



# **MAPPING THE WASTE JOURNEY: WASTE VALUE CHAIN ANALYSIS (WVCA) FOR HUMANITARIAN SETTINGS**

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## 1. Why this document?

The Waste Value Chain Analysis (WVCA) has been designed to help organizations understand local waste value chains, with the aim:

- To **identify gaps and opportunities for improvement** of local waste value chains (e.g. where shredding, baling can make recovery profitable).
- To **assess viable waste management interventions** (e.g. feasibility of recycling, upcycling initiatives, or reverse logistics schemes).
- Ensure actions **do not harm existing local livelihoods**; instead, aim to integrate and support them (e.g., by including the informal sector).
- To **prepare for emergencies** such displacement, climate events by developing contingency plans (e.g., for waste management).

## 2. What is a Waste Value Chain Analysis?

A WVCA helps you understand what happens to waste in your area—from how it is **created, collected, and handled**, to how it is **recovered or disposed of**. It looks closely at recovery steps such as **reuse, repurposing, and recycling**.

The WVCA shows you:

- **What happens to different types of waste**  
(Why some waste is collected while others are dumped)
- **Who is involved**  
(Formal actors like companies and informal actors like local collectors)
- **Where waste goes**  
(From camps to local dealers, then to recycling centers or landfills)
- **The value of waste at each step**  
(How much waste is bought and sold)

## 3. WVCA and WM&R Mapping: Key Differences

The WVCA method builds on two components of the [Logistics Capacity Assessment \(LCA\)](#) tool hosted by the Global Logistics Cluster:

- Waste Management & Recycling Infrastructure Assessment (WM&R) **Country Profile** ([Template 3.7](#))
- List of **Service Providers** ([Template 4.12](#))

WVCA adds a **geographical perspective** to waste value chain analysis, allowing you to:

- Assess **waste flows** across locations
- Understand **economic value** at different stages
- Identify **gaps and opportunities** for improvement

Completing Templates 3.7 and 4.12 makes WVCA easier—and vice versa. WVCA provides data that can help fill both templates.

Table 1. Differences between Waste management infrastructure assessments and WVCA tools

Information provided by the different tools:	WM&R 3.7	WM&R 4.12	WVCA
• Information on how waste is collected, transported, recovered and disposed	x		x
• List of formal stakeholders engaged in waste value chain		x	x
• Informal stakeholders engaged in waste supply chain			x
• Information on the economic value and geographical flow of material from its generation to its recovery or disposal			x
• Gaps and opportunities of the waste value chain			x



## 4. How to conduct a Waste Value Chain Analysis?

The WVCA methodology has five steps. Start with a desk review to cover all steps and draft a preliminary report (See [Annex 4](#) report outline). Then conduct field data collection to fill gaps and validate final findings.

Table 2. Five steps to conduct a Waste Value Chain Analysis

Steps to conduct a Waste Value Chain Analysis	
METHODOLOGY STEPS	Guiding information and sources
<b>Step 1.</b> Define your scope	<p><b>Information to collect:</b></p> <ul style="list-style-type: none"> <li>• What types of waste do you want to analyse? (e.g., all, plastics, organics)</li> <li>• What area or unit of analysis? (e.g., a camp, a town)</li> <li>• What is your goal? (e.g., reduce open burning, increase recycling)</li> </ul> <p><b>Source of information:</b></p> <ul style="list-style-type: none"> <li>• Country map</li> <li>• Organisation waste management data</li> <li>• Project information</li> </ul>
<b>Step 2.</b> Compile a waste management Country Profile.	<p><b>Information to collect:</b></p> <ul style="list-style-type: none"> <li>• How is waste managed in your country and area?</li> <li>• Who is responsible for collection, recycling, and disposal?</li> <li>• What laws or rules do exist?</li> </ul> <p>Follow the WM&amp;R <a href="#">template 3.7</a> to collect the information – Check first if the information for your country/context is available <a href="#">here</a>. Collect the necessary information to complete the country profile, including specific information from the targeted municipality or camp unit of analysis.</p> <p><b>Source of information:</b></p> <ul style="list-style-type: none"> <li>• Country Waste Management &amp; Recycling profile (<a href="#">here</a>)</li> <li>• Online search (desk review)</li> <li>• Local government website or in-person meeting</li> <li>• In-country humanitarian actors</li> </ul> <p><i>Key note: Urban areas usually have more advanced waste systems, while rural zones may lack them or cover only markets. Knowing if waste is collected, segregated or sent mixed to landfills is key to identify formal recovery. The informal sector often recovers valuable materials without official recognition.</i></p>
<b>Step 3.</b> Identify stakeholders.	<p><b>Information to collect:</b></p> <ul style="list-style-type: none"> <li>• List all actors: municipal collectors, private companies, informal waste pickers, NGOs, community groups.</li> <li>• Use the Questionnaire in <a href="#">Annex 1</a> to collect information from the waste management and recycling formal and informal stakeholders.</li> <li>• Contact them to schedule visits OR interview them over phone.</li> </ul> <p><b>Formal sector source of data</b></p> <ul style="list-style-type: none"> <li>• Check first <a href="#">here</a> if the information of Service Providers List (template 4.12) exists for your country/context and build on the existing data. This assessment maps the formal waste management and recycling companies/initiatives in a country.</li> <li>• Contact local authorities to get the list of registered companies.</li> <li>• Contact in-country humanitarian actors to get information on service providers.</li> </ul>

