I am very pleased to be able to share this report which looks at the value created from goods that to many are regarded as waste and seemingly worthless. Solid waste management is a complex field of study and project development; with many interrelated value chains, often supporting multiple layers of workers, entrepreneurs and business owners in society. It must be recognized that with the expected population growth in Uganda and the resultant increased urbanization, there will be an ever increasing need to address ways to deal with the accompanying increase in solid waste.

The Kampala Capital City Authority (KCCA), has requested GGGI to seek out new and innovative solutions for solid waste management as the current landfill site, Kiteezi, comes to the end of its useful life. Priority has been placed on reducing and recycling waste as much as possible in order to effectively manage the predicted growth in volumes. This report analyses the various components of the waste chain, from organic waste to metals, marking the route of the components from waste to valued feedstock or end product. Great personal stories emerge of ingenuity and creativity, from artisans reshaping waste rubber and metals to the incomes generated from the complex and lengthy value chains of plastic. The incomes generated are more often than not ploughed back into the economy, from day to day living expenses to more substantial outgoings such as school fees being paid; showing just how essential these value chains are to the economy. The report recommends possible interventions to improve values within chains, from extraction of plastic at an earlier point in the waste cycle to improving enabling environments for artisans working with rubber and metal.

This report would not have been possible without the valued input provided by the many contributors. I would like to thank the following for their time and assistance; KCCA management, the National Environment Management Authority (NEMA), CBOs such as Rubaga and Makindye, Plastic Recycling Industries Ltd (PRI), the private sector waste collectors - Nabugado, Homeclean and Kasasiro. Also, the time and information shared by members of the informal sector, from Rose – a street waste picker, Nalongo a broker in banana peel waste, Abbas the plastic waste broker and Raymond a shoe maker; to the representatives of the landfill waste pickers association.

As GGGI we look forward to using the data within this report to identify a pipeline of interventions that can increased diversion rates from landfill and by increasing values generated within the waste chains see improvements in collection rates.

Okubal Peter James Ejokuo  
Country Representative - Uganda
Executive Summary

This Report presents the findings of a detailed Solid Waste Value Chain Analysis of Municipal Solid Waste (MSW) in Kampala conducted by Global Green Growth Initiative (GGGI) in December 2017. The project was initiated and funded by GGGI with the objective of providing robust data and information for the design and implementation of solid waste management interventions.

The Solid Waste Value Chain Analysis comprised a combination of desk study work and extensive semi-structured interviews of stakeholders in Kampala. These stakeholders included people, companies and organizations dealing with solid waste from waste collectors and waste pickers at the landfill through waste brokers and recycling companies to the relevant government authorities.

Kiteezi landfill is the only licensed waste disposal and treatment facility in Kampala and it is currently operating over capacity. According to the GGGI Waste Management Policy document 2017, the rate of solid waste generation in Kampala in 2015 was 3,206 tons per day and is expected to increase to 4,739 tons per day by 2030. While Kampala City Council Authority (KCCA) spends 8.5Bn/= annually on waste collection and disposal, only 45% of the total waste generated is being collected or managed properly, which creates a public nuisance and raises public health concerns.

There are more than 3,000 people involved in and employed in the informal sector which deals with solid waste. This informal sector is mainly involved in the collection and sorting phases of the solid waste cycle including waste collection truck loaders and waste pickers at the landfill. Several waste brokers are also operating in the informal sector. Within the formal private sector there are 100+ companies registered as recycling companies in Uganda.

It is evident that there are well established solid waste value chains for key solid waste streams such as metals, banana peels, paper, cardboard and plastics. These value chains stretch from the initial collection (mainly by the informal sector) through to final recovery and recycling either in-country or through export. These value chains also support profitable businesses processing and trading these key waste streams, thus demonstrating a robust commercial and operational foundation on which additional value chains could be developed.

A significant gap in the solid waste management system is for organic waste (i.e. food waste from households). This waste stream constitutes 73% of waste arriving at the landfill, yet it is not being captured for recycling or recovery to any significant degree.

The industry is susceptible to external shocks such as a significant drop in oil prices which impacts negatively on plastics recycling, growing restrictions on importation of recyclables to China and the collapse of the carbon market.

The recommendations in this report focus on developing new value chains where none currently exists (i.e. for organic waste), improving infrastructure and public awareness. Note that the
recommendations do not seek to intervene in currently established value chains since these are functioning adequately. Other recommendations are encouraging segregation of waste at source, leveraging funding from large corporations by developing Corporate Social Responsibility (CSR) projects, professionalization of the informal sector by creating working hubs for groups of informal workers and creating community-based waste banks in the city.
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1 SCOPE OF WORK

1.1 Desk review and preliminary stakeholder analysis
The desk review revealed a highly fragmented industry with little integration among MSW actors and stakeholders and a high concentration of informal actors. Limited industry information made it difficult to estimate number of actors and market sizes. The analysis revealed that waste segregation is dominated by small, informal actors while recycling is done by a few large recyclers and a few large groups of informal workers.

1.2 Semi-structured interviews
Based on the findings of the initial stakeholder analysis, data was collected through semi-structured interviews. The same questions were posed to informal and formal business actors but in very different formats. In very few cases, such as PET recycling, actors were able to specify capacity and market size in terms of number of actors and revenue.

1.3 Data collection, analysis and limitations
Primary and secondary sources of data were used. Primary data were obtained from KCCA management, National Environment Management Authority (NEMA) staff, International Finance Corporation (IFC) staff, members of the waste pickers association, metal foundry workers, rubber shoe makers, Community Based Organizations (CBO) involved in waste management, street pickers, landfill waste brokers, specialized waste brokers, plastic recycling firms, private collection companies, households in each of the divisions and people working or living near open dumpsites. Secondary data were obtained from the review of academic research journals, government documents, books, and consultancy reports.

In some cases, key informants either had incomplete knowledge or were unwilling to share information; and even when they did, the data they presented seemed exaggerated when compared to that provided by similar informants. The aggregated figures therefore only present a picture of the valorized quantities identified in this process and are not presented in this report to be used as estimates.

2 STAKEHOLDER ANALYSIS AND MAPPING

2.1 Public Sector
Kampala Capital City Authority (KCCA) is responsible for collection, transportation, disposal and regulation of solid waste management in the city. KCCA operates as a waste collection company to supplement the capabilities of the private collectors, especially in informal settlements and other hard to reach areas.

NEMA is the regulator and is responsible for developing regulations and standards for waste management in Uganda as well as issuing operating licenses for companies in the waste management sector. NEMA also occasionally implements development programs to encourage cities to deal with waste efficiently.
2.2 Private sector

2.2.1 Collection companies
There are over 50 waste collection companies in Uganda. Kampala city is divided the city into 7 zones and three private companies have 5-year concessions to collect waste in specified zones.

2.2.2 Recycling companies
Recycling activity in Kampala is still happening on a small scale. There are 4 large recycling companies who manufacture PET flake mostly for export to China and to a lesser extent, recycle HDPE blow to feed local manufacturing of plastic products such as jerry cans, basins, and bottle caps. Paper and cardboard recycling is also happening at a small scale, whereas metal is the most established recycling industry in Uganda, driven by growth in the construction industry as well as welding and fabrication in the informal foundry sector.

The Kavera industry has experienced turmoil, with a government ban that government has not been successful in implementing. The industry has a lobby group - Uganda Plastic Manufacturers and Recyclers Association (UPMRA) comprised of 45 manufacturers and recyclers of Kavera.

