HELP LOGISTICS

KÜHNE FOUNDATION

Supply Chain and Operations Management

Waste Value Chain Mapping

Identifying and mapping the available waste streams and waste stakeholders in Dakar

June 2024

About Help

Established in 2014, HELP Logistics AG is a non-profit subsidiary of the Kühne Foundation in Switzerland. The organisation operates from logistics hubs strategically located in Amman (Middle East), Dakar (West Africa), Nairobi (East Africa), Hamburg (Germany), and Singapore (Asia-Pacific). HELP Logistics is committed to improving the effectiveness and efficiency of humanitarian supply chains whilst advocating for transformative changes in delivering humanitarian assistance. Our core services encompass supply chain analysis, training, applied research, and outreach. With a dedicated team of 25 experts and collaborating with over 30 organisations from various sectors, we tackle critical challenges in the humanitarian landscape.

The West Africa Office in Dakar, who spearheaded this project, is the youngest office established only in 2019. The office focusses on specific challenges in the West Africa region and in francophone countries and has positioned itself by supporting partner organisations through innovative approaches and by bringing together thought leaders in the region.

Acknowledgments

We are grateful to all the respondents who participated anonymously in our study. Their feedback and opinions have been essential for this report. We also want to express our sincere appreciation to the thought leaders from the partners to this project: Plan International & the Swiss Embassy in Dakar. Their insights were essential in the problem definition, methodology definition and analysis.

Content Management

Aiché Dadoye Ba

Supply Chain Consultant – HELP Logistics West Africa

Seynabou Diakhoumpa

Operations manager – HELP Logistics West Africa

Content Reviewers

Bruno Vandemeulebroecke

Regional Director – HELP Logistics West Africa

With contributions from:

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Introduction

Waste management encompasses the collection, transport, processing, recycling, and disposal of waste generated by human activities. Effective waste management is essential for sustainable development, environmental protection, and public health. It is a critical issue in developing countries, where inadequate infrastructure and limited resources often hinder the proper disposal and recycling of waste. Humanitarian organizations, operating in these contexts, face the challenge of not exacerbating the strain on existing waste management systems with the waste generated by their activities. Indeed, the substantial waste streams coming from humanitarian operations mix with existing waste from private and commercial activities in the broader areas of intervention. Despite various initiatives aimed at minimizing waste output from humanitarian operations and managing humanitarian waste more sustainably, the lack of knowledge about local waste management systems, facilities, and providers poses a great challenge.

HELP Logistics, as part of its ongoing efforts to support sustainability initiatives within humanitarian supply chain management, initiated this project, in collaboration with PLAN International and the Embassy of Switzerland in Senegal. This project focuses on the development and the application of a methodology to map waste value chains in urban and peri-urban settings, with a focus on promoting sustainable practices within supply chain setups of humanitarian and development actors. By applying a methodology allowing to systematically identify waste streams within their areas of operation, humanitarian organizations can gain valuable insights to adapt and connect their waste streams to existing waste management initiatives, as well as inform targeted interventions to enhance the efficiency and sustainability of local waste management systems.

The methodology developed by HELP Logistics was piloted in Dakar, Senegal, leveraging insights and inputs from PLAN International and the Embassy of Switzerland in Senegal, Dakar. Like many rapidly growing cities in developing countries, faces significant waste management challenges, making it an ideal setting for this pilot study. Through the collection and analysis of waste stream data, the project enabled the mapping of the various waste streams in Dakar and the identification of key stakeholders involved in the waste value chain, highlighting opportunities for humanitarian organizations to support and strengthen the capacities of local stakeholders. Despite this initial pilot mapping out the stakeholders and their respective interactions, a further adaptation of the methodology with an additional project phase is required if actors want to identify more specific projects. The methodology is thereby to be adapted with additional modules focussing on for example more specific supply chain data or social and livelihoods aspects.

Additionally, this project identified small-scale waste management initiatives. Although little is known about the efficiency of their supply chains, as this was not in the scope of this project, these entities present opportunities for further exploration with a focus on improving their supply chains, as well as their role in income generating activities to some of the most vulnerable populations in an urban environment.

This report presents the findings of the project that emerged from applying the waste value chain mapping methodology piloted in Dakar by HELP Logistics. It includes a detailed map of the waste streams and waste management stakeholders in Dakar, from waste generators to final disposal facilities. Additionally, this report outlines the complexities and challenges within Dakar's waste management sector, underscoring the potential impact of targeted support and intervention.

Ultimately, this report aims to provide actionable recommendations to enhance the efficiency, inclusivity, and sustainability of waste management practices in Dakar, thereby fostering economic empowerment and environmental stewardship among local communities.

Dakar waste value chain mapping

The mapping of the waste streams and waste stakeholders in Dakar was obtained using the waste value chain mapping methodology developed during this project and comprising two steps:

1. Stakeholder Identification:

Initial interviews were conducted with PLAN International and the Embassy of Switzerland in Dakar. These interviews provided an overview of their waste management practices and served as a starting point for mapping the waste value chain. Concurrently, a preliminary desk study was performed to identify various players in Dakar's waste management sector. The desk study led to the inclusion of the official government waste management company, as well as private waste collection and transport service providers. The desk study primarily utilized information available online.

