



International  
Labour  
Organization

# ► Reducing Waste Towards a Just Transition

Work, Labour, and Value in the Informal Recycling Chain  
Evidence from Adana, Türkiye | October 2023





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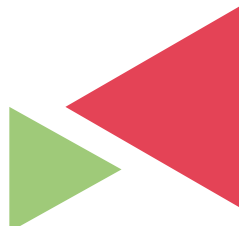
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## ► Abbreviations

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|            |                                                                          |
|------------|--------------------------------------------------------------------------|
| ► CEI      | Central European Initiative                                              |
| ► CLARISSA | Child Labour: Action-Research-Innovation in South and South-Eastern Asia |
| ► EU       | European Union                                                           |
| ► EPR      | Extended Producer Responsibility                                         |
| ► ILO      | International Labour Organization                                        |
| ► IDI      | In-Depth Interview                                                       |
| ► KII      | Key Informant Interview                                                  |
| ► NGO      | Non-governmental Organisation                                            |
| ► OECD     | Organization for Economic Co-Operation and Development                   |
| ► ODS      | Organic Dust Toxic Syndrome                                              |
| ► PAGEV    | Turkish Plastics Industry Foundation                                     |
| ► RNE      | German Council for Sustainable Development                               |
| ► TUÇA     | Turkish Environment Agency                                               |
| ► UNEP     | European Union Environment Programme                                     |
| ► WHO      | World Health Organization                                                |
| ► WIEGO    | Women in Informal Employment Globalizing and Organizing                  |
| ► WWF      | World Wide Fund For Nature                                               |

# ► 1. Foreword

---

Waste generation has increased dramatically worldwide in recent decades, with no signs of slowing down. In the absence of immediate action, the approximately 2 billion tons of municipal solid waste generated globally today are expected to increase by more than 70% before the mid-century (The World Bank 2018). This expansion results from the interplay of accelerated population growth, urbanisation, economic expansion, rapidly growing and diversifying consumer purchasing habits, and in some cases, debris-creating disasters such as floods, earthquakes, and cyclones.

With such massive amounts of waste being generated worldwide, the need for authorities to provide adequate waste removal, treatment, and disposal services has become increasingly critical. In this effort, recycling, the process of converting secondary materials into reusable commodities, is progressively accepted as an overriding component of the circular economy, substituting the linear “take-make-waste” scheme with a circular one that “reuses”, “repurposes”, and “recycles” the stock of material in circulation. Reusing goods and cutting back on consumption remained largely secondary in this endeavour to generate a circular economy as recycling has grown in popularity without losing sight of economic growth targets worldwide. In this context, recycling has emerged as the new environmental buzzword, global social norm, and a popular method of launching a sustainable economy and society.

In this global effort, high-income countries appear to have higher recycling rates than low-income countries, while the global percentage of waste recycled remains dramatically lower when compared to landfilling, sea discharge, and/or open-air waste incineration. Only 6% of global plastic waste was recycled between 1990 and 2019, compared to 39% landfilled, 10% incinerated, and 18% mismanaged (Environmental Investigation Agency 2023, 3). Furthermore, high-income countries are progressively exporting their waste to low-income countries as part of managing garbage at the national level, separating the origin of waste from the location of discharge. For example, by including exported waste in recycling rates, even high-income countries, such as Germany and Austria could recycle around half of their waste (Alves 2023b).

With the rising uneven distribution of material leftovers through trade and trafficking, primarily from the north to the south, waste, as a socio-material substance, has become a global agent of change in the industries of recycling, landscapes, and the life of workers at destination sites. Recently, as China, Malaysia, Vietnam, and Thailand have imposed import restrictions on plastic waste since early 2018, Türkiye, now, has emerged as the primary destination country for global waste accumulation and dumping, particularly from high income countries in Europe. Due to being a part of the European continent, affordable transportation, and status as an Organisation for Economic Co-Operation and Development (OECD) member where European Union (EU) waste may enter lawfully, Türkiye has evolved into a refuge for waste trade and trafficking (Eurostat 2020). Owing to its geographical location on the European continent, coupled with the presence of cost-effective transportation options, and its status as a member of the OECD, which allows for the lawful import of waste from the EU, Türkiye has transformed into a notable hub for waste trade and trafficking (Eurostat 2020).

Despite being one of the world’s most fertile plains, Adana, located on the Seyhan and Ceyhan rivers’ watery delta and near the Mediterranean port of Mersin, has been absorbing nearly half of Türkiye’s waste imports (Human Rights Watch 2022, 3). With the high volume of waste entering the region, the recycling industry has rapidly expanded, as have the employment, and incorporation of workers, technologies, know-how, and organisational forms. In this socio-economic setting, not only have formal corporations, contracts, and regulated flows of work proliferated, but so have unregulated facilities, informal, and non-unionised workers, insecure, unsatisfactory, and precarious work and employment practices.

With a relational approach, this study aims to trace and document the informal relations that underpin the expansion of the recycling industry in Adana, while also exploring the local and global dynamics upholding this growth. It seeks to identify the material flow of waste with actors, linkages, and valorization along the recycling value chain, as well as the enabling legalities, policies, and institutions. In doing so, the current study targets to enhance the social dialogue among all parties impacted and facilitate the creation of fair, decent, and inclusive employment, and business opportunities along the recycling chain, while transitioning to more climate-neutral economies and societies.



## ► 2. Objectives of the Study

By identifying the current circumstances along the value chain of recycling in Türkiye, this study seeks to investigate and document ways to enhance current working conditions and assist to stimulate the creation of green and decent livelihood opportunities. In order to achieve this, the study will focus on the proliferation of waste and the expansion of the recycling industry, as well as the integration of formal and informal work practices, business, and employment in Adana. With the devastating earthquake in February 2023, which altered the environment and produced millions of tons of rubble, the report has also investigated emerging debris as a risk, opportunity, and challenge for the recycling sector, as well as how the livelihood and conditions of waste pickers have comparably been affected.

By situating the current expansion in waste production and recycling in the region within the historical context, the study seeks to identify and document (i) actors and connections; (ii) categorisation and valorization of waste; (iii) the enabling environment; (iv) work and labour relations along the downstream and upstream value chain of waste.

The study's objectives can be broken down into 4 research areas, as seen in Table 2.1 below.

**Table 2.1 Research areas and inquiries**

|                                                                 |                                                                                                                                                                                                  |
|-----------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Identifying the Actors and Connections</b>                   | To assess the characteristics and organisation forms of actors along the recycling chain of waste and how they are hierarchically and horizontally intertwined with one another.                 |
| <b>Identifying the Categorisation and Valorisation of Waste</b> | To assess how the recycling chain operates in terms of categorisation, material quality, material supply, income and valuation between actors and spaces, and the type of processing undertaken. |
| <b>Identifying the Enabling Environment</b>                     | To assess waste circulation laws, regulations, institutions, unions, solidarities, and conflicts, while providing an analysis of waste management legislation in Türkiye.                        |
| <b>Identifying the Conditions of Work and Labouring</b>         | To assess the categories and characteristics of labour, working conditions, rights, and demands.                                                                                                 |

## ► 3. Methodology

---

### 3.1 Research Design

In order to explore our research objectives and document the findings, two distinct yet complementary studies were conducted:

- desktop data collection;
- an empirical field study.

First, the desktop data collection was conducted to assess the global literature on the value chain of recycling and the working conditions of labouring along with the waste flow.

*The desktop data collection included:*

- a review of waste and recycling literature including global waste network, trade, and trafficking; work and labour in the recycling sector; and the concept of just transition;
- a review of the regulatory framework in Türkiye (existing legislation, regulation, and policies) regarding recycling;
- a comparative analysis of the legislation of Türkiye and other selected countries on the recycling of waste, identification of toxicity and legal response;
- a review of case studies and good practices at the international level regarding the organisation of recycling, working conditions, institutional forms, solidarities, and unionisation.

*The empirical field study included two phases:*

In the first part, empirical field research was conducted based on face-to-face in-depth interviews and surveys with actors including (A1) waste collectors, (A2) waste mediators, (A3) waged workers employed in recycling facilities, and (A4) representatives from industrial facilities operating distinct stages of the recycling process (see table 3.1).

Face-to-face, semi-structured in-depth interviews, and first-hand observation with actors and experts were among the primary data collection methods used in our empirical research. One of our researchers committed around four months to living in a neighbourhood predominantly inhabited by waste collectors, engaging in an extensive ethnographic field study in Adana. Throughout this duration, the researcher closely followed the activities of waste pickers, intermediaries, and sorters at distinct cluster points within the Yeşilyurt district of Adana. This approach revealed dynamic shifts, particularly following the catastrophic earthquake, and contributed first hand observations and insights that significantly enhanced the research and report.

The second section included online in-depth interviews with foreign experts from Brazil, India, and Colombia who were involved in policy-making for the enhancement of the recycling value chain as well as worker rights, awareness, and conditions of employment. Our focus was on creating data-driven policy suggestions, enhancing global collaboration, and assisting in the spread of specialised expertise across countries.



## 3.2 Data Collection and Analysis

Adana was selected as the field study location for this research due to its emergence as a notable hub for imported European plastic waste. Furthermore, the region demonstrates substantial plastic consumption, particularly in agro- plastics, leaving a significant footprint across its expansive agricultural lands and production. These factors have collectively fuelled the rapid growth of the recycling sector along the eastern Mediterranean coast of Türkiye.

Parallel to the proliferation of waste, the region has seen the emergence of several informal recycling plants, in addition to registered ones, as well as collectors, middlemen, retailers, and, eventually, an economic geography of “waste-scape”, Poor working conditions, such as low pay, long workdays, exposure to workplace hazards, and a lack of social protection, proliferated along the recycling value chain, which typically combined formal and informal settings, processes, and employment (Human Rights Watch 2022; Greenpeace 2021; WWF Mediterranean Marine Initiative 2019).

During two planned research visits, targeted interviews in this region seek cases of the value chain (such as plastics, paper, cardboard, iron, and aluminium) that will optimise quantitative and qualitative in-depth data collection from all identified actors along the recycling value chain. It is worth noting that upstream and downstream refer to different stages of the supply chain. Upstream operations are those where materials, such as waste, enter the organisation, while downstream operations are those in which materials, such as plastic bags, flow away from the organisation and toward customers.

In order to assist value chain analysis, actors moving through the upstream value chain are identified as (A1) waste collectors and (A2) waste mediators; and actors moving through the downstream value chain are identified as (A3) waged workers employed in recycling facilities, and (A4) managers from industrial facilities sorting, washing, drying, screening, crushing, and manufacturing final products from recycled materials.

Though they are not directly involved in the movement of waste and the industrial recycling processes, experts (E) from associations, chambers, and non-governmental organisations participate in the public discourse and assist in shaping the environment. Interviews with these individuals are therefore categorised and analytically analysed at a different level.

**Table 3.1 Identified actors along the recycling value chain**

| Upstream Recycling Chain   |                                                                                                                                                                                                  |
|----------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| A1                         | <i>Waste Collectors</i>                                                                                                                                                                          |
| A2                         | <i>Waste Mediators - including (a) Waste Sorters, locally known as “ayrıştırıcı”, (b) Waste Middlemen who own warehouses, called “depo”, and (c) Waste Transporters, recognised as “ayakçı”.</i> |
| Downstream Recycling Chain |                                                                                                                                                                                                  |
| A3                         | <i>Waged Waste Workers employed in recycling facilities</i>                                                                                                                                      |
| A4                         | <i>Managers from industrial facilities</i>                                                                                                                                                       |
| Enabling Environment       |                                                                                                                                                                                                  |
| E                          | <i>Experts from public institutions, associations, chambers, and non-governmental organisations</i>                                                                                              |

Two field trips were designed to collect first-hand empirical data over a total of 13 days, during which 98 semi-structured interviews, key informant interviews and surveys (see Table 3.2) were conducted, mainly in Seyhan, Yüreğir, and Çukurova districts. The face-to-face interviews were conducted in Adana and integrated with the three online expert interviews with international specialists, resulting in a total of 101 interviews.

Table 3.2 Field data collection

| Type of Actors                | Survey Questionnaire | In-Depth Interviews | Key Informant Interviews |
|-------------------------------|----------------------|---------------------|--------------------------|
| A1                            | 51                   | 50                  | N/A                      |
| A2                            | 14                   | 14                  | N/A                      |
| A3                            | 8                    | 9                   | N/A                      |
| A4                            | N/A                  | N/A                 | 5                        |
| Experts                       | N/A                  | N/A                 | 23                       |
| Total#                        | 73                   | 73                  | 28                       |
| Total # of persons contacted: | 101                  |                     |                          |

The cluster sampling method was used to select the actors (A1 and A2) to be interviewed along the upstream recycling cycle. Interviewing waste collectors, and mediators at “cluster points” where actors connect and trade waste made obtaining the required sample size more efficient. Researchers visited four selected cluster points to collect a representative sample of waste pickers from different ethnic, gender, age and socio-economic backgrounds, including informal workers, refugees, unregistered migrants and child labourers, in order to reflect as closely as possible the waste picker population. In the selection of the actors along the downstream recycling chain (A3 and A4) to be investigated, the flow of materials and business connections of the upstream actors (A1 and A2) were followed to reach the sample which facilitated the relational analysis. Selection of the corporations (A4) to be investigated was made among both registered and unregistered facilities and operated in two levels of the recycling process, namely (a) washing and crushing and (b) manufacturing granules from recycled particles.

In addition to the main actors in the recycling value chain, in-depth interviews with actors in the legal and political enabling environment were conducted. In this framework, the enabling environment consists of the critical factors and trends that are shaping the value chain environment and its operating conditions. These enabling factors are generated by structures and institutions (national and local-level authorities, non-governmental agencies, formal and informal alliances, trade unions, policies, regulations, and practices) that are beyond the direct control of the actors in the recycling value chain. The purpose of charting this enabling environment is not only to map the status quo, but to understand the trends that are affecting the entire value chain, and examine the powers and interests that are driving change.

The actors were interviewed for around 40-60 minutes using pre-prepared semi-structured interview guides with both semi-structured and structured questionnaire sections. Before the interviews, all participants were notified of their anonymity, confidentiality, and voluntary involvement, as well as their right to withdraw from the study at any time. The information provided by the interlocutor was solely evaluated within the context of the complete sample. Pseudonyms were allocated to respondents to ensure participant anonymity, while data recording and storage remained confidential, accessible solely to the designated research team overseeing the project.

Thematic analysis was adopted as an inductive method since it allows researchers to uncover and comprehend patterns in open-ended responses by providing a structural framework. Thematic analysis was conducted in six phases, including “familiarisation”, “initial coding”, “searching themes”, “reviewing themes”, “defining themes”, and “reporting”. Prior to coding, researchers became acquainted with the raw data. Hard-copy interview notes were transferred to the computer as a soft copy within the first week of the interviews. The initial thematic codes were created and organised to correspond with the responses. In accordance with the semi-structured interview questions asked, codes also covered the indirect data, including narratives, discourses, descriptions, gossip, humour, and everyday reflections including the context of participants in a clear, age and gender-sensitive, and unbiased way.

Once the codes had reached saturation, the coding framework was established. The generated codes were used to search for themes. In the following phases, the behavioural and perceptual patterns that emerged as themes, sub-themes, global themes, cross-connections, and their prevalence were identified. The findings of the research and insights were presented, and ultimately, evaluations were enhanced by participant observation during field research to provide additional individual views and reflexivity. Data from the qualitative instruments were cross-confirmed with the quantitative data for validation.

The findings were presented in four subsections corresponding to the central research areas shown in Table 3.1 (identification of actors and connections, waste valorisation, enabling environment, and conditions of work and labour relations). In addition, a brief subsection on the impact of the earthquake, which divided our first and second field studies, was explained in the last subsection of the findings. Contextual analysis of all primary data and secondary findings including the outcomes and subgroup analysis were presented in their respective sections explaining the value chain in the selected research region.

### 3.3 Risks and Mitigations

This research aimed to investigate how to improve the recycling chain by facilitating decent employment in the process of just transition to a greener and climate-neutral economy by outlining the current conditions of the recycling industry in Türkiye. While the empirically well-designed and globally informed research methodology enabled selected questions to be targeted and answered, some limitations may, unfortunately, remain inherent in the research process.

