

Exploring the capabilities of women waste pickers in the recycled plastic supply chain in Maputo, Mozambique.



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Abstract

As titled, this study shall explore the capabilities of women waste pickers in the recycled plastic supply chain in Maputo City, Mozambique. In doing so, it aims to understand the opportunities and constraints experienced by women in the recycled plastic supply chain. As we move to a circular economy there is a growing need to understand the current and future potential capacities of waste pickers generating an income from recycled waste. This study was conducted in partnership with Resilience BV and Topack Plastic. A research based internship was undertaken to support Topack to better understand the waste pickers within their supply chain.

Theoretically framed by the Capability Approach, the study is formed from qualitative methods. Data was primarily collected by in depth interviews supplemented with observations to collect data from the perspective of the participants. The study population consisted primarily of women waste pickers, men were also included to enrich contextual understanding. Secondary stakeholders included Topack workers and experts in the field. Thematic analysis was undertaken to share key findings on the opportunities and constraints experienced by women waste pickers. In summary, waste reclaiming provides an accessible opportunity for women to generate income, expressed through themes of flexibility demonstrated by waste picker typologies. Findings share opportunities for women to increase their sense of agency and create change within their own livelihood and others but indicate different levels of freedoms within typologies. The study concludes with key recommendations for Topack to support the capabilities of waste pickers in their supply chain with recommendation for future research on cross stakeholder partnerships.

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List of abbreviations and key terms

Aggregator	In the context of this study, an aggregator is referenced as a waste picker in the recycled plastic supply chain that purchases plastic from others to sell for a profit.
Catador	Portuguese word for waste picker or reclaimer (see below)
HDI	Human Development Index
ISWA	International Solid Waste Association
ILO	International Labour Organisation
IRS	Informal Recycling Sector
MSW	Municipal Solid Waste
NGO	Non Governmental Organisation
PET	Polyethylene terephthalate, type of recycled plastic
Supplier	In the context of this study, supplier will be used when referencing a waste picker selling plastic
Txova	Local dialect word for cart, used in transportation
UNEP	United Nations Environmental Programme
UNDP	United Nations Development Programme
Waste pickers	Also known as waste reclaimers, are defined as individuals that reclaim recyclable materials from large waste streams to sell to the formal or informal secondary markets (Pholoto and Chitaka, 2022).
WIEGO	Women in Informal Employment: Globalizing and Organizing

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1. Introduction

1.1. Waste pickers' role in waste management

Before seeking to understand the role of a waste picker, the challenge of waste management must first be contextually introduced. Waste can be subjective in its meaning but is defined by the United Nations Environment Programme & International Solid Waste Association (2024:10) as “the unintended by-product of consumption and production”, categorized by material, product type and source. The UNEP & ISWA (2024) estimate current Municipality Solid Waste generation to be at 2.1 billion tons, predicting a rise to 3.8 billion tons by 2050. Consequently, this has seen an increase of environmental and social impacts as a result of pollution (Salvia et al. 2021). Pollution can be caused from the procedural processes of waste generation (UNEP & ISWA 2024) as well as the decomposition of waste from open spaces such as landfill sites (UNEP, 2018), both contributing to increased climate change. In addition, health impacts from pollution trigger respiratory complaints as well as an increased risk of disease from bacteria, rats and malaria carrying mosquitoes from decomposing waste (UNEP, 2018. Allen & Elisio, 2011. Muchangos et al. 2017). For the Global South, controlling waste management with growing rates of population and urbanisation has created challenges to provide adequate services (UNEP, 2018. Muchangos et al. 2017). As a result, the Global South comparatively to the Global North has historically had an active informal economy undertaking activities at open dumpsites (Velis, 2017. Gutberlet & Carenzo, 2020).

Included in this informal economy, are waste pickers, also known as waste reclaimers or catadores that recover recyclable materials such as cardboards, plastic, paper and e-waste from waste streams such as landfill sites or street waste, to sell onto formal and informal secondary markets (Pholoto and Chitaka, 2022). Across the global south, individuals are sustaining their livelihoods generating an income from separating waste that holds market value, out of the waste stream (Velis, 2017). Within the context of the International Labour Organisation (2023:13) the work of waste pickers is defined as informal if the economic activity in which ‘workers and economic units are, in law or in practice not covered or insufficiently covered by formal arrangements’ such as the contribution to social security and receipt of paid security leave. It is estimated that Informal Recycling Sector (IRS) accounts for 58% of the waste recovered globally (UNEP, 2023), as such a large contribution of work is unregulated providing limited to no support to mitigate hazardous working conditions (United Nations Development Programme, 2021).

The rise of global concern to address the challenge of increased waste management, has presented challenges and opportunities for waste pickers to sustain their livelihoods. One being the shift to a circular economy, a model which sees recycling and reusing waste as the

key strategy to reduce material and energy needed for good production (Gallaud, 2016. OCED, 2022). In particular, as global production rates of plastic increase, there is increased attention to recycle plastic and mitigate pollution to the land and seas (Jambeck et al. 2015). For private recycling companies positioned in the Global South, there is a reliance on the IRS to source recycled product and operationalise the circular economy filling the gap in municipality resources (Gutberlet & Carengo, 2020, IUCN, 2021). Waste pickers are as such benefiting from an increased market demand for reclaimed waste. However, global attention to improve waste management in the Global South, has seen a lack of recognition and understanding of waste pickers in the IRS. This was expressed in institutional efforts to improve poor management at landfill sites, closing sites without consideration of the consequences of livelihood loss for waste pickers (Velis, 2017). Despite the long standing role of the IRS, waste pickers have not historically been recognised as knowledge holders in waste management, resulting in exclusion in policy changes (Gutberlet & Carengo, 2020). Furthermore a high percentage of the informal waste management sector are women (OCED 2021), highlighting a need for research to further understand gendered challenges.

1.2. Relevance of the problem

As introduced, the issue of waste management is a global challenge but due to poor waste management the negative consequences are felt greater in the Global South. Across the African continent waste management challenges and opportunities vary contextually but follow similar trends as highlighted in the Global South (UNEP, 2018). The failure of service provision, has seen an increase in Africa's private sector, identifying business opportunities in which recycling which has influenced technological and infrastructure development (UNEP, 2023). However, academic studies on waste pickers in the African context is less prevalent than in the geographical context of South America showcased as a leading example for the inclusion of waste pickers in waste management procedures (Velis, 2017). This research gap is further highlighted by Pholoto and Chitaka (2022) in their report on *Mainstreaming the Informal Waste Sector towards* focused on African cities by arguing the need to understand the varied roles undertaken by waste pickers across Africa. Pholoto and Chitaka (2022) highlight waste pickers are more than just service providers, but economic actors and drivers of social change by contributing to the recycling industry and influence income opportunities within the informal waste management sector.

Understanding economic opportunities offered in the informal waste management sector is particularly important in countries with developing economies. This is alike for the geographical remit of this study, looking at the informal waste sector in Mozambique, a country with a Human Development Index ranked 7th lowest in the world (UNDP, 2021). There is particular relevance for this research focus on women waste pickers in the recycled plastic

supply chain in Maputo due to knowledge demand from private sector recycling firms on their supply chain. As introduced as a global trend, the private recycling sector in Maputo similarly relies on waste pickers to source recycled plastic but due to the informal nature of the IRS, there is limited resources available for firms to inform their policies. This study is conducted in partnership with Topack Plastic, a private recycling firm, further explained in chapter 3. Topack seeks to better understand the waste pickers in their supply chain to improve their business relationship with their suppliers. Topack expressed they experienced more women in their supply chain, which was later confirmed in the results chapter 5. As such, this study will provide qualitative research framed by the capability approach on the opportunities and constraints experienced by women in Topack's supply chain to increase their livelihoods and improve their living conditions. The research aims and questions will be explained in greater detail, followed by a literature review to provide contextual and theoretical framing, and the regional framework of the study. The study's methodology will then provide reference for the following results chapters to answer the study's research question. The results will conclude with actionable recommendations for Topack and wider recommendations for the private recycling sector to enhance the socio-economic impacts of recycling in the local economy to contribute to literature on just transitions for waste pickers in the circular economy.

1.3. Research objectives and questions

Research objective:

To understand the opportunities and constraints experienced by women waste pickers to increase their livelihood and improve their living conditions as a supplier in the recycled plastic supply chain in Maputo.

Research questions:

1. What opportunities does waste reclaiming offer for women to generate income?
2. What constrains or enhances women to increase their livelihood as a waste picker?
3. How is agency expressed in a women's choice to earn their livelihood as a waste picker?

2. Contextual, theoretical and conceptual framework

2.1. Contextual literature on waste pickers

As introduced, women typically make up a higher proportion of the informal economy than men in the Global South. Literature shall be discussed to explore how the IRS can offer an opportunity for women to generate income while indicating a potential lack of alternatives.

Academic literature focused on women waste pickers in Mozambique is limited and therefore wider a wider geographic remit will be referenced. A report conducted on behalf of the Women in Informal Employment Globalising and Organising (WEIGO) shares results from a short qualitative study conducted at the Hulene Landfill site in Maputo (Allen & Jossias, 2011). This study confirms global trends, in stating women waste pickers aged 40 – 50 to make up the largest groups of reclaimers working at the landfill, second to men aged 20 -30 years (Allen & Jossias, 2011). Allen & Jossias (2011) do not provide analysis to further understand this trend but highlight that many of these women have additional livelihoods supported from the landfill site most commonly noting to feed livestock from food waste, that will be later sold for meat. To further understand, the access for women to generate income an additional WEIGO report on women waste pickers in Brazil highlights 80% of women were not educated past primary school (Bouvier & Dias, 2021). Despite, trends of waste pickers having low levels of education, Madsen (2006) article on *feminizing waste: waste -picking as empowerment opportunity for women and children in impoverished communities* argues how women have the opportunity to learn and develop skills sets through the informal economy. As indicated through the WEIGO reports, Madsen (2006) similarly highlights themes of accessibility for women to generate income. However, Madsen (2006) argues that although women from the poorest communities are able to access waste as a commodity, by experiencing restrictions from other sectors of the economy therefore indicates higher risk of marginalisation from capitalist markets.

To further explain gendered patterns in waste management as a specific sector of the informal economy, academic literature highlights how cultural norms associated women to such actions (Madsen, 2006. UNEP & ISWA, 2024). UNEP & ISWA (2024:51) argue that “gendered aspects of waste are not recognised” and as such constrain advancement to a just transition into a circular economy. The report highlights how women interact with waste differently as a result of cultural norms associated to domestic tasks such as waste disposal and as such are also exposed to risks differently to men (UNEP & ISWA. 2024). The importance of understanding the context of cultural norms, is further highlighted in a gendered analysis conducted by Banyan Global (2021) on waste pickers in Jordan. Despite this report being undertaken in a different cultural context to this study’s remit, findings can provide

transferable context. Banyan Global (2021) reported social stigmas of unclean work can impact both genders, however the sector has developed to be male dominated, which can act as barrier for women to access work in the context on religious cultural beliefs prohibiting mixed gendered working. As such, literature highlights the need for a gendered lens, to further understand challenges and opportunities within the IRS to have a deeper understanding on how cultural norms and practices interplay.

There are potential barriers experienced by waste pickers working within the informal waste management sector. From an economic standpoint, the income of waste reclaimers can be subject to vulnerabilities. Viljoen, et al (2018) paper “An analysis of South African street waste pickers’ income’ researched 873 street waste reclaimers across 13 major city centres and suburbs in South Africa to quantitatively analyse influencers on earning capabilities. Income was analysed against independent variables such as gender, age, marital status, education, country of origin, working group dynamics, equipment used, work experience, number of hours used and starting time of work Viljoen, et al (2018). Additionally, a lack of recognition for the work of waste reclaimers is an issue which intersects with perceived negative connotations from the public, which can influence low self-esteem of waste pickers, to be further discussed in chapter 2.2.1 (Schenck et al. 2021).

2.2. Capability Approach as a theoretical framework

There are different theoretical paradigms and approaches to one's understanding of development, offering alternative views on how development can be defined, or whether it should be defined at all. In this study, the Capability Approach frames development based on Amartya Sen's (1999) understanding of development as freedoms. Sen's approach to development, goes beyond that of classic economics, where economic growth and economic prosperity is seen as the prime goal and indicator of development to argue that instead, wealth is a means "for having more freedom to lead the kind of lives we have reason to value" and aspire to lead (1999:14). As such an individual is measured on what they are capable to achieve rather than the output of that function (Nussbaum, 2000). This is further contextualised by Sen's (1999) focus that an individual's development is based on their ability to lead the life through actions they value. This builds upon the 'good life' established in the work of Aristotle (1984), who argued that the desire for wealth is for it to be used to further actions for something else. In addition to Amartya Sen, the Capability Approach is underpinned by the work of Martha Nussbaum, both contributing to offer an interdisciplinary approach that provides an alternative framework to human development (Chiappero-Martinetti et al. 2020). Within the capability approach the *doings and beings* that a person undertakes are referenced as functionings (Sen, 1999; Crocker, 1995; Nussbaum & Sen, 1993).

Highlighted in shared work (Nussbaum & Sen, 1993:3), both scholars agree that "the capability of a person refers to the various alternative combinations of functionings, any one of which (any combination, that is) the person can choose to have." As such, a person's capability is indicated by the available choices of actions to undertake, linking back to Sen (1999) concept of development as freedom. However, between the two scholars there is an academic debate on whether to define a set term of capabilities, known contextually as the list debate between Nussbaum and Sen (Claasen, 2020). Sen (1999) takes a firm stance that the freedoms that form the quality of one's life are diverse and wide ranging by the contextual nature of each individual's understanding of a good life. In this, Sen cautions that to try to form indicators out of freedoms and capabilities may risk neglecting a subject of importance specific to an individual (Sen, 1999. Claasen, 2020). However Nussbaum (2000: 81) provides an alternative view that capabilities can be defined under ten capabilities, listed as separate components but stated to be "related to one another in many complex ways". In defence, Nussbaum (2000) advocates listing basic capabilities can support analysts in differentiating between capabilities of importance. Sen defends an opposing view that listing capabilities should be a democratic process with alternative functions combinations (Claasen, 2020). Despite the nuances, Claasen (2020) highlights that there are four key underpinnings of the approach; to understand that an individual holds a set of capabilities with potential

functionings, to evaluate based on capabilities, to prioritise capabilities over functioning and an awareness of levels between basic and non basic capabilities.

To further understand development as freedom (Sen, 1999), freedom is referenced as processes, opportunities and unfreedoms. Processes of freedoms allow for freedoms of actions and decisions whereas opportunities of freedoms are influenced by personal and social circumstances of an individual (Sen, 1999). A denial of a capability is approached by Sen (1999) as an unfreedom, arising from a deprivation of processes or lack of opportunities. According to Sen (1999) a lack of societal resources are influenced by a deprivation in structural processes, as such indicating freedoms at a meso and macro level. Secondly, an individual's capability set to achieve functions from available resources may be restricted by a lack of opportunities influenced at a micro and meso level, expressed by the actions of an individual (Sen, 1999). As such, human development within the capability approach prioritises the removal of unfreedoms to allow for actions within the realm of choice rather than requirement (Sen, 1999; Nussbaum, 2000).

2.2.1 Agency

Agency, forms a key element of freedom as development, defined by Sen (1999:19) as an individual's ability "to act and bring change, and whose achievements can be judged in terms of her own values and objectives" despite any external criteria or assessment. Academic literature highlights the role of agency in empowering women within their own households and wider society (Sen, 1999; Ibrahim & Alkire, 2007; Kabeer, 1999; Kabeer, 2005; Eger et al. 2018). To look into agency in greater detail Kabeer (2005:15) elaborates on Sen (1999) by discussing women empowerment "in terms of the ability to make choices" that stems from the relationship between agency, resources and achievement. Kabeer (1999) further breaks down choice as first order choice, comprising strategic life choices essential to lead the life an individual wants. Then second order choices, which do not define the life one leads but plays a role in its quality (Kabeer, 1999). Kabeer (1999) highlights how agency in a positive sense can be expressed in different forms, *power to*, *power within* and *power together* to create change however, if expressed in its negative form *power over* it can disempower women. The power to create change, is expressed as instrumental agency, expressed by a women's ability to utilise resources to act and create change and pursue goals (Kabeer, 1999, 2005; Eger et al. 2018). This is highlighted in Sen's (1999) chapter on *Women's agency and social change* sharing empirical findings on the influence from women generating income provided a visible contribution to the family than other forms of domestic contribution which are often overlooked and as such is seen to strengthen a women's voice (Sen, 1999). This chapter, also highlighted examples of collective agency, *power with* when arguing the need to see women as agents not patients in welfare, to use their experiences for greater change for women as

well as others members of the household and wider community (Sen, 1999). Intrinsic agency refers to *power within* which references self esteem and self confidence of women to make change and social connections (Nussbaum, 2003; Kabeer, 2005; Eger et al. 2018).

2.3. Capability Approach as a theoretical lens in literature

The Capability Approach has proven to be an effective theoretical lens in literature, key examples shall be shared to highlight transferable context for this study. In the context of researching the ‘scarring effects’ from unemployment and job insecurity, Egdell & Beck (2020) argues for the Capability Approach as an alternative theoretical framework. Egdell & Beck (2020) state such framing brought new insights by shifting priority from the economic impacts of job insecurity to highlight an individuals ability to make desired choices. As such, findings highlighted the different perceptions and decision making process of their respondents, contrasting usual links to the neo liberal paradigm of economics (Egdell & Beck, 2020). Despite the contextual difference to this study’s subject area, the article offers insightful understanding to highlight how using the framework can bring in participants experiences on choices, thus providing new insights to prior quantitative research.

In closer relation to this study’s focus area Schenck et al. (2021) study on South African waste pickers similarity highlights the benefits of using the capability approach to highlight alternative insights. *Precarious, More Precarious, Most Precarious? The Quality of Life of Waste Pickers in the Karoo* references capabilities to be "the circumstances that prevail when people’s capabilities, opportunities and freedoms are restricted and when safety nets are unavailable to support them" (Schenck et al. 2021: 304). The theoretical lens is reflected in the paper’s results section that discusses increased and decreased sense of agency among the participants. Increased agency was shown in waste pickers have in their desire to provide for their family through entrepreneurial working style, with personal choice referenced in reasonings “to “have something to do here” and “to keep me out of trouble” (Schenck et al. 2021:311). While at the same time, findings indicate decreased intrinsic agency by highlighting low self esteem impacted by negative social perceptions of their work (Schenck et al. 2021). The theoretical framing continued to guide recommendations, noting increased social acceptance from the municipality and public to improve self esteem of waste pickers and further develop their sense of agency (Schenck et al. 2021). The practicalities of operationalising concepts from the Capability Approach is further highlighted in the Ibrahim and Alkire (2007) paper on *Agency and Empowerment: A proposal for international comparable indicators*. Ibrahim and Alkire (2007) discuss how their quantitative questionnaire examines power deficit as a key theme and indicator of empowerment in relation to decision making. The framework of the Capability Approach is demonstrated through their question

guide, by focusing on the ability as well as the desire to collect data on power of decision making. Although, questionnaires will not be used in the methodology of this study, this paper provides transferable learning points for how to operationalise agency in a qualitative.

2.4. Conceptual model of the study

Below lists and visualises the conceptual model of this research design, which are further operationalised in the interview guides in Annex B. The conceptual model provides a guide to understand the capabilities of women waste pickers by the four key topic areas that shall indicate capability sets to understand the opportunities and constraints experienced by women when waste reclaiming. The first topic area are resources, theoretically framed as processes of freedoms (Sen, 1999) data will be collected on a participants resources of plastic, education and social networks. Although mentioned within theoretical literature of the Capability Approach, resources of health was not included as a core resource focus, as the selected focus areas provide further aligned opportunities and as such a closer focus to the study remit. As discussed prior, the underpinning of the Capability Approach is that not all individuals have the capacity to function available resources, focus area two therefore looks at opportunities of access. Additionally, focus area three on state of a person looks at opportunities from age, gender and marital status to increase a waste picker's livelihood. In the conceptual model, agency is highlighted as a positive feedback loop between capabilities and achieved functions. Based on discussed literature, deductive reasoning indicates women with an increased sense of agency have greater chance to action achievements which henceforth further enhances their agency to expand their capabilities. Important, in answering the study's research question on agency expressed in individual choice, the element of choice is stated in the model that acts as an awareness indicator that individuals may have the capabilities to function a resources but choose not too or act in certain ways. In turn, it also indicates the lack of personal choice, due to restricted opportunities and therefore decreased agency.

