Kabadiwalla Connect

# INFORMAL SECTOR MAPPING IN BATTICALOA



KABADIWALLA CONNECT®

CONSERVATION COLLECTIVE

LANKA ENVIRONMENT FUND

HUBLOT

DEPECHE MODE

SPM FOUNDATION

# INFORMAL SECTOR MAPPING IN BATTICALOA

This project was made possible by the support of **Depeche Mode and Hublot**, facilitated through the **Conservation Collective**.

Conservation Collective is a global network of local environment foundations rooted in their communities working to protect the environment, restore    nature and safeguard against climate change.

This project is in partnership with
**Lanka Environment Fund and SPM Foundation.**

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# 1.EXECUTIVE SUMMARY

## 1.1 Introduction

The project "Mapping of Informal Waste Management in Batticaloa" aims to document and analyse the role of the informal recycling sector in the municipal waste management system of Batticaloa, Sri Lanka. The initiative is implemented by SPM Foundation in partnership with Kabadiwalla Connect (KC), with support from the Lanka Environment Fund (LEF). The project is funded through Round 4 of the Depeche Mode–Hublot–Conservation Collective partnership, which supports community-based initiatives focused on waste management, environmental protection, and sustainable consumption practices. This partnership, established in June 2023, has distributed nearly USD 900,000 globally to support local projects that address waste management challenges, encourage clean-up initiatives, and promote sustainable practices among businesses and communities.

In this project, Kabadiwalla Connect (KC) serves as the technical partner, providing methodological guidance and technical expertise based on its extensive experience in mapping informal recycling supply chains in India. SPM Foundation acts as the operational partner, responsible for implementing field activities and coordinating data collection in Batticaloa. Through this collaboration, KC will transfer knowledge and provide technical support to SPM to conduct a systematic mapping exercise and analyse the resulting data.

The project involves conducting a street-by-street survey of the informal recycling ecosystem across the Grama Niladhari (GN) administrative divisions in Batticaloa. The survey focuses on identifying and enumerating key actors within the informal waste management system, including small scrap shops, large informal scrap dealers, and recycling processors. The data collected will provide insights into the demographic characteristics of stakeholders, business activities, types and quantities of recyclable materials handled, and the flow of materials within the informal recycling supply chain.

By analysing this information, the project aims to develop a comparative understanding of the structure and functioning of the informal recycling sector in Batticaloa. The study will also explore opportunities to strengthen material recovery, particularly for high-value plastics, and improve traceability within the recycling supply chain.

A key outcome of the project is the development of a data-driven framework for understanding material flows and informal recycling networks. KC will support SPM in the analysis, interpretation, and visualisation of the collected data, enabling the creation of a traceability

solution that can potentially be scaled across Sri Lanka. The findings will contribute to improved planning of waste management systems, strengthen the integration of informal waste workers into circular economy initiatives, and support evidence-based decision-making by local stakeholders and policymakers.

Overall, the project seeks to highlight the critical role of the informal sector in resource recovery and recycling, while building local capacity to replicate data-driven mapping approaches for sustainable waste management across the island.

## 1.2 OBJECTIVES AND SCOPE OF WORK:

The objective of this study is to conduct field surveys to understand where informal waste collection clusters are situated in the Batticaloa district. Capture baseline data on the quantity of waste collected by the informal sector and the proportion of this waste that is directed toward recycling. The study aims to analyse the demographic characteristics, business operations, and material flow patterns within the informal waste sector better to understand its contribution to resource recovery and recycling. In addition, the study seeks to identify opportunities to enhance the collection of high-value plastics within the district by exploring interventions, such as conducting pop-up collection drives in schools. The findings of the study will be documented in a comprehensive report and will provide evidence-based recommendations to strengthen the role of the informal sector in sustainable waste management and support policy development. The scope of the project focuses on understanding and documenting the functioning of the informal recycling sector and its contribution to waste management and recycling activities.

**The project includes the following key components:**

**Data Collection and Enumeration:** Gathering demographic, operational, and material flow data from informal waste sector actors, including waste pickers and scrap shops.

**Material Flow Assessment:** Analysing the types and quantities of recyclable materials handled by the informal sector and the pathways through which these materials move toward recycling markets.

**Assessment of High-Value Plastic Recovery:** Identifying opportunities to improve the collection of high-value plastics through community-based initiatives such as school pop-up collection points.

**Policy Insights and Recommendations:** Providing evidence-based recommendations to support the integration and strengthening of the informal sector within the broader waste management system.

## 1.3 KEY FINDINGS AND RECOMMENDATIONS

The study mapped the informal recycling supply chain in Batticaloa and identified 221 waste pickers (L0s), 35 scrap shops (L1s), and 9 Material Recovery Facilities (L2s) operating within the city. The findings reveal that L0 waste pickers form the foundation of the recycling system, collecting recyclable materials from households, streets, and commercial areas and supplying them to scrap shops. Their work involves extensive daily travel and manual sorting of materials, demonstrating their crucial role in the initial recovery of recyclables from the waste stream.

At the L1 level, scrap shops function as aggregation and trading points, purchasing materials from waste pickers, sorting them into different categories, and preparing them for onward sale. These shops play a key role in stabilising the recycling supply chain by providing a consistent market for collected materials and linking informal collectors with larger buyers.

The L2 Material Recovery Facilities act as larger consolidation and processing hubs within the supply chain. These facilities handle higher volumes of recyclable materials, further sort and bale them, and supply them to recycling industries. Together, these three levels demonstrate a well-established but informal recycling network that supports material recovery and recycling activities in Batticaloa.

To strengthen this ecosystem, it is recommended to integrate informal recycling actors into formal waste management systems, support their operations through improved infrastructure and training, and expand decentralised pop-up collection drives in schools, colleges, and Grama Niladhari (GN) divisions. These initiatives can enhance material recovery, improve traceability within the recycling supply chain, and create more stable livelihood opportunities for informal workers while building a more inclusive and scalable recycling system.

## 1.4 SUMMARY OF PRIMARY AND SECONDARY DATA INSIGHTS

The study utilised both primary and secondary data sources to develop a comprehensive understanding of the informal recycling ecosystem in Batticaloa.

Primary data was collected through a street-by-street field survey conducted across the Grama Niladhari (GN) divisions of Batticaloa. The survey involved the enumeration and interviews of key actors within the informal recycling supply chain, including 221 L0 waste pickers, 35 L1 scrap shops, and 9 L2 Material Recovery Facilities (MRFs). Structured questionnaires were used to collect information on demographic characteristics, educational background, transportation methods, materials handled, pricing structures, business operations, and health-related aspects. The data also captured operational linkages between different actors, helping to map the material flow and relationships within the informal recycling supply chain.

Secondary data was compiled from government publications, existing studies, and waste management reports related to Sri Lanka. This included data on Batticaloa's population of 662,516 people, an estimated per capita waste generation of 0.43 kg per day, and waste composition patterns where biodegradable waste accounts for about 62% of the waste stream, followed by paper (7%), plastics (6%), wood (6%), glass (2%), and other materials (17%). Secondary literature was also used to understand national waste management policies and the broader role of informal recycling in Sri Lanka.

The integration of primary field data and secondary research enabled the study to provide a data-driven assessment of the informal recycling sector in Batticaloa, supporting the analysis of supply chains, material flows, and opportunities for improving recycling systems.

## 1.5 RECOMMENDATIONS FOR STAKEHOLDERS, POLICYMAKERS, AND COMMUNITY PARTNERS

To strengthen the recycling ecosystem in Batticaloa, it is important for policymakers and municipal authorities to recognise and integrate informal recycling workers into the formal waste management system. Supporting the sector with basic infrastructure, safety equipment, and capacity-building programs can improve both working conditions and operational efficiency.
In addition, community partners such as schools, colleges, and Grama Niladhari (GN) divisions can support decentralised recycling initiatives through periodic pop-up collection drives, enabling households and institutions to deposit segregated recyclables. Engaging informal workers in managing these collection points can increase material recovery while creating additional livelihood opportunities.

Strengthening collaboration between local authorities, civil society organisations, and recycling businesses will be essential to building a more inclusive, efficient, and sustainable waste management system in Batticaloa.

## 2. PROJECT TIMELINE:

The total duration of the project is 14 months, spanning from January 2025 to February 2026. The project officially commenced in February 2025 with the signing of a Memorandum of Understanding (MoU) with LEF.
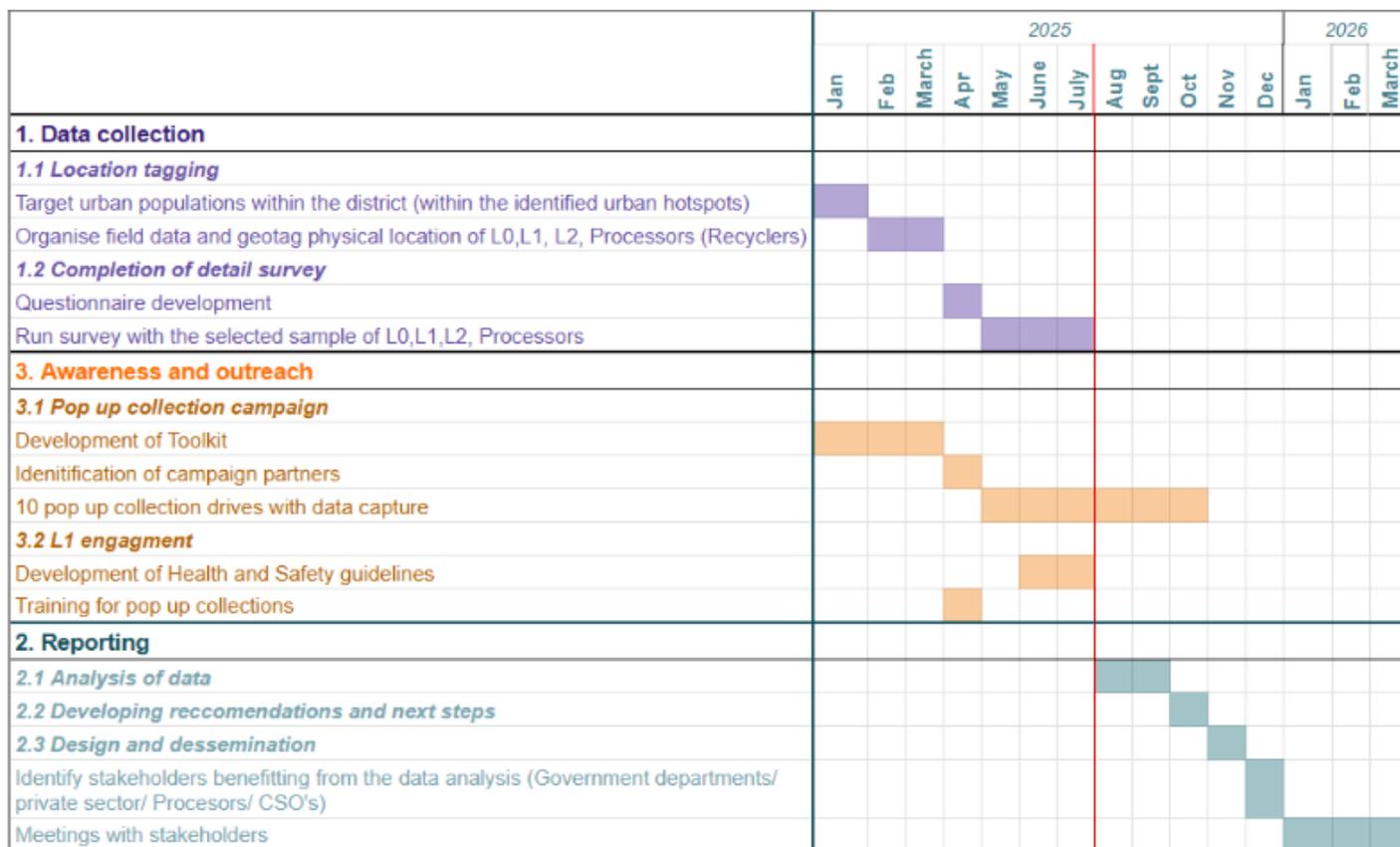
## 2.1 Gantt Chart



Image 2.1 : Gantt chart

## 3. Context, Literature Review & Secondary Data

## 3.1 Institutional & Governance Overview

Effective municipal solid waste management requires a clear institutional framework, supportive policies, and coordination among national and local government agencies. In Sri Lanka, waste management responsibilities are shared between national regulatory institutions and local authorities responsible for implementation. Understanding this governance framework is important for assessing the current waste management system in Batticaloa and identifying opportunities to integrate informal sector actors into the broader recycling value chain.

## 3.1.1 National Institutional Framework

At the national level, environmental management and waste governance are primarily overseen by the Ministry of Environment, which develops policies, strategies, and national action plans for environmental protection and sustainable waste management. The ministry provides policy direction to provincial and local authorities to improve waste management practices and promote environmentally sound waste treatment and disposal methods.

A key regulatory body within this framework is the Central Environmental Authority (CEA), established under the National Environmental Act No. 47 of 1980. The CEA is responsible for environmental regulation, pollution control, and monitoring compliance with environmental standards. The authority also oversees environmental licensing, waste disposal regulations, and environmental impact assessments for infrastructure projects. Through these mechanisms, the CEA plays an important role in guiding waste management practices across Sri Lanka.

In addition to these institutions, the Ministry of Local Government and Provincial Councils and the National Solid Waste Management Support Centre (NSWMSC) provide technical guidance and support to local authorities to strengthen waste management planning and implementation.

## 3.1.2  Local Governance and Institutional Responsibilities in Batticaloa

At the local level, the Batticaloa Municipal Council (BMC) is the primary authority responsible for municipal solid waste management within the city. The municipal council manages day-to-day waste management operations, including waste collection, transportation, street sweeping, and disposal.