Firstly, due to time and budget constraints, the researchers selected a representative sample from the identified actors in the chosen research area. Although the actors were selected to maximise the opportunities for data collection from the two planned research visits, some characteristics of the actors may have been excluded from the data obtained, so that some conclusions may suggest generalisable trends.

Second, as we moved from downstream to upstream in the recycling value chain, we encountered low-paid, unregistered, and poor working conditions, as well as unregistered migrants, refugees, and children. Under these conditions, study participants were less likely to share information. To address this, actors were interviewed and given explanations and clarifications to build interpersonal trust. In addition, certain actors were contacted more than once over time, with follow-up meetings to ensure a more genuine, balanced and reliable exchange. The safety, privacy and anonymity of these people were carefully maintained throughout the study to protect them from any harm.

Third, given the newspaper columns and reports about improper waste management, including accusations of incineration, landfilling, and dumping waste into the sea, certain registered and, more significantly, unregistered recycling facilities that are exporting waste from abroad were sensitive. Company representatives were resistant, or at least sceptical, about efforts to facilitate research while restricting the exchange of information. Under these delicate conditions, the researchers explained the aim of the research, which is to improve the functioning of the recycling value chain, in a transparent way, and the motivation to include the perspectives of actors to gain consent and build multi-level cooperation.

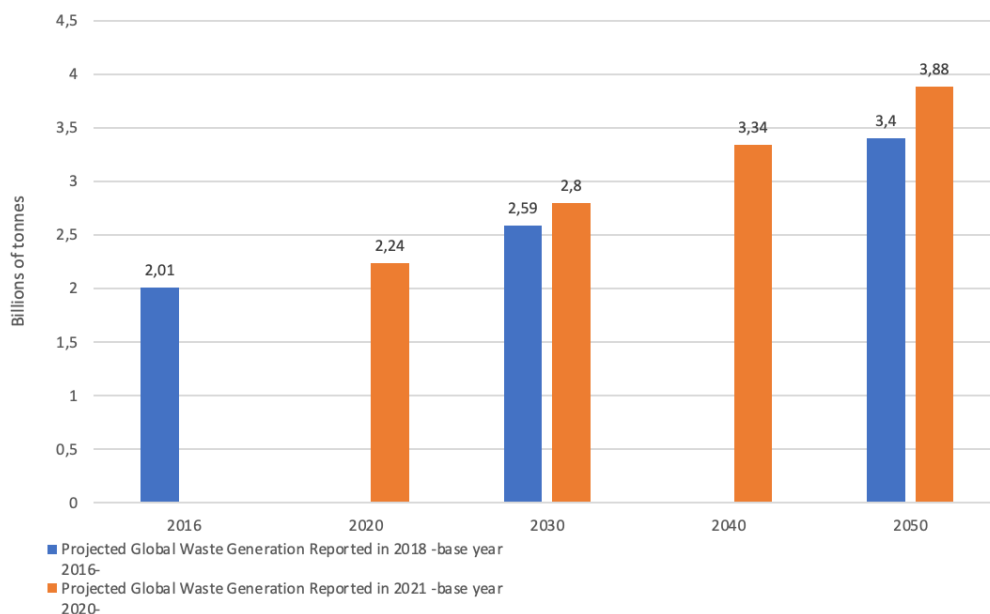
Finally, we experienced the devastating earthquake that struck Adana on 6 February 2023, near the end of our first field visit. The following day, scheduled meetings were cancelled and part of the research team returned from the field. Our research agenda had to be changed and we began to investigate how the quake had changed the working and living conditions of waste pickers. Further investigation and research is needed, as the data currently available from our research is not sufficient to fully understand how the recent emergence of millions of tonnes of rubble in the quake zone is integrated with waste recycling and the economy.

## ► 4. Global Literature on Waste and Recycling

### 4.1 Thriving Global Economy of Recycling

Accelerated population expansion, and urbanisation, coupled with increased economic activities and high levels of material consumption during the last century caused an increasing demand for raw materials at an unprecedented scale. Rising scales of conspicuous consumption led to greater use of natural resources in manufacturing, as well as a greater amount of waste being generated when consumers discard them. Today, the world generates 2.24 billion tonnes of municipal solid waste annually. If nothing changes, the total amount of waste produced is predicted to rise to 3.88 billion tonnes by 2050, indicating a 73% increase from 2020 or a 93% increase from the waste generation predictions reported in 2018 (see Figure 4.1).

Figure 4.1 Projected global waste generation



Source: Data retrieved from World Bank Group 2018 and 2021

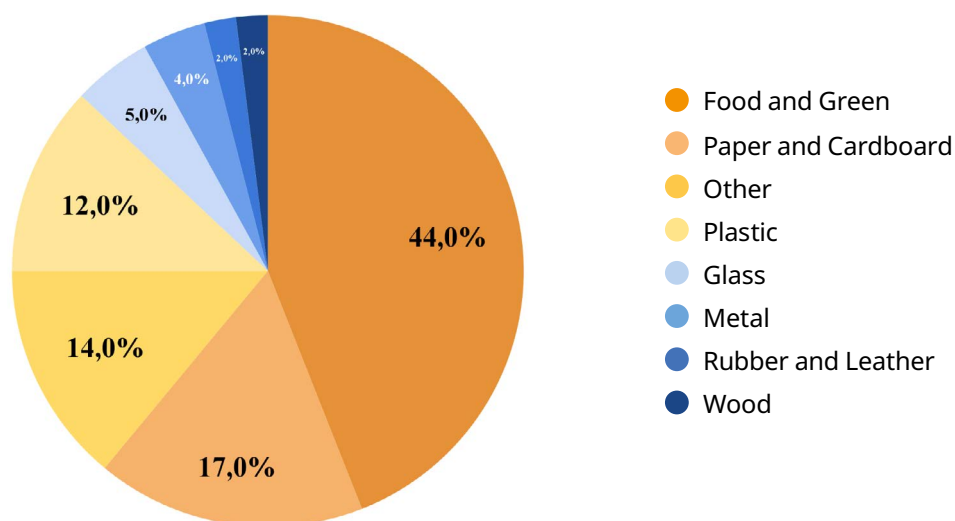
Given the depleting natural resources and massive growth in waste generation, *the waste-to-resource* scheme has received increased attention as the idea seems to uncouple economic growth from rising resource use while also promoting waste reduction (Gregson et al. 2015, 219). The waste-to-resource model suggests utilising secondary resources, materials derived from waste, to meet the increasing resource demand. The primary example of a waste-to-resource scheme is recognized to have occurred in China, where 43% of the world's copper (with an infinitely recyclable life) is consumed, 50% of which is derived from scrap (Gregson et al. 2015, 163).

In our contemporary world, the search for waste and its collection for use as secondary resources has grown into a multibillion-dollar industry worldwide. The global recycling business was valued at 55.1 billion US dollars in 2020, and it is projected to reach about 90 billion US dollars by 2028 (Alves 2023c). Wastes turning into resources to be recovered and revalorized, through recycling, have been the predominant operationalizing strategy both for the circular and green economy initiatives. As a result, the idea of a

“green economy” has gained popularity as the international community seeks to balance the conflicting ideals of economic growth and environmental protection. Notwithstanding the slight differences among the definitions, a green economy generally refers to an economy that is “low carbon, resource efficient, and socially inclusive” (Osoro et al. 2022; UNEP 2011). Interpretations emphasise the significance of fusing environmental and economic policy in a manner that promotes prospects for alternative sources of growth whilst eliminating the excess burden on natural resources (OECD 2011a and 2011b). In efforts to green the economy, with a particular focus on resource efficiency, the circular economic model has been proposed which presents an operationalizing framework for configuring the structural shift of value creation from the linear, resource-intensive to the circular, resource-efficient one (CEI 2021).

The circular economy has three fundamental pillars: a decrease in the total amount of resources used (reduce), an extension of product lifespans (reuse and repair), and sustained usage of materials after the cycle has completed (recycle) (EU Parliament 2021). The objective is to replace the linear economic model, which can be outlined as “take-make-dispose”, in favour of a circular economic model where wastes are recovered and recycled, and materials are continually circulated across economies. In this regard, the circular economy seeks to minimise resource consumption overall, close material loops to the greatest extent possible, promote sustainable development, especially in terms of achieving climate neutrality and safeguarding biodiversity. Furthermore, the circular economy is proposed to decouple resource consumption and economic growth by lessening reliance on imported raw materials (RNE 2021). Though the general notion of the circular economy goes well beyond its current conceptualization as a “closed loop” economy, it has up to now primarily concentrated on “recycling”. The importance placed on recycling has drawn attention to waste and material management policies.

Figure 4.2 Global waste composition

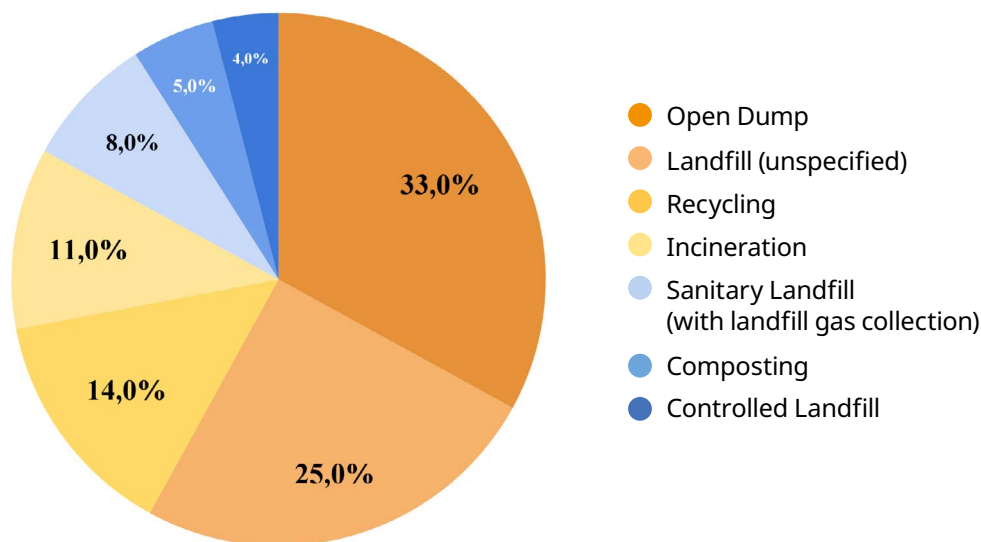


Source: Data retrieved from the World Bank Group 2018 and 2021

As people are discarding increasing amounts of waste, the composition of waste has become more complex than ever due to the diffusion of electronic and plastic consumer items (Vergara and Tchobanoglous 2012). In addition, waste composition differs as the income levels and consumption patterns alter. Food and green waste account for 44% of all waste globally, making it the leading waste category on a worldwide scale (see Figure 4.2). About 38% of global municipal waste is made up of dry recyclables, which include plastic, paper and cardboard, metal, and glass. Waste composition of high-income countries contains the highest number of dry recyclables (roughly 50%), as opposed to low-income countries whose waste composition is composed of mostly organic waste (around 56%) and only 17% of dry recyclables (Kaza et al. 2021).

The ecosystem can be affected by inappropriate waste management on a variety of fronts. Through its creation and management, post-consumer waste influences human health, water, and air quality, as well as accelerating climate change. To exemplify, organic and inorganic contaminants that are transferred to surrounding aquatic systems via open dumping of waste has significant adverse effects on aquatic life. It may also endanger public health by exposing nearby residents to hazardous substances. Furthermore, the incineration of waste releases several toxins and gases that are dangerous for both humans and the environment. For instance, in 2016, solid waste treatment and disposal is predicted to have produced 1.6 billion tonnes of carbon dioxide (CO<sub>2</sub>) equivalent greenhouse gas emissions, largely from open dumping and disposal in landfills without landfill gas capture technologies. This accounts for around 5% of world emissions. By 2050, it is expected that emissions from solid waste will reach 2.6 billion tonnes of CO<sub>2</sub>-equivalent annually (Kaza et al. 2018).

**Figure 4.3 Global waste treatment and disposal**



Source: Data retrieved from the World Bank Group 2018 and 2021

As demonstrated in Figure 4.3, globally, 19% of the produced waste is recovered via recycling and composting, roughly 33% of the municipal solid waste produced annually is openly dumped, and 25% is disposed of in landfills, which indicates that approximately 58% of the municipal solid waste is not managed in an environmentally safe manner. In high-income countries, 29% of waste is recycled and 6% is composted, whereas in low-income countries recycling rates are only about 4% (Kaza et al. 2021). However, as part of managing waste at the national scale, high-income countries are continuously shipping their waste to low-income countries. Through trade and trafficking, uneven waste distribution across the globe intensifies, which further compounds the disparity in recycling rates between high- and low-income countries. While everyone is impacted by the negative effects of improper waste management, the most vulnerable members of society are disproportionately affected, losing their lives and homes to waste dump landslides, working in hazardous conditions while collecting waste, and experiencing severe health effects.



## 4.2 Expanding Global Waste Network, Trade, and Trafficking

Waste trade<sup>1</sup> began in the late 1970s and became standard practice thereafter in the 1990s with technological improvements to transportation and communication that facilitated the ever-growing global connectedness. Rising costs of waste disposal in the Global North coupled with domestic pressures concerned with the environmental and health repercussions have led to an unprecedented increase in waste flows into the Global South. The main type of non-hazardous waste produced and traded has become plastic with 6.3 billion metric tons of plastic waste generated worldwide and only 12% recycled (Brooks et al. 2018). Statistics from 2021 highlight that the largest plastic-consuming regions were OECD America (22%), China (21%), OECD Europe (18%), and Other Asia (15%) (Environmental Investigation Agency 2023, 6). These high levels of consumption lead to a multiplication of waste that is unmanageable in the Global North, thus increasingly underpinning the global waste trade. In 2020, six EU countries (namely Germany, the Netherlands, France, Belgium, Italy, and Slovenia) were amongst the top ten largest plastic waste exporters (Environmental Investigation Agency 2023b, 6).

Alongside legal waste trade, there has been a significant growth in the illicit exporting of waste which now accounts for around 25% of all waste shipments (Dermatas and Georganti-Ntaliapē 2020, 1187). This growth in waste trafficking has come from tightened waste management legislation and the enactment of the Basel Convention<sup>2</sup>. Most governments in the global North have tightened waste management legislation due to a greater awareness of environmental issues. As a result, the rising costs of safe and legal trash disposal have fuelled the growth of an illicit export industry to many of the least developed nations in the globe. The Interpol (2020) study on global waste trafficking shows that countries in South-East Asia and Africa are the places of import, while exports come mainly from the Global North, with the exception of China. It is generally accepted that illegal trash imports pass across borders rather readily, especially in nations with technology and inspection mechanisms that are either inadequate or non-existent (Favarin and Aziani 2020). Waste trafficking, which can be defined as any waste movement that doesn't follow environmental regulations, has been an increasingly prominent phenomenon. False declarations and paperwork, concealment, and other illegal practices are used by offenders to smuggle their waste, either directly or with the assistance of intermediaries (Favarin and Aziani 2020). These practices negatively impact the environment, endanger human health, and undermine nations' legitimate economies. Since 2018, there have been more requests from South East Asian nations to return illicit plastic garbage containers, but the process is still time-consuming and difficult (Interpol 2020, 6). As a result, containers have accumulated in South-East Asian ports and have occasionally been illegally transported again to neighbours in the area. Capturing waste trafficking requires a collective effort worldwide, however, even in countries where fines are regulated and applied, the penalties are probably insufficient to appreciably reduce inflows of illegal waste (Dermatas and Georganti-Ntaliapē 2020, 1188). Overall, with increasing legislation and waste production, illicit exporting of waste has been a significant problem worldwide.

The cost of exporting waste to low-income countries has become cheaper due to factors, such as lower environmental regulations and low labour costs, thereby increasing both the legal and illegal trade in waste. The EU has become one of the top garbage exporters by taking advantage of the reduced costs and transporting waste while claiming higher recycling rates since they are utilising the recipient countries' recycling infrastructure (Environmental Investigation Agency 2023, 6). For the UK, mixed plastics are a particularly difficult waste stream since there are not enough facilities to collect, sift and treat them (Mitchell et al. 2013). Therefore, the UK has been exporting more plastic waste than it recycles domestically and Türkiye is the biggest receiver with 39% (Greenpeace 2021, 8). In 2020, Japan exported around 800 thousand metric tonnes of waste, becoming the second biggest exporter; whereas the U.S. followed as a third, exporting 600.000 tonnes (Environmental Investigation Agency 2021, 19).

