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Increasing Waste Recycling Through Better Informal Sector Data

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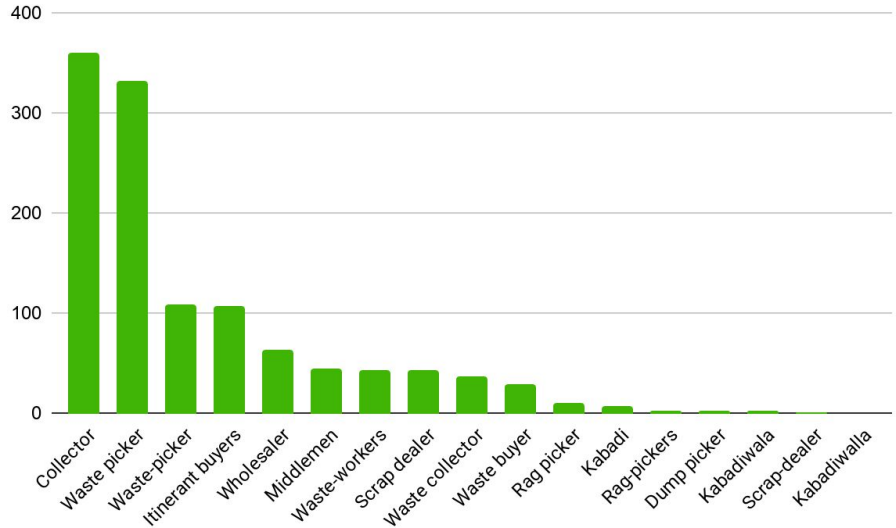
Kabadiwalla Connect

There is a lack of consensus on how the informal supply-chain is defined

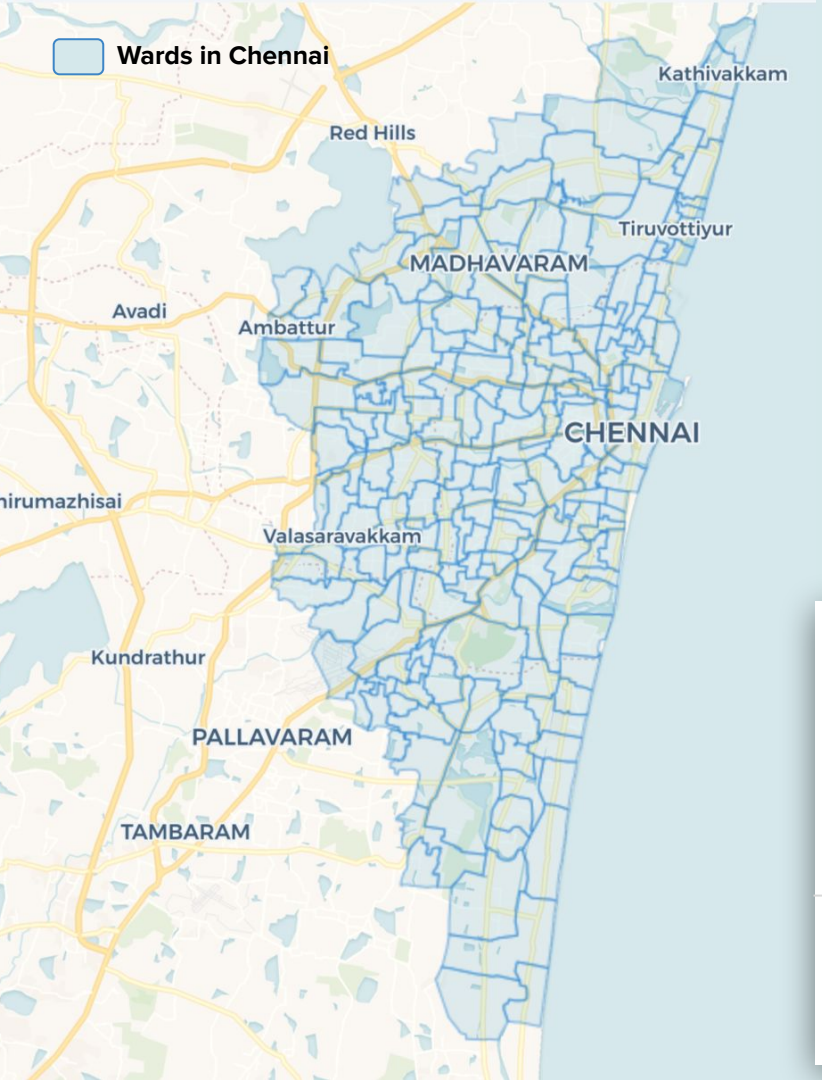
Most studies have focused mainly on waste-pickers when speaking about the informal supply chain, leaving out the informal small scrap shops and large scrap shops. Currently, there is no standardised naming conventions that refer to the different players in the informal supply chain