2. Field assessment:

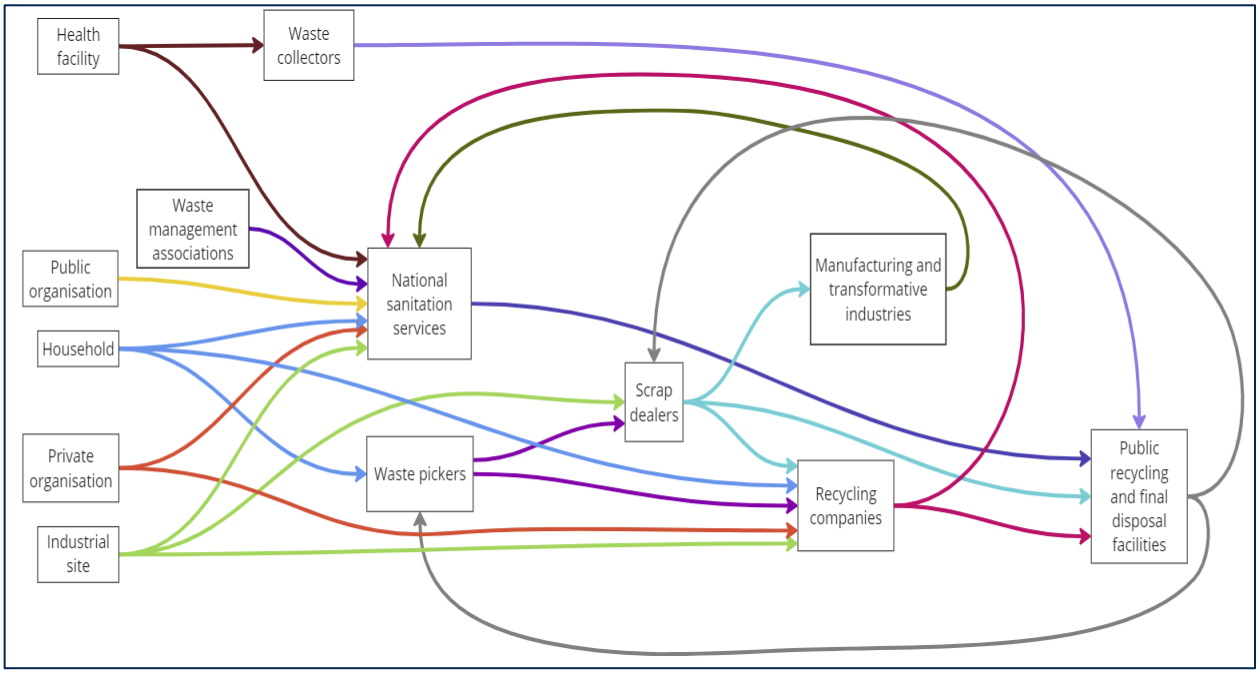
Following the preliminary identification, the assessment methodology detailed in Appendix 1 was applied to identify additional stakeholders and provide a broader view of the waste value chain, including various actors, waste types, and waste streams within the city. As part of this assessment, 257 participants were interviewed, ranging from waste pickers to scrap dealers and recycling companies. Collaborating with an external assessor, the field interviews started with informal waste pickers, extended to intermediate resellers and recyclers, and concluded at the Mbeubeuss landfill, the final and official disposal site in Dakar.

Table 1 : Respondents to the field assessment survey

Type of respondents	Count of respondents
1- Community based / waste management associations	2
1- Contracted waste collection and transport services	1
1- National Government / State sanitation services	1
1- Waste pickers	168
2- Middle agents / Scrap dealers	83
3- Recycling companies	2
Grand Total	**257**

This approach allowed the comprehensive mapping of the waste value chain in Dakar, providing a detailed understanding of the stakeholders and the dynamics of waste management in the city.

Figure 1 : Dakar Waste value chain stakeholders mapping



The results illuminate the current waste management landscape in Dakar, underscoring the sector's complexity and the diverse range of stakeholders involved. The complex nature of the waste value chain in Dakar highlights the interdependencies among stakeholders. Unlike a linear process where waste flows from generation to disposal, this complex system demonstrates multiple feedback loops. Waste moves between various stakeholders in a dynamic and cyclical manner, with upstream and downstream interactions continuously looping back to one another. However, two stakeholders, waste pickers and the national sanitation service, emerge as central nodes within this network, being interconnected with almost all other actors in the waste value chain.

Waste pickers appear to be crucial in the initial stages of waste collection, but also in the transformation and recycling chain. As observed during the assessment, they mostly operate within informal economies, collecting, and sorting waste before passing it on to other entities. Their activities connect them to households, businesses, and informal recycling operators. They act as a bridge between the waste generators and the larger waste management framework, including national sanitation services. However, despite their importance in the waste value chain, waste pickers often work under precarious conditions with minimal social, sanitary, or economic security.

National sanitation services represent the formal[1] sector's backbone, responsible for overseeing comprehensive waste management from collection to final disposal or recycling. They are connected to all other stakeholders, including informal[2] players such as recycling companies, and transformative industries. This central role ensures that even waste initially managed by informal sectors is eventually processed or regulated by national services. While they have the mandate to handle waste on a large scale, the national

[1] Formal waste management stakeholders are entities officially recognised and regulated by governmental frameworks. They include municipal authorities, private waste management companies, and other organisations that operate under legal and institutional arrangements to provide structured waste collection, transportation, treatment, and disposal services.

[2] Informal waste management stakeholders operate outside formal regulatory frameworks and are not officially recognised by government authorities. These include, but are not limited to, waste pickers, scrap collectors and dealers, small-scale recyclers but also more formalised private sector companies working in the waste collection and transformation industry.

sanitation services capacity is still insufficient. This gap in service provision has led to the emergence of numerous private actors in the waste management sector.

This multitude of private actors are essentially small enterprises, some of them holding a registered business license but many of them operating informally. They primarily collect waste from households and private companies and either engage in small or medium scale recycling activities (Recycling companies), resell the waste collected to transformative industries (middle agents), or merely transport the waste from the collection point to the disposal sites (waste collectors) without any intermediate processing. Their disposal practices are however often unregulated, with waste frequently ending up in informal dump sites. The use of informal dump sites poses significant risks to the environment and public health, highlighting the need for better regulation and support for these actors.