The main importers of waste are Southeast Asian countries with India, Vietnam, and Indonesia as the top three, and Türkiye, gaining prominence after China's ban on imports in 2018. Prior to 2018, China was the main importer of non-hazardous waste and plastics worldwide with nearly half of the worldwide nonindustrial plastics (Brooks et al. 2018). In 2017, however, China passed the National Sword policy

1 International exchange of waste between nations for purposes of additional treatment, disposal, or recycling.

2 The Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and Their Disposal, usually referred to as the Basel Convention, was created in 1989 to regulate this issue of hazardous waste and its dumping by more developed countries to the lesser ones.

which permanently banned the import of nonindustrial plastic waste as of January 2018 (Wang et al. 2020). This has led to an immediate need to find new sites for 111 million metric tons of plastic waste by 2030 (Sembiring 2019). The main destinations after the ban have been Southeast Asian countries, chiefly Malaysia, Vietnam, Indonesia, Thailand, and Türkiye. However, unapt to deal with the immense amount of waste imports, Southeast Asian countries have begun to uphold their own bans. In June 2018, Thailand initially implemented a temporary ban on plastic waste imports, followed by a process to implement a complete ban from February 2023. In addition, Vietnam has suspended the issuance of import permits for plastic recycling in 2020.

As a result of these developments, Türkiye has become a destination for plastic waste imports, particularly from Western Europe, firstly because of its proximity to Europe. Furthermore, Türkiye's OECD membership has facilitated plastics exports to the country, as exporting to OECD countries is a less regulated process that does not require mutual consent and written documentation from the countries involved (OECD 2022).

### 4.3 Recycling Sector in Türkiye

Plastic production is a burgeoning industry in Türkiye, characterised by its relatively recent emergence and rapid growth. With a market share of 2.7% of global plastics production, Türkiye has established itself as the second largest producer in Europe after Germany, and ranks sixth in the world (PAGEV 2022, 2). Türkiye sources plastic raw materials from a wide network of over 100 countries, highlighting the considerable external reliance of the Turkish plastics industry for meeting its raw material needs, with imports constituting a substantial 87% of the total supply volume (PAGEV 2016, 25).

In recent years, plastic waste imports from the EU have drastically increased, almost expanding 20 folds the amount imported in 2016 (Greenpeace 2021, 12). In 2021, Türkiye domestically generated around 4 million tonnes of plastic waste while importing, around 700,000 tonnes (Environmental Investigation Agency 2023, 13). Out of the total nearly 4 million tonnes of plastic waste, only around 850 thousand tonnes were recycled, making the total recycling capacity roughly 18%. The EU was the biggest export of plastic waste to Türkiye with nearly 400 million kg, making up roughly 60% of all plastic imports (Environmental Investigation Agency 2023, 13). In 2022, Türkiye was the biggest importer of plastic waste, accounting for 14% of the worldwide trade (Alves 2023a). In a comparative context, Türkiye has imported approximately 13 million tonnes of ferrous metal waste from Europe, accounting for 67% of all EU metal exports, while also importing 0.4 million tonnes of paper waste from the EU in 2021 (Vaclavova 2022).

In 2020, the amount of waste generated in Türkiye was calculated to be around 105 million tonnes. This waste originated from various sources, including manufacturing industry establishments, mining establishments, thermal power plants, organised industrial zones, health institutions, and households. Among the total waste generated, around 30 million tonnes were classified as hazardous. Compared to 2018, the total amount of waste generated witnessed around 10% increase. Of the total waste, around 56% was either sold or sent to licensed waste treatment facilities, while 24% was directed to landfill sites. Additionally, approximately 7% of the waste was stored within the establishments, 7% was recovered within the facilities, 3.2% was collected by municipalities or managed by organised industrial zones, 1.7% was sent to co-incineration or incineration plants, 0.4% was utilised as filling material or for reclamation purposes, and the remaining was disposed of using other methods (TÜİK 2021).

The import of plastic waste has had a spill-over effect on the creation of tertiary businesses and employment in the recycling sector. However, there is a lack of statistical data on the economic value of the recycling sector, on the creation of jobs and on the wider impact of recycling practices. Therefore, there is a pressing need to establish a comprehensive and standardised data collection framework that captures key metrics related to the economic value generated by the recycling sector, including employment figures, revenue generation, cost savings, and resource conservation. It should also be noted that the recycling sector in Türkiye is predominantly characterised by informal work, with the upstream value chain heavily dependent on informal labour, upon which formal establishments rely. Collecting statistical data in an unregulated sector poses significant challenges for government bodies. This report aimed to fill in gaps in uncovering the mechanisms and operations of informal relationships in the waste management sector, highlighting how the recycling sector depends on unregulated work deals and labour relations.

Of the available studies on the informal sector of recycling in Türkiye, a recent report by Greenpeace (2021, 9) has exposed the illegal dumping and incineration of plastic waste exported from the UK, shedding light on the harmful consequences of mismanaged waste. The report highlights the long-term health risks, including leukaemia and elevated white blood cell counts, resulting from toxic exposure at the landfills, which are often ignored by Global North countries. Moreover, WWF (2019, 6) revealed that Türkiye is faced with the illegal dumping of 0.8 million tonnes of plastic at unregulated sites annually, contributing to 20% of the plastic waste entering the Mediterranean Sea. Furthermore, the OECD 2020 report positioned Türkiye as one of the least effective member countries in terms of the overall waste recovery rate (OECD 2020). Unable to deal with imported waste, dumping of waste into landfills as well as waste burning practices have been common, further accelerating the environmental and health repercussions (Interpol 2020, 6).

In wake of the adverse consequences caused by mismanaged imported waste from Europe on waste-importing countries, on January 17, 2023, the European Parliament adopted a new legislative proposal on waste shipments, flagging a recent development in the global waste trade, particularly from Europe to low-income countries. If adopted by the European Parliament and the Council, this legislation will be a step towards recognising and tackling the EU's waste footprint. The legislation aims to ensure that the EU promotes stricter rules on waste shipments outside the Union and cracks down on waste-related crime, while promoting a sustainable and circular economy. The legislation bans the export of hazardous waste and plastics to non-OECD countries. It establishes a monitoring mechanism for waste-exporting countries, requiring them to demonstrate that they can recycle waste in an environmentally sound manner (COM, 2021, 709, 12). Nevertheless, current legislation allows shipments to third countries as long as those countries give their consent and demonstrate that they have the capacity to manage this waste in a sustainable way.

## 4.4 Conditions of Work, Unionisation, and Labour

The informal sector plays a fundamental role in collecting and aggregating waste in the recycling industry around the globe. In situations like the financial crisis and factory closure in Argentina, agricultural dispossession in India, high inequality in Brazil, and fast urbanisation in Vietnam, waste streams have given surplus populations new sources to make a livelihood and to survive (Doherty and Brown 2019, 6). For instance, even at the beginning of the Millennium, it is reported that up to 2% of the population in Asia and Latin America make their living as waste pickers (Downs and Medina 2000).

As it largely remains unregulated, waste pickers are exposed to the most significant health risks along the value chain. They manually separate waste while wearing little to no protective equipment leading to direct contact with toxic materials or bacteria (Nikam et al. 2022, 17). Containers with residues of chemicals, pesticides or solvents, needles or bandages, and human/animal faecal matter are amongst the most common facilitators of occupational health risks (Wilson et al. 2006, 803). Many waste pickers have been documented to suffer from respiratory and dermatological problems, eye infections, and low life expectancy (Poole and Basu 2017). Chronic backache from carrying out intensive manual labour and a sense of general weakness was also noted to be fundamental issues. Moreover, as a result of the unsanitary conditions of their work environment, diarrhoea, and jaundice (pink-eye) were extremely common in waste pickers and domestic waste recycling workers in Denmark (Ivens et al. 1999).

Similarly, workers in recycling facilities are commonly observed to have respiratory, gastrointestinal, eye, and skin issues such as conjunctivitis, observed in recycling factories in Germany (Bünger et al. 2007). Those who handle batteries and cables for recycling are exposed to additional heavy metals as well as lead poisoning. Moreover, whereas mercury poisoning from the recycling of fluorescent lights has been reported in two cases from the same factory in Germany (Aymaz et al. 2001, 2254), recycling of wood and paper has been linked to cases of occupational asthma. Furthermore, it has been reported in studies from Southeast Asia that workers employed in recycling e-waste are exposed to organic and heavy metals that have been linked to DNA damage (Grant et al. 2013).

Child labour has also been reported as a feature of the informal recycling industry, with children as young as 3 or 4 accompanied by parents or older siblings in South and Southeast Asia, according to research by Child Labour: Action-Research-Innovation in South and Southeast Asia (Constant et al. 2020, 22). Children mostly work on the streets as waste pickers, but they are also employed at the lowest point in the supply chain, handling the exchange between community collection points and waste collectors. Children who work as waste pickers might be especially susceptible to contracting illnesses including cholera, tuberculosis, malaria, and occasionally even death-causing typhoid fever (Morais et al. 2022, 16). Furthermore, in e-waste recycling, children as young as five, are exposed to over 1,000 toxic substances, such as lead, cadmium, mercury, dioxins, nickel, brominated flame retardants, and polycyclic aromatic hydrocarbons (WHO 2021). These substances not only have detrimental effects on the health of the children but also contaminate the soil and waterways, leading to spill over effects, and endangering the survival of species (Environmental Investigation Agency 2023, 10).

Waste pickers also face societal vulnerabilities with women being paid less than men and informal recycling being traditionally practised by marginal groups (Nikam et al. 2022). For example, in India, the Harijans, a cast of untouchables, are responsible for waste collection and recycling which reinforces societal boundaries and diminishes the possibility of upward mobility (Wilson et al. 2006, 803). Scavenger communities establish their own habits, rituals, beliefs, and values as a result of isolation brought on by social rejection. Their communities often have poor living conditions, limited access to amenities and infrastructure, little provision for urban services like water supply and sewage, and no social safety networks. Moreover, they frequently face persecution from the government and police as a result of their marginalisation, and female waste pickers especially become more vulnerable targets for sexual exploitation, evidenced in regions of Latin America and Asia (Downs and Medina 2000, 59).

Unionisation among waste pickers has grown in the last decade, accompanied by governments' recognition of the informal sector and engagement with it by protecting workers' rights and incorporating their voices into the industry. Numerous waste pickers are already members of unions or cooperatives, despite the fact that division and hierarchies within the waste picker community can affect who participates in and gains from policies aiming at inclusion (Marello and Helwege 2018, 110). Unionisation not only provides waste pickers with institutional avenues to demand and protect their rights but also in cases like Bogotá, Columbia leads to enhanced integration into the formal recycling value chain. For instance, in Bogotá, there are already more than 100 waste picker collectives, many of which belong to the Asociación Cooperativa de Recicladores de Bogotá, which has 9,000 members (Medina 2005). The city designates collection routes for the cooperative and transports the recyclables to a facility where waste pickers sort them. Additionally, waste pickers in Pune, India, have utilised unionisation to legitimise their work, seamlessly integrating into the formal municipal waste recycling chain and elevating their socio-economic status. The establishment of the Kagad Kach Patra Kashtakari Panchayat in 1993 was crucial to this (Chikarmane 2012). After that, the organisation led the fight for waste pickers and nomadic waste purchasers to be classified as employees. Hence, unionising waste pickers can assist to ensure the fair recognition and governance of the unorganised sector.

## 4.5 Towards A Just Transition

The concept of Just Transition is rooted in the idea that the transition to a sustainable, low-carbon economy must be fair and equitable for all, particularly for workers and communities that have historically relied on fossil fuels and other polluting industries. It seeks to ensure that the costs of transition are shared fairly and that no one is left behind. People frequently struggle to find new employment due to a skills gap or are forced to make compromises, including significant income losses, lengthy commutes, loss of culture, community identification, and feeling of place (Wang and Lo 2021). As moving away from fossil fuels necessitates the complete closure of numerous related industries, promoting potential green jobs offered by alternative energy sectors has been put forward as a solution (Abraham 2017; ILO 2022a), and the just transition concept has been centred around the “green jobs” since its first proposal by trade unions in the 1980s (McCauley and Heffron 2018; ILO 2022a).

Today, the scope of green jobs has expanded beyond its initial focus as potential jobs in the renewable energy sector. Jobs that help to safeguard and restore the ecosystem, whether they are in traditional sectors like manufacturing and construction, or in new, emerging green sectors like renewable energy, are regarded as green jobs (ILO 2017; ILO 2022b). Although the definition has been broadened to include all sectors that contribute to environmentally friendly practices, with a growing emphasis on the circular economy, and thus recovery, reuse, and recycling; new “green” jobs and economic opportunities in sectors such as waste management, recycling, and refurbishment have been highlighted as having a high potential for offering green jobs that can help to support workers and communities affected by the transition.

Justice issues in the low-carbon transitions are brought on by the unequal distribution of benefits as well as the downfall of the fossil fuel sector. Research shows that underprivileged people may not really profit from renewable energy, the so-called “green employment generators” (Wang and Lo 2021). For example, the percentage of women and persons of colour working in the solar sector in the United States is much lower than the national average for all occupations (Carley and Konisky 2020). When it comes to “green jobs”, men continue to predominate globally in highly specialised, lucrative occupations. This indicates that the process of the just transition has to be accompanied by active efforts and implementation to integrate the vulnerable parts of society while ensuring that their living standards increase.

The waste management and recycling industry already employs a substantial number of individuals. In developing countries, about 15-20 million people work as informal waste collectors (Haley 2020) and this figure only includes the number of waste collectors, not workers in both informal and formal facilities, waste mediators, and other workers moving along the recycling value chain. Although the sector has a high potential for offering green jobs towards just transition, waste labourers in informal recycling, many of whom are poor, often work in hazardous settings while greening the economy. Furthermore, several informal waste collectors are not only marginalised and overlooked by the local authorities in many cases but also receive vindictive treatments such as the retention of their vehicles like iron rickshaws (Nikam et al. 2022). According to Morais et al. (2022), waste pickers continue to be an unattended portion of society and are perceived as a marginalised minority by the state and the general public in countries like China, Thailand, Türkiye, and Russia. Therefore, there is no other sector of the economy where the need for legislative actions for a level of formalisation with benefits for health and safety and appropriate training is more pressing.

In line with the principles of just transition, truly greening the waste management and recycling sector would require formalisation and organisation of waste workers (The Green Jobs Initiative 2012; ILO 2022b, 5) while ensuring social inclusion, improving working conditions through health and security measures, and incomes, and implementing safeguards against child labour. In our report, section 6 will go into more detail regarding the best practices used globally to enhance people’s working and living conditions along the waste cycle in order to assist in the transition to a just and ecologically responsible economy and society.

Incorporating insights gleaned from global literature, trends, and movements as contextual background, our focus now shifts to the empirical data within the specific region under examination.



## ► 5. Findings

### 5.1 Identifying Actors and Connections

In this section, we will be documenting the actors and sites entangled along the chain of waste from collection to sorting and recycling. Our objective is to identify the actors and relationships that move and shape waste, as well as how waste comes to shape worker's lives as it circulates. During our research, we identified two cluster nodes along the waste chain in the region: firstly, a warehouse, known locally as a "*depo*", which receives mixed waste collected directly from the streets and agricultural fields; and secondly, an industrial recycling facility where the sorted waste is delivered in larger quantities, facilitated by waste transporters, known locally as "*ayakçı*".



*Photo 5.1 A "depo" where waste collectors gather mixed waste from the streets*

*Depos* (cluster 1) are makeshift mini warehouses that are often 140 to 160 meter squares in the bottom of an apartment (see Photo 5.2) or a brick built-and-aluminium-roofed structure where garbage coming from streets and agricultural fields is accumulated and distributed. Since these *depos* are not officially registered, neither the municipality nor the Çukurova Association of Waste Collectors (Çukurova Atık Toplayıcıları Derneği) provides a number but estimates suggest that there are over 1,000 in Adana, not exclusively but densely in the Yeşilyurt, Çarşı, Gürselpaşa, Şakirpaşa, Hürriyet, Yurt, Toros, and Gülbahçesi neighbourhoods. According to the former vice-president of the Çukurova Association of Waste Collectors, the association has approximately 1200 registered waste pickers. This number does not include Syrians and unregistered Turkish waste collectors.



