SMEP | Sustainable Manufacturing and Environmental Pollution

A STUDY OF TEXTILE WASTE AT OWINO MARKET, KAMPALA

TOWARDS A CIRCULAR TEXTILE ECONOMY IN UGANDA

wasteaid

MTAC MANAGE

UGANDA TAILORS ASSOCIATION Empowering Tailors

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WasteAid UK, Uganda Tailors Association and Management Training and Advisory Centre has been awarded a UK International Development grant in order to implement the project *Uganda Circular Textiles: Recovery and upcycling of textile residues to address excessive amounts of unsold and second-hand garments*. The grant has been made via the **Sustainable Manufacturing and Environmental Pollution (SMEP) Programme**. The SMEP Programme is funded by UK International Development from the UK Government and is implemented in partnership with the UN Trade and Development (UNCTAD) providing technical support. The grant has been awarded until 31 March 2026.

WasteAid is an international NGO focused on supporting countries to fast track local solutions to the circular economy. It currently has projects in The Gambia, South Africa, Uganda and India, and has previously worked in Cameroon, Indonesia, Kenya and Vietnam.

Management Training and Advisory Centre is a body corporate under the Ministry Trade, Industry and Cooperatives that promotes enterprise development and sound management practices through training, advisory, entrepreneurship development services and business.

Uganda Tailors Association is a non-government organisation that was formed to unite, professionalise and create a common voice for all tailors operating in Uganda.

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EXECUTIVE SUMMARY

The *Uganda Circular Textiles Project* is a partnership between WasteAid, the Management Training and Advisory Centre, and Uganda Tailors Association It is funded by UK International Development through the Sustainable Manufacturing and Environmental Pollution Programme to address critical issues within the second-hand clothing supply chain, particularly the identification, management and options for diversion and reuse of second-hand clothing (SHC) and other textile waste. By establishing a Textile Reuse Hub and implementing innovative diversion, sorting and repurposing systems, the project aims to reduce environmental impact, support local industries and create new job opportunities, ultimately promoting a more sustainable and circular economy in Uganda. This study was commissioned to inform the implementation of the project.

Background

Globally, the clothing industry is valued at approximately USD 1.3 trillion. It largely operates in a linear system where consumers typically use garments for less than a year before disposing of them. This short usage contributes to pollution and environmental degradation.[5, 26] The fashion and textile industry represents 2-8% of global greenhouse gas emissions.[5]

The East African Community accounts for 12.5% of global imports of second-hand clothing[16, 29] and Uganda ranks as the fifth largest importer in Africa, accounting for 6.3% of the continent's total SHC imports. The Uganda Revenue Authority reported 80 million kg of second-hand clothing imported in 2023, contributing UGX 262 billion (USD 70.85 million) in taxes in 2023. This trade is essential for the local economy, providing affordable clothing to a large segment of the population and generating employment for traders, transporters, and ancillary service providers.[4]

Globally, the SHC market contributes significantly to sustainability by extending the lifespan of textiles. Yet in Uganda it remains a linear market, with SHC and other textiles eventually making their way to landfill sites, dumped or burnt, where recent estimates show that it makes up between 0.5 and 3% of the waste (up to 48 tonnes per day).[14, 18]

Owino Market is at the heart of Uganda's SHC market, attracting thousands of traders and customers daily. Despite the economic significance of this market, there is little research on this SHC market and the waste generated there, so this research provides an important snapshot of the SHC flow from import of bales to sale of individual pieces, the waste arising in the process, and its management. This study's findings provide critical insights into market dynamics, waste generation, and innovative opportunities for reuse and recycling.

Key Findings

1. **Economic Role of the SHC Market**
   Owino Market is a **major economic hub**, providing **affordable clothing and employment for thousands**, including importers, distributors, vendors, tailors, and informal waste collectors. It supports **broad economic participation**, with a significant proportion of participants advancing from entry-level roles (e.g. bale carriers) to retailers and distributors, though this is more likely for retailers than vendors, and those with higher education levels. Both men and women benefit from the sector, though men are more likely to be business owners (58%) than women (42%). Women face unique challenges due to lower education levels and capital access.

2. **Waste Volumes in SHC Bale**
   The study found that 96.5–96.7% of bales are reused, as intended, as clothing (including fagi-grade clothing) and remainder (2.4-2.6%) is repurposed as rags. Contrary to study findings elsewhere, the percentage per bale that goes directly to landfill was found to be much lower than initially anticipated, at **0.9-1%**. Fagi-grade clothing, often mischaracterised as waste, serves an important role in providing affordable clothing options for low-income consumers. Despite the low percentage, the scale of the SHC trade at Owino Market still creates **800,000 kg per annum** of waste SHC, based on Uganda Revenue Authority data for 2023[18].

3. **Tailoring Offcuts**
   Offcuts from tailoring activities also make up a significant proportion of textile waste emanating from Owino Market. Approximately **14,500–16,900 kg** of textile offcuts are generated weekly, which equates to around **754,000-878,800 kg per annum**. These offcuts are largely comprised of fabric remnants that are deemed unsuitable for tailoring. They are collected by informal waste collectors, largely for repurpose as furniture stuffing or cooking fuel. Where materials are contaminated, these are collected by market sweepers and sent to landfill.

4. **Challenges in Waste Characteristics**
   Textile waste from tailoring is highly variable in size and composition, complicating large-scale reuse. Effective sorting processes and infrastructure are essential to unlock the potential of these materials and **a sorting methodology was proposed and trialled**. This resulted in the trial participants shifting their perception of the materials from waste to a resource with value.

5. **Opportunities for Innovation and Circularity**
   Drawing on global best practices, such as Panipat's textile recycling model in India, the study identifies potential for upcycling and value addition. Transforming offcuts into items such as mats and carpets or shredding of textile waste for manufacturing uses such as pillow stuffing offers a promising pathway to reduce waste and create jobs.

6. **Environmental Impact**

   Diverting waste textiles from Owino Market into reuse can significantly reduce waste management volumes and associated carbon emissions. This includes emissions avoided by preventing burning and by replacing virgin material production with reused textiles. Establishing pathways for this through the SMEP project's Textile Reuse Hub is an important step in finding repurposing solutions towards a truly circular economy.

Conclusion

This research on textile waste at Owino Market provides **an important snapshot of the SHC flow** from import of bales to sale of individual pieces, the waste arising in the process and its management. The study highlights both opportunities and challenges in dealing with the waste arising from a linear market and of transitioning towards a circular textile economy in Uganda.

The *Uganda Circular Textiles Project* holds the **potential to transform waste into opportunity**. By leveraging local strengths, fostering innovation, and implementing sustainable practices, **Uganda could become a leader in circular textile economy initiatives**. These efforts can reduce landfill reliance, create green jobs, and attract international investment, setting a powerful example for the East African region and beyond.

This research calls for **urgent collaboration** among stakeholders – local governments, policymakers, international donors, and market participants – to act on its findings and recommendations. **With targeted investments and a shared vision, Uganda can redefine its textile industry for a more sustainable future.**

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CHAPTER 1: RESEARCH SCOPE

1.1 Background

Globally, the clothing industry is valued at approximately USD 1.3 trillion, with production having doubled over the past 15 years. The industry largely operates in a linear system where consumers typically use garments for less than a year before disposing of them. This short usage strains resources and contributes to pollution and environmental degradation.[5, 26] The fashion and textile industry represents 2-8% of global greenhouse gas emissions[5], with 75% of textile disposed of in landfills, 25% reused or recycled, and less than 1% recycled back into clothing. [5, 23]

The East African Community (EAC) accounts for 12.5% of global imports of second-hand (used) clothing, commonly known as *mitumba, mivumba and mutunda* across the EAC.[16, 29] **Uganda ranks as the fifth largest importer of second-hand clothing (SHC) in Africa, accounting for 6.3% of the continent's total SHC imports.** The Uganda Revenue Authority reported 80 million kg of second-hand clothing imported in 2023, contributing UGX 262 billion (USD 70.85 million) in taxes in 2023. This trade is essential for the local economy, providing affordable clothing to a large segment of the population and generating employment for traders, transporters, and ancillary service providers.[4] By comparison, 64 million kg of new clothing were imported in 2023.

- EAS 356:2019 is the East African Standard that specifies the requirements for the inspection and acceptance of used textile products. This standard is implemented across East Africa, including Uganda and Kenya, to ensure the quality and safety of imported used textiles and means any findings on waste are applicable across the EAC imports. However, there are inconsistencies in the reported amounts of waste in these imports.[3, 8] **In Kenya, the Changing Market Foundation report[2] indicates that 20–50% of SHC in imported bales is unsellable** due to factors such as cultural or climatic unsuitability, inappropriate sizes, unsellable conditions or damage beyond repair. The report compares the contents of bales to a lottery, with market traders unable to predict the proportion of waste within each bale. The interviews conducted for the report suggested that most of the unusable items end up as rags or are incinerated as fuel. Low grade clothes that are called 'fagia' in Swahili were assumed to have no economic value and therefore to be waste.[2]

- **The Mitumba Consortium Association Kenya report[17] presents a different view, suggesting that waste in Kenyan markets from imported SHC in the retail trade is minimal, constituting no more than 2%.** The research conducted 120 quantitative surveys with retailers in Kenya, which revealed that only about 4-12 items (1-2%) out of 350-600 pieces of clothing per bale are considered waste, which is either incinerated or discarded at the Dandora dumpsite.[17] This is more in line with data quoted at the recent Bureau of International Recycling Interactive Textiles Event.[33]

This difference in estimates is potentially linked to inconsistent definitions of textile waste across different countries.[3, 8] GIZ defines textile waste as textile material designated for final disposal that is not subject to any recycling or reuse measures and has no economic value, and this is the definition used here.

Reusing second-hand clothes is fundamental to the principles of the circular economy and the second-hand market plays a crucial role in the consumption of pre-existing goods rather than new ones. In Uganda, reuse involves consumers purchasing SHC, which are graded and priced by quality. Consumers may engage tailors to adjust the garments for a better fit or to suit their preferences. This approach conserves valuable resources, reduces the environmental impacts associated with producing new goods, and alleviates the strain on waste management systems.[12, 13]

Owino Market, a vast market selling a huge range of goods, is the largest SHC market in Uganda. Over 30,000 customers are thought to visit the market daily and the market feeds other SHC markets in the country and neighbouring countries like South Sudan and DR Congo. The Kampala Capital City Authority (KCCA) is the mandated authority for waste collection and cleaning of the market, under the Market Act, Part V, Section 23. The waste collected was taken to the Kiteezi landfill site at the time of the research. In August 2024 the site was closed following a landslide which killed at least 21 people. The city is now being served by landfill sites at Katikolo in Mukono Municipality and Menvu in Nansana Division.

According to the KCCA's 2023 Solid Waste Management Strategy, the Greater Kampala Metropolitan Area (GKMA) produced approximately 4,600 tons of municipal solid waste per day in 2021, with a per capita generation rate of 0.97 kg per person per day. Within Kampala City itself, an estimated 1,659 tons of waste are generated daily, with a collection rate of 60-65%, compared to 33% in the broader metropolitan area.[18] This discrepancy is attributed to the insufficient number of collection vehicles and equipment, as well as limited funding.[18]

Approximately 1,600 tons of waste were transported daily to Kiteezi Sanitary Engineered Landfill, a landfill that has reached its full capacity.[18] The KCCA reported a total post-industrial and post-consumer textile waste (including SHC but also other textiles) of 1.81% in 2019, based on waste composition analysis conducted at Kiteezi. According to a 2023 GIZ report, a review of holistic data on both pre-consumer and post-consumer textile waste delivered to Kiteezi, excluding shoes, estimated it to be 0.5% of the total waste.[14] Later in 2023, KCCA reported that household waste composition analysis showed organic waste to be the most prevalent at 78%. Clothes (including SHC), home textiles such as linen and towels and shoes make up about 3% (48 tonnes per day).[18] Textile waste from households includes imported used textiles, imported new textiles, and locally produced textiles.

There are significant gaps in knowledge to inform options towards a more circular economy for textiles in Uganda. One such gap, which this research focuses on, is the lack of understanding in the import of SHC into the country and how much waste is present in the imported bales that is immediately discarded. There is also a gap in understanding the options for diversion of waste to prevent it from being sent to landfill in favour of being reused or

recycled to extend the life of the materials. Conducting a comprehensive study in Owino Market would provide much-needed clarity on these gaps and support the body of knowledge about EAC textile waste data to inform more circular approaches.

WasteAid, with the Management Training and Advisory Centre and Uganda Tailors Association as its partners, initiated the *Uganda Circular Textile Project* in February 2024 to address critical issues within the second-hand clothing supply chain, particularly the identification, management and options for diversion and reuse of SHC and other textile waste. By establishing a Textile Reuse Hub and implementing innovative diversion, sorting and repurposing systems, the project aims to reduce environmental impact, support local industries and create new job opportunities, ultimately promoting a more sustainable and circular economy in Uganda.

The UK Government funds this project through UK International Development. The grant has been provided through the Sustainable Manufacturing and Environmental Pollution (SMEP) Programme and is implemented in partnership with UN Trade and Development (UNCTAD). The SMEP Programme is designed to facilitate the uptake of pollution mitigation solutions in sub-Saharan Africa and South Asia through research and piloting pollution mitigation technologies. This work extends to sharing evidence and identifying and engaging in areas where policy and regulatory adjustments may enable wider uptake of pollution mitigation solutions.

1.2 Study Objectives

The second-hand clothing (SHC) industry is a significant global trade offering affordable clothing options and extending the life of textiles through reuse. This study aims to assess various aspects of this trade and market participation within the SHC industry in Owino Market in Uganda, focusing on roles, gender distribution, and educational accessibility. Understanding these dimensions will provide insights into the inclusivity and dynamics of the SHC market and offer insights to inform policy development.

To accurately identify the sources of SHC waste within Owino Market and understand traders' definitions of waste, the study explores the supply chain by mapping out the journey of imported used textiles – from importation and distribution to final sale – and pinpoints the specific stages where waste is generated. This comprehensive understanding of the supply chain is crucial to inform interventions to managing and mitigating textile waste. Additionally, understanding the characteristics of the textile waste is vital for creating locally suitable solutions.

Objectives

A. Market participation in the second-hand clothing (SHC) industry in Owino Market: roles, gender distribution, and educational accessibility

The study assessed market participation in the second-hand clothing (SHC) industry in Owino Market by understanding the roles and stakeholders involved. This involved examining the gender distribution among business owners and the educational levels of market participants to evaluate market accessibility for individuals with diverse educational backgrounds.