Table 2 : Type of waste processed by each stakeholder

	Type of waste that are collected or processed												
Stakeholder Type	E-waste	Liquid waste (sewage, wastewater, stormwater,	Hazardous waste	Medical waste	Industrial waste	PET Bottles	Metals	Copper	Glass Containers	Paper and cardboard	Hard Plastics	Soft plastics	Food waste
1- Community based / waste management associations	Never	Never	Never	Never	Never	Often	Often	Never	Never	Never	Often	Never	Never
1- Municipal authorities / Local sanitation services	Not interviewed	Not interviewed	Not interviewed	Not interviewed	Not interviewed	Not interviewed	Not interviewed	Not interviewed	Not interviewed	Not interviewed	Not interviewed	Not interviewed	Not interviewed
1- National Government / State sanitation services	Regularly	Regularly	Never	Regularly	Regularly	Regularly	Regularly	Regularly	Regularly	Regularly	Regularly	Regularly	Regularly
1- Waste pickers	Never	Never	Never	Never	Never	Rarely	Often	Often	Rarely	Never	Rarely	Rarely	Rarely
2- Waste collectors	Never	Never	Never	Regularly	Never	Never	Regularly	Regularly	Never	Never	Never	Regularly	Never
2- Middle agents (Scrap dealers)	Sometimes	Never	Never	Never	Never	Rarely	Sometimes	Never	Never	Never	Rarely	Rarely	Never
3- Public recycling and final disposal facilities	Not interviewed	Not interviewed	Not interviewed	Not interviewed	Not interviewed	Not interviewed	Not interviewed	Not interviewed	Not interviewed	Not interviewed	Not interviewed	Not interviewed	Not interviewed
3- Recycling companies	Never	Never	Never	Never	Never	Regularly	Often	Never	Often	Regularly	Never	Regularly	Often
4- Manufacturing / Transformation industries	Not interviewed	Not interviewed	Not interviewed	Not interviewed	Not interviewed	Not interviewed	Not interviewed	Not interviewed	Not interviewed	Not interviewed	Not interviewed	Not interviewed	Not interviewed

As part of the assessment, the respondents to the interviews were asked to indicate the different type of waste they either collect or process. As shown in table 2**Error! Reference source not found.**, there are significant discrepancies in the coverage of the different waste types by the stakeholders in the local waste value chain.

PET bottles, metals, copper, glass containers, hard plastics, soft plastics, and food waste are processed by the majority of actors in the Dakar waste value chain. This underscores their economic significance in the local waste management sector due to their high recycling and monetization potential that attract multiple actors to participate in their collection, processing, and transformation. The market value of the recycled products, and the potential economic returns for the stakeholders involved explain their attractiveness in the waste value chain. In particular, the participation of multiple actors in the collection and the processing of PET bottles and metals highlights the interaction between small scale actors such as waste pickers and larger scale stakeholders such as recycling companies or waste management associations. Small scale actors usually play a crucial role in the initial collection and sorting of recyclable materials, which are then integrated into recycling or reuse processes.

Waste pickers primarily collect metals and copper which are valuable recyclable materials with a relatively stable market demand (local or foreign). Waste pickers focus on these materials because they can fetch a higher price compared to other types of waste. These materials offer the highest economic return per unit of weight or volume, making them a more interesting source of income… The ability of waste pickers to identify and segregate valuable materials like metals and copper from mixed waste streams is a testament to their expertise in waste sorting and resource recovery.

Similarly, recycling companies also prioritize materials that offer higher economic returns, except for hard plastics. Processing hard plastics, especially those that are less common or more complex in composition, require specialized equipment and technologies. Local recycling companies prefer to focus on materials that

are easier to process and yield higher-quality recycled products. Moreover, handling and transporting hard plastics can pose logistical challenges due to their bulkiness and weight compared to other materials, which could impact the efficiency and cost-effectiveness of their recycling operations.

On the other hand, liquid waste, hazardous waste, medical waste, and industrial waste are processed by a very limited number of actors in the waste value chain. These types of waste often require specialized handling, processing, and disposal methods due to their potentially harmful nature, and their management is governed by strict regulations in Senegal. The management of biomedical waste is regulated by the Environmental Code and Decree No. 2008-1007 dated August 18, 2008. The Decree specifies that "Any natural or legal person who produces or holds biomedical waste must ensure its elimination or recycling themselves, or have it eliminated or recycled by companies approved by the Ministry in charge of health." The decree further adds that "Any biomedical waste operator must obtain approval from the Ministry in charge of Health".

As explained in the *Updated Biomedical Waste Management Plan* published by the Ministry in charge of Health and Social Action in 2019, in Senegal, very few healthcare facilities have incinerators that meet technical and environmental standards for biomedical waste disposal. Most public healthcare facilities have artisanal burners that allow for more or less efficient incineration of medical waste (thus avoiding chaotic disposal with household waste), despite this open burning constituting a major source of pollution and nuisances for the surrounding environment.
However, a significant portion of healthcare facilities, particularly private clinics, do not have appropriate disposal systems and use services of private waste collection companies. Indeed, these relatively small and limited-capacity clinics do not have enough physical space that would allow for the installation of incinerators, especially in the urban centre. Some private clinics in Dakar have partnerships with hospitals that have incinerators, but this is not a widespread practice. As indicated by the Ministry of Health, biomedical waste management does not represent enough financial potential to make it an attractive market for private collection companies as there are no economic returns on the recycling and transformation part and the operating costs are quite high due to the technical precautions and installations required. This, combined to the very strict regulations, explains that very few waste management actors offer this service. Moreover, the Ministry of Health reports that private medical waste collectors generally burn or dispose of this waste along with household garbage in inappropriate dumps, despite the Dakar controlled landfill including compartments for disposing of medical waste.

Liquid waste generated in Dakar are managed by the National Sanitation Office of Senegal (ONAS, Office National d'Assainissement du Sénégal) which is the public institution responsible for managing sanitation services in urban and semi-urban areas of Senegal. ONAS oversees the collection, treatment, and disposal of wastewater in urban areas. This includes the sewage systems and wastewater treatment Plants, the stormwater drainage systems to prevent flooding and waterlogging, and the emptying of septic tanks and latrines.
In Dakar, there are two different types of "liquid sanitation":

- "Conventional" sanitation constituted of closed sewer networks
- "Non-conventional" sanitation constituted of septic tanks, latrines, dry pits, i.e., all types of autonomous sanitation devices installed in households.

In theory, the National Sanitation Office (ONAS) oversees the entire sector, but in reality, it only manages "conventional" sanitation networks (Toure, Kamara, & Mamadou, 2022). Households functioning in the "non-conventional" sanitation system evacuate their generated liquid waste by manually emptying the septic tanks and burying or disposing of it, or by utilizing the services of suction trucks, for those who can afford it. Suctions trucks are usually operated by professional companies, individuals (informal enterprises), or can be accessible through NGOs or communal services at a lower cost (Toure, Kamara, & Mamadou, 2022). The evacuation of sewage sludge is done at the official sewage treatment plant upon payment of a fee. However, clandestine discharges into ONAS sewers, marshy areas, and open canals are frequent, even though clandestine dumping is punishable by fines and even imprisonment in cases of caught in the act (Toure,

Kamara, & Mamadou, 2022). An alternative recycling channel also exists with some local economic interest groups (GIEs) operating in the liquid waste management sector collaborating with farmers, especially horticulturists who use sewage sludge as a fertilizer for plants or for soil amendment, despite this practice being prohibited (Toure, Kamara, & Mamadou, 2022).