*Photo 5.2 Inside a depo, where mixed garbage is sorted*

**Table 5.1** The characteristics of *depos* visited

| # of depo     | Characteristics                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|---------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Depo 1</b> | Only men of mixed ethnicity and nationality (Syrians, Kurdish, and Turkish) work where the owner, Ali, rents the space, organises the work and has significant decision-making power over the organisation of work, communication and financial flows. Despite the lack of a common language, Syrians and Turkish citizens of Kurdish origin cooperate, share sleeping spaces and work together, with older Syrians relying on younger ones for everyday communication. Children, especially Syrians, live and work alongside their fathers in the <i>depo</i> .                                                                                                                                                                                                                                |
| <b>Depo 2</b> | Only men of mixed ethnicity and single nationality (Kurdish and Turkish) work in a cooperative way, where several people pool money to finance the space, organise the work and make more collective decisions about the organisation of work, information exchange, and the flow of money. Elderly people who have been divorced, isolated or abandoned by their families, as well as orphaned children, are relatively more common, where they tend to be bonded in solidarity as a brotherhood rather than through kinship.                                                                                                                                                                                                                                                                  |
| <b>Depo 3</b> | Only men of a single ethnicity and nationality (Syrian, Arab) work in this <i>depo</i> , where the owner, Khaled, rents the space, organises the work and has relatively high decision-making power over the work processes, information-exchange and financial flows. However, almost all the workers in this <i>depo</i> , with the exception of the Turkish waste mediators, share biological ties or previous companionship prior to their migration. This dynamic gives each worker a degree of influence over the organisation of work, as the <i>depo</i> functions as a community space that promotes collaborative work and income generation for all. Here, women do not assist male family members in their work, and children start assisting the family at a relatively early age. |
| <b>Depo 4</b> | Mixed genders and people of a single ethnicity and nationality work at the <i>depo</i> , where the patriarchal father, Musa, rents the space, organises the work with extended family members and has strong decision-making power over work organisation, information exchange and financial flows. Here, women work alongside male relatives such as husbands, children and cousins, and children start contributing to the family at a young age and leave school early.                                                                                                                                                                                                                                                                                                                     |



The four different characteristics of *depo* that we concentrated on during our research are detailed above. In these *depos*, there are typically 8-16 people who have become affiliated as a result of their involvement and cooperation along the material and economic chain of waste. Some of these attachments are deeper, emotional, and enduring, while others are sporadic, depending on the availability of waste and the negotiated market price for materials. We will explain here the categories and functions of labours in these *depos*, and then clarify the attachments, but will largely return to document informal solidarities, unionisation, and conflict in the final section, while we discuss the enabling environment and structures that shape workers and waste.

In general, there are five categories of people associated with these *depos*. First, there are “waste pickers” who live in these *depos*, and they cohabitate there with other waste pickers who are homeless, divorced, estranged from their families, orphaned, abandoned, and/or lost family members due to war, sickness, imprisonment, or drugs. These workers sleep in bunk beds, cook together, and share a communal space where they help each other financially and physically. For example, if someone becomes ill, he is cared for, taken to a doctor, and food is provided.



*Photo 5.3 Inside a depo, where certain waste collectors reside*

Second, there are waste collectors who come to the associated *depo* on a regular or irregular basis and leave the materials they collect, but they do not live in these *depos*. Some of these pickers prefer to be more socially connected with these sites and are less concerned with getting the best price. In exchange, they develop deeper relationships in order to provide reciprocal assistance and support if necessary. To obtain a better rate, some individuals can choose to transfer their materials to other *depos*, but this takes more time and effort and calls for a reliable exchange. Below, one waste collector discusses how he makes long-term calculations as opposed to small, daily calculations.

*Our lives revolve around a few people, and we want to get to know and trust them as we work together all the time. We, of course, care about the price and have the option to sell it to someone else if we feel mistreated. However, we do not make daily small calculations as we balance our rights and debts in the long run, taking a little less now and a little more later, and cooperating and helping each other as we trade. We can and will survive if we rely on and cooperate with one another.*

Third, in some of these depots, there is a person known as a “waste sorter” who is paid on a regular basis by the owner of the depot and receives meals. He either lives in a depot or a nearby house and comes to the site mostly six days a week for about ten-twelve hours of work. The sorter mostly segregates the mixed waste taken from waste collectors into six categories, typically termed as (1) hard plastics, (2) soft plastics, (3) nylon, (4) aluminium, (5) iron and steel, and finally (6) papers and cardboards. Depending on the size of the depot, he commonly sorts around 7-10 waste bags, locally known as “atom”, weighing 60 to 80 kg, each of which takes 45 to 75 minutes of classification depending on the characteristics of the materials brought in.



*Photo 5.4 Waste collectors use electric cycles or walk, collecting waste with “çek-çek” devices*

Fourth, the depot owner, also identified as a waste intermediary, is in charge of the depot’s administration and expenditures, as well as occasionally assisting in the sorting of materials that arrive. Typically, a depot owner—who was earlier often a waste collector—selects a spot in the neighbourhood close to his family home and pays the rent. Depending on the neighbourhood and size, the rent ranges from 10,000 TL to 30,000 TL annually for the 4 depots we have studied as of early February 2023. The depot owner typically acts as a middleman, accepting mixed waste and organising sorting work for standardisation, and then transferring to industrial facilities for further processing.

Finally, *ayakçı*, the fifth and final actor connected to the store, transports the sorted materials to industrial manufacturers where these materials are broken down and melted to make plastic granules. Depending on the workload, the business partnership, the quality, and the bargaining power of each side combined with the overall market conditions, there may be more than one *ayakçı* for each depot. Typically, *ayakçı* takes standardised waste material from depot to industrial processing.

There are two distinct yet interconnected industrial processes that can sometimes be physically integrated in the same location, while in other cases, they are separated. The standardised waste material is crushed in the first facility, and the crushed particles are collected and melted in the second facility to create plastic granules, which are tiny particles utilised as raw materials in industrial manufacturing.





*Photo 5.5 Farmland irrigation pipes transported for washing and crushing*

While conducting our research in the region, we looked at both types and observed that, as a business strategy, entrepreneurs frequently begin with a crushing machine as it is less costly and can be operated informally to easily supply raw materials for locally produced granules. Granule production, on the other hand, calls for more formalisation, standardisation, optimization, and marketing and sales operations as it is a standard raw material for sale in both domestic and international markets. Hence, the degree of formalisation and standardisation grows as we move from upstream to downstream recycling operations. Nevertheless, as we followed the processes of recycling waste into a commodity, the formal and informal appeared to go hand in hand, mix, and merge as waste moves and transforms. In other words, even as an informal process is absorbed by a formal one, informality endures and perpetuates profitability, enabling the industry's explosive growth, especially with the assistance of cheap, informal, refugee labour. Estimating the informal rate of the recycling sector is challenging due to the dynamic nature of formality and informality within the industry. The integration of formal and informal practices further complicates the assessment of the sector's informality. However, it is key to recognise that the sector encompasses a mix of formal and informal activities, with varying degrees of informality depending on the specific context and individuals involved. According to the former Vice-President of the Çukurova Waste Collectors Association, there are approximately 240 recycling facilities in Adana, of which an estimated 30 percent operate unregistered or "under the counter". The remaining facilities in Adana exhibit a range of informal practices, such as employing undocumented migrants, lacking social security coverage, paying low wages and, in some cases, using child labour. However, as we move downstream to larger plastics manufacturing companies, as observed in the field, the prevalence of informal practices tends to decrease.

During in-depth discussions with managers of prominent plastic production companies operating in the downstream recycling chain, specifically engaged in the manufacturing of plastic bags, nylons, irrigation pipes, a concerning issue emerges. Despite the outward appearance of high formalisation within these companies, there is a noticeable denial or disregard for the presence of informality that permeates their supply chain links. For instance, in the production of plastic bags, certain stages of the supply chain may involve child labour or informal workers, such as the collection and sorting of plastic waste by waste pickers operating in informal settings. Moreover, waste pickers often work under precarious conditions, lacking



proper employment contracts, social security coverage, and fair wages. This situation raises significant concerns about the lack of supply chain monitoring and responsibility in these highly formalised sectors. While these companies focus on the procurement and processing of plastic granules, there is often a disconnect when it comes to ensuring ethical labour practices and fair wages throughout the entire supply chain. This gap in responsibility contributes to the perpetuation of informal practices and undermines efforts to address social and labour rights issues within the industry. We now shift our focus back to industrial relations to comprehensively conclude the loop, encompassing the entire process up to granule production. This topic will be revisited in section 5.4, where a more detailed examination of work, working conditions, and the waste cycle will be undertaken.

The plastics brought to the factory are washed after being separated by colour before being placed through a crushing machine and turned into small pieces, locally known as “*çapak*”. The procedure then moves on to the heating and melting step. The recycled materials are then processed into granules. Paper cartons delivered to the factory are separated into three types of waste: cardboard paper, glossy magazine paper, and white paper. In the paper grinding machine, the separated wastes are ground into *çapak*, or small pieces. To separate the paper fibres, they are immersed in water for a period of time with chemicals that allow them to dissolve in the water. When the fibres separate, they are cleaned and placed in paper making machines, which use pressure to squeeze the water out of the pulp and turn it into recycled paper.



*Photo 5.6 Plastic irrigation pipes are broken down into small pieces called “çapak”*



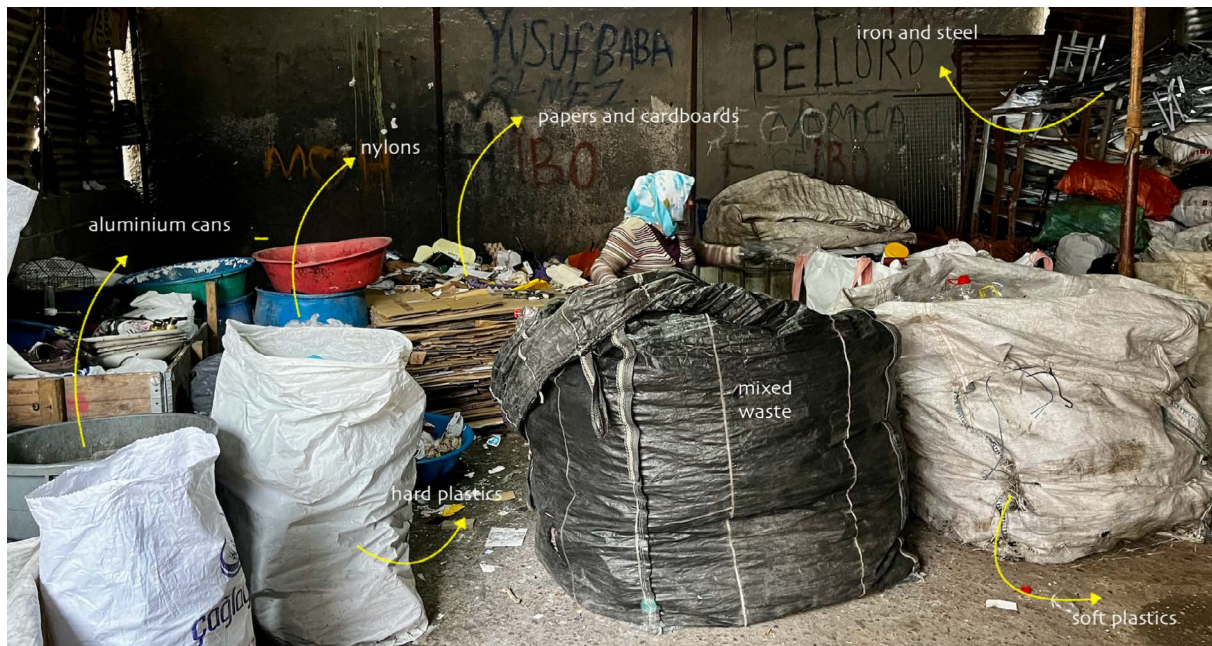
*Photo 5.7 Plastic irrigation pipes are broken down for granulation*



These identified actors move along the value chain with their work relationships, which shape and are shaped by the flow of waste. As the waste degrades into granules, the labour and interactions of the actors are accumulated and transferred along the value chain from upstream to downstream, and finally to the final actor, the consumer, who shops plastic bags, bikes, toys, pipes, and a variety of other stuff. The cycle will restart with the disposal of things, which turns them back into waste, and reshape the landscape along with the actors and their connections once again. It should also be noted that plastics can be recycled an estimated 2-3 times as their quality deteriorates significantly with each cycle. Hence, the primary approach to mitigating the negative environmental impact of plastic consumption remains to minimise its use and consequently its disposal.

## 5.2 Identifying the Categorisation and Valorization of Waste

In this section, we will be disclosing the categories, market valuation, and profitability of waste along the chain of recycling. Our objective is to demonstrate the different categories of waste that are exchanged on the market, as well as the value transformation and accumulation that appears along the movement of waste.



*Photo 5.8 A waste sorter in a depo classifies mixed waste for the next stage*

The journey of recycled waste starts with the collection of waste pickers from garbage containers, neighbourhoods, roadsides and in front of certain businesses by travelling approximately 20 km by iron rickshaw and approximately 30 km by electric motorcycle in and around urban neighbourhoods. By tracing the route taken by Yusuf as a case example, a waste picker who operates approximately six days a week, we gain insights into the tasks and activities at the foundational level of the recycling process. If he uses an iron rickshaw, also known as “çek-çek” in Türkiye, he walks approximately 20 kilometers for each cycle. He would be back in 4-5 hours, depending on how much waste he collected. He takes a break, drinks some tea, and then continues walking for another 20 kilometers. He even takes a third tour, depending on his mood, weather, and police surveillance, as well as market prices, which motivates him to earn more. For each cycle, he could bring between 40-80 kg of mixed waste in the winter, and slightly more between 60-100 kg in the summer. If he rides a motorcycle, he may travel approximately 35-40 kilometers per cycle before returning to change the battery, which normally lasts approximately 45-50 kilometers with no load. He could travel to more distant areas and check in wide areas if waste is not found, increasing



the likelihood of bringing a larger volume of waste. The amount of waste carried to the depo increases slightly around 60-100 in the winter and 80-120 in the summer, but overall, they could approach upper limits with this device compared to an iron rickshaw, which restricts movement and reach. In the summer months, a noticeable surge in plastic waste is often noted, primarily attributed to the holiday season and the heightened demand for plastic products linked to agricultural production and harvesting, including containers for pesticides and herbicides, mulch, films, and plastic irrigation pipes. Waste collectors also report a rise in paper waste during the winter break in January and the completion of the school year in late May, driven by the disposal of student notebooks and the customary spring household cleaning practices prevalent in Türkiye.

The collected mix waste is, in the next stage, taken to depo, where when purchased by the depo owner, it gains its first market value. While estimating the market price of waste and finalising the transaction, it was noticed that the industrial market price was used as a foundation while negotiating and explaining how the market behaves, with each actor attempting to maximise his or her own profit margin. It was observed that waste pickers in the region generally gather six different types of waste, including (1) hard plastics, (2) soft plastics, (3) nylon, (4) aluminium cans, (5) iron and steel, and finally (6) papers and cardboards. We also classified the waste collected and segregated in terms of standardisation and provided the industrial processes that each material undergoes, as well as examples of which products they recycled into for their next cycle of life. Moreover, some collectors—not all—collect glass waste which includes glass bottles, jars, and any other glass-based waste. Due to its low material value, glass waste is one of the least collected waste categories. Collectors typically sell it to a depo owner for 1.00 TL per kilo, the depo owner sells it to waste transporters for around 1.20 TL, and waste transporters sell it to industries for 1.50 TL in early February 2023.



*Photo 5.9 Collected alcohol bottles for refilling*

Waste pickers occasionally gather bottles of prestigious branded alcohol, such as whiskey, rakı, vodka, or gin, although such occurrences are infrequent. These bottles hold distinct value within the market, selling at a premium to individuals involved in producing counterfeit alcohol. For instance, a Chivas whiskey bottle might fetch approximately 25 TL as of early February 2023. However, some of our interviewees expressed strong resistance towards collecting and vending these alcohol glass bottles, citing their association with fake or illicitly produced alcohol that can lead to adverse health effects, such as nausea, blindness, and even death.