B. Content quality and economic inclusivity through market segmentation

This study assessed economic inclusion by examining the distribution of bales and the quantity of waste within each bale. It aims to identify what is considered waste within the value chain and evaluate the percentage of textiles discarded as waste. By analysing how different grades of clothing are distributed and the proportion of waste they contain, the study sought to understand the economic impact and inclusivity of the second-hand clothing trade.

C. Understanding Owino Market waste management practices and textile waste characteristics

The study identified and mapped the stakeholders involved in textile waste management, highlighting both formal and informal systems currently in place. It sought to understand traders' definitions of waste and examined the sources and volume generated within the Owino market to provide a comprehensive understanding of the waste landscape.

D. Creating solutions to address textile waste generated from Owino Market

The study identified opportunities for repurposing textile waste generated in the market, including applications and economic feasibility suitable for implementation by the Uganda Tailors Association and Management Training and Advisory Centre.

E. Analyse the environmental impact assessment diverting waste from the landfill

Finally, the study proposes a methodology to calculate the net reduction in GHG emissions to measure the environmental impact by diverting and reusing otherwise discarded textiles.

CHAPTER 2: METHODOLOGY

2.1 Research Design

The research adopted a cross-sectional design incorporating government engagement, primary data collection through structured interviews at Owino Market and a comprehensive desk review to achieve the study's objectives. Both quantitative and qualitative approaches were employed for data collection. The use of different approaches and data collections provides a multidimensional perspective on Owino Market's SHC market.

2.2 Sampling

A comprehensive mapping of the textile waste supply chain was achieved through qualitative structured interviews and preliminary assessments with various participants, from importers to end users.

Meetings were conducted with key stakeholders to gather insights on current government regulations, waste management practices, import standards, and import statistics.
Documents shared by government agencies were reviewed and analysed. This covered the Uganda Ministry of Trade Industry and Cooperatives, Uganda National Bureau of Standards, Uganda Revenue Authority, Kampala Capital City Authority and National Environment Management Authority.

A comprehensive survey strategy was employed. All retailers and vendors were offered the opportunity to participate with no pre-selection of respondents. A total of 1,001 surveys that combined both qualitative and quantitative methods were completed to ensure a thorough data collection process:

- **Retailers (598):** Traders purchasing bales and selling items individually to vendors and consumers.
- **Vendors (312):** Traders purchasing individual pieces and reselling them directly to consumers.
- **Tailors (91):** Skilled professionals responsible for designing, altering, and repairing garments.

An additional eleven interviews were conducted to map out the second-hand textile value chain. This multi-faceted approach ensured a thorough understanding of the textile waste dynamics within the Owino Market.

- **Importers (2):** Responsible for sourcing and importing second-hand clothing.
- **Distributor (2):** Facilitating the distribution of bales to vendors and consumers.
- **Bale Carriers (2):** Individuals tasked with transporting bales within the market.
- **Informal Textile Waste Collectors (5):** Independent individuals collecting textile waste, such as discarded clothing and fabric scraps, from various sources without formal employment or ties to official waste management bodies.

Data Analysis: The surveys focused on the distribution of clothing pieces within a bale, categorising them into first, second, rag, and waste quality. Quantitative analysis was conducted on numerical responses, while qualitative data was subjected to keyword analysis. Demographic data were also collected to provide context to the findings.

Textile Waste Quantification: The normal collection average of discarded textiles in markets ranged from 49-57 sacks per day, as reported to the researchers in their inquiries. For the study a sample of 382.5 kg waste (representative of 8.7-10% of the collection that day) was collected from different areas within Owino Market from both tailors and floor sweepings. The textile waste was weighed on-site for accurate quantification before being subjected to detailed sorting and analysis for potential product creation.

2.3 Research Period

Data collection took place between May and June 2024. Interviews and surveys were conducted in-person at participants' business locations, lasting approximately 20 minutes each. A total of 1,001 surveys and 11 interviews were completed by a team of 13 data collectors and 5 support staff. Paper questionnaires, each with an assigned unique identification code were used. Responses were manually entered into Google Forms for efficient aggregation and analysis. A verification process ensured accuracy by cross-checking digital entries against scanned images of the paper questionnaires.

2.4 Ethical Considerations

Prior to the interviews, informed verbal consent was obtained from all participants, ensuring anonymity and confidentiality. Participants were informed of their right to withdraw from the survey or skip any questions if they felt uncomfortable, ensuring voluntary participation and respect for their comfort levels.

2.5 Limitations of this study

This study specifically explores waste generated at Owino Market through the second-hand clothes market and tailoring market. It recognises that there are wider sources of the textile waste that makes its way into landfill or is dumped and/or burnt, but this is outside of the scope of the research.

The scope of the research was limited to Owino Market only. Whilst this is the largest market in Kampala and Uganda, various other markets exist and warrant exploration.

A limitation of the study is that the distribution of sub-grades including textile waste in bales is based on the perception of survey respondents. This could be corroborated independently through a randomised test on bales to strengthen the findings.

Another limitation is that the estimation of the average weight of the textile waste sacks presented later in the report was based on spot checks over a few days, and there could be variations in volumes and type depending on e.g. seasonality or workload of the tailors. In order to quantify the total volume generated from Owino Market, further field analysis would be needed.

Exploring tailor off-cuts and developing a methodology for sorting was not initially envisaged for the research, but was later added, though the pilot for sorting and prototyping was limited. It would be important to research the composition of textile waste (i.e. whether it is cotton, polyester, blends, etc.) as this would inform any equipment needed to process it for reuse, which would be a factor in scaling up reuse.

Prices are referenced in the report, based on the Uganda Shilling price, and converted using the exchange at the time of writing of 1 USD = 3,750 UGX.

CHAPTER 3: STUDY FINDINGS

OBJECTIVE A: ASSESSING MARKET PARTICIPATION IN THE SECOND-HAND CLOTHING INDUSTRY IN OWINO MARKET: ROLES, GENDER DISTRIBUTION, AND EDUCATIONAL ACCESSIBILITY

3A.1 Introduction

Gender inclusive market participation is crucial for driving sustainable economic growth. This involves engagement in market activities, including buying, selling, trading goods and services, and entrepreneurship. In the second-hand clothing (SHC) industry, market participation entails multiple roles, such as importers, distributors, retailers, vendors, bale carriers, tailors, and brokers. The diversity of these roles allows for the involvement of different members of society, enabling the generation of an inclusive economic participation.

This section explores:

1. **The operational landscape at Owino Market:** This section provides an in-depth understanding of the physical layout and operational dynamics of Owino Market. It explores the market's location, setup and how the flow of goods and services. Additionally, it describes the diverse range of participants, including vendors, retailers, and other key players, who contribute to the market's vibrant economy.

2. **Participants of the SHC market:** The various roles and functions of individuals and businesses operating within Owino Market are explored.

3. **Market participation through assessing gender and education among traders:** This section examines the demographics of traders, with a focus on gender and education. By analysing the roles of male and female traders and their educational backgrounds, this section provides insights into the inclusivity and entry requirements of the market.

3A.2: The Operational Landscape of Participants at Owino Market

Owino Market, also known as St. Balikuddembe Market, is a major commercial hub located in the centre of Kampala, Uganda. The market is near Nakivubo Stadium and the Old Taxi Park, and easily accessible from various parts of the city. Owino Market offers a wide range of goods and includes the most prominent market for second-hand clothing in Uganda, providing affordable clothing options and creating employment opportunities. The market hosts around 50,000 vendors.[34] Estimates of customers ranges vastly, from 30,000-300,000 customers visiting the market daily.

The market is encircled by two-story buildings, occupied by tailors and salons. At ground level several main gates serve as primary access points, all strategically positioned around the market's perimeter to efficiently manage the flow of vendors and customers. Inside, the main market is organised into different sections divided by central walkways. Each section typically features a mix of clothing, where specific categories tend to dominate different areas, making it easier for customers to locate the desired items. For example, the Mivumba Section is dedicated to second-hand clothing, where there are sub-sections dedicated to home textiles, women's party dresses, children's clothing, and others. The southern part of the market consists of vibrant fresh produce, dry goods, spices, and prepared foods, with additional sections specialising in services such as beauty and tailoring.

To navigate the market or exit through a different entrance, visitors can use both central walkways and narrower paths. The central walkways, which traverse the entire market horizontally and vertically, are wider and ideal for transporting bales and goods. Branching off from these main walkways are narrower paths that accommodate additional stalls within the compact space. Pathways with higher foot traffic are particularly attractive to tenants due to their potential for higher profits, making stalls along these busy pathways more sought after and highlighting the importance of location within the market.

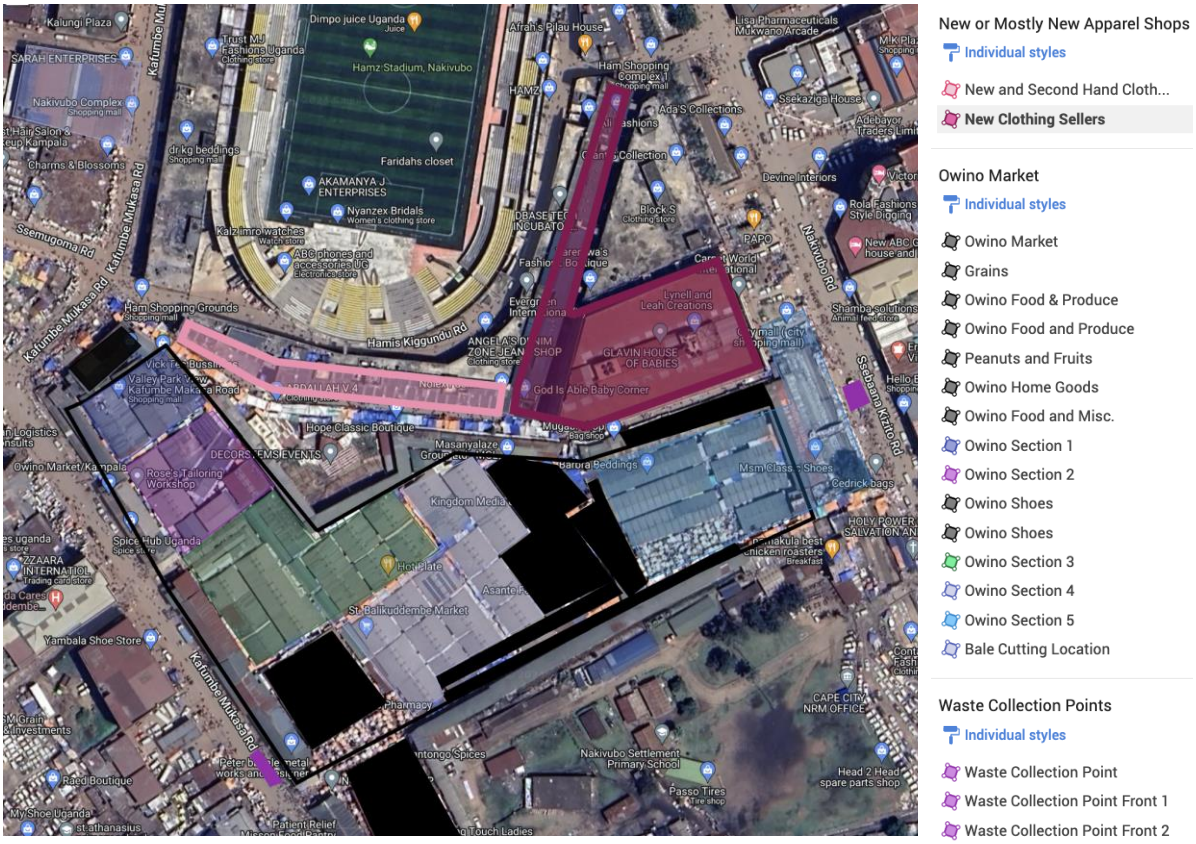


Figure 1 Map showing Owino Market and its environs (Google Map with overlap)

3A.3: Understanding the Market Actors' Roles in the Second-Hand Clothing Market

A range of market participants contribute to the flow of goods through the supply chain from import to end consumer, which are identified here with an explanation of each participant's function. Bales remain unopened until they reach retailers, thus waste arises in the supply chain with the retailers and vendors.

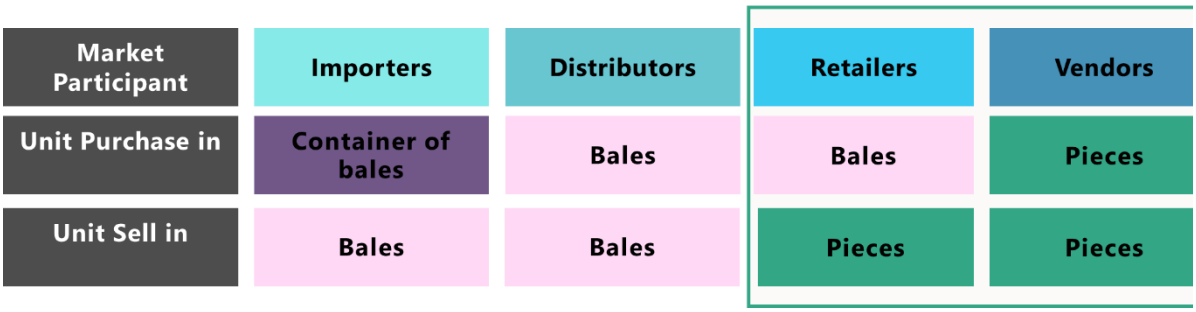


Figure 2 Diagram outlining the flow of imported bales and individual clothing pieces in Owino Market. Bales remain unopened until they reach retailers, thus waste arises in the supply chain with the retailers and vendors.

(i) Importers

Importers source SHC clothes from global sorting facilities: Importers in Uganda source second-hand clothing from sorting facilities in various regions, including Europe, North America and Asia, where the clothes are sorted for resale, compacted into bales and shipped via container.

Importer's collaborative approach with sorting facilities to ensure quality control: During qualitative interviews, importers emphasised the importance of quality control, which they achieve by collaborating closely with sorting facility contacts. They clearly communicate their clothing requirements to their suppliers through verbal communication and visual references, such as images of samples. Importers are willing to switch suppliers if there are persistent quality issues or if suppliers fail to make necessary adjustments based on feedback.

The global sorting facilities label the bales with the importer's brand name: The bales are labelled with the importer's brand name, helping buyers associate the brand with both quality and price. Importers play a vital role in maintaining the quality of the clothing, as their reputation depends on consistently delivering high-quality products to their customers.

Importers ensure compliance with SHC import regulations: Importers are responsible for ensuring SHC shipments comply with regulations, including import duties and local standards. As Uganda is landlocked, cargo is first offloaded predominantly in Mombasa, Kenya, cleared, and transported overland to the Ugandan border for customs processing before reaching the importer's warehouse.