Recycled materials including metal, paper, and plastic make their way to manufacturing plants around Kampala for use in production. Organic waste that is turned into compost ends up in small farms while that which is turned into briquettes is used by institutions such as restaurants and schools for cooking.

2.2.3 Waste segregation by the informal sector
The informal sector is deeply involved in the waste sector in Kampala. Street pickers, loaders (waste collection company employees) and landfill waste pickers do all of the waste segregation in Kampala. Informal waste brokers buy this segregated waste and sell it to the recycling industry.

2.3 International organizations
There are various international organizations working in the waste sector in Uganda including the World Bank/IFC, which is acting as a financial advisor to KCCA in securing financing for a new landfill in Ddundu. The European Union (EU) is peripherally involved through their Switch Africa Green project (SAG) which is focused on promoting Sustainable Consumption and Production in Africa. United Nations Development Program (UNDP) has also dabbled in this space.

2.4 Civil society
There are 40+ Non-Governmental Organizations (NGOs) and Community Based Organizations (CBOs) actively involved, often in partnership, in the implementation and development of sanitation and solid waste activities. Their results are, however, limited by financial, policy and political challenges in implementing successful sanitation and solid waste collection projects. Below are a few examples of NGO/CBO activity.

Living Earth Foundation run a program called Waste to Wealth in Uganda from 2010-2015. The project was funded by EU, UK Government’s Department for International Development (DFID) and Comic Relief. The program encouraged slum dwellers to deal in the collection of plastic waste and recycling organic waste through composting and Briquette making. Through the African Urban Enterprise Development Program
(AUEDP), the program trained entrepreneurs and managers of small and medium-sized enterprises (SMEs) in business management. In addition, the program trained Local Government officers on best practices in establishing public-private partnerships with micro enterprises working in the field of waste management.

GIZ is involved through its International Water Stewardship Program (IWaSP), is working to improve water resource management, including the provision of drinking water and sanitation, and to promote sustainable water usage in the country.

Plastic Recycling Industries Uganda Limited (PRI), the largest plastic recycling company in Uganda, in partnership with KCCA, has created a model that creates and supports a CBO to collect plastics at the household level.

### 3 WASTE VALUE CHAIN MAPPING

#### 3.1 Generation

Low income neighborhoods generate 62% of total waste due to their high population density. For the most part, collecting in these areas is done by KCCA as the residents of these areas have a low willingness to pay and therefore, private contractors are not incentivized to collect there.

#### 3.2 Composition

Composition of waste is difficult to ascertain due to the informal nature of waste segregation that is currently taking place. For the most part, segregation is done between the source and the landfill. The numbers shown in this chart reflect the waste arriving at Kiteezi landfill. There needs to be a study to determine composition of waste at source.

#### 3.3 Collection

NEMA records show that there are 35 licensed waste collectors in Kampala, yet it is estimated that only 45% of total waste generated in Kampala is collected by waste collection companies and KCCA, the rest being dumped in dumpsites and disposed of in trenches around the city. Even though this is a marked improvement from 40% in 2014, it hardly matches the rapid growth in population and waste generation per capita, which has increased by 12% since 2014 (from 0.34kg to 0.38kg per person per day in 2018).¹

---

¹ Kampala Waste Treatment and Disposal PPP project, IFC (Investor Presentation, Dec 2017)
3.3.1 Private waste collectors
In June 2015, KCCA divided the city into 7 zones and awarded three private waste collection companies 5-year concessions that give exclusivity to the concessionaire to collect all waste in a well-defined geography within the city. According to the contract, private companies can charge households from 3,000/= up to 30,000/= ($0.80 – $8.30) per month for waste collection depending on quantity and frequency of collection. Details on the three concessionaires are below.

I. Nabugabo: Founded in 1998, Nabugabo has a fleet of 26 trucks and 360 employees, serving an area with a population of 52,000 or 9,000 households and 12 parishes. This company has recently secured $1.1mm of debt capital to expand its fleet of trucks.

II. Homeclean: Founded in 2001, Homeclean has a fleet of 40 trucks and 400+ employees. This company has grown capacity from 5 owned trucks to 40 trucks through a sub-contracting model, working with smaller companies, who are required to brand their trucks and operate under the Homeclean brand.

III. Kasasiro: A consortium of 31 informal waste collectors formed out of a need to consolidate capacity to compete for the KCCA concession. The consortium has struggled with corporate governance issues and failed to align the interests of its partners. These governance issues have resulted in low collection rates and managerial squabbles.

### Table: Collection Company Data

<table>
<thead>
<tr>
<th>Collection Company</th>
<th>No. trucks</th>
<th>No. workers</th>
<th>No. female workers</th>
<th>Quantities Recovered in 2017 (tons)</th>
</tr>
</thead>
<tbody>
<tr>
<td>KCCA</td>
<td>24</td>
<td>n.a</td>
<td>n.a</td>
<td>263,126</td>
</tr>
<tr>
<td>Nabugabo</td>
<td>26</td>
<td>360</td>
<td>90</td>
<td>65,846</td>
</tr>
<tr>
<td>Homeclean</td>
<td>40</td>
<td>400</td>
<td>200</td>
<td>58,691</td>
</tr>
<tr>
<td>Kasasiro</td>
<td>19</td>
<td>103</td>
<td>10</td>
<td>28,660</td>
</tr>
<tr>
<td>Errant companies</td>
<td>40</td>
<td>n.a</td>
<td>n.a</td>
<td>64,759</td>
</tr>
<tr>
<td>Total</td>
<td>149</td>
<td></td>
<td></td>
<td>481,082</td>
</tr>
</tbody>
</table>

(1) Reflects snapshot as of December 2017 (not full year)

Source: Company interviews and data provided by KCCA

Legal issues and “Errant Companies” - Some companies who did not participate in the bidding process have challenged the validity of the KCCA waste collection concessions and continued to collect waste in the gazetted...
areas. KCCA refers to these companies as “Errant companies” and they include some of the oldest names in waste collection such as BINit, NOREMA and newer ones such as Asante. When KCCA failed to enforce exclusivity, tensions between concessionaires and errant companies escalated into deadly violence. Recently, the courts ruled in favor of BINit on some of the complaints, but the matter is still largely unresolved.

### 3.3.2 KCCA as a collection company

KCCA is the largest collection company with capacity of 24 trucks. In 2017, KCCA spent 5.3Bn/= ($1.5mm) to collect 263k tons of waste or 55% of the total waste delivered to the landfill. In total, the private sector collected 45%. The three concessionaires accounted for 32% while errant companies accounted for 13%. Private sector participation has increased dramatically from 33% in 2016 and 30% in 2015 and is expected to continue to increase as the concessionaires slowly increase their capacity and improve efficiency. However, even with sufficient capacity, private sector players are faced with numerous challenges and KCCA will remain the largest collector if these persist.

### 3.3.3 Challenges faced in collection of MSW

Below are some of the reasons contributing to the low waste collection rates:

I. **Low willingness to pay:** Low income households, mostly in semi-formal and slum areas, make up a significant portion of the households in Kampala. These households find the waste collection fees too high and moreover, KCCA has failed to enforce payment in these areas due to political pressure. Concessionaires are therefore more incentivized to collect waste in wealthier suburbs and from institutions that are willing to pay for the service, leaving KCCA to fill the gap.