	<p><b>Informal sector source of information</b></p> <p>Information on the informal recycling sector remains scarce online and typically requires field research to obtain reliable insights. Plan for desk and field data collection using the snow-ball approach – to reach the point in which all interviewees tell you the same story. Follow the next:</p> <ul style="list-style-type: none"> <li>• Conduct a desk review</li> <li>• Contact the municipality</li> <li>• Interview municipal waste collectors</li> <li>• Contact shop owners and households</li> <li>• Check the existence of waste pickers associations</li> <li>• Request formal recyclers about who are their waste suppliers, including recycling company associations.</li> <li>• Visit the municipality landfill</li> <li>• Observe the streets in the early morning or at the market areas.</li> <li>• Interview to waste pickers and scrap dealers and visit their compounds.</li> </ul> <p><i>Key note:</i> The informal recycling sector, often overlooked, plays a key role in collecting and supplying recyclables. Mapping these actors is crucial in remote areas, where they can be integrated as collectors and transporters instead of creating parallel supply chains and use unnecessary humanitarian resources.</p>
<b>Step 4.</b> Draft the WVCA Diagram, map, gaps, and opportunities.	<p><b>Information to process:</b></p> <ul style="list-style-type: none"> <li>• Draw the WVCA diagram with the information gathered in the previous sections to summarise: <ul style="list-style-type: none"> <li>• What happen with waste at each step,</li> <li>• Who is engaged, and which are their challenges,</li> <li>• Where waste goes geographically,</li> <li>• Added value of waste at each step (if possible).</li> </ul> </li> <li>• Draw a map of the WVCA to visualize the geographical movement of waste.</li> <li>• Use the WVCA diagram and map in <a href="#">Annex 2</a> templates and see an example of a WVCA diagram and map in <a href="#">Section 5</a>.</li> <li>• Identify gaps (e.g. no collection for organics, long transportation distances) and opportunities (e.g. composting, supporting waste pickers, reverse logistics) to strengthen the waste value chain in the targeted locality.</li> </ul> <p><b>Source of information:</b></p> <ul style="list-style-type: none"> <li>• Information gathered in Step 1, 2 and 3.</li> </ul>
<b>Step 5.</b> WVCA report and share findings.	<ul style="list-style-type: none"> <li>• Write a short report following the proposed report structure in <a href="#">Annex 4</a>. The report will support the organisation to inform decisions on waste management interventions in the locality.</li> <li>• Share the report with other humanitarian agencies as well as the Logistics Cluster Environmental Team (WREC): <a href="mailto:global.wrec@wfp.org">global.wrec@wfp.org</a></li> </ul>

## 5. Example of a Waste value chain analysis diagram, map, gaps & opportunities

This section presents a fictional WVCA diagram, map and gaps & opportunities of a particular refugee camp to show a practical example of the tool. In this example, the WVCA has been conducted with the aim to know the existing livelihoods and improve the recovery of certain type of waste. The diagram in Table 3 has been completed following Steps 1 to 3. It breaks down the value of waste by wastestream, providing a clearer understanding of each stage in the process and the stakeholders involved.

Table 3. Example of a WVCA Diagram in a fictional context

1. Waste Process 2. Type of waste 4. Stakeholders	Generation and source segregation	Collection & handling	Waste Recovery				Energy recovery	Disposal & Incineration
			Waste Aggregation	Processing (baling, shredding), Recycling (pellet)	Traded & Exported (if applicable)	Manufactured & new product & Treated (hazardous waste)	Pyrolysis, incineration with energy recovery, gasifier, etc.	
HDPE: plastic pallets	<ul style="list-style-type: none"> <li>UN/ NGOs</li> </ul> <i>0 USD/kg</i>	<ul style="list-style-type: none"> <li>UN/ NGOs (stored)</li> </ul> <i>0 USD/kg</i>	<ul style="list-style-type: none"> <li>UN/NGO (Reverse Logistics)</li> </ul> <i>*20 USD/Kg</i>	<ul style="list-style-type: none"> <li>Company in capital city</li> </ul> <i>*35 USD/Kg processed</i>		<ul style="list-style-type: none"> <li>Manufactories capital city</li> </ul> <i>(final product price)</i>		
HDPE: Other items	<ul style="list-style-type: none"> <li>UN/ NGOs</li> <li>Community HH</li> <li>Markets</li> </ul>	<ul style="list-style-type: none"> <li>Informal sector (waste pickers in the camps)</li> </ul> <i>0.10 USD/Kg</i>	<ul style="list-style-type: none"> <li>Informal sector (sort it by colour outside the camps)</li> </ul> <i>0.20 USD/Kg</i>		<ul style="list-style-type: none"> <li>County Scrap dealers</li> </ul> <i>0.50 USD/Kg</i>	<ul style="list-style-type: none"> <li>Neighbour country Manufactories</li> </ul> <i>(final product price)</i>		
PET (e.g. plastic bottles)	<ul style="list-style-type: none"> <li>UN/ NGOs</li> <li>Community HH</li> <li>Market</li> </ul> <i>0 USD/Kg</i>	<ul style="list-style-type: none"> <li>Informal sector (waste pickers in the camps)</li> </ul> <i>0.15 USD/Kg</i>	<ul style="list-style-type: none"> <li>Informal sector (sort it by colour outside the camps)</li> </ul> <i>0.25 USD/Kg</i>		<ul style="list-style-type: none"> <li>County Scrap dealers</li> </ul> <i>0.55 USD/Kg</i>	<ul style="list-style-type: none"> <li>Neighbour country Manufactories</li> </ul> <i>(final product price)</i>		
Organic waste	<ul style="list-style-type: none"> <li>UN/ NGOs</li> <li>Community HH</li> <li>Market</li> </ul>	<ul style="list-style-type: none"> <li>Local Waste service providers</li> </ul>						<ul style="list-style-type: none"> <li>Municipal Landfill</li> </ul>
		<ul style="list-style-type: none"> <li><i>Non-collected but dumped</i></li> </ul>						
Cardboard (e.g. boxes)	<ul style="list-style-type: none"> <li>UN/ NGOs</li> <li>Community HH</li> <li>Market</li> </ul>	<ul style="list-style-type: none"> <li>NGOs re-distributes them in the community</li> </ul>						<ul style="list-style-type: none"> <li>Municipal Landfill</li> </ul>
		<ul style="list-style-type: none"> <li>Market waste collectors</li> </ul>						
		<ul style="list-style-type: none"> <li><i>Open burned</i></li> </ul>						