A word cloud showing the use of naming conventions used to describe the informal sector in India



A graph showing the use of naming conventions used to describe the informal sector in India

Visualised using the top 30 cited papers on the informal sector in India: https://docs.google.com/spreadsheets/d/16hzisOWhbt84GEvDEL0pXeqbwL5XES_RQ7kEHEHnt9I/edit?usp=sharing



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In 2015, Kabadiwalla Connect won a grant from Global Partnership for Sustainable Development Data (GPSDD)

Key goals and activities of the project:

- Street by street surveying of small scrap shops, large informal scrap shops and processors across the 200 wards in Chennai
- A comparative analysis of demographics, business activities and material flow with in the informal supply chain
- Build an map based interactive portal allowing the exploration of the data

GLOBAL PARTNERSHIP FOR SUSTAINABLE DEVELOPMENT DATA

BETTER DATA. BETTER DECISIONS. BETTER LIVES.

A global network using data to achieve the Sustainable Development Goals - improving lives, fighting inequality, and promoting environmental sustainability.

Also supported by WORLD ECONOMIC FORUM EXPO LIVE

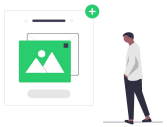
Survey Methodology & Features

Kabadiwalla Connect has developed a customised platform that helps in making the data collection, visualisation and analysis a lot simpler.

Key steps followed for Mapping

Training

Training the surveyors on using data collection tools and conducting survey with the informal sector. This includes review of questionnaire, training on survey pitch, best practices on data input etc. We have built an seperate SOP that will guide the surveyors on collecting quality data



Data Collection

During the data collection phase, the surveyors are assigned a municipal administrative boundary to collect data. They will have to cover every street in the boundary and collect data. Data is then verified by the supervisor and approved to be added to the primary database

Data Analysis

Once the data collection is complete, the data is analysed and visualised on a dashboard. The database structure is also finalised in this phase and all required standards for data storage are maintained. Any KPI required in the future can be easily updated in the dashboard

Key Features

- Mobile based data collection
- Offline data collection
- Admin dashboard for data validation
- Robust database structure
- Language localisation
- Data Collection and Curation SOPs
- Potential to collect all data types including rich data such as photos
- Sophisticated dashboard to explore the data

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Kabadiwalla Connect's classification of the Informal Sector

L0 Aggregators
(Waste-pickers)

Informal sector workers who may or may not have a means of transportation and incur zero or minimal input cost. These stakeholders primarily collect from roadside dustbins, landfills, and, in the case of those owning a vehicle, from households

Material Source: Street picking and dump sites

Procurement Philosophy: Material agnostic

Tech Adoption: Low

Average Volume: 1000 kg/month

Material currently sourced: Paper, Plastics, Glass, Metal

L1 Aggregators
(Small Scrap shops)

Informal sector workers who have a storage space and aggregate material from L0 stakeholders and residents. They do minimal or no processing of the material.

Material Source: L0 Aggregators

Procurement Philosophy: Material agnostic

Tech Adoption: High

Processing: Manual Segregation

Average shop size: 125 sq. ft

Average monthly income: $270

Smartphone: 52 %

Average Volume: 6000 kg/month

L2 Aggregators
(Large Scrap shops)

Informal sector workers who have a storage space which is many times larger than L1 stakeholder and aggregate material directly from L1 and other commercial sources in bulk. They typically specialise in a single super category of material and process it to produce secondary raw materials as well.