II. **Poor infrastructure:** In many slum areas and informal settlements, there are no access roads. In such cases, collection trucks use the “bring to truck” model, where residents either take their own trash to the truck and pay 500/= ($0.13) to a local porter to transport their trash on a wheelbarrow to the truck. This can end up being more expensive than paying a waste collection company depending on how many times they dispose of trash. A classic case of the price of being poor.

Due to poor infrastructure, open dumpsites are commonplace in high population areas. In 2015, there were 59 illegal dump sites in Kampala, 133 unofficial temporary storage sites (these are acknowledged by KCCA but not formally designated for waste storage), and 35 official temporary waste storage locations (these are officially recognized by KCCA)².

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² Mapping out the solid waste generation and collection models: The case of Kampala City, Kinobe (2015)
A man walks past an open dumpsite in Namuwongo slum of Kampala

Open dumpsites such as the one shown in the picture above are more common in high population areas such as Kawempe division, which houses almost 40% of all dumpsites in Kampala. Rubaga houses 50% of all the illegal dumpsites. Makindye had the least number of dumpsites.

III. Hostile political climate: In certain areas (especially the most impoverished ones), local politicians gain political favor by discouraging citizens from paying waste collection fees, claiming that it is the duty of KCCA to collect waste at no fee.

IV. Citizens lack sensitization: Waste management is a relatively new concept in Kampala and many people still do not understand the value of organized waste management systems. It is common to see a driver/passenger throw an empty can out of the window on the highway and littering in
the streets is quite acceptable. Furthermore, about 70% of Kampala residents are renters who shifthouses frequently. It is therefore necessary to carry out sensitization campaigns several times a year in the same community, which waste collectors find too costly.

V. Collectors have limited capacity. Concessionaires are still building their internal capacity in terms of number of trucks and workforce necessary to cover their zones. It is also clear from the volumes collected that their efficiency is still lower than that of KCCA.

3.4 SEGREGATION

3.4.1 Loaders
Nearly all waste collected from households and institutions is mixed or unsorted waste. When a waste collection truck picks up waste, the collector’s employees or “Loaders” quickly rummage through the waste and extract as much of the valuables as possible; most especially plastics (e.g. PET bottles, plastic containers, polyethylene bags or “kavera”) and metal (e.g. aluminum, copper and steel).

The loaders pack the valuables into separate bags and tie them atop the collection trucks and sell them to waste dealers located on the roadside in-route to Kiteezi landfill. Since sorting is not part of their official job description, the loaders’ segregation efforts are minimal and haphazard which is why much of the valuable waste ends up in the landfill after all.

3.4.2 Landfill scrap dealers
On the last stretch of road nearing Kiteezi landfill, there is a row of scrap dealers who weigh and buy the bags of mixed recyclables off the trucks at a fixed price of 200/= ($0.06) per kilogram. There are about 14 such businesses on the roadside, 10 of which are female owned. These businesses employ on average 4 workers each, who earn 6,000/= ($1.67) per day; more than half of the employees are women. These scrap dealers are organized under the Scrap Association and their take home profit in can be up to
Scrap dealers clean and further sort the waste for sell to recyclers or larger brokers.

### 3.4.3 Street pickers

Street pickers are itinerant waste pickers who roam around neighborhoods in the city collecting recyclable waste for sale to waste brokers or recyclers. This group of people is mostly comprised of unemployed women and youth and some have found modest success despite the stigma they face from participating in waste picking.

### 3.4.4 Landfill pickers

At Kiteezi landfill itself, there are 1,000+ waste pickers manually sorting through the waste and picking out the most valuable items for sale to waste brokers. These pickers are organized under the Landfill Waste Pickers Association, which has 500 registered members, 78% of whom are women. The clear majority live around the landfill and about 60% of them moved to Kiteezi mainly for the business of waste picking. About 300 members show up daily (the equivalent of full time), and 250 of them pay membership fees to the organization. Most of the waste pickers are independent workers but a fraction of them are employed directly by scrap dealers for a daily wage of 6,000/= ($1.67). The pickers sell the waste to specialized scrap dealers who are usually located near the landfill themselves, and are typically specialized in one sub-value chain e.g. cardboard or PET etc.

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3 Source: Interview with the Chairman, Landfill Waste Pickers Association

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Rose, a street picker stands outside her home, which also doubles as a plastic waste storage facility in Namuwongo slum

*Before people knew the value of waste, most people treated me like a mad woman, but I have managed to educate my children. My eldest is in S.5*”

…………………

Rose, Street Picker
3.4.5 Community Based Organizations (CBO)

The CBO model is new to Kampala’s MSW sector. It was introduced by Plastic Recycling Industries (PRI), the largest plastics recycling company in Uganda, structured as a partnership between PRI, KCCA and members of civil society, organized as a CBO. The goal of the partnership is to establish 10 plastic waste collection centers in different zones of the city by the end of 2018.

KCCA provides the land on which the centers are constructed. PRI has committed 175million/= ($49,000) in total construction costs for all ten centers. PRI also serves as a reliable market for all collected plastics and has pledged to buy them at market prices. The CBO is made up of community members, mostly women and youth, and it is responsible for operating the collection centers i.e. collecting, cleaning and packing plastics and finally selling them to PRI.
These centers are aimed at increasing collection and recycling of plastics and some are already showing positive results. Only two centers are already in operation. Rubaga, which has been in operation for only 6 months now supplies PRI with 10 tons of plastics per month, and Makindye, which has only been in operation for 4 months is currently supplying 3 tons of plastics per month. The Rubaga CBO, at its current capacity (which is expected to improve), is on track to make 60million/= ($17,000) in 12-month revenue.

As the CBOs improve their capacity and efficiency, their revenue is expected to increase significantly. Rubaga is eventually expected to supply 4-6 tons of plastic per week, which translates to 120mm/= ($33k) in annual revenue. The positive performance of these collection centers is highly encouraging given that currently, PRI’s largest suppliers deliver no more than 8 tons of plastic per month. This success, though too early to gauge full results, serves as a case study to demonstrate the possibilities that lie in working with large corporates to create value through corporate social responsibility (CSR) projects that benefit both the corporation and society.

3.5 DISPOSAL

6.5.1 Kiteezi Landfill has capacity constraints

The Kiteezi landfill in Wakiso district (15km from Kampala City center) currently collects around 1,400 tons of waste a day from Kampala and it is owned and managed by KCCA. All waste collection companies are mandated to dispose of their collected waste in the Kiteezi landfill, the only licensed waste disposal and treatment facility in the Kampala area. Near Kiteezi landfill, there are domestic residences, vacant land and plastic recycling workshops. A 6m weighbridge was installed at the entrance of the landfill but it operates infrequently due to mechanical challenges since 2011. The landfill was initially designed with a total surface...
area of 0.04 km\(^2\) but was recently extended beyond its capacity to reach 0.11 km\(^2\). Additionally, Kiteezi is in a wetland and some parts of the landfill do not have a liner. Therefore, untreated leachate from the landfill discharges directly underground, threatening water supplies (Kinobe, 2015).

### 3.5.2 KCCA plans for a new disposal and treatment facility
To address the capacity issues at Kiteezi landfill, Kampala City Council Authority (KCCA), with the International Finance Corporation (IFC) as its transaction advisor is putting together a Public Private Partnership (PPP) to close Kiteezi landfill and design, build, operate and maintain a new landfill at Ddundu. The project proposes remediation, closure and aftercare of the existing disposal site, construction and maintenance of a transfer station with an associated weigh bridge and treatment and or Pre-Treatment of the waste delivered to achieve KCCA diversion from landfill targets, if feasible at the existing Kiteezi landfill site.