Waste collections are generally organised through municipal sanitation workers who collect waste from households, commercial establishments, markets, and public spaces. Collected waste is transported to designated disposal sites managed by the municipal council. The municipality may also collaborate with private contractors or community-based initiatives for specific waste management activities.

Local authorities in Sri Lanka operate under the Municipal Council Ordinance, which empowers them to regulate waste management practices through local by-laws and service delivery mechanisms. These by-laws may include regulations on waste disposal practices, sanitation standards, and community responsibilities for maintaining environmental cleanliness.

### 3.1.3 Policy and Regulatory Framework

Solid waste management in Sri Lanka is guided by several national policies and regulatory instruments aimed at promoting sustainable waste management practices. The National Policy on Waste Management encourages waste reduction, resource recovery, and environmentally sound disposal practices based on the principles of the 3R approach–Reduce, Reuse, and Recycle.

The National Environmental Act provides the legal foundation for regulating waste disposal and environmental pollution. Additional regulations related to plastic and polythene management have also been introduced in recent years to address the environmental impacts of plastic waste. National environmental strategies also emphasise the importance of strengthening waste segregation at source, promoting recycling industries, and encouraging greater participation from communities and private sector actors in waste management systems.

## 3.2 Waste Generation & Composition Profile

According to national estimates, Sri Lanka generates approximately 7,000–7,500 tonnes of municipal solid waste per day, with a significant proportion originating from urban and semi-urban areas (Central Environmental Authority, 2019).

The amount of waste generated varies across regions depending on factors such as population density, economic activity, and consumption patterns. On average, the per capita waste generation in Sri Lanka ranges between 0.35 kg and 0.60 kg per person per day, with higher values typically observed in large cities (Central Environmental Authority, 2019). Effective management of this waste stream remains a challenge for many local authorities due to limited infrastructure, financial constraints, and inadequate waste segregation practices.

### 3.2.1 Waste Composition in Sri Lanka

The composition of municipal solid waste in Sri Lanka is dominated by organic or biodegradable materials. Studies indicate that a large share of waste generated in households consists of food waste, garden waste, and other organic matter. The predominance of biodegradable waste presents an opportunity for composting and other organic waste treatment methods.

Based on available estimates, the typical composition of municipal solid waste in Sri Lanka is presented below:
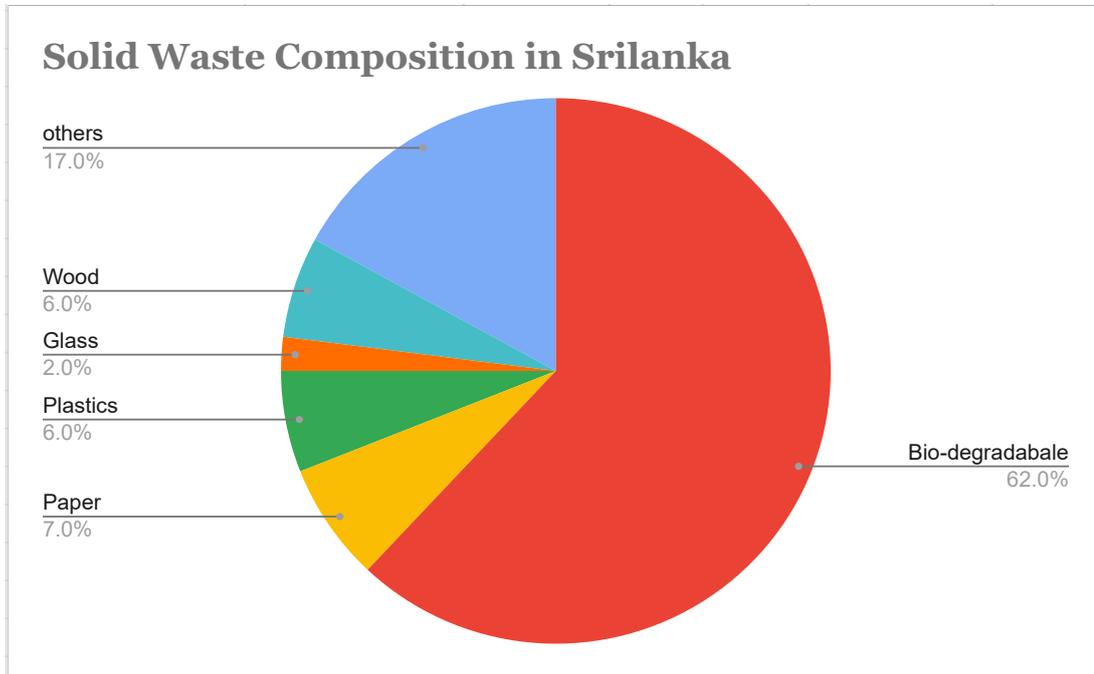


Image 3.1: Solid waste composition - Srilanka

## 3.2.2 Waste Generation in Batticaloa

Batticaloa District, located in the Eastern Province of Sri Lanka, is experiencing increasing waste generation due to population growth and urban development. The total population of Batticaloa District is approximately 662,516.

Based on an estimated per capita waste generation rate of 0.43 kg per person per day, the total waste generation in Batticaloa can be estimated as follows:

| DS Divisions | Population | Total Waste Generation per day in MT |
|---|---|---|
| Koralaipattu North | 29128 | 12.53 |
| Koralaipattu Central | 35619 | 15.32 |
| Koralaipattu West | 29096 | 12.51 |
| Koralaipattu North | 31003 | 13.33 |
| Koralaipattu South | 32153 | 13.83 |
| Eravur pattu | 86528 | 37.21 |
| Eravur Town | 46351 | 19.93 |
| Manmunai North | 95415 | 41.03 |
| Manumunai West | 36737 | 15.80 |
| Kattankudy | 53880 | 23.17 |
| Manmunai Pattu | 39612 | 17.03 |
| Manmunai South West | 30203 | 12.99 |
| Porathivu Pattu | 47025 | 20.22 |
| Manmunai South Eruvil Pattu | 69766 | 30.00 |
| **Total** | **662516** | **284.88** |

Table 3.1 : Waste Generation in Batticaloa

| Batticaloa Municipal Waste Generation - 2024 | | | | | | | |
|---|---|---|---|---|---|---|---|
| Month | Degradable Wastes in MT | Non Degradable Wastes in MT | PET | Cardboard | Plastics | Mixed Waste | Total Waste |
| January | 230,900 | 241,300 | | 410 | 1,000 | | 473,610 |
| February | 57,400 | 218,520 | | 1,225 | | 2,000 | 279,145 |
| March | 40,680 | 248,620 | | 1,080 | | | 290,380 |
| April | 41,000 | 255,500 | | 351 | 1,000 | 1,000 | 298,851 |
| May | 76,800 | 257,300 | 1,000 | 388 | | 1,000 | 336,488 |
| June | 80,400 | 210,800 | | 810 | | 1,000 | 293,010 |
| July | 437,700 | 200,800 | | 960 | | | 639,460 |
| August | 471,400 | 257,100 | | | | 13,000 | 741,500 |
| September | 313,500 | 244,300 | 1,000 | | | 3,000 | 561,800 |
| October | 462,500 | 230,700 | | | 2,500 | | 695,700 |
| November | 422,200 | 152,100 | | | | 29,500 | 603,800 |
| December | 487,500 | 212,200 | | | | 1,000 | 700,700 |

Table 3.2 : Batticaloa Municipal Council – Waste Collection Monthly Statistics - 2024

| Month | Degradable Wastes in MT | Non Degradable Wastes in MT | Waste volume in landfill in MT |
|---|---|---|---|
| January | 230.45 | 174.82 | 80.17 |
| February | 152.10 | 117.37 | 382.57 |
| March | 144.10 | 154.85 | - |
| April | 146.08 | 145.80 | 38.82 |
| May | 136.79 | 106.22 | 26.18 |
| June | 105.77 | 151.50 | 49.73 |
| July | 153.84 | 161.55 | 210.03 |
| August | 123.18 | 121.91 | 243.99 |
| September | 92.81 | 116.85 | 911.88 |
| October | 96.28 | 168.19 | 531.32 |
| November | 113.57 | 179.03 | 143.81 |
| December | 127.36 | 182.40 | 296.86 |

**Table 3.3 Kattankudy Urban Council - Waste Collection Monthly Statistics - 2025**

## 3.3 Existing Studies & Interventions

The informal waste sector plays a significant role in solid waste management in many developing countries, including Sri Lanka. Informal actors such as waste pickers and scrap shop operators contribute to the recovery and recycling of materials that would otherwise be disposed of in landfills or open dumping sites. These actors collect recyclable materials from households, commercial establishments, streets, and disposal sites and supply them to recycling industries through networks of intermediaries (Wilson et al., 2006). As a result, the informal sector contributes to resource recovery while also supporting livelihoods for individuals who have limited access to formal employment opportunities.

Despite their contribution to environmental sustainability and waste reduction, informal waste workers often operate outside formal regulatory frameworks and lack institutional recognition. In Sri Lanka, the informal recycling sector forms an important component of the overall waste management system, particularly in urban and peri-urban areas where municipal waste management infrastructure is limited (Perera & Ranasinghe, 2022). Previous research highlights that informal waste collectors help reduce the volume of waste reaching disposal sites and contribute to recycling systems through the collection and sale of recyclable materials.

Several studies indicate that informal waste workers contribute substantially to recycling activities in Sri Lanka. These actors collect materials such as plastics, paper, metals, and glass and sell them to scrap dealers or recycling industries. Perera and Ranasinghe (2022) examined the integration of formal and informal sectors in municipal solid waste management systems in Sri Lankan cities and found that informal waste collectors play an important role in material recovery and recycling. However, their contributions are often not formally recognised within municipal waste management frameworks.

Global research on waste management also highlights the importance of informal recycling systems in diverting recyclable materials from landfills and reducing the operational costs of municipal waste management (Wilson et al., 2009). However, informal waste workers are rarely included in municipal waste management planning processes. The absence of institutional support limits their access to infrastructure, financial assistance, and policy recognition, despite their contributions to recycling and environmental sustainability.

The informal waste sector is often characterised by low-income livelihoods, limited social protection, and unsafe working conditions. Informal waste workers typically rely on daily earnings generated through the sale of recyclable materials (Dias, 2016). Research indicates that many individuals enter the informal recycling sector due to limited employment opportunities and low levels of education. In many cases, workers operate independently or as part of small family-based enterprises and depend on scrap dealers as their primary buyers.

Studies on informal recycling and e-waste management in Sri Lanka have identified several economic and operational challenges faced by waste collectors. These challenges include fluctuating market prices for recyclable materials, lack of storage facilities, and limited access to financial resources or credit (Wijethilake et al., 2019). In addition, informal waste workers often operate under hazardous conditions. Handling mixed waste exposes them to risks such as injuries from sharp objects, exposure to hazardous materials, and infectious diseases. The lack of protective equipment and occupational safety measures further increases these risks (Dias, 2016; Wilson et al., 2006).

The informal recycling system in Sri Lanka generally operates through a multi-layered supply chain involving different actors. Waste pickers or itinerant buyers collect recyclable materials from households and public spaces and sell them to small scrap shops. These scrap shops aggregate and sort the materials before supplying them to recycling industries or larger traders. The functioning of this supply chain is largely market-driven and depends on demand from recycling industries. Consequently, the prices of recyclable materials fluctuate depending on market conditions and international commodity prices, directly influencing the income levels of waste collectors.

Understanding the structure and dynamics of these informal recycling supply chains is essential for developing effective waste management policies and improving recycling efficiency. It also helps identify opportunities for strengthening the livelihoods of informal waste workers and enhancing resource recovery within local waste management systems.

Solid waste management is a growing environmental concern in many municipalities in Sri Lanka, including Batticaloa. Rapid urbanisation, population growth, and changing consumption patterns have contributed to increasing waste generation across the country. Thirumarpan and Dilsath (2015) examined household willingness to pay for improved solid waste management services in Batticaloa and found that households generate a considerable quantity of municipal waste and demonstrate willingness to support improved waste management systems.

However, municipal authorities in smaller cities often face significant challenges related to limited infrastructure, financial resources, and technical capacity (Central Environmental Authority, 2019). These limitations affect the efficiency of waste collection and disposal systems and highlight the importance of alternative recycling mechanisms such as those operated by informal waste workers.

External socio-economic shocks can also significantly affect the livelihoods of informal waste workers. For example, disruptions in recycling markets or waste collection systems can reduce the availability of recyclable materials and lower income levels. Studies examining the impact of the COVID-19 pandemic in Sri Lanka found that informal waste workers experienced reduced income due to restrictions on mobility and disruptions in recycling supply chains (Fernando et al., 2023). These disruptions highlighted the vulnerability of informal workers who often lack financial security, social protection, and access to healthcare.

## 3.4 Identified Gaps in Data and System Design

Although several studies have examined waste management systems and informal recycling activities in Sri Lanka, significant research gaps remain.

Most existing research focuses on major urban areas such as Colombo and other metropolitan regions. There is limited research specifically examining the informal recycling sector in secondary cities and municipalities such as Batticaloa.

Existing literature provides limited insight into the structure and functioning of informal recycling supply chains, particularly the relationships between waste collectors, scrap dealers, and recycling industries.

There is a lack of comprehensive enumeration and mapping of informal recycling actors, including waste pickers, scrap shops and informal material recovery facilities. Without such data, it is difficult for policymakers and municipal authorities to design inclusive waste management strategies.

Research on material flow within informal recycling systems in Sri Lanka remains limited. Understanding how recyclable materials move from generation sources to recycling industries is essential for identifying inefficiencies and opportunities for improving resource recovery.

The livelihood conditions, income structures, and operational challenges of informal waste workers in smaller municipalities remain under-documented.