Material Source: L1 Aggregators

Procurement Philosophy: Specialised Material

Tech Adoption: High

Processing: Baling,Grinding,Segregation

Average shop size: 5000 sq. ft

Average monthly income: $1200

Smartphone: 69 %

Average Volume: 30,000 kg/month

Processor/ Recyclers

These are stakeholders who buy specific grades of post-consumer scrap material from L1s and L2s and convert them to usable secondary raw material for the manufacturing industry.

Material Source: L2 Aggregators

Procurement Philosophy: Specialised Material

Tech Adoption: High

Processing: End of life recycling of the material

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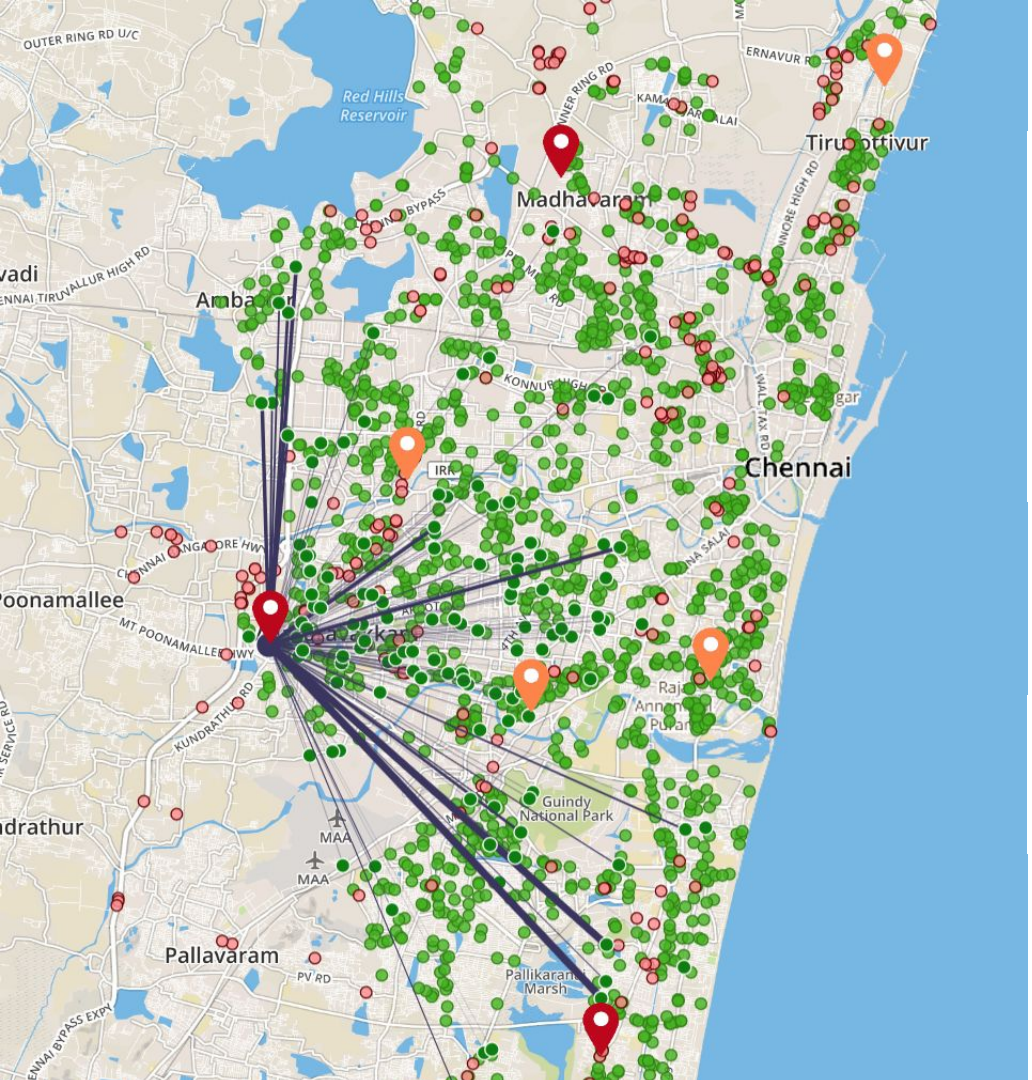