Concerning industrial waste and hazardous waste, they are of various types, but regulatory provisions specify that they must be managed on-site by their producer under the "polluter-pays" principle. In the absence of adequate equipment at production sites, regulations allow the use of approved organizations to carry out the required treatment. However, no specific information was identified in this study regarding entities, whether public or private, specifically handling hazardous and industrial waste, or detailing the procedures involved and how they are integrated in the waste value chain.

The insufficient management capacity for hazardous, medical, and industrial waste presents sanitary risks, especially given the limited capabilities of the national entity responsible for waste management. There are too little alternatives in the private sector to sufficiently complement the local capacity and ensure the safety of the population.

Regarding the value chain of e-waste, scrap dealers handling e-waste tend to specialise themselves on that specific waste type and are different from other scrap dealers operating in the recycling value chain. E-waste recycling often requires specific technical skills and adherence to international standards and protocols, which might be challenging for many local actors to meet.

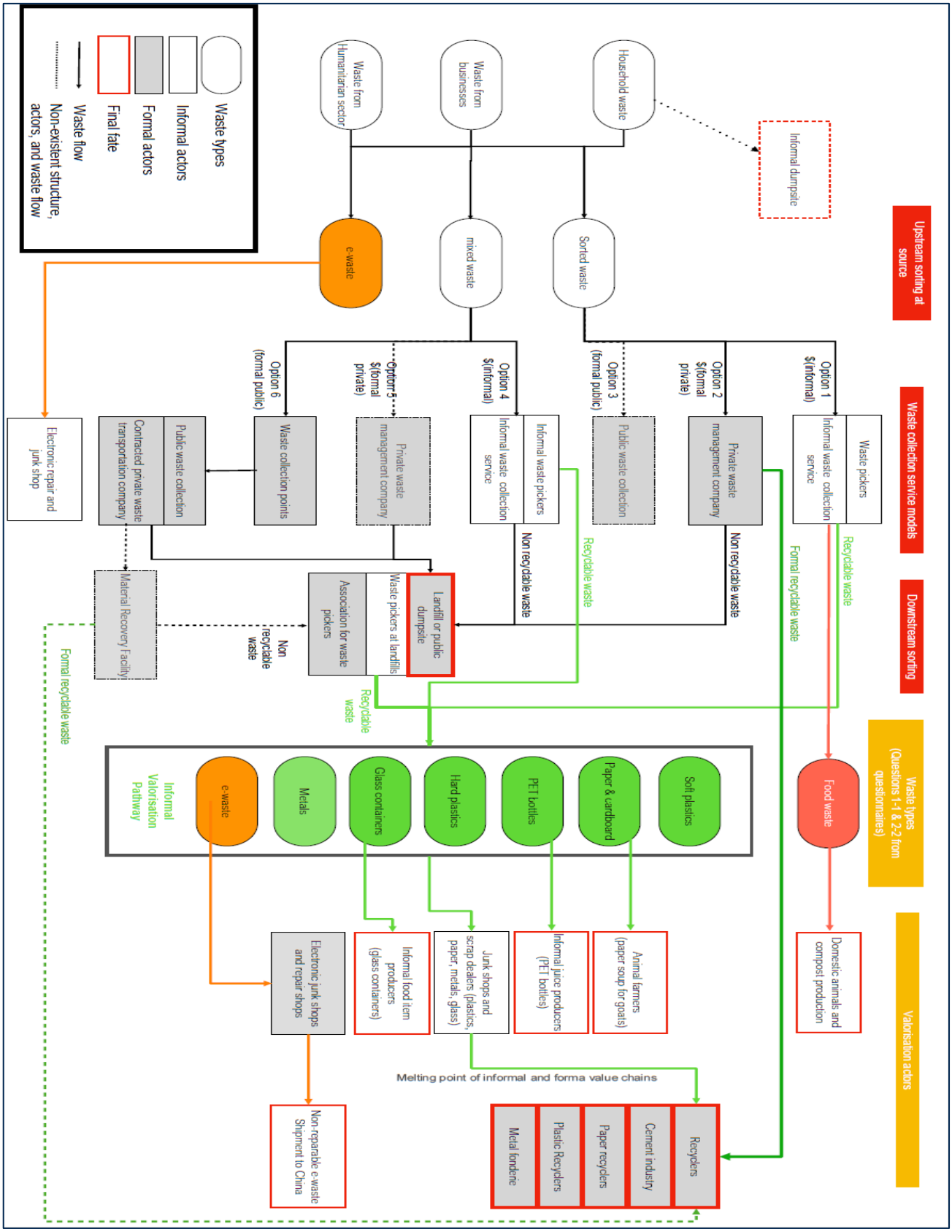
The lack of traction and investment in the local e-waste management sector is unfortunate, as there is substantial potential for revenue generation. Currently, e-waste processing is conducted on a small scale where valuable parts are extracted for resale, or reassembly and repair for second-hand sale. The activity is not very organized or regulated, limiting its effectiveness and potential impact.

Error! Reference source not found. presents a comprehensive overview of the waste value chain in Dakar, based on the findings from the assessment. It presents the locally available valorisation pathways for the different types of waste generated in the city. As confirmed by the findings from the assessment and the preliminary desk study, the waste recycling chain in Dakar is not sufficiently formalized and industrialized. Most recycling activities are carried out by informal players who lack the infrastructure and support to process waste efficiently on a large scale. This limits the capacity of the private recycling sector to handle waste effectively and bridge the capacity gap of the national waste management entity.

Additionally, the lack of large-scale recycling capacity and the limited presence of highly industrialized transformation industries in the country hinder the ability to locally maximize the value creation potential of the waste generated in the city and to create substantial local income opportunities. As a result, foreign players often capitalize on these gaps. For instance, e-waste and metal waste are for the most part purchased by large scrap dealers in bulk from scrap dealers and exported to foreign markets for processing and value creation.

