0
			Total Delhi Male	3	1	1	5	1
			Total Pune Male	6	0	4	4	3
			Total Delhi Female	6	5	9	9	8
			Total Pune Female	9	3	10	8	6
			Total (%)	69%	26%	69%	74%	51%

Table 6.2 Waste pickers' perceptions on who should manage menstrual waste						
Category	Location		Code	Number of participants	*Only women*	*Both men and women*
Female	Delhi	Urban	IDI - BDU1	1	1	0
Female	Delhi	Urban	IDI - BDU2	1	1	0
Female	Delhi	Urban	IDI - BDU3	1	1	0
Female	Delhi	Urban	IDI - BDU4	1	0	1
Female	Delhi	Peri-urban	IDI - BDP1	1	1	0
Female	Delhi	Peri-urban	IDI - BDP2	1	1	0
Female	Delhi	Peri-urban	IDI - BDP3	1	0	1
Female	Pune	Urban	IDI - BPU1	1	1	0
Female	Pune	Urban	IDI - BPU2	1	1	0
Female	Pune	Urban	IDI - BPU3	1	1	0
Female	Pune	Peri-urban	IDI - BPP1	1	1	0
Female	Pune	Peri-urban	IDI - BPP2	1	0	1
Female	Pune	Peri-urban	IDI - BPP3	1	0	1
Female	Delhi	Urban	IDI -BDU5	1	0	1
Female	Delhi	Urban	IDI -BDU6	1	1	0
Female	Delhi	Urban	IDI -BDU7	1	1	0
Male	Delhi	Urban	IDI -BDU8	1	1	0
Male	Delhi	Urban	IDI -BDU9	1	1	0
Male	Delhi	Urban	IDI -BDU10	1	1	0
Female	Delhi	Peri-urban	IDI - BDP4	1	0	1
Female	Delhi	Peri-urban	IDI - BDP5	1	1	0
Male	Delhi	Peri-urban	IDI - BDP6	1	1	0
Male	Delhi	Peri-urban	IDI - BDP7	1	1	0
Male	Delhi	Peri-urban	IDI - BDP8	1	1	0
Female	Pune	Urban	IDI - BPU4	1	0	1
Female	Pune	Urban	IDI - BPU5	1	1	0
Female	Pune	Urban	IDI - BPU6	1	1	0
Male	Pune	Urban	IDI - BPU7	1	1	0
Male	Pune	Urban	IDI - BPU8	1	1	0
Male	Pune	Urban	IDI - BPU9	1	1	0
Male	Pune	Urban	IDI - BPU10	1	1	0
Female	Pune	Peri-urban	IDI - BPP4	1	1	0
Female	Pune	Peri-urban	IDI - BPP5	1	0	1
Male	Pune	Peri-urban	IDI - BPP6	1	0	1
Male	Pune	Peri-urban	IDI - BPP7	1	1	0
				Total Delhi Male	6	0
				Total Pune Male	5	1
				Total Delhi Female	8	4
				Total Pune Female	7	4
				Total (%)	74%	26%

Table 6.3 Waste pickers' perceptions of whether menstrual waste is an important issue						
Category	Location		Code	Number of participants	*Yes*	*No*
Female	Delhi	Urban	IDI - BDU1	1	1	0
Female	Delhi	Urban	IDI - BDU2	1	1	z
Female	Delhi	Urban	IDI - BDU3	1	1	0
Female	Delhi	Urban	IDI - BDU4	1	0	1
Female	Delhi	Peri-urban	IDI - BDP1	1	1	0
Female	Delhi	Peri-urban	IDI - BDP2	1	1	0
Female	Delhi	Peri-urban	IDI - BDP3	1	0	1
Female	Pune	Urban	IDI - BPU1	1	1	0
Female	Pune	Urban	IDI - BPU2	1	1	0
Female	Pune	Urban	IDI - BPU3	1	1	0
Female	Pune	Peri-urban	IDI - BPP1	1	1	0
Female	Pune	Peri-urban	IDI - BPP2	1	1	0
Female	Pune	Peri-urban	IDI - BPP3	1	1	0
Female	Delhi	Urban	IDI -BDU5	1	0	1
Female	Delhi	Urban	IDI -BDU6	1	1	0
Female	Delhi	Urban	IDI -BDU7	1	1	0
Male	Delhi	Urban	IDI -BDU8	1	1	0
Male	Delhi	Urban	IDI -BDU9	1	1	0
Male	Delhi	Urban	IDI -BDU10	1	1	0
Female	Delhi	Peri-urban	IDI - BDP4	1	0	1
Female	Delhi	Peri-urban	IDI - BDP5	1	0	1
Male	Delhi	Peri-urban	IDI - BDP6	1	0	1
Male	Delhi	Peri-urban	IDI - BDP7	1	0	1
Male	Delhi	Peri-urban	IDI - BDP8	1	0	1
Female	Pune	Urban	IDI - BPU4	1	1	0
Female	Pune	Urban	IDI - BPU5	1	1	0
Female	Pune	Urban	IDI - BPU6	1	1	0
Male	Pune	Urban	IDI - BPU7	1	1	0
Male	Pune	Urban	IDI - BPU8	1	1	0
Male	Pune	Urban	IDI - BPU9	1	1	0
Male	Pune	Urban	IDI - BPU10	1	1	0
Female	Pune	Peri-urban	IDI - BPP4	1	1	0
Female	Pune	Peri-urban	IDI - BPP5	1	1	0
Male	Pune	Peri-urban	IDI - BPP6	1	1	0
Male	Pune	Peri-urban	IDI - BPP7	1	1	0
				Total Delhi Male	3	3
				Total Pune Male	6	0
				Total Delhi Female	7	5
				Total Pune Female	11	0
				Total (%)	77%	23%