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Level 1 Aggregators

24%
of recyclable waste is already informally sourced back from this network

130k
tons of recyclables saved form landfills every year

52%
of them have smartphones. 100% of them have phones

$270
earning per month for more than 80% of recyclers (INR 20,000)

74%
can deploy their network to procure from the household

Level 2 Aggregators

69%
of them specialise in a single material (Paper/Plastic/Glass or Metal)

7
employees working under each aggregator

69%
of them have smartphones. 100% of them have phones

36
tons - average storage capacity

$12K
average revenue per month

Case study of Ward 100, Chennai

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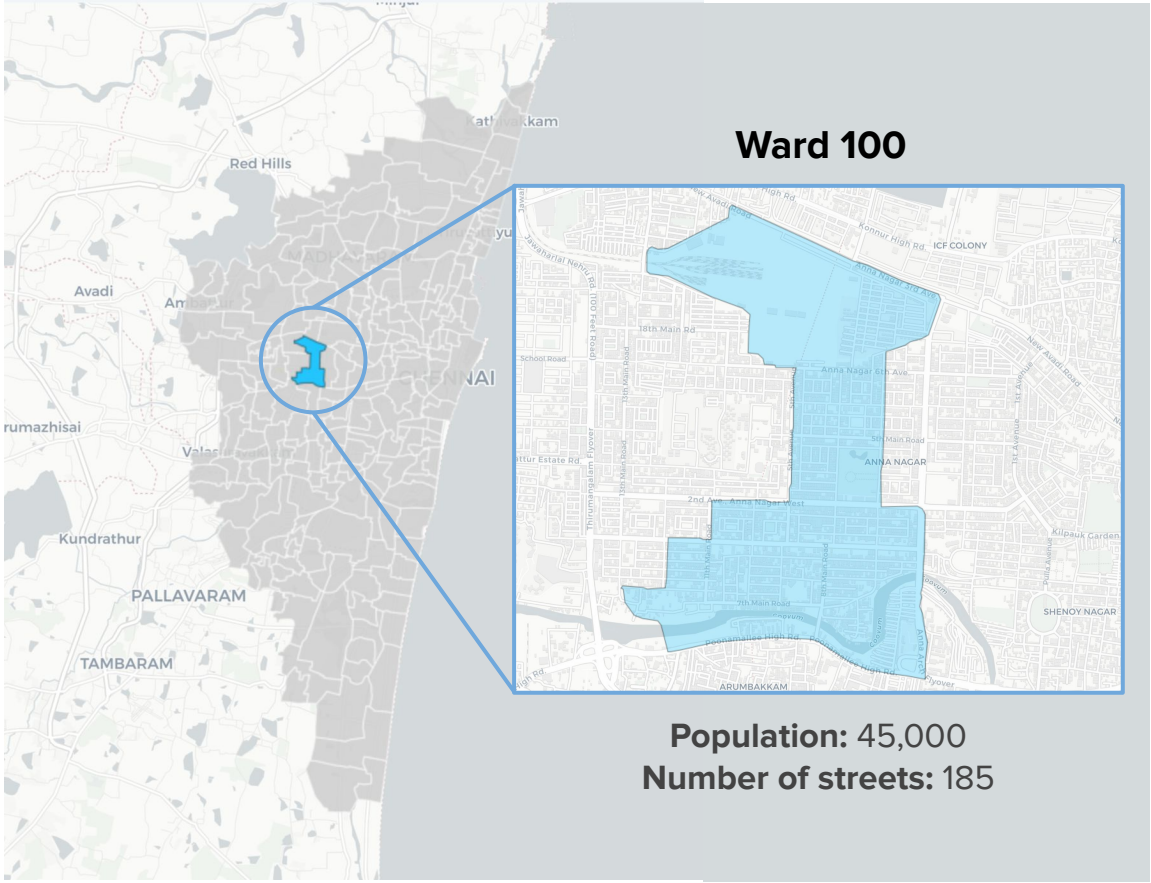
Detailed assessment of the solid waste management data and activities in a specific ward in Chennai (Ward 100)