The PPP transaction is expected to close in June 2018 and cost between $30mm and $100mm to develop and run for 20 years, depending on the type of technology deployed. It proposes that waste be transported from Kiteezi to the new landfill site in Ddundu (30km distance) where the investor is expected to construct, operate and maintain an engineered sanitary landfill for disposal of treated and untreated municipal waste.

The project strongly encourages proven methods of diverting waste away from the new landfill as much as possible.

Due to strict provisions on the maximum amount of waste that can be buried in the new landfill, it is expected that the private investor will be incentivized to divert waste away from Kiteezi. It is therefore possible that the investor will work with any actor that is working to divert waste from the landfill including waste collection companies, recyclers, civil society etc.

### 3.5.3 The landfill waste picker problem
At the investor conference in December 2017, the elephant in the room was the fate of the 1,000+ landfill waste pickers who make a living off the Kiteezi landfill. These waste pickers are organized under the Landfill Waste Pickers Association, with over 500 registered members, 78% of whom are women. Most of them live around the landfill and about 60% of them moved to Kiteezi primarily for the business of waste picking. About 300 members of the organization are known to show up daily (the equivalent of permanent workers) while the rest work part time. Half of its registered members pay membership fees to the organization. Membership perks include group savings schemes and the group helps cover funeral expenses for its members and their families through voluntary member contributions.

When the IFC project commences, the landfill will be inaccessible to these waste pickers putting them out of work. It is expected that they will try to gain access to the landfill illegally but KCCA believes that it has the means to enforce the new policy by fencing off the landfill and restricting access. This however, poses various risks to the different stakeholders - operational risk for the investor, political risk for KCCA and reputational risk for IFC. At this point, IFC does not have a solution to the problem and is looking to local institutions e.g. Makerere University for “home-grown” ideas.

IFC has also informally invited GGGI to help in forging a way forward on this issue. It is important to note that IFC was initially skeptical of GGGI’s involvement under the assumption that GGGI was preparing a parallel intervention in the waste management sector. This misconception has been cleared and the expectation is that interventions by both organizations will be cohesive and complimentary to each other.
### 4.1 Plastic

The chart below shows the various types of plastics that exist in the waste stream of Kampala. It also shows their level of availability on the market and whether they are recycled in Uganda.

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Acronym</th>
<th>Full name</th>
<th>Common uses</th>
<th>Availability / Recycled</th>
<th>Common uses of recycled materials</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>PET</td>
<td>Polyethylene terephthalate</td>
<td>Mineral water and soda bottles</td>
<td>High / Yes</td>
<td>Clothing, vehicle upholstery</td>
</tr>
<tr>
<td>2</td>
<td>HDPE</td>
<td>High density polyethylene</td>
<td>Jerry cans, basins, plastic cups, toiletry bottles</td>
<td>High / Yes</td>
<td>Plastic bottles, jugs, outdoor furniture</td>
</tr>
<tr>
<td>3</td>
<td>PVC</td>
<td>Polyvinyl chloride</td>
<td>Rigid packaging, pipes, flooring</td>
<td>Low / No</td>
<td>Pipes, floor tiles, mats, hotel key cards, credit cards</td>
</tr>
<tr>
<td>4</td>
<td>LDPE</td>
<td>Low density polyethylene</td>
<td>Grocery bags, cling wrap, bread and trash bags, hospital drip bottles</td>
<td>Medium / Yes</td>
<td>Compost bins, trash cans, floor tiles</td>
</tr>
<tr>
<td>5</td>
<td>PP</td>
<td>Polypropylene</td>
<td>Yoghurt + margarine containers, bottle caps; 85% of total plastic packaging</td>
<td>High / Yes</td>
<td>Storage bins, mixing bowls, car battery cases</td>
</tr>
<tr>
<td>6</td>
<td>PS</td>
<td>Polystyrene</td>
<td>Foam meat &amp; fish trays, egg cartons, plates, cups</td>
<td>Low / No</td>
<td>Egg cartons, picture frames, home décor, foam packaging</td>
</tr>
<tr>
<td>7</td>
<td>Other</td>
<td>Any other plastics</td>
<td>Any other plastics</td>
<td>Low</td>
<td>Depends on resin</td>
</tr>
</tbody>
</table>

#### 4.1.1 Segregation

There is increased awareness about the value of collecting plastics for recycling and there are many people in the informal sector who are involved in the segregation of plastic waste in Kampala.

As mentioned above, collection company employees or loaders are usually the first point of segregation. They extract plastics and other recyclable materials from each bag of waste and pack them in separate bags, which are then tied atop the collection truck. The process is very hurried and thus inefficient because the activity of segregation is for their own private benefit and not for the collection company that employs them. They then sell the bags of recyclable waste to landfill brokers along the road to Kiteezi.

Landfill brokers then clean and do a more thorough segregation of the waste and sell the final product (clean plastic material) to recyclers.

Street pickers, who are either independent or contracted by large waste brokers walk around neighborhoods in search of discarded plastics, which they pack and sell to specialized brokers who usually have storage facilities where they aggregate volumes provided by street pickers and after they aggregate large volumes, then pay for a truck to transport the material to their client, usually a plastic recycling plant such as PRI. The recycler weighs and sorts through the material to determine if it is in good condition and typically pays the broker in cash within 2-3 days of delivery.

Finally, landfill pickers at Kiteezi extract any plastics from the landfill and sell them to landfill brokers. By the
time the waste gets to Kiteezi landfill, most of the plastic has been extracted as much of the segregation of plastic happens upstream.

4.1.2 Recycling
There are over 30 companies registered as plastic recycling companies in Uganda. Most of these are engaged in recycling of PET, Polyethylene (both HDPE and LDPE) and Polypropylene (PP).

4.1.2.1 PET Bottles
PET is the most recycled plastic in Uganda. Four major companies are involved in turning PET into PET flake for export to China and India mainly for use in making polyester fabric. The four companies export ~582MT in total per month, worth $250k. The largest recycler of PET is PRI, an offshoot of Coca-Cola with 45% market share of PET exports operating at 50% capacity.

---

Annual volume of exports (metric tons)

<table>
<thead>
<tr>
<th>Company</th>
<th>Volume</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chinese</td>
<td>132</td>
</tr>
<tr>
<td>PRI</td>
<td>261</td>
</tr>
<tr>
<td>Aquila</td>
<td>66</td>
</tr>
</tbody>
</table>

Source: PRI
China’s ban on recycled plastics

In a July 18 filing with the World Trade Organization (WTO), China’s Ministry of Environmental Protection announced that it will ban the importation of 24 categories of recyclables and solid waste by end of 2017. The ban, which is part of a campaign against yang laji or “foreign garbage” applies to textiles, mixed paper and plastic, which includes recycled PET, PE, PVC, PS and other plastics. The impact is far reaching as China has been the dominant market for recycled plastic, taking 51% of the world’s recycled plastic. Alternative markets include India and South Korea.

In Uganda, the effects are already being felt by the four major exporters of recycled plastic. The four are PRI, Standard Plastics, Aquilla and a Chinese recycling company. Altogether, these recyclers have been exporting a total of about 582 Metric Tons of recycled PET flake to China. At a price of $430 per metric ton, the total annual revenue of the industry is $250k.