To address these gaps, the present study focuses on the informal recycling sector in Batticaloa. The study conducts a systematic enumeration of informal sector actors involved in recyclable material collection and trade. It provides detailed information on the types of materials handled within the informal recycling network, the price points associated with different recyclable materials, and the structure of income generation among informal actors. In addition, the study examines the operational practices and challenges faced by waste collectors and scrap shop operators. By generating this baseline information, the study contributes to a better understanding of the informal recycling system in Batticaloa and provides evidence that can support the development of more inclusive and effective waste management strategies.

# 4. METHODOLOGY

## 4.1 Study Area Description

Batticaloa district comprises one municipal council, 14 divisional secretariat divisions, and 346 grama niladari divisions. For this study, we have selected Divisional Secretariat divisions as the survey boundary. The extensive mapping was carried out in these 14 divisions to identify the waste pickers, scrap shops and informal material recovery facilities
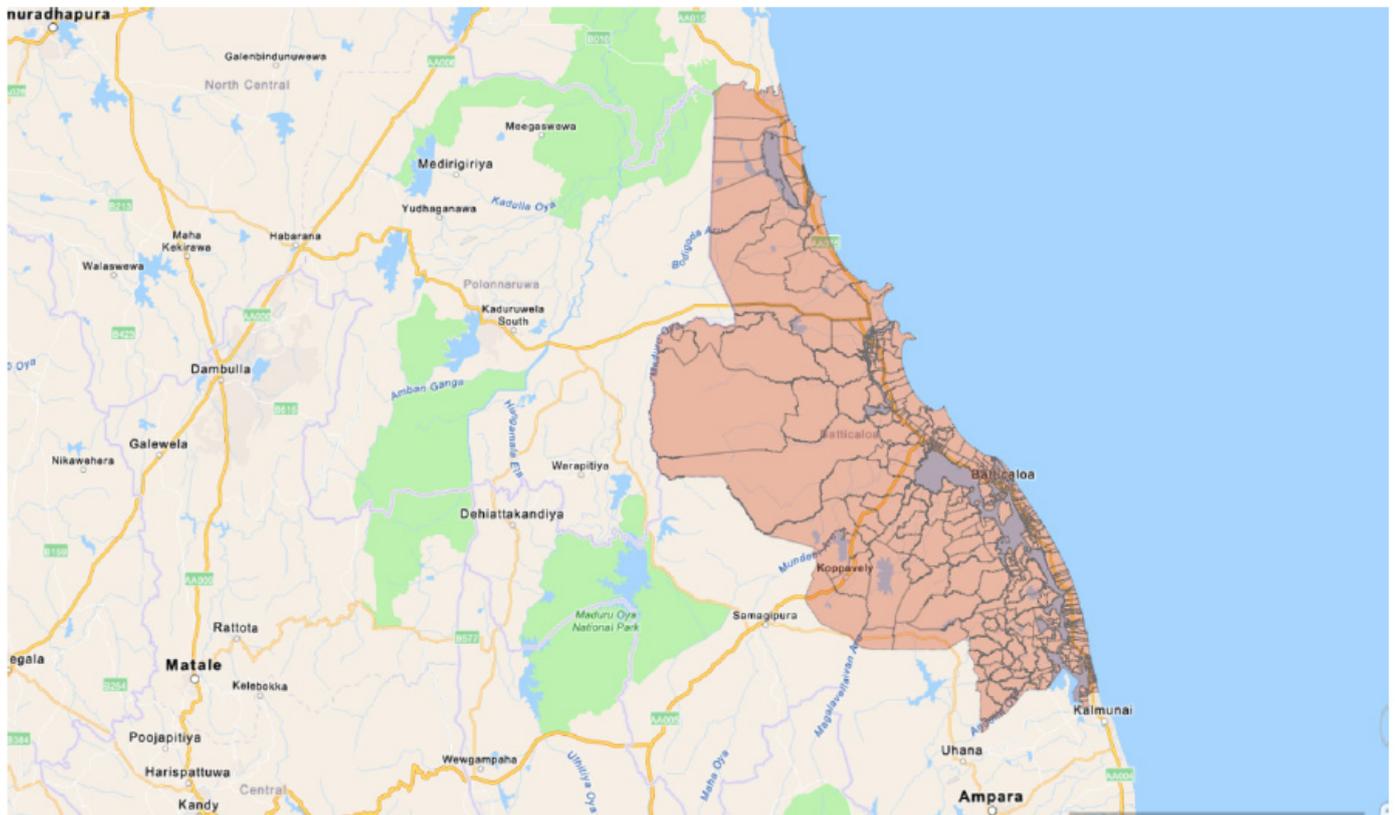
**Image 4.1: Batticaloa Grama Niladari Divisions Map**

## 4.2 Research Design

This study utilises a quantitative research approach to collect and analyse data related to the informal waste sector in Batticaloa District. Structured questionnaires were designed to facilitate geo-tagging of respondents and detailed data collection during field surveys. The questionnaire was developed to capture multiple dimensions of the informal recycling sector.

The demographic section of the questionnaire collected information such as age, gender, and socio-economic background of respondents, providing an overall understanding of the characteristics of individuals engaged in informal recycling activities. The business-related section focused on operational aspects, including types of activities performed, work patterns, collection methods, and income sources, which help in understanding the economic structure of informal waste sector operations.

In addition, the questionnaire included questions on material-specific information, identifying the types of recyclable materials handled by respondents and the recycling streams they contribute to within the waste value chain. Finally, the survey also captured health-related information, which provides insights into the well-being of informal waste workers and highlights potential occupational risks and safety concerns associated with waste handling activities.

## 4.3 Sampling Strategy

The study targeted informal waste sector actors, including waste pickers, scrap shop operators, and informal material recovery facilities involved in the collection and trade of recyclable materials. As the objective of the study was to map all stakeholders within the informal recycling sector in the study area, the approach aimed to cover the entire population of relevant actors wherever possible.

## 4.4 Data Collection Tools

The study utilised the Open Data Kit (ODK) platform for data collection. The structured questionnaires were uploaded to the ODK application and used by surveyors during field surveys to collect responses digitally. This approach enabled real-time data capture.

## 4.5 Methodology

The study began with the recruitment of surveyors to support field data collection. Following this, the survey questionnaires were developed, and a reconnaissance (recce) visit was conducted to gain an initial understanding of the study area and the presence of informal waste sector actors. Based on the insights gathered during the recce, the questionnaire was refined and finalised.

Subsequently, the study area was identified and divided among the surveyors to ensure systematic coverage. Surveyors conducted street-by-street field visits to identify stakeholders such as waste pickers, scrap shop operators, and informal material recovery facilities, and collected relevant data using the survey tools.

The collected data was digitally stored and compiled, after which it underwent a data cleaning process to verify accuracy and remove inconsistencies. Once the dataset was finalised, data analysis was carried out to interpret the findings and generate insights on the informal waste sector in the study area.
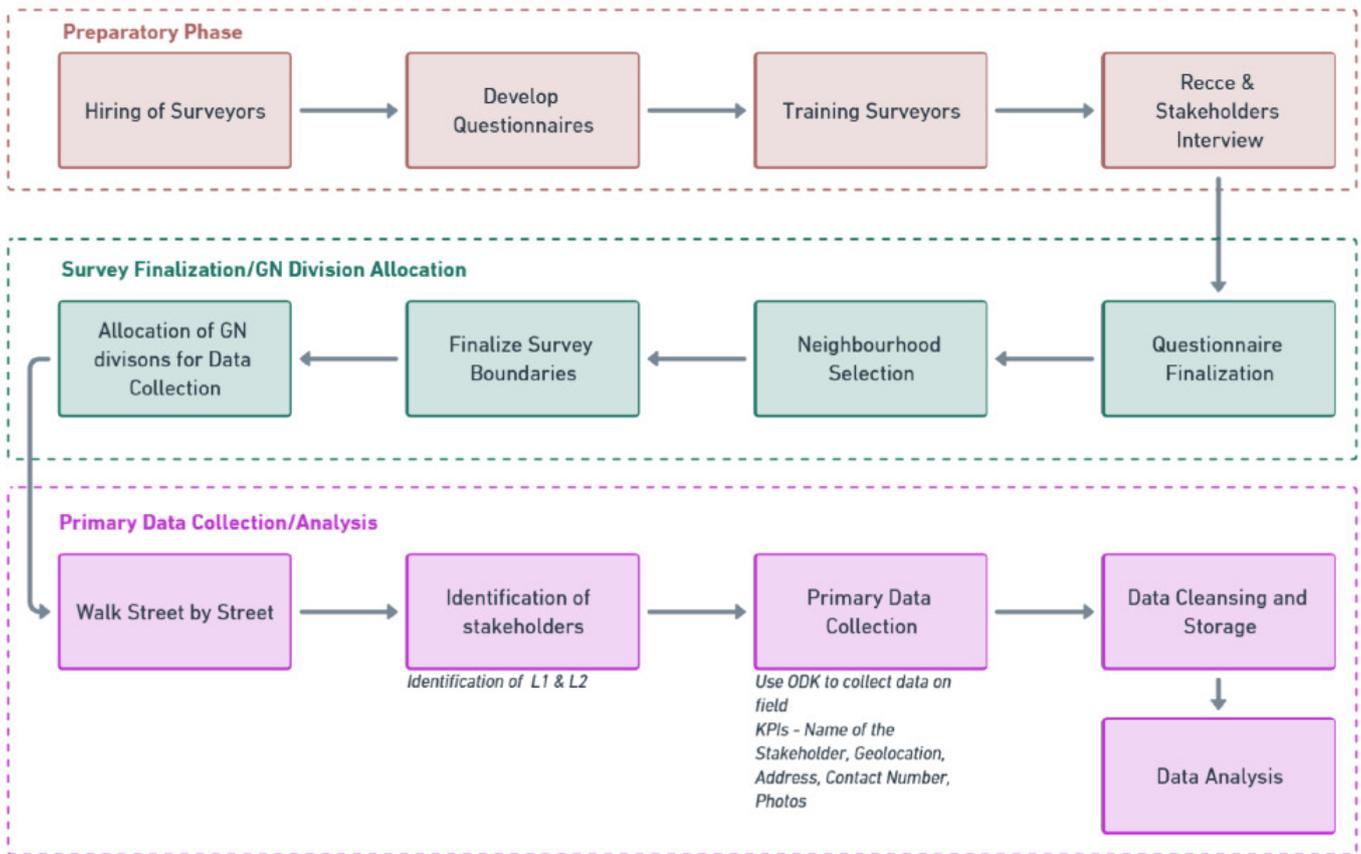
**Image 4.2: Primary data collection methodology**

## 5. PRIMARY DATA COLLECTION FINDINGS

Primary data was collected from waste pickers, scrap shop operators, and informal material recovery facilities (MRFs) involved in the recycling value chain. The following sections present the key findings and insights derived from the study.

## 5.1 Waste Picker (L0): Descriptive statistics

This section provides detailed information on the identification and enumeration of waste pickers, offering a clearer understanding of their demographic and operational characteristics.
A total of 221 waste pickers were enumerated during the study, and all identified waste pickers were male. The age of the respondents ranged from 26 to 89 years, indicating the presence of both middle-aged and elderly individuals within the informal waste collection sector. The average age of the waste pickers was 59 years, suggesting that a significant proportion of workers in this sector are older individuals. This age distribution indicates that informal waste collection in the study area is largely sustained by an ageing workforce, highlighting potential
concerns related to labour sustainability, occupational health, and the limited entry of younger workers into the sector.
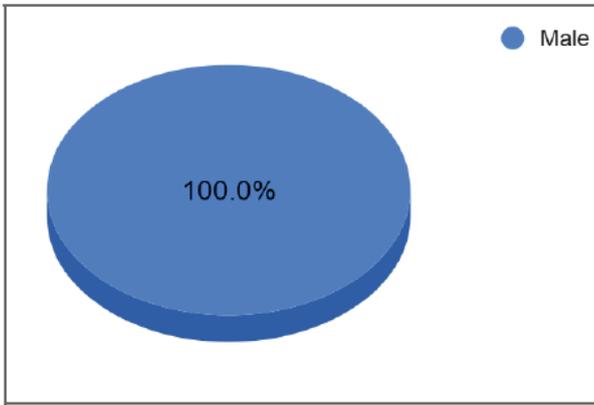
Image 5.1: Gender



Image 5.2: Age

In terms of educational background, the majority of waste pickers had relatively low levels of formal education. About 71% of the respondents had completed primary education, while 22% had attained secondary education. A smaller proportion, 6.9% of respondents, had completed higher secondary education (11th and 12th standard). These findings indicate that most individuals engaged in informal waste collection possess limited formal educational qualifications, which may influence their employment opportunities and contribute to their participation in the informal waste sector.
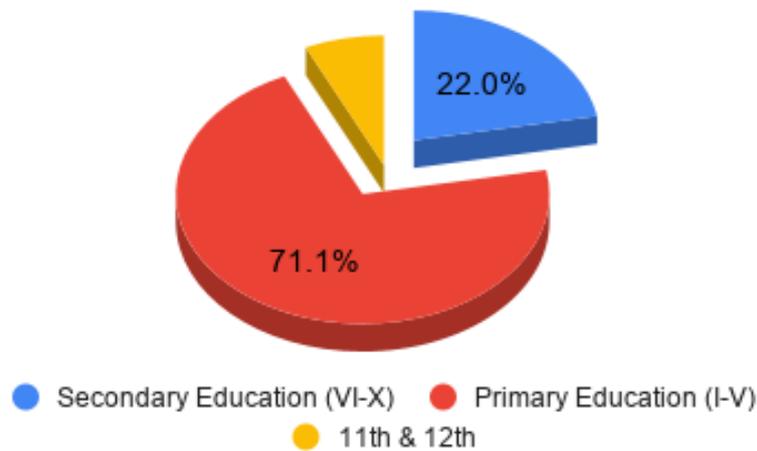