Waste Generation

Total waste generation per day
39 MT

Per capita waste generation per day
0.86 kg

Waste collected by Municipality per day
37 MT

Waste collected by Informal sector per day
2 MT

Material	Volume per day
Wet Waste	19 MT
Paper	2 MT
Plastic	3 MT
Glass	0.75 MT
Metal	3 MT
Hazardous and Inerts	9 MT

Formal Infrastructure in Ward 100, Chennai

Battery Operated Vehicles

Number: 8
Capacity: 2.8 tons per trip
Operating capacity: 23% coverage

Micro Composting Centers

Number: 2
Capacity: 6 tons/day
Operating capacity:

HMV

Number: 2
Capacity: 16 tons per trip
Operating capacity: -

Corporation Bins

Number: 61
Capacity: 30 tons/day
Operating capacity: -

Well Ring Composting

Number: 2
Capacity: 1 ton/day
Operating capacity: 100%

LMV

Number: 2
Capacity: 6 tons per trip
Operating capacity: -

Tricycles

Number: 36
Capacity: 5.5 tons per trip
Operating capacity: 77% coverage

Bio Gas Plant

Number: 1
Capacity: 80 kg/day
Operating capacity: 100%

-

Mulch Pits

Number: 2
Capacity: 200 kg/day
Operating capacity: 100%

-

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Informal Infrastructure in Ward 100, Chennai

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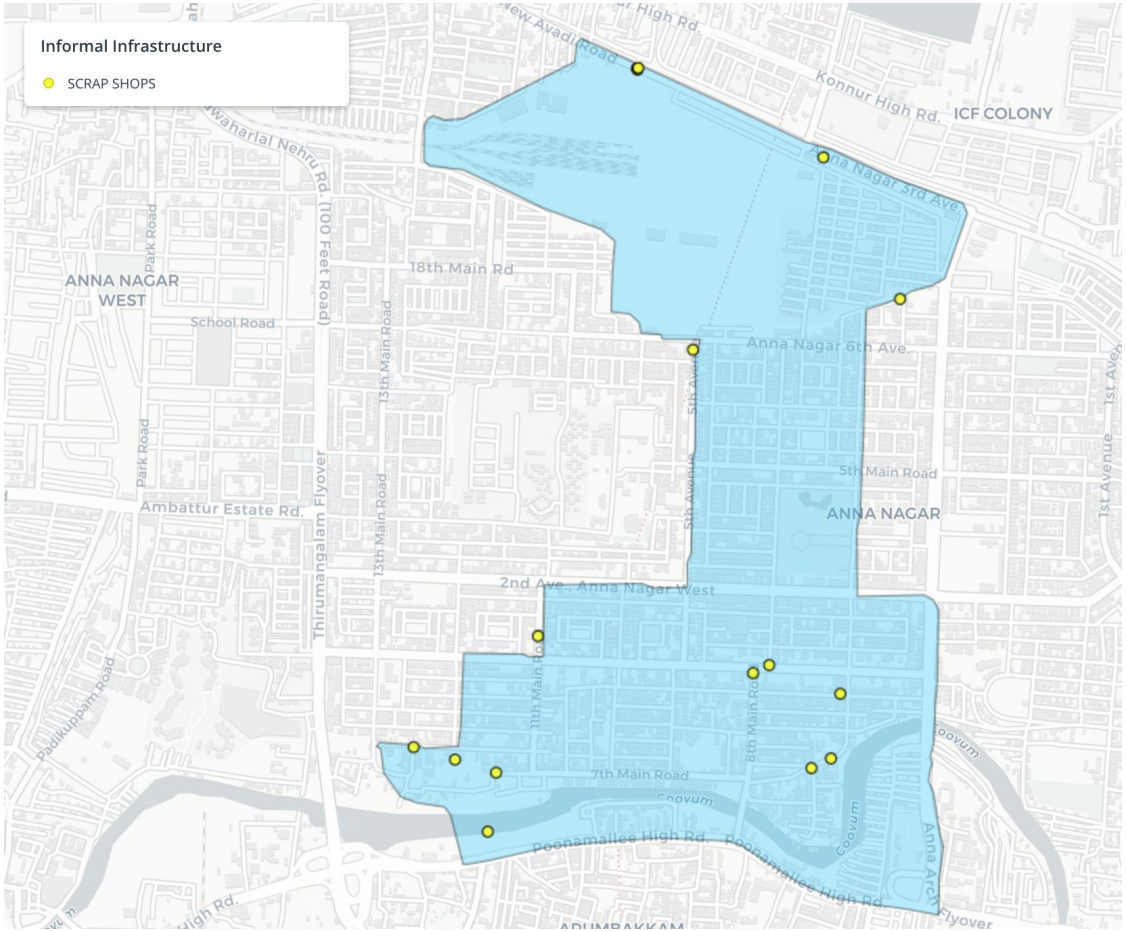