According to a statement from China Scrap Plastic Association said in November 2017, the Chinese government may allow importation of some grades of clean material if they can be used directly in manufacturing. Such materials may include hot washed PET flake, which fetched even more than unwashed flake.

Recyclers are finding modest success in entering new markets mainly in India but the prices in India are about 28% lower than prices in China. Larger ones such as PRI are considering value addition and other manufacturing options as an alternative to exporting PET flake.

4.1.2.2 HDPE

Most plastic recyclers also recycle used jerrycans, plastic plates etc. used in making new products. 22% of PRI’s recycling material is HDPE (its second largest product). HDPE is not easily available, and its scarcity is reflected in its price of 850/= to 1,050/= ($0.24 - $0.29) per kg. This may be due to the long-lasting nature of the products e.g. jerrycans, plastic plates etc. The recycled resin is sold locally to manufacturers such as Victoria Nile (for Jerrycans), Mukwano (for bottle caps), and even local plastic floor tile manufacturers.

4.1.2.3 LDPE (Kavera)

Kavera is the most commonly used plastic shopping bag in Uganda but in 2009, the government of Uganda, through NEMA, banned the importation, manufacture and use of polythene bag of gauge 30 microns and below, popularly known as “kavera”. The issues cited as reasons for the ban included clogging of water channels and impeding smooth water filtration and percolation into the soil. However, NEMA has since failed to enforce the ban due to a strong lobby group from recyclers and manufacturers of Kavera. The lobby group, Uganda Plastic Manufacturers and Recyclers Association (UPMRA) is made up of 45 members and claims to have the support of Uganda’s Ministry of Trade as well as KCCA.

UPMRA claims that there are currently 30+ kavera recycling plants in Uganda who have invested over $45mm in machinery and provide direct employment to 3,000 people and indirectly to 10,000+ others. The machinery used to make kavera is not fungible and therefore these plants cannot easily switch from manufacturing kavera to manufacturing other products. The recyclers buy the raw material from street pickers and landfill waste brokers, and per UPMRA, produce a total of 2,500+ tons of recycled material per year.
It is important to note that a kavera ban has been successful in neighboring countries namely Kenya and Rwanda. While it took Kenya three attempts over ten years, it finally passed the ban in Q3 2017. In Rwanda, plastic bags have been banned since 2008. In Uganda, the manufacture of kavera is still ongoing despite the ban, albeit much uncertainty.

4.1.3 Prices along the plastic value chain

Given than prices are derived from byproducts of petroleum, the final price of recyclable plastic is positively correlated with the price of oil; prices today are 75% lower than they were during the oil price peak in 2011.

CASE STUDY: ABAAS THE SUPER BROKER (PLASTIC)

Abaas is the biggest individual “stockist” or raw material supplier of plastics to PRI, the largest plastic recycling company in Uganda. He delivers approximately 12 tons of PET and HDPE to PRI every month.

Abaas started his business in 2009, when he heard an advertisement on a local radio station, calling for citizens to get involved in plastic collection for recycling. He has since built a business that employs 10 people and makes about $2,400 in monthly revenue with $380 profit or 16% profit margin.

He rents 4 warehouses in different neighborhoods of Kampala and has a network of women and youth street pickers who collect plastics from trenches and dumphsites in the area and bring them to his warehouses. Each warehouse is run by a manager who pays the street pickers cash upon delivery for their plastics. The warehouses serve as storage and aggregation points until Abbas has collected at least 1 ton of plastics. At that point, he rents a truck which delivers the plastic to PRI in Nakawa. PRI’s payment terms are 2-3 days, during which PRI goes through the plastics to perform quality control and determine the category composition for pricing purposes (PET vs HDPE).

KCCA has an existing program that could provide free transportation services for entrepreneurs like Abaas but he complains that the trucks are never available when needed so he rents a private truck instead of waiting for the KCCA truck.

One of his main challenges is a fluctuating market price of used plastic, which has fallen by 75% from its peak of 700/= ($0.19) per kg in 2011 to the current market price of 400/= ($0.11) per kg. Other issues are high transportation costs and working capital constraints, which are about $1,700 a month. He takes home a profit of ~$380 per month in profit. A breakdown of his PnL is shown in the chart below. There are about 7-10 entrepreneurs operating on the same scale as Abaas i.e. supplying the same volumes to PRI.
4.2 ORGANIC

4.2.1 Segregation

Organic waste is the least valorized waste stream and most of it ends up in Kiteezi landfill, apart from green banana peels also known as “Bikuuta”. Matooke (green banana) is the main staple food of Uganda and as such, matooke peels make up a large chunk of the organic waste in Kampala. Small restaurants and hotels are major generators of matooke peels, especially in high population neighborhoods e.g. markets and slums.

Itinerant brokers buy the waste from small restaurants and sell it to organized groups of roadside brokers, such as the Bikuuta group featured in the case study below. These groups sell their inventory to farmers to use as animal feed or convert it into compost or mulch to improve the quality of soil. These groups are usually located strategically along major highways that lead out of Kampala to various up-country farming regions. Most of the roadside brokers do not have permanent locations and are sometimes evicted from the premises by KCCA. Other challenges include lack of storage, high costs of transportation, and lack of technology and know-how to add value to the waste.

Organic fertilizers can be made from organic waste but the market for organic fertilizers in Uganda is insignificant because most farmers believe that Uganda’s soils are fertile as is and therefore, do not need fertilizer. In addition, when they do need fertilizer, most farmers will choose a synthetic fertilizer because imported synthetic fertilizers are well marketed. The price of organic fertilizer is 10/= per kg. A community initiative called “Kasanvu” was formed by a former employee of KCCA in the slum of Namuwongo but has failed to take off due to the low prices of compost.

Another project was funded by the World Bank and implemented by NEMA to support 12 municipalities/secondary cities in Uganda (Kampala was not included in this project) to develop composting capabilities. The project was registered as a CDM project and the cities went through one emissions reduction verification process and received a $215k payout for 15,425 metric tons during the period 2010 – 2012. The World Bank was the buyer for this first tranche. Since then, the carbon market collapsed, and prices fell from $12 to $3. The cities are still struggling to find buyers. This has demoralized the cities especially having spent over $100k to register the project.
**CASE STUDY: THE BIKUUTA GROUP (ORGANIC WASTE BROKERS)**

The Bikuuta group was formed in the year 2000 by Nalongo, a female broker, to focus on trading in banana peels in Mulago, along the Masindi highway just outside the city.

The group currently has 17 members (12 women). They buy sacks of banana peels from a network of itinerant dealers who source the peels from local restaurants around large markets. Members pool their resources to pay for inventory and transportation and remain wary of the high interest loans offered by micro finance groups.

Their client base is mostly made up of farmers who own farms on the outskirts of Kampala and along Masindi highway. The group’s highway location is advantageous because farmers often make a stop to buy peels en route from the city to their upcountry farms.

Their main challenges include lack of a permanent location as the location they occupy now is on public land and KCCA has evicted them in the past. Another issue is the high transportation costs. The group believes that owning a truck would increase sales and allow them to distribute to their clients across the farming regions. Also, the group has limited knowledge of sales and marketing and their marketing efforts are limited to their children interning as sales agents during school vacations.