Image 5.3: Educational Qualifications of waste pickers

The most common mode of transportation used by waste pickers for collecting recyclable materials is the bicycle, which enables them to travel across multiple locations during their daily collection activities. Bicycles provide a low-cost and accessible means of transport, allowing waste pickers to move between residential areas, commercial establishments, and other waste generation points. On average, waste pickers travel approximately 24 kilometres per day to collect recyclable materials, reflecting the extensive distances covered in order to gather sufficient quantities of recyclables for sale. This highlights the physically demanding nature of their work and the reliance on simple, self-managed transportation methods within the informal waste collection system.
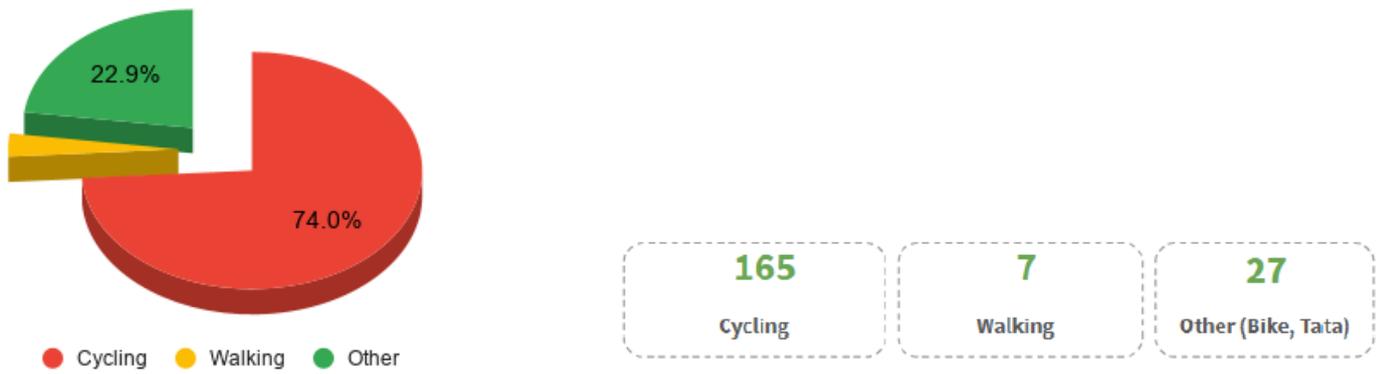
| 165 | 7 | 27 |
|---|---|---|
| Cycling | Walking | Other (Bike, Tata) |

Image 5.4: Mode of Transportation of waste pickers

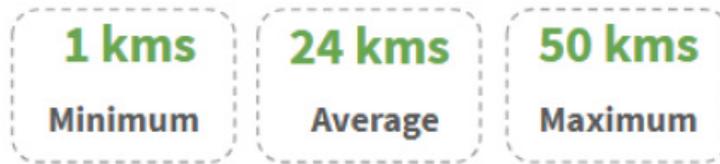| 1 kms | 24 kms | 50 kms |
|---|---|---|
| Minimum | Average | Maximum |

Image 5.5: Distance Travelled by waste pickers in a day

The average quantity of recyclable materials collected per day is approximately 25 kilograms. Based on the collected materials, waste pickers earn an average daily income ranging between LKR 2,000 and LKR 4,000, highlighting the role of informal recycling activities as an important livelihood source for these workers.

| 6 kgs | 25 kgs | 60 kgs |
|---|---|---|
| Minimum | Average | Maximum |

Image 5.6: Volume collected per day

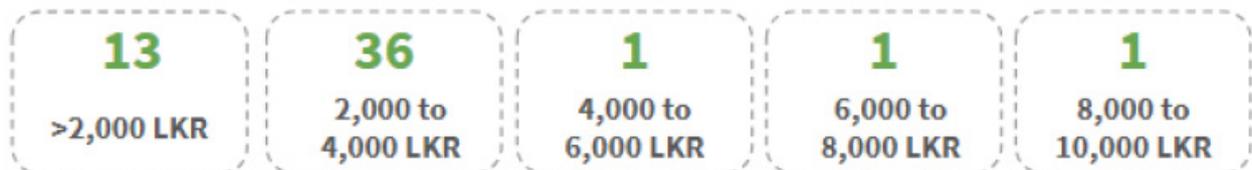| 13 | 36 | 1 | 1 | 1 |
|---|---|---|---|---|
| >2,000 LKR | 2,000 to 4,000 LKR | 4,000 to 6,000 LKR | 6,000 to 8,000 LKR | 8,000 to 10,000 LKR |

Image 5.7: Income of waste pickers

The primary mode of payment for transactions between scrap shop owners and waste pickers is cash, with 98.9% of respondents reporting that payments are made in cash. This reflects the informal nature of transactions within the recycling supply chain, where digital payment systems are rarely used, and most exchanges occur through direct cash payments.



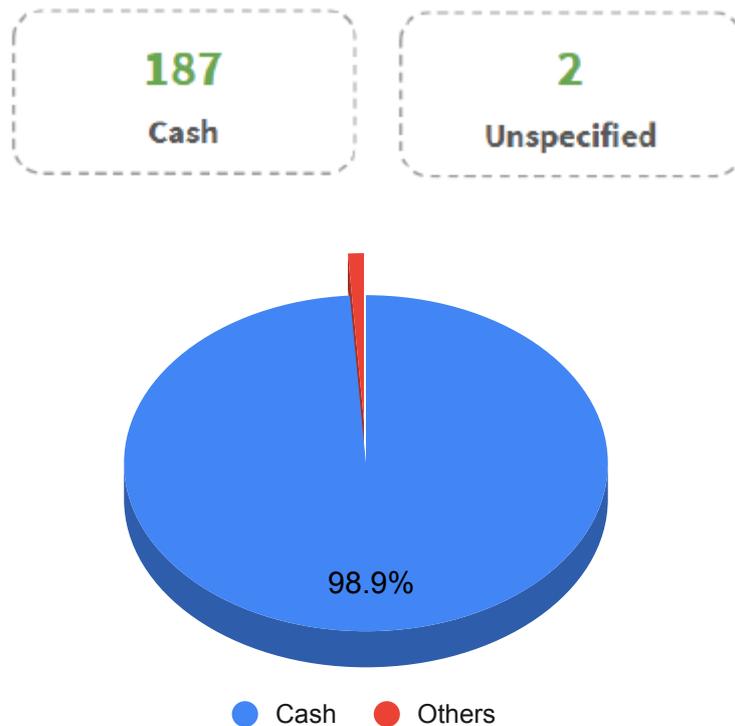| 187 | 2 |
| --- | --- |
| Cash | Unspecified |

98.9%

● Cash    ● Others

Image 5.8: Mode of Transactions

In terms of healthcare access, 99% of the respondents reported visiting government hospitals for medical treatment, indicating a strong reliance on public healthcare services. On average, waste pickers reported visiting a doctor approximately six times in the past three months. The minimum number of visits recorded was two, while the maximum was twenty visits within the same period.



| 208 | 1 | 1 |
| --- | --- | --- |
| Government Hospital | Private Hospital | Both |

Image 5.9: Medical Care

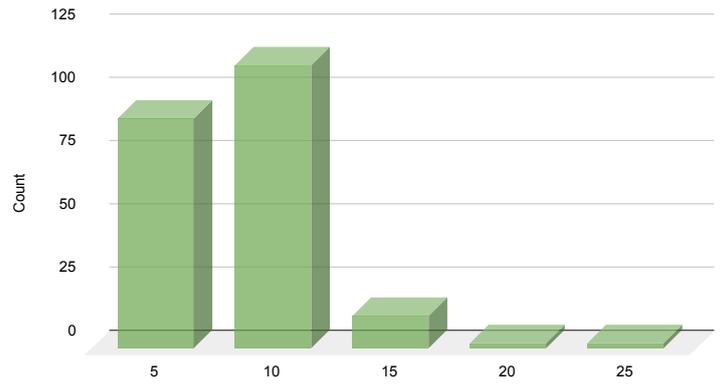|  | **2** Minimum | | **6** Average | | **20** Maximum |
| --- | --- | --- | --- | --- | --- |

Image 5.10: Doctor visits
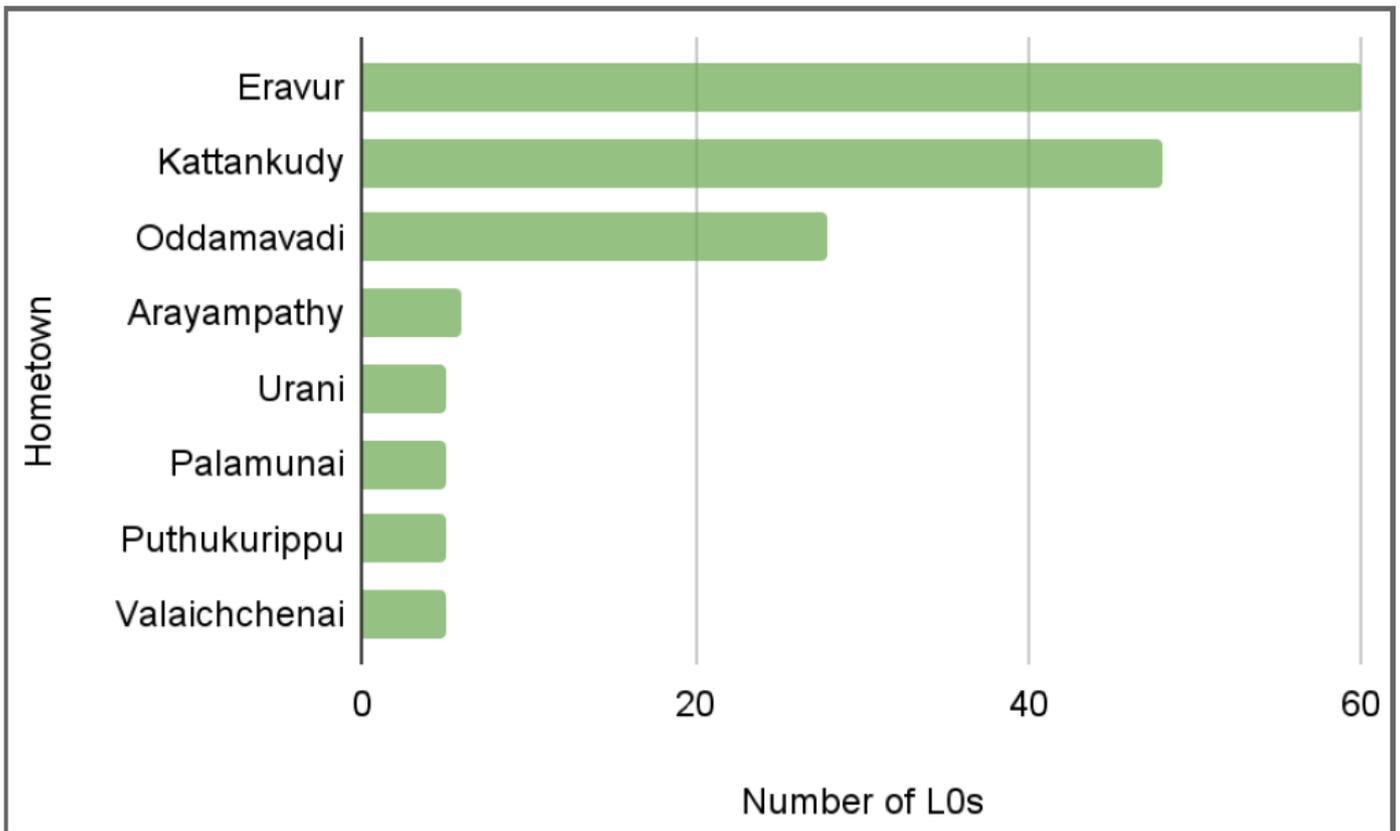


Image 5.11: Waste Pickers
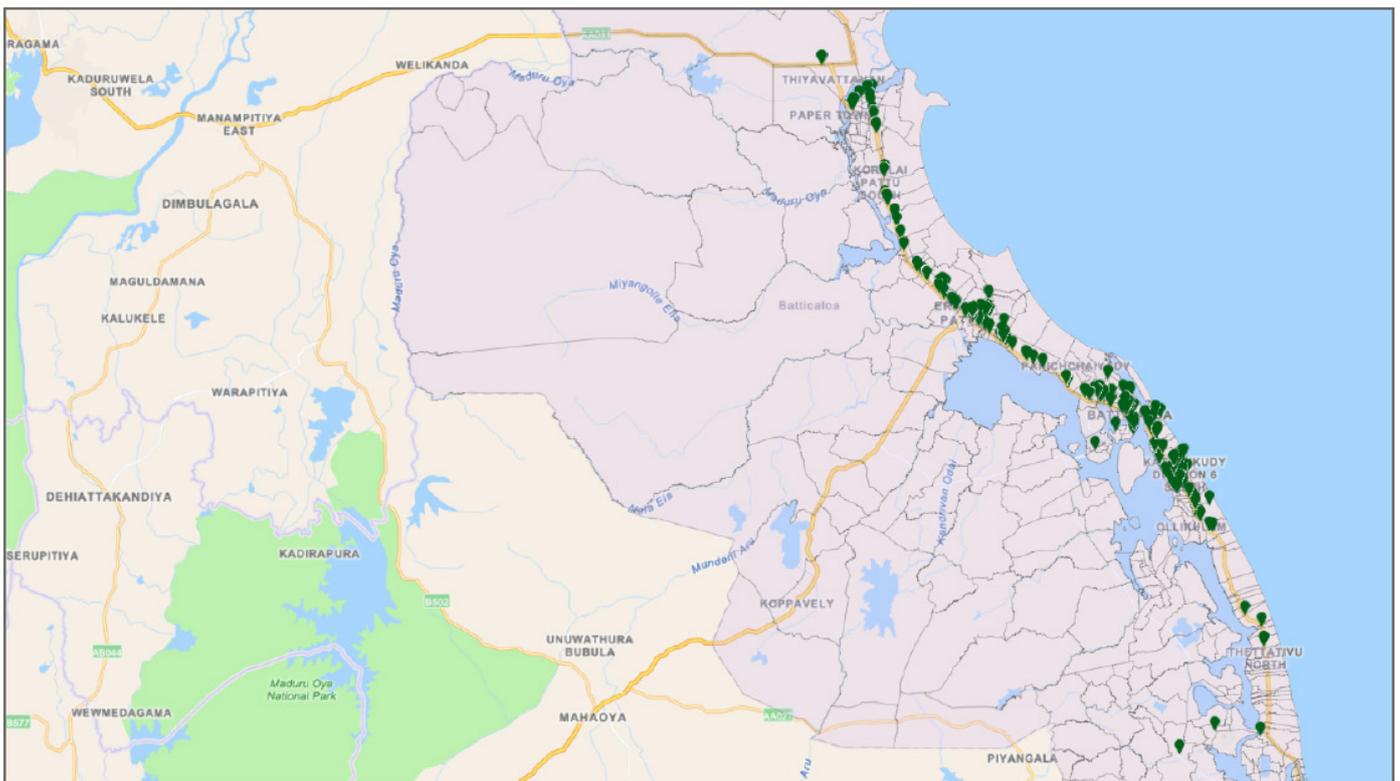
Image 5.12: Home Town


Image 5.13: Map of Waste Picker Locations

## 5.2 L1 (Scrap Shop): Descriptive statistics

This section provides detailed information on the identification and enumeration of scrap shops, offering a clearer understanding of their demographic and operational characteristics.