Importers are located in the surrounding buildings near Owino markets: Due to the compact nature of the market and the need for storage, importers are located in buildings and warehouses near the market.

Bales are organised by the type of clothing for inventory management: Once offloaded, the bales of clothing are organised and categorised, such as "men's shirts" or "women's dresses," to facilitate easy identification and inventory management.

(ii) Distributors

Role of distributors in the supply chain: Distributors acquire bales in varying quantities from importers and play a crucial role in the second-hand textile supply chain by acting as intermediaries between importers and retailers, who purchase bales and sell the contents as individual pieces. With extensive networks and a thorough understanding of market demands, distributors efficiently allocate the appropriate types and quantities of clothing to different retailers.

Distributors procure from multiple importers to meet the market demand: Often the distributor purchases bales from multiple importers to meet their customers' needs. Retailers can access a variety of products and prices of bales suited to different customer preferences, enhancing their ability to compete and thrive in the market.

Distributors are located within the same building as importers: Often situated within the same buildings as importers, distributors streamline the logistics of distribution, managing the delivery of goods to various outlets, including large markets like Owino Market. This setup ensures that the supply chain operates smoothly and efficiently.

(iii) Retailers

Retailers are individuals or businesses that acquire bales of second-hand clothing from importers or distributors, then sell the pieces of clothes individually to resellers and end consumers. **A total of 598 retailers were surveyed during the market flow assessment.**

Nearly all retailers specialise in one category of clothes: Clothing is categorised into specific types at sorting facilities prior to importation, such as women's cotton dresses, women's party dresses, and men's cargo pants. This classification is determined by importers to align with the supply chain structure, catering to the specific categorisation preferences of resellers and retailers.

Retailers employ various methods for conducting bale openings: The bale opening process is essential for managing inventory and meeting market demand in the second-hand clothing market. Retailers open the bale for vendors to purchase.

- **Bidding System**: Some retailers allow the highest bidders to examine and select the clothing first, followed by lower bidders.
- **Pre-Sorting**: Other retailers pre-sort the bales before customers arrive.
- **Rapid Selection**: Some retailers open the bales and permit surrounding vendors to select items rapidly. Subsequently, the remaining pieces are resorted by the retailer according to their perceived resale value.

Bale opening timing and frequency is retailer dependent: The timing and frequency of bale openings are market demand dependent. For example, in a building near Nakivubo Complex Owino, retailers specialising in women's cotton dresses, skirts, and evening wear open bales twice a week starting at 7am. In contrast, in the Discount Mall adjacent to Owino Market, retailers specialising in men's trousers open their bales every morning.

There are three types of retailers, categorised by their physical location within Owino Market.

1. **Retail store retailers**, operating from established physical stores located within buildings.
2. **Non-store retailers**, selling their products inside buildings without having a fixed physical retail shop.
3. **Market stall retailers** with stalls inside Owino Market.

(iv) Vendors

A total of 312 vendors, traders that purchase individual pieces from retailers and resell them directly to consumers, participated in the survey. Retailers offer wholesale prices to vendors, and any unsold items from the bale openings are sold directly to consumers at prices comparable to those offered to vendors.

Locations of the vendors vary: Vendors can range from small-scale sellers known as hawkers, who sell clothes on the streets or door-to-door without a fixed retail location, to those who operate from stalls.

Vendors purchase clothes at different price points to meet the customer demand: Vendors are adept at understanding and catering to the diverse needs of their customer base, offering a range of clothing that suits different tastes and price points, and also in function of their own capital. Furthermore, the vendors can stock a variety of clothes not confined to one category of clothes.

(v) Tailors

To understand the complete market textile flow dynamic and market participation of Owino Market, the research team conducted 91 interviews with tailors located within the market, of which 90% specialise in one particular service while 10% provide multi-purpose services:

1. **New Clothing Design**: 54% of the tailors receive new fabric from a customer or purchase new fabric to create clothing. New clothing design also includes modification of SHC into new pieces e.g. long dress to short party dress.

2. **Resizing:** 20% of the tailors alter the dimensions of existing garments for a better fit, taking in the seams, resizing the shape, shortening, and adjusting other aspects of the garments according to the client's needs.

3. **Repurposing:** 17% specialise in taking textile material from the original use and modifying them for a completely different purpose. For example, it was observed that tailors within Owino Market would utilise a set of bedsheets and one curtain to repurpose them into 20 pillow cases. The total cost of the material and stuffing is around UGX 2,000-3,000 (USD 0.56-0.84) and the pillow cases are sold for UGX 5,000-7,000 (USD 1.39-1.95).

4. **Patch Work:** 9% of the tailors do patchwork, a method of sewing together pieces of fabric to create a new, composite textile. This technique can be used to mend garments by covering holes or worn areas with patches of fabric, or to create entirely new items like quilts, bags, or decorative items.

(vi) Consumers

Consumers purchase clothing items for personal use (not resale or production purposes). In 2021, Uganda's disposable income per capita was reported at USD 654.94, or about UGX 2.35 million per year, which breaks down to roughly USD 1.79 or UGX 6,436 per day.[31] It is estimated that 47% of Uganda's population experiences multidimensional poverty, with 21% living in monetary poverty.[25] Given these economic conditions, individuals and families in Uganda prioritise spending on necessities such as food, housing, healthcare, and education, with limited financial flexibility for non-essential items like clothing and entertainment.[25]

(vii) Bale Carriers

Bale carriers are responsible for unloading bales when the containers arrive at importers' warehouses and for the transportation of bales from importer or distributor to retailer. Occasionally, a bale carrier serves also as a broker selling bales.

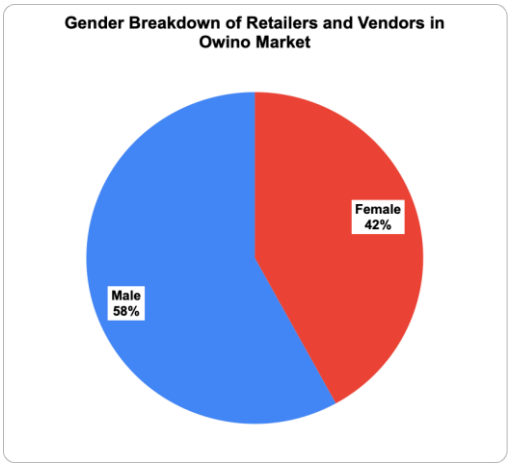
3A.4: Measuring Market Participation through Assessing Gender and Education in Traders Participation

In Sub-Saharan Africa, women contribute to 46.5% of the total labour force.[31] To develop an understanding of market participation in the second-hand clothing (SHC) industry, specifically Uganda's Owino Market, an analysis of the gender distribution in education level and business ownership was made. These factors provide insight into socio-economic background, offering information on inclusivity within the SHC trade. This evidence assists in understanding the broader SHC industry.

Gender Distribution in Business Ownership of Retailers and Vendors

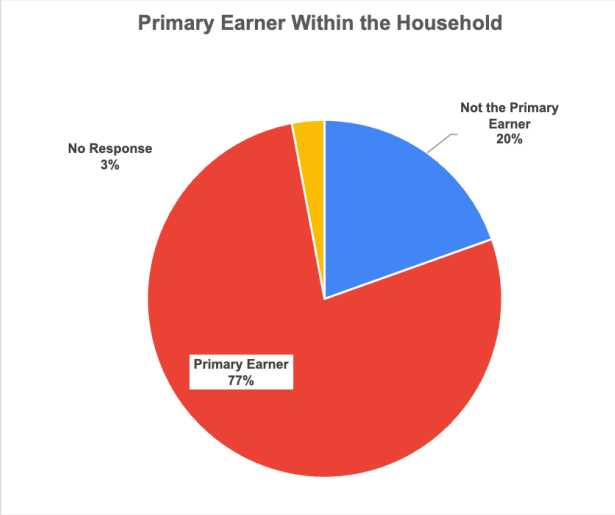
Owino Market encapsulates a vibrant business community of different actors. Gender differences of business ownership of retailers and vendors were examined to assess inclusion and equity, and provide insights into the control of economic resources, access to entrepreneurial opportunities, and how gender roles influence business practices and decision making.

This survey obtained a total of 910 responses from retailers and vendors; 531 (58%) male and 379 (42%) female (*see graph 1*)[1]. A majority of women were within the age range of 30-40 years, compared to men who were largely within the age range of 20-30 years. Although definite reasoning for this difference cannot be provided, it is possible to relate this to the particular gendered issues of marriage and children. Uganda's Bureau of Statistics (2018) states that almost 25% of Ugandan women have given birth by the age of 18 years.[24] Furthermore, results from Uganda's Demographic Health Survey (2016) found that 43% of women within the age range of 25-49 years reported to have been married by the age of 18 years.[27] As such, women within the age range of 20-30 years are likely to be preoccupied with duties of childcare and household duties. For many women who continue to work despite such responsibilities, it is likely that added commitments can influence productivity and earnings.

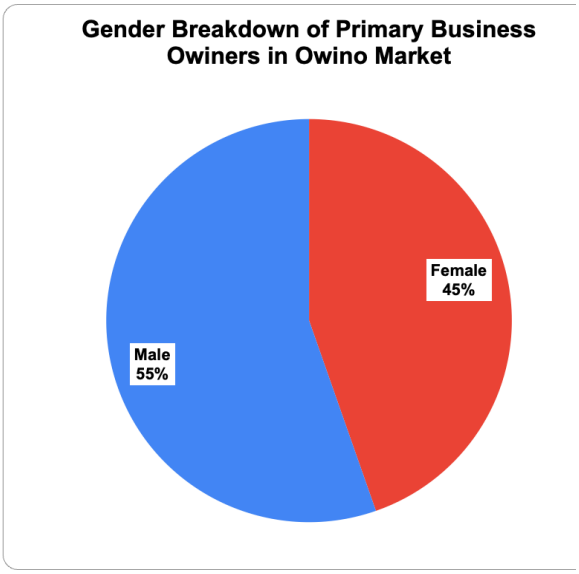


Graph 1. Gender breakdown of retailers and vendors

[1] Data has not been disaggregated here by retailer and vendor as the findings were virtually identical when split.



Graph 2. Primary earners within households, Owino Market



Graph 3. Gender breakdown of business owners

The survey shows that 77% of business owners (75% for females, 79% for males) are the primary earners in their households *(see graph 2)*, emphasising the critical role that business owners play in supporting their families and driving economic activity within their communities. However, there is a gender difference between business owners, where 58% are male and 42% are female, indicating an imbalance in gender distribution in vendors and retailers. Although the survey gathered more male than female responses, it is important to consider this inequity in relation to family structures and gender roles.

Many businesses in the SHC trade informally involve the labour of family members, with male business owners often employing their spouses to work for them. This collaborative family business model significantly influences business operations and roles within the market. Women are given an opportunity to participate in and contribute to the family business, however it is unclear how much decision-making freedom they are given or whether they are compensated for their labour. It may also limit their mobility within the supply chain. According to Buvinic and colleagues (2013)[30], women's earnings and productivity are generally lower in entrepreneurship than men. It is possible that social norms and/or access to finance are a contributing factor to such inequities, with added household and care duties subjected to women within traditional contexts[30], such as that of Uganda. Despite this, the relatively high number of women business owners reflects the importance of the SHC trade, micro-trading, and entrepreneurship in sustaining the livelihoods of Ugandan women. In order to develop a more inclusive SHC market it is important for programmes and policies to cater towards the unique experiences and needs of women

Position	Owner															
Count of Timestamp		Primary E	Highest L	:ducation												
		Yes						Yes Total	No						No Total	Grand Total
Gender	Years in E	Elementary	No Formal E	Others	Secondary	Tertiary	(blank)		Elementary	No Formal E	Others	Secondary	Tertiary	(blank)		
Female	0 to 1	1	2		5	1		9				4			4	13
	1 to 3	1	2	1	20	5		29	1	7		8	2		18	47
	10+	10	11	2	43	5	5	76	1	6	1	5	1		14	90
	3 to 5	15	6	1	36	6	1	65	2	1	1	10	3	1	18	83
	5 to 10	9	4	2	44	2	3	64	4	4		11		1	20	84
	No Respons	1			1		1	3								3
Female Total		37	25	6	149	19	10	246	8	18	2	38	6	2	74	320
Male	0 to 1	2			12			14		2		3			5	19
	1 to 3	7	3	3	35	5	2	55	2	3		6	2		13	68
	10+	10	10	3	41	8	3	75	5	4	4	2	1		16	91
	3 to 5	16	7	1	60	15	1	100	3	1	1	15	3		23	123
	5 to 10	12	7	4	60	22	3	108	4	4		11	2		21	129
	No Respons	1			2			3								3
Male Total		48	27	11	210	50	9	355	14	14	5	37	8		78	433
Grand Total		85	52	17	359	69	19	601	22	32	7	75	14	2	152	753

Table 1. Gender breakdown of highest education level and years spent in the SHC trade, Owino Market

On gender and education, the results showed that of both primary business owners and non-primary business owners a majority (for both men and women) had a highest education level of secondary school, suggesting no particular relationship between education level, ownership of business, and gender. However, among the primary business owners significantly more males held a tertiary education (n=50) compared to women (n=19). Additionally, among both primary and non-primary business owners, the highest number of women were involved in the business for ten or more years, compared to the highest number of men involved in the business for five to ten years *(Table 1)*. The reasoning behind this discrepancy is unclear, however it may provide indirect support for women's reliance on micro-trading within low and middle-income countries.[21]

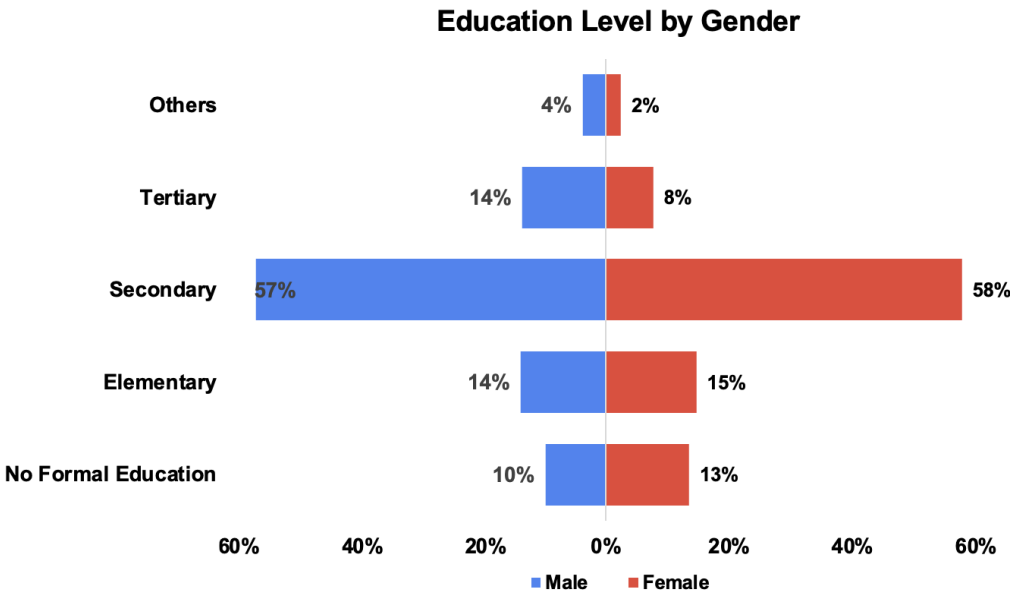
Education Level and Market Participation in Owino's SHC Trade

Uganda's Universal Primary Education policy, introduced in 1997, affords free education to all school-age children and increase access to education. The survey showed that the majority of retailers and vendors had completed secondary education: 13% of women and 10% of men had not received formal education,15% of women and 14% of men completed only elementary education, 57% of women and 58% of men completed secondary education, and 14% of men and 8% of women attained tertiary education (graph 4).