In their spare time, the members cut up the banana peels into small pieces, which they sell as chicken feed. This process is labor intensive but almost 6x value to the peels. The group sells 200-500 bags per day depending on the season - high season is in January-February. Assuming all members work 30 days in a month (which is typical), sell all their inventory, and split costs and profits evenly, each member would take home 0.9mm/= ($265) in the low season and 2.4mm/= ($662) in the high season.

### Table: Financial Data

<table>
<thead>
<tr>
<th></th>
<th>Low season</th>
<th>High season</th>
</tr>
</thead>
<tbody>
<tr>
<td>Price of peels / bag</td>
<td>5,000</td>
<td>5,000</td>
</tr>
<tr>
<td>Price of a sack (packaging)</td>
<td>300</td>
<td>300</td>
</tr>
<tr>
<td>Transportation cost / bag</td>
<td>1,000</td>
<td>1,000</td>
</tr>
<tr>
<td>Working capital / bag</td>
<td>6,300</td>
<td>6,300</td>
</tr>
<tr>
<td>Selling price / bag</td>
<td>9,000</td>
<td>9,000</td>
</tr>
<tr>
<td>Sales per day (# bags)</td>
<td>200</td>
<td>500</td>
</tr>
<tr>
<td>Group Revenue / day</td>
<td>1,800,000</td>
<td>4,500,000</td>
</tr>
<tr>
<td>Working capital / day</td>
<td>1,260,000</td>
<td>3,150,000</td>
</tr>
<tr>
<td>Profit / day</td>
<td>540,000</td>
<td>1,350,000</td>
</tr>
<tr>
<td>Group Monthly profit</td>
<td>16,200,000</td>
<td>40,500,000</td>
</tr>
<tr>
<td>Number of members</td>
<td>17</td>
<td>17</td>
</tr>
<tr>
<td>Member Profit / day</td>
<td>31,764.71</td>
<td>79,411.76</td>
</tr>
<tr>
<td>Member Profit / day (USD)</td>
<td>$8.82</td>
<td>$22.06</td>
</tr>
<tr>
<td>Member Monthly profit</td>
<td>952,941</td>
<td>2,382,353</td>
</tr>
<tr>
<td>Member Monthly profit (USD)</td>
<td>$264.71</td>
<td>$661.76</td>
</tr>
</tbody>
</table>

Source: Stakeholder interviews

There are 200+ Bikuuta traders in Kampala, with the potential to earn over $200 a month from the organic waste stream.
4.3 PAPER AND CARDBOARD

4.3.1 Segregation

Most paper and cardboard waste is generated by institutions, especially consumer packaged goods manufacturers e.g. Britannia and Riham. Waste brokers buy it directly from these institutions and sell it to local and regional recyclers.

Waste from households ends up at Kiteezi landfill and makes up 5% of total waste arriving there. Landfill waste pickers salvage any usable waste and sell it to brokers located near the landfill. Some of the landfill brokers employ waste pickers and pay them a daily wage of 7,000/= ($1.90) to collect as much paper and cardboard from the landfill as possible. The brokers sort, package, transport and sell the waste to recyclers in Kampala or export it to recyclers in Kenya.

In Q3 2017, Kenya banned the use of plastic packaging material and this dramatically increased the demand for recycled cardboard in Kenya, which is used to make paper shopping bags that replaced plastic ones. As a result, brokers in Uganda are exporting cardboard to Kenya and fetching 27% higher prices (FOB) than the local market.

4.3.2 Prices along the value chain

<table>
<thead>
<tr>
<th></th>
<th>Buying Price / kg (UGX)</th>
<th>Selling Price / kg (UGX)</th>
<th>Gross Profit %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cardboard - exports to Kenya*</td>
<td>100</td>
<td>331</td>
<td>231%</td>
</tr>
<tr>
<td>Cardboard - local market**</td>
<td>100</td>
<td>260</td>
<td>160%</td>
</tr>
<tr>
<td>Paper</td>
<td>600</td>
<td>800</td>
<td>33%</td>
</tr>
</tbody>
</table>

* On average ~4% of supply does not pass the quality control done by Kenyan buyers
** On average ~25% of supply does not pass the quality control done by local recyclers

Source: Stakeholder interviews
4.4 **METAL**

Metal is the most valorized waste stream. Scrap metal is classified as either ferrous or non-ferrous scrap. While ferrous metal (e.g. steel) contains some degree of iron, non-ferrous metal (e.g. Aluminum and copper) does not contain iron as a component. The three most recycled metals in Uganda are Steel, Aluminum and Copper; steel being the most established.

4.5.1 **Segregation**

In almost every neighborhood, there is a scrap dealer who buys obsolete scrap e.g. old cars, appliances, farm equipment etc. at an established spot price and sells it to individual metal workers or larger brokers for a small profit. The brokers then transport steel and aluminum for resale to factories that produce construction materials. Limited amounts of metal reach the landfill and they are collected by waste pickers and sold to individual metal workers or larger brokers at the spot price.

4.5.2 **Recycling**

Among recyclable products in Uganda, metal is the most established, making scrap metal the most valuable waste stream. It is nearly impossible to find scrap metal visibly discarded as it is a commodity whose value is well understood by the population.

**Steel (Ferrous Scrap)**

Globally, all new steel has a recycled content, and this can vary between 10 and 100% depending upon the availability and price of scrap, the specification of the steel and the steel production route. The global demand for new steel, however, exceeds the world scrap supply by an average factor of around 2x and so it is not currently possible to meet the demand for all new steel entirely from scrap (Bassam and Michael, 2006). About 14% of the energy necessary to produce virgin steel is avoided by the recycling process.
The formal sector

In Uganda, steel is the most recycled metal and it is an essential raw material in making new steel in the country. There are 12 registered steel mills in Uganda with a total annual capacity of 585ktons\footnote{Source: Executive Director, Roofings Rolling Mills; “Good outlook for Uganda’s steel industry in 2018” 1/9/2018}. The industry is largely focused on manufacturing construction materials e.g. steel bars for reinforcing concrete and steel roofing products.

The rapid growth of the construction industry has increased demand for steel which has resulted in fierce competition for scrap metal and price has increased by 78\% from 510,000/= ($142) per ton in 2010 to 907,000/= ($252) in 2017. Due to the shortage of good quality steel scrap in the county, recyclers will sometimes melt stock with variability in composition, which compromises the quality of steel.

That said, the general outlook of the industry is positive considering 300mm in new high-quality iron ore deposits recently discovered in Western Uganda. Furthermore, the advent of an oil and gas sector will give the industry access to cheap natural gas, used to remove impurities from iron ore. It’s currently sourced expensively from South Africa; Tanzania has huge gas reserves but lacks the transportation infrastructure to pipe it to Uganda.

A steel manufacturing plant in Uganda

The informal sector

There are over 2,000 workers (also known as “Jua Kali”) in the informal foundry markets such as Kisenyi, slum fabricating products out of metal. These Jua Kali buy raw material from local scrap dealers and fabricate a wide range of metallic goods ranging from saucepans, weighing scales, machinery, to motor spare parts. They work in large semi-permanent hubs across the city in suburbs such as Katwe, Kalerwe, Ndeeba, Nakulabye, Kivuulu,
Kagugube, Katanga and Mengo. Kisenyi alone has over 500 artisans working in highly unsafe conditions. With no protective gear, some have lost eyes from explosions during the metal smelting process. Furthermore, the hubs are on public land and it is probable that KCCA will evict them to make room for development.