A total of 35 scrap shops were enumerated during the study. The majority of shop owners were male, with only one female respondent.
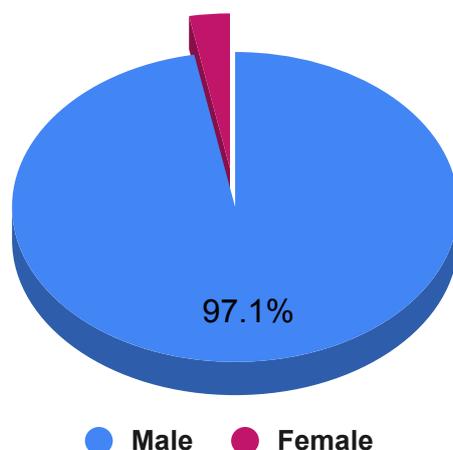


97.1%

● Male    ● Female

Image 5.14: Gender of Scrap Shop Owner

The age of scrap shop owners varied considerably among the respondents. The minimum age recorded was 30 years, while the maximum age was 77 years. The average age of scrap shop owners was 50 years, indicating that most individuals involved in operating scrap shops belong to the middle-aged group. This suggests that scrap shop operations in the informal recycling sector are generally managed by experienced individuals who have been engaged in the trade for several years.



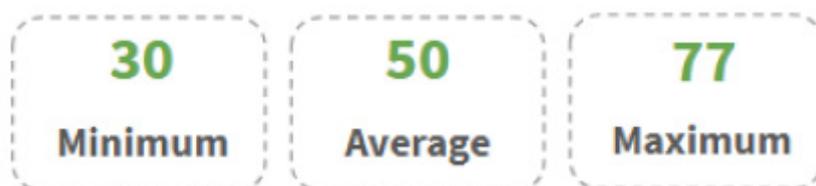| 30 | 50 | 77 |
| Minimum | Average | Maximum |

Image 5.15: Age

In terms of educational background, the majority of scrap shop owners had basic levels of formal education. Approximately 53% of the respondents had completed primary education, while 35% had attained secondary education. This indicates that most individuals operating scrap shops possess foundational educational qualifications, which may support their ability to manage basic business operations such as material sorting, price negotiation, and record keeping within the informal recycling sector.

35.3%

52.9%
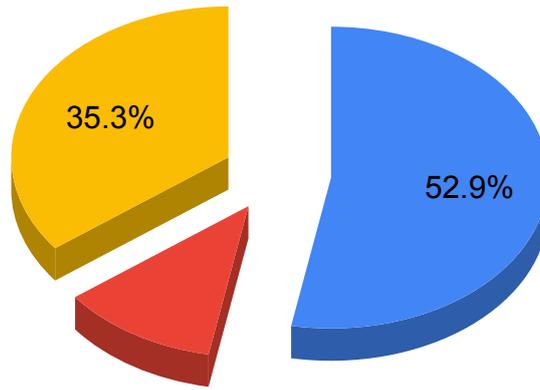
● Secondary school education (VI to X)
● Primary school education ( I to V)    ● 11th & 12th

Image 5.16: Educational Qualifications of Scrap Shop Owner

Regarding business infrastructure, 64% of the scrap shop operators owned their shop space, while the remaining operated from rented premises. The average shop area was approximately 1,247 sq. ft., with an average storage capacity of around 6 metric tonnes (MT) of recyclable materials.

| 110 Sq Ft | 1257 Sq Ft | 4398 Sq Ft |
|:---:|:---:|:---:|
| Minimum | Average | Maximum |

Image 5.17: Area of the shop in Sq.ft

| 1000 kgs | 6152 kgs | 15,000 kgs |
|:---:|:---:|:---:|
| Minimum | Average | Maximum |

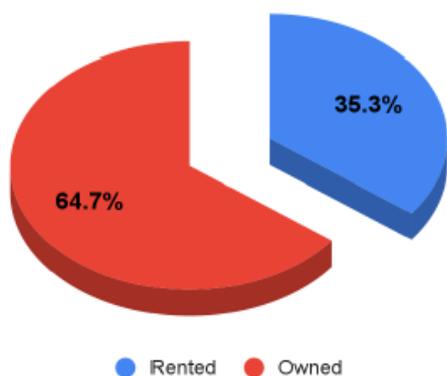Image 5.18: Storage Capacity of the scrap shop
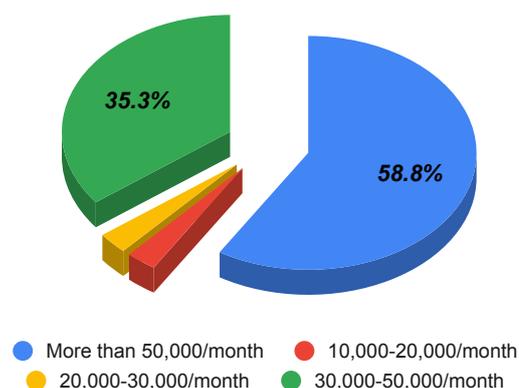
Image 5.19: Shop Ownership



Image 5.20: Revenue

The frequency of doctor visits among respondents varied during the reference period. About 38.2% of the respondents reported visiting a doctor once, 58.82% reported visiting twice, and 0.29% reported visiting three times. Scrap shop owners reported experiencing several health issues associated with their occupational activities and working conditions. The most commonly reported health problems include skin allergies, dust allergies, fatigue, blood pressure, and diabetes. These conditions may be linked to prolonged exposure to dust, mixed waste materials, and physically demanding work environments. In addition, respondents also reported occupational injuries such as cuts, fractures, sprains, and eye injuries, which can occur during the handling, sorting, and storage of recyclable materials. These findings highlight the health and safety risks faced by individuals working in scrap shops, emphasizing the need for improved occupational safety measures, protective equipment, and access to regular healthcare services within the informal recycling sector.
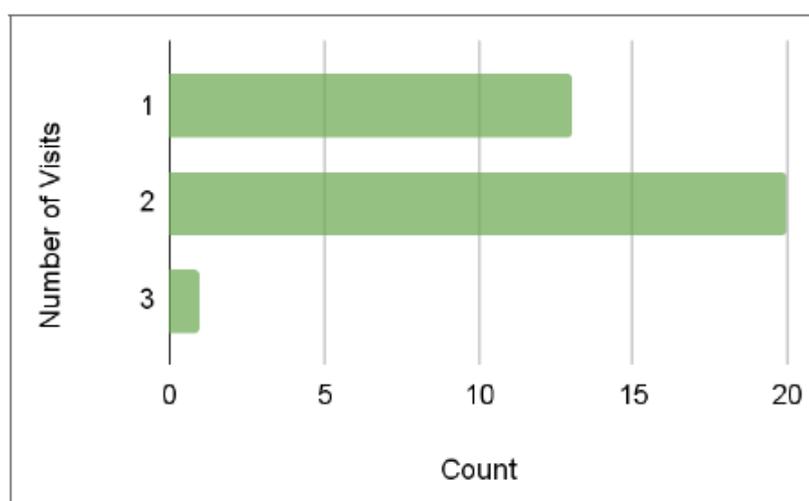


Image 5.21: Doctor Visit

- *Skin Allergy*
- *Blood Pressure*
- *Diabetes*
- *Dust Allergy*
- *Fatigue*
- *Occupational Injuries (Cuts, Fractures, sprains, Eye injuries)*

Image 5.22: Health Issues

The major recyclable materials handled by these scrap shops include paper, plastics, iron, cardboard, glass, metal, and coconut shells, which are collected, aggregated, and sold to recycling intermediaries or processing facilities.

| Materials | Average Volume/Shop | Average Price Per Kg |
|---|---|---|
| Plastics | 1470.69 | Rs76.36 |
| Cardboard | 1705.56 | Rs47.55 |
| Iron | 2525.00 | Rs108.67 |
| Coconut grove | 1858.70 | Rs55.71 |
| Glass | 1834 | Rs15.12 |
| Copper | 601.54 | Rs1,690.15 |
| Paper | 1327.27 | Rs54.66 |
| Metal | 2337.50 | Rs108.50 |
| Aluminium | 1100.00 | Rs306.17 |

Table 5.1: Materials Handled at Scrap Shop
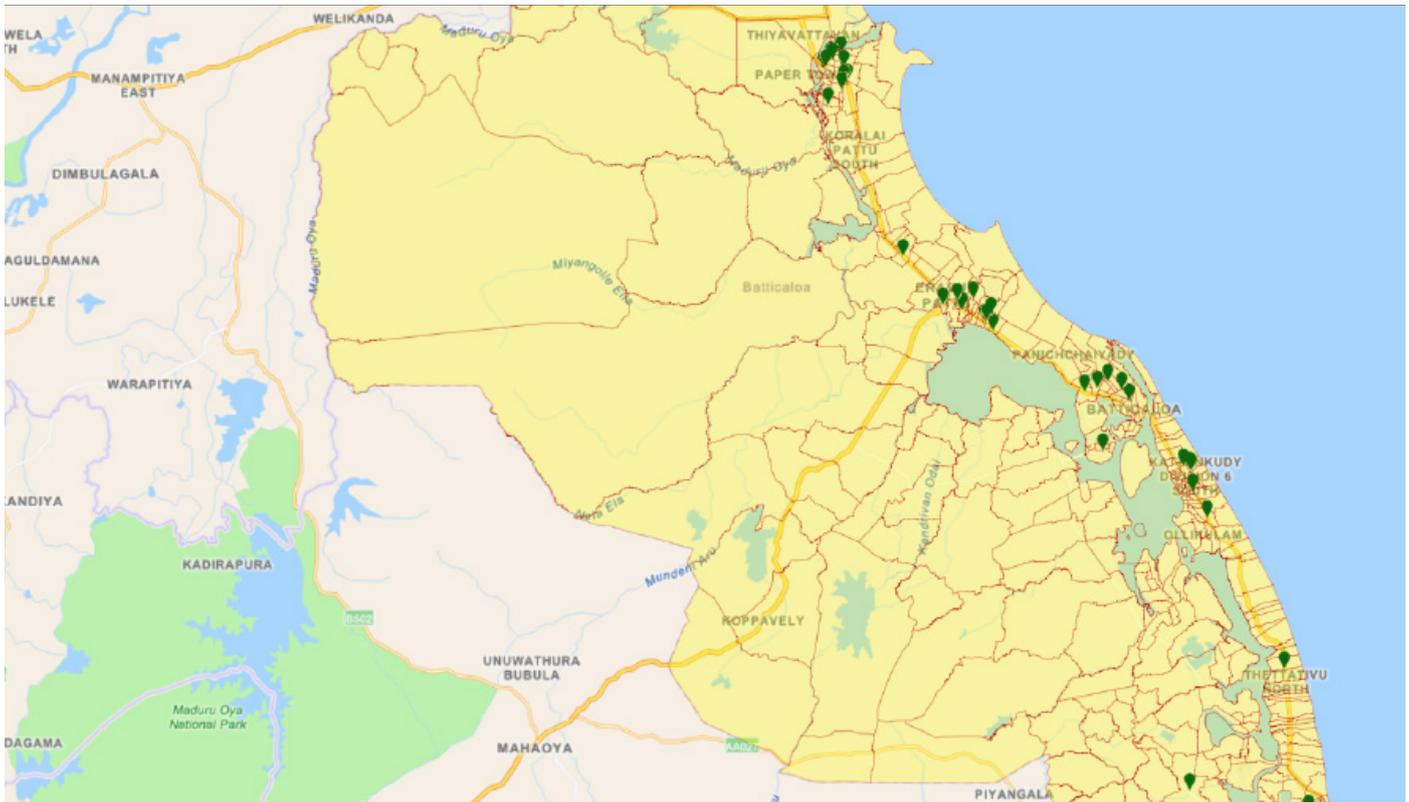


Image 5.23: Scrap Shops

Image 5.24: Map of Scrap Shops

## 5.3 L2 (Informal MRF): Descriptive statistics

This section provides detailed information on the identification and enumeration of informal Material Recovery Facilities (MRFs), offering a clearer understanding of their demographic and operational characteristics.

A total of nine Material Recovery Facilities (MRFs) were enumerated during the study, and all the shop owners were male. The age of the shop owners ranged from 21 to 68 years, with an average age of 44 years. This indicates that MRF operations in the study area are largely managed by individuals in the working-age and middle-aged groups, suggesting active participation of relatively younger entrepreneurs compared to other actors in the informal recycling sector.