160
Number (Estd)

5 MT/day
Capacity

< 40%
Operating Capacity

16
Number (Estd)

15 MT/day
Capacity

13%
Operating Capacity

Infrastructure Assessment in Ward 100

Organic waste treatment

There is a requirement for decentralised organic waste processing infrastructures in the ward

Recyclable Waste treatment

There needs to be a strong focus on segregating waste at source to improve the recovery rates

Informal Sector storage utilisation*

There needs to be a strong focus on segregating waste at source to improve the recovery rates

***The informal sector helps collect around 720 tons of recyclable waste annually making revenues of $170,000**

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Building waste management strategies for ward 100

Without informal sector data

Door to Door Collection

Hire **78 municipal staff and tricycles** to handle door to door collection of waste

Hire **8 supervisors** to ensure proper scheduling and monitoring of day to day collection activities

Organic/Wet Waste

Wet waste collected from door to door collection by by all **78 municipal staff** is deposited in **micro composting centers**

Build **4 micro composting centers** where the wet waste collected is **further segregated** and processed into compost

About **85 tons** of compost generated monthly, can be sold by the municipality at subsidised prices

Dry Recyclable Waste

Dry recyclable waste collected from door to door collection by all **78 municipal staff** is deposited in **resource recovery centers (RRC)**

Build **2 resource recovery centers (RRC)** which can handle about 6 MT of dry waste every day and hire about **20 staff** for further segregation of waste at RRC

Digitalisation at **2 resource recovery centers** that can provide traceability of material, providing a segregation at a ward-level

Different types of segregated material is sold to respective **processors** who process the material

Inert/hazardous/non-recyclable waste

Waste collected from door to door collection by all **78 municipal staff** is deposited in **transfer station,** where it is further segregated

Waste from the **transfer station** is **further segregated** by municipal staff and transported to landfills/incineration plants

With informal sector data

Door to Door Collection

Integrate **78 waste-pickers (50% of existing waste-pickers in the ward)** with tricycles to handle door to door collection of waste

Integrate **8 small scrap shops** who will ensure proper scheduling and monitoring of day to day collection activities

Organic/Wet Waste

Wet waste collected from door to door collection by **78 waste-pickers integrated,** is deposited in **micro composting centers**

Build **4 micro-composting centers** where the wet waste collected is **further segregated** and processed into compost

About **85 tons** of compost generated monthly, can be sold by the municipality at subsidised prices

Dry Recyclable Waste

Dry recyclable waste collected from door to door collection by all **78 waste-pickers integrated,** is deposited in **resource recovery centers (RRC)**

Integrate **12 small scrap shops** with capacity to handle **12 MT** of dry waste every day. Waste-pickers enrolled and the small scrap shops will carry out segregation themselves.

Digitalisation at **12 small scrap shops** and respective **large scrap shops** that can provide traceability of material at a more granular level

Different types of segregated material is sold to respective **large scrap-shops** who aggregate/process the material in turn selling to **processors**

Inert/hazardous/non-recyclable waste

Waste collected from door to door collection by all **78 waste-pickers integrated,** is deposited in **transfer station,** where it is further segregated

Waste from the **transfer station** is transported to landfills/incineration plants