When the waste arrives at a depo in a mixed form, the owner ensures that it is divided into the six categories as seen in table 5.2. A kilo of mixed waste is around 1.7-2 TL and in some *depos*, the separation is done by a separate paid labourer (waste sorter); in others, the depo owner and waste pickers do it collectively, as mentioned earlier. In the next stage of the chain, the depo owner collects the separated waste and sells them to the waste transporter. Waste transporters, namely *ayakçılar*, then sell the waste for around a price margin of 0.5 - 1 TL on the price bought and deliver it to recycling facilities or crusher plants. In the next stage, the wastes transported to the crushing plants become *çapak* following the crushing process, and these *çapak* wastes are turned into granules by employing various chemicals in other factories or granule producing machines within their own establishment.

**Table 5.2 Types of recycling materials**

| Categorisation by Waste Collectors        | Standardisation                                                                     | Industrial Process                                                     | Possible End Products                                                                                                  |
|-------------------------------------------|-------------------------------------------------------------------------------------|------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------|
| <b>Hard Plastics</b>                      | Polypropylene (PP) and Polyvinyl chloride (PVC) - or locally known as <i>moblen</i> | Crushing, Watering, Pelitting, Melting, Granuling                      | Plastic containers, pipelines, Shampoo/Detergent bottles, Garbage Bins, Buckets, Carboys                               |
| <b>Soft Plastics</b>                      | Polyethylene and Terephthalate (PETE or PET) - or locally known as <i>elteks</i>    | Crushing, Watering, Pelitting, Melting, Granuling                      | Cups, Plastic Bags, Stretch Film, Bottle Caps, Pet Cups, Plastic Toys, Stationery Supplies                             |
| <b>Nylons</b>                             | Polyamide (PA)                                                                      | Crushing, Watering, Pelitting, Melting, Granuling                      | Films, Package Foam, Compact Discs, Nylon Bags, Stationery Supplies                                                    |
| <b>Aluminium and Stainless Steel Cans</b> | Easily Malleable Metal                                                              | Sorting<br>Crushing<br>Melting<br>Casting                              | Metal Cans, Aluminum Foil, Rebar, Automobile/Bicycle parts                                                             |
| <b>Iron and Steel</b>                     | Metal                                                                               | Sorting<br>Crushing<br>Melting<br>Purification<br>Casting              | Cooking pots & pans, Railroad/Subway, Machinery, Electrical Wires, Telephone Wires, Aeronautical & Aerospace equipment |
| <b>Paper and Cardboards</b>               | Paper and Cardboard                                                                 | Shredding<br>Pulping<br>Screening<br>De-Inking<br>Bleaching<br>Rolling | Newspapers, Books, Carry Bag, Egg cartons, Paper Towel, Napkins, New Cardboard                                         |

In terms of the volumes of different categories of waste collected and segregated, we examined four different depots right before the earthquake, as seen in Table 5.1. We calculated the aggregated average volumes over a week-time frame since some waste collectors, sorters, and intermediaries do not work every day and their load fluctuates over days.

Table 5.3 The volume of different types of materials collected

| Type of Waste                     | Periods Per Week | Depo 1 Volume Per KG | Depo 2 Volume Per KG | Depo 3 Volume Per KG | Depo 4 Volume Per KG |
|-----------------------------------|------------------|----------------------|----------------------|----------------------|----------------------|
| Hard Plastic                      | 1                | 480                  | 360                  | 420                  | 420                  |
| Soft Plastic                      | 1                | 180                  | 70                   | 120                  | 120                  |
| Nylons                            | 1                | 120                  | 90                   | 70                   | 70                   |
| Aluminium Stainless Steel Bottles | 1                | 30                   | 7                    | 14                   | 36                   |
| Iron and Steel                    | 1                | 204                  | 160                  | 210                  | 84                   |
| Paper and Cardboards              | 1                | 2,400                | 2,100                | 2,040                | 2,496                |
| <b>Total</b>                      | <b>1</b>         | <b>3,414</b>         | <b>2,787</b>         | <b>2,874</b>         | <b>3,226</b>         |

When analysing currency values, we start with different types of plastic (hard plastic, soft plastic, and nylon), then move on to metals and papers. It should be noted that the price amounts were identified and cross-checked using interviews conducted prior to the earthquake in early February 2023 in four depots. It should be also noted that plastics have different values depending on their colour and quality. When the colour of plastic waste approaches white, the market price rises in comparison to mixed-coloured plastics.

Table 5.4 Valuation of waste between actors<sup>3</sup>

| Collected Waste                   | Sales Price to Waste Middlemen (depo owner) per Kg | Sales Price to Waste Transporter (ayakçı) per Kg | Sales Price to Recycling Facilities per Kg |
|-----------------------------------|----------------------------------------------------|--------------------------------------------------|--------------------------------------------|
| Hard Plastic                      | 4 TL                                               | 5 TL                                             | 6 TL                                       |
| Soft Plastic                      | 4 TL                                               | 5 TL                                             | 6.5 TL                                     |
| Nylons                            | 3.5 TL                                             | 4.5 TL                                           | 5 TL                                       |
| Aluminium/Stainless Steel Bottles | 18 TL                                              | 22 TL                                            | 26 TL                                      |
| Iron and Steel                    | 4.5 TL                                             | 5.5 TL                                           | 6.5 TL                                     |
| Paper and Cardboards              | 1.40 TL                                            | 1.60 TL                                          | 1.80 TL                                    |
| Glass                             | 1 TL                                               | 1.20 TL                                          | 1.50 TL                                    |

<sup>3</sup> It should be noted that the price amounts were identified and confirmed based on 73 interviews conducted in four *depos* in early February 2023, right before the quake.

Starting with the first category of hard plastic waste (such as detergent and shampoo boxes, basins and buckets), we found that in early February 2023, the collector sells it to the *depo* owner for 4.00 TL, the *depo* owner sells it to the waste transporter for 5.00 TL, and the waste transporter sells it to the manufacturer for 6.00 TL. Due to differences in material quality, the value of PET waste fluctuates according to thickness. While the collector sells the PET waste for 4.00 TL to the *depo* owner, the *depo* owner sells it to the waste transporter for 5.00 TL, and the waste transporter sells it to the factory for 6.50 TL. Nylon waste encapsulates disposable thin packages and plastic bags. It is the least valuable type of plastic waste, as it contains thin and generally disposable plastics of typically poor quality. The *depo* owner, who buys the weight of nylon waste from the collector for 3.50 TL, sells it to the waste transporter for around 4.50 TL, who sells it to the factory for around 5.00 TL.

Tin and cans are examples of aluminium waste whose value varies significantly. The *depo* owner purchases a kilo of these wastes from the collector for 18 TL and sells it to the waste transporter for 22 TL, who then sells it to the factory for 26 TL. A sub-category discovered through field study indicates that beverage cans, particularly tin beverage cans, have more value than other aluminium wastes. The *depo* owner purchases these wastes from the collectors for 12.00 TL per kg and sells them to the waste transporter for 18.00 TL before selling them to the manufacturer for 20 TL. Finally, metal waste, also called scrap, includes iron, copper scrap, electronic waste, battery scrap and cable scrap. While the collector sells the scrap to the *depo* owner for 4.50 TL per kilo, the *depo* owner sells it to the waste transporter for 5.50 TL, and eventually the waste transporter sells it to the factory for 6.50 TL.

The category of paper waste includes waste such as books, notebooks, napkins, and cardboard. It has the lowest monetary value of the 6 waste types identified in this analysis. However, it is generally available and is the most frequently collected by waste collectors, albeit it is not always favoured. The collector sells paper waste to the *depo* owner for 1.40 TL per kilo, the *depo* owner to the waste transporter for 1.60 TL, and the waste transporter to the factory for 1.80 TL. When waste collectors and middlemen want to maximise the value of their waste, they use techniques such as soaking the paper to increase its weight before selling it to the waste transporter.

### 5.3 Identifying the Enabling Environment

In this section, we will be uncovering the enabling legal and institutional environment, control, solidarities, as well as conflict along the value chain of recycling. Our purpose is to portray the environment in which waste, people, and organisations manifest and move, as well as how people interact with rules and norms when dealing with waste.

The main legal framework for waste management in Türkiye is the Environmental Law No. 2872, enacted in 1983 and amended several times since then, which sets out the general principles and objectives for the protection and improvement of the environment in Türkiye. Waste management includes concepts based on the prevention of waste generation, separation of waste by type and recycling. It is regulated by the Ministry of Environment, Urbanization, and Climate Change. The Waste Management Regulation (2015) summarises the key ideas of waste management as follows:

- Prevention of waste generation, (reduction at source, reuse)
- Separation according to its nature and type, (accumulation, collection, temporary storage, transportation)
- Recycling, (disposal, control and supervision)

The Turkish laws, regulations, and policies that are built around these tenets call for the implementation of waste prevention measures and establish the guidelines for the entire waste generation and disposal process, which are summarised in Table 5.5 below.



Table 5.5 Legal framework of waste management in Türkiye

| Regulations,<br>Laws, Circulars                                                            | Scope                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|--------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Environmental Law</b><br>-<br>11.08.1983<br>Official Gazette No.18132                   | <ul style="list-style-type: none"> <li>► The purpose of this law is to ensure the protection of the environment, which is the common asset of all living beings, in line with the principles of a sustainable environment and sustainable development.</li> <li>► It is written with the principle that the person who creates pollution takes responsibility. Consequently, it determines the institutions responsible for waste and recycling and the general framework of issues such as polluter responsibility, administrative penalties, and environmental budgets.</li> </ul>                                                                                                                                                                                                                                                                           |
| <b>Regulation on Landfilling of Wastes</b><br>-<br>26.03.2010<br>Official Gazette No.27533 | <ul style="list-style-type: none"> <li>► It aims to prevent environmental pollution that may occur during the storage of wastes, waste acceptance processes, and technical design of storage facilities. Furthermore, it seeks to prevent adverse effects that may pose a risk to the environment and human health, including the greenhouse effect, during the operation, closure, and post-closure maintenance processes of waste storage facilities.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                             |
| <b>Waste Collection Center Communiqué</b><br>-<br>31.12.2014<br>Official Gazette No.29222  | <ul style="list-style-type: none"> <li>► It aims to determine the procedures and principles regarding the waste collection centres established to ensure that recyclable wastes are collected separately at the source without mixing with other wastes and left for recovery or disposal.</li> <li>► Explains the waste list and grouping in order to ensure the correct separation and accumulation of wastes.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>Waste Management Regulation</b><br>-<br>02.04.2015<br>Official Gazette No.29314         | <ul style="list-style-type: none"> <li>► It aims to ensure the management of wastes from their generation to their disposal without harming the environment and human health, and to reduce the use of natural resources through ways such as reducing waste generation and encouraging reuse and recycling.</li> <li>► Defines the concept of Extended Producer Responsibility</li> <li>► Determines the duties and authorities of persons, institutions, and organisations responsible for the production and management of waste. Defines the general procedures and principles regarding the production, market surveillance, and inspection of products covered by the regulation.</li> </ul>                                                                                                                                                             |
| <b>Zero Waste Regulation</b><br>-<br>12.07.2019<br>Official Gazette No.30829               | <ul style="list-style-type: none"> <li>► The main objective of the Zero Waste Regulation is to reduce the generation of waste and minimise the harmful effects of waste on the environment and human health. It is to determine the general principles and those regarding the establishment, dissemination, development, monitoring, financing, registration, and certification of the zero-waste management system.</li> <li>► The Regulation provides a waste management plan covering the reduction, recycling, reuse, and management of waste from its generation to end use.</li> <li>► To regulate the procedures and principles regarding the establishment of an effective zero waste management system, the establishment of an effective collection system, the recycling/recovery of waste and the issuance of zero waste certificates.</li> </ul> |

|                                                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|-------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Regulation on Control of Packaging Waste</b><br>-<br>26.06.2021<br>Official Gazette No.31523 | <ul style="list-style-type: none"> <li>► The purpose of this regulation is to ensure the production of packaging with certain universal criteria, basic conditions, and characteristics, to prevent the generation of packaging waste, and to reduce the amount of packaging waste that cannot be disposed of through reuse and recycling.</li> <li>► It is the determination of legal, administrative, and technical principles and programs for the establishment of technical and administrative standards for separate collection at source and transportation within a certain management system.</li> <li>► Sets the framework for the accumulation, collection, and management of packaging waste in the dual sorting system and prohibits the disposal of packaging waste in landfills. Defines annual recovery targets for authorised institutions.</li> <li>► The Regulation also establishes the environmental protection standards and inspection processes required for the construction, operation, and maintenance of facilities where packaging waste is collected, recycled, and/or disposed of.</li> <li>► As of 2021, total recycling and recovery targets and recycling rates by material type have been set across the country. In this regulation, the recovery target for 2031 and beyond is 70%.</li> </ul> |
| <b>Waste Collectors Circular</b><br>-<br>06.2022                                                | <ul style="list-style-type: none"> <li>► Waste collectors can apply to the municipality with their identity information.</li> <li>► They are registered into the Zero Waste Information System and can receive a 'Independent Zero Waste Collector' card if they are considered appropriate as a result of the municipality's examination.</li> <li>► It is important that the collected waste be carried to municipal waste facilities using gloves, work clothing, and vehicles in compliance with municipal requirements. Aside from that, waste collections are also controlled by the municipality.</li> <li>► It is essential that recyclable wastes such as paper, plastic, and metal be collected separately based on their type, and that waste collectors do their task within the timeframe specified and without disturbing the current zero waste management system.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                        |

Source: Ministry of Environment, Urbanization and Climate Change

Under these laws and regulations, management of solid waste is the responsibility of local authorities, primarily municipalities. In other words, these authorities are made responsible for the safe and environmentally sound collection, transportation, and disposal of solid waste. In order of authority and responsibility, each level is subordinate to the next, and the higher authorities must provide the necessary training, materials, and support to those below them, as categorised with their duties in Table 5.5 below.

**Table 5.6 Authorization and obligations of institutions**

| Ministry of Environment, Urbanization and Climate Change                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <ul style="list-style-type: none"> <li>► Granting environmental licences to waste treatment facilities, supervising waste management activities</li> <li>► Authorising institutions and organisations, supervising the authorised institutions</li> <li>► Carrying out international studies on transboundary movement and disposal of waste</li> <li>► To determine the procedures and principles regarding the preparation, implementation, and monitoring of waste management plans</li> <li>► To prepare or have prepared a national, regional, and/or local waste management plan and to ensure that the public is informed</li> <li>► To determine the principles regarding the implementation and monitoring of the deposit system</li> </ul> |

### Provincial Directorates

- Ensuring cooperation and coordination for the implementation of the regulations and conducting inspections
- Identifying and registering the producers/waste generators operating within the provincial borders, organising training activities by the parties assigned responsibility
- Permitting temporary storage areas, non-hazardous waste collection-separation facilities, granting and inspecting environmental licences to waste processing facilities
- To take the necessary legal actions regarding the institutions that are found not to operate in accordance with the licence conditions within the provincial borders and to notify the Ministry
- To evaluate the waste declaration form filled out by waste generators through the online application and ensure that necessary corrections are made
- To evaluate and approve the submitted waste management plans and ensure their implementation

### Municipalities

- Establishment and operation of waste processing facilities and obtaining environmental licences for the relevant facilities
- Prepare and submit to the Ministry waste management plans, including the prevention of waste generation and waste minimization
- Keeping records of vehicles used in waste transportation, establishing a vehicle tracking system
- To take necessary measures to prevent the collection, transportation, and processing of waste by unauthorised persons
- Ensuring the separate collection of waste at source and the establishment of dual collection systems, and submitting information and documents regarding the collected waste to the Ministry