The waste management in Dakar predominantly involves small-scale reuse rather than large-scale transformation. A notable example is the local reuse of containers such as PET bottles, glass bottles, and jars, which waste pickers trade to homemade food item producers who clean and reuse them for products like fruit juice, jam, and snacks. Although these reuse applications are employed by informal workers and create small-scale economic value chains from waste, they are beneficial because reuse is more sustainable and circular than recycling, according to the waste hierarchy.

Figure 2: Dakar waste value chain mapping



Challenges and opportunities in the local waste value chain

The field assessment collected the following indications of challenges from the waste pickers and scrap dealers:

Main challenges reported by scrap dealers

Pricing was reported by the scrap dealers as the most pressing challenge. According to the scrap dealers, the purchasing cost of waste from waste pickers and waste collectors is considered too high, compared to the reselling price to local recycling companies or transformative industries. This claimed pricing imbalance hinders the ability for scrap dealers to achieve a sustainable profit margin. This challenge highlights the need for negotiated pricing mechanisms and potentially more supportive policies or interventions to ensure correct and viable pricing throughout the waste management chain.

Scamming and theft are other important issues raised by the scrap dealers during the survey. Scrap dealers indicate that they often face challenges with the quality and legality of the waste they purchase. They sometimes unknowingly acquire stolen objects or waste of poor quality that cannot be recycled or reused, resulting in no value generation. High-value waste, such as metals and copper, is particularly susceptible to theft due to limited and suboptimal storage facilities. Moreover, high-potential waste is scarce because it is monopolized by a small number of large scrap dealers who resell it to foreign transformation industries, leaving small-scale middle agents with limited access.

Insufficient storage capacity was listed by the scrap dealers as one of the most impacting issues. Nearly half of the scrap dealers interviewed during the assessment estimated that the waste they collect or purchase from pickers and collectors is stored for more than one week. As indicated during the interviews, they accumulate waste to sell in bulk to their regular clients, often storing it for several weeks, up to a month or more. However, the lack of sufficient and formal storage facilities often results in damage, thefts, and potential loss of value.

Additionally, scrap dealers perceive the waste management sector's informality and lack of regulation as a hindrance to attract funding that could help them scale up their activities. The sector's potential is not very attractive to investors, and those working within it lack the technical support to enhance its appeal to investment. Additionally, there is significant social stigma associated with scrap dealers, who are often perceived as thieves or associated with homelessness and addiction. This negative perception further devalues the sector and its workers.

Main challenges reported by waste pickers

From waste pickers' point of view, their main challenge is safety. They reported frequent work incidents where they would get cut while searching for waste or get burned when extracting copper from the wires. As they usually don't have suitable personal protective equipment (PPE), they have health issues caused by the exposure to dust and garbage without enough sanitary protection. Waste pickers also work in a context of high insecurity, especially in the dumpsites where violent competition sometimes leads to brawls and injuries, particularly exposing female waste pickers. Many of the waste pickers interviewed also reported their concerns about the growing presence of underaged kids in the dumpsites, which exposes them to the risks associated with the dumpsites.

Transport is another hurdle reported by waste pickers. Over 40 percent of the waste pickers interviewed confirmed that they use pushing cart to transport the waste they have collected, and nearly 25 percent rely on horse-drawn carriages. While the use of these transportation methods presents many advantages for

waste pickers as they are usually cheap and only require a limited initial investment (no fuel, little maintenance, no driver's license, …), they limit the amount of waste that pickers can transport at one time, reducing their overall efficiency and productivity. Additionally, pushing carts can be physically demanding and may lead to health problems, due to the strenuous labour involved. They are also not suitable for long distances, which restricts the areas waste pickers can cover and potentially limits their income opportunities. Finally, the lack of more advanced transportation options reflects broader systemic issues, such as inadequate infrastructure and lack of support for waste pickers, which further hinders the development of a more effective and sustainable waste management system.

Opportunities in the local waste value chain

While several challenges were highlighted, several opportunities also emerged from the conversations with the waste stakeholders.

Transformation initiatives such as composting and animal feed production from organic waste are being developed at a local and small scale as presented in **Error! Reference source not found.**, underscoring the potential for waste management to stimulate innovation and create opportunities for income generation. These initiatives contribute to the processing of organic household waste, which is otherwise not the easiest to process instead of sending it directly to a disposal facility, therefore significantly reducing the amount of waste sent to landfills. Additionally, composting's added value is undeniable in sustainable agriculture, and it is gradually being adopted more and more by farmers as an alternative for fertilizers. Using organic waste as animal feed is a lifelong practice by local communities and is slowly getting more traction as a production initiative. A list of such initiatives was identified during the preliminary desk study of this project and can be found in Appendix 3.

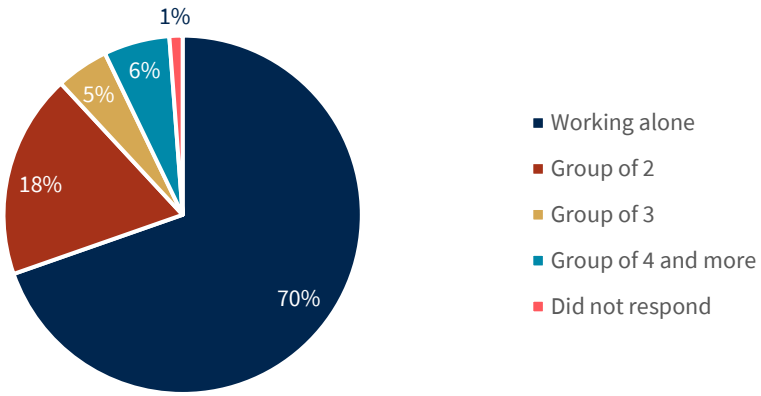
Advocacy groups have also increased in recent years, playing a critical role in supporting waste management initiatives. These groups raise awareness about the challenges faced by waste pickers and other stakeholders, advocate for better policies, safer working conditions, and fairer compensation. They help connect waste management initiatives with potential funding sources and provide training and resources to help these initiatives thrive. Zero Waste Senegal is one such example, working with schools, entrepreneurs, at multiples events to raise awareness about the sector's issues on such examples. They also provide trainings for their members and beyond on multiple matters such as the legal landscape, the different types of alternatives available in terms of waste management practices, etc. In 2019, they trained almost 600 participants.