\*Selling price: refers to the price at which the stakeholder sells the waste material to the next stakeholders in the value chain.

3. Locations

Generation location

Capital city

County

Neighbour country

## **Description of the WVCA Diagram**

### **1. Process:**

Shows the main steps in the waste value chain: generation → collection → recovery → disposal for the location analysed.

### **2. Waste Types:**

The diagram covers four types of waste:

- HDPE (e.g., plastic pallets and other packaging)
- PET (e.g., plastic bottles)
- Organic waste
- Cardboard

### **3. Location:**

Color-coded cells indicate where each step happens:

- White – Waste generation site
- Blue – County area
- Yellow – Capital city
- Pink – Neighboring country

### **4. Stakeholders & Economic Value:**

- HDPE & PET
  - Humanitarian agencies use reverse logistics to send HDPE pallets to recycling companies in the capital city (high revenue: \$20/kg HDPE, but high transport cost).
  - Informal collectors gather plastics in camps, sell to county dealers, who export to neighboring countries (lower revenue: \$0.50–\$0.55/kg, low transport costs).
- Organic Waste
  - Mostly dumped or sent to municipal landfills via contracted service providers.
  - Potential for composting (organic waste = 70% of total waste).
- Cardboard
  - Reused by communities or burned.
  - Limited recycling options but some companies exist in country.

### **5. Challenges:**

- Inefficient collection of valuable waste
- Low community awareness on segregation
- High transport costs to recycling centers
- Limited investment and equipment
- Informal sector lacks fair integration

### **6. Opportunities:**

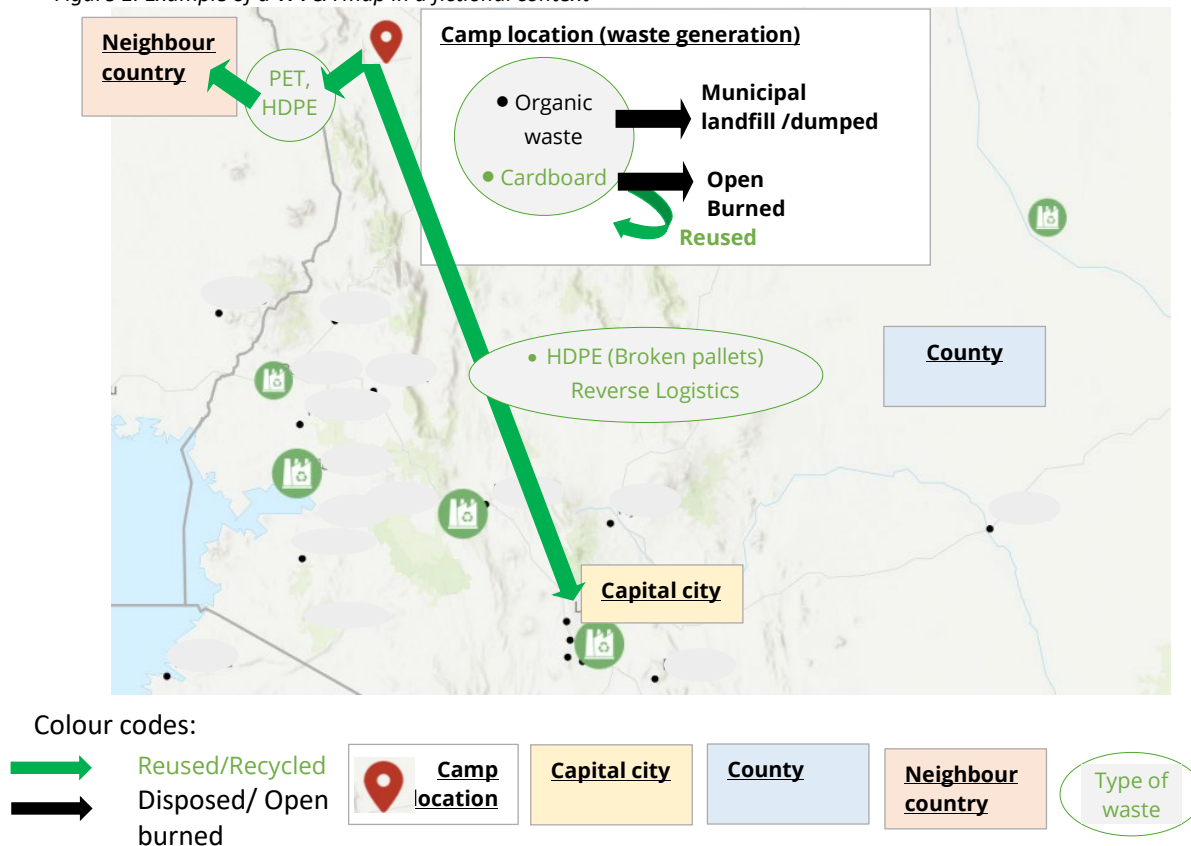
- Set up source segregation and collection hubs in the camps
- Promote household composting
- Awareness campaigns
- Integrate informal sector through contracts and logistics support<sup>1</sup>
- Provide grants and equipment for existing local recycling initiatives
- Improve health, safety, and business skills for informal workers