### Waste Processing Plants

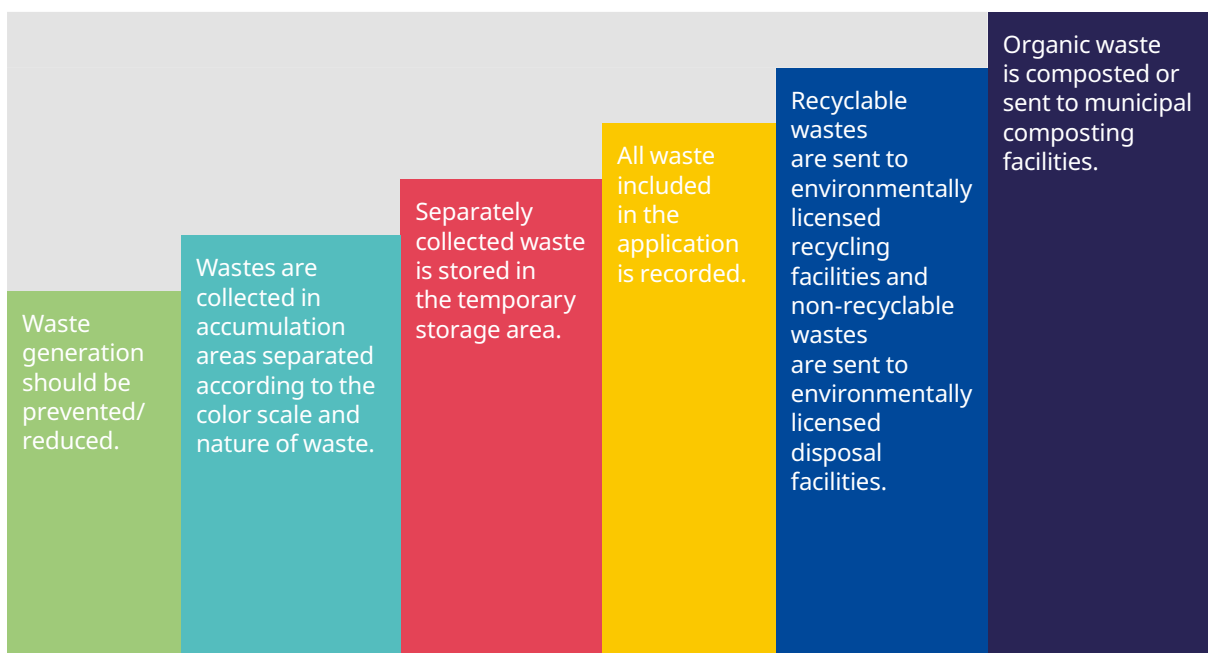
- To select the location of the facility so that the closest distance to residential areas is 250 meters and to design it in a way to prevent pollution of soil, surface waters, and groundwater
- Taking all kinds of preventive measures to minimise odour, dust, leachate, gas, and similar negative effects that may arise from the facility
- Ensuring the occupational health and safety of personnel working in the risk-bearing parts of the facility, ensuring the training of personnel in case of emergencies, and informing the Ministry in such cases
- To prepare and implement the work plan of each department related to the operation of the facility

### Waste Producers

- Taking measures to minimise waste generation
- To determine the nature of the waste and to cover the costs incurred for its collection, transportation, and treatment
- Collecting waste separately and storing it temporarily, keeping it closed in a way that does not harm the environment and human health, and making it ready for collection
- Keeping records in line with the principles determined by the Ministry for the wastes it generates and making appropriate packaging and labelling
- To ensure the training of its employees who are responsible for the waste management process and to take all kinds of measures related to health and safety
- Fill in the waste declaration form every year using online applications prepared by the Ministry, including information from the previous year

Apart from the national regulatory framework, Türkiye has been involved in international agreements related to climate change and waste management since the 1960s. Being one of the founding members of the OECD, and signatory to Basel Convention (1989), Kyoto Protocol (1997), and Paris Agreement (2005), it has a responsibility to control transboundary movement and disposal of hazardous waste, ensure sustainable resource management, and establish effective waste management strategies. As part of these objectives, initiatives have started to be implemented in recent years to bring its legislation more in line with EU Waste Management Directives and Regulations. Under the Nationally Determined Contributions, Türkiye also pledged to move its solid waste to controlled disposal sites, restore its unmanaged waste sites, and recover secondary raw materials through reuse, recycling, and other methods.

Figure 5.1 Phases of the zero waste system



The Zero Waste System in Türkiye has been launched as a result of these initiatives to promote recycling and waste reduction. The mission's goal is to send virtually no waste to landfills by extracting materials from the waste stream through recycling, composting, and other means of reuse. Its ultimate goal is to use resources more efficiently, reduce the amount of greenhouse gases released into the atmosphere, and reduce landfill usage. The system includes both public and private institutions including schools, municipalities, organised industrial zones, airports, markets, stores, industrial facilities, and restaurants. In each institution, responsibility to ensure the establishment, effective implementation, and monitoring of the zero-waste management system is given to the appointed unit within the organisation. By the end of 2022, the Zero Waste Management System has been implemented in more than 150 thousand institutions and organisations across Türkiye (Sıfır Atık 2022).

In July 2022, The Zero Waste System regulations incorporated waste collectors for the first time with the Circular of Waste Pickers (Waste Collectors Circular 2022). With this circular, waste collectors, who are above 18 years of age, can register to Zero Waste Information System, as an independent waste collector, and obtain an identity card from the local municipalities if they are deemed appropriately by the relevant security units. According to the circular, it is necessary that the collected waste be transported to municipal waste facilities using gloves, work clothing, and vehicles in accordance with municipal requirements. Furthermore, the waste collectors are required to work within the time frame specified by the municipality without disturbing the practices implemented under the Zero Waste System. According to the regulation, waste collectors will deliver the collected waste to the waste collection centres and



recyclable waste transfer centres of the municipalities or the licensed recycling facilities located within the boundaries of the municipality. Waste will be weighed in these locations and payment will be made according to market conditions. According to this circular, any waste collection activity without permission from the municipality will be banned and sanctions will be imposed by the relevant security units.

Based on our discussions with Seyhan Municipality in February 2023, we learned that since July 2022, approximately 15 waste collectors have applied to the municipality to register as independent waste collectors, but none of the applicants have been able to register with the system. The situation is similar in all the other districts of Adana as of early February 2023. For example, according to experts from Adana Metropolitan Municipality's Environmental Protection and Control Division, no independent waste collector in Adana has been able to obtain an occupational identity card. Based on our fieldwork, we found that interrelated conditions contributed to this dysfunction: a lack of effective unionisation of waste collectors and confusion on the part of the implementing authorities about how to initiate the process.

First, effective organisation and unionisation among waste collectors are deemed crucial in order to achieve validity to their concerns over their livelihoods in legal and regulatory domains. In terms of formal unity, the Çukurova Association of Waste Collectors was founded in 2011, in Adana. The majority of the waste collectors we interviewed, including one of the founding members, think that no meaningful attempt has been made under this association for the last 12 years, and members have gradually disassociated themselves from the organisation due to their ongoing disappointments. The organisation remained ineffective in mobilising effective union action to articulate the demands of the waste pickers and act as a bridge between the government and the workers. In addition, we found no international or local non-profit organisations implementing projects towards recycling workers.

When it comes to solidarities, we observed that *depos* are places where waste labourers establish family like connections and support each other to a varying degree. These strong informal solidarities exist in small circles, yet do not present themselves in broader settings, which subsequently can be an effective tool to advocate the formalisation of their work. In the absence of effective formal unionisation, several informal waste workers who demand recognition for their work, seem to be unaware of the current rights and regulations facilitating their formal registration to the system. Such lack of information explains why only a few applications have been filed to municipalities in the eight months after the circular of waste collectors was issued in June 2022. The existence of an effective organisation and unionisation would not only inform their members about new legislation and required actions but would also put pressure on local municipalities to enforce existing regulations.

Second, during our meetings with Seyhan Municipality and Adana Metropolitan Municipality, we observed an ambiguity amongst implementing authorities regarding how to put the circular in practice. Municipal experts expressed their concerns about how this new regulation lacks a definitive model for integrating waste collectors into the system, as well as concerns over establishing work safety measures for registered collectors, and security concerns, which is primarily caused by the stigmatisation of waste workers for engaging in theft. While they have no clear plan to implement existing regulation in a way that addresses their concerns, experts in municipalities are observed to be open to communication and cooperation in order to establish an effective programme for integration of waste collectors to the system. As such, they expressed their willingness to exchange ideas with a representative who would talk on behalf of the waste collectors, or an association of the waste collectors, if there is any, they added. The waste collectors interviewed made a similar request, with many stating that they needed a real representative in public institutions, as they believed they were not being treated fairly.

Though there is a current regulation regarding waste workers integration into the Zero Waste System, it has not been implemented effectively in Adana as observed in the field, mainly due to a lack of coordination among waste collectors and an ambiguity on part of implementing authorities on how to implement the process addressing their previously mentioned concerns. With new policy strategies such as Extended Producer Responsibility and the Deposit Refund System, which will be mandatory beginning in January 2024, current deficiencies in the enabling environment must be addressed before these regulations introduce new actors and new waves of competition into the recycling chain. In Türkiye, legislative provisions for the Extended Producer Responsibility and Deposit Return System were included in Waste Management Regulation in April 2015; and Environmental Law No. 2872 in December 2018,

respectively<sup>4</sup>. Under these laws and regulations, producers are obligated to create a plan for waste collection and processing of their products, as well as establish transfer points and a mechanism to ensure their implementation plans. According to the first clause of the 15th article of the Waste Management Regulation, waste management expenses are covered by those who put the product on the market, and the established plans for implementation are required to be approved by the Ministry of Environment, Urbanization, and Climate Change, Türkiye.

Extended Producer Responsibility is a policy strategy where the manufacturer's obligations for a product are extended to the post-consumer phase of the product's life cycle including its take-back, recycling, and final disposal (OECD 2022). The policy approach aims to transfer responsibility from municipalities to the producer arguing that if manufacturers must bear the environmental costs associated with their products, they will redesign their goods and packaging to be more easily recyclable (WIEGO 2022). Furthermore, given current trends in waste production levels in urban areas, shifting responsibility to the private sector will reduce the pressure on the local government's waste management capacities.

As a tool for Extended Producer Responsibility, A Deposit Refund System is utilised where producers are given financial and operational responsibility for the system, which is currently implemented in Germany, Lithuania and Norway. Customers who purchase products through the Deposit Return System pay a deposit that is reimbursed upon returning the product to a collection station. The mechanism has been shown to be successful in improving collection rates and lowering product litterings, such as aluminium cans, glass, and PET bottles. By assigning a value to discarded goods, operators are able to gather more materials of better quality for reuse, recycling, or ecologically friendly disposal (OECD 2022, 8-10).

In December 2020, responsibility for the operation of the Deposit Refund System in Türkiye was transferred to the Turkish Environment Agency (TUÇA). Companies producing fruit juices, milk, soft beverages, bottled water, mineral waters, beer, malt, energy, and sports drinks are required to register to the Deposit Refund System starting from January 2023 and establish their implementation plan throughout 2023. To be effective from January 2024, above-mentioned products without Deposit Refund System will be banned from releasing to the market. To some extent, shifting waste management and recycling tasks from the public to the private sector will alleviate the load on local governments' waste management capacity.

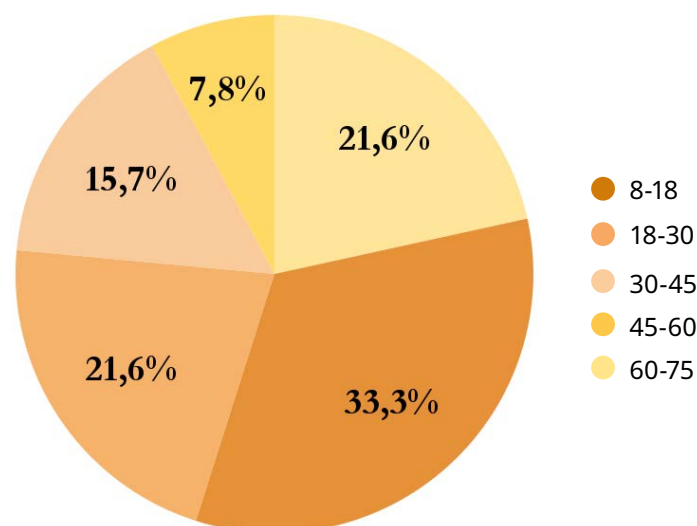
During our discussions with experts from Seyhan Municipality in February 2023, it was stated that the municipality's waste treatment and disposal plant is running with a capacity of 1,250 tons per day, however the facility is now attempting to run at a capacity of 2,000 tons per day. Experts at the Seyhan Municipality raised concerns about the system's long-term viability, citing the rising volume of waste with the inflow of people into the region, particularly at the summer time that is already beyond the capacity of the existing facilities. While the implementation of an Extended Producer Responsibility strategy could be seen as a potential solution to alleviate the growing burden on municipalities, it is crucial to recognise the state of informal waste collectors, as the practices around Extended Producer Responsibility often accelerate or intensify the rapid privatisation of the industry and bring about a new round of material competition (OECD 2022, Schröder 2020). Therefore, these new regulations aimed at promoting the so-called "circular economy" must also target and include workers who depend on waste for their livelihoods, and include them in new circularity activities, investments and opportunities led by the private sector, which has been an oversight in the regulations so far.

<sup>4</sup> Extended Producer Responsibility regulations currently cover only electrical and electronic products, packaging, vehicles, batteries and accumulators.

## 5.4 Identifying the Conditions of Work and Labour Relations

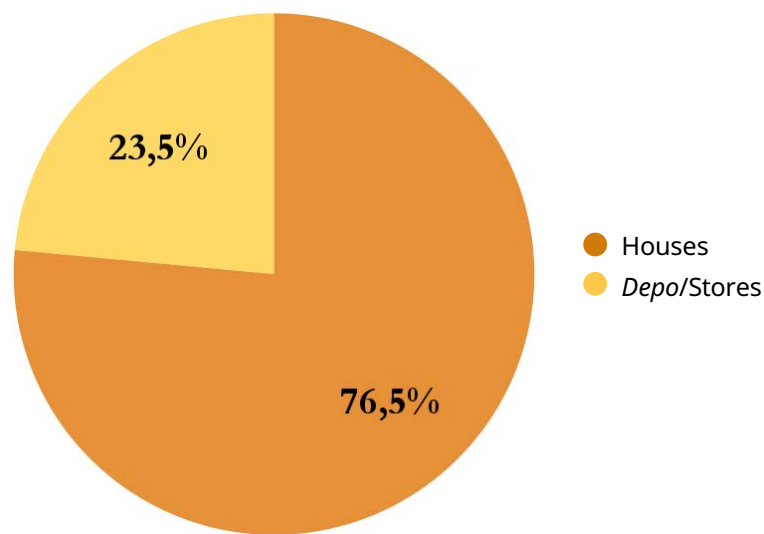
During the course of our study, we engaged extensively with a noteworthy cohort of key actors, including waste collectors, sorters, *depo* owners, and transporters. These interactions involved individuals closely associated with the four *depos*, totalling approximately 65 workers. The selected methodology yielded a comprehensive elucidation, facilitated through a series of iterative engagements conducted over a span of four months, combining participant observation and in-depth interviews. In the field, as we moved along the waste value cycle, from the initial point of upstream provision of waste inputs to the downstream phase characterised by the transformation of materials into granular products, the capacity to collect data gradually became constrained. These limitations are mainly due to the challenges of accessing industrial production facilities. This challenge is particularly pronounced in cases where facilities operate in an informal capacity, commonly referred to in the local context as “*merdiven altı*” or “under-the-counter production”.

Figure 5.2 Age distribution among respondents



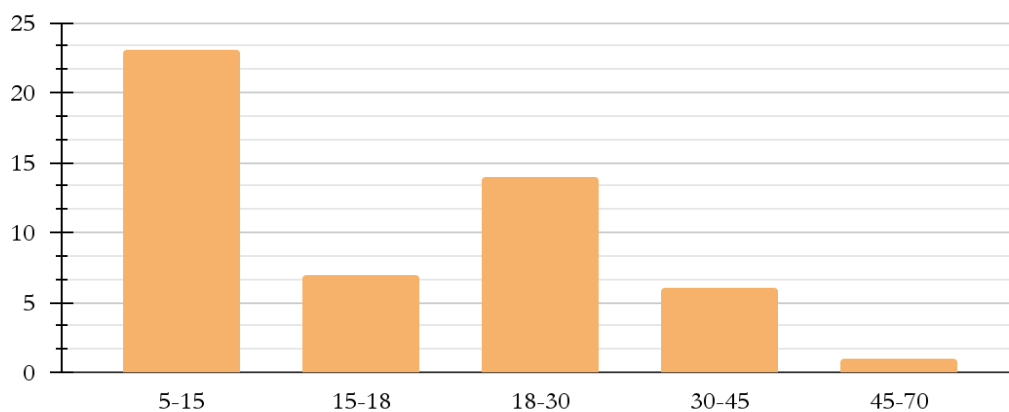
During our research, we interviewed a total of 75 people, including waste collectors (A1), waste sorters and transporters (A2), as well as salaried workers employed in recycling facilities (A3) and managers of industrial facilities (A4). Throughout our research, we met waste collectors of various ages, with the youngest being 8 years old and the oldest 73 years old, and more than 20% of the waste collectors sampled were under the age of 18 at the time of the survey. Through our research, we found that individuals who engage in waste collection activities often do so because of financial hardship, catalysed or exacerbated by circumstances such as forced migration, family breakdown, marital dissolution, parental loss, destitution, and social isolation. While a pattern of migratory experiences and parental loss is prevalent among younger waste collectors, our research revealed a higher incidence of destitution, loneliness and abandonment among those aged 40 and over. The category of orphans, which includes those who have been deprived of both parents, abandoned by parents or entrusted to the care of others due to parental incapacity, accounted for about 10% of the population of waste collectors. Lacking the means to secure housing in urban centres, all of these waste workers live within the confines of the *depos* alongside other waste collectors.