These initiatives, combined with targeted support and collaborative efforts from public and private stakeholders, can significantly boost the ability for the waste management sector to achieve its potential for economic and environmental benefits.

Social and demographical analysis of the waste pickers

The analysis zeroed in on a limited set of social variables in the sector, particularly for waste pickers…

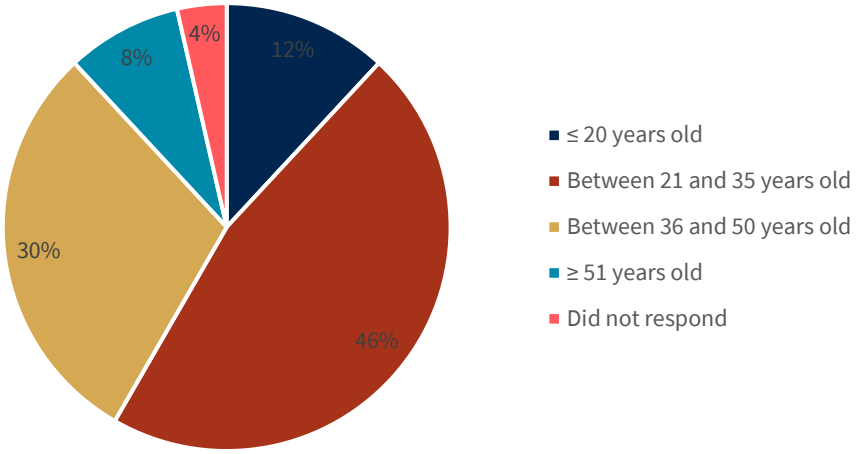
Figure 3 Share of waste pickers working alone or in groups



The findings of the field assessment show that a non-negligeable proportion of waste pickers work in family units (30%). This indicates that waste picking is often performed as an important income generation of a large part of the family. This presents an opportunity for diversification of services as families already working in the industry may diversify their services beyond waste collection alone, and include additional services such as sorting, recycling, or even offering specialized waste management solutions. These additional services could attract higher-paying clients and increase overall income. Additionally, working in groups can enhance efficiency in waste collection and sorting and allow to cover larger areas or access more lucrative waste sources. It can also increase negotiation power of waste pickers when selling collected materials.

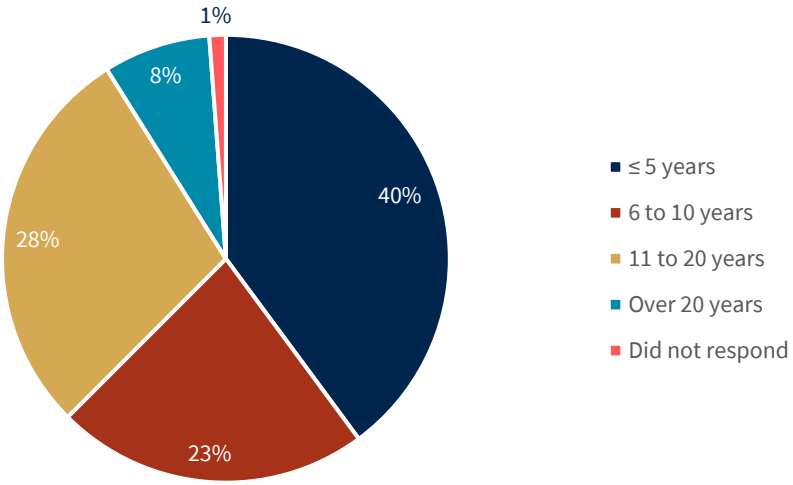
Regarding the demographics of the respondents, the analysis highlighted that the sector is male dominated with 83% of the waste pickers interviewed being male while only 17% are female. The average male picker is 31 years old while the average age of female waste pickers is 43 years old. More generally, a significant majority (76% combined) of waste pickers fall within the age range of 21 to 50 years old. This age group is typically associated with prime working age, suggesting that waste picking serves as a viable or necessary income-generating activity for adults in their productive years.

Figure 4 Age groups of waste pickers



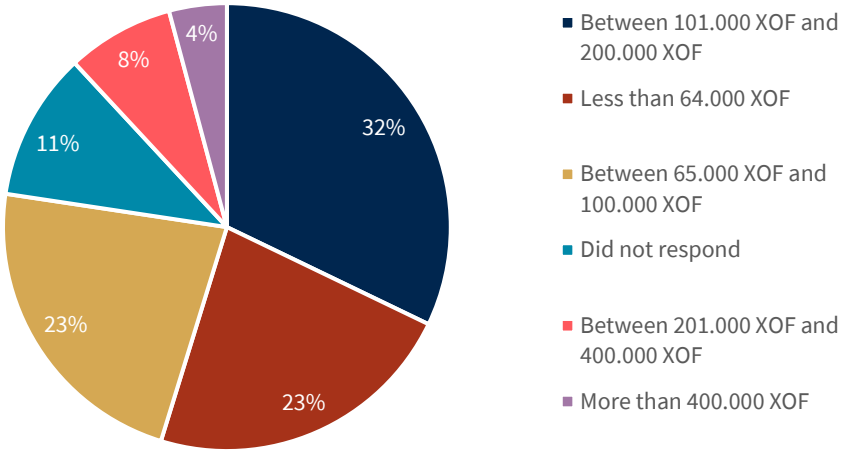
The significant proportion (40%) of waste pickers having less than 5 years of experience indicates a relatively high turnover rate within the profession. However, a substantial number of waste pickers have been engaged in the profession for longer periods with 36% of waste pickers who have been in the field for a decade or more. On average, the waste pickers interviewed have been working in the field for 10 years, similarly for male and female pickers. They have therefore ample experience in these activities but have also been exposed to the risks of the job for long stretches of time as well. The longevity of these waste pickers in the sector suggests that waste picking can provide sustained income and livelihood for those who remain in the profession. This engagement may also indicate a deeper reliance on waste picking as a primary source of income or lack of viable alternative employment opportunities over the years.

Figure 5 Average years of experience of waste pickers



The average monthly revenue from waste picking activities is estimated at around 150.000 XOF by the waste pickers interviewed. Only 23% of them make less than the national minimum salary (64.223 XOF) while over than 10% of them make more than three times the minimum salary on average.