The by-product of manufacturing (both formal and informal) such as stampings, turnings, and clippings, is called prompt scrap, and it accounts for almost half of all ferrous scrap supply. It is smelted to make new metal.
Aluminum (Non-ferrous scrap)

Aluminum is second to steel in amount of recycling in the market. Its segregation and recycling are identical to that of steel described above, with the same dealers and process. Recycling is done by both formal and informal sectors to make new products. There are about 20-30 aluminum metal recyclers in the formal sector of Uganda and over 2,000 foundry workers making goods out of Aluminum. The most common goods made of recycled Aluminum are saucepans, weighing scales, doors and windows and aluminum roofing sheets.

Copper is not recycled in Uganda, so it is exported to waste dealers in Kenya.

### 4.5.4 Prices of metal along the value chain

<table>
<thead>
<tr>
<th>Actor</th>
<th>Steel</th>
<th>Aluminum</th>
<th>Copper</th>
</tr>
</thead>
<tbody>
<tr>
<td>Street and landfill waste pickers</td>
<td>Buying</td>
<td>500 kg</td>
<td>-</td>
</tr>
<tr>
<td>neighborhood scrap dealers</td>
<td>Selling</td>
<td>700 kg</td>
<td>-</td>
</tr>
<tr>
<td>Large scrap dealers</td>
<td>Margin</td>
<td>0%</td>
<td>-</td>
</tr>
<tr>
<td>Exporters</td>
<td>Buying</td>
<td>3,000 kg</td>
<td>-</td>
</tr>
<tr>
<td>Recyclers</td>
<td>Selling</td>
<td>3,000 kg</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>Margin</td>
<td>50%</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>Buying</td>
<td>8,000 kg</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>Selling</td>
<td>12,000 kg</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>Margin</td>
<td>25%</td>
<td>-</td>
</tr>
</tbody>
</table>

### Notes

1. Only copper is exported to Kenya.
2. Recyclers of steel (both informal and formal) sell their prompt scrap e.g. clippings.

Source: Stakeholder interviews

### 4.6 RUBBER

Tires sent to landfills or dumped illegally are a significant concern. Old tires provide shelter for rodents, and can trap water, providing a breeding ground for mosquitoes. In landfills, tires consume up to 75% air space and may become buoyant and rise to the surface if they trap methane gases. This action can rupture landfill liners that are designed to prevent contaminants from polluting surface and ground water.

#### 4.6.1 Segregation

End of life tires have a well-established market in Kampala and most are diverted away from the landfill. They are normally stock piled in car garages until specialized waste brokers buy them at a price between 3,000/= and 12,000/= ($0.83 - $3.33) to and sell them to recyclers.

#### 4.6.2 Recycling

Recyclers include shoe maker associations and a military owned fuel making facility in Bombo.

There are 5 shoe maker associations in Kampala with ~200-300 members, mostly made up of young males with low levels of education. These associations are an opportunity for youth to acquire artisanal skills and earn a living. They are constrained by lack of permanent location as they are currently squatting on KCCA public land. They are often displaced to make room for development projects and cannot afford to rent their own space. A case study of an entrepreneur member of one such association is outlined in this report.
### 4.6.3 Actors and prices of rubber tires along the value chain

<table>
<thead>
<tr>
<th>Actor</th>
<th>No. of workers</th>
<th>No. of female workers</th>
<th>Average buying price (Ugx)</th>
<th>Average selling price (Ugx)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Car garages</td>
<td>n.a</td>
<td>n.a</td>
<td>0</td>
<td>1,000 - 12,000</td>
</tr>
<tr>
<td>Itinerant waste brokers</td>
<td>50-100</td>
<td>n.a</td>
<td>1,000 - 12,000</td>
<td>2,000 - 15,000</td>
</tr>
<tr>
<td>Shoemakers</td>
<td>200-300</td>
<td>30-50</td>
<td>2,000 - 15,000</td>
<td>n.a</td>
</tr>
</tbody>
</table>
CASE STUDY: RAYMOND THE SHOE MAKER

Raymond Ssekitowas an early member of the Mambule Shoe Makers Association in Bwaise. With 50 members, Mambule is the second largest rubber shoe makers association in Kampala after Kisekka Shoe Makers Association. Raymond joined Mambule in 2008 when he was still a full time secondary school student. He worked there during the holidays and used the proceeds to pay for his tuition. He later dropped out of school and joined as a full-time member of the association.

He currently makes a living making shoes of various styles out of end of life tires. He buys raw material from itinerant suppliers who purchase them from garages across the city and deliver them to his workshop for a small profit. He employs 5 people and often trains other youth in shoe making skills.

His challenges include lack of a permanent address. KCCA has evicted him several times and sometimes extorted money from him in exchange for protection. The uncertainty this causes negatively affects his business. He also needs working capital to purchase raw material and marketing skills but is afraid to take out high interest micro finance loans that are available on the market. Even though he has improved his shoe making skills through a training program run by an expatriate shoe maker, he cannot afford the more advanced machinery for tailoring to make better quality products. Lastly, he has neither the experience nor the time to carry out sales and marketing for his products.

Raymond makes a monthly profit of between 520,000/= and 900,000/= ($144 - $250) depending on the season. The high season coincides with school holidays as most of his clients are young children and adults. A rough breakdown of his profit and loss statement is shown in the chart below.

<table>
<thead>
<tr>
<th></th>
<th>Low season</th>
<th>High season</th>
</tr>
</thead>
<tbody>
<tr>
<td>Capacity: number of pairs per month</td>
<td>1,600</td>
<td>4,000</td>
</tr>
<tr>
<td>Average wholesale price per pair</td>
<td>2,000</td>
<td>2,000</td>
</tr>
<tr>
<td>Monthly revenue</td>
<td>3,200,000</td>
<td>8,000,000</td>
</tr>
<tr>
<td>Cost of raw material</td>
<td>1,400,000</td>
<td>3,900,000</td>
</tr>
<tr>
<td>Labor expense</td>
<td>1,280,000</td>
<td>3,200,000</td>
</tr>
<tr>
<td>Monthly profit</td>
<td>520,000</td>
<td>900,000</td>
</tr>
</tbody>
</table>

All currency in UGX

Source: Stakeholder interviews
4.7 **INCOME GENERATION ALONG THE VALUE CHAIN**

Below is a table showing the various actors in the waste value chain of Kampala and a range of their estimated monthly income. Clearly, women are present in the most highly paying areas of waste in Uganda. They are less present among metal foundry and waste collection loader jobs possibly due to the amount of physical exertion required to perform these jobs.