A sub category of gender, is stated as *women** this is to indicated the gendered lens applied to this study. As understood, women make up a significant proportion of the Informal Waste Management Sector, which has indicated gendered behaviours and cultural norms discussed in chapter 1. Literature has shown (Sen, 1999; Nussbaum and Glover, 1995) that socio – cultural and economic impacts manifest in different ways in women and men. Therefore in applying a gendered lens, this study seeks to understand gendered challenges regarding expanding a the capabilities for women waste pickers.

Figure 1. *The study's visualised conceptual model.*

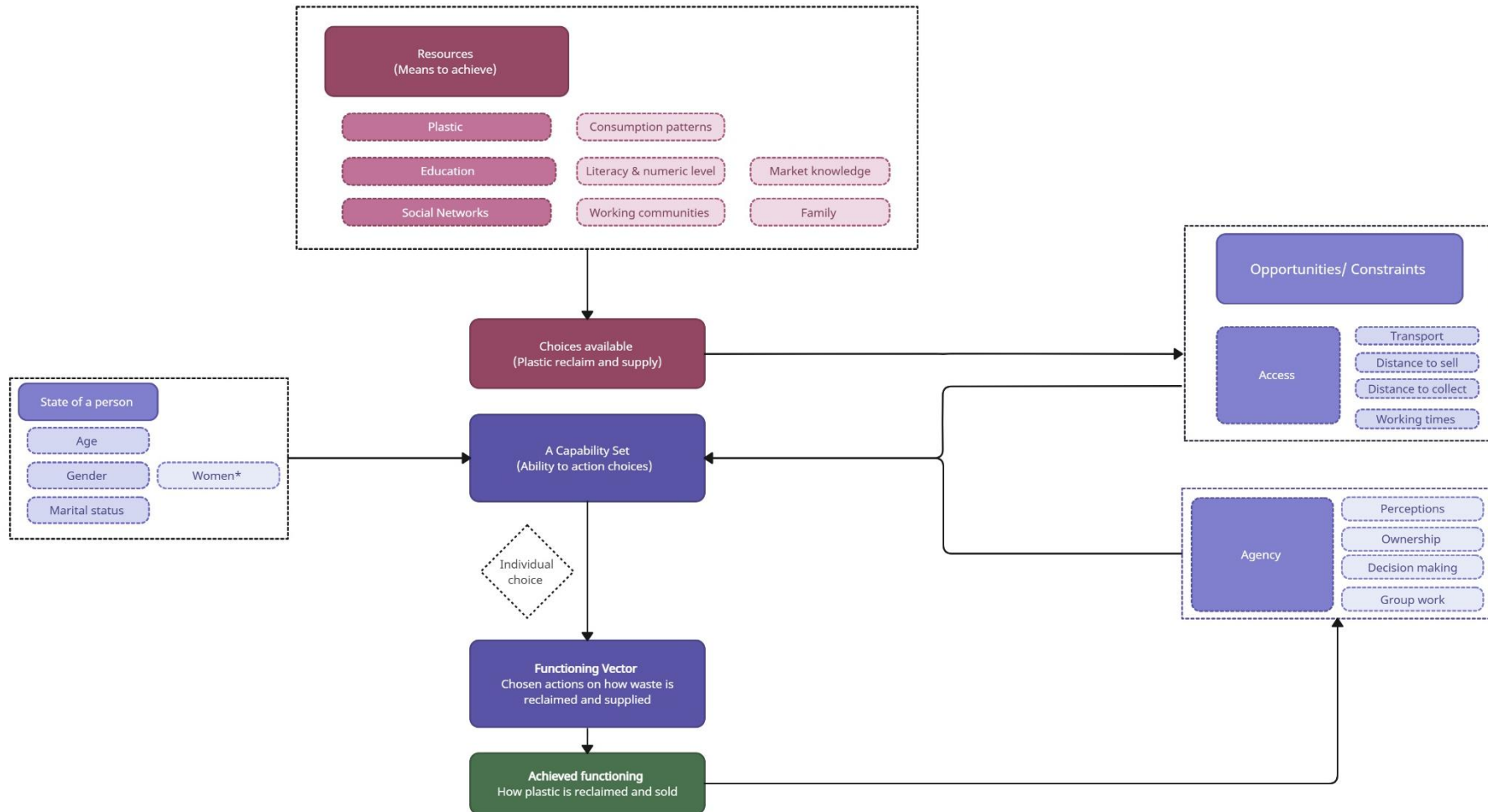


Table 1. Table of concepts operationalised in the study

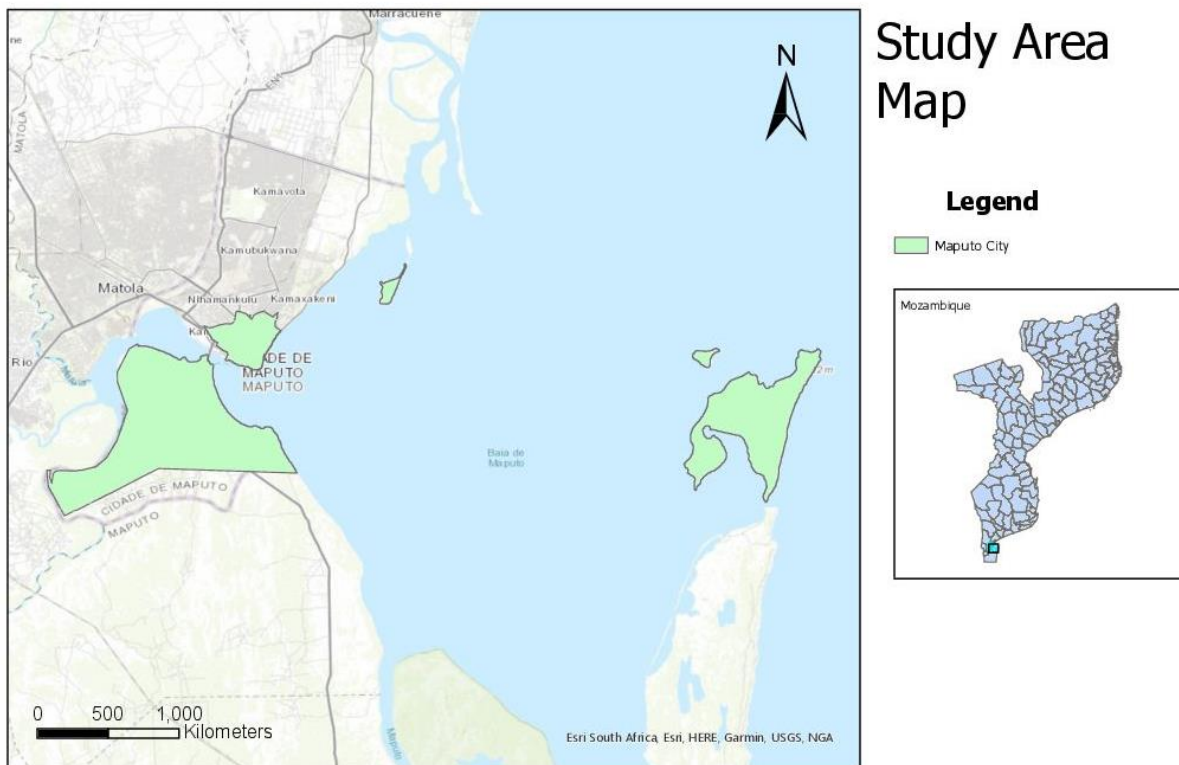
Concepts	Definition	Operationalised (Main Group)	Operationalised (Sub group)
Resources	Material, human and social resources which "serve to enhance the ability to exercise choice, understood as pre conditions to agency (Kabeer, 1999: 437)	Plastic	Consumption patterns
		Education	Literacy, reading & numeric levels
			Market knowledge
		Social networks	Working community
		Household	
Opportunities/constraints	Constraints can occur from a deprivation of processes or lack of opportunities (Sen, 1999). Freedoms make up the quality of life an individual values (Sen, 1999).	Access	Transport
			Working times
			Distance to sell plastic
			Distance to collect plastic
Agency	"To act and bring change, and whose achievements can be judged in terms of her own values and objectives" despite any external criteria or assessment (1999:19).	Intrinsic agency	Perception/self esteem
		Instrumental agency	Ownership Decision making
		Collective agency	Group work
Conversion Factors	Factors, that influence an individual's capability set.	State of a person	Age
			Gender *
			Marital status
Functionings	Functionings are the ability to undertake actions from the resource commodities present. (Sen, 1999; Crocker, 1995). Function vectors are "the combination of functionings that leads to the actions of an individual's actual life"(Crocker, 1995: 158).	Method of waste reclaiming	Collection method
			Collection location
		Frequencies	Of sale
			Of collection
Capability Set	"The capability of a person refers to the various alternative combinations of functionings, any one of which (any combination, that is) the person can choose to have."	Livelihood	Main Supplementary
		Activity patterns	Data from methodology and frequencies (above)

	(Nussbaum & Sen, 1993:3)		
Achieved Functioning	The achieved actions that reflect the 'doings' and 'beings' of everyday life (Sen, 1985a: 45; Crocker, 1995).	Waste reclaimed	Quantity
		Income generated	Consistency
		Income spent	Saved

3. Regional Framework

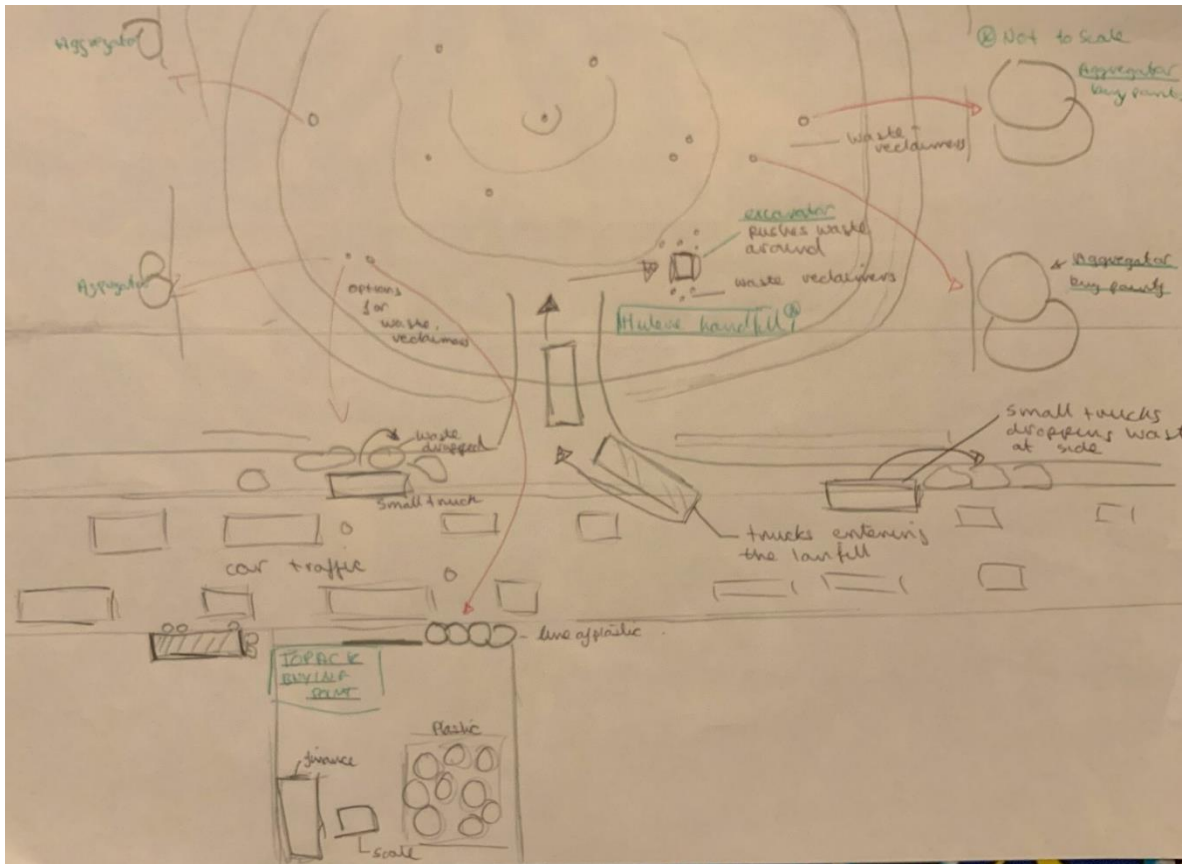
This study shall be focused on Maputo City, the capital of Mozambique with a population size of approximately 1.1 million and the wider Maputo metropolitan area, including Matola is populated with approximately 2.7 million people as stated in the 2017 census (Instituto Nacional de Estatística, 2019). To provide local context on waste management, it is estimated that 1,500 tonnes of waste is generated per day from Maputo City, from a range of sources such as houses, offices, restaurants and shops (African Clean Cities Platform, 2022) This pattern of consumption and waste generation in the City are not spread evenly due to high levels of socio-economic inequality and poverty levels.

Figure 2. The study map, highlighting Maputo City Province



In city centre of Maputo, the Municipality is responsible for the collection of domestic waste, it outsources private companies to undertake the collection of plastic bags placed on residential streets to the Municipalities landfill site, Hulene (Muchangos et al. 2017). Despite having no formal services provided by the municipality to sort waste prior to final deposit, in Maputo it was estimated that 36% of waste generated did not enter the waste stream (Mertanen et al. 2013). This partly due to the necessity to reuse and recycle at household level in the context of low income household (Muchangos et al. 2017) and the actions of waste pickers. The Hulene land fill site located in Maputo, 10km from the city centre, that covered 42 acres and rises to 15 meters in height (Siddons, 2023) provides economic opportunities to reclaim waste. Despite, the environmental and health risks of living so close to the landfill site, households have settled here, this reached global attention in 2018 when 17 people were killed when heavy rains caused landslides destroying these settlements (Swingler, 2018). This disaster led the government at Mozambique to announce the closure of the landfill site, the previous Mayor of Maputo Comiche predicted the closure of Hulene landfill site for approximately 2024 but there has not been any direct action at this current stage (Club Mozambique, 2023). This background provides relevant context for this study to understanding the opportunities and constraints for waste pickers in Maputo.

Figure 3. As media access is limited at the Hulene Landfill, below is a field sketch highlighting the location of the landfill and Topack Buying point, to be discussed in 3.1 and 4.



3.1. Partner organizations – Topack Plastic and Resilience BV

To support this study, a research internship was arranged between the researcher, Topack (Topack, n.d) and Resilience BV (Resilience BV, n.d.). Topack, is a plastic production company, with industrial units in Mozambique and Angola (Topack, n.d). In addition to plastic production, Topack has a recycling unit, purchasing plastic from suppliers that sell at buying points located at the Topack Factory and at the Hulene Landfill. Topack will purchase plastic from individuals present with product at the select opening times of the buying point. Acting as an (unpaid) research consultant on behalf of Resilience BV, this internship will undertake empirical research to provide Topack with a greater understanding of the waste pickers within Topack’s supply chain and the relative challenges and opportunities they experience. In addition to the study objective of this thesis study, the research will support Topack by providing recommendations to further meet the needs of their suppliers to enhance the capabilities of the waste pickers and increase Topack’s socio -economic impact.



Figure 4. Image from the Topack Factory of Topack staff moving purchased reclaimed plastic

4. Methodology

This section shall discuss the key components that formed the data collection of the study.

4.1. Study site








As highlighted in the regional framework, the study focus is on waste pickers within Topack's recycled plastic supply chain in Maputo, Mozambique. *Figure 6* represents a visualised representation of Topack's supply chain, highlighting Topack's buying points. The primary study sites are Topack's main buying points located at the Topack Factory and the Hulene Landfill (refer to site maps in Annex E) where waste pickers sell plastic. The third buying point referenced in *figure 6*, located outside the city, was removed from the scope of the project due to not being operational during the study's time period. Secondary study sites are located at the buying points of aggregators within Topack's supply chain.

Figure 5. Secondary study site, an aggregator's buying point



Figure 6. Visualised representation of Topack's supply chain. The selling points and locations of waste pickers are visual representations and not located by GPS accuracy it to scale, apart from where stated. Through the support of the partnered organisation when in country, this map can be developed in depth and accuracy



Key	
	Waste reclaimers
	Transport (waste reclaimers) - on foot
	Transport (waste reclaimers) – motorized vehicle
	Transport (Topack plastic production) – motorized vehicle
	Selling points for recycled plastic (Topack)
	Topack plastic production site
	Hulene Dumpite

4.2. Study design

This study is formed from qualitative research, with in depth interviews as the primary collection method supplemented by observation. Secondary quantified data, provides additional context to the data collection. Qualitative research is appropriate for this study as by nature, it collects data from the perspective of the participants (Hennink et al. 2020). Therefore data collected on the objective to understand the opportunities and constraints experienced by women waste pickers will be expressed by the participants themselves.

4.3. Participant selection strategy

The primary study population are waste pickers selling plastic within Topack's supply chain. Data collection is supplemented with participants working at Topack and experts in field to provide further context. This section outlines the participation selection strategy.

In the first stage of research, the primary study population was purposefully sampled with a deductive focus on women waste pickers from the selling queue at the primary study sites. In this context, purposeful sampled allowed the flexibility to select the study's primary focus, women and select different demographics to ensure sufficient diverse and relevant data collection (Hennink et al. 2020). The sampling strategy additionally included men, in reduced numbers to enrich the understanding of gendered differences. During early data collection, thematic groups of waste pickers were identified. This led to a shift in the sampling strategy to inductively selecting participant to enrich the formation of waste picker typologies, later discussed in the results chapters. Additional study sites were chosen through inductive snowball sampling to include aggregator's buying points, an approach which builds up contacts based on information gathered from participants and the other stakeholder groups (Hennik et al. 2020). This strengthened contextual understanding of the supply chain and activity patterns of waste pickers. A combination of purposeful and snowball sampling was undertaken to select Topack staff working at the study sites and sector related experts to further contextualise data collection.

4.4. Data Collected

4.4.1 Overview

In total, 36 in depth semi structured interviews were conducted across three stakeholder groups. Data was supplemented with passive and participant observation conducted at primary and secondary study sites. In addition, maps and photos were created to contextualise discussion.

Table 2. Overview of participants interviewed

Stakeholder group	Number interviewed	Gender breakdown	
		Men	Women
Waste picker	30	10	20
Sector expert	2	1	1
Topack Staff	4	4	NA
Total interviews	36		

The participant list with key characteristics displays the participants interviewed and referenced through chapter 5 from the primary stakeholder group. An age range is provided for participant when necessary to further protect their identity, this is most significant for women selling on days for a select number of established aggregators.