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<sup>1</sup> UNDP, 2023 - [The Role of Scrap Dealers in Cox's Bazar to support humanitarian response and reduce environmental impact](#)

## Waste Value Chain Analysis (WVCA) map:

Figure 1. Example of a WVCA map in a fictional context



### Description of the WVCA map example:

- Organic waste and cardboard generated remain near the Camp location (mostly dumped or burned).
- Instead, plastics follow longer routes to recyclers in the Capital city (Reverse logistics) or Neighboring country (transported by recycling dealers operating locally).
- Large geographical gaps reduce recycling efficiency.

To finalise with the exercise all information is compiled in the final report (Step 5) using the proposed structure in [Annex 4](#), including some recommendations as next steps:

### Recommendations to improve the value chain of the targeted waste:

- Conduct awareness campaigns on waste segregation to improve collection efficiency.
- Support those identified local recycling enterprises to reduce long distances waste transportation and costs (e.g. community recycling centers).
- Work with local recycling dealers to design cost-effective management and transport of HDPE/PET plastics.
- Prioritise recovery of organic waste and cardboard. Encourage household composting and connect local stakeholders with cardboard recycling companies.



## 6. WREC Coalition HelpDesk

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For further details on type of waste and management options in humanitarian settings, please see [Quick guide](#), the [Waste Management Cheatsheet](#) and examples of waste value chain reports from different contexts<sup>2</sup>. Contact WREC Help Desk for support: [Global.WREC@wfp.org](mailto:Global.WREC@wfp.org).

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<sup>2</sup> Waste value chain reports:

- > UNDP, 2023 - [The Role of Scrap Dealers in Cox's Bazar to support humanitarian response and reduce environmental impact](#)
- > Help Logistics, 2024 - [Waste value chain mapping: Identifying and mapping the available waste streams and waste stakeholders in Dakar](#)
- > R.Jaligot, et al, 2016. [Applying value chain analysis to informal sector recycling: A case study of the Zabaleen, Cairo](#)
- > UNDP, 2015 - [Solid Waste Value Chain Analysis, Irbid and Mafrqa, Jordan](#)

## Annex

### Annex 1. Waste value chain questionnaire template

This adapted questionnaire builds on the [Service providers List \(4.12 template\)](#) and adds sections D and E for WVCA completion. Suitable for both formal and informal waste sectors, it is best used with online survey tools (e.g. Kobo, Moda, Forms) for easy data systematisation and analysis.

#### Index Sections/Questions

A	Enumerator information	Answers
A.1*	Full name:	
A.2*	Position:	
A.3*	Organisation name:	
A.4	Email address:	
A.5*	Phone number:	
B	Company/organisation information	
1*	Company/organisation name:	
2*	Physical address:	
3*	Geolocation (latitude, longitude):	
4*	Name of the focal point of the company/organization or name of the individual:	
5*	Focal point phone number:	
6*	Focal point email address (if any):	
7*	Website (if any):	
8	Does the company have an Environmental, Health and Safety certification (e.g. ISO 14001, ISO 45001 or equivalent) or self-certified management plan for facilities and personnel?:	
9	Business License Validity Dates:	
10	Years of experience:	
11*	What are the main activities of the company/organization/individual: (waste collection / aggregation only/ processing & recycling / composting / traded & exported / manufacturing / Disposal / Incineration / Other (waste to energy, coprocessing)	
12	Facility is well maintained (roof/walls)? (Y/N)	
13	Hazardous materials are processed and stored separately from non-hazardous waste? (Y/N)	
14	Facility has adequate ventilation (Y/N)	
15	PPE provided to staff (hard hats, overalls, boots, etc.)? (Y/N)	
16*	Processing capacity (e.g. max tonnes/day or month):	
17	Collection provided (Y/N)	