Overall, the pattern of educational attainment is largely mirrored between men and women, with a notable difference at tertiary level. This is perhaps due to a large percentage (34%[32]) of women being married and/or mothers by age 18 years so there is little time or, probably, opportunity for tertiary study unless they have their husband's or family's support to do so.

The SHC market demonstrates inclusivity across various education levels, with even individuals with no formal education actively participating in it.

Even though Universal Primary Education provides free education to all school-age children in Uganda, families still bear significant indirect costs such as for uniforms, books, and other school supplies.[25] For many families these expenses are unaffordable and early dropouts are observed, as observed among the vendors and retailers.



Graph 4. Educational attainment by gender of retailers and vendors in Owino Market

Social mobility was examined in the survey by exploring whether retailers and vendors had started at a lower point in the SHC value chain. This showed that over half of retailers (ranging from 54 – 89%), regardless of education, moved up in the value chain (table 2). This was especially true when they were tertiary educated (89%). For vendors the mobility was much lower – between 2 and 20% depending on education level.

	RETAILERS who started lower in the SHC value chain	**n**	**% experienced mobility**	**VENDORS who started lower in the SHC value chain**	**n**	**% experienced mobility**	***Total retailers and vendors in dataset***
No formal education	35	63	56%	2	24	8%	*87*
Elementary	38	69	55%	1	41	2%	*110*
Secondary	159	297	54%	20	145	14%	*442*
Tertiary	51	57	89%	3	29	10%	*86*
Other	10	15	67%	2	10	20%	*25*
Total	**293**	**501**	**58%**	**28**	**249**	**11%**	***750***

Table 2. Social mobility of retailers and vendors

Objective A Conclusion

Owino Market is the most prominent market for second-hand clothing in Uganda, providing affordable clothing options and creating employment opportunities. It is a vibrant market where a range of actors ensure the flow of SHC goods through the supply chain from import to end consumer. The analysis of gender distribution in business ownership and education levels within Uganda's Owino Market reveals both opportunities and challenges in the SHC trade. While women contribute significantly to the labour force and are often the primary earners in their households, they face unique barriers, including access to finance that may limit their entrepreneurial potential. The survey findings highlight the need for targeted interventions to support female entrepreneurs, particularly in addressing the disparities in education and additional responsibilities (e.g. their caring role) that may impact their productivity. Despite these challenges, the SHC trade in Owino Market demonstrates a degree of inclusivity, with individuals of varying educational backgrounds actively participating. Opportunity to move up the value chain for vendors is limited, whereas retailers over half move up – rising to 89% for those with tertiary education. Understanding the economic mobility within this trade is crucial to gaining a fuller context of the opportunities available to the various traders, highlighting how they navigate and sustain themselves within the SHC market.

OBJECTIVE B: CONTENT QUALITY AND ECONOMIC INCLUSIVITY THROUGH MARKET SEGMENTATION

3B.1 Introduction

Given the inconsistencies in the reported amounts of waste in SHC imports, outlined in the background section, the study assessed the proportion of textile waste present in SHC bales. As the inconsistencies may be due to definition, it was important to define *textile waste*. The definition of textile waste used has been adopted from a recent GIZ report: textile waste is textile material designated for final disposal that is not subject to any recycling or reuse measures and has no economic value.[15] The grading system used by market actors directly influences the distribution of reusable items within a bale and estimation of textile waste, and is therefore explored here to offer more accurate and actionable insights into how the SHC market operates and the economic implications of textile waste. This understanding also aids in developing strategies to manage waste and optimise the reuse of materials, thereby contributing to a more sustainable market environment.

This section explores:

1. **The bale grades and sub-categories within a bale** to quantify the amount of waste material in each bale of SHC.

2. **Economic inclusion in the trade** to understand the economic impact and inclusivity of the second-hand clothing trade through analysing how different grades of clothing are distributed and the proportion of waste they contain.

3B.2 The Bale Grade and the Sub-Categories within a bale

3B.2.1 Understanding Clothing Grades in Second-Hand Textile Bales

Buyers import clothing from sorting facilities abroad by buying graded bales on order. The grading indicates the quality of the items within without opening the bale. The perceived quality can vary depending on the market demand as well as the origin of the bales.

Bales are typically graded as follows.

- **Grade A:** Predominantly contains items of the highest quality and fetch the highest prices. They are often nearly new and in excellent condition.
- **Grade B:** Predominantly contains items of good quality but may have minor defects or show slight signs of use. They are valued lower than Grade A.
- **Grade C:** Predominantly contains items with noticeable wear and are considered lower quality compared to Grades A and B. They are sold at the lowest prices.

3B.2.2 The Sub-Categories within Bale

On arrival, once a bale is opened, the pieces of clothing are sorted into the sub-categories below based on their perceived economic value and the speed at which it can be sold (see figure 3):

- **First (Top)**: Items with the highest turnover and economic value.
- **Second**: Highly sought-after items but with a lower market value than the first.
- **Fagi**: Fagi is a locally designated term. It is identified by retailers upon opening a bale or by vendors when items remain unsold for an extended period. Fagi is wearable clothing, but generally of lower quality than the first or second classes or is anticipated to have a slower turnover. Fagi is sold both as bales and as individual pieces, normally in a pile in front of the storefront, whereas the higher quality clothing is hung up in the stores. Despite its lower grade, there is consistent demand for fagi, which is sought after by vendors for purchase and resale.
- **Rags:** Items with the lowest economic value, typically sold at the lowest prices. The key difference between fagi and rags lies in the condition of the clothing – rags exhibit significant wear and tear, damage, or extensive signs of use so that they can no longer be used as clothing. Rags, particularly those with high absorbency, are primarily sold individually to consumers or in bulk sacks to industries for cleaning purposes.
- **Waste:** Some waste arises at this unbaling and sub-categorisation stage. Waste items are usually beyond repair or reuse and are typically disposed of.

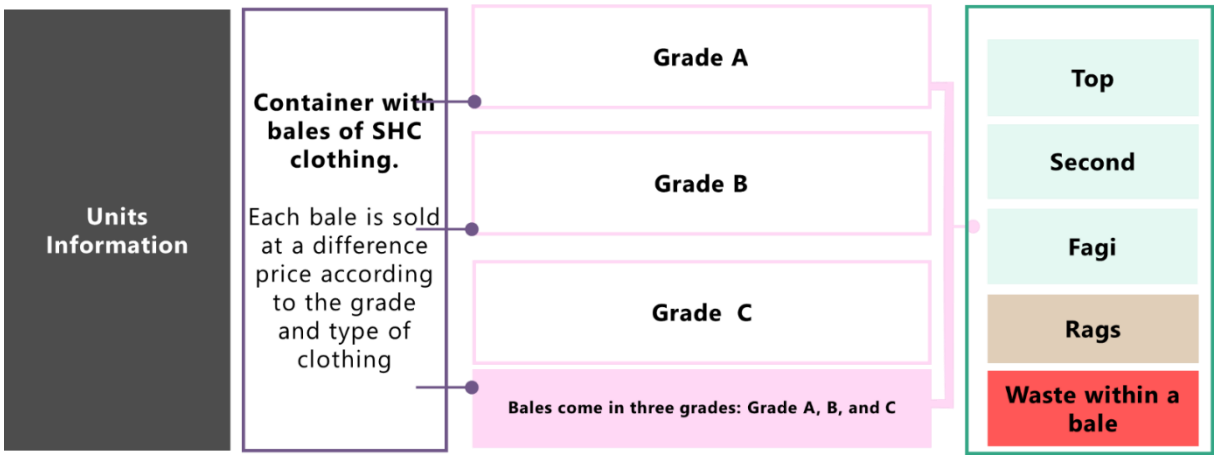
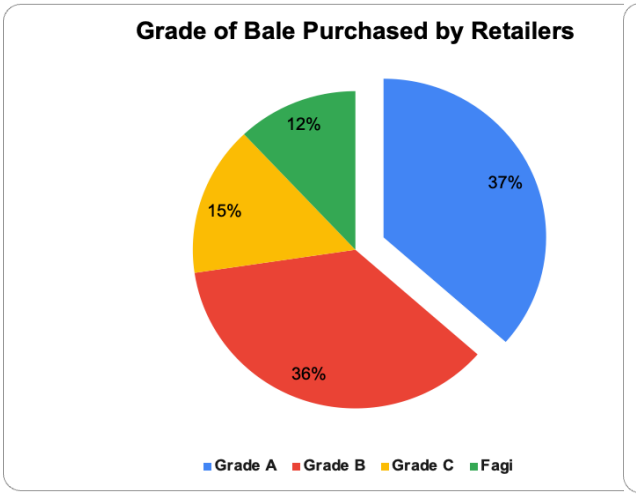


Figure 3 Diagram summarising how grade imports are sub-categorised upon opening. Note that items sub-categorised as fagi may be re-baled for sale or sold as individual pieces

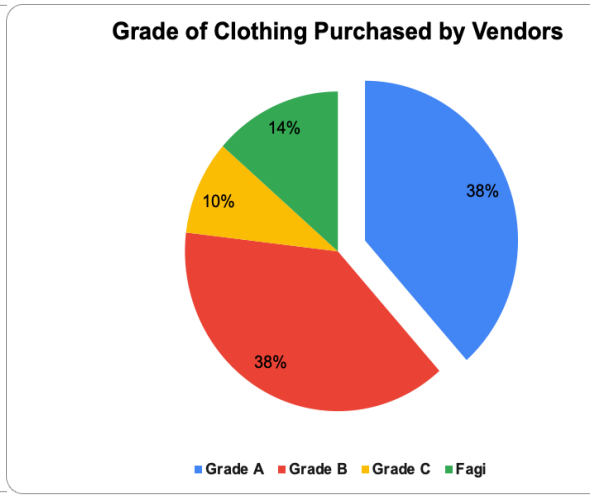
A Grade A bale would be expected to contain mostly first-class items; Grade B would contain a mix of first- and second-class items, and Grade C would contain mostly second-class items. There is fluidity in the grading, as demonstrated by the sub-category sorting process, where items are sorted into top, second-class, fagi, rags and waste. Sorting is a subjective process, due to differences in perception, and errors in assessment by the sorter either at the point of origin or destination may also slip in. A higher-grade item may also be downgraded if it remains unsold for months.

3B.2.3 Purchase Patterns

Traders were found to employ different purchasing methods to increase their profit, predominantly focusing on Grades A and B. The analysis revealed that 37% of retailers purchase Grade A bales, while 36% purchase Grade B, 15% purchase Grade C and 12% purchase fagi which arises from the sub-categorisation process outlined above (diagram 5). The pattern is similar for vendors at 38%, 38%, 10% and 14% respectively (diagram 6).



Graph 5. Grade of bale purchased by retailers at Owino Market. Note that fagi is not an imported grade, but fagi items are re-baled and sold as bales within the market.



Graph 6. Grade of bale purchased by vendors.

Rather than mixing grades, traders tend to focus on a single grade, particularly for the vendors versus retailers: 61% versus 39% (table 3). This can be explained due to the nature of the business, as vendors purchase by piece, with the ability to select desired pieces prior to purchase. This strategy allows them to coordinate with fewer suppliers and potentially experience faster inventory turnover for that specific grade. The remaining retailers and vendors purchase multiple grades and sub-categories, balancing their turnover by catering to a broader target market and avoiding overstocking or understocking any single grade. Interestingly, the data indicated fagi is bought and resold within Owino Market as individual pieces or re-baled: 12% of retailers purchase fagi-grade bales and 14% of vendors, who purchase individual pieces, specifically purchase fagi items for resale.

Retailers and Vendors Grade Purchased Breakdown		
	Retailers and Grade Purchased	**Vendors and Grade Purchased**
Single Grade	39%	61%
Two Grades	27%	29%
Three Grades	16%	6%
Four Grades	14%	4%

Table 3. Breakdown of mix of grades purchased by retailer and vendor at Owino Market

3B.2.4 Definition of Waste According to the Retailers and Vendors

To understand where waste is arising, 891 retailers and vendors were surveyed about their unsold stock as this could be a potential source of waste. The researchers sought to understand why these items remain unsold and the strategies used to manage them. Notably, 13.4% (119 respondents) reported no strategy for inventory management, as all residual items are sold.

For those with residual items, the primary strategy to manage this unsold inventory, cited by 75.8% of respondents, is to offer discounts on items that have remained unsold for an extended period and 6.2% store items for future sale e.g. in high season such as December to sell at higher prices during peak market demand. Some respondents (3%) mentioned donating unsold items to charities or giving significant discounts as a form of charity. A small percentage is sold to industry (0.3%) or used is some other way e.g. given to relatives (1.3%) The study highlights that even unsold items largely retain economic value and are sold or donated at some point, resulting in little waste.

Unsold Inventory Management	Count of Response	Percent
All items are sold off	119	13.4%
Discount Sales	675	75.8%
Storage for Future Sales	55	6.2%
Donate to Charities	27	3.0%
Other	12	1.3%
Sales to Industry	3	0.3%
Count	**891**	

Table 4. Management of retailers' and vendors' unsold stock, Owino Market

For those who stated they had residual items (772 retailers and vendors), they were asked about the characteristics of discarded textile pieces lacking reuse options, marketability or economic value (table 5). After implementing inventory management strategies, 45.2% of traders reported this question does not apply to them since all pieces of clothing are sold, i.e. they do not have any waste. The remaining **54.8% of traders explained that when they do have pieces they cannot sell it is often because the clothing is torn, appears old, is faded, stained beyond repair or has another fault and these items are typically disposed of as waste**.