Table 3. Primary participant list

Name	Gender	Age	Born in Maputo	Education	Marital status	Typology	Frequency to sell
Amélia	Woman	62	Yes	Primary	Widow	Collector	1 x month
Ana	Woman	66	Yes	Can read and write	Separated	Aggregator (emerging)	2 x week
Beatriz	Woman	31	No Gaza Province	Not shared	Unmarried	Aggregator (emerging)	1 x month
Benedita	Woman	55	Yes	Can read and write	Married	Aggregator (emerging)	2 x week
Carla	Woman	50	No Massinga Province	None (can count)	Married	Collector	1 x month
Celia	Woman	50 - 65	No Eswatini	Primary (Married	Aggregator (established)	2 x week
Clara	Woman	42	No Gaza Province	Not shared	Married	Aggregator (emerging)	2 x week
Claúdia	Woman	64	Yes	None Can't read or write	Widow	Collector	1 x month
Eliza	Woman	20 - 35	Yes	Primary	Married	Aggregator (established)	2 x week

Fatima	Woman	50+	No Gaza Province	None Can't read or write	Married	Collector	New supplier
Isobel	Woman	50 +	<i>not shared</i>	None Can't read or write	Unmarried	Collector	1-2 x month
Jéssica	Woman	65	Yes	None Can't read or write	Married	Collector	1 -2 x month
Lilian	Woman	64	No Inhambane Province	Not shared	Married	Aggregator (emerging)	1 - 2 month
Márcia	Woman	49	No Gaza Province	Primary	Widow	Collector	Infrequent
Marta	Woman	50 - 65	Yes	Can read and write	Married	Aggregator (established)	2 x week
Matild	Woman	44	No	Can read and write	Not shared	Aggregator (emerging)	1 x week
Noor	Woman	29	Yes	Secondary	Unmarried	Aggregator (emerging)	2 x week
Paula	Woman	43	Yes	None Can't read or write	Unmarried	Collector	1 x week
Sofia	Woman	35 - 55	Yes	Primary	Married	Aggregator (established)	Dependent
Vânia	Woman	63	Yes	Primary	<i>Not shared</i>	Collector	1 x month
Alfonso	Man	22	Yes	Secondary	Single	Collector	2 – 3 x day
Gustavo	Man	58	Yes	None	Married	Collector	1 x week
Leo	Man	36	Not share	Secondary	Married	Aggregator large	3 x week
Lucas	Man	51	Not shared	Primary	Unmarried	Collector	1 x week
Marco	Man	46	Yes	Primary	Married	Aggregator large	2 x week
Pedro	Man	37	No Inhambe Province	Primary	Married	Collector	2 x week
Saores	Man	48	Yes	None Basic reading and writing (observed)	Married	Aggregator (established)	2 x week
Tito	Man	40	No Inhambe Province	Primary	Married	Aggregator (emerging)	2 x week
Edson	Man	25	Maputo	Secondary	Married	Collector	3 x week
Justinho	Man	58	No Gaza Province	Primary	Married	Collector	2 x week

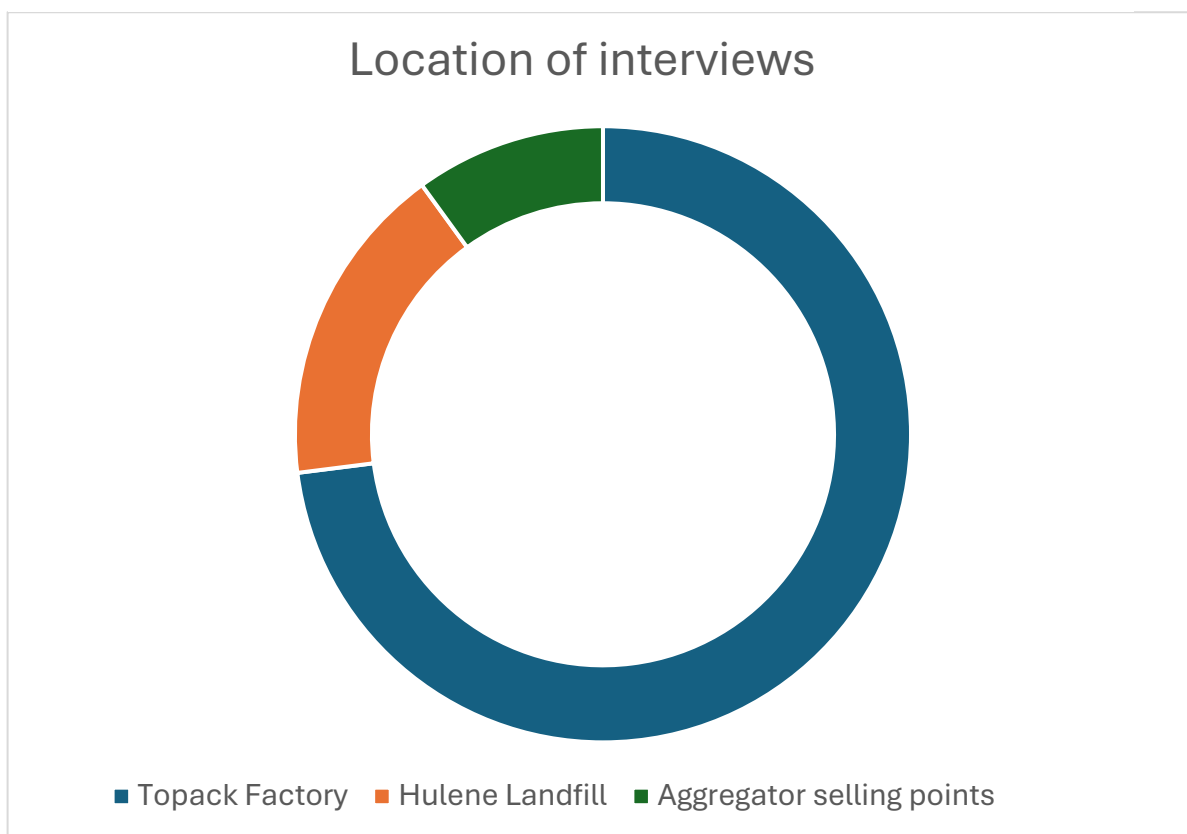
4.4.2 In depth, semi structured interviews

Interviews were conducted using the interview guides referenced in Annex B for the relevant stakeholder group. The interview guide was later amended with inductive led information to support data collection of typologies of waste pickers. Discussion on the activity patterns of the supply chain was supported by drawing the responses to create a visual map/flow diagrams. The primary languages spoken by the participants was Portuguese and local dialect *Changana*. Apart from interviews with experts in the sector, all other stakeholder groups were interviewed with a translator in the language of preference. For the primary study population, interviews were conducted at the study site where participants were sampled. On average interviews lasted 30 minutes for the primary study population, ranging 20 – 40 minutes. This methodology, is appropriate for this study as it gives the participants a platform to share context and meaning behind experiences and decisions (Hennink et al. 2020). Further relating to the study's research questions framed through the Capability Approach with a focus on lived experiences and therefore lends its self well to the study objective to understand the challenges and opportunities.

Figure 7. Images of the primary study sites. On the left, is the Topack Factory, where suppliers would sit on old tyres while watching their place in the queue to sell plastic. Image on the right is the gated area of the buying location opposite the Hulene Landfill.



Figure 8. Summary of data collected at study site locations



4.4.3 Observation

Prior to conducting interviews, passive participation was conducted at the Topack Factory. This involved sitting opposite the selling queue, less visibly connected to Topack and inside the factory observing the purchase process between stakeholder groups. Throughout the observation, age dynamics and a gendered lens will be applied to further highlight gendered social protocol and activity patterns. The process is further explained in the observation guide (Annex A). Once my presence was familiar, observation moved to moderate participant, engaging in limited conversation with the participants. Noted in 4.5, data collection at the Hulene Landfill site held greater sensitivities for the methodology. From the enclosed Topack selling point, non participant observation was conducted looking through an open gate that provided clear views to the landfill site (refer to map Annex E). Observations while walking the outskirts of the landfill site have been conducted without notes, with a trusted team member known to the community Topack. Notes have then be written up at the selling point, to minimise risks. Passive and moderate participation observation was continued during in depth interviews to supplement verbal signals. In all cases observation was utilised to further understand the working dynamics, process and behavioural patterns of the waste pickers. Supplementing the primary data method with observation enables data collection on non

verbalized discussion and provided oversight of the bigger picture to strengthen the narrative (Mulhall, 2003; Hennink et al. 2020).

4.4.4. Data and coding analysis

Thematic data analysis was conducted from qualitative research methods. Annex F references the study's code tree, which is the foundation to forming the thematic sections in chapter 5. Nvivo 14, was used to support the data coding, supplemented with visual methods and matrixes referenced in annex G and H.

4.4.5 Secondary data analysis

Secondary data was sourced from digital app, used by Topack to digitally track the sales of plastic from their suppliers. The data included the suppliers details and the quantity and sum of sale from 2023 and 2024. Analysis was undertaken to obtain quantified information on average quantities of plastic purchased and income generated. This support the contextual understanding and formation of waste picker typologies in chapter 5.1.1.

Figure 9. An image showing Topack staff recording sale through the digital app.



4.5. Positionality and ethical approval

Language and local dialects posed a limitation to the methodology of this study. Although mitigated by the support of a translator, it resulted in less autonomy to engage with the participants directly. However, piloting the interview guide and receiving feedback on more colloquially understood wording further mitigate risk of misunderstanding during the interviews. The positionality of myself, the translator and the partnered organisation was considered throughout the methodology. As a University student and an international visitor, I was aware that I portray a level of privilege, in addition I was also representing Topack the purchaser of the plastic the participants sell to. I was therefore aware of potential power dynamics when speaking with waste pickers near Topack buying points. To ensure my intentions and role was clearly stated, the ethical consent form (Annex C) was read in their preferred language. Additionally I used my observation diary to note any verbal or non-verbal signal that could indicate how a response may have been influenced by either party's positionality. Through the data collection I became aware of signals indicated by the participant's body language and answers that participants expressed greater comfortability when interviewed opposite the factory, slightly apart from Topack staff rather than closer to the Topack gates. This can be seen as an influence of the power dynamic between the suppliers and the Topack staff and as such strived to maintain greater distance.

The ethical review form is listed in Annex D which highlights ethical concerns in greater detail. To ensure ethical consent was obtained, the consent form was translated into the Portuguese and verbally read in Portuguese or the local dialect by the translator, with consent received prior to collecting data. Due to low levels of education within the participant study population, verbal consent was most suitable. In chapter 5, there are images shared with relating quotes these participants confirmed their consent for their image to be shared and used for this study remit and narrative impact reports for the internship. Otherwise all other information has been anonymised and referenced with pseudonyms to minimize harm.

5. Results

5.1. Opportunities present for women to generate income from waste reclaiming

This this chapter shall explore the study's first research question, on the opportunities of flexibility and enhanced agency experienced by women waste pickers.

5.1.2 Waste picker typologies

A key opportunity identified from this study, is the opportunity for waste reclaiming to be undertaken in different ways. This is exemplified by the formation of waste picker typologies characterised by their behaviours within the supply chain of recycled plastic, as explained in table 4. A typology in this context is defined by Hennink et al. (2020:254) is 'a way to categorize data along a continuum to distinguish different types of behaviours, beliefs or attitudes'. The waste picker typologies will be referenced throughout the results chapter to contextualise the thematic analysis.

Table 4 displays typologies of waste pickers grouped by collection method and frequency to sell.

Typology	Collection method	Location of plastic	Frequency to sell	Quantity to sell
Collectors selling infrequently	Individual collects	Domestic waste City streets	1 -2 months	Average quantity
Collectors selling frequently	Individual collects	Waste bins and bags City streets Domestic waste Hulene Landfill site	Daily Once a week	Sells smaller quantities: Below average Average
Emerging aggregators	Individual buys from collectors Supplements with individual collection	Collectors bring to sell at buying point set up at individual's home Collector's source locations	1 - 2 weeks 1 – 2 months	Sells larger quantities Average Above average
Established aggregators	Individual buys from collectors	Collectors bring to sell at buying point set up at individual's home Collectors bring to sell at individual's property	2 -4 days 1 week	Sells very large quantities Well above average

Table 4 highlights two key collection methods, individuals that collect waste and aggregators who purchase waste from collectors to then sell on. Collectors are separated into two typologies. Firstly, collectors that sell frequently, sell plastic daily or weekly as their main source of livelihood selling to buy back centres or to aggregators (referenced in figure 10 & 12). Secondary data collected from Topack’s digital register explained an average supplier selling to Topack will sell, 75KG generating an average income of 15 euros per transaction. This typology typically sells smaller to average quantities, collecting from a wide range of locations, including landfills and city bins. However gendered differences, highlighted men more likely to collect from city bins than women, which shall be further discussed in chapter 5.3 .

Figure 10, a man collecting to sell frequently, sorts his material at an aggregators property, to sell.



Alternatively, collectors selling infrequently are characterised by collecting opportunistically alongside their daily activity patterns. They typically sold Topack’s average quantity, every 1 – 2 months. This typology showed the highest patterns of elderly women and widows, who

typically collected alongside other livelihoods or at home. Examples are referenced in figure 9. Women expressed preference to collect from the city streets, at the location of their main livelihood, commonly the market or from home. This typology did not show trends of collection at city bins or at the landfill site.

Figure 11. Quotes and activity maps collected from interviews with collectors selling infrequently

	<p><i>“While I am selling my things, I am also collecting my plastic bottles as there are people near by drinking juices and things..they help me. Then after work I go home.”</i></p> <p>Amélia, a 62 year old widow</p>
	<p><i>“I collect them, from my home, when I drink water, or juice or something I store them.”</i></p> <p>Fatima, a married 50 year old</p>
	<p><i>“I wake up and do some work like washing dishes.. then I go out to look for the waste.. I sell at half past 1pm..because I am preparing my nephew for school”.</i></p> <p>Cláudia, a 64 year old widow</p>

Aggregators, in the context of this study’s population, set up buying points from their home for collectors to sell recycled waste, operating as informal businesses (referenced in figure 10). Both typologies of aggregators expressed selling plastic as their main form of livelihood. Established aggregators, are a select group of suppliers that sell on average 2,500KG of plastic a week to Topack, generating the equivalent of approximately 500 euros (without profit calculations from purchase costs). Despite being the smallest typology group, the gendered

dynamics were evenly distributed with all women stating to be married, which will be further analysed in chapter 5.2. Emerging aggregators, sell smaller quantities, characterized by a less stability supply chain. This typology also had both men and women represented, however unlike the established aggregators, this typology showed greater pattern of women living separated from their husband.

Figure 12, vignette of an established aggregator, supplemented with a observation diary extract.

Vignette 1: Celia a married adult, operating as an established aggregator

I met Celia, at the Topack factory after selling plastic on a day reserved for a select number of aggregators. Celia typically sells 1,500KG of plastic to Topack, twice a week. Celia lives at home with her now retired husband and their two nephews, where she runs her buying point for recycled waste. Celia started this business after being advised *'that this can help you provide for your family'*, she expressed this work to be more reliable than previous experiences at the market.

Observation diary extract - Home visit to Celia's buying point

When we arrived, there is a young man sorting out waste in the front courtyard of Celia's home, her husband sits on a plastic chair inside. Celia, joins him and watches the man sort through the waste, he is separating it into categories, plastic, steel and cans. ... They have a small scale hanging from the middle of the courtyard. The collector has sorted the waste into his own plastic sacs.... He goes to weigh the bags on the scale. The hook rips the bag,

The different typologies of waste pickers analysed above, highlight flexibility in how an income is generated by selling plastic. Women aggregators highlight how businesses can be run from their family home (figure 10 & 13) or by women seeking to generate extra income with no additional time impact (figure 11). Qualitative findings on flexibility therefore support quantitative data on Topack's supply chain that 70% of supply chain are women, to further indicating this livelihood to be an accessible opportunity for women.

Figure 13. An image taken at a different buying point, from a home visit to Established aggregator Marta's. Scales to weigh materials are located on the floor left of the table.



4.4.5 Opportunities for increased agency

Outlined in the table of concepts, agency was operationalized into three themes, intrinsic, instrumental and collective. This section shares finding on expressed agency within waste picker typologies.

Intrinsic agency – generating income with limited alternatives

To an extent, it can be argued all primary participants expressed a form of intrinsic agency by undergoing actions to generate an income from waste reclaiming. In reference to the conceptual model, intrinsic agency was operationalised as perceptions and self esteem. Such findings hold important relevance to answer the study's research question on how agency is expressed in a women's choice to waste reclaim and as such will be discussed in chapter 5.3. This section shall highlight inductive findings that women expressed the opportunity to generate income from waste reclaiming while experiencing health constraints. Multiple waste pickers, when interviewed, identified as *ill* due to current complaints or past complications. These individuals expressed having to leave previous work was due to *low energy* levels and

no longer being physically able. Additionally, observation of suppliers waiting to sell plastic, highlighted physical disabilities, indicated through physical movement. Anna, an elderly woman who lives with four nieces separated from her husband, explained how she became an emerging aggregator:

“It is hard when you stop working, when you do not have anything, and you need to start again. It’s hard...I live by doing business but as I have this issue with my legs I am not able to do the work I used to... I can walk but sometimes my leg hurts but I am able to do housework... I buy from these boys that come to sell at my house. Sometimes when I feel well I go and collect on my own..I buy, I organise everything else on my own’.



Figure 14 Anna sits on her mosquito net of plastic, waiting to sell at the Topack factory

Anna’s story highlights how being an aggregator and purchasing plastic from others based from her home can provide opportunities when constrained by physical movement. Living separated from her husband, the flexibility to conduct this livelihood to meet her physical capabilities is therefore more significant as a result of reduced financial support. As such, Anna has created an opportunity for financial independence, influenced by the accessible nature of waste reclaiming.

5.3.1.2 Instrumental agency

The conceptual model of this study, operationalised instrumental agency as ownership and decision making. Findings highlighted both to be present in the experiences of women waste pickers as well as inductive findings on the use of saving mechanisms. Ownership was present in different forms, the physical ownership of capital and the concept of identifying as a business owner. Ownership of capital as an expressed form of instrumental agency shall be discussed in chapter 5.2 as an enabling factor for economic advancement. Women aggregator typologies expressed strong themes of ownership, with many identifying as the owner and decision maker of the business. This was expressed by Sofia a married woman aged 49 operating as an established operator at the Hulene Landfill:

“I am the one who makes the decision, no other person.”

Of the married aggregators, many expressed the opportunity to have ownership of their own business within their family structure. This is demonstrated by Marta, an aggregator aged 50 – 65 who can make up to the equivalent of 285 euros a week selling plastic to Topack.

“My husband works and the money he earns sustains our family but I have seen the opportunity to do something also. He sometimes help me, carrying things. Like today, he has helped me carry the plastic... I am (happy) because I do not depend on anyone, what I want I do, without asking my husband.”

Martha's quote highlights, that although she receives support from her husband, it is Marta that feels she has the ability to undertake actions independently as a result of identifying as the owner of the business. Furthermore, as a result of ownership women aggregators demonstrated a chance to expand their skill sets in business management. This is represented in the quote from Eliza an young established aggregator, regularly selling large sums of plastic at the Topack Factory:

“This business was not mine at the beginning, it was my mother's business. She saw I was not doing anything, so then she invited me..I needed to find some money to start the business. I have sold a lot of times and it did not go well, the business fell because of lack of experience but in the end I adapted myself, little by little. I adapt and I make the business without failing For example, if I sell and see that I already do not have the money to work, sometimes I borrow money. But when I see that is not possible to borrow money, I confirm with what I have. At the selling day, I sell that material and the money I gain is mine but if I borrow there are people from whom you borrow money that say you have to pay me.”

Eliza demonstrated an ability to increase her livelihood by developing business management while working, expanding on skills not previously well established. As a result of new skills, Eliza demonstrates how this increased the profitability of the business.

Inductive findings expressed instrumental agency in the opportunity for women to save income through local saving mechanisms group saving mechanism *xitque*. Different levels of

capability were expressed across the typologies. Paula, a forty three year old unmarried mother of three has been collecting at the Hulene Landfill site since 12 years old. Paula exemplified that she cannot currently save but wants to continue selling waste in a hope to build her house. Typically, the ability to save, was expressed higher among aggregators, such as Noor's experience in vignette 2, figure 13.

Figure 15. Vignette 2.

Vignette – Noor, 29 years old, operating as an aggregator from her home

I met Noor, while organising her mosquito nets of plastic to sell to Topack. Noor grew up orphaned and currently lives with her two sisters and two daughters. Noor explained her journey to becoming an aggregator:

“I started to sell plastic bottles because my husband left me with two children and I needed to do something to earn money and look after my children.. I started in December 2023, to sell this because sometimes life is hard and we need to struggle so we won't die hungry”

Noor, is generating income as an emerging aggregator, receiving on average 27 collectors a day, she sells plastic at the Topack Factory just above the average quantity. Noor has the opportunity to save her income:

“ I am saving through xitique and m-pesa. I invest 500MT (7 euros) into m-pesa (telephone banking) and 200MT (3 euros) into group Xitique (local group collection) by day...I do not get the benefits now but I am planning to buy some land, to buy a freezer and I will build my home by selling these plastic bottles.”

Noor, as single parent with a reduced family support network, demonstrates how running a buying point from home can be an accessible way to generate income when options feel limited. Noor shows the potential to further increase her living conditions through the ability to save money for capital purchase. Additionally, collectors who sold plastic alongside other livelihoods, demonstrated an increased ability to be able to save money. This is demonstrated by Márcia, an adult widow who collects plastic while running a market stand, selling infrequently to Topack:

“I have a group of sellers in the market we make this 100 MT (1.5 euros) xitique, today I have to give 100 ...part of the money I earn here will got the xitique’. The rest of her income will go towards ‘buying some kinds of food for my home’.

Márcia highlighted how collecting alongside her job at the market has allowed the opportunity to generate additional income to save for future use. This example is

poignant to further contextualise understanding of typologies selling infrequently and the wider opportunities of selling plastic.