18	Any transport capacity constraints (geographical, volumes, frequency)?:	
<b>C</b>	<b>Waste information</b>	
19*	Non hazardous waste accepted* Select from dropdown menu	
20*	Non hazardous waste Disposal method* Select from dropdown menu	
21*	Hazardous Waste Accepted* Select from dropdown menu	
22*	Hazardous waste disposal Disposal method* Select from dropdown menu	
<b>D</b>	<b>Flow of materials and financial value</b>	
23*	From which geographical areas waste is collected? (name the municipality and the specific dealer/enterprise and take the contact phone):	
24*	To where waste is transported after? (name the municipality and the specific dealer/enterprise and take the contact phone):	
25*	How many other similar organisations/dealers are around in the municipality?	
26	What price/Kg do you buy the material you collect?	
27	What price/Kg do you sell the material you produce (output)?	
<b>E</b>	<b>Gaps and opportunities</b>	
28*	What are the main challenges of the business? (e.g. lack of investment capacity, costs of transportation, lack of machinery, marginalisation, etc.):	
29*	Which interventions would help to overcome the challenges (e.g. grant program, awareness campaign for household waste segregation, integration to formal schemes/contracts, etc.)?:	

\* Mandatory fields

Date

Signature

## Annex 2. Waste value chain analysis diagram template

The Waste value chain analysis diagram help you compile and analyse key information about the waste value chain in a specific location, including the value chain process, waste types, stakeholders, locations and economic value.

### How to develop the diagram?

- ⇒ Review definitions and instructions of each diagram component 1-5 in the next sections.
- ⇒ Briefly describe each component below the diagram, highlighting key points.
- ⇒ Transfer essential details of each component into the diagram.
  - For multiple locations of study, create one diagram per locality.
  - For well-developed waste streams, consider separate diagrams per waste type.
- ⇒ See the example in [section 5](#) for additional guidance.

Table 4. WVCA diagram template

1. Process (Waste chain)	Waste Recovery						Energy recovery	Disposal or Incineration
	Generation	Collection & handling	Aggregation	Processing (baling, shredding), Recycling (pellet)	Traded & Exported (if applicable)	Manufactured & new product & Treated (hazardous waste)	Pyrolysis, incineration with energy recovery, gasifier, etc.	
2. Waste type								
3. Stakeholders								
3.1. Challenges								
3.2. Opportunities								
4. Geographic area								
5. Economic Value								
Brief description of each WVCA component (follow the guidance in the next section):								
Process								
Waste types								
Stakeholders								
Challenges								
Opportunities								
Locations								
Economic Value								

## Description of the diagram by components:

### 1. Process (waste chain)

*Read the description below of the key activities at each step of the value chain for more information and briefly describe the process in your location of study. Adjust, if necessary, the steps in the diagram.*

The waste value chain usually follows the same sequence: **generation, collection, recovery**, and **disposal**. Each recovery stage increases the waste's value—transforming waste and increasing its potential economic worth per kilogram.

Table 5. WVCA diagram process description

Process steps	What happen at each step? (definitions)
<b>Generation</b>	Waste is produced and stored, either mixed or segregated, at households, offices, shops, and refugee camps.
<b>Collection &amp; handling</b>	Waste is collected through door-to-door services, street containers, or transfer stations. It may be collected as mixed or segregated waste.
<b>Waste Recovery</b>	Waste is recovered as a resource for reuse, repurposing, or recycling. See below the sub-steps:
Aggregation	Waste is grouped by type in large quantities, either at municipal material recovery facilities <sup>3</sup> or by informal/formal enterprises.
Processing (baling, shredding), Recycling (pellet)	Waste materials are baled or shredded to reduce volume and transport costs. Plastics can be melted and transformed into pellets as raw materials for manufacturers. E-waste is often dismantled to recover valuable components.
Traded & Exported (if applicable)	Materials may be exported for recycling abroad or sold to manufacturers through intermediaries. (This step is not always applicable).
Manufactured & new product & Treated (hazardous waste)	Materials are transformed into new products and reintroduced to the market. This step also includes upcycling initiatives and the treatment of hazardous waste.
<b>Energy recovery</b> Pyrolysis, incineration with energy recovery, gasifier, etc	The energy value of waste can be recovered as heat, electricity, or fuel through processes such as pyrolysis, incineration with energy recovery, or gasification. Some sanitary landfills also recover energy.
<b>Disposal or Incineration</b>	Waste can be incinerated (in controlled or uncontrolled facilities) or disposed of in landfills (sanitary or non-sanitary). In these cases, there is no recovery of energy.

### 2. Waste types

*Briefly describe which types of waste have value in the location you are studying. Indicate whether each waste type is segregated and recovered through reuse, repurposing, recycling, or energy recovery—or if it is disposed of, openly dumped, or burned without energy recovery. Add a list of waste types at each step of the diagram or develop one waste value chain per each type.*

Different types of waste are generated at households, offices, and markets. However, many of these materials are not recovered and instead end up in landfills, dumps, or are burned. Tracking which materials are recovered at each stage is essential for the waste value chain analysis (WVCA).