Point of Waste		
At what point do you consider clothing you purchased to be waste?	**Frequency Mentioned**	**Percent**
Nothing remains as waste	349	45.2%
When it's torn	214	27.7%
When it appears old	93	12.0%
When it's faded	60	7.8%
Other	30	3.9%
When it's stained	26	3.4%
Total	**772**	

Table 5. Point at which retailers and vendors consider purchased second-hand clothing to be waste

3B. 2.4 Second-hand Clothing Bale Distribution

The distribution of pieces within a bale was assessed from the response of 683 participants of the 910 surveyed. Some vendors did not have access to this information, thus didn't respond. Participants were asked to estimate the number of pieces within a bale according to the sub-categories of first, second and fagi – classed together as items for reuse, rags and waste i.e. torn, stained, old, faded or with another defect (see figure 4). This was divided by the total number of pieces to determine percentages to overcome the issue of differing bale sizes (table 6). Responses were given as a range, thus a low and high range is given in the table to reflect this.

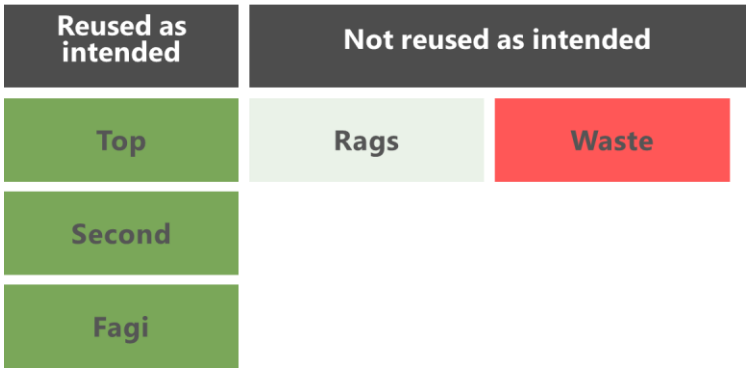


Figure 4 Breakdown of SHC by reuse purpose

Distribution of Pieces within a Bale (Non-Grade Specific)				
	Low Range	**Percentage**	**High Range**	**Percentage**
Reuse	113,423	96.7%	118,697	96.5%
Rags	2,779	2.4%	3,185	2.6%
Waste	1,055	0.9%	1,178	1.0%
Total Pieces	117,257		123,060	

Table 6. Distribution of pieces within a bale, based on bale-content estimations by survey participants

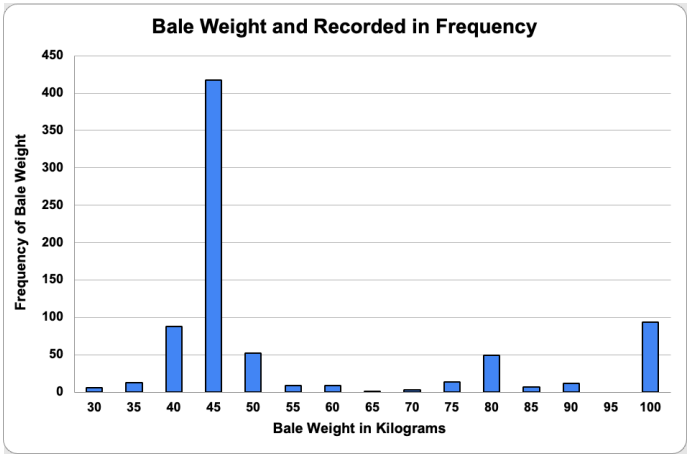
This estimation indicates that approximately 96.7-96.5% of a bale imported for reuse as second-hand clothes is actually used for this purpose, with an estimated 3.3-3.6% not reused for their intended purpose, i.e. are rags or waste. **Looking specifically at waste within a bale, this was estimated by survey respondents at 0.9-1% of the total number of pieces within a bale, equivalent to 800,000 kg per annum** based on Uganda Revenue Authority data for 2023[18].

Rags – pieces of clothing sold as wiping cloths or absorbent material – were estimated at 2.4-2.6% and are sold to industrial or other market consumers such as households. Although rags are not utilised for their original purpose as second-hand clothing, they retain market value as sellable pieces. Since sorting facilities rely on manual labour, human errors, though minimal, are inevitable but this nevertheless gives a good indication that volumes of waste are low at this stage of the clothing's lifecycle. This is perhaps unsurprising, given that presumably a high proportion of waste found within imported bales would impact negatively on traders by reducing profit margins and increasing financial risk, ultimately hindering economic growth within the SHC sector.

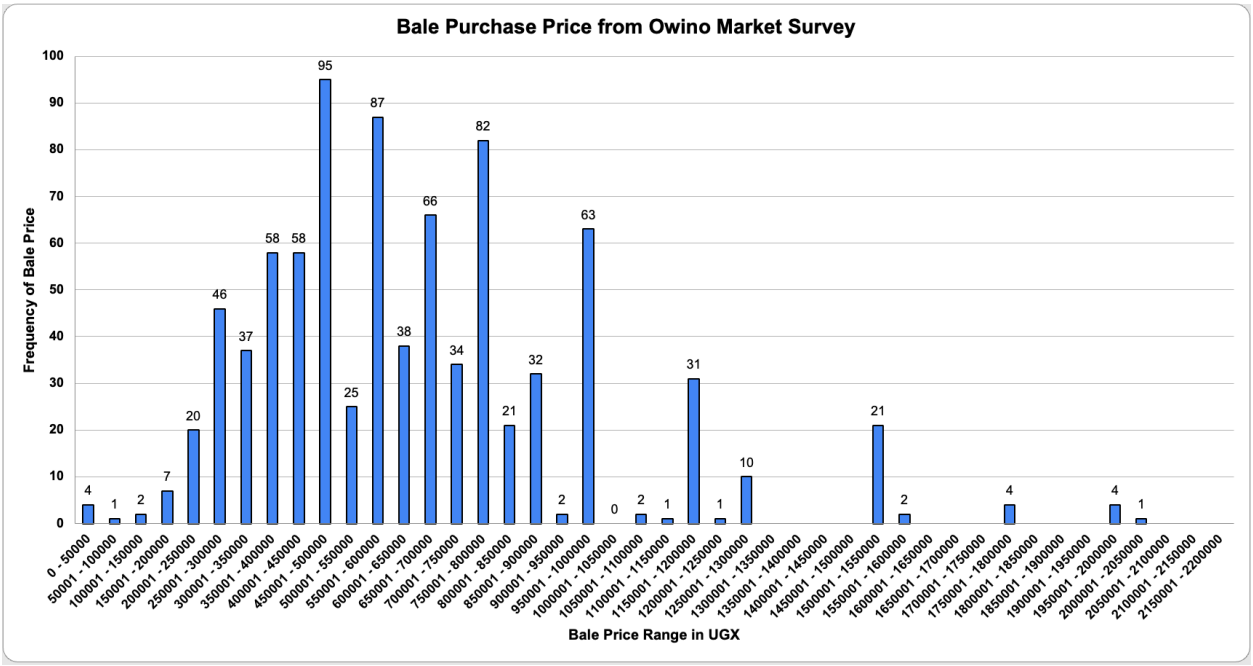
3B.3 Examining Economic Inclusion in the Sector

This section examines the variation in bale pricing and weight, as well as fagi and rag trading prices, and discusses economic inclusion in the SHC market.

3B.3.1 Bale Pricing and Weight Variation



Graph 7. Bale weight frequency, Owino Market



Graph 8. Bale purchase price frequency, Owino Market (June 2024; 1 USD = 3,750 UGX)

Bale weight varies based on sales channels and importer needs, and directly impacts the number of bales per container, purchase price, and turnover rates. **Bale sizes, grades and pricing were found to vary widely, accommodating different market participants.** This variability allows 61% of retailers and 39% of vendors to purchase multiple grades of SHC, targeting specific customer segments based on gender, age, clothing type (e.g. t-shirts, jeans, dresses), and bale size. The ability to choose from various bale sizes and grades enables retailers to align their purchases with their target market and available capital, facilitating diverse entry points into the trade. **The 45 kg size is favoured as the most practical choice for importers for its balance of economy and efficiency, optimising space, handling, and transportation costs** and has a typical variation of ±2 kg (up to ±5 kg for 100 kg bales).

3B.3.2 Fagi and Rag Trading Prices

Textile waste is distinct from fagi and rags, which retain economic value. Drilling down into the reused textiles in section 3B. 2.4, fagi items are estimated to constitute 22.7% to 23.2% of a bale and are actively traded as wearable clothes.

In graph 9, the purchase and selling price of fagi is depicted in blue and red respectively. It highlights a notable disparity between the purchase and selling prices of fagi, reflected in the data for rags (shown in graph 10). Notably, the purchase and selling prices for fagi are consistently higher than those for rags, further validating the distinction between these sub-

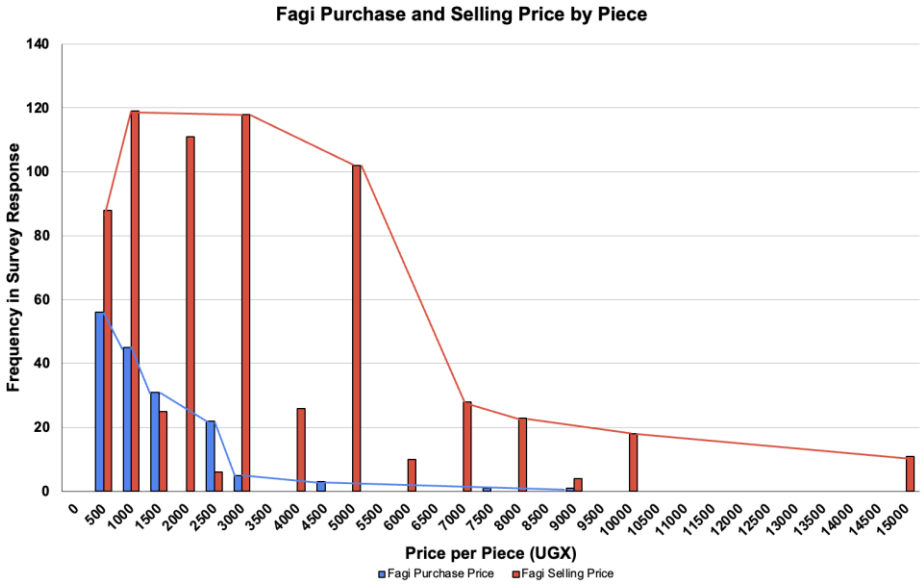
categories that greater economic value is associated with fagi compared to rags and underscores the distinct market dynamics at play within these textile categories.

The survey revealed that fagi is purchased most frequently (the mode) for up to 500 UGX (0.13 USD) for an individual piece and sold for 1,000 UGX (0.27 USD). The second most common price frequency is 3,000 UGX (0.80 USD) – see graph 9. The wide mean distribution indicates a significant variance in price, attributed to factors such as differing selling prices with the duration for which the clothing has been held in inventory.

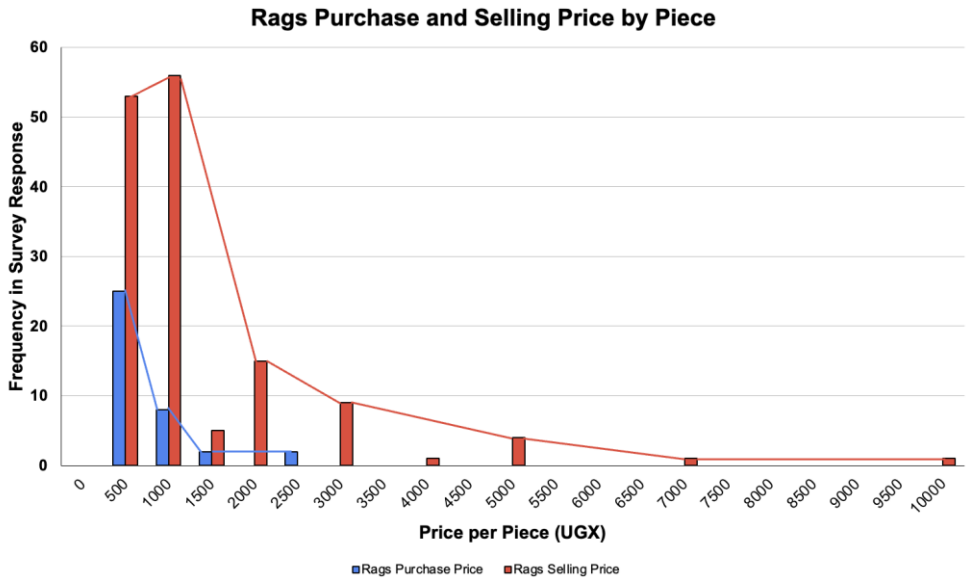
Fagi provide a crucial affordable option for individuals who cannot afford clothing from the first and second sub-categories. It allows a significant segment of consumers to purchase wearable clothes at a lower cost, ensuring broader access to clothing within the market.

Whereas fagi are sold for their original intended reuse as clothing, rags are not but rather meet a demand for cleaning materials. The most frequent purchase price is up to 500 UGX (0.13 USD), and the second most common price frequency is 500 UGX (0.13 USD) to 1,000 UGX (0.27 USD).

Note that the data in this section represent the frequency of response, and are not weighted to the number of pieces the traders are selling



Graph 9. Comparison of the purchase and sale price of fagi, Owino Market (June 2024; 1 USD = 3,750 UGX)



Graph 10. Comparison of the purchase and sale price of rags, Owino Market (June 2024; 1 USD = 3,750 UGX)

3B.3.3 Economic Inclusion in the Second-Hand Clothing Market

The variation in prices illustrated above demonstrates that the SHC market accommodates individuals with varying levels of capital and diverse financial backgrounds, whether as vendors operating in or entering into the market or as consumers purchasing second-hand clothing. Notably, 58% of retailers have experienced economic mobility, with similar patterns observed across genders**.** Among the women retailers in Owino Market, 102 out of 212 (48%) began their careers as vendors, while 162 out of 282 (57%) male retailers started as vendors. Vendors enter the market with different levels of capital; for instance, the minimum capital required for purchasing fagi is 500 UGX (0.13 USD) per piece of clothing. Vendors often mix various grades to optimise sales, with purchasing prices ranging from 2,000-4,000 UGX (0.52-1.04 USD) per piece. This approach facilitates economic mobility, allowing vendors, whether male or female, to start small and accumulate wealth and eventually make larger investments, such as purchasing a bale. For those that lack capital to enter the trade as a vendor, males tend to begin their journey in the SHC trade as a bale carrier, while women frequently start their careers working as shopkeepers for the retailers, distributors, or importers. The variation in bale price discussed earlier also accommodates a wide range of market participants, regardless of education level or gender, supporting improvements in economic status across the board.