Image 5.25: Gender



| 21 | 44 | 68 |
|---|---|---|
| Minimum | Average | Maximum |
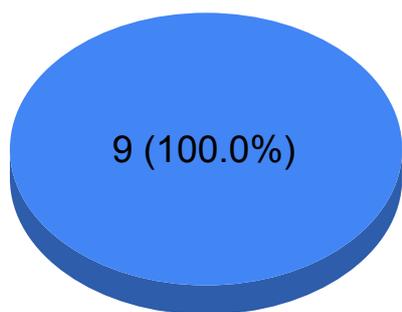
Image 5.26: Age

In terms of educational qualifications, 44.4% of the respondents had completed higher secondary education (11th or 12th grade), while 33.3% had completed secondary education. A smaller proportion, 22.2% of the respondents, had less than primary education. These findings indicate that a considerable share of MRF operators possess moderate levels of formal education, which may support their ability to manage operational activities such as material sorting, record keeping, and coordination with buyers and suppliers within the recycling supply chain.



- Secondary School Education
- Primary School Education
- 11th & 12th
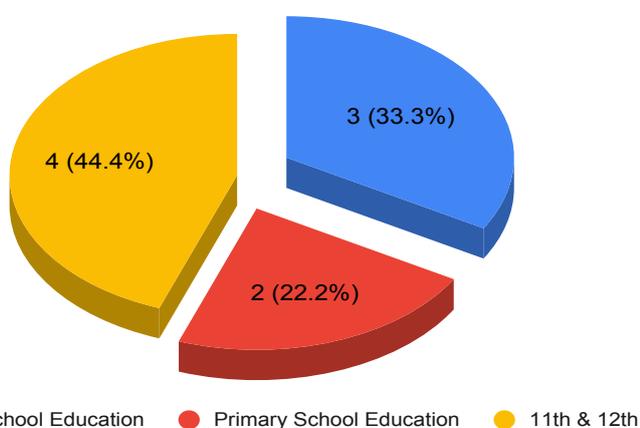
Image 5.27: Educational Qualification of Informal MRF Owners

The average duration of business operations among the MRF owners was 13 years, indicating that many of the respondents have considerable experience in the recycling sector. This suggests that MRF operators have been engaged in the trade for a significant period and have developed stable business practices within the informal recycling supply chain. In terms of shop ownership, 66.7% of the respondents operated their businesses from rented spaces, while 33.3% owned their shop premises. This reflects that a majority of MRF operators depend on
rented facilities for their operations, which may influence their operational costs and long-term business stability.

| 8 | 13 | 20 |
|---|---|---|
| **Minimum** | **Average** | **Maximum** |

Image 5.28: Age
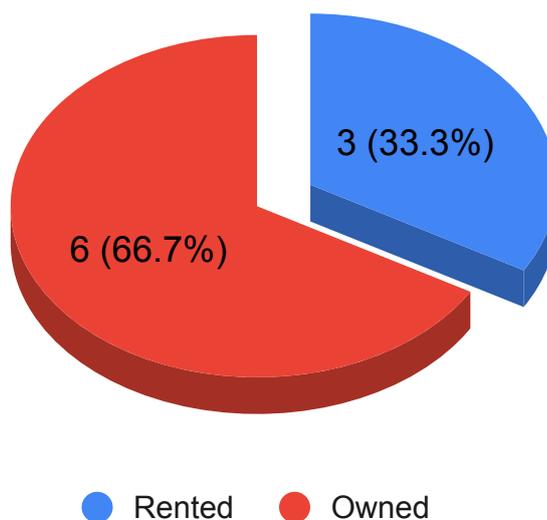


Image 5.29: Shop Ownership Status

With respect to income levels, 33.3% of the respondents reported earning around LKR 60,000 per month, 22.2% earned between LKR 50,000 and LKR 60,000, and 22.2% reported incomes ranging between LKR 80,000 and LKR 100,000 per month.

| 2 | 3 | 2 | 2 |
|---|---|---|---|
| **50k to 60k LKR** | **60k to 80k LKR** | **80k to 100k LKR** | **100k to 150 LKR** |

Image 5.30: Income Range

The average storage capacity of the enumerated MRFs was 5,022 kg, indicating their role as important aggregation points within the informal recycling supply chain.

| 2,000 Kgs Minimum | 5,022 kgs Average | 10,000 kgs Maximum |

Image 5.31: Storage Capacity



Image 5.32: Informal MRFs

# Materials Collected by Informal MRF

| Standard Name | Major Categories | Volume/Month in Tons | Average Price Per Kg |
|---|---|---|---|
| Aluminium | Metal | 10.05 | Rs123.48 |
| Barrel Sheet | Metal | 15.25 | Rs58.46 |
| Beer Bottle | Glass | 5.88 | Rs22.46 |
| Beer Tin | Metal | 1.28 | Rs59.02 |
| Books | Paper | 16.6 | Rs34.52 |
| Brass | Metal | 4 | Rs1,300.00 |
| Card Board | Paper | 15.6 | Rs25.99 |
| Cheena Chatti | Metal | 5.5 | Rs35.55 |
| Coconut Shell | Coconut Shell | 44.7 | Rs65.11 |
| Copper | Metal | 1.83 | Rs837.43 |
| Full Bottle | Glass | 15.9 | Rs14.37 |
| Half bottle | Glass | 5.625 | Rs7.47 |
| Iron | Metal | 29.3 | Rs97.51 |
| Label bottle | Glass | 9.25 | Rs16.32 |
| Plastic Chair | Plastics | 18.6 | Rs104.62 |
| Plastics Cans | Plastics | 10.92 | Rs58.87 |
| Plastic Electronic Parts | Plastics | 4 | Rs78.75 |
| Plastics vessels | Plastics | 15.8 | Rs51.01 |
| PVC | Plastics | 5.6 | Rs47.86 |
| Quarter bottle | Glass | 2.67 | Rs8.78 |
| Saaku | Saaku | 3.9 | Rs352.31 |
| Saline Bottle | Saline bottle | 0.035 | Rs80.00 |
| Urea bag | Urea bag | 2.5 | Rs32.00 |
| Vehicle Parts | Vehicle Parts | 6.5 | Rs80.08 |

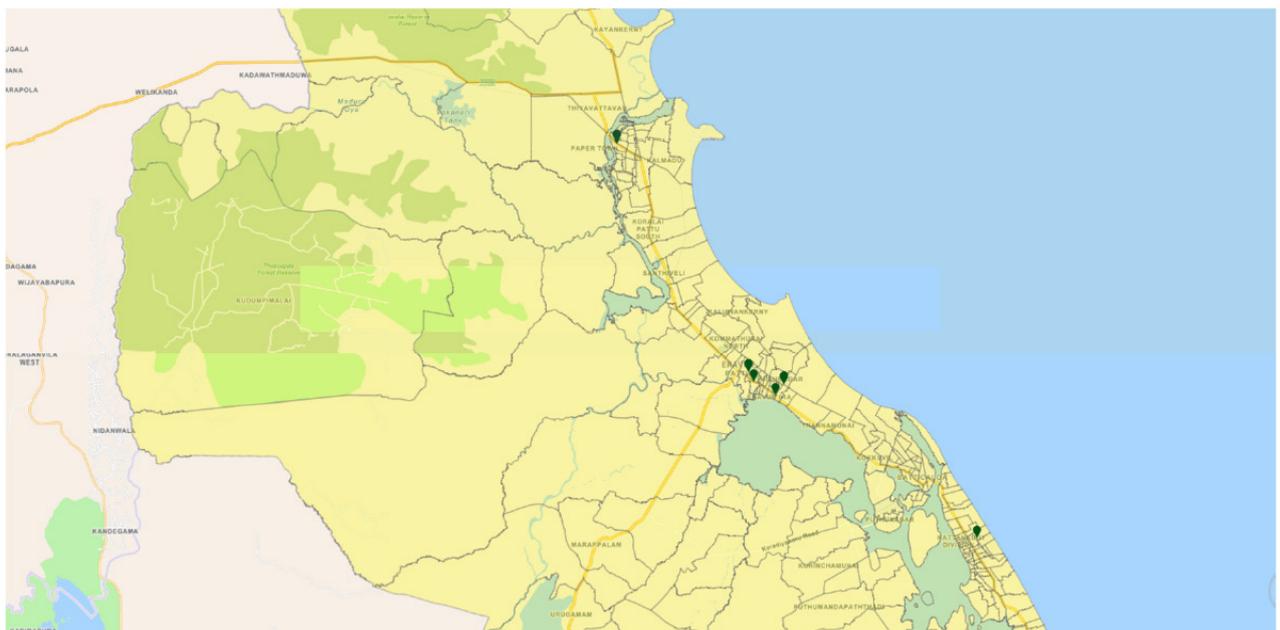Table 5.2: Materials Handled by Informal MRF



Image 5.33: Map of Informal MRFs

## 5.4 Participation of Women in the Informal Sector

The assessment of the informal recycling sector in Batticaloa indicates limited participation of women across the value chain, with their involvement largely restricted to low-risk and low-intensity activities.

No female participation was observed among waste pickers. This may be attributed to the physically demanding nature of the work, along with safety concerns, prevailing social norms, and mobility constraints, which often limit women's engagement in primary collection activities. At the scrap shop level (L1), a total of 13 women were identified as being involved. Their roles are primarily confined to light processing activities, such as sorting and tearing of paper. These tasks are less physically intensive and are typically carried out in relatively controlled environments, making them more accessible to women. However, their participation remains limited to low-value activities, with minimal involvement in decision-making, handling high-value materials, or managing shop operations.

No female participation was observed in informal Material Recovery Facilities (MRFs). Similar to waste picking, this absence may be due to factors such as challenging working conditions, lack of adequate sanitation facilities, and safety concerns.

## 6. POP-UP COLLECTION INTERVENTION

The Salvage City program is an initiative where local scrap shops are connected with schools, colleges, and universities to establish collection drives and enhance the recovery of recyclable materials from the community.

A total of 10 collection programs were conducted in collaboration with four scrap shops across eight schools in Batticaloa. Through these initiatives, approximately 1.55 metric tonnes of recyclable materials were collected and successfully channelised into the recycling supply chain.

Images 6.1: Pop-Up Collection Drives

# 6.1 Standard Operating Procedure (SOP)

The process of conducting a pop-up collection drive begins with the onboarding of scrap shops. This involves the identification and scoping of scrap shops, followed by shortlisting suitable L1 aggregators. The shortlisted L1S who express willingness to participate in the collection drives are then formally onboarded through a partnership agreement.

The next step involves finalising institutional stakeholders for hosting the collection drives. Schools, colleges, and universities are scoped and approached to assess their interest in participating. Interested institutions are then shortlisted, converted, and formally onboarded through an agreement to host the collection events.

The final phase is the conduct of the pop-up collection events. On the scheduled day, the onboarded L1 scrap shops visit the stakeholder location. Students and members of the institution bring recyclable materials and drop them at the collection point. The L1 operators carry out preliminary segregation of the materials, after which the segregated materials are weighed. The quantity and details of the materials collected are recorded in a bill, and a receipt is issued to the users for their contribution.
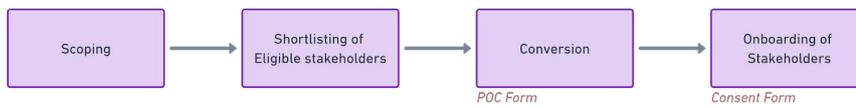
## Kabadiwalla

**Onboarding of L1s**

| Scoping | → | Shortlisting of Eligible L1's | → | Conversion | → | Onboarding of L1's | → | Issue of Bill Book |
|---|---|---|---|---|---|---|---|---|
| | | | | *POC form signed by L1* | | *Consent Letter signed by L1* | | |

**Pop Collection SOP for L1s**

| L1 will arrive at the designated location | → | Users dropping off Materials | → | Preliminary Segregation | → | Weighing of Materials | → | Issue of bill | → | Provide cash to user for sales |
|---|---|---|---|---|---|---|---|---|---|---|

## Stakeholder SOP

**Onboarding of Stakeholders**

| Scoping | → | Shortlisting of Eligible stakeholders | → | Conversion | → | Onboarding of Stakeholders |
|---|---|---|---|---|---|---|
| | | | | *POC Form* | | *Consent Form* |

**Popup Collection SOP for Stakeholders**

| Waste Segregation at home | → | Bring the segregated waste on the assigned day | → | Sell Materials to L1 | → | Preliminary Segregation by L1 | → | Weighing of recyclables by L1 | → | L1 will Issue bill and cash for the recyclables |
|---|---|---|---|---|---|---|---|---|---|---|

Image 6.2: SOP of Pop-Up Collection Drives

# 6.2 Pop-up Collection Summaries

**10**
Total Events

**8**
Locations

**1.55 MT**
Total Volume

**4**
Number of L1s

| Locations | Number of Transactions | Volume in kgs |
|---|---|---|
| BT BC Macan Markar National School | 56 | 263.6 |
| Hindu College | 116 | 183.2 |
| Mahajana College | 119 | 456.16 |
| Pillayarady Nalliah Vidyalayam | 31 | 101.61 |
| Silom Hospital Batticaloa | 29 | 126.05 |
| Sri Lankan Pre School | 34 | 85.25 |
| Urani Saraswathy Vidyalayam | 56 | 280.195 |
| Vipulanandha Maha Vidyayalayam | 39 | 59.45 |
| Total | 480 | 1555.515 |

Table 6.1: Statistics of Pop-up collection drives

| L1 Name | Number of events | Transactions | Volume in kgs | Amount Earned |
|---|---|---|---|---|
| Sellaiya Ganesh | 7 | 354 | 1130.855 | Rs35,253.00 |
| Sarojini Devi | 1 | 39 | 59.45 | Rs1,924.00 |
| Kamal Raj | 1 | 31 | 101.61 | Rs2,022.40 |
| Selabteen | 1 | 56 | 263.6 | Rs9,667.00 |