<table>
<thead>
<tr>
<th>Actor</th>
<th>Number of actors</th>
<th>Women (% of total)</th>
<th>Income per month (UGX)</th>
<th>Income per month (USD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Street waste pickers</td>
<td>1,000+</td>
<td>70%</td>
<td>Low: 100,000 High: 300,000</td>
<td>Low: $28 High: $83</td>
</tr>
<tr>
<td>Landfill waste pickers</td>
<td>1,000+</td>
<td>80%</td>
<td>Low: 168,000 High: 600,000</td>
<td>Low: $47 High: $167</td>
</tr>
<tr>
<td>Itinerant waste brokers</td>
<td>100-200</td>
<td>20%</td>
<td>n.a High: n.a</td>
<td>n.a High: n.a</td>
</tr>
<tr>
<td>Scrap dealers - organic waste</td>
<td>200 - 300</td>
<td>90%</td>
<td>Low: 1,000,000 High: 2,000,000</td>
<td>$278 High: $556</td>
</tr>
<tr>
<td>Scrap dealers - plastic waste</td>
<td>200-250</td>
<td>75%</td>
<td>Low: 800,000 High: 1,300,000</td>
<td>$222 High: $361</td>
</tr>
<tr>
<td>Scrap dealers - metal waste</td>
<td>300-500</td>
<td>10%</td>
<td>n.a High: n.a</td>
<td>n.a High: n.a</td>
</tr>
<tr>
<td>Shoemakers - rubber waste</td>
<td>200-300</td>
<td>15%</td>
<td>Low: 500,000 High: 900,000</td>
<td>$139 High: $250</td>
</tr>
<tr>
<td>Recyclers - plastic waste</td>
<td>30-40 (1)</td>
<td>80%</td>
<td>Low: 250,000 High: 372,000</td>
<td>$69 High: $103</td>
</tr>
<tr>
<td>Recyclers - metallic waste</td>
<td>25-40 (1)</td>
<td>5%</td>
<td>Low: 250,000 High: 700,000</td>
<td>$69 High: $194</td>
</tr>
<tr>
<td>Metal foundry workers</td>
<td>5,000+</td>
<td>2%</td>
<td>Low: 400,000 High: 1,000,000</td>
<td>$111 High: $278</td>
</tr>
<tr>
<td>Waste collection loaders</td>
<td>500-700</td>
<td>2%</td>
<td>Low: 150,000 High: 200,000</td>
<td>$42 High: $56</td>
</tr>
</tbody>
</table>

(1) Number of firms

5 **GAPS IN THE VALUE CHAIN**

Generally, most recyclable materials are being recovered at different stages of the waste management cycle, albeit inefficiently, except for glass, organic waste, PET and construction and demolition waste.

**Organic waste** makes up most of the waste in Kampala, yet it is the least valorized stream. The composting market is almost non-existent due to fertility of the soils in Uganda.

**Glass** is not allowed in Kiteezi landfill and there is currently no known recycling in this industry. Some collectors have collected thousands of glass bottles over the years in hope that one day they could find a market for them.

**Construction and demolition** waste is currently dumped illegally or left by construction site after extracting all the metal waste.

**Financial services**: Most of the informal players in the sector are entrepreneurs who need access to finance for working capital or to finance growth; yet most of the ones interviewed preferred not to take the microloans readily available on the market citing high interest rates that they perceived as very risky. Since most of the players in the informal sector are not highly educated, it is safe to assume that this fear is due to a lack of understanding of the available sources of capital, which presents an opportunity to educate them on business fundamentals.

**High transportation costs**: KCCA has a few trucks assigned to transport aggregated waste from brokers to recyclers but due to low capacity, the trucks are seldom available when needed and most brokers prefer to rent private trucks to transport their waste rather than wait for a KCCA truck to become available.
6 RECOMMENDATIONS

DEMONSTRATED SEGREGATION AT SOURCE – There is an opportunity to demonstrate alongside private waste collectors that there is value in segregation at source. A concerted effort to figure out what incentives to offer waste generators so that they do their own waste segregation. Incentives would need to be accompanied by strong messaging and awareness raising about the benefits of segregation. Any intervention would need to consider that waste collectors/loaders would be affected as they currently benefit from status quo.

CORPORATE SOCIAL RESPONSIBILITY (CSR) PROJECTS – The success of the CSR project funded by PRI demonstrates the untapped potential in corporate partnerships in the waste management space. Large corporates with significant CSR budgets e.g. companies in telecommunications, agriculture and consumer goods.

Agriculture serves as an interesting starting point; Madhvani, one of the largest agricultural conglomerates in Uganda, recently expressed interest in turning organic waste into compost and organic fertilizer for its farms. The waste collectors they approached did not have the capacity to meet the demand for organic waste required to cover their 500+ hectares of land on which they grow tea and flowers. This is an opportunity to form partnerships with large agricultural companies in which they benefit from the compost and create green jobs in composting, while diverting waste away from the landfill.

CREATION OF INFORMAL HUBS – Most of the informal sector players interviewed had one challenge in common - lack of a permanent place of work. This was the case with foundry workers in Kisenyi, shoemakers in Bwaise, landfill pickers and waste brokers at Kiteezi, roadside banana peel dealers in Mulago etc. All of them expressed that the uncertainty this causes decreases the efficiency of their operations and keeps their businesses small because they must stay nimble, to minimize their loss if they are evicted from the public land on which they now temporarily work.

Given that the informal sector is responsible for most of the valorization of waste in Kampala, it is worth considering an intervention that provides safe and stable working spaces or hubs for their activities. These hubs could offer a path to formalization through skills training, quality control, financial services, sales marketing etc. If structured appropriately, these hubs could be highly scalable and gender inclusive.

INFRASTRUCTURE DEVELOPMENT AND PHYSICAL PLANNING – There is an urgent need to improve the infrastructure in the inner city; collection rates are lowest in hard to reach informal settlements because trucks cannot go door to door. Fixing infrastructure will thus reduce the number of illegal dumpsites in the city. This must go hand in hand with better physical planning and city zoning which is has improved in the last few years, but not to the desired level.

RAISING AWARENESS – Clearly, the public does not think of waste as a resource and changing mindsets might take considerable effort and time, but the result would be twofold – a cleaner city and higher rates of waste valorization and therefore higher incomes for all actors. • Waste Banks: Waste banks would strengthen and expand the existing supply chain for recycled materials by creating collection points in more remote areas, thus reducing transport time and costs for both waste pickers and itinerant waste brokers. Depending on the nature of involvement of local government, waste banks can be transfer and sorting stations, directly managed by the municipality, benefiting from both reduced quantities to be sent for disposal and the sale of
recycled material.

**Creation of Waste Banks** – Waste banks would strengthen and expand the existing supply chain for recycled materials by creating collection points in more remote areas, thus reducing transport time and costs for both waste pickers and itinerant waste brokers. Depending on the nature of involvement of local government, waste banks can be transfer and sorting stations, directly managed by the municipality, benefiting from both diverting waste from the landfill and the sale of recycled material. Waste banks can also be managed at a community level by a CBO (such as the PRI model described in this report) or simply by local waste brokers willing to expand their reach.

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**7 Value Chain Maps**
7.1 PLASTIC

- Plastic
  - Household and Institutional Waste
  - Industrial Waste
  - Internal Recycling

Household and Institutional Waste

- Street Pickers (50-700)
- Waste Collectors / Loaders (500-700)
- Landfill Brokers (100-120)
- Specialized Waste Brokers (200+)
- Landfill Pickers (1,000+)
- Recyclers (20-40)
- Manufacturing (50)
- Export (PET only) (-600MT/mo)

Kiteezi Landfill

Open Dumping

KAMPALA MSW VALUE CHAIN MAPPING
7.2 ORGANIC
7.3 METAL

KAMPALA MSW VALUE CHAIN MAPPING
7.4 PAPER AND CARDBOARD

KAMPALA MSW VALUE CHAIN MAPPING

7.4 Paper and Cardboard

- Household waste
- Industrial waste
- Institutional waste

- Waste collectors / loaders (500 - 700)
- Itinerant waste brokers (50+)
- Landfill brokers (50+)
- Landfill pickers (1,000+)

- Paper mills + recycling plants

- Burn/open dumping
- Landfill
- Manufacturing
- Recycling plants
- Paper mills

(Number of workers or firms)