Figure 6 Average monthly revenue from waste picking activities



There are however there are significant variations in income distribution based on demographic criteria. While the average count of years of experience is identical for male and female waste pickers, the average monthly revenue of male pickers is 49% higher than for female pickers. Waste pickers who work alone make on average 128.000 XOF while those who work in group have an average monthly revenue of 291.000 XOF with groups of 4 and above making 485.000 XOF on average. This disparity underscores the economic advantages of collaborative work arrangements in the waste picking sector.

The most substantial difference in average revenue is between waste pickers with over 5 years of experience who earn 97% more than those working in the sector for 5 years or less. This significant revenue gap highlights the financial benefit of experience in the waste picking profession. Waste pickers with longer tenure likely have developed skills, efficiency, and knowledge of waste streams and market dynamics over time. These factors contribute to higher productivity, better waste sorting techniques, and potentially accessing higher-value waste materials.

Recommendations

The challenges and opportunities of the waste value chain that were identified throughout this study have highlighted several key areas for support and improvement. By addressing these areas, the waste management system can become more efficient, sustainable, and capable of generating income. The following recommendations aim to enhance the overall effectiveness of the waste value chain in Dakar, transforming it into a significant opportunity for sustainable development and economic growth. If PLAN International is interested in supporting in the potential value creation initiatives and the social and economic development of the small-scale stakeholders among other aspects, the following recommendations can be used as initial guidance:

Targeted support to waste pickers

Looking into the demographic composition and work dynamics of the waste pickers presented in the analysis, it appears that sector-specific interventions must be implemented.

More than 20% of the waste pickers reported that safety is their main challenge during the waste collection process. Waste pickers should therefore be trained on health and safety measures to reduce the risks associated with waste handling, such as exposure to hazardous substances, injuries from sharp objects, and ergonomic strain. This includes proper lifting techniques, use of personal protective equipment (PPE), hygiene practices but also how to handle, and process of various waste types. Given the high exposure of waste pickers to unsafe and unsanitary conditions, PLAN International can explore opportunities to promote the importance of personal protective equipment (PPE) for waste pickers and facilitate their access to this essential gear.

Additionally, as over 10% of the waste pickers are under 20 years old, tailored support programs could be developed to assist younger waste pickers in transitioning to more sustainable livelihoods or accessing educational opportunities.

The data collected on waste picking revenues suggests that income in the waste picking sector tends to increase with experience. This trajectory reflects the accumulation of skills, networks, and efficiencies that allow experienced waste pickers to maximize their earning potential compared to newcomers. Recognizing the income disparity based on experience underscores the importance of supporting ongoing training, capacity building, and career development initiatives for waste pickers. They can be trained on proper waste sorting techniques helping them identify and separate recyclable materials from non-recyclables, thereby increasing the value and marketability of collected waste. Skills development in alternative income-generating activities, such as composting, handicraft production from recycled materials can also support the diversification of income streams.

Support the professionalization of the sector and capacity building efforts

Sponsoring capacity-building initiatives that equip all stakeholders in the waste value chain with specific knowledge and skills can support the effectiveness of the local waste management sector.

Facilitating access to technical expertise in recycling and transformation activities for small-scale scrap dealers and supporting the formalization of their activity could help them access local and international recycling and transformation markets, ramp up their operations and improve their profitability.

Small recycling initiatives can also benefit from technical expertise on how to process different types of waste and create value from it, how to increase their capacities and make their businesses more viable. By

providing them with the necessary technical and technological knowledge, they can process a wider range of waste types and generate more value. Familiarizing them with business management standards will also support the formalization of their activity which could help these initiatives access formal markets to sell their processed or transformed waste products. This can stabilize their income and eventually make the sector more attractive to investors.

Mentorship from experienced industry professionals can further guide the growth and development of all stakeholders in the waste management chain.

Enhance community engagement

Community engagement is a critical area where waste management initiatives often face challenges, including a lack of awareness and participation from local residents regarding waste segregation and recycling practices. Educating communities about the benefits of proper waste management and involving them in recycling programs can significantly improve waste collection efficiency and quality. PLAN International and the Embassy of Switzerland in Senegal can play a pivotal role in this by launching educational campaigns to inform communities about the dangers of improper waste disposal and the importance of safe waste management practices. Encouraging community participation in initiatives, such as clean-up activities, can foster a more active and responsible community. PLAN International can also conduct widespread awareness campaigns to educate the community about the importance of waste segregation, recycling, and proper waste disposal. These campaigns can be complemented by community outreach programs and partnerships with local organizations and community-based associations to promote environmental responsibility and sustainability resulting in a more efficient, sustainable, and community-supported waste management system. This community engagement can be heightened further in collaboration with the advocacy groups identified during the field assessment.

Enhance supply chain efficiency of small-scale waste management operations

The storage and transportation challenges identified in the assessment indicate opportunities to increase the efficiency and profitability of small-scale waste initiatives through supply chain optimization. HELP Logistics can collaborate with PLAN International on that matter to examine in detail the supply chain dynamics and capacities within the local waste management chain and highlight areas for improvement and efficiency gains. Approaching the supply chain as a strategic asset within the sector and exploring opportunities to enhance operational effectiveness can contribute to transforming small-scale waste management into a more profitable and sustainable business sector.

However, the study showed that supply chain practices are very elementary and not properly structured in the sector, leading to inefficiencies and lost opportunities for economic and social value creation. It is recommended to define standard operating procedures (SOP) for the waste collection process that can be used by waste pickers and waste collectors for efficient waste segregation and processing. This standardization of practices, combined with the previously mentioned professionalization of the sector and the related capacity building efforts, will ultimately improve visibility and oversight across the broader waste management network. It is also recommended to incentivize the formalization of informal stakeholders and initiatives. This will help in regulating their activities, ensuring compliance to the previously mentioned SOPs, and contributing to a more efficient and structured supply chain that will make it easier to track and manage waste flows.

Complement the methodology with supply chain and socio-economics related aspects

The waste value chain stakeholders, in particular waste pickers and scrap dealers underlined several supply chain challenges in the sector including the storage and transportation modes. While the

methodology piloted in this project did not allow to collect more detailed information and data about the supply chain structure along the waste value chain in Dakar, follow up projects could be initiated in collaboration with HELP Logistics to analyse these supply chain aspects in depth and recommend more actionable steps to take for a more efficient and organized waste supply chain in Dakar.