Table 6.2: L1s Participated in Pop-up Drives

| Name of the material | Volume in kgs |
|---|---|
| Paper | 342.20 |
| Plastic | 271.57 |
| Coconut shell | 229.35 |
| Glass | 194.65 |
| Cardboard | 119.85 |

Table 6.3: Top 5 Materials collected in Pop-up Drives
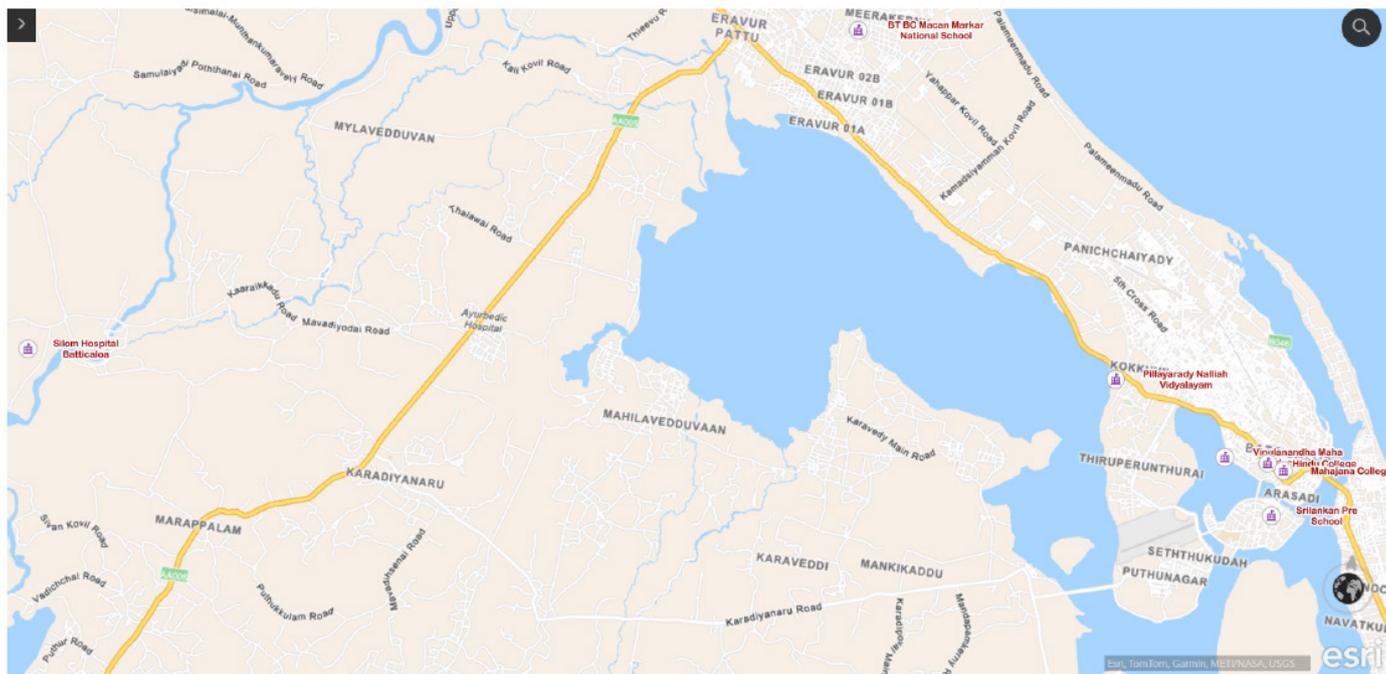


Image 6.3: Map of Pop-up Locations

## 7.1 Material Taxonomy - Informal Sector (L0, L1, and L2)

| Terminology of L0 and L1 | Meaning |
|---|---|
| Puttuvam | Chairs |
| | Table |
| | Washing Machine Cover |
| Koppai/ Basin Samaan | Plastic Vessels |
| Can Item | Plastic Cans |
| Plastic Electronic parts | Plastic Electronic parts |
| PVC/Batta | PVC |
| Thanni Boththal | PET |
| Cardboard | Cardboard |
| Sirattai | Coconut Shell |
| Irumbu | Iron |
| Kaa botthal | Quarter bottle |
| Ara Botthal | Half bottle |
| Mulu Botthal | Full Bottle |
| Cardboard | Cardboard |
| Sirattai | Coconut Shell |
| Irumbu | Iron |
| Beer Botthal | Beer Bottle |
| Barrel Sheet | Thar Barrel |
| | Cupboard |
| | Gas cooker case/Gas stove stainless steel |
| | Oil Barrels |
| Thagaram | Sheets |

Table 7.1: Taxonomy at L0 and L1

## 7.2 Material Flow Analysis

The Material Flow Analysis (MFA) of the informal recycling sector in Batticaloa was conducted to understand how recyclable materials move through different actors within the local waste management system. The analysis focuses on waste generated from residential households, small commercial establishments, and street waste streams, and how these materials are recovered and channelled into the recycling supply chain.

Recyclable waste generated on streets and public spaces is primarily collected by informal waste pickers, who recover valuable materials such as plastics, paper, metals, and glass from mixed waste. These waste pickers play a crucial role in diverting recyclables that would otherwise end up in disposal sites.

Recyclable materials generated from residential households and small commercial establishments are mainly collected directly by informal scrap shops operating within the community. These scrap shops function as primary collection and aggregation points for recyclable materials.

Waste pickers typically sell or drop off the materials they collect at informal scrap shops, where the materials are further sorted and temporarily stored. These scrap shops then transfer the materials through two main pathways within the recycling value chain.

In the first pathway, scrap shops sell the collected materials to aggregators (transport aggregators) who supply them to recycling processors.

In the second pathway, scrap shops sell materials directly to informal Material Recovery Facilities (MRFs). At these facilities, recyclables undergo additional sorting and basic pre-processing, such as cleaning, grading, or baling, before being sold to recycling processors or industries.

An assessment of the material flow in Batticaloa indicates that the types of materials handled at both scrap shops and informal MRFs are largely similar, with the key difference being the scale of operations and storage capacity. Informal MRFs typically operate at a larger scale and have higher storage capacities compared to smaller scrap shops. However, since both actors handle similar recyclable materials, the market price points for materials remain relatively consistent across Level 1 (scrap shops) and Level 2 (MRF) aggregators within the informal recycling value chain.
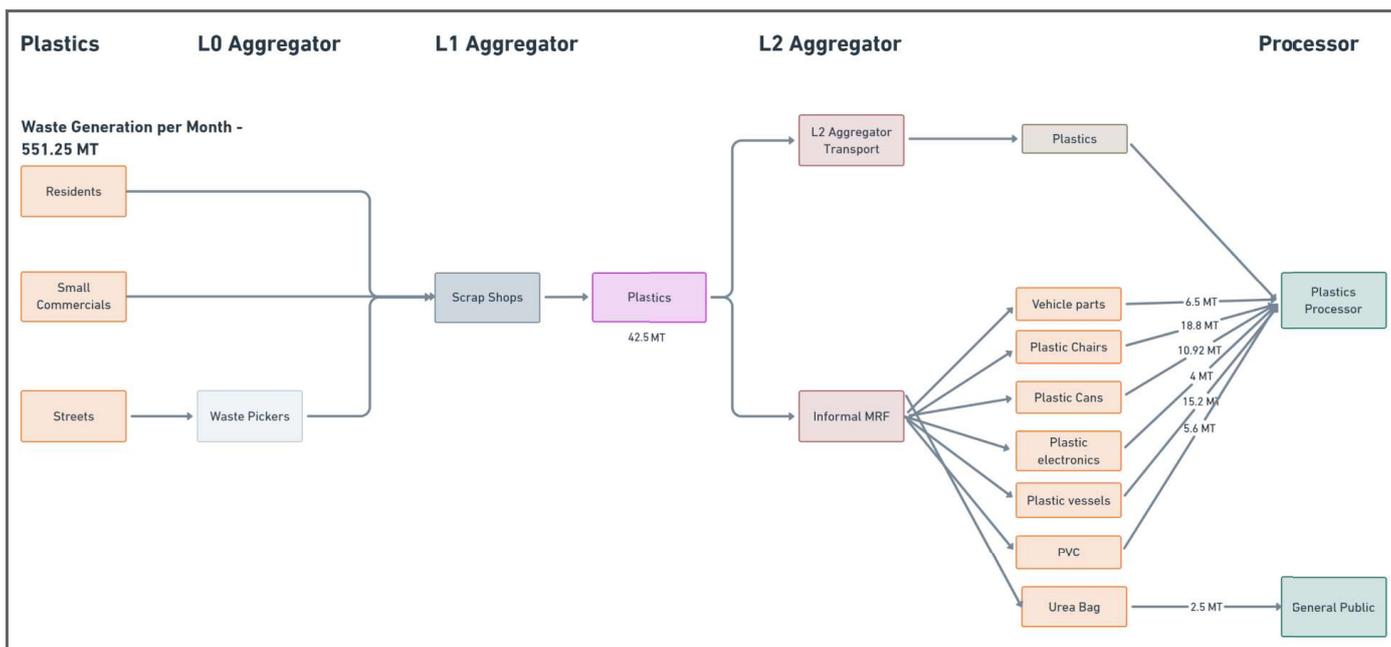
# Plastic Material Flow