Collective agency

In continuation, findings now demonstrate the opportunities for expressed collective agency, deductively operationalized as group work. Working dynamics will be discussed as well as inductive findings on women as job creators in the community. In general the study did not highlight strong trends of group working among the collector typologies. Many stating they worked alone, however later referenced the support of family members or trusted friends. This was further contextualized when speaking Alicia, an academic within the sector who explained *'people would rather work individually than in associated groups'*. Alicia shared her belief that the civil war experienced by the country had reduced the national sense of community. Although group work was not predominant, findings did evidence support networks during working activities. Observations highlighted social dynamics of women queuing to sell at the Topack Factory (refer to map in Annex E). Elderly women and women with babies were often first in line to sell their plastic, a Topack worker explained this was organized among the suppliers *'as a human being thing'*. During the queue, men demonstrated an active role, moving up and down the line, supporting women to move their plastic. Similarly, women were not static but observed to leave the queue, calling back to one another when required to sell. Figure 14, demonstrates how women support each other but sell individual. As a result of such networks, women demonstrated greater access to working times, to be able to undertake other commitments during the waiting periods. This example of collective agency is further discussed in section 5.2.1 on access.

Significant inductive findings, indicated women aggregators' ability to make change within the community, for her self and for others. As highlighted in chapter 5.1.1, collectors selling frequently will sell to the buying points located at the homes of aggregators. Marta an aggregator previously highlighted in wanting to seek her own financial independence shared the change she experienced as being an aggregator:

"My children have someone they can rely on, in the past I could tell them I am in a bad situation so they are too but now they know they have someone they can rely on, when they need something they can say my mother can help..."

They (the collectors) see me as a saviour because when they lack money for food, those young men that come to sell to me, they are father's of families. There are also mother's of families, that come to sell to me when they do not have money to buy food...they know they can come to me."

Marta's experience demonstrates how having her business has created a change in how she feels she is perceived by her family. Marta, expressed value on being perceived as reliable, in particular to her children. As such, Marta suggests that in having a business that

generates reliable income it has influenced her to feel more reliable as a mother. In addition Marta expressed acknowledgement in her ability to make change for others, by expressing she felt viewed as a *saviour* from the collectors she buys from. This therefore indicates a role change in the community, indicating increased respect from others.

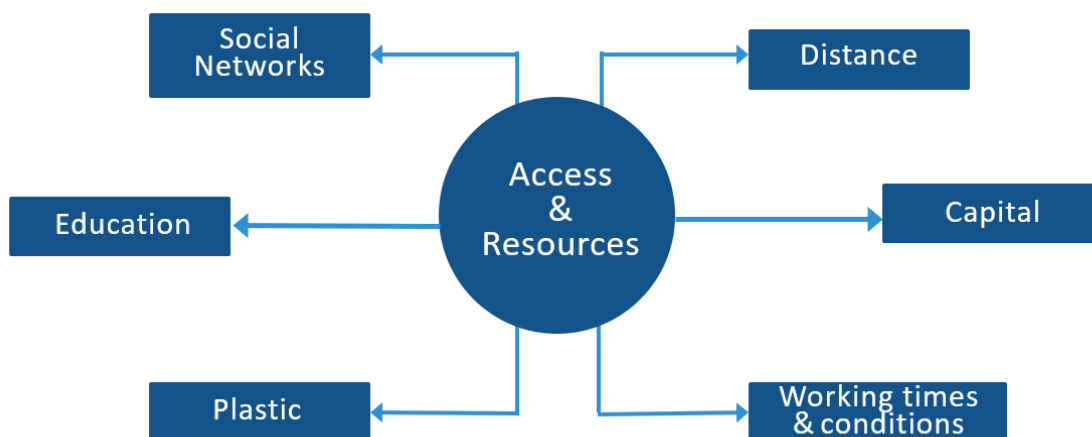
Figure 16 demonstrates women supporting each other at the Topack Factory. The three women help each other to transport the plastic but will sell their product individually.



5.2. Enablers and constraints for women to advance

The study's findings thus far have highlight opportunities present in waste reclaiming, highlighting potential pathways for women to generate income to create change. This section shall now go deeper to answer the study's research question on how women are enabled or constrained to advance as a supplier of recycled plastic through access and resources.

Figure 17. Displays a summary of enablers and constraints to be discussed in findings.



5.2.1 Access

Access was operationalised deductively as distance, transportation and working times, all in which were identified in the study's findings. However, data analysis identified access to capital, as an overarching concept the most significant constraint for women desiring to advance to be an aggregator. As laid out in the typology table, aggregators have greater capacity to reclaim larger quantities of plastic by purchasing from others. Sofia, an established aggregator at the Hulene Landfill explained the need for start up capital:

"It was my sister in law that gave me the 6,000 MT to start this business."

Additionally, having the opportunity to purchase land was a common aspiration expressed by waste pickers throughout the typologies. Lilian, a married 64 year old aggregator, who sells below average quantities to Topack explained her aspirations:

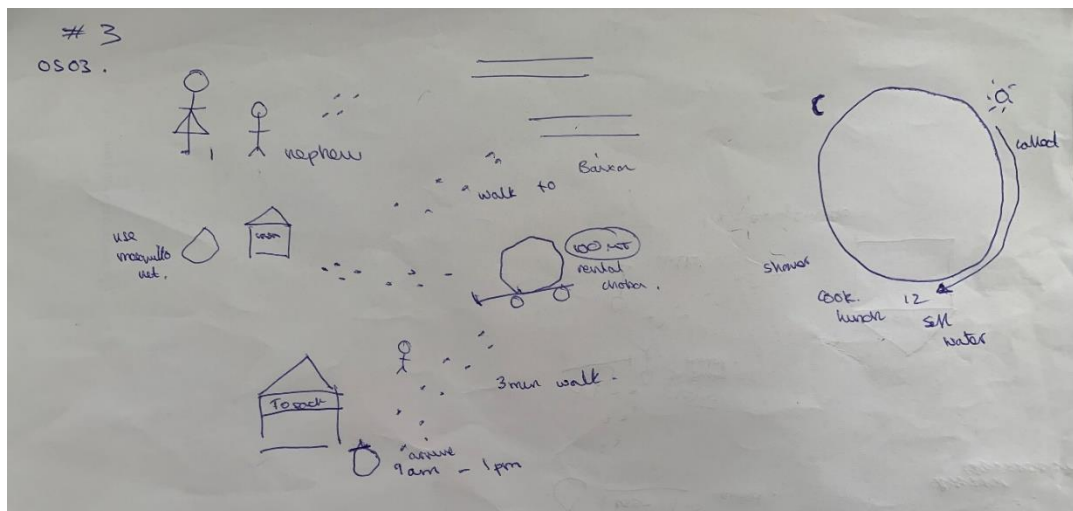
"I brought a house... I paid almost everything... It was an APIE (Administração do Património Imobiliária do Estado/ government owned) house, I have been living there a long time, I was told I can buy this house now... I thought this would be great for me, best for me to pay for this house, because if I do not have a house, how can I be able to make this business if I do not have a place to live?"

Lilian's aspirations to have her own house is significant, to advancing as an aggregator due to the study's contextual understanding that a storage and sorting space is required at the buying

points. Capital investments were also shown to increase profitability, aggregators most commonly aspired to and purchased scales. Capital investments in transportation was not common across the typologies, which is reflected in findings highlighting all collectors to be within walking distance to Topack. Access to transportation is poignant, as the average quantity of plastic, when carried in a mosquito net (most common mode of carrying), was shown to be achievable without transport. However, to sell above average quantities suppliers were required to rent or purchase transport. Most commonly accessible was renting the txova (cart) for transportation fee (refer to figure 18 & 20). Established aggregators showed highest patterns of transport ownership, with a few owning cars, however this was not commonly accessible for most suppliers. This was shared by Beatriz, a 31 year old unmarried aggregator of old who aspires to establish her business:

“The place I told you about, others have already called me, they have told me that I can send the mosquito nets and I can find boys who can collect things, if I had transport money I would go there and collect because they told me there was a lot of plastic there.”

Figure 18 to demonstrate the cost of the txova rental, of 100MT (1.40 euros)



Beatriz’s experience, highlights how access to potential product for her livelihood is restricted to a lack of financial ability to access transport. Thus linking prior examples that indicate how access to capital can mitigate constraints from distance and transportation costs.

Figure 19 shows an example of scale aspired by aggregators, it has been modified with an old table to widen the surface area.



Figure 20 shows an established aggregator's truck entering Topack Factory with a weekly load of plastic to sell and a loaded Txova (cart).



Access was also operationalised as working times. In interviews participants were not forthright in complaining on the time impact of the 2.5 -4hr waiting queues to Topack, which relates back to sensitivities of power dynamics highlighted in chapter 4. Abilio, who works at the Topack Factory reaffirmed analysis, expressing waiting times to be a common complaint by their suppliers. This is of particular significance, as many of the women expressed childcare responsibilities, either leaving their children at home or bringing them to the Topack Factory. As such reiterates the need for social networks highlighted in chapter 5.1.2. Additionally, findings highlighted how the informal nature of waste reclaiming can also enhance access to working times. Waste pickers demonstrated agency to choose how many hours they want to work, expressed in figure 20 and aggregators choose certain hour to advance their profitability. This was explained by Celia, on how she attracts more customers to sell plastic:

“There are some people that come a lot but they go to a lot of places..often at night. They buy here in the evenings but some places are not open...I get business because I am available in the evenings.”

Nighttime work was a theme expressed among male collectors working at the landfill due to experiencing less competition from other collectors at this time. Vignette 3 highlights how Pedro chooses to work through the night however when speaking to Paula, an unmarried women, aged 43 who collects at the landfill during the day, she expressed to be more risk aware:

“The benefits is that I was able to build my own house but the problem is that there are a lot of risks. For example this week that rained, and there are the big cars, the machines and the small cars that come into the dumpsite. There are also the ones passing by the road and the ones that come to drop the waste, so there is a lot of risks.”

As such, Paula highlights how an increased sense of risk may restrict access for women to work at night which differs to the opportunity assed by male collectors to access plastic when there is less competition. This finding is further contextualized, from information shared by Alicia, an academic expert in the sector that waste collection trucks will be operational during the night.

Figure 20. Vignette 3.

Vignette 3: Pedro, collecting at the landfill to provide for his family

I met Pedro, a married man, aged 37, after he had sold plastic at Topack's Hulene Landfill buying point.

Pedro, used to work as a security guard in a different province before his contract was terminated. Educated to primary school level, he struggled to find new work and moved to Maputo, explaining:



"I saw myself unemployed. I looked to the left, to the right and to the front and saw that I had to do something, to provide for my family; the children needed to eat. I noticed there was a dumpsite where it was not necessary to have a document, ID card or anything to work. You just needed your power and your mind, so I started working in the dumpsite."

Pedro has now worked at the landfill site for 8 years and explained his working patterns: *"I work every day, but not on Sunday, on Sunday I have to be home rest a bit, go to church ... I work from Monday – Saturday. I work in the day and night, so if I get here this morning I can go home tomorrow morning..."*

Pedro's main challenges are not working due to heavy rains making it unsafe to collect or feeling unwell. *"I am an ill person, see here on my foot..the job I am doing is a job the requires strength, strength on feet because of the mud, you can slip..when it rains as you can see."* As such, Pedro expressed his hopes to seek another job with a contract, hoping it can *"guarantee me a 30 days salary for better sustain my family"*.

The shared experiences of Pedro and Celia, highlight how the informal nature of waste reclaiming can enhance access to working times, to better fit an individuals activity patterns and increase access to resources. However, finding indicate it is not equally accessible to women due to gendered perceptions of risk. Despite aspects enhancing accessibility, the lack of regulations of the informal nature are shown by Pedro's experience to constrain access by weather and health impacts. This is particularly constraining for waste pickers working at the landfill site where working conditions can present greater hazards than city collection.

5.2.2 Resources to enhance economic opportunities to advance

The conceptual model highlights plastic, education and social networks as resources that provide opportunities for waste pickers to achieve and generate an income. Empirical findings highlighted resources of plastic to be constraining to women's capabilities in two forms. Firstly, impacting all typologies were low seasons of plastic availability. Experienced in the winter months, this was explained by waste pickers and Topack staff to correlating to reduced

purchase and consumption of water in plastic bottles. Secondly, was increased competition of plastic, explained by Sofia, a married aggregator aged 35 – 55, working at Hulene Landfill:

'In the beginning, it was easy to do the business because I was alone, there was not a lot of people doing this job. So it was easy to find the material. I could, buy and sell this product just to earn 1MT per KG, but I was able to see what I was doing, I was able to find the product, because I was alone and I was able to find customers too.'

As highlighted by Sofia, waste pickers at the landfill expressed reduced availability of plastic. Increased number of collectors, due to changing perceptions on waste reclaiming as a livelihood, further discussed in chapter 5.3, has resulted in less plastic entering the waste stream. As such, waste pickers at the landfill experience less available product and street pickers experience greater competition from other individuals.

Additionally, resources of education was shown to enable access to advance as an aggregator in the IRS. Trends of educational patterns within typologies showed collectors more likely to be illiterate than aggregators. This can be explained by the need for aggregators to demonstrate financial management run a profitable operation, as outlined in the next section and reflected in table 2. Although there is an opportunity for illiterate collectors to access an income from selling plastic, they experienced less control over their sale transaction. This was shared by Isobel, aged 50 – 60 years old, who started selling plastic to Topack when they first opened their recycling factory but explained:

"We do not know how to read, so I cannot tell you how much I sell, I just get the money."

Isobel's lack of control over her sale indicates decreased instrumental agency as a result of having no formal education. Observation supplemented this finding highlighting different levels of engagements when weighing plastic, with some women documenting their sale in note books while others are supported by Topack staff to read the figures on the scales. Findings therefore highlight barriers for illiterate collectors to advance as a profitable aggregator, limiting their opportunities.

The study deductively indicated market knowledge as a sub category of educational resources. However, the most significant findings were highlighted in discussion on prior business experience, which then led to greater market knowledge. An examples was demonstrated by Celia, one of Topack's established aggregators, who shared :

I have been doing business since childhood.. with my mother I used to sell roasted peanuts, I have done a lot of business before this. One of the things I learnt, was to know the market, you need to know where you are, where you are going to sell this type of product. If you are going to sell food for example, you won't sell it in front of the president's house because they eat in restaurants.

Male waste pickers showed higher trends of prior contracted work, typically in security and construction. Despite no women sharing work experience in the formal labour market, Celia's experience highlights how women are demonstrating transferable skills from other informal work sectors such as selling at the market. As such, indicating women with prior selling experience to be at a greater advantage to express instrumental agency to increase their livelihood than women without, as discussed in chapter 5.3.

Figure 21. Highlights the scales which display the weight for suppliers and staff to read the quantities to be sold.



Conclude findings of resources, the results shall now discuss social networks. Deductively operationalised as working communities and family, the influence of working communities have been highlighted prior in chapter 5.2.2. Focus shall now be turned to family structure as an enhancing resource. Family has already been interweaved into prior examples shared throughout the results. Firstly, family showed to enhance access to capital, as highlighted in the previous section, additionally Marta an established aggregator explained how she shared resources with her sister to establish the business:

“I, used to have a store at home but I saw that it was not working, so my sister the owner of this car, she lives here at the city she came to me and said ‘why don’t we start doing this business?’”

By the nature of aggregators running buying points located at their homes, prior examples have highlighted the involvement of other family members in running the operations. As mention prior in chapter 5.1.2, all established aggregators were married where as unmarried or widowed women running emerging aggregators were more likely to express financial instability and sell small quantities. Furthermore, of the women running emerging operations, a few had experienced the lost of their father when growing up. This was previously highlighted in figure 15, the vignette of emerging aggregator Noor. An additional example was expressed in emerging aggregator Matild’s upbringing. Matild is 44 years old, she is unmarried and has a child that does not live with her. She currently lives with her mother and her nephews, generating 39 euros a week from selling plastic. Matild explains:

“I grew up with my mother and my sisters, my father died, my grandfather helped my mother bring me up and my sister but they were not able to take us to school. So did not go to school.”

Although, Matild explained she can read and write her narrative highlights that she did not attend formal schooling as a result of the death of her father. Consequently, this indicates secondary consequences of reduced family structure. Nearly all of the waste pickers shared that they live with children, whether their own or family members. It is not within the ethical review to have included children in the study’s participant selection, however it is important to note how children support women in being able to undertake this livelihood. As such, family structure is a social network that can enhance women’s success which can therefore act as a constraint for typologies of waste pickers with higher patterns of widows and unmarried women.

5.3. Freedoms and personal choice in women who waste reclaiming

The study’s findings have explained the opportunities present for women and highlighted enabling factors to further advance. This section shall now seek to answer the research question on how agency is expressed in a women’s choice to waste reclaim.

5.3.1 Expression of choice

Analysis highlights different forms of freedom and personal choice expressed in a women’s decision and methodology to waste reclaim. Appendix G displays a matrix to further understand how choice, freedoms and agency interplay within waste picker typologies (refer to table 4). This is based on data collected on reasoning, location and frequency of sale and

collection, perceptions and ambitions. As highlighted in table 5 the participants reasoning for reclaiming plastic are categorized as economic, socio economic and social.

Table 5 . Summarised from the matrix in Appendix G, displays reasoning to start selling plastic by typology.

Typologies of waste pickers based on activity patterns					
		Collectors selling frequently	Collectors selling infrequently	Emerging Aggregators	Established aggregators
Reasoning	Economic	Lack of economic opportunities No other option	To increase household income Lack of economic opportunities	Need for a business to sustain livelihood To earn more money	Choosing a livelihood with higher income and reliability Married women seeking financial independence
	Socio – Economic	Unemployment Choosing not to steal Hunger	Constraints on main livelihood	Need for less active work Choosing not to steal	Left previous work to become an aggregator
	Social	Influence from others	Influence from others	Living separated from husband	Influence of others

Table 5 highlights that collectors selling frequently expressed low levels of choice by experiencing a lack of other economic opportunities, despite expressing intrinsic agency to provide for their families. This typology further described their work as *suffering*, unable or not knowing how to find an alternative income to sustain their livelihood. Additionally, Paula collecting at the Hulene Landfill expressed that her work is:

‘Not easy, we are sacrificing being a women and doing this job’.

As such, describing work as a *sacrifice* or a *suffer* highlights loss and struggle, thus indicating a lack of choice in undertaking such actions. In addition, Paula’s reference of *sacrifice* indicates that by undertaking this livelihood she may perceive to work outside the societal norm of a women’s livelihood. Among waste pickers, collectors and aggregators making a living out of reclaiming were often referred as individual choosing not to steal. This was expressed by Tito, a 40 year old, married man who has established operations as an aggregator. Tito explained why he started reclaiming four years ago:

“Poverty, I was not doing anything so I did not want to go to jail. If you do not do anything in this life you start to want other people’s things. You need to do something and I did not want to lose my family.”

This reference was further reiterated by Tom, an expert working in the sector:

“The choice came after.. people then see an opportunity to go into something, to avoid criminality... its something more in the desert of opportunity”

Choosing not to steal can be seen as an expression of agency however comparing waste reclaiming to living outside the law highlights a lack of freedom to choose otherwise. Additional socio - economic reasonings for collectors selling frequently included hunger, this is particularly poignant for this typology as discussion with experts and observations highlighted there are individuals not selling recyclable products but instead relying on eating waste to survive. Thus highlighting a community which may lack agency to undertake the opportunities available from reclaiming waste to generate income.

As highlighted in sections 5.1 collectors selling infrequently, are most likely to sell plastic as an additional source of income, thus expressing intrinsic and instrumental agency to increasing their household income and save. However, economic reasonings similarly suggest a lack of personal choice due to an inability to sustain their livelihood through one means. This was expressed by Benedita, a 55 year old married women who would normally sell at the market but was currently required to support her husband’s emerging business purchasing and selling plastic. Benedita explained:

“I sell soup in Mallanga but this as a business is not going well now because it is hot and people do not drink a lot of soup but this business will run well in winter.”

Despite highlighting the opportunities of this additional income, Benedita highlighted a lack of freedom to undertake the actions she would like to by further explaining:

“I like to cook.. I am not happy, there are things I am not being able to do because I do not have money. I do not know, only god knows.”