Alphat, a young man with a plan: Life hasn't been easy for Alphat, who grew up in Makerere Kivulu 1, a slum area in Kampala. At 19, Alphat's life took an unexpected turn. Originally studying phone and computer repair, he had to drop out during the pandemic to support his younger siblings. With his resilient nature, he started working as a cleaner in a building bustling with traders, importers, and distributors. Each month as a cleaner he was paid UGX 335,000 (USD 90). His goal was then to become a vendor, but adversity in life had depleted his savings. His sociable and hardworking nature helped him form connections with shop owners and regular visitors. Eventually, Alphat's dedication paid off when he secured a position as a bale carrier and broker for an importer being paid UGX 400,000 (USD 108) per month, plus commission. Now he has saved enough money to purchase bales and plans to capitalise on the upcoming high season in October to December by selling to vendors, steadily moving towards his new dream of becoming a retailer and distributor.

3B.3.4 Market Participation for Tailors

Tailors in Owino Market play a strong role in obtaining textiles as new fabric, imported new or used clothing, and other used textiles. The relationship between retailers, vendors, and tailors is symbiotic. **Tailoring services play a crucial role in the supply chain by customising and repairing second-hand clothing, which aligns the products with market preferences and increases their market value.** This collaboration not only ensures a steady flow of high-quality materials to tailors but also supports their businesses.

The results of the survey of 91 tailors show that 60% of tailors work with walk-in clients and 37% of tailors work with pre-selected suppliers. The other 3% have other arrangements. The tailors receive contracts to create various products out of new fabric, or otherwise receive used clothes from retailers and vendors for resizing or repurposing according to customer demands. Tailors also perform minor repairs, increasing the clothing's appeal and value, enabling sale at a higher price.

It is noteworthy that 99% of the materials tailors receive from retailers, vendors, and end-consumers consist of Grade A or Grade B clothing, rather than fagi or rags. This preference for higher-grade materials underscores the focus on maintaining quality and maximising the economic value of the garments.

Objective B Conclusion

The analysis of the SHC market reveals significant insights into the dynamics of textile waste, grading systems, and economic inclusion. This section followed the flow of bales from import as Category A, B or C to sub-categorisation as first class, second class, fagi or rags upon opening. Whilst the studies cited earlier consider fagi waste, this study shows that there is consistent demand for the purchase and resale of fagi. Notably, 12% of retailers specifically purchase fagi-grade bales. For vendors, who purchase individual pieces, 14% specifically

purchase fagi items for resale. As fagi is sold for intended reuse as clothes they are not classified here as waste. Whereas fagi are sold for their original intended reuse as clothing, rags are sold to meet a demand for cleaning materials. Again, these should not be considered waste given they are sold for reuse. Understanding the grading system and sub-categories within bales enables an assessment of the economic value of second-hand clothing and developing effective waste management strategies. The perception in other studies that fagi is waste, i.e. does not have an economic value, does not hold true in the Owino Market SHC context.

Of 891 retailers and vendors surveyed, 13.4% of respondents reported no residual items, i.e. no waste, as all items are sold. The remainder implement stock management strategies. The 772 with residual pieces were asked at what point they consider clothing to be waste, to which 45.2% reported that nothing remains as waste since all pieces of clothing are sold. Others consider an item to be waste when it is torn, or appears old, faded or stained.

In Owino Market the predominant point of SHC textile waste arising appears to be as retailers open bales and categorise items for sale as individual pieces and as stock remains unsold. Respondents estimated that 96.7-96.5% of the pieces in an imported bale were reused as clothing, with an estimated 3.3-3.6% comprising items that do not meet the intended reuse as clothing criteria, i.e. rags and waste. Even rags, although not utilised for their original purpose, retain market value by being sold for cleaning purposes and are thus not disposed of as waste at this stage in their lifecycle. Based on the distribution of pieces within a bale, SHC textile waste by pieces was estimated to be 0.9-1% of the total number of items within a bale. Given the turnover of bales, this nevertheless represents a significant volume.

Bale sizes, grades and pricing were found to vary widely, accommodating different market participants. The 45 kg size is favoured as the most practical choice for importers for its balance of economy and efficiency, optimising space, handling, and transportation costs. Fagi provide a crucial affordable option for individuals who cannot afford clothing from the first and second sub-categories, both in terms of entry to the market for traders and for a significant segment of consumers to purchase wearable clothes at low cost.

When examining the economic mobility of retailers and vendors, it was found that 58% of retailers experienced upward mobility, regardless of gender. Retailers typically start at entry-level positions, such as vendors, particularly when they have limited capital. For those without the capital to begin as vendors, men often enter the trade as bale carriers, while women frequently start their careers as shopkeepers for the retailers, distributors, or importers. The SHC market accommodates individuals with varying levels of capital, enabling broad participation across different financial backgrounds. This economic inclusivity allows for a diverse range of participants to engage in the market and move up the economic ladder. Notably, the level of education does not appear to significantly impact economic mobility in this context.

The next objective examines the characteristics of textile waste from Owino Market by measuring the sizes and estimating the volume of discarded materials.

OBJECTIVE C: UNDERSTANDING OWINO MARKET WASTE MANAGEMENT PRACTICES AND TEXTILE WASTE CHARACTERISTICS

3C.1 Introduction

Upon identifying that volumes of waste within bales were estimated at 0.9-1%, the research team extended its research to conduct a thorough analysis of the destination and characteristics of textile waste generated within Owino Market to better understand these findings. This enabled a deeper understanding of the points of origin of the market's waste, waste management practices and the specific nature of the textile waste. By analysing these characteristics, targeted solutions to address the waste effectively can be developed.

This section explores:

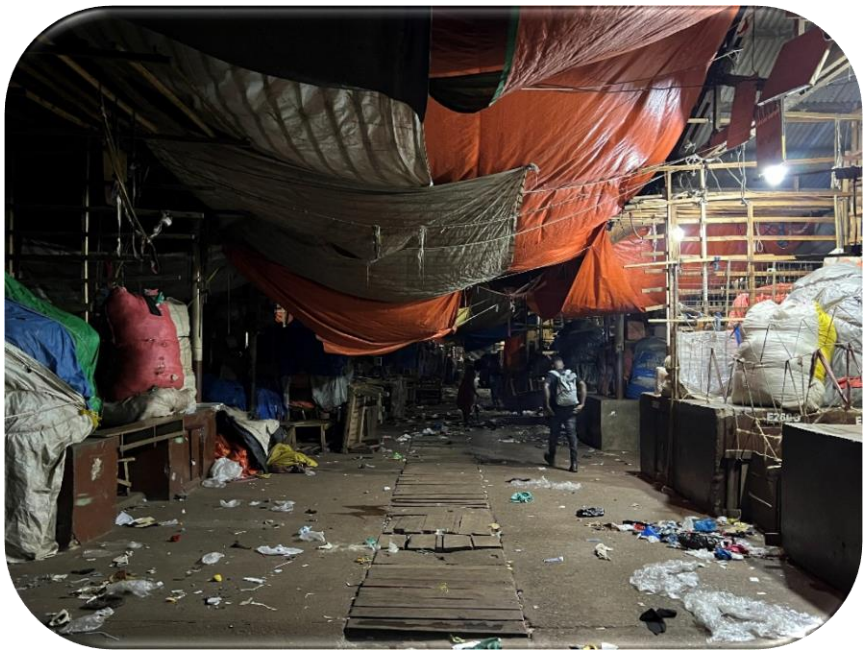
1. **Stakeholder Identification and Mapping** of those involved in textile waste management at Owino Market, both the formal and informal systems currently in place.
2. **Waste Sources and Volume Analysis** to pinpoint the sources and volume of textile waste generated within the market to provide a comprehensive understanding of the waste landscape.
3. **Textile Waste Characteristics Assessment** to analyse the characteristics of the textile waste, specifically focusing on the sizes of the textiles being disposed of within the market to help create tailored solutions for the specific types of waste found.

3C.2 Waste Management and Textile Waste Collection in Owino Market

Under the Market Act, Part V, Section 23 by the Ugandan Government, locations are allocated for waste disposal. Kampala Capital City Authority (KCCA) is responsible for waste collection and market cleaning. KCCA cleaners commence their duties after the market closes, sweeping and collecting the day's waste. The market employs 46 casual workers who support these activities, operating in two shifts: the morning shift from 7:00 am to 1:00 pm, and the night shift from 8:00 pm to 1:00 am.[34] This routine ensures the market remains clean and organised for the next day's activities.

During the day, designated roadside waste disposal locations in Owino Market mainly contain organic waste, with minimal to no textile waste. These sites receive loose waste deposited directly on the ground by cleaners and traders, which prolongs the collection process as cleaners must shovel the waste onto the trucks for removal.

A collection truck circulates throughout the day, moving from one designated area to the next until it is full, at which point it transports the waste to the Kiteezi (at the time of writing – see earlier note). Dedicated to waste collection, the truck makes rounds once in the morning and once in the evening. Due to maintenance challenges with the weighbridge at Kiteezi, data on the exact weight of the collected waste was unavailable.



In the evening, after the market closes around 7 pm, security becomes a primary concern to ensure the safety of goods and infrastructure. Various measures are employed to secure the market. The gates are securely locked to prevent unauthorised access and deter theft. Security guards are stationed at various points around the market and patrol the area throughout the night. Adequate lighting is installed around the market premises to facilitate easier monitoring by security personnel. Additionally, ropes are tied across narrow pathways to prevent unauthorised access and passage, further enhancing security measures.

As the market quietens down, the sounds of sweepers and the occasional hum of a tailoring machine can be heard. During this time, formal waste cleaners and five confirmed informal textile waste collectors collaborate to manage the market's waste. The **informal collectors operate alongside formal cleaners and specialise in gathering uncontaminated textile waste** in areas with high concentrations of tailors, which is then sold or used other purposes. **The textile offcuts can be purchased directly from informal collectors, with prices varying based on whether the material has been pre-sorted.**

Estimates were made by counting the number of bags over a few days on volume of textile generated to determine that the majority of offcuts (69%) were contaminated and swept up by the formal cleaners. These are available for free collection as they are otherwise taken to the landfill. The remainder, the uncontaminated materials, are collected and available for sale, and can also be purchased from tailors directly, who would put the textile waste into a *gunia* bag for waste separation. KCCA could instruct all tailors to do this separation and officials could help on reinforcement. This data was observed by the researchers and explained or confirmed by the officials that accompanied them.

3C.3. The Volume of Textile Waste Generated from Owino Market

As established earlier, the 0.9-1% of waste arising directly at the time of opening bales could equate to 800,000 kg annually.

Informal collectors operate both mornings and evenings, targeting areas with high concentrations of textile waste around the tailors. They collect uncontaminated textile waste into durable polypropylene (PP) sacks designed to hold and transport bulk and heavy materials. The majority of the textile waste, which is mixed with organic waste, is collected by the formal waste cleaners and removed to landfill (Kiteezi at the time of writing).

The average weight of the uncontaminated textile waste sacks was found to vary from 38-47 kg, as there are no current standards for filling and collection by informal collectors. Taking an average of 42.5 kg and multiplying this up by the average estimated high (57) and low (49) number of sacks per day as indicated in table 8, the study establishes that there is a **total weight ranging from 14,535-16,915 kg per week or 755,820-879,580 kg annually. This equates to 27-31 containers (assuming 28 tons per container) per year. This consists of various sources of textile waste including new and used clothing and other fabric, including traditional fabric such as kitenge** (a type of fabric popular in East, Central, and West Africa known for its vibrant colours and bold patterns, which are often deeply symbolic or tied to local customs and traditions). **A limitation of the study is that the estimation is based on spot checks over a few days, and there could be variations in volumes and type depending on e.g. seasonality or workload of the tailors. In order to quantify the total volume generated from Owino Market, further analysis would be needed.**

In the visual inspections of the textile waste only offcuts were visible, which means it originates from the tailors within Owino Market, who tailor SHC and new fabric to specific customer preference.

Total Textile Waste Collected by Informal Collectors

	Average Sack Weight	**42.5**
	Average Sacks (Low)	Average Sacks (High)
Average Sacks Per Day	49	57
Total Sacks Per Week	342	398
Total Sacks per Year	17,784	20,696
Yearly Weighth (Kg)	755,820	879,580

***Textile waste generated includes new and SHC offcuts

Table 8. Total textile waste collected by informal collectors, Owino Market

Textile offcuts hold value in various applications. Some are sold for use as furniture and pillow stuffing, while others are used more detrimentally as fuel for burning. The price is dependent on the sources of the seller and specifications, such as sorting (see table 9).

Prices of textile offcuts per sack (average weight 42.5 kg)		
	Tailors	**Informal Waste Collectors**
Unsorted	5,000 UGX - 10,000 UGX 1.35 USD - 2.70 USD	3,000 - 4,000 UGX 0.81 USD to 1.08 USD
Sorted (upon requirement from the buyer)	Dependent on the requirement	8,000 UGX - 10,000 UGX 2.16 USD - 2.70 USD

Table 9. Prices of textile offcuts per sack (average weight 42.6 kg), Owino Market

3C.4 Examining the Characteristics of the Textile Waste Generated

Any potential for textile waste reuse would be limited by the characteristics of the textiles found, e.g. size, material. For the study, a visual inspection of piles of waste around the market was made and no full pieces of clothing were observed. **Textile waste collected from the floor was assumed to be primarily tailor-generated offcuts, while floor waste in the market would come from all market participants. It was observed that textile waste at Owino Market is mainly offcuts.** For a more detailed analysis, three samples totalling 333.5 kg of textile waste were collected randomly from both market sweepers and tailors on a weekday split across various weeks. Around 0.3-0.4 kg of full piece clothing (two items) were found torn and heavily stained, likely having been used as rags before disposal, while the rest consisted of off-cuts.

Though the sample is small, it indicates that **the textile waste collected from Owino Market primarily consists of offcuts rather than full pieces of clothing, which has implications for reuse.** As size has implications for reuse, the size of the off-cuts was examined (see table 10). The 10,000 UGX bill was used as the reference size for the offcuts from the tailors because everyone in the context could imagine and relate to this size. This has standard dimensions of 14.3cm x 7cm = 100.1cm^2.

Offcuts from the tailors tended to be larger than a 10,000 UGX bill, whilst floor textile waste was more mixed in size. The sample taken enabled a pilot of a sorting methodology (see later section).