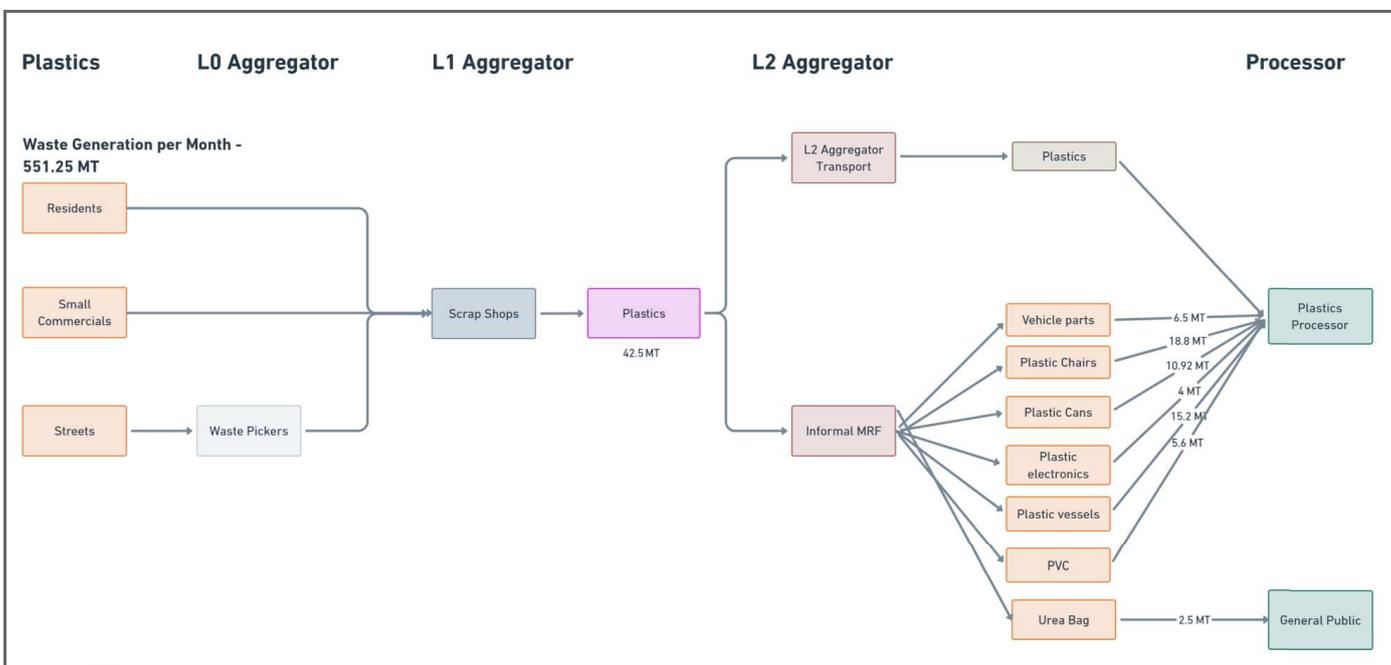Image 7.1: Plastics Material Flow

# Paper Material Flow



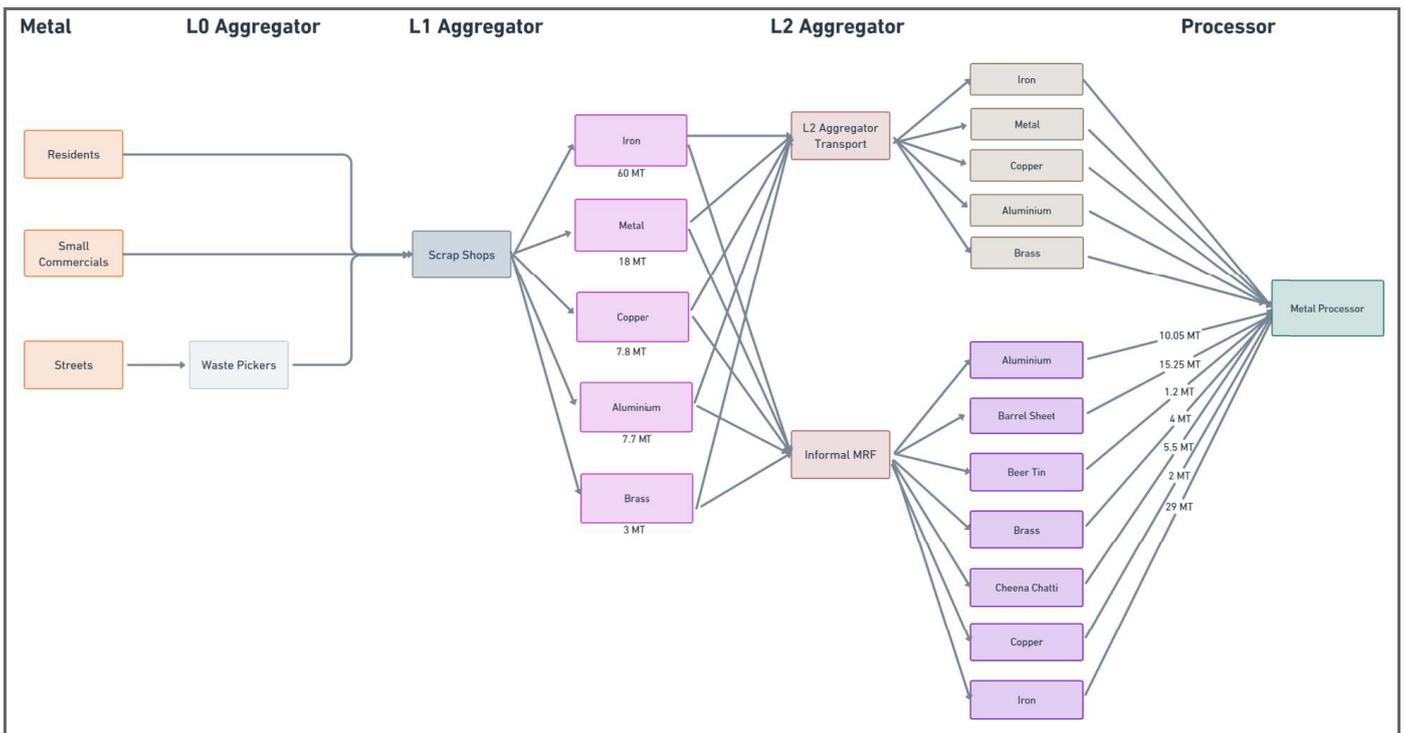Image 7.2: Paper Material Flow

# Metal Material Flow



Image 7.3: Metal Material Flow
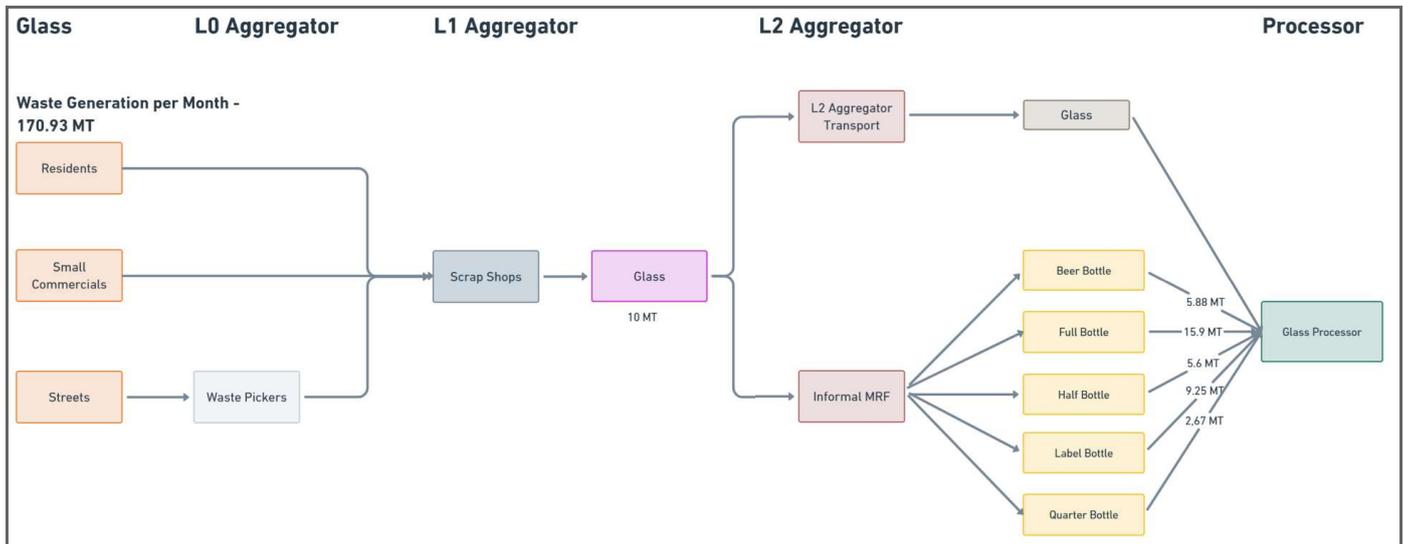
# Glass Material Flow



Image 7.4: Glass Material Flow
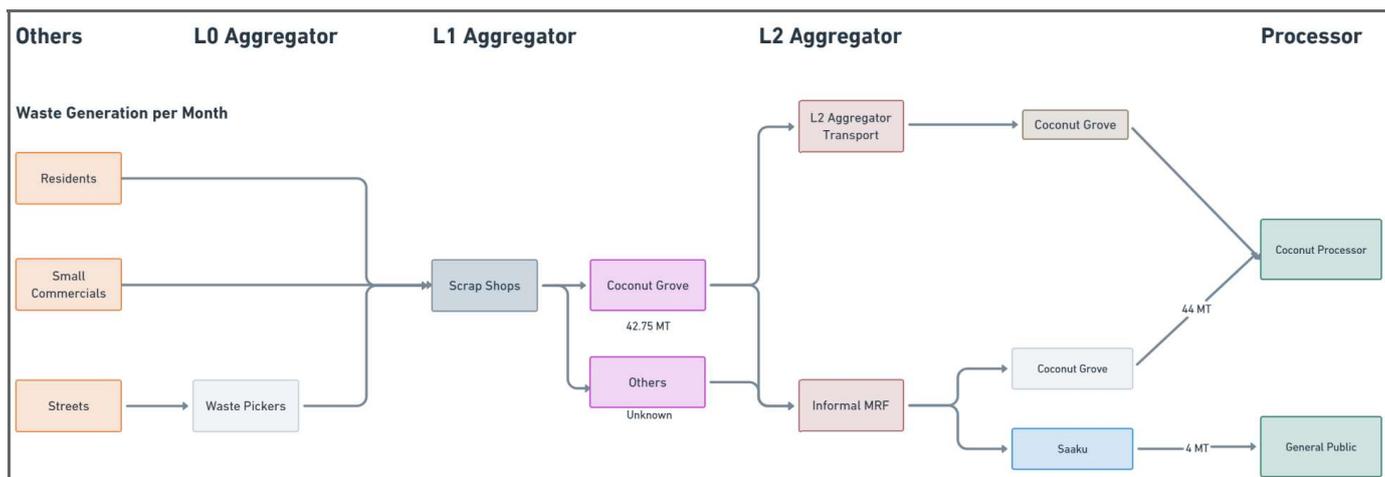
# Other Materials - Material Flow



Image 7.5: Other Materials - Material Flow

## 8.1 Consolidated recommendations

Based on the findings of the study, the following are the recommendations proposed to strengthen the informal recycling sector and improve the overall efficiency of waste management systems in Batticaloa.

There is a need to recognise and integrate the informal recycling sector into municipal waste management systems. Waste pickers, scrap shop operators, and Material Recovery Facilities (MRFs) play a crucial role in the collection, sorting, and aggregation of recyclable materials. Municipal authorities can formally recognise these workers through registration systems, identity cards, and inclusion in local waste management programs, which would improve coordination between informal workers and municipal services.

The expansion of pop-up collection drives in schools, colleges, and Grama Niladhari (GN) divisions can significantly improve the aggregation and traceability of recyclable materials. Periodic pop-up collection drives can be organised within educational institutions and local administrative divisions, enabling students, households, and nearby businesses to deposit segregated recyclable materials

Pathways should be created to align informal waste workers with formal waste collection systems. Integrating informal collectors into door-to-door waste collection programs or decentralised material recovery facilities can improve recycling efficiency while ensuring stable livelihoods for workers.

Occupational health and safety conditions should be improved for individuals working in the informal recycling sector. Many workers reported health issues such as skin allergies, dust allergies, fatigue, and occupational injuries. Providing access to protective equipment such as gloves, masks, and safety footwear, along with regular health awareness programs and medical check-ups, can help reduce work-related health risks.

Capacity-building and training programs should be implemented for informal sector actors. Training on waste segregation, material sorting, safety practices, business management, and record keeping can improve operational efficiency and help workers transition toward more organised recycling systems.

There is a need to improve data systems and traceability of recyclable materials. Strengthening data collection and material flow tracking can support the development of traceability systems and improve transparency within the recycling supply chain.

Public awareness and source segregation initiatives should be strengthened. Encouraging households, schools, and businesses to segregate waste at source will increase the availability of clean recyclable materials and improve the efficiency of the recycling supply chain. This will also enable informal waste workers to collect higher-value materials more efficiently.

## 8.2 Conclusions

The Mapping of Informal Waste Management in Batticaloa project provides a comprehensive understanding of the informal recycling ecosystem in the city through street-by-street enumeration of waste pickers, scrap shops, and Material Recovery Facilities (MRFs). The study generated important baseline data on the demographics, business operations, and material flows within the informal recycling supply chain, highlighting the critical role informal workers play in recovering recyclable materials and supporting local waste management.

The project improves the visibility and recognition of the informal sector, providing evidence that can support municipal authorities and stakeholders in designing more inclusive and efficient recycling systems. The findings also help identify opportunities to strengthen the sector through better infrastructure, training, and integration into formal waste management processes.

Importantly, the methodology used in this study has strong potential for scalability. The street-by-street mapping approach can be replicated in other municipalities across Sri Lanka to better understand local recycling supply chains. In addition, expanding decentralized pop-up collection drives in schools, colleges, and Grama Niladhari (GN) divisions can further strengthen recyclable material aggregation while creating livelihood opportunities for informal workers. Together, these approaches provide a practical and scalable pathway for improving recycling systems and promoting inclusive, community-driven waste management across the country.

# 9. ANNEXURE

## Material Flow Analysis
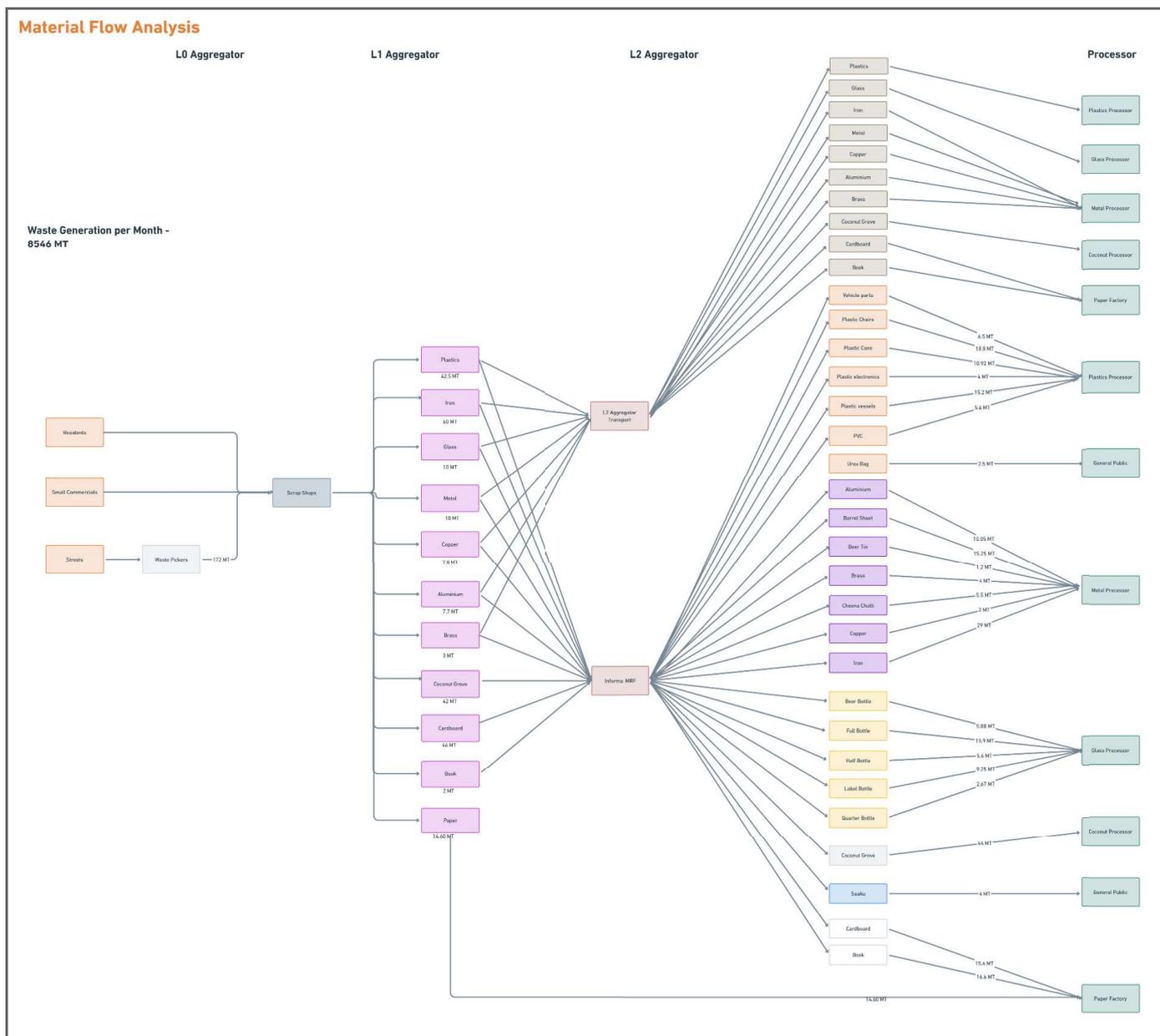
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