Similar constraints of freedom can be analysed from table 5 on social reasonings for emerging aggregators to reclaim waste based on health constraints. As such, this highlights a lack of choice to change despite expressing agency to increase their livelihood when faced with a lack of economic alternatives. Poignantly, the established aggregator typology, indicated the highest expression of personal choice in common economic reasonings to waste reclaim. Often this typology expressed the perception that waste reclaiming was more a reliable form of livelihood than their previous. Soares an established aggregator generating the equivalent of 120 euros a week selling plastic, shared his experience

“I used to do a job in construction, the amount I earnt from that job I used to buy plastic from others to sell. I saw this was a better way to make money..I sell and earn that money myself but when I earned from my previous job I did not always get paid, so this is better for me.”

Soares decision to leave another job highlights greater freedom of choice, in comparison to prior examples that seek alternatives. Married women in this typology also expressed personal choice when seeking financial independence from their husband living in the same household. As such, table 5 highlights how within agency there are different levels of personal choice, with the highest earning typology demonstrating greater freedom in their actions to waste reclaim.

5.3.2 Power dynamics

Having highlighted different expression of freedom, this section shall now discuss how findings on perceptions indicate visible and invisible power dynamics within the waste picker typologies.

Figure 22. A summary of key findings on perceptions by waste picker typologies divided by negative, neutral and positive themes.

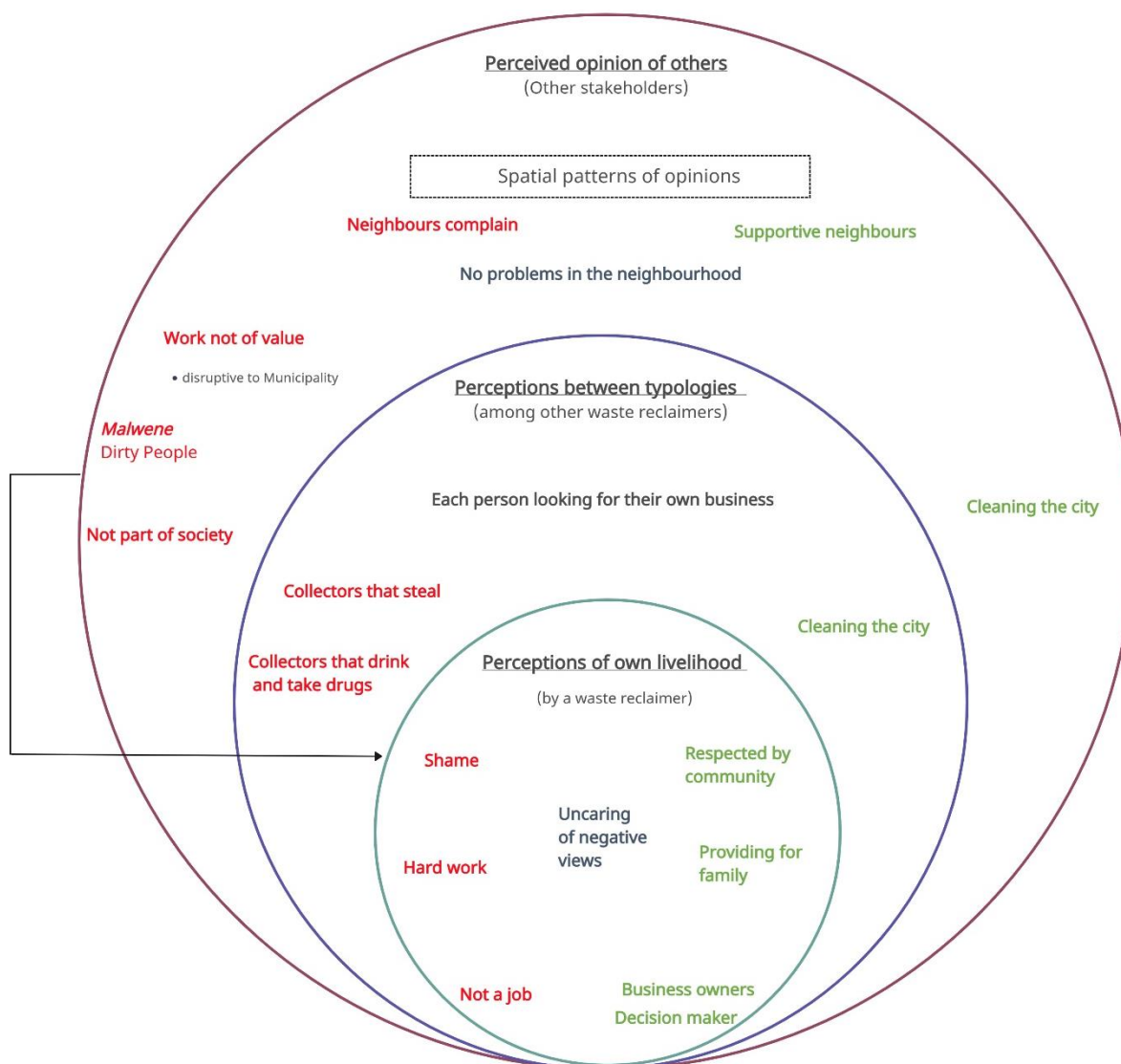


Figure 22 displays the perceptions waste pickers shared of their own livelihood, the opinions between waste picker typologies and how the perceived opinions from other stakeholders. Typologies that related negative perception of their own work, were most often collectors selling frequently at the Topack Factory and the Hulene Landfill site. Explained in greater detail in Annex H, feelings of shame were analysed from how participant's spoke about themselves. When seeking approval to take images for this study, many individuals expressed not wanting others to know they reclaimed waste. This was reiterated when speaking to Paula who explained how her others viewed her livelihood:

“They say why are you collecting these plastic bottles instead of looking for a job? It doesn't suit you to go and collect these plastic bottles... My neighbours, they do not know that I work here because they are too ignorant. One time a neighbour knew that I worked here then started to speak badly of me.”

Paula's experience further highlights the different perceptions on whether waste reclaiming is perceived as a livelihood. Additionally, being laughed and receiving verbal abuse was shared by multiple collectors. As such, collectors expressed feelings that their work was not accepted by society. In addition, Aleixo at Topack explained how others can call waste pickers as *malwene* (dialect word for dirty person). Interestingly, Tom working for NGO experienced similar perceptions when starting operations at the landfill site, explaining *“I came.. people like other NGOs, donors.. I swear you, donors laughed in my face”*. As such, the influence of the societal norms from the public, is an invisible power dynamic influencing the self esteem of collectors reclaiming waste, as represented in *figure 22*.

In contrast, aggregators were most likely to share positive opinions of their own livelihood, expressing respect as business owners. This was additionally highlighted in section 5.2.2 with the example of Marta sharing she was seen as a *saviour* in her community. Furthermore Alicia, an academic in the sector shared knowledge of waste pickers that *“study in South Africa to improve the recycling knowledge on toners and for printers”*. However, aggregators, when speaking about the collectors in their supply chain, they often labelled collectors to steal, drink and take drugs an example was explained by established aggregator Celia, who despite being called *Grandmother* by her collectors shared:

“I have to pay attention, some of them can steal things. I don't have a phone, because they steal things. They take drugs, they don't have a home and they live on the street.”

This was further reiterated by many aggregators referencing stealing as a work challenge. Marven, working at Topack, further highlighted the divide of typologies by referencing *‘There are two types of waste pickers’*. This divide, can as consequence be seen as a visible power

dynamic expressed by a collector's reliance on the aggregator to enable income generation, and in turn influence more positive perceptions towards aggregators.

Figure 22 highlights mixed perceptions from participant's neighbours. Participants working at the Landfill site expressed less problems from their neighbours, further explained by a Topack worker:

"I don't see a lot of constraints from this neighbourhood, they can see and understand the work they are doing, people from this neighbourhood depend on recycling."

These findings signal a spatial relationship with the landfill as a source of livelihood and the low income neighbourhood around it. For aggregator established closer to the Topack Factory, participants expressed mixed support for their neighbours. Such as Soares, an established aggregator who reiterated findings of collective agency from chapter 5.2.2 by explained:

"My neighbours go and collect and sell to me. I have no problems with them. It works well."

However, not all neighbours expressed positive reactions, Matild, aged 44 has been working as a small scale aggregator for 5 years still striving to establish her business, expressed constraint from her the municipality and her neighbours:

"It can be difficult, with the people from the municipality they said that what she is doing is not right...the people who I live with, they are jealous."

This was similarly expressed by emerging aggregator Tito, who claimed their neighbours complained about the rats out of jealousy. Perceptions of jealousy, may highlight a confliction between societal norms and an economic opportunity to generate a sustaining livelihood. As such, spatial patterns of support therefore highlight the potential for invisible power dynamics that can either be supportive and increase a sense of collective agency or constrain advancement by not expressing acceptance.

Positive perceptions that waste pickers were cleaning the city were mentioned by other stakeholder groups but was not a predominant discussion with waste pickers themselves. However, it was mentioned in respect for waste pickers working in wider range of locations, that they would not like to work in. An example was Fatima, who experiences difficulties with her eyes and sells the plastic waste collected from her family home. Fatima expressed that:

"I do not want to walk and collect plastic... I only collect at home when I drink something". When asked why she does not collect she explained "My children, doesn't accept for me to go around and collect..I do not want to walk and collect it either. Those who walk and collect are doing well because they are cleaning the city but I do not want to."

Fatima's quote highlights how her activity patterns may be influenced by cultural norms expressed from her family despite stating it is also her own choice to not collect around the city. Highlighted in section 5.1, findings discussed how women are less likely to collect from the city bins and in section 5.2.1 to work during the night. As such these examples indicate invisible power dynamics that can influence the decision making of women in waste reclaiming.

6. Discussion and conclusions

Key outcomes

This section discusses key outcomes from the study's findings chapters, to then contextualise with the theoretical framing of the study and later address key recommendations for the private recycling sector.

The accessible nature of waste reclaiming was highlighted as a key opportunity for women to generate income, evidenced by typologies of different activity patterns. The significance, was reiterated by findings of agency, when women experienced potentially constraining socio-economic circumstances. However, despite being an accessible opportunity to generate income, findings highlighted not all women had equal chances to advance into the highest earning tier of the waste picker typology. Analysing the enabling factors for success, women with stronger resources of social networks and education indicated greater access to capital; a key enabler to advance as an aggregator. In addition, this study found that women are using the informal working conditions of waste reclaiming, to further enhance flexibility and access to working hours. However, this was expressed with spatial inequalities, as waste pickers working at the landfill expressed greater constraints by the lack of regulations to mitigate increased environmental and health risks. Importantly, to contextualise findings of opportunities present for women within the wider socio-economic picture, chapter 5.3.1 discussed expression of choice and freedom within the actions taken by women. Most typologies expressed a lack of freedom of choice in undertaking waste reclaiming, with highest expression of personal choice expressed by established aggregators. Furthermore, societal norms, highlight that a women's choice in how to undertake a livelihood may be constrained by visible and invisible power dynamics. As such, findings theoretically framed by development as freedom of choice (Sen, 1999), indicate women working due to no alternative options cannot be seen as developed as those undertaking actions with choice, despite exerting agency to improve their living conditions.

6.1. Waste picker typologies and capability sets

There is limited academic literature that explains the significance of waste picker profiles on a women's ability to increase her livelihood and improve her living conditions. Research on waste pickers in South Africa (Pholoto and Chitaka, 2022a, 2022b) argue for a greater understanding the different categories of waste pickers, highlighting the range of personal factors and skills sets in a just transition within a circular economy. The development of waste picker typologies in this study were formed inductively through the collection process and later analysis. As highlighted throughout the findings chapters opportunities, challenges and outcomes are expressed differently within the different typologies. In reference to table 1, the different activity patterns of the typologies operationalised the concepts of *functionings* within waste reclaimers, as such typologies of waste pickers can used as an indication of an individuals capability sets. Table 4 provided an indication of capacity highlighting the frequency and quantities sold but without referencing results of expression of agency (chapter 5.2.2) and freedom of alternative choice (chapter 5.3.1) women's capabilities cannot be deeply assessed. The Capability Approach as a framework to prioritise freedom of choice over value sum of money (Sen, 1999; Nussbaum, 2000) has provided insightful findings for the research objective. By understanding the participants desires in how to undertake their livelihood and use their income in relation with their undertaken actions provides greater insight on the opportunities and constraints for an individual. For example, collectors who sells plastic frequently at the landfill site but desire an alternative livelihoods express greater constraints than a collector selling less frequently but has the ability to save money for something of value, most desired as property.

Findings discussed women to express a basic form of intrinsic agency by undertaking waste reclaiming. However typologies expressed different forms of agency in different ways. A key finding highlighted how women aggregators running buying points for recycled waste can exert the ability to increase their own livelihood at the same time as creating income opportunities for others. However, in order to establish such operations, a certain level of instrumental agency is required from access to capital, a key enabler to advance as highlighted in chapter 5.2.2. Therefore an ability to exert agency already influences an ability to achieve functions which when achieved, further increases the scope "to act and bring change" (Sen, 1999:19). This was additionally reflected in findings highlighting established aggregators, to have the highest higher patterns of married women. Marriage increases resources of social network and indirectly education, dependent on the husband's work experience. As such, married women have different resources to be able to access potential capital exert instrumental agency than widowed or separated women. This pattern between agency, access to opportunities and achieved outcomes relates to the conceptual framework

indicating agency as a positive feedback loop between capability sets and achieved functions. The influence of capital as a resource to exert agency and expand a livelihood is in line with the thinking of Kabeer (1999) resources to be the foundation in a women's ability to make their own choices.

Furthermore, the influence of intrinsic agency, operationalised as perceptions additionally explained the interaction of agency and capabilities to achieve outcomes. For women, that experienced lack of alternative choice by not being able to do the work they would like to, are therefore undertaking waste reclaiming based on requirement (Nussbaum, 2000). As such capability theorists (Nussbaum,2000. Sen,1999) would argue that expression of agency to generate a livelihood in the context of no alternatives do not hold the same worth as women who are undertaking actions closer aligned to life that hold value in. As such, although there are opportunities for women to exert agency to increase their family's livelihood through ownership of a business in the IRS, there are still many women who due to socio-economic circumstances would not have the capability sets to follow such paths to success. As highlighted prior, chapter 5.3 is important to contextualise the hardship of waste reclaiming as a livelihood.

6.2. Recommendations for the private recycling sector

This study has provided novel research to Topack, to provide the first qualitative study focused on waste pickers within their supply chain, building upon wider studies in Maputo (Mertanen et al. 2013. Buque & Ribeiro,2015. Allen & Elisio, 2011). As introduced, waste pickers are relied upon to source the supply chain for the private relying sector. Through the internship undertaken alongside this study, I was able to share early findings with Topack to suggest recommendations founded by the experience of the waste pickers in their supply chain. This was delivered in an interactive workshop providing Topack an opportunity to express their opinion on the feasibility of implementing recommendations (refer to Annex J). Annex K references the circle of influence (Covey, 1989) which structured the discussion, enabling the differentiation of recommendations with Topack's control or within Topack's influence to change.

Figure 23. Image from the workshop, proposing recommendation to partner organization.



Topack are an example of private sector stakeholders indicating a will to enhance socio-economic benefits to their suppliers through policy changes within their business remit. The company has an understanding of the low-economic backgrounds of their suppliers and the increased risks exposed to from the informal nature of their work. Topack expresses a willingness to support but are limited as a business to the range of activities that can be implemented. As such a selection of recommendation on access were confirmed within Topack's control to change internally:

1. Mitigate socio-economic constrains from access to distance by expanding the geographical remit of buying points. This can be achieved by enabling aggregators to sell at Topack's site the neighbouring city and by collaborating with established aggregators out Topack's current geographic scope, increasing supply chain of both stakeholders.
2. Mitigate constraints on working times caused by time impact from long queueing periods, by implementing a shift based system and operationalize twice the number of resources for processing sales.

3. Enhance access to support capital for aspiring and emerging aggregators with unstable finances, by establishing a shop with an instalment based program.

Recommendations to enhance resources and additional points on access were highlighted by Topack to be outside of their business remit. Despite this, no recommendation was disregarded by Topack in the ranking stage but stated instead to be in their influence to change through partnership:

4. Further mitigate constraints by distance through partnerships to enable greater access for suppliers investment in transport. This can be achieved by mentoring and funding local business renting txovas (carts) and trucks to mitigate transportation costs and distance for their suppliers.
5. Enhance access to working times for women seek partnership with local NGOs to conduct research to consider a form of childcare supports for women waste pickers.
6. Partner with an NGOs to provide additional services during waiting periods to further support waste pickers with educational resources and mitigate time impact. Through partnership Topack can provide numeric and literacy classes to enhance the skills required to advance to an aggregator. In additionally provide health education to support the well being on women waste pickers.
7. Partner to implement a training package tailored to the informal waste management sector to train selected aggregators to receive essential business skills and mentoring to enhance resources of education and social networks to improve financial stability.

Recommendations shall be followed up to Topack through a communication product, listing the key findings to provide context for actionable recommendations and potential partnerships.

6.3. Limitations

This section will discuss methodological limitations of the study design. Consideration on ethical access to participants resulted in potential limitation to this study's findings on agency. The study population primarily included individuals selling plastic, thus already demonstrating some level of agency in an ability to waste reclaim. Hearing experiences of those unable to waste reclaim may have enriched the findings. Additionally, access to the study population at the Hulene landfill site was more challenging due to enforced social hierarchies limiting as discussed in the methodology. This restricted independence resulted in a reliance on gate keepers being available and less participants being interviewed at this study site. These challenges were mitigated by interviewing other stakeholder groups which provided wider contextual understanding. This study's remit focused on women, which hold potential limitation on representational discussion however a range of male stakeholders were also included to mitigate this limitation. In addition, the study lacked representation from children to understand

their role from their own experience, this was outside the ethical review but was mitigated through observations and discussion on family structure.

6.4. Conclusion

In summary this study has contributed research to the global challenge to socio-environmental challenges of waste management by bringing to light challenges and opportunities experienced by waste pickers in Maputo. With initiatives to manage waste in alternative ways, there is a need to further understand the livelihoods of people relying on the informal waste management sector. Responding to a research gap, this study provided private plastic company Topack with a greater understanding on the suppliers within the recycled plastic supply chain. Throughout the study the use of typologies were used to contextualise findings then later discussed as a indicator to assess capability sets in the context of answering the study's research objective.

Key findings highlighted that waste reclaiming in Maputo, in line with global trends of informal working has a greater proportion of women workers. In this context, accessibility was key opportunity for women to generate income despite socio-constraining factors such as marital status or health constraints. As such, typologies expressed patterns of demographic features which although highlighted opportunities for different personal circumstances but indicated not all women are able to take the same pathways to advance their livelihood. The study explored this further by looking deeper at what can enable and constrain advancement for women wanting to access or develop as an aggregator typology. As discussed, the theoretical framing of this study placed importance on the availability of resources to enhance a women's ability to exert agency to create change for themselves and their family. Chapters on increased agency reiterate the success of women aggregators to exert their capability to own a business, make decisions and alleviate their social standing in their family and community. Such examples, are particularly poignant within the study population of Maputo, where there are less economic opportunities. However in understanding the enabling factors to support this success, findings bring to light women with reduced resources of education and social networks are disadvantaged in their access to opportunities to set up as an aggregator. This is reflected in typologies of emerging aggregators and infrequent collectors that expressed higher patterns of widowed and separated women.

However, it is complex to understand the opportunities and constraints experienced by women based on achieved outcomes of quantity and frequency of plastic sold. Therefore understanding the typologies through the expression of choice, aligns with the Capability Approach that actions through choice hold greater value than actions through necessity (Nussbaum, 2000). As such, although findings highlighted opportunities for increased agency

in collectors to provide for their family, for those undertaking actions due to lack of alternative options, this value is decreased. Additionally findings highlighted how invisible power dynamics can further constrain women through invisible power dynamics. Most poignantly women collectors expressed lack of access to certain areas as a choice but deeper analysis indicates constraint based on societal norms. Furthermore, although there is a growing understanding on the opportunities of reclaiming waste, the influence of positive perceptions were expressed higher from aggregators. As such, collectors expressed decreased intrinsic agency, influenced by societal perceptions of their work but expressed further constraint in being unable to change their work as a consequence of low self esteem. The final chapter is poignant to contextualise the opportunities with the wider understanding and to not disregard the struggle experienced by certain individuals in undertaking their livelihood.