Figure 5.3 Location where waste collectors reside



According to our findings, more than half of the 51 waste pickers started working before the age of 18. The youngest participant, who is currently 19 years old, started working at the age of five (see Figure 5.4) for the distribution of starting age). During our research we noticed that the age at which waste pickers start collecting waste has decreased in recent years.

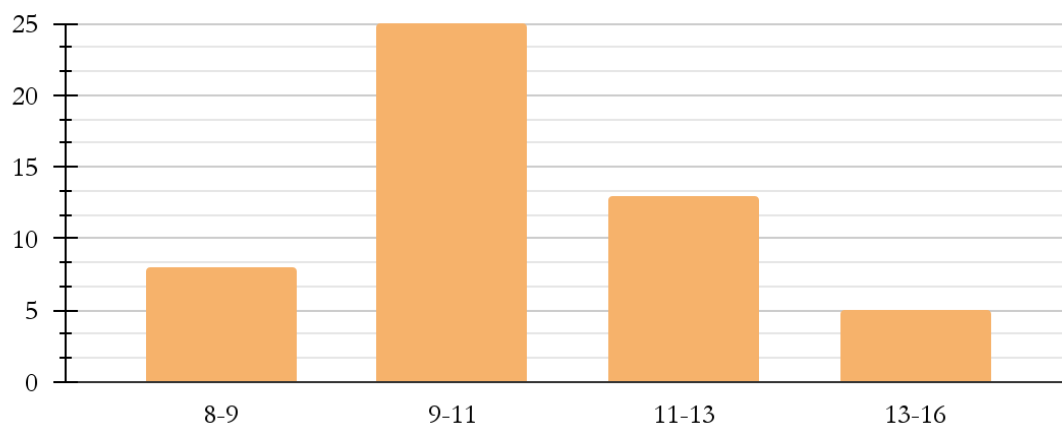
Figure 5.4 Starting age of waste collecting



In assessing working conditions, we found that none of the waste collectors interviewed had social security and could not earn more than the minimum wage, despite working more than 10 hours a day on average, mostly for 6 days (see Figure 5.5 for the distribution of working hours). Furthermore, almost 10% of respondents said that they had to work between 13 and 16 hours a day to make a living.



Figure 5.5 Working hours per day



In addition to long working hours, usually six or seven days a week, working at waste poses health risks and has an effect on their physical condition, especially in the absence of protective equipment. Almost none of the waste pickers use any protective equipment, such as gloves and masks while collecting waste. Only five of the 51 waste pickers reported wearing gloves, and none wore masks. When hands and faces are not protected, incidents such as scratches, scrapes, abrasion, and skin irritation especially while handling metal or glass pieces, may happen. Waste collectors may also experience diarrhoea, poisoning, eye infections, asthma, and persistent coughs. Workers engaging in the manual sorting of waste are generally exposed to a variety of chemicals, airborne germs, and endotoxins that can cause adverse consequences, such as organic dust toxic syndrome (ODTS) and jaundice (pink eye). Nevertheless, their overall restricted access to examinations, screenings, and medical history may understate the registered diagnosis, prognosis, and level of awareness of the diseases. During our research, waste pickers generally reported feeling constantly weak, tired, and lethargic. Davut, who is a waste picker living in a *depo*, describes how his way of coping for his illness is to wait for the sickness to go away:

*I often feel exhausted when I get up, even before I start work. When it's humid, especially after rain, I can't sleep well. I cough all night and feel like I'm drowning. We make an effort to clean and maintain our hygiene. Yet, even when we try to clean the bathroom, beds and toilets, we can still see that they are generally dirty. When I'm very ill, all I can do is wait for the illness to go away.*

While some workers wait for their illnesses to pass, others make an effort to stay indoors during inclement weather in order to preserve their health. They also underlined that their evasion limits their capacity to work and, consequently, their ability to earn money, especially during the winter. While feeling frail, they also believe that their immunisation and resilience are ironically strengthened by their employment with waste.

Waste actors in the recycling chain strongly demanded to be officially registered and identified, as we noticed during the course of our inquiry. Due to the informal nature of their profession, they reported that they continuously experience fear, worry, and embarrassment. As they are not registered as waste collectors, they are frequently stopped by the police, interrogated, and their iron rickshaws and electric motorcycles, which they use to gather waste, are seized. For example, according to the four *depo* owners we spoke to, nine iron rickshaws and 19 electric motorcycles were detained in 2022. The waste collectors undoubtedly suffer a financial loss, an imbalance in their cash flow, anxiety and stress, as a motorbike is worth around TL 7,000-8,000 and an iron rickshaw around TL 1,500 in early February 2023.

According to the Circular of Waste Pickers published by the Ministry of Environment, Urbanization and Climate Change, in June 2022, waste collectors can now apply to municipalities stating that they are engaged in waste collection, and if the relevant municipality considers it acceptable, they can register the worker. Based on our face-to-face meetings with representatives of the Metropolitan Municipality and Seyhan Municipality in early February 2023, we learned that despite ongoing awareness of the issue and official initiative, this directive has not yet been implemented.

Based on our interviews with public organisations, we found that neither the municipalities, the Turkish Statistical Institute nor the Chamber of Commerce and Industry in Adana monitor and collect statistics that would provide information on, for example, the exact number of recycling facilities, working conditions, the number of workers or the gender concentration in the sector. Furthermore, even the most basic statistics that we were able to obtain from the Chamber of Commerce and cross-check with the Chamber of Industry, Adana Metropolitan Municipality and Adana Governor's Office contradict each other. According to our interviews with Adana Metropolitan Municipality, there are 48 licensed recycling facilities registered in the municipality's information system as of February 2023, while figures obtained from Adana Governorship show 183 licensed recycling facilities registered in their data information system for the same date intervals. On the other hand, according to figures we obtained from the Chamber of Commerce in Adana in early February 2023, 315 facilities operate in recycling sector in Adana as of 2022, which has NACE codes<sup>5</sup> starting with 24, 38, and 46. Derived from the identical dataset, it can be inferred that the recycling sector in Adana has experienced noteworthy expansion over the past 17 years. This assertion is substantiated by the fact that the count of recycling facilities has undergone two instances of quadrupling: firstly, within the timeframe of 2005 to 2015, during which the number of facilities escalated from 23 to 83; and secondly, spanning the period of 2015 to 2022, resulting in a rise from 83 to 315 facilities. While the dataset procured from the Chamber of Commerce provides a more comprehensive coverage compared to other sources, it is important to acknowledge that a subset of the registered establishments might presently be non-operational, as affirmed by the Chamber Registry Manager.

During the course of our on-site investigation, our team was only able to gain access to three of the six targeted facilities. Unfortunately, two of these factories refused our requests to interview their workers. As a result, our ability to conduct worker interviews was limited to a single industrial facility, where a total of seven interviews were successfully conducted. It is important to note that all of the interviewees were found to be unregistered workers and, as such, none of them were beneficiaries of social security or health insurance schemes. Six of the seven workers we interviewed were Syrian refugees and one was a Turkish of Kurdish origin. The work that these workers do does not necessarily require skills or education; the average level of education of the seven people we interviewed was five years. Before arriving in Türkiye, Syrian refugees were already familiar with each other, either through family ties or friendships. This pre-existing familiarity allowed them to communicate effectively in their workplaces, using the common language of Arabic. This network facilitated their employment in the same location, specifically in a recycling plant, where they had the opportunity to learn from each other. This collaborative environment enabled them to gain skills and become competent workers within the recycling facility. A final observation was that a number of facilities had a notable presence of female workers, particularly in the sorting area of the facility. Under this industrial division, female workers work alongside each other, but are physically separated from their male counterparts. A personal interview with one of the owners of a recycling plant revealed a division of labour in which men were primarily involved in physically demanding and maintenance-oriented tasks within the plant. This included tasks such as operating forklift trucks and quickly unloading containers. In contrast, women were perceived as more attentive and disciplined when involved in sorting and packing tasks.

<sup>5</sup> NACE is a system used to classify all the sectors in which companies will operate, so it is important to identify the correct code when starting a business. NACE codes 24.10.07: Remelting of iron and steel scrap; NACE codes 38.11.02/38.31.02/38.32.01/38.32.02: Collection, treatment and disposal of waste and recycling of materials; NACE codes 46.18.06/ 46.77.01/ 46.77.02: Wholesale of waste and scrap.

## 5.5 The Earthquake Effect

In February 2023, a catastrophic twin earthquake struck southern Türkiye and north-western Syria, measuring 7.7 and 7.5 on the Richter scale. A state of emergency was declared for three months in the quake zone in Türkiye, and the incident reached a level 4 emergency, prompting a call for international humanitarian aid. On the last day of our initial field study in Adana, our research team encountered the earthquake. As the earthquake divided our two field studies into pre- and post-earthquake periods, we included in our analysis, albeit briefly, the disruptions, opportunities, and risks along the recycling chain that emerged as a result of the disaster.

The quake affected 10 Turkish provinces with a population of around 13.5 million and resulted in the destruction of more than 300,000 buildings, either by complete collapse or severe damage requiring demolition (UNDP 2023, 2). The city of Antakya, in Hatay, bordering Adana, on the north-eastern coast of the Mediterranean Sea, suffered a near-total collapse, turning into a ghost town with thousands of deaths and the displacement of millions of people, including a significant population of Syrian refugees who settled in the area following the Syrian civil war. The UNDP estimated that the demolition generated at least 200 million cubic meters of debris, covering an area of 100 square kilometers with debris one meter high (UNDP 2023, 13). To provide a comparative perspective, the Great Hanshin-Awaji Earthquake of 1995 generated approximately 20 million tonnes of debris, while the Tōhoku Earthquake of 2011 generated approximately 28 million tonnes (Tabata et al., 2019). On a broader scale, Hurricane Katrina in 2005, which impacted the Gulf Coast, generated over 100 million cubic yards of debris, equivalent to around 125 million tonnes, while Hurricane Michael in 2018 generated around 33 million cubic yards, equivalent to around 40 million tonnes (U.S. Federal Emergency Management Agency 2019). Following the disintegration of physical infrastructure, the coastal landscape is now left with a heavy burden of disaster debris such as rubble, bricks, concrete, steel, metal, damaged household items, plastics and glass, as well as the release of hazardous substances, such as asbestos into the land-water-scape.

In this context, during our second fieldwork in this socio-material context, we observed that rubble recycling and the aftermath post-earthquake construction provided opportunities for employment and livelihood sources for waste pickers, as well as vulnerabilities, risks, and challenges.<sup>6</sup> We did not interview any waste pickers involved in rubble removal in Adana, as the number of demolished buildings and the amount of rubble was disproportionately low compared to neighbouring earthquake areas such as Hatay. However, waste pickers in Adana experienced constrained mobility and operational restrictions, a situation that endured for around 25 days following the earthquake. The underlying cause of these restrictions was the implementation of access limitations by the police authorities. Specifically, these restrictions were imposed on structures and their immediate surroundings that had incurred damage or collapse as a consequence of the earthquake. Consequently, waste pickers experienced a notable curtailment in their ability to move freely and engage in their waste-related activities during this specified timeframe. This regulatory measure not only hindered their regular work routines but also had implications for their livelihoods during the critical post-quake period.

In addition, in the immediate aftermath of the earthquake, a trend emerged whereby residents began to evacuate the neighbourhoods that constituted the area of focus of our fieldwork. In particular, these relocations were predominantly to villages of origin, to low-rise secondary residences outside the urban areas, or to the homes of distant relatives in rural areas. In particular, individuals from the upper-middle and upper socio-economic strata had the means to undertake such relocations, which in turn could contribute to an increased accumulation of waste in roadside containers located in the immediate vicinity of waste pickers. In-depth interviews conducted with waste pickers during the post-earthquake field study consistently revealed that this scenario resulted in a significant reduction in their daily waste collection volumes. For example, Adem, who has been a waste collector for seven years, reports that there has been a significant reduction in the amount of waste he typically collects:

<sup>6</sup> During our visit to Hatay, we observed waste pickers and seasonal agricultural workers involved in the extraction and sorting of rubble for recycling and livelihoods. However, it is noteworthy that agricultural areas faced asbestos contamination. This contamination extends to surface irrigation channels, wetlands, and underground water reservoirs, posing a potential cancer risk. This risk applies not only to the large population of earthquake survivors, but also to workers involved in the recovery and recycling of debris, and to those involved in seasonal agricultural activities in these agricultural areas. These issues warrant further investigation and comprehensive documentation and may call for a separate report.

*Many residents left Adana, taking their rubbish with them. Prior to the earthquake, I would go through three rounds of waste collection, yielding approximately 150 to 200 kilos per day. However, I was unable to go out for about a month, and even when I could, I only collected about half of it per day, drastically reducing my income.*

Furthermore, there were instances of looting observed in Adana during the days following the earthquake. This looting encompassed various abandoned or extensively impaired buildings, as well as salvageable materials left behind amidst the aftermath of destruction. Consequently, waste pickers navigating through the afflicted districts of Adana found themselves branded as “thieves,” “looters,” or “smugglers” by onlookers. This characterization not only created an atmosphere of fear but also coerced waste pickers to retreat from public spaces in the immediate aftermath of the disaster. These post-disaster effects led to increased hostility towards waste pickers, adding to the existing stigma and marginalisation.

In addition to the initial 25-day period of job loss, diminishing waste volumes, and escalated negative societal labelling, there has been a further decline in income owing to the reduced valuation of paper and cardboard materials. This marginal effect has particularly affected people who are heavily involved in the trade and collection of wastepaper and cardboard, but its significance should be duly noted. Preceding the earthquake, the market value of paper and cardboards for waste transporters stood at 1.6 Turkish Lira per kilogram (as outlined in Table 5.3). However, the post-quake value has contracted to 1 Turkish Lira per kilogram due to the suspension of paper recycling operations by companies such as KİPAŞ and KVK located in Kahramanmaraş, a city notably affected by the earthquake. This development has necessitated the transportation of the collected paper materials primarily to Istanbul, subsequently increasing the costs associated with transportation and exerting downward pressure on prices in the upstream supply chain. Combined with the decline in waste volumes, tighter mobility restrictions and price reductions, each of the monitored landfills has experienced a drop in revenue of around fifty per cent. Khaled, the owner of a Syrian-operated *depo* facility, explains the significant loss of income he has experienced, underlining the fragility of their economic situation. economic situation:

*After the earthquake, half of the waste pickers stopped bringing waste to my depo. We heard that some people fled to large cities like Ankara or Istanbul in the hopes of finding jobs outside the quake zones. Combined with the 25 days of not being able to work, this has caused me to lose around 25,000 Liras. My yearly contract is ending in three months, but I don't know if I will be able to stay here for another year. I just cannot afford it if the waste collected remains this low.*

Recycling facility owners, as indicated by the President of the Chamber of Recyclers within the Adana Union of Chambers of Tradesmen and Craftsmen, who also owns a recycling facility in Adana, experienced comparatively lower disturbance from the earthquake than actors in the downstream recycling chain, such as waste pickers and intermediaries. This discrepancy arises because recycling companies have the capacity to stockpile substantial quantities of waste materials for recycling purposes. Furthermore, their ability to conduct business with entities across different regions enabled them to sustain their operations even during the cessation of activities in earthquake-affected zones. This observation implies that, in contrast to downstream actors, the vulnerability of those situated upstream in the recycling value chain has been more affected by the earthquake.