	Offcuts (from tailors)	Textile waste from the floor
50% or less of the surface area of a 10,000 UGX bill	3 kg	18 kg
50% to a full size of the surface area of a 10,000 UGX bill	5 kg	24 kg
Pieces larger than 100% of the surface area of a 10,000 UGX bill	51 kg	29 kg
Full pieces of clothing	0 kg	0 kg
Total detailed sorting	***59 kg***	***71 kg***

Table 10. The size of the off-cuts was examined, given this has implications for reuse, in comparison to a 10,000 UGX bill (14.3 x 7 cm). Decimal rounding accounts for the discrepancy in the totals.

To explore potential solutions for offcuts waste, tailors were asked about the types of material compositions they use. **The majority of materials used by tailors are natural fibres such as cotton, with kitenge being the second most commonly used.** Kitenge is typically made from 100% cotton or a blend of cotton and synthetic fibres. **The diversity both in material composition and size variation creates complexity for creating an effective solution for the textile waste generated from Owino Market.**

A sound sorting process will be crucial for maintaining consistent quality and ensuring the viability of future products. Additionally, the variability in textile waste may require the use of different machines to effectively process the materials into new products.

Objective C Conclusion

The investigation into Owino Market's waste management practices and textile waste characteristics has provided a comprehensive overview of the existing systems and the nature of the waste generated. The market's waste management practices involve both formal and informal systems. Formal waste collection is managed by KCCA, which operates cleaning shifts after market hours. Informal textile waste collectors play a crucial role in

gathering uncontaminated textile waste, which is then repurposed for various uses such as furniture stuffing, pillow stuffing, or cooking fuel. Most offcuts (69%) are available for free collection, while the remainder are available for sale.

Based on the average weight of the textile waste sacks estimated high and low number of sacks collected per day, the study establishes that there is a total weight ranging from 14,535-16,915 kg per week or 755,820-879,580 kg annually. A limitation of the study is that the estimation is based on spot checks over a few days, and there could be variations in volumes and type depending on e.g. seasonality or workload of the tailors. In order to quantify the total volume generated from Owino Market, further analysis would be needed.

As section B showed, the percentage of waste per bale, as estimated by traders, is relatively low, ranging from 0.9-1%, though in real terms this still equates to 800,000 kg per year. The random sampling of 333.5 kg of textile waste from Owino Market, which revealed that only 2 items of full pieces (torn and heavily stained) seems to confirm the low percentage of waste arising immediately from bales in the SHC market.

In various visual inspections of the textile waste almost only offcuts were visible, which means the primary source of waste is the tailors operating within Owino Market. A more specific inquiry on the waste arising immediately from the bales and how they are disposed of would provide useful information to inform whether and how these can be intercepted and whether this would detract from another reuse initiative already in place.

The fact that the waste consists almost entirely of textile offcuts of differing sizes and a mix of fibre compositions has implications for reuse options. The variability in the size and composition of textile waste presents challenges for consistent production, necessitating different size-based sorting methods and potentially machinery for effective processing into new products. Alternatively, repurposing could be for other products like mattress filling, mats, carpets, etc. rather than clothing.

The study highlights that there is a value to the textile offcuts, with prices varying based on the source and level of sorting. Informal collectors and tailors sell these offcuts, contributing to a secondary market within the waste management ecosystem. This provides valuable insights into the complexities of textile waste management and opportunities for reuse at Owino Market, emphasising the need for tailored strategies that consider the unique characteristics of the waste and the market's existing systems.

OBJECTIVE D: CREATING SOLUTIONS TO ADDRESS TEXTILE WASTE GENERATED FROM OWINO MARKET

3D.1 Introduction

The market assessment was conducted to evaluate the levels of waste within second-hand clothing bales and to identify potential uses for this waste. The findings indicate that the previously cited estimates of 40% waste per bale appear not to apply to the Owino Market context, but rather a much lower percentage of 0.9-1% which equates to circa 800,000 kg annually. The random sampling of 333.5 kg of textile waste from Owino Market, which revealed that only 2 items of full pieces (torn and heavily stained) seems to confirm the low percentage of waste volumes from the SHC market. The study estimates a total weight ranging from 14,535-16,915 kg per week, or 755,820-879,580 kg annually of uncontaminated offcuts are generated from Owino Market. There is also contaminated textiles waste, but this is extremely limited in its reuse potential and not investigated further in this study.

This section explores:

1. **Insights from textile recyclers in Panipat, India for the practices and waste characteristics observed at Owino Market:** Panipat is a significant hub in India for the textile recycling industry. It is a centre for processing imported second-hand clothing waste, contributing to its reputation in the recycling and textile sector. The recyclers employ detailed sorting techniques based on fabric composition, colour, and quality to maximise the value extracted from textile waste.

2. **Product creation and testing financial feasibility:** This section looks at the development of products from collected textile waste and evaluates their financial viability.

3. **The environmental impact of diverting waste from the landfill:** By analysing the reduction in waste volume sent to landfills and the reuse of materials rather than use of virgin materials, WasteAid's planned project will be able to calculate its contribution to lowering greenhouse gas emissions caused by waste.

3D.2 Insights from Panipat for Waste Management Practices at Owino Market

This section explores textile recycling practices in Panipat, Asia's Largest Textile Recycling Hub, and relevance to the specific context of Owino Market.

3D.2.1 The City of Weavers: the textile hub of Panipat

Panipat, often called the "City of Weavers," is a key textile hub in Haryana, India, located about 90 km north of Delhi. The city specialises in processing both pre-consumer textile

waste from northern India and imported second-hand clothing. Panipat's mechanical recycling machines, operating at various scales, focus on opening the fibres of textiles with high single-fibre compositions like cotton, wool, and acrylic, each requiring specific machinery settings due to distinct fibre properties.

Recyclers like Jindal Industries utilise efficient sorting methods, dyeing, and recycling to turn fibres into yarn. Imported used clothing, particularly knitted sweaters, is first sorted by composition (e.g. wool, cotton, acrylic), then by colour and condition. Non-fabric elements like zippers and buttons are removed, and the fabric is dyed if necessary before entering the recycling process. Similar sorting techniques are used by other recyclers handling cotton and wool[11] and were observed by the study's authors.

A key difference compared to textile waste from Owino Market is the size of the textiles, which can affect the efficiency and results of the recycling process.

3D.2.1 Adapting Panipat's Mechanical Recycling Techniques to Optimise Textile Waste Management in Owino Market

The waste sorting practices observed in Panipat provided a foundational framework, which was subsequently adapted to address the distinct characteristics of the textile waste generated in Owino Market and trialled by the research team with a team at Kyambogo University through practical application to provide a robust recommendation on sorting. This tailored model is designed to optimise waste management by considering key factors such as fabric construction, colour, fibre composition, size, and condition, which are crucial in determining the appropriate processing and upcycling pathways for the materials (see table 11). The sorting is applied to textile waste by dividing it into heaps based on the sorting process criteria given and variables identified. This results in piles of materials split by whether they are knitted or woven. These are then further split by colour, then type of fibre, size and finally condition.

Sorting Process	Variables	Details
Original construction process	Type of fabric construction	Fabrics are made through two primary processes: knitting and weaving, with additional factors of spinning system and twist level. The type of construction is the first criterion for sorting textile/fabric waste and impacts recycling options.
Colour	Number of colours	Colour helps in the design process. Fewer colours are preferred as it means that more material is available for use for each of these colours than in a bag with many different colours. Once the construction process has been fully considered, then colours are sorted, resulting in different colours for knitted or woven heaps.
Fibre composition	Type of fibre	The type of fibres used in yarn construction influences the properties of the garments made from the fabric. Different fibre compositions affect the upcycling or recycling potential of the textile waste.
Size	Size of fabric	Larger and longer fabric offcuts provide more material, making new product creation easier with less labour. Larger pieces can be repurposed into clothing, bags, and home decor items. The UGX 10,000 note was used as the reference size for the offcuts from the tailors because everyone in the context could imagine and relate to this size. This has standard dimensions of 14.3cm x 7cm = 100.1cm^2
Condition	Wear, damage, and usability	The wear, damage, and usability of the fabric pieces determines their suitability for various recycling or upcycling applications. Pieces in better condition can be upcycled, while heavily worn or damaged pieces may be used for recycling or stuffing. Collection method could impact the condition.
Removal of excess items on the fabric		After sorting, non-fabric elements like zippers, tags, labels, buttons, and trims are removed. This can be done either manually or with specialised shredding machines that extract these.

Table 11. Suggested process for adapting Panipat's mechanical recycling techniques to optimise textile waste management in Owino Market

3D.2.2 Implementation of the Sorting Methodology and Pilot Product Creation

Once the textile waste had been sorted into various piles according to the aforementioned sorting criteria in the study's pilot, a collaborative team of fashion students, art professor, and textile specialists was assembled to trial the generation of ideas for utilising the material. Engaging professionals who interact directly with consumers is crucial for ensuring that products meet market demand. The products were developed by experts with a strong understanding of marketability, and user (potential end-buyers) feedback was integral to aligning them with consumer needs. This user-centred approach is key to creating products that are not only market-ready but also likely to be successfully adopted and satisfy customer expectations. Due to limited equipment, the pilot products were created using the technology currently available within the Ugandan context. Prototypes were tested, refined based on feedback, and iterated to improve solutions.

The sorting process, which considers fabric construction, colour, fibre composition, size, and condition, was a useful step for repurposing textile offcuts into marketable products. Interestingly, the perception of the textiles by those involved in the pilot shifted from being seen as waste to being viewed as raw material after it has gone through the sorting process. This shift in mentality was crucial, as it encouraged participants to think creatively and freely about potential solutions without judgement and explore diverse ideas and innovative approaches to repurposing the materials.

Various products, including tops, wall hangings, art pieces, floor mats, and table mats, were developed, demonstrating the potential to adapt global textile recycling practices to the specific context of Owino Market. These products underwent multiple revisions to suit different skill levels, with pricing tailored to the target market. The product catalogue can continue to evolve, incorporating further feedback from the makers and consumers.

As the SMEP project develops, there **may be opportunities to explore the acquisition of specialised garneting machines for processing both pre-consumer and post-consumer waste.** Garneting is a process in the textile recycling industry where textile waste is mechanically shredded or broken down into loose fibres which can then be spun back into yarn or used in the production of nonwoven fabrics. However, it is crucial to conduct further

analysis to ensure that post-consumer material is not already being utilised and that a project does not disrupt the existing market. Additionally, a more detailed analysis of the textile composition is needed to inform and optimise the recycling process.

3D.3 Product Financial Feasibility

Next, the pilot assessed the financial feasibility of using tailor offcuts from Owino Market to create new products whilst minimising waste. This ensures that the repurposing efforts not only address environmental concerns but also contribute to the economic opportunities of the local community. The planned project will put in place a textile reuse hub, and it is assumed that in future the production of items made from reused textiles will contribute to the financial sustainability of the hub beyond the SMEP funding. This section breaks down the financials based on the executed raw material acquisition to product production time. This is *not* a full business model for the hub, but rather demonstrates 'part of the picture', to which other income and costs such as overheads and running costs must also be factored in.

Tailor offcuts were sourced directly from informal collectors operating within Owino Market, with a price range of UGX 3,000-5,000 (USD 0.81-1.34) per 42.5 kg average sack and otherwise used e.g. as cooking fuel. Storage and logistical costs associated with maintaining safekeeping and delivery to Kyambogo University for the innovation creation are factored into the calculations (see table 12). The processing time (hours) of the 5 purchased sacks for various tasks was measured. The corresponding personnel cost, assuming UGX 20,000 (USD 5.39) per day for novice tailors, was used to calculate the total personnel cost of material sorting and preparation, as well as the production. See tables 13 and 14. The various products' selling prices were determined based on the market pricing of similar quality goods, with production capacity defined per day).

Material and Logistics Cost	**Cost per Sack**	**Number of Sacks**	**Total Cost**	
Cost of Scrap Material	3000	5	UGX	15,000
Cost of Storage Overnight	1000	5	UGX	5,000
Cost of Transportation to per Bag (5 Sacks per Truck)	5000	5	UGX	25,000
Raw Material Total Cost	**9000**		**UGX**	**45,000**

Table 12. Cost of tailor offcuts, storage and transportation from Owino Market to Kyambogo University

Material Preparation Time	Processing Time (number of hours)	Number of Personnel	Compensation Cost for 8 hr workday equivalent
Sorting Time	1	5	UGX 12,500
Cleaning & Material Preparation	16	5	UGX 200,000
Total Cost			**UGX 212,500**

Table 13. Cost of processing time for tailor offcuts from Owino Market

Product Production	Production Time	Number of Personnel	Product Labor Cost	Number Produced per Day	Selling Price	Total Revenue
Rugs	1	1	UGX 20,000	2	UGX 50,000	UGX 100,000
Bags	1	1	UGX 20,000	6.5	UGX 15,000	UGX 97,500
Table Mats	1	1	UGX 20,000	5	UGX 30,000	UGX 150,000
Designer Pillows	1	1	UGX 20,000	8	UGX 30,000	UGX 240,000
Total			**UGX 80,000**		**UGX 125,000**	**UGX 587,500**

Table 14. Cost of production of new items from reused tailor offcuts from Owino Market

A summary profit and loss statement for direct cost of goods sold (COGS), excluding overhead costs, showed a net profit of 17,094 UGX (4.6 USD) per novice per day (table 15). Assuming that professional tailors are twice as efficient as the students, the improved efficiency would reduce pre-production and production costs and increase production, resulting in a net profit of 67,265 UGX (17.9 USD) per tailor per day. This outcome will vary depending on the specific product selection, determined by customer base.

Transforming offcuts into items such as mats and carpets or shredding of textile waste for manufacturing uses such as pillow stuffing offers a promising pathway to reduce waste and create jobs. The quantity and mix of products will depend on the ability to secure niche offtake markets or produce items in mass for general consumption. **With a wide range of products and targeted offtake markets available, this case study demonstrates financial viability of this example solution. It would be important to create a diverse product to meet various local market demands and for the full utilisation of the offcut material.**

Summary (Per 5 Bags Material)	Students	Professional Tailors
Revenue	**UGX 587,500**	**UGX 1,175,000**
Cost Total	**UGX 337,500**	**UGX 191,250**
Raw Material Cost	UGX 45,000	UGX 45,000
Pre-Production Process Cost	UGX 212,500	UGX 106,250
Production Labor Cost	UGX 80,000	UGX 40,000
Profit and Loss	**UGX 250,000**	**UGX 983,750**
Hour Spent	117	117
Profit per Hour	UGX 2,137	UGX 8,408
Profit per Day (8 hour work day) in addition to wages	**UGX 17,094**	**UGX 67,265**

Table 15. Summary profit and loss statement for direct cost of goods sold (COGS), excluding overhead costs showed a net profit of 17,094 UGX (4.6 USD) per novice per day

3D.4 Determining the Environmental Impact on Diverting Textile Waste Generated from the Market

A project to divert waste textiles in Owino Market into reuse would support a reduction in the volumes of waste requiring management, i.e. collection, transfer, management at landfill, dumping and/or burning, and therefore contribute to carbon reductions in the most significant SHC and textile market in Uganda. It would create a move towards a more circular economy as the lifespan of materials is extended.