The recommendations in this report, highlights suggestions for Topack and the private recycling sector more broadly to adapt to further enhance the opportunities for women to economically advance as suppliers. This is particularly relevant in Mozambique due to the private sector's reliance on the IRS to source the plastic required for recycling. Furthermore, findings highlighted that group working and associations are not the preferred working method for waste pickers in Mozambique, as such highlighting greater need for the engagement of the private sector. As highlighted, Topack demonstrated a social commitment to support the suppliers in their supply chain but due to the nature of the private sector are restricted in what is perceived in their control to implement. As such further research is required to look at how partnerships between private sector and other stakeholders can mitigate constraints from power dynamics that interplay and decrease the self esteem for women with less capabilities.

7. Annexes

Annex A - Guide to observation

Key themes to observe:

- Arrival of suppliers
 - How the individual and the plastic arrives (together/separately, transport/by hand)
 - Social interactions in the queue
 - Impact of time and weather (shade/sun)
 - Physical appearances and age dynamics
 - Peak and low times
- Weighing of plastic
 - How the plastic gets moved from the queue
 - Social interactions of suppliers with staff and other suppliers
 - Engagement with the purchasing process (reading the scales, taking notes)
 - Physical appearances and age dynamics
- Payment
 - Social interactions
 - Engagement and expressions
 - Physical appearances and age dynamics
- Transportation (Travelling with Topack vehicles)
 - Social interaction with drivers and suppliers
 - Distance travelled and quantity of stops
 - Activity patterns and quantity of suppliers
 - Physical appearances and age dynamics

Annex B – Interview guides

Interview guide – Waste pickers (collectors)

Personal

1. How old are you? (If they don't know – what age range? 18 -35 (youth) 35 + (adult)
2. How would you describe your education level? (reading, writing and counting skill)
3. Where were you born?
 - a. When did you move to Maputo? Why?
4. Can you describe your household? / What is your living situation?
 - a. Who do you live with? What age range?
 - b. Are you married or living a marital life?

Livelihood

5. Can you explain your livelihoods?
 - a. What are the ways you make money? What percentages?
 - b. Do you sell other materials?
6. How often do you sell Plastic?
 - a. On average how much kg per sale?
 - b. Where else do you sell plastic?
7. Why did you start?
 - a. How long have you been selling?
8. How do you use the money you make from selling plastic?
 - a. Are you saving money for something?
9. Do you want to continue making money in this way?

Plastic flow and map exercise

1. Who?

- (myself) – did you get help?
- (others) – how do you know the collectors?

Where?

- How do you get there? How far?
- What other materials were collected?
- How often do you do this?

Sorting

- Where were the materials sorted?
- Where were the materials stored? (Who owns this area?)

Transport?

- How did you bring the plastic? Who was responsible? Who helped?
- How far from storage/home?
- What type of net/bag (who owns/buys this?)

Timings?

2. Can you explain the time of day for these activities? (*Mark on paper*)
3. What are the best times to collect plastic?

Look at the flow diagram:

- **What is difficult for you?** (How does it impact your actions?)
- **What works well?** (can it be better?)
- **What would you change?**
- **Do you want to collect more plastic** than your average? **How** would this be possible?

Decision making (refer to visuals to support, change questions based on context)

1. When is the best time to collect plastic?
 - Why can you/ cannot work at these times?
2. What areas are the best for collecting plastic?
 - Why can you/ cannot go there?
3. Who decides where to sell the plastic?
 - What is the decision process?
 - Are you comfortable with this process?
 - What is important when you sell plastic?

Group dynamics (refer to visuals to support)

4. Why do you work with others/work alone?
 - What are the benefits?
 - How do you help each other succeed?
5. How can this be better?

Perceptions (refer to visuals to support)

6. How do you think others view the work of collecting plastic?
7. How does this make you feel?
8. Does this change the way you work?

Closing questions

9. Do you have anything you would like to add to this topic?

Interview guide - Waste pickers (Aggregator)

Personal

1. How old are you? (If they don't know – what age range? 18 -35 (youth) 35 + (adult)
2. How would you describe your education level? (reading, writing and counting skill)
3. Where were you born?
 - a. When did you move to Maputo? Why?
4. Can you describe your household? / What is your living situation?
 - a. Who do you live with? What age range?
 - b. Are you married or living a marital life?

Life story

1. Can you share something about yourself?
2. I am interested to know about your life story, can you describe a time when you experienced a lot of difficulties?
3. Can you describe a happier moment or time in your life?
4. Did you experience a moment which caused a big change in your life?

Livelihood

1. Can you explain your livelihood?
 - a. What are the ways you make money? What percentages?
 - b. Do you sell other materials?
2. How often do you sell Plastic?

- a. On average how much kg per sale?
- b. Where else do you sell plastic?
- c. How long have you been selling?
- 3. Why did you start your business?
 - a. How long have has it been operational?
- 4. How do you use the money you make from selling plastic?
 - a. Are you saving money for something?
- 5. Do you have an example of a job you would prefer to do if you had the choice to change?

Supply chain

- 1. Can you describe the operation of your business?
 - a. Who collects the plastic? Where?
 - b. Who sells the plastic to you? How many people?
 - c. Explain the storage
 - d. Explain the transport and distance
 - e. Timings of purchase?

Ownership and decision making

- 1. Explain who owns this business?
- 2. Explain the roles in the business
 - o Are you happy with this?
 - o What would you change?
- 3. How are decisions in the business made?
- 4. What capital/ equipment do you own for the business?
- 5. What would you like to change?
- 6. What do you find important from the byer when you sell your plastic?

Access

- 1. How is the company different to when you first started working?
- 2. Explain what helped the company grow?
- 3. Explain the opportunities that helped the business?
- 4. Explain what challenges you experience?
- 5. How can you progress further?

Market knowledge

- 1. Explain your business experience?
- 2. Do have have an example of a lesson or advice you were given to support you?
- 3. Explain what knowledge you need to help you improve the business?

Perceptions

- 1. How do you view the people who sell to you?
- 2. How do others view your work?
- 3. How does this impact your work?

Annex C – informed consent

INFORMED CONSENT FORM

Agreement to participate in Topack supply chain study and MSc. Thesis research project

Title:

Exploring the capabilities of waste pickers in the recycled plastic supply chain in Maputo, Mozambique.

Purpose of the Study

I am doing a study on waste pickers selling plastic. I want to gather data to understand the opportunities and challenges experienced when collecting and selling plastic in Maputo.

Procedures

As a participant in this study, you will be asked to be interviewed (individual/group). The information you provide will help me understand the different types of sellers and advise Topack on how they can improve their services. The study will take approximately 20 - 30 minutes to complete.

Risks, discomforts and Benefits

There are no known risks or discomforts associated with participating in this study. The benefits of participating in this study is to help Topack better understand the work plastic suppliers.

Confidentiality

Your name will not be included or connected to the information shared. All data will be anonymous, to prevent impact to you or your work.

Participation and Withdrawal

Your participation in this study is completely voluntary. You may choose not to participate or stop at any time.

I can confirm that (please tick box):

- I have read and understand the information sheet and consent form of this research project.
- I agree that my participation in this research project is voluntary.
- I understand I am allowed to take information back until the study has ended, I can decline to answer questions
- I understand I will not be paid or receive gifts for my participation.
- I understand that the data collected for this study will be kept confidential and secure.
- I understand that the information collected for this study will be used only for research purposes only, for the Topack supply chain study and for the MSc thesis.

- I consent to my interview/focus group discussion being audio-recorded and understand I have the right to ask for the audio-recorder to be turned off at any time.
- I understand that my name will not be used on any documents, presentations or other output of the research.

- [A pseudonym of my own choosing can be used in this research: _____]

“I agree to participate in this individual research project and acknowledge receipt of a copy of this consent form and the research project information sheet.”

Signature of participant: _____

Date: _____

“I agree to abide by the conditions set out in the information sheet and I ensure to minimize harm done to any participant during this research.”

Signature of researcher: _____ Date: _____

Please fill in the following information. It will only be used if you want to be sent a copy of interview notes and/or transcripts [so that you have the opportunity to make corrections; if relevant].

Address: _____

Email: _____

Annex D - Ethical review form

1. Access to participants / online participant recruitment/ access to data

The participants involved in this study will be waste reclaimers of plastic in Maputo.

Access to participants will be conducted through the support of the partner organisation to this study, Topack. Topack is a purchaser of recycled plastic. Participants will be observed and interviewed at locations where waste reclaimers sell plastic to Topack, as such there will be contacts from the organisation able to act as a gate keeper to be able to interview the participants but will not be involved in the interviewing process.

The study has a focus on gendered issues for women, this study will interview both men and women to further understand this. Adult women and men will be selected as participants. It is understood that underaged individuals may be involved in collecting plastic waste, it is not in the scope of this study to research children and not within the ethical approval of this study. Therefore, the researcher will take measures to ensure that the participants are over the 18, the United Nation's definition of an adult (UNICEF, n.d).

Topack, as the partnered organisation intend to share supporting material when in country. A non-disclosure form will be signed between the research and the partner organisation to allow access.

2. Informed consent/ consent to use data.

Informed consent will be gained before undertaking an interview. The participant will be read the research aims, then asked for consent to take part and permission to record the interview. It is expected that the target group, waste reclaimers, may have a low literacy level and therefore to ensure understanding consent will be asked verbally. The request and confirmation will be recorded. If the participant does not understand, the wording will be changed to ensure clear understanding before accepting the consent.

Photos will be required as part of the outputs of this study. Informed consent will be gained before taking a photo. Photos will only be taken relevant to the research remit of this study of overaged women and men. The participant will be explained clearly how the photo will be intended to be used.

3. Potential risk to participants/ stakeholders, including data protection and confidentiality

As stated in the interview guide (Annex B) data the participant will be informed that the data will be anonymous and not shared further than the remit of the research. The recordings will be deleted once the transcripts have been made. The researcher will take extra caution to ensure that specific details cannot be traced back to that individual to cause harm.

The participants may feel concerned that questions answered in the interview may impact their ability to sell plastic. The researcher will make clear that they do not work for Topack, information later shared within the remit of the study will be shared anonymously, with extra care taken to make sure no details can be traced back to an individual. This is to minimise risk and safeguard the individual.

4. Plan for sharing of findings

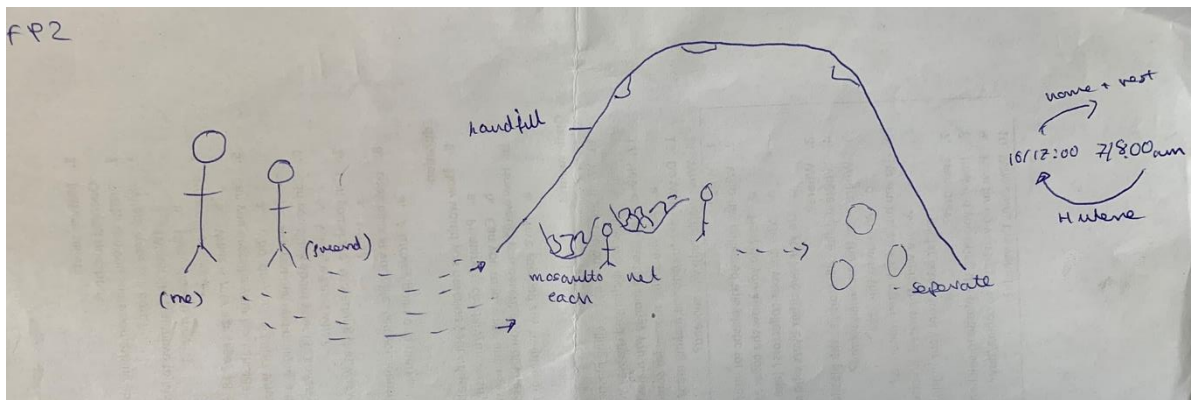
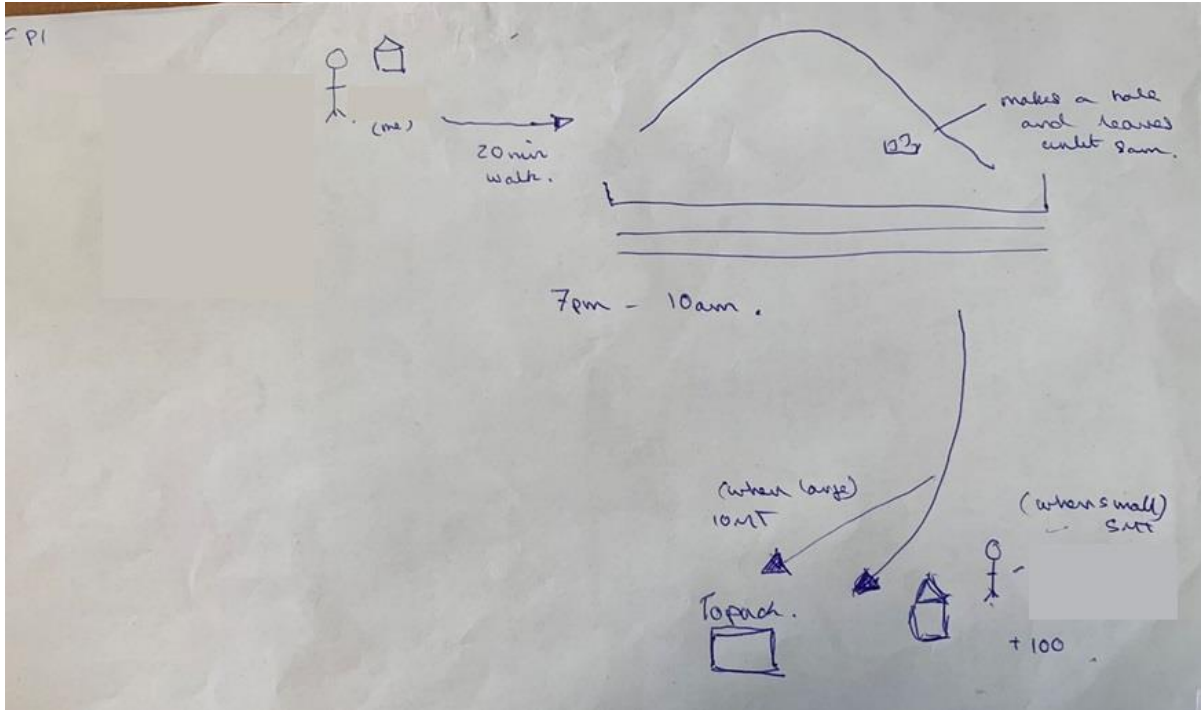
When the research findings have been collated and analysed according to the stated confidentiality measures, deliverables as defined in the internship agreement will be shared with Topack. This includes a power point slide pack on recommendations, to improve the capabilities of waste reclaimers within their supply chain and an arc story board to share the perspectives of waste reclaimers.

5. Conflict of interest

This research will be conducted in support of Topack, who are a key purchaser of the reclaimed plastic sold in Maputo. The organisation seeks to understand the barriers and opportunities present to waste reclaimers to be able to enhance their capabilities. They have interests to increase the social impacts of using recycled impacts in their supply chain as well as strengthening their own supply chain.

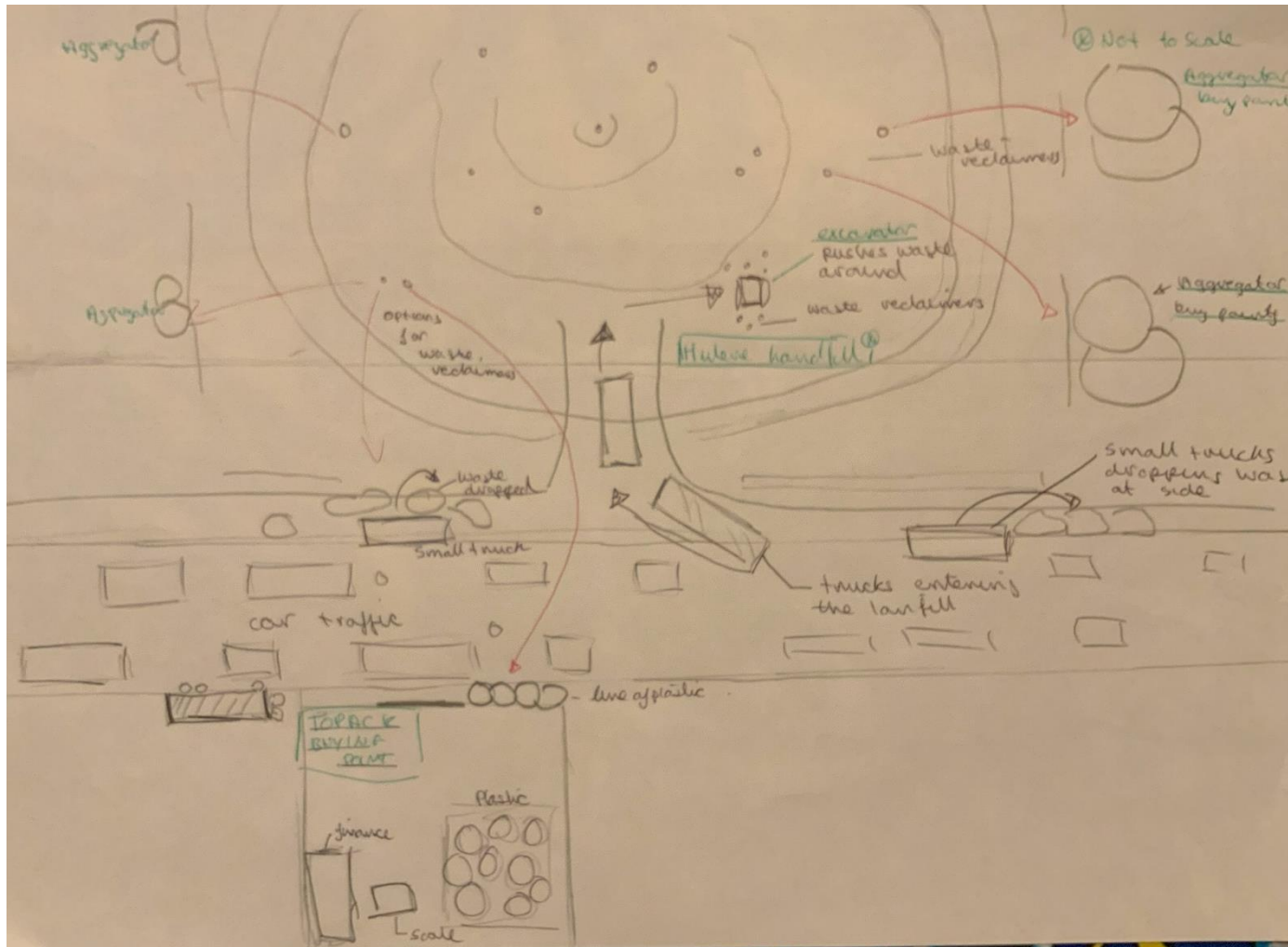
This therefore poses a limitation to the subjectivity of the researcher, who may be seen linked to the organisation. It will be made clear in the interview introduction that the researcher is not employed by the organisation. The researcher will conduct interviews without the presence of Topack staff and use a translator that does not work for Topack. The aims of the research will be stated, and it will be transparently stated that the research will be shared with Topack anonymously.