The assessment provided insights into the social and demographical aspects of the waste value chain, especially on waste picking stakeholders. Factors such as gender, experience and working structure (alone or within a family group) have appeared to be significantly influencing the level of income collected from waste picking activities. PLAN International could intervene in such aspects and contribute to efforts towards ensuring adequate working and living conditions for all stakeholders. While social, economic, and demographical aspects were partly taken into consideration during the interviews, they were not assessed comprehensively enough to provide a broad scope of analysis.

The methodology used for the waste value chain mapping in this project must therefore be adapted to include more specific supply chain assessment datapoints as well as inputs related to the social and economic aspects of the waste management sector. This adaptation will ensure that the methodology is comprehensive and applicable to the unique conditions and challenges faced in the waste management sector in Dakar and other contexts where the methodology might be replicated in.

Support local informal waste recycling initiatives

The existing valorisation pathways presented in **Error! Reference source not found.** provide visibility on the small-scale, informal, local initiatives working on waste reuse and recycling, but also on the gaps and types of waste that are still not well processed locally. These insights can be avenues to explore for PLAN International to support the value creation initiatives of the waste stakeholders and that of more circular economies in the sector. The focus could be on areas where local stakeholders can introduce or enhance the processing of specific waste types, such as organic waste for composting or plastic waste to produce products such as home and office furniture, etc.

Conclusions

The assessment of the waste streams in the city of Dakar has revealed a complex and interconnected waste management ecosystem. This complexity involves a diverse array of stakeholders—from waste pickers and scrap dealers to small-scale recycling initiatives and formal waste management entities—all playing integral roles in the management and processing of waste materials, while interacting with one-another.

Despite many challenges faced in the waste value chain, such as inadequate storage infrastructure and transport means, safety concerns, and limited market access for recycled materials, the assessment reveals significant potential for enhancing efficiency, profitability, and sustainability of waste management initiatives.

Building upon these opportunities, this report presents a list of recommendations, essentially focused on strategic interventions, to address these challenges effectively. Advocating for supportive policies, building capacities through targeted training programs, fostering public-private partnerships, and engaging local communities are identified as critical pathways towards sustainable waste management practices. Furthermore, recognizing the supply chain as a strategic asset of the waste management sector and exploring opportunities for optimizing logistics, especially for small-scale actors could also support the efforts to streamline operations, increase profitability and enhance the sector's overall resilience.

The project’s primary output was the creation and piloting of a waste value chain mapping methodology that can easily be duplicated. Through the pilot, the methodology has been created and the survey has been established and adapted based on the pilot learnings. Where the methodology currently identifies the stakeholders and their interactions, there is opportunity to go beyond the current mapping scope and include optional modules on supply chain capacity, livelihoods analysis or a socio-economical mapping of the waste value chains. In the latter two, HELP Logistics would welcome a cooperation with, and reliance on the expertise of PLAN International.

Appendices

Appendix 1: Local waste value chain mapping methodology for the Humanitarian Sector (Pdf file)

Appendix 2: Local field assessment questionnaire (Pdf file)

Appendix 3: Dakar waste value chain stakeholder's directory

	Stakeholder type	Waste type	Contact information
UCG : Unité de Coordination de la Gestion des déchets solides (Renamed SONAGED)	Public authority	Municipal solid waste (MSW)	https://www.ucg.gouv.sn/docsucg contact@ucg.gouv.sn +221 338690263
Bokk Diom: Association of waste pickers at Mbeubeuss	Association	Recyclables	Harouna Niass, president of the association +221 765856059
Zero-waste Senegal	NGO		https://zerowastesenegal.org
Deekali plastic project	NGO	Plastic credit project in Dakar	https://acc.sn/our-plastic-credits/
GreenO	Private WM company	MSW & recyclables separated at source	https://greeno.ag/
CIPROVIS (Dakar):	Private WM company	MSW & recyclables separated at source	https://www.ciprovis.com

Dr Sett	Private WM company	Medical waste, microwave disinfection	https://docteursett.com/
Proplast	Recycling company	Hard plastics	https://www.proplast-industrie.sn/
Sodiaplast	Recycling company	Hard plastics	+221 77 631 50 75 +224 628107608 diamoussa1980@yahoo.fr
Transtech industries	Recycling company	Hard plastics	
Recuplast	Recycling company	Hard plastics	https://recuplast.sn/
Fabrimetal	Manufacturer	Metals (ferrous and non-ferrous)	https://fabrimetal-senegal.com/
Someta	Manufacturer	Metals (ferrous and non-ferrous)	+221 33 836 99 99

Appendix 4: List of composting/ animal food production initiatives

	Output type	Contact information
Unité de Compostage de Joal-Fadiouth	Compost production	-
Unité de Mborro Nettoiement et valorisation des déchets	Compost production	-
Nayleen Kompost	Compost production	+221 33 820 83 28
Ased Ndiaye Services	Compost production	+221 77 645 12 56
Senfeed	Animal feed production	+221 33 827 89 45
Agrofeed Senegal	Animal feed production	+221 33 840 79 30

Teranga Feeds	Animal feed production	+221 33 864 51 23
Ecofeed	Animal feed production	+221 33 841 91 54

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Head Office

HELP Logistics AG

Dorfstrasse 50
8834 Schindellegi
Switzerland
Tel: +41 44 786 9670

www.help-logistics.org

info-help@kuehne-foundation.org

www.linkedin.com/company/help-logistics

www.twitter.com/help_logistics

www.youtube.com/c/helplogistics

www.learning.help-logistics.org

Regional Offices

HELP Logistics Ltd
352 Tanglin Road, #02-01
Strathmore Building
Singapore 247671
Tel: +65 64 752 150

HELP Logistics LLC
158 Makkah Street
Alhijaz Towers
Amman, Jordan
Tel: +962 6 550 7870

HELP Logistics Limited
4th Floor, West Wing
Vienna Court
State House Crescent
Nairobi, Kenya

HELP Logistics BdR
Almadies, Zone 9
.P. 24915,
Dakar, Senegal
Tel: +221 33 825 5845