Note: Waste sent to landfill may have no value in that location but could hold value elsewhere or gain value if key challenges are addressed.

<sup>3</sup> Material Recovery Facility are infrastructures where waste is segregated or double-segregated by material types allowing their recovery such as recycling or composting.



### 3. Stakeholders & Challenges & Opportunities

*Briefly describe the different stakeholders who play a role at each step of the process. Distinguish between formal and informal stakeholders. Define the main challenges and opportunities identified. Then, place each stakeholder in the diagram according to the step they are involved in.*

Stakeholders involved in the waste value chain are very different in nature (e.g. municipality collectors, informal waste pickers, recycling companies, NGOs, community groups, waste generators, etc.). The next table will help to classify them according to the role they play along the value chain process, as well as to highlight their key challenges and needs.

Table 6. WVCA diagram stakeholders' description

Process steps	Which <b>stakeholders</b> play a role at each step? (definitions)
<b>Generation</b>	Households, market shops and institutions (including NGO/UN offices Warehouses in refugee camps and/or host communities,).
<b>Collection &amp; handling</b>	Municipality, private stakeholder or organisations* or contractors. Waste can be collected mixed or segregated and handled by formal <sup>4</sup> or informal <sup>5</sup> stakeholders which usually only targets valuable waste.
<b>Waste Recovery</b>	
Aggregation	Waste pickers (in small quantities) or scrap dealers or enterprises (which manages larger volumes). In formal collection, the municipality workers or contracted enterprises run material recovery facilities for waste segregation.
Processing (baling, shredding), Recycling (pellet)	Private, community or public enterprises / organisations.
Traded & Exported (if applicable)	Private companies or middleman who can either transported to long distances or exported to neighbouring countries.
Manufactured & new product & Treated (hazardous waste)	Enterprises or organisations who turn wastes into new resources or neutralise the hazardous components to be recovered or disposed.
<b>Energy recovery</b> Pyrolysis, incineration with energy recovery, gasifier, etc	Public or private enterprises who runs the different facilities.
<b>Disposal or Incineration</b>	Public or private enterprises who runs the different facilities.

\* Within organisations also humanitarian agencies implementing Reverse Logistics (RL) initiatives using their trucks returning empty can be also interesting to be captured to promote joint transportation of waste from other agencies.

<sup>4</sup> The **formal** waste management or recycling stakeholders refers to those who operate under organized, regulated, and often technologically advanced systems for collecting, processing, and recycling waste. These can be the public sector, enterprises or community base organisations. This sector is characterized by licensed and authorized entities operating under established environmental regulations and guidelines.

<sup>5</sup> The **informal** waste management or recycling stakeholders is typically unregulated, labor-intensive, and low technology. As defined by the International Labour Organization (ILO), the informal waste workers are, 'individuals, or small and unregistered micro-enterprises, that intervene in waste management informally and are in charge of providing waste management services' (GIZ, 2016). Most of the informal waste workers are engaged in collecting recyclable materials and supply them to recycling/manufactory plants. They are called informal sector either because they work without any formal contract (e.g. waste pickers) or because their activities, like recovering recyclable materials, are not officially recognized by the local authorities. In some cases, they may hold economic licenses, but these are registered under unrelated activities (e.g. scrap dealers operating under general trade or metalwork licenses).

## Challenges & Needs:

Waste value chain gaps are typically determined by challenges stakeholders are facing in a specific location, the most common are outlined in the next table. It is fundamental to hear from the stakeholders with regards to the limitations they are facing and the solutions they propose to improve the waste value chain of the locality as well as avoid any harm when planning future waste management interventions.

Table 7. WVCA diagram stakeholders' common challenges description

Process steps	Which common <b>challenges</b> stakeholders face at each step?
<b>Generation</b>	No source segregation, common open dumping, lack of awareness challenges the collection of waste efficiently.
<b>Collection &amp; handling</b>	Lack of truck capacity/resources for collection, non-optimised collection routes, no transfer stations, no segregation capacity.
<b>Waste Recovery</b>	
Aggregation	Lack of land access for storing or processing waste, lack of personal protective equipment (PPE), insufficient investment capacity to purchase materials, hire staff or acquire machinery, social stigma with waste work, poor quality of waste received (e.g. dirty or degraded), high electricity costs for running machinery.
Processing (baling, shredding), Recycling (pellet)	
Traded & Exported (if applicable)	High taxes for exportation, high land rent, lack of investment capacity.
Manufactured & new product & Treated (hazardous waste)	Quality of waste, lack of enough input material, long distances from where waste is generated, cost of transportation, no government incentives, etc.
<b>Energy recovery</b> Pyrolysis, incineration with energy recovery, gasifier, etc	No economic incentives from the government, not enough input material.
<b>Disposal or Incineration</b>	Lack of environmentally sustainable mitigation measures, limited management capacity, no waste compaction, etc.