Annex D – Activity maps, sample of additional maps

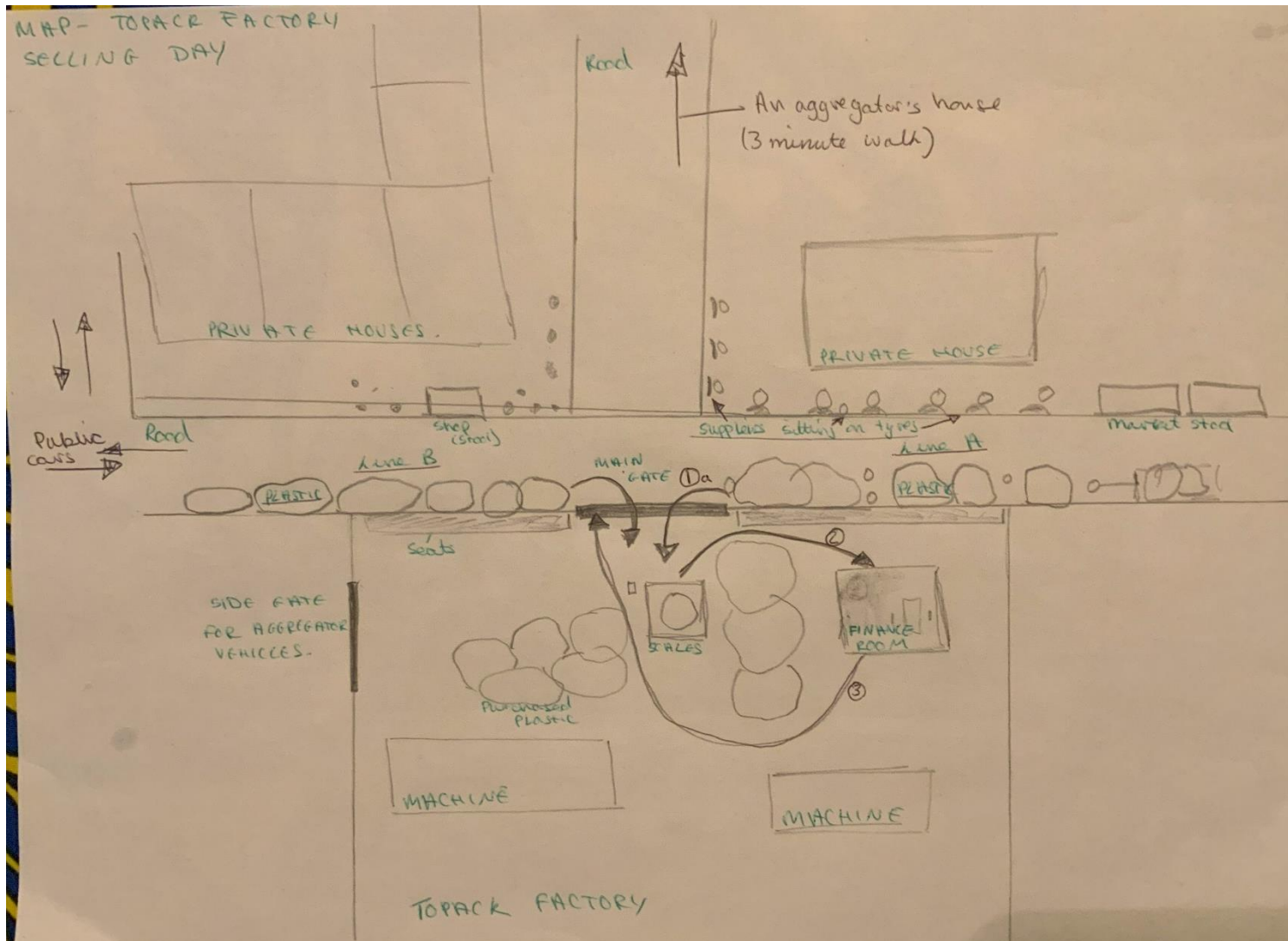


Annex E – Study site maps

Hulene Landfill study site



Topack factory study site



Annex E – Coding book

	Sub theme grouping	Group code	Code	
(Family code 1)	Income opportunities			
(Sub theme 1.1)	Accessibility	Family run business	Family run business	
		Flexibility	Daily activity patterns	Collecting alongside other livelihood
				Collects additional waste material
				Collects additional waste material
			Secondary livelihood	
	Health constraints		Working alongside household commitments	
			Ill	
		Disabilities		
		ADHD		
	Low education levels		Low education levels	
(Sub theme 1.2)	Group work	Working dynamics	Helping but separate rather work individually	
		Social dynamics	Between sellers	children helping
			groups of women sellers	
			men supporting queue priority	
(Sub theme 1.3)	Previous job		Previous job	cleaner
				construction
				fisherman
				Government
				market
				Security
				selling clothes worked in a store
(Sub theme 1.4)	Primary livelihood of supplier		Alternatie	Construction
				Guard
				Sell at the market

			Recycled waste	buy and sell plastic
				collect metal and plastic
				recycling waste
				this business, plastic
				this job, plastic
(Sub theme 1.5)	Reliability of private sector markets			Always have the money
				Rely on waste pickers to source
(Family code 2)	Challenges and opportunities to advance as a supplier			
(Sub theme 2.1)	Access	Capital		Carrying materials
				Equipment
				Buying a scale
				Financial instability
				House ownership
				Start up capital
				store bottles in the house
		Distance		Distance travelled to sell
				Moved for work
		Transport		Transport choice
				Gendered transport choices
				Transport costs
		Working hours		Gendered times
				Working time
				Heat of the sun
				Night work
				Selective selling days
				Queue waiting times
		Information		Information access
(Sub theme 2.2)	Resources	Education	Business knowledge	Save profits
				Book keeping
				Financial skills
				Need to improve business management skills

			Previous business experience	Previous business experience
				No business support
			Business advice given	
		Literacy	Illiterate	
			Numeric levels	
		Plastic	Competition	Competition between suppliers
				Customer loyalty patterns
			Plastic availability	Plastic consumption patterns
		Social Networks	Family networks	Family loss
				Family support
Family business				
Finance from family				
Household make up				
Friendship support				
		Working community		
(Sub theme 2.3)	Storage and sorting challenges			Sorting and storing
				Stealing
(Sub theme 2.4)	Working conditions	Economic impacts		always paid for the work
				irregular income
				not paying taxes
				Price change
		Health impacts		Accident risk
				Dusty
				Flies
				Smoke and fires
		Lack of support regulations		Weather
				Working time
(Sub theme 2.5)	NGO stakeholders	Opportunities		NGO start up
				NGO created the market
				purchasing equipment
				Service creation
				support the private sector

			Associations	Project management of waste connection between people and institutions				
		Challenges		laughed at private sector not taking responsibility				
(Family code 3)	Agency in choice							
(Sub theme 3.1)	Expression of choice	Decision process		Actions of value Choice in where to collect Choice of where to sell Choice to continue				
			Reason to start	Economic	do not have another thing lack of other economic opportunities saw this job was better To earn more money unemployment			
					Social	Feed addiction Husband left influence of others		
						Socio - economic	Choosing not to steal Values Hunger left previous work Hard to sell COVID 19	
		Health reasons					Cannot do other work Ill No energy	
					(Sub theme 3.2)		Lack of freedom	Desires and hopes
				Restricted by the work				
		(Sub theme 3.3)		Expressed agency	Collective agency		Group saving	
						Job creation	Secondary jobs	

				Food markets		
				Role in community		
			Role in the family business	children helping		
				men collecting		
				men transporting		
		women speaking to buyers				
			Support network			
		Instrumental agency		Decision making		
				Improve lifestyle		
		Ownership		Business owner		
			Control of decisions			
			Opportunity to buy land			
			Prior land ownership			
	Skill development		Sending children to school			
			Buying from others			
			Financial management			
			Investment			
	Intrinsic agency		Ability to increase family income			
			Ability to increase family income			
			Ability to save			
		Financial independence		Own income		
				Husband without job		
				Helping others		
			Self esteem		Impacts to work	
					Encouragement	
				Feel well		
				No problem		
			Considered not work			
		(Sub theme 3.4)	Perceptions	Negative attitudes	Perceptions of collectors	Collectors as thieves
						Collectors taking drugs
Collectors as drunks						
	Self perception			Hardship		

			Shame	Laughed at
				Not clean
				Neighbours complain
				Not accepted by society
			Stakeholders	municipality is a challenge
		Neutral perceptions		
		Positive	View of community's perception	encouragement
				Neighbourhood supportive
	Respect			
	Of other pickers	People doing business		
	Of self	Provide for family		
(Sub theme 3.5)	Power dynamics	Between staff and supplier		Familiarity
				Helpful interactions
				Joking
				Staff not happy
		social hierarchies		Leader controlling the landfill
			Negative perception toward frequent collectors	
		Positionality of researcher		Positionality of researcher
		Between sellers		negative perception toward frequent collectors
		Two types of sellers		
		Visual signs of economic improvement		
(Family code 4)	Process of waste management			
	Waste management process			Municipality's role
		Privat sector contractors		Collection process
				Commercial waste
				Domestic waste
			Suburban	
	Recycling process		Paid waste segregation	

				private sector recycling
				Waste dumping
			Hulene Landfill	Planned closure of the dumpsite
				People working at the dumpsite
(Family code 5)	State of a person			
		Age	Adult	35 - 60
			Elderly	60+
			Youth	18 - 35
		Appearance		Dirty clothes
				Smart phone
				Sweating
			Body language	Confident
				Shy
				Smiling at sale Unhappy with sale
		Gender	Man	
			Women	Women with baby
			Gender roles in community	
		Marital status		Married
Single				
Single parent				
Widowed				
		Not born in Maputo		
Family code 6	Supply chain activity			
		Frequency		Frequency of collection
				Frequency of sale
				Length of time
		Location of collecting	Landfill	City bins
				Site conditions
				Working dynamics Neighbourhoods that collect

				Steet waste
		Location of sale	Aggregators buypoint	
			Hulene Landfill Selling Point	
			Topack factory	Non selling days
				Process on selling days
		Quantity		Quantity
		Sorting activities		Sorting activities
		Storage		Storage
		Typologies	Aggregator	Emerging
				Established
			Collector	Child collectors
				Collect for own supply
				Collector selling infrequently
				Collectors selling frequently

Annex G – Matrix on element of choice

Martrix to understand the element of choice

Key:

Indicators of personal choice = dark green

Indicators of lack of freedom = red

Increased agency = light green

Decreased agency = pink

Typologies of waste pickers based on activity patterns				
	Collectors selling frequently	Collectors selling infrequently	Emerging Aggregators	Established aggregators
Reason to start (agency in choice code)	<p>Summary: expression of agency but lack of personal choice that expresses decreased agency to make change</p> <p>Economic:</p>	<p>Summary: expression of agency to supplement household income, but lack of ability to sustain livelihood through alternative wants.</p> <p>Economic: Need to increase household income.</p>	<p>Summary: expression of agency as a result of lack of freedom, decreasing expression of choice</p> <p>Economic</p>	<p>Summary: greater expression of personal choice. Lack of freedom in restriction faced from previous job.</p> <p>Economic</p> <p>Choosing a new livelihood based on perception of higher income opportunities and reliability (to earn more money)</p>

	<p>Lack of economic opportunities and money to provide for family</p> <p>“I would want to change everything, that can be changed. I would like to do cleaning work, I can't find this work.”</p> <p>I do not have another idea or way of doing a job in order to sustain my daughter.</p> <p>“Working here (Hulene Landfill site) is suffering but I do not have another job.”</p> <p>Socio economic</p> <p>Unemployment</p> <ul style="list-style-type: none"> • Health • No jobs <p>Choosing not to steal</p> <p>“did not want to go to jail... don't want or desire things from other people “</p> <p>“People who had just come out of jail, this can give them a different job to sell plastic”. (aggregator)</p>	<p>Do not have another thing</p> <p>‘My husband is dead, I am collecting bottles to help myself and my family’ and ‘I am the one working but I have a lot of children (widow)</p> <p>Socio economic</p> <p>Constraints on main livelihood</p> <ul style="list-style-type: none"> • Covid 19 <p>Social</p> <p>Influence of others</p>	<p>Require a business to sustain household livelihood.</p> <p>Mothers living separated to father of children or with husbands that cannot work</p> <p>To earn more money</p> <p>Socio economic</p> <p>Women requiring less active work due to health constraints and having less energy</p> <p>“I didn't go back to the market, I do not have the energy to do a lot of things so sometimes I collect but I buy from others’</p> <p>‘I used to work as a cleaning worker I cannot</p>	<p>‘I saw this was a better way to make money... from my previous job he does not always get paid, so this is better for me. (man, previously working in construction)</p> <p>Married women seeking financial independence from husband, living in same household</p> <p>‘I do not depend on anyone, what I want I do without asking my husband’</p> <p>Socio economic</p> <p>Left previous work:</p> <ul style="list-style-type: none"> • Covid 19 • Municipality paid jobs less reliable
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	<p>“They could have become criminals. No problem. But no, they have values (NGO)</p> <p>Hunger</p> <p>To earn money so “we need to struggle so we won’t die hungry”</p> <p>Waste reclaiming not earn money but to eat “in the beginning, when I came to the dump, people were looking for food.</p> <p>Social</p> <p>Influence of friends</p> <p>Opinion:</p> <p>‘They have faced difficult situations but no one chooses this job as a first option... For men, they may lose their job..or maybe they have a wife doing this and they don’t have any other option.’ (Topack worker)</p>		<p>do the work that I used to, Now I do not have the energy’ (0503P2)</p> <p>I am suffering, I don’t have a job, I don’t have anything. (unmarried with child)</p> <p>Social</p> <p>Husband left</p> <p>“because my husband left me with two children and I needed to do something to earn money and look after my children.”</p> <p>Women may have been married, they have been left with children and they need to earn money</p>	<p>Social</p> <p>Influence of others</p>
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	<p>“It's something more in the desert of opportunity” (excpert interview)</p> <p>Hunger (Toapck workders)</p>			
<p>Choice of where to sell (agency in choice code) (supply chain – family code)</p>	<p>Time vs cost analysis</p> <p>Agency in collectors choice of aggregator</p> <p>‘They don’t do other types of work but they sell less to us, there is a new person. They can trick that person because they don’t know the business.’</p> <p>Distance</p>	<p>Distance</p> <p>Price</p>	<p>Distance</p> <p>Prince</p>	<p>Distance</p> <p>Price</p>
<p>Choice of where to collect (agency in choice code) (supply chain – family code)</p>	<p>Around the city and roads</p> <p>In the bins</p> <p>‘All places in the city, in the bins’</p> <p>Observation diary - Two men empty the large street bins they take food out of the bin.</p> <p>Landfill</p>	<p>Market</p> <p>Households</p> <p>‘I do not want to walk and collect it either. Those who walk and collect are doing well because they are cleaning the city but I do not want to.’</p> <p>Not the bins -</p>		

	So.. the waste pickers that were going to the landfill were going for food.	'do not like it, it doesn't smell well. I prefer to collect it from other places.'		
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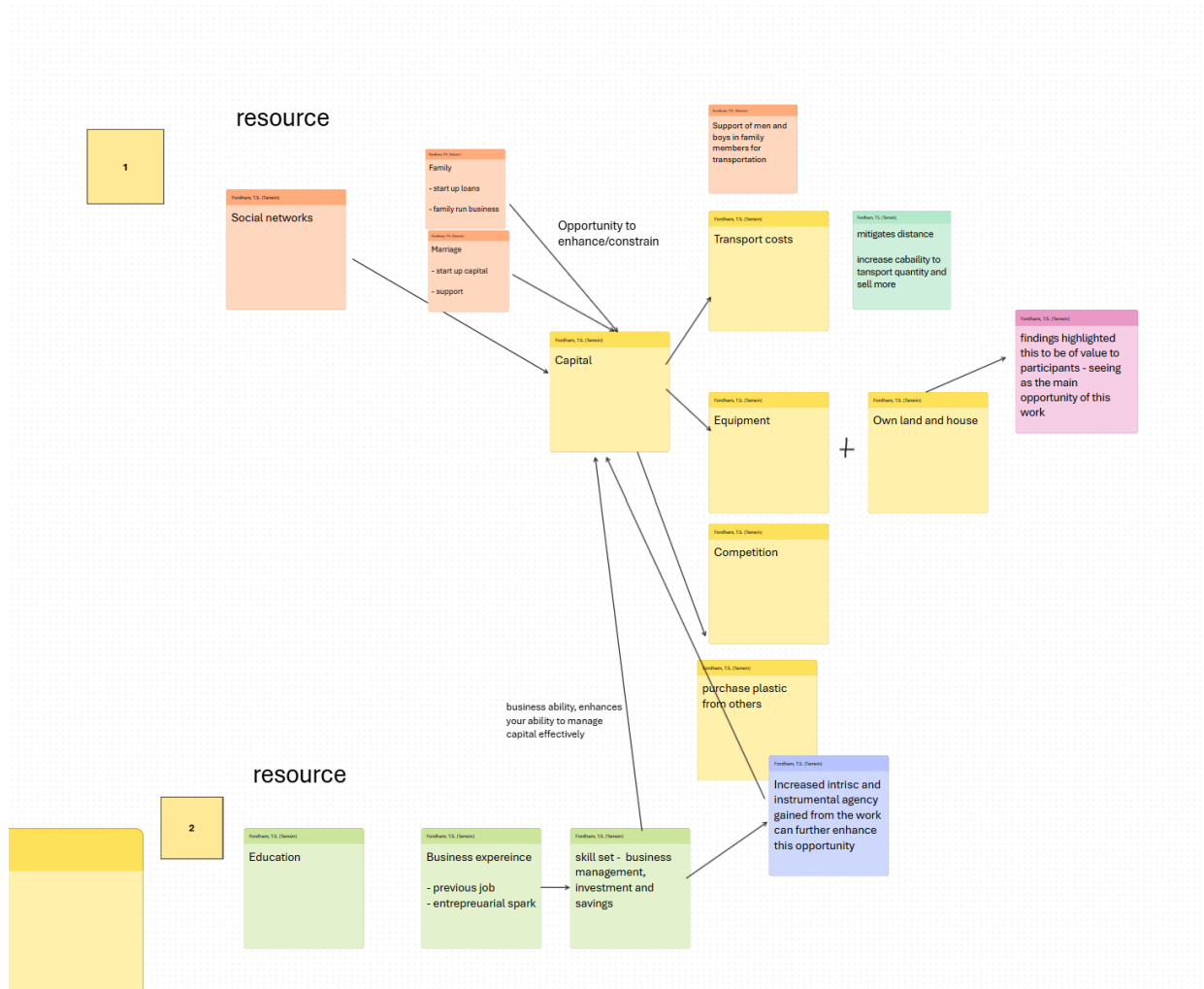
Annex H – Analysis on perceptions

Perceptions				
	Personal		Others	
	Of self	Of work	Within typologies	From other stakeholders
<p>Negative (perception – negative attitudes) (Self esteem) (Power dynamics – spcial heierachies</p>	<p>Shame:</p> <p><i>I do not want others to see this and say this old man sells plastic</i></p> <p>“they say why are you collecting these plastic bottles instead of looking for a job? It doesn’t suit you to go and collect these plastic bottles. I say you do not know, you think this is waste so you don’t know why I am collect, what I am collecting the plastic bottles for.”</p> <p>- Laughed at:</p>	<p>Hardship</p> <p>a) suffering</p> <p>b) hard job</p> <p>c) sacrifice</p> <p>“I have no good things”</p> <p>“we are sacrificing, being a women and doing this job.”</p> <p>Challenged by muciplality as an aggregator</p>	<p>Negative perception of street and landfill collectors:</p> <p>Collectors steal (experienced by aggregators)</p> <ul style="list-style-type: none"> Collectors take drugs <p>They take drugs, they don’t have a home and they live on the street</p> <p>My children, doesn’t accept for me to go around and collect</p>	<ul style="list-style-type: none"> Not accepted by society <p>-a) Neighbours complain work is not clean (rats, durirt) and produces waste</p> <p>‘They think they are <i>malwene (dirty person)</i>’</p> <p>b) Drunks</p> <p>“I think the municipality as a responsibility of the waste management in Maputo and legally so they should be, they have to be the ones to decide on how to reintegrate the reintegrate these people because you have all different kinds of people we have like people that are just drunk and just looking for some food for that day and they're just leaving on the outskirts of society completely.”</p>

	<p>people laugh at us, they think we are crazy but we are not crazy we are trying to earn some money.</p> <p>I came, people like NGOs, GIZ, I swear you, GIZ laughed in my face</p> <p>Not work, not a job</p>			<p>(academic)</p> <p>“Society does not accept our work” (hulene landfill collector)</p> <p>c) Challenged by municipality as an aggregator</p> <ul style="list-style-type: none"> • Not valued for work (links to shame) <p>“ a lot of people think that not just the waste pickers, but people that work in waste companies don't have that much value in society” (academic)</p>
Neutral	<p>Changing views:</p> <p>‘Those that use to laugh are now also selling here’</p>	<p>Neutral reaction to negative opinions</p> <p>“I listen to them speak but I do not care.”</p> <p>We don't care, the only things that matters is that we can provide for our children,</p>	Each person looking for their own business	<ul style="list-style-type: none"> • No problems in this neighborhood (hulene) • Some Aggregators face no problems with neighbors • ‘There are two types of waste pickers’ (Topack worker) • Even my students at university, think they are all the same profile.