## ► 6. Good Practices for Inclusion

In line with the principles of a just transition, a key focus for practitioners has been to ensure the legitimate integration of waste workers into the emerging recycling sector. The study of global examples of successful practices is an essential step in developing an effective and sustainable strategy to facilitate the transition to a just and environmentally conscious economy and society. The integration of waste pickers involves the establishment of a carefully orchestrated recycling framework that complements the existing contributions of waste pickers. This integration process involves their involvement as proactive collaborators in the design, implementation, evaluation and structuring of competent waste management systems.

Our research shows that several developing countries, such as South Africa, Serbia, Brazil, Tunisia and the Philippines have strengthened waste picker integration as an essential component of legal recycling systems and effective waste management. In other words, these countries have been working on and leading the way to equitably include and value the expertise of waste pickers. Key examples are Brazil and South Africa, which have begun to formally integrate waste pickers into the recycling value chain, providing them with fair wages and more decent working conditions. Among the global good practices reviewed, four different strategies for integrating waste pickers were selected: “cooperativisation”, “segregation at source”, “community integration” and “decentralised technology-based solutions”.

Cooperativisation is one of the fundamental aspects of integrating waste pickers into the formal recycling sector, as in the case of Brazil. Recicla Ourinhos, a cooperative that defends the rights of waste pickers against poor working conditions in landfills, was created through the efforts of around a hundred waste pickers to offer their services formally to municipalities. Starting as a small project with only a few waste pickers, Recicla Ourinhos expanded the project after a forum with municipalities in 2010, allowing thousands of waste pickers to be freed from the informal working conditions of landfills. Members of Recicla Ourinhos began to receive monthly payments for their services under a contract they signed with the Superintendent of Water and Sewage (WIEGO 2012, 1). As a result, the waste pickers continued to collect more each month, increasing their income and qualifying for guaranteed social security payments. Because of this initiative, the city’s selective collection law will continue to ensure the future social and economic integration of waste pickers (WIEGO 2012, 2). Waste pickers, catadores de lixo, have organised themselves into a national cooperative movement with 500 cooperatives and a total of 60,000 waste pickers (UNEP 2008). In addition, Belo Horizonte, one of Brazil’s largest cities, inaugurated the first recycling plant run by independent catadores de lixo associations. The plant is designed to eliminate disreputable middlemen while increasing the income of collectors by about 30% (UNEP 2008).

Our meeting with a Brazilian expert in March 2023 revealed that there has indeed been an increase in the number of waste pickers in Brazil who have formed cooperatives or associations since the 1990s. The first waste pickers’ association, with the aim of studying the needs of waste pickers, was formed in 1990 as a result of the efforts of two local NGOs conducting research on street dwellers and their living conditions. By 1993, this organisation had gained the support of the municipality and was included as a partner in the local recycling programme, which was made possible by the government’s receptiveness to programmes for the working poor and the fact that the president at the time was a member of the Brazilian Labour Party.

As the success of these social inclusion initiatives for waste pickers spread around the world, a National Forum on Waste and Citizenship was launched in Brazil in 1998, led by UNICEF, with the objectives of eliminating child and adolescent labour in open dumps, eradicating open dumps, reclaiming degraded areas, and creating sanitary landfills, and promoting partnerships between government and cooperatives. This forum created a space for social dialogue between waste picker cooperatives, public institutions, and NGOs, enabling participatory governance through the involvement of waste pickers in the planning and implementation of waste management systems. In addition, the National Forum’s social mobilisation efforts led to the adoption of legislation recognising waste pickers as legitimate service providers, the promotion of waste pickers’ unionisation efforts, and the formulation of government guidelines for

the integration of these cooperatives into formal waste management systems. However, only around 20% of waste pickers are now organised in cooperatives, with the rest working autonomously. During the interview, it became clear that a misunderstanding among waste pickers about how cooperatives work may have led to a large percentage of waste pickers continuing to work individually. Many waste pickers may feel that joining a cooperative would take away their autonomy by subjecting them to a 'boss'. Furthermore, holding regular meetings for the cooperative can be seen as a burden by waste pickers. Therefore, there is an ongoing need for public channels that address the concerns of different groups of waste workers while providing a clear picture of how a cooperative works, or "for the formation of a more loosely affiliated cooperative that requires further social engineering," as the WIEGO expert noted in the interview.

In the context of cooperativisation, the City of Johannesburg in South Africa has identified effective practices to improve the working conditions of waste pickers, who are at the bottom of the hierarchy and exposed to poor working conditions and low wages. A proven method of improving the working conditions of waste pickers is to increase the level of segregation at source (S@S), which can be effectively mobilised by raising awareness among residents to separate their waste for waste pickers. In Johannesburg, positive results have been achieved when waste pickers work with communities to encourage more residents to participate. The African Reclaimers Organisation (ARO) began contacting Johannesburg residents to introduce themselves, describe their work and discuss how they could work with residents. Waste pickers in Johannesburg reported that after getting to know residents personally and making them aware of the difference it would make to them not to have to sift through bins, more people began to segregate waste (Department of Environment, Forestry and Fisheries and Department of Science and Innovation 2020, 42). This has improved the working and living conditions of waste pickers as they no longer have to scavenge and segregate waste, allowing them to work fewer hours, particularly at night.

There have been other successful measures to incentivize the segregation of waste at the household level, given that residential waste disposal marks the beginning of the recycling chain. To raise awareness and encourage action to reduce plastic waste, the Tamil Nadu government, a leading state in India, has announced competitions for plastic-free villages, plastic-free schools, and self-help groups to collect the maximum amount of waste (Nikam et al. 2022, 31). Furthermore, a similar good practice in incentivizing reducing waste and improving separation comes from the European Union. The pay-as-you-throw approach, in which customers' waste fees are adjusted based on the amount of mixed waste provided to the waste management system, produces remarkable results by increasing the number of fractions collected separately and sent for recycling, while reducing mixed waste (Dri et al. 2018). A pay-as-you-throw system should be accompanied by a user-friendly and efficient collection infrastructure for the individually collected fractions, covering the widest possible range of waste categories.

A third effective strategy of a more intensive waste collector integration strategy, municipal-level integration, has been practised in Bogotá, Colombia where municipalities began to pay individual waste pickers (and later cooperatives) directly into their bank accounts. The waste pickers were compensated for their services based on the number of kilos collected and sold at the registered private purchase centres and aggregation stations of the municipality (Parra 2013). The system included municipally owned buy-back centres as well as some privately held ones and through sales to these centres, waste pickers got regular remuneration for the sale of their recyclables. They also received an electronic payment from the municipality every two months for the service provided. Prior to this initiative, waste pickers in Bogotá were paid based on the amount they collected by selling to private enterprises, similar to the cycle in Adana. Nevertheless, the new process, which starts with registration of the waste pickers, obtaining an identity card, and having a bank account, provided waste pickers with a steady stream of income and recognition, thus oversight of the government. In the case that individuals did not have a bank account, municipalities assisted in opening one. Overall, the waste pickers were not only paid fairly and regularly for their work but were also able to collect more in fewer hours, as the mobile buy-back centres reduced the distances they had to travel to sell their materials.

Based on our discussions with WIEGO specialists, we concluded that the Colombian Constitutional Court's rulings were one of the most essential pillars of the recognition of waste pickers as legal actors. The Constitutional Court mandated that waste pickers be included in waste management and that national

and municipal authorities build support systems to ensure their continued employment and growth in the industry, as well as payment for their labour. Notwithstanding, a coalition between authorities and conglomerates of private-public service providers has halted the progression of the just inclusion of waste pickers into the value chain as they have supported the free competition concept that underpins Colombia's public service delivery when interpreting the Constitutional Court's rulings (Parra and Abizaid 2021, 6). The legal framework has also allowed for the inclusion of private waste collection, logistics, and other service providers to compete with waste pickers' collectives for the contracts of the municipalities. As a result, this has acted as a barrier to the just inclusion of waste pickers in Colombia, emphasising the significance of government support in a competitive market context.

The fourth innovative practice in the form of decentralised technology-based solution comes from a company in Chennai, Tamil Nadu, which combined waste pickers and plastic waste recyclers via an app called "Kabadiwalla Connect." Rather than the traditional door-to-door collection by waste pickers, which has no assurance of the amount of waste collected, this firm provides smart tablet applications that assist them in planning their day as well as setting market standard values for their material. In our meeting with the company's managers, we found that a pilot project had also been carried out in which "smart bins" had been used to inform waste pickers about the type and quantity of waste collected using the app. In this way, the company aims to eliminate the risk of scavenging, which leads to unhealthy and undignified collection, through a market solution.

Our discussions with *Kabadiwalla Connect* managers highlighted a market-based strategy centred on not disrupting the existing ecosystem of waste pickers and *depos*, but rather making this process more efficient with the assistance of technology. Through their mapping of the recycling chain in Chennai, they have found that there are approximately 2,000 *depos* that act as a cluster point between waste pickers and the recycling facilities. The system operates on a smart tablet given to *depo* owners with the application. *Depo* owners record every transaction in this application, create profiles for each waste picker to expedite transaction registration, and generate a QR code to label aggregated waste transferred to facilities. This will create a mapping and tracking system that can be used to drive policy.

Currently, the Indian government provides licensing to these *depos* but no further action has been taken to formalise the work of waste pickers. Although the market approach helps to mitigate the limits faced by governments due to budget constraints, they leave waste pickers open to market vulnerabilities. In addition, the large-scale provision of smart bins, which provide alerts on the quality and quantity of waste, can lead to increased competition between waste pickers to collect the best quality and the largest quantity of waste. Ultimately, there is a crucial need for government support to formalise waste pickers to protect them from market instability and provide them with social security. Once these are in place, Kabadiwalla Connect and other market-based initiatives can be innovative solutions that integrate the private sector into the existing ecosystem, particularly in light of the shift of responsibility from states to producers through upcoming extended producer responsibility policies.

## ► 7. Conclusions and Recommendations

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Several attempts are being made around the world to incorporate waste pickers and informal waste picking into an organised sector with decent work conditions and labour rights, as numerous studies have demonstrated the critical function, they play in the recycling value chain. This study contributed to the global literature from an understudied but rapidly expanding industry zone extending over the south-eastern Mediterranean coast of Türkiye where informal work conditions and labour evidently prevail. It also documented the critical role of the unorganised waste recycling sector, particularly in the upstream chain, as well as the involvement and connections that informal waste workers play and establish for our economies and societies, which still mostly rely on linear waste schemes and throw-away culture.

The study found that the local recycling business in Adana, particularly the upstream cycle, was characterised by informal labour, precarity, long working hours, low payment, a lack of social security, and a lack of health insurance coverage. In the upstream recycling cycle, hundreds of depots in neighbourhoods serve as unregistered, unregulated cluster points where waste collectors, middlemen, sorters, and transporters interact, interoperate, and perform a key part in the development of the recycling industry by gathering, classifying, and organising the waste material for the downstream cycle, which is mainly officially governed and organised. The report underlined the connection, cohabitation, and interdependence between the predominantly informal upstream and essentially formal downstream cycles of recycling. The informal industry provides precarious labour, which in turn generates cheap raw materials for the industrial facilities, while the facilities provide a stream of income and a livelihood for thousands of workers. As waste is collected and transformed from the street to the depot, and then from the depot to the facility, informal work relations are largely rendered invisible and dissolved along the production of a standardised material, known as granule.

Based on our research, we identified that upstream cycle actors demand recognition and acceptance as valued members of the system, much as they do informally, throughout the collection, sorting, and transfer of classified materials to facilities. Despite the significant amount of labour they contribute and the functions they perform, they have not yet been formalised, registered, given rights, or given a fair share of the profits. They are mostly anxious at work, afraid of being humiliated and stigmatised as they cycle, walk and stay on the roads during the day and at night, carrying waste and connecting it to the recycling sector. In this way, although they are mostly present along the movement of waste, they try to become invisible to the gaze and absent from the patrolled spaces while carrying and moving waste, in order to avoid any conflict, financial loss and humiliation in the current conditions.

The field research combined with a review of the good practices reveals that achieving a sustainable solution to improve the working conditions and the just inclusion of the waste pickers necessitates multi-stakeholder partnerships between public institutions, private sector, and civil society organisations. Strengthening the social dialogue between waste pickers and the stakeholders is vital as with the growing dependence on extended producer responsibility, waste pickers are especially exposed to market volatility in the absence of government regulation. On the other hand, the public sector remains limited in support the acknowledgement, comprehensive formalisation, and integration of waste pickers into the waste management system. Civil society organisations also play a role in promoting the rights of waste pickers, which increases their representation, inclusion and bargaining power, which is currently lacking in this field. Hence, an approach that merges all of these actors is key.

- The first recommendation of this report is initiating channels for representation, communication, and dialogue between municipalities, civil sector organisations, and waste collectors, which is currently missing, as observed in the field. The organisations today, such as the Çukurova Association of Waste Collectors, remain merely limited in connecting waste pickers with the local authorities and advocating for the execution of the Circular of Waste Pickers (Waste Collectors Circular 2022) mandating the integration of waste workers into the Zero Waste System. A series of meetings should be organised



with the inclusion of selected spokesperson amongst waste picker sub-communities, district and metropolitan municipalities, and civil society organisations, such as Chamber of Recyclers under the Adana Union of Chambers of Tradesmen and Craftsmen, the Chamber of Commerce, and Chamber of Industry. These meetings would serve as a space for communication, inclusion, social dialogue, and cross-sectoral engagement for design and implementation. For instance, our meeting with the Adana Union of Chambers of Tradesmen and Craftsmen President revealed how to combine under the counter establishments, such as carpenters in an industrial zone spanning 2,500 acres of land. The aim of the initiative has been here to provide and to facilitate a zone for the formalisation of these under-the-counter facilities.

- A second recommendation of this report is to provide waste pickers with identification cards and bags, assisting them in their efforts to increase representation, legitimacy, trust, and forge personal bonds with the rest of the community, into which they are increasingly integrating. Their empowerment not only demonstrates recognition of the critical role waste collectors in the upstream channel play in recycling, but it also contributes to separation efforts at the point of generation through the use of municipal incentives through collaboration. This certainly necessitates the formal inclusion and representation of their presence, voices, rights, improved working conditions, and increased living wage along the recycling chain.
- A third recommendation of this report is to encourage public and private investments in the recycling sector, as it offers significant economic returns in a world where waste is increasingly recognized as a valuable resource with the potential to create value and employment opportunities. The formal sector plays a critical role in this regard and should receive support to expand its operations, generate value, and generate jobs. In this respect, providing tax incentives, subsidies, and grants to small and medium-sized businesses in the recycling sector is highly recommended. These incentives can take the form of tax credits for investments in recycling infrastructure, reduced tax rates for facilities engaged in waste collection and recycling activities, and financial support for research and development of innovative recycling methods and technologies. By offering such incentives, the formalization of under-the-counter facilities prevalent in the upstream recycling chains can be fostered, while also encouraging private sector involvement and expansion in this sector. By providing support and establishing enabling conditions, including access to training, technical assistance, and financial resources, transparency and accountability can be promoted in the recycling sector, while also ensuring fair job opportunities and improved working conditions for workers. By addressing issues such as social security coverage, occupational health and safety measures, and fair wages, the formalisation process can contribute to enhancing the overall well-being and livelihoods of those employed in the recycling industry.
- A fourth and the final recommendation of this report is to implement conditional cash transfers to waste picker households in order to monitor the continuous enrolment and participation of school-age children in education and off the streets and waste picking. It was revealed that the children of the informal waste workers are at increased risk of leaving school at early ages and starting working with their families in *depos*. The tendency for generational continuity to work in waste labour halts the upwards mobility of children through education, thereby perpetuating the poverty cycle. With the identification of children as young as 6 years old working as waste pickers in the streets along with their families, they are at a higher risk of dropping out of school and continuing to rely on waste for a living, transferring poor working conditions, chronic underpayment, and informality from father to son and limiting upward mobility. Small cash transfers of as little as 25USD per child per month could be sustained to protect children and keep them in school, as well as away from the worst forms of child labour, as their exposure to toxic chemicals, physical harmful tasks, in an unsanitary physical environment and even working at night endures.

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