Table 8. WVCA diagram stakeholders' common needs/opportunities description

Process steps	Which common <b>needs/opportunities</b> stakeholders face at each step?
<b>Generation</b>	Communication campaigns, provision of bins to store waste inside, etc.
<b>Collection &amp; handling</b>	Integrated Municipality waste management system, budget, capacity building, integrate waste pickers and scrap dealers, etc.
<b>Waste Recovery</b>	
Aggregation	Engage the informal recycling sector to manage municipal MRFs over a year, provide land /space, etc.
Processing (baling, shredding), Recycling (pellet)	Provide grants to the recycling sector to open decentralised recycling facilities, acquire balers/ shredders, etc.
Traded & Exported (if applicable)	Leverage their logistics capacity, formalisation of contracts, provision of balers / shredders, etc.
Manufactured & new product & Treated (hazardous waste)	Dissemination of manufacturing facilities interested in used materials, Company reverse logistics schemes, etc.
<b>Energy recovery</b> Pyrolysis, incineration with energy recovery, gasifier.	Dissemination of existing facilities, upgrade environmental performance measures, etc.
<b>Disposal or Incineration</b>	Upgrade dumping sites to sanitary landfills, reject the disposal of organic material or recyclable waste, add a rate of use, compact and cover waste with soil daily, etc.

#### 4. Geographic area (flow of materials)

Briefly describe the different locations across which waste is transported along the value chain. Colour the cells of the diagram to show where stakeholders operate—leave cells white for the location where waste is generated, and colour other locations where waste is transported outside the location.

Mapping where each value chain step occurs helps visualize waste flows and spot gaps or opportunities for better recovery. In many contexts, early stages of the waste value chain—generation, collection, and initial recovery like processing—typically occur locally, while later stages like recycling, or manufacturing are often centralized in major cities or industrial hubs far from the locality.

Table 9. WVCA diagram geographical description

	Generation	Collection & handling	Waste Recovery				Energy recovery	Disposal or Incineration
			Aggregation	Processing (baling, shredding), Recycling (pellet), Upcycling	Traded & Exported (if applicable)	Manufactured & new product & Treated (hazardous waste)		
Location								

Location 1	Location 2	Location 3
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#### 5. Economic value of waste

Briefly note the economic value of each waste stream to identify local market prices. Use stakeholder interview data from [Annex 1](#) and use the table below to support the analysis.

Use simple calculation: **Value Added per kg = Selling Price per kg – Purchase Price per kg**. The value of waste depends on the context and the waste management system in place.

If data is hard to obtain, use **ranges or estimates** from multiple sources.

Note: Collecting the economic value data is not mandatory for every WVCA. In urban settings for instance, with strong formal waste systems the collection of economic value is less essential for the study.

Table 10. WVCA Economic value of PET waste

Waste Chain (Process) For PET	Generation of PET bottles	Collection & handling PET	PET Waste Recovery				PET Energy recovery	PET Disposal or Incineration
			Aggregation	Processing (baling, shredding), Recycling (pellet), Upcycling	Traded & Exported (if applicable)	Manufactured & new product & Treated (hazardous waste)		
Buying price (USD/KG)	-	0	5	12	41	46		
Selling price (USD/KG)	0	5	12	41	46	98		
Value added (USD/KG)	-	5 (5-0)	7 (12-5)	29	5	57		

*Note:* Collect information of the buying and selling price per Kg of waste material from the stakeholders interviewed (Q.26 and Q.27 in Annex 1) and fill the table above. For instance, in the example, collectors (second column) get for free household PET bottles. So put '0' in the buying price cell- and sell them to aggregators at 5 cents/Kg -'5' in the selling price.

Each stage of the value chain adds value to materials—for example, plastic bottles are worth more when aggregated, shredded, or baled for transport.

#### Actions which can add value to waste:

- *Sort waste at source:* Makes it easier to collect and group valuable materials.
- *Compost locally:* Cuts transport costs and turns organic waste into useful compost.
- *Raise awareness:* Encourages waste segregation at source and improves recovery rates.
- *Compact or shred on-site:* Lowers transport costs to recycling facilities.
- *Work with informal recyclers:* Formalize partnerships and use their expertise and logistics networks.
- *Process plastics into pellets:* Sell pellets as raw material to manufacturers.
- *Train local dealers:* Improve business skills and material quality standards.
- *Provide grants:* Help local enterprises or local dealers set up local recovery facilities and reduce transport costs.