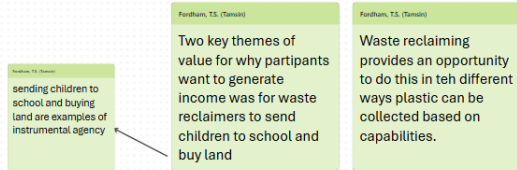
				(academic)
<p>Positive (intrinsic agency – perceptions; self esteem) (Instrumental agency, ownership)</p>	<p>Providing for family</p> <ul style="list-style-type: none"> - Saving - Able to own land 	<p>Respected by their community</p> <p>Others say it is great, you can continue to grow, you can continue to grow up like others have done. (aggregator)</p> <p>“My neighbours go and collect and sell to me. I have no problems with them. I works well”</p> <p>Business owner</p> <p>Decision maker</p>	<p>Respect of other waste pickers</p> <ul style="list-style-type: none"> - Inspired and encouraged by other aggregators (impact to work) - Saw other collectors generating income (impact to work) - Communities of waste pickers <p>“They can see and understand the work they are doing, people from this neighbourhood depend on recycling”</p> <p>Environmental actors - “They are cleaning the city”</p>	<p>•</p> <p>Spatial patterns of supportive neighbors (Hulene Landfill) (some aggregators – link to impact of collective agency)</p>

Annex I – Analysis tools and planning



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Opportunities

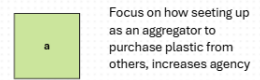
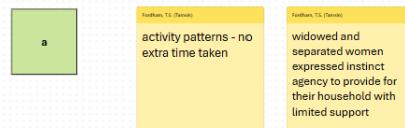
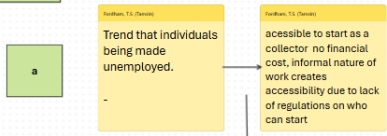


1 Requiring a livelihood to maintain livelihood, waste reclaiming can present an accessible job when no other economic opportunities are available due to informal nature of the market.

2 generate alongside in livelihood

Health constraints
general pattern of physical disability.

run a business with low educations levels



profile

"I started to do this job when my contract ended in the company where I was working as as security, the job ended because the company used to provide services to other company, they ended their contract with this company and I lost my job" 0304p1

Agency
Found a job from the landfill when there were no alternatives

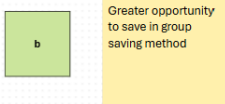
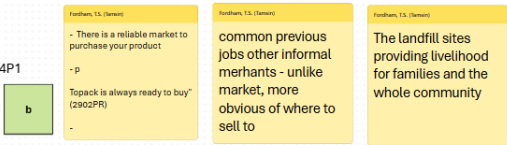
Agency - intrinsic agency provide for family with limited support

profile (case study)

Agency
financial independence when health constrains restrict other work

Agency
Collective - intrinsic

210324P1



collective agency - group saving
- ability to spend extra



Constrain and enhance economic development

Resources

social networks
Family structure

Marriage
Established aggregators all married
Profile:
Highlight profile of women 28 years, single and orphaned

Family run businesses
profiles of family support

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Access

social networks influence access to capital, which then supports transport

financial security has an impact on ability to assert agency in choosing the location and frequency of sale which can impact a sellers capability set to earn a higher income

Capital

patterns of frequency of sale reflect the ability to wait between payments.
Sellers that need to sell quickly will sell to aggregators who process transactions quicker at a lower cost.

Time vs cost analysis
Larger buy back companies have restricted selling days, take longer to process but pay a higher price.

Having access to start up capital, allows you to already start buying plastic from collectors

Links back to being financed - having financial support to commence business
Harder journey to go from a collector to a aggregator - savings on investing as you go

Click or tap here to type

distance and transport - greater access to capital provides an opportunity to invest in transport that mitigates transport constraints

Example - crows and car rental

Transport cost influences the quantity you can sell, if you can't afford transport costs the you sell as much as you can carry

investing in equipment to support economic growth of business

Opportunities

sending children to school and buying land are examples of instrumental agency

Two key themes of value for why participants want to generate income was for waste reclaimers to send children to school and buy land

Waste reclaiming provides an opportunity to do this in teh different ways plastic can be collected based on capabilities.

3

Fordham, T.S. (Tamsin)
to be covered in 3rd chapter

Fordham, T.S. (Tamsin)
perceptions

Fordham, T.S. (Tamsin)
competition

Informal sector

Fordham, T.S. (Tamsin)
working conditions

Fordham, T.S. (Tamsin)
Lack of reregulations to support

Fordham, T.S. (Tamsin)
increased accessibility

Fordham, T.S. (Tamsin)
Hazardous environments

Fordham, T.S. (Tamsin)
Weather

Fordham, T.S. (Tamsin)
lack of health support

Fordham, T.S. (Tamsin)
irregualr working hours

Fordham, T.S. (Tamsin)
benefical for flexibility

Fordham, T.S. (Tamsin)
negative for instable income

Fordham, T.S. (Tamsin)
not to be highlighted

Fordham, T.S. (Tamsin)
price fluctuation

Annex J – Data from sense making workshop of preliminary recommendation

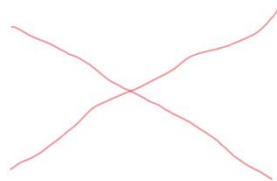
Feedback from sense making workshop

Recommendations in Topack's control to increases access to distance, working time, capital, information which can be addressed internally

Recommendations in Topack's influence to increase access to distance, working times and capital, with partnership from external parties



Sense making workshop explained it was **not** in Topack's control to increase resources to enhance success



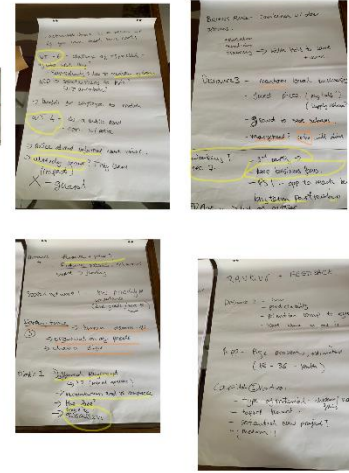
Recommendations in Topack's influence to increase resources with an partnership from external parties

Plastic
Social network
Business knowledge



Link this into a training package - loan system is not possible for Topack but they can provide training and improve skills

Add guidance that the KOLKET supplier tab can be used to highlight the suppliers which are in established and emerging categories



Recommendations in Topack's control to further enhance positive actions



Annex K – circle of influence used in workshops of preliminary recommendations

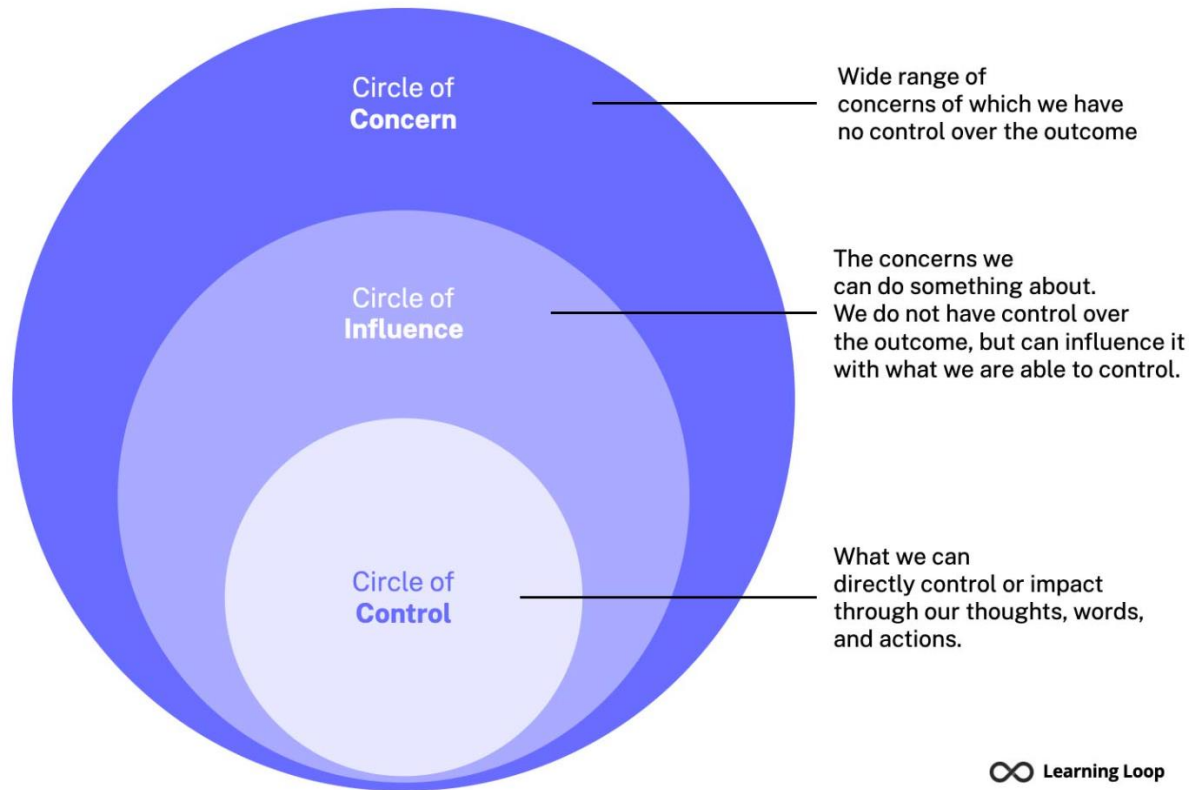


Image source: Learning Loop. (n.d.). Circles of influence. Learning Loop. <https://learningloop.io/glossary/circles-of-influence>

References

- Aristotle. (1984). *The complete works of Aristotle: the revised oxford translation* (J. Barnes, Ed.; Vol. Volume one and two, Ser. Bollingen series, 71:2). Princeton University Press.
- Africa RISE (n.d.). *Introducing Kolekt: How Africa Rise and Amor are Digitising the Waste Supply Chain in Mozambique*. EU Africa Rise. Retrieved from <https://eu-africanrise.com/article/introducing-kolekt-how-africa-rise-and-amor-are-digitising-the-waste-supplychain-in-mozambique>
- African Clean Cities Platform. (2022). *Maputo Urban Sanitation Profile*. Retrieved from [African Clean Cities Platform](#).
- Allen, C., Elísio, J., & Women in Informal Employment: Globalizing and Organizing. (2011). *Mapping of the policy context and catadores organizations in maputo, mozambique* (Ser. Wiego organizing brief, no. 6). WIEGO.
- Bataineh, K. M. (2020). Life-Cycle Assessment of Recycling Postconsumer High-Density Polyethylene and Polyethylene Terephthalate. *Journal of Environmental and Public Health*. <https://doi.org/10.1155/2020/8905431>
- Banyan Global. (2021). *Recycling in Jordan activity, gender analysis, USAID*
- Bouvier, M., & Dias, S. M. (2021, November). *Waste Pickers in Brazil: A Statistical Profile*. WIEGO Statistical Brief No. 29.
- Buque, L. I. B., & Ribeiro, H. (2015). Overview of the selective waste collection with pickers in Maputo municipality, Mozambique: Challenges and perspectives. *Saúde e Sociedade*, 24(1), 298–307. <https://doi.org/10.1590/S0104-12902015000100023>
- Claasen, R (2020) "Selecting a List: The Capability approach's Achilles Heel" in Chiappero Martinetti, E. (Ed.). (2021). *The Cambridge handbook of the capability approach*. Cambridge University Press.
- Chiappero Martinetti, E. (Ed.). (2021). *The Cambridge handbook of the capability approach*. Cambridge University Press.
- Club Mozambique (2023) "Mozambique: Maputo Council abandons plan for joint landfill with Matola". (2023, November 11). Club of Mozambique. Retrieved from <https://clubofmozambique.com/news/mozambique-maputo-council-abandons-plan-for-joint-landfill-with-matola-248598/#>
- Covey, S. R. (1989). *The 7 habits of highly effective people: Restoring the character ethic*. Free Press.
- Crocker, D (1995). "Functionings and Capabilities: The Foundation of Sen's and Nussbaum's Development Ethic" in Nussbaum, M. C., Glover, J., & World Institute for Development Economics Research. (1995). *Women, culture, and development: a study of human capabilities* (Ser. Wider studies in development economics). Clarendon Press.
- DEFF. 2020. *National Waste Management Strategy*. Department of Environment, Forestry and Fisheries, Pretoria, South Africa. www.dffe.gov.za/sites/default/files/docs/2020nationalwaste_managementstrategy1.pdf
- Egdell, V. & Beck, V. 2020. A capability approach to understand the scarring effects of unemployment and job insecurity: Developing the research agenda. *Work, Employment and Society*, 34(5):937-948

- Eger, C., Miller, G., & Scarles, C. (2018). Gender and capacity building: A multi-layered study of empowerment. *World Development*, 106, 207–219. <https://doi.org/10.1016/j.worlddev.2018.01.024>
- Gallaud, D. (2016). *Circular Economy*. Wiley. <https://doi.org/10.1002/9781119777076>
- Gutberlet, J., & Carenzo, S. (2020). Waste Pickers at the Heart of the Circular Economy: A Perspective of Inclusive Recycling from the Global South. *Worldwide Waste*, 3(1), 6. <https://doi.org/10.5334/wwwj.50>
- Hennink, M., Hutter, I., & Bailey, A. (2020). *Qualitative research methods*. (2nd ed.) Sage.
- Ibrahim, S., & Alkire, S. (2007). Agency and Empowerment: A Proposal for Internationally Comparable Indicators. *Oxford Development Studies*, 35(4), December 2007.
- IUCN, (2021) Waste pickers role in plastic pollution reduction: the ones we cannot leave behind, *IUCN News*. <https://www.iucn.org/news/environmental-law/202104/waste-pickers-role-plastic-pollution-reduction-ones-we-cannot-leave-behind>
- International Labour Organization (2023). Women and Men in the Informal Economy: Statistical Update. Geneva. https://www.ilo.org/wcmsp5/groups/public/---ed_protect/
- Instituto Nacional de Estatística. (2019). *IV Recenseamento Geral da População e Habitação 2017: Resultados Definitivos, Moçambique*. Maputo: Instituto Nacional de Estatística.
- UNDP (n.d). Human Development Index <https://hdr.undp.org/data-center/human-development-index#/indicies/HDI>
- Jambeck, J. R., Geyer, R., Wilcox, C., Siegler, T. R., Perryman, M., Andrady, A., Narayan, R., & Law, K. L. (2015). Marine pollution. Plastic waste inputs from land into the ocean. *Science (New York, N.Y.)*, 347(6223), 768–771. <https://doi.org/10.1126/science.1260352>
- Jones, R. E., Haardörfer, R., Ramakrishnan, U., Yount, K. M., Miedema, S. S., Roach, T. D., & Girard, A. W. (2020). Intrinsic and instrumental agency associated with nutritional status of East African women. *Social Science & Medicine*, 247. <https://doi.org/10.1016/j.socscimed.2020.112803>
- Kabeer, N. (2005). Gender equality and women's empowerment: A critical analysis of the third millennium development goal 1. *Gender & Development*, 13(1), 13–24. <https://doi.org/10.1080/13552070512331332273>
- Kabeer, N. (1999). Resources, agency, achievements: reflections on the measurement of women's empowerment. *Development and Change*, 30(3), 435–464. <https://doi.org/10.1111/1467-7660.00125>
- Learning Loop. (n.d.). Circles of influence. Learning Loop. <https://learningloop.io/glossary/circles-of-influence>
- Madsen, C. A. (2006). Feminizing waste: Waste-picking as an empowerment opportunity for women and children in impoverished communities. *Colorado Journal of International Environmental Law and Policy*, 17(1), 165-200.
- Mertanen, S. T., Langa, J. M., & Ferrari, K. (2013). *Maputo Garbage Collectors - Who are they and how do they work?. LVIA*.
- Mulhall, A (2003) 'In the field: Notes on observation in qualitative research', *Journal of Advanced Nursing*, 41 (3): 306 – 13.

Nussbaum, M. C., Glover, J., & World Institute for Development Economics Research. (1995). *Women, culture, and development : a study of human capabilities* (Ser. Wider studies in development economics). Clarendon Press.

Nussbaum, M. C. (2000). *Women and human development : the capabilities approach*. Cambridge University Press.

OECD. (2021). *Tackling vulnerability in the informal economy*. OECD Publishing.

Pholoto, L. and Chitaka, T. 2022a. *Mainstreaming the informal waste sector: Towards an inclusive circular economy in African cities*. WWF South Africa, Cape Town, South Africa.

Pholoto, L. and Chitaka, T. 2022b. *Mainstreaming the informal waste sector: Towards an inclusive circular economy in African cities (infographic)*. WWF South Africa, Cape Town, South Africa.

https://wwfafrica.awsassets.panda.org/downloads/informal_reclaimers_in_circular_economy_fs.pdf?41642/informal-reclaimers-in-the-context-of-a-circular-economy

Resilience BV (n.d) <https://resiliencebv.com>

Muchangos, L. S. dos, Tokai, A., & Hanashima, A. (2017). Application of material flow analysis to municipal solid waste in Maputo City, Mozambique. *Waste Management & Research*, 35(3), 253–266. <https://doi.org/10.1177/0734242X16678067>

Salvia, G., Zimmermann, N., Willan, C., Hale, J., Gitau, H., Muindi, K., Gichana, E., & Davies, M. (2021). The wicked problem of waste management: An attention-based analysis of stakeholder behaviours. *Journal of Cleaner Production*, 326. <https://doi.org/10.1016/j.jclepro.2021.129200>

Sen, A. (1999). *Development as freedom*. Oxford University Press.

Sen, A (1985a) *Commodities and Capabilities*. Amsterdam: North Holland.

Sen, A (1985 b) 'Well-being, Agency and Freedom: The Dewey lectures 1984', *Journal of Philosophy*, 82 -169 -221.

Sen, A. (2010). *The idea of justice*. Allen Lane/Penguin Books.

Siddons, E. (2023, June 7). The news from a Mozambique landfill site – Mário Macilau's best photograph. *The Guardian*. <https://www.theguardian.com/artanddesign/2023/jun/07/the-news-from-a-mozambique-landfill-site-mario-macilau-s-best-photograph>

Schenck, C. J., Viljoen, J. M. M., & Blaauw, P. F. (2021). Precarious, More Precarious, Most Precarious? The Quality of Life of Waste Pickers in the Karoo. *Social Work/Maatskaplike Werk*, 57(3), Issue 4. Retrieved from <http://socialwork.journals.ac.za/pub>
doi:<http://dx.doi.org/10.15270/52-2-949>

Swingler, S. (2018, February 26). Living and dying on a rubbish dump: the landfill collapse in Mozambique. *The Guardian*. <https://www.theguardian.com/global-development/2018/feb/26/explosion-fatal-rubbish-landslide-mozambique-hulene-dump>

Sontheimer, S., Callens, K., & Seiffert, B. (1999). Annex B *in* Improving Household Food Security and Nutrition in Northern Shewa (Amhara region) and Southern zone (Tigray region), Ethiopia. Food and Agriculture Organization of the United Nations. <https://www.fao.org/3/x5996e/x5996e06.htm#TopOfPage>

Topack. (n.d.). *Recycling*. Retrieved from <https://www.topack.net/en/recycling/>

UNICEF (n.d) Child Rights Convention. <https://www.unicef.org/child-rights-convention/convention-text>

UNDP (2021) What is beyond recognising the informal waste sector?: [What is beyond recognising the informal waste sector? | United Nations Development Programme \(undp.org\)](#)

United Nations Environment Programme. (2023). Africa's Private Sector Supports Fight Against Plastic Pollution. Retrieved from <http://www.unep.org/news-and-stories/story/africas-private-sector-supports-fight-against-plastic-pollution>

United Nations Environment Programme (2024). Global Waste Management Outlook 2024: Beyond an age of waste – Turning rubbish into a resource. Nairobi. <https://wedocs.unep.org/20.500.11822/44939>

United Nations Environment Programme (2018). Africa Waste Management Outlook. United Nations Environment Programme, Nairobi, Kenya

United Nations Environment Programme, & International Solid Waste Association (2024). *Global Waste Management Outlook 2024 - Beyond an age of waste: Turning Rubbish into a Resource*. <https://wedocs.unep.org/20.500.11822/44939>.

Velis, C. (2017). Waste pickers in Global South: Informal recycling sector in a circular economy era. *Waste Management & Research : The Journal of the International Solid Wastes and Public Cleansing Association, ISWA*, 35(4), 329–331. <https://doi.org/10.1177/0734242X17702024>

Viljoen, K., Blaauw, D., & Schenck, R. (2018). 'Sometimes you don't make enough to buy food': An analysis of South African street waste pickers' income. *Journal of Economic and Financial Sciences*, ISSN: 2312-2803.