### Annex 3. Waste value chain analysis map template

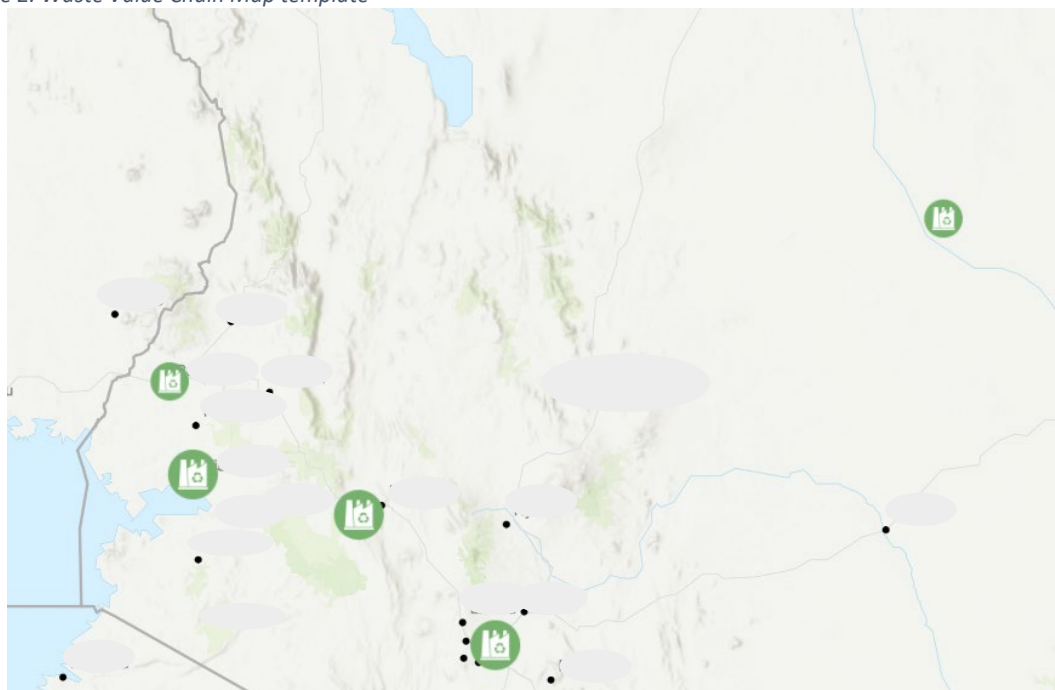
Map is a resourceful tool to represent the steps of the waste value chain geographically and help to the data analysis identifying geographical gaps of the waste process.

#### How to build the map?

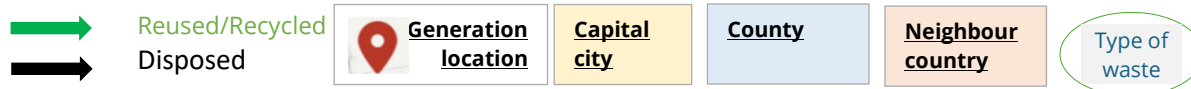
Capture a screenshot of the country map from the [LogIE map](#) and define the visual codes:

- ⇒ Circles refers to the type of waste being tracked in the WVCA
- ⇒ Arrows refers to the direction of waste movement from where to where is moved. Green arrows denote waste that is reused/repurposed/recycled or energy recovered, while black arrows indicate waste that is disposed of or burned.
- ⇒ Boxes label the locations involved, using the same colour scheme as the WVCA diagram.

Figure 2. Waste Value Chain Map template



Colour codes:





## Annex 4. Waste value chain analysis report outline

This section outlines the proposed structure for the preliminary/final Waste Value Chain Analysis report. The second column describes the contents and indicates the corresponding sections in the quick guide.

Contents	Guiding information
<b>1. Introduction</b> (study overview)	Describe the organization's project, its context, and the purpose of conducting a Waste Value Chain Analysis (WVCA).
1.1 Objective and scope	Describe the objectives of the WVCA, the types of waste targeted for solutions, and the geographical area. See <a href="#">Step 1</a>
1.2 Country waste management profile 1.2.1 <i>General overview</i> 1.2.2 <i>Non-hazardous waste management</i> 1.2.3 <i>Hazardous waste management</i> 1.2.4 <i>Medical Waste Management</i>	Provide an overview of the country's waste management process and the target location, including responsible entities and key regulations. See <a href="#">Step 2</a> .
1.3 Methodology	Summarize the study approach, highlighting key activities, timeline, limitations, and data sources from the desk review and field visits.
<b>2. Waste value chain analysis</b>	See <a href="#">Step 4</a> .
2.1 Waste Value Chain Analysis - Diagram	Develop the WVCA diagram, transferring key data to provide a quick overview of waste value gaps and recovery initiatives (Table 4)
2.2.1 Waste value chain Process	Present a summary of the main value chain steps in that location
2.2.2 Waste streams	Provide a summary of the main waste streams recovered and non-recovered
2.2.3 Stakeholders	Provide a summary of the main stakeholders identified, distinguishing the role of the informal sector
2.2.4 Challenges and opportunities	Summarize the main waste value chain challenges and opportunities identified from the stakeholders' interviews for that locality.
2.2.5 Geographical location	Briefly explain where each step takes place.
2.2.6 Economic value (when needed)	Provide information on the value of waste streams at each step of the value chain.
2.2 Waste Value Chain Analysis Map	Develop the map to support the visualisation of the WVCA's geographic dimension (Figure 2)
<b>2.3 Conclusions and recommendations</b>	As a conclusion, describe the main gaps in the waste value chain for the different waste streams in the location, and provide recommendations based on the study's objectives.
<b>2.4 Annex</b>	
4.1 List of stakeholders interviewed	Provide a list of all stakeholders interviewed over phone or in person and locations visited. <a href="#">Step 3</a>
4.2 Updated Country profile (WM&R template 3.7)	If the Waste management <a href="#">Country profile (3.7 template)</a> and the <a href="#">Service providers List (4.12 template)</a> (for formal and informal stakeholders) have been <a href="#">created/updated</a> , please share the files separately with <a href="mailto:global.wrec@wfp.org">global.wrec@wfp.org</a>
4.3 Updated Service Providers List (WM&R template 4.12)	