Quantifying the reduction in greenhouse gas (GHG) emissions as a result of the intervention should assess two elements compared to the current status quo, where waste textiles would continue to be discarded and assumed to be burned, either immediately or in time to reduce the volume of dumps:

1. **The GHG emissions avoided by diverting textiles away from burning for reuse;**
2. **The GHG emissions avoided by not producing and using virgin materials in manufacturing, but rather reusing textiles.**

The calculations are complex if the full diversity of materials diverted for reuse is considered as each bag of waste textiles is different, varying by factors such as material, composition, manufacturing processes, etc. Similarly, there is complexity for the calculations in how the materials are reused. A number of parameters and conservative assumptions must be applied in order to establish high-level methodologies for modest estimates of the GHG emissions avoided, which are presented below. Note that the methodologies focus on the reuse of tailor offcuts, given that this is the predominant source of waste at Owino Market.

It should be noted that, unless large CAPEX is allocated, there isn't like-for-like product value from fibre extraction and re-spinning, for a variety of reasons. A straight line can't be drawn between recycled fibre products and virgin fibre products. However, a reduction in GHG emissions can be acknowledged, due to the fibres (or small pieces of fabric) being put to use in applications other than decomposing in landfill or being burnt.

3D.4.1 GHG emissions avoided by diverting waste textiles for reuse

The aim of WasteAid's planned intervention is to reduce textile wastes by establishing textile recycling and reuse initiatives. It is assumed that textiles would continue to be dumped and incinerated if it were not for the intervention.

The general approach to calculate GHG emissions from the open burning of waste is to obtain the amount of dry weight of waste open-burned (differentiated by waste type if practical) and to calculate the emissions by applying applicable GHG emission factors, such as those provided by the Intergovernmental Panel on Climate Change (IPCC) if more specific data is not available. The waste would be differentiated by type of fabric if practical, but determining the exact composition isn't feasible in the context at this stage.

Assumptions

- Open burning takes place throughout the year.
- The rate of burning for the various waste materials are uniform.
- The emissions associated with the combustion of solid textile waste have been determined using the equation below and parameters in the table.

Equation

IPCC equation for the CO_2 emission estimate based on the total amount of waste combusted:

$$CO_2\ emissions = SW \times dm \times CF \times FCF \times OF \times \frac{44}{12} \times Frac_{open\ burned}$$

Parameters

Descriptions for parameters required to estimate GHG emissions from the burning of waste.

Parameter	Description	Unit
CO_2 emissions	CO_2 emission in inventory year	Metric tonnes/year

- Referenced in the 2006 IPCC guidelines, the amount of waste open-burned is the most important activity data required for estimating emissions from the open burning of waste. Conservatively, the amount (metric tonnes) of waste open-burned is assumed to be equivalent to 60% of the amount of waste diverted by the project teams.
- Default IPCC emission factors are applied to calculate the CO_2 emissions from open burning of solid wastes.

- IPCC factors are applied for the following parameters [1],[2] since country-specific data was not available:

    - SW = Dry matter content (wet weight) of the solid waste = 80%
    - dm = Fraction of dry matter content in the MSW
    - CF = Carbon content fraction in the dry matter = 50%
    - FCF = Fossil carbon fraction of plastic = 20%
    - OF = Oxidation factor = 100%
    - $Frac_{open\ burned}$ = Fraction of waste amount open-burned = 60%

This can be differentiated by waste type (e.g. cotton or polyester) if practical and using the specific values for that material in step 2.

3D.4.2 GHG emissions avoided by reuse of textiles

The method above assesses the GHG emissions avoidance by diverting the textile waste, but does not yet include savings from the reuse of the material over manufacture of virgin materials. In other words, it doesn't capture the entirety of the GHG emissions savings, which is addressed here. **To make the calculation the GHG emissions of reuse is subtracted from new production for a given item. The resulting difference is the net GHG saving.** As before, a number of parameters and conservative assumptions must be applied. Note that the savings will be product-dependent. An example is used to illustrate the methodology.

The methodology is based on the European Recycling Industries' Association's Textiles Life Cycle Assessment (LCA) of the management of European used textiles, in absence of a methodology better suited to the Sub-Saharan Africa context.[6] This approach focuses on the LCA of garments by defining incremental processes and their corresponding GHG footprints.

Assumptions

The following assumptions were made to adapt the specifics of Owino Market SHC tailor offcuts to the LCA EcoInvent database.

- **Survey Results**: Tailors at Owino Market utilise Grade A, B, and C textiles for new clothing design, repurposing, resizing, and patching. Hence, the composition of offcuts will primarily consist of these grades. It is noted that the local Ugandan Grade A is equivalent to Grade B in the Global North, thus Grade B and C from the LCA-based assessment are used for the GHG calculation basis.

- **Reused Industrial Offcuts**: Tailor offcuts from new fabric equate to reused industrial offcuts.

[2] 2019 Refinement to the 2006 IPCC Guidelines for National Greenhouse Gas Inventories, Volume 5: Waste, Chapter 5: Incineration and Open Burning of Waste: Table 5.2 (Updated). Available here.

- **Transportation Emissions**: The GHG contribution from city transportation within Kampala is negligible compared to the LCA's estimate of 1,320 km land short-haul transport.

- **Confection Emissions**: The emissions from cutting, sewing, and ironing during the production of new clothing are applied to the new products made from offcuts.

- **Categorisation as Reuse**: The reutilisation and production of new products from offcuts are categorised as reuse.

- **Application to Project:** Reuse is considered as taking the SHC and simply re-using it as clothing. The planned project scope examines re-use from a raw material perspective into manufacturing of new products.

- **A Modelling Exercise:** This is a modelling exercise, not actuals, since upcycling is likely to take place towards other materials (rugs, bags) rather than into t-shirts, given current infrastructure and machinery limitations in Uganda.

Modelling

The proposed GHG calculation methodology applied to Owino Market's SHC tailor offcuts is based on capturing GHG savings of reuse versus new clothing by utilising the weight of offcut material as completed fabric. The calculations examine the different stages of manufacture required for each process. The confection stage, including cutting, sewing and ironing of the product manufacture, are parallel in both processes so these are omitted as they are assumed to be the same across each. "End of life", when the item is no longer being used for its original intended purpose is not included. An example of a cotton t-shirt is given later.

Step 1: Assessing the new clothing manufacture	**Step 2: Assessing reuse**	**Step 3: Calculating the difference**
To determine the GHG baseline of new manufacture, the LCA-assessment methodology and database is used to calculate the GHG for the manufacture of a given product from virgin materials, including each of the following stages of manufacture[6]: 1. Fibre production - Production of fibre based on various composition 2. Yarn production - Spinning of yarn 3. Fabric production - Knitting and weaving of fabric 4. Finishing - Wet treatment and drying of fabric during production 5. Confection - Cutting, sewing and ironing.	Due to the nature of utilising second-hand clothing, the specific GHG contribution for the following stages specific to reuse is calculated. 1. Collection, aggregation and transport to sorting facility 2. Manual sorting 3. Transport to point of sale 4. Laundering 5. Confection - Cutting, sewing and ironing.	Differences between the new and reused product will be the estimated net GHG savings due to reuse.

3D.4.3 Example: equivalent GHG savings for new versus cotton t-shirt made from reused material

A generic (i.e. non-Uganda specific) example is given here to illustrate the methodology, whereby the manufacture of a new cotton fabric t-shirt is compared to a reuse cotton fabric t-shirt. The LCA-assessment methodology assesses the GHG contribution differences across steps 1 and 2 above.

Assumptions

- The replacement rate (RP) is the replacement rate of reused product versus new product. Here is it assumed to be a high rate of - 80% as it represents the highest "1-for-1" replacement ratio between new product and reuse product. In the example of the t-shirt, therefore, for every second-hand t-shirt made from reused materials purchased, it replaces 80% the need of purchasing a new t-shirt.[6]
- Grade B is selected, as it is assumed that global north Grade A articles are sold domestically, with Grade B being the primary for export. However, Grade B is rebranded as local Grade A within Uganda.

Modelling exercise

For each t-shirt produced with reused cotton fabric, the model produces a net saving of 2.7778 kg CO_2 over fully new production.

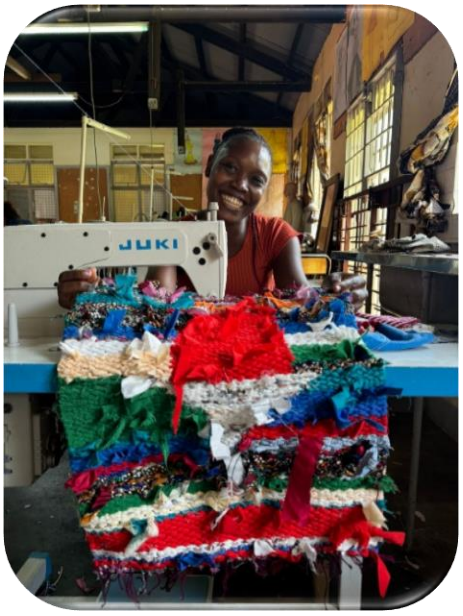
	Equivalent GHG savings for new versus cotton t-shirt made from reused material		
Replacement Rate	**Grade A**	**Grade B**	**Grade C**
10%	-0.2835 kg CO_2	-0.1314 kg CO_2	-0.2264 kg CO_2
40%	-1.2970 kg CO_2	-1.2655 kg CO_2	-1.2928 kg CO_2
80%	-2.6483 kg CO_2	-2.7778 kg CO_2	-2.7146 kg CO_2

Table 16. Equivalent GHG savings value for a new cotton fabric t-shirt versus reused cotton fabric t-shirt

Objective D Conclusion

The findings from this study shows the potential for adapting global best practices in textile recycling to the specific context of Owino Market in Uganda. By drawing on the mechanical recycling methods observed in Panipat, particularly those employed by Jindal Industries, we can better understand the complexities of sorting and processing textile waste in Owino Market. The key differences lie in the scale, infrastructure and available resources as well as the size and composition of the textiles, which presents both challenges and opportunities for developing sustainable solutions tailored to local needs.

The detailed sorting process outlined in the study highlights the importance of categorising textile waste by factors such as fabric construction, colour, fibre composition, size, and condition. This methodical approach is critical for ensuring that textile offcuts can be effectively repurposed into marketable products. The shift in perception – from viewing textile waste as merely discarded material to recognising its potential as a resource with value – was pivotal in fostering innovation among participants, leading to the creation of various products such as tops, wall hangings, and floor mats.



The financial analysis further supports the viability of these initiatives, demonstrating that with proper sorting, processing, and marketing, the production of new items from textile offcuts can be both economically and environmentally sustainable if there are long-term markets available or that can be stimulated.

A project to divert waste textiles in Owino Market into reuse would support a reduction in the volumes of waste requiring management, i.e. collection, transfer, management at landfill, dumping and/or burning, and therefore contribute to carbon reductions in the most significant SHC and textile market in Uganda. It would create a move towards a more circular economy as the lifespan of materials is extended. A methodology to capture this was examined, which looked firstly at the GHG emissions avoided by diverting textiles away from burning for reuse, and secondly, the GHG emissions avoided by not producing and using virgin materials in manufacturing, but rather reusing textiles.

In conclusion, this study shows that with careful adaptation of global recycling practices, combined with a user-centred approach to product development and market engagement, tailored to Owino Market, it has the potential to become a model for more sustainable textile waste management in East Africa. The ongoing refinement of products, coupled with a commitment to environmental responsibility and financial feasibility, will be crucial in achieving long-term success and broader adoption of these practices.

CHAPTER 4: CONCLUSIONS AND THE WAY FORWARD

This chapter gives a brief overview of the findings on the second-hand clothing market in Uganda, specifically Owino Market, one of the largest trading hubs in East Africa. The market plays a significant role in the local economy by providing affordable clothing and employment opportunities. Given the high level of imports of SHC bales into the market, the level of waste textiles at the market was assumed to be high. This assumption was tested though the market assessment, which assessed market participation, waste management practices, and develop solutions for repurposing textile waste.

SUMMARY OF CONCLUSIONS PER OBJECTIVE

Objective A: Assessing Market Participation in the SHC Industry in Owino Market

- **Gender Distribution**: Women make up 42% of the SHC retailors and vendors and 45% of business owners. Women contribute significantly to the market, including through informal roles within family businesses, though their decision-making power might be limited.

- **Education**: Most SHC traders has completed secondary school as their highest level of education, but those with higher and lower levels are also represented. Education levels are similar for males and females, with only a noticeable difference at tertiary levels, which a higher percentage of men attain.

- **Economic Inclusivity**: The SHC trade accommodates participants across various educational backgrounds and capital levels. Economic mobility is common for retailers, with 58% of retailers reporting upward mobility, but less so for vendors where only up to 11% report it. Mobility is linked to education level. Many start in entry-level positions, such as vendors or bale carriers, and gradually progress to higher roles.

- **Roles and Supply Chain**: The supply chain involves diverse participants, from importers and distributors to tailors and vendors, each playing a critical role in moving goods from importation to final sale.

Objective B: Content Quality and Economic Inclusivity through Market Segmentation

- **Textile Waste**: SHC bales are graded for import as Category A, B or C. Items contained within are then classified upon opening as first class, second class, fagi or rags. Retailers appear to be the main producer of SHC textile waste as they open bales and categorise items for sale as individual pieces. Respondents estimated that 96.4% of the pieces in an imported bale were reused as first class, second class or fagi

clothing, with 3.6% comprising items that do not meet the intended reuse as clothing criteria. Disaggregated, this represents 2.6% rags and 0.9-1% waste.

- **Economic Value of Fagi and Rags**: Despite their lower quality, fagi and rags are actively traded. They provide affordable clothing options for low-income consumers and are used for cleaning, respectively. Whilst some studies consider fagi waste, this study shows that there is consistent demand for the purchase and resale of fagi for use as clothing. Notably, 12% of retailers specifically purchase fagi-grade bales. For vendors, who purchase individual pieces, 14% specifically purchase fagi items for resale. As fagi is sold for intended reuse as clothes and rags find a new use for cleaning they are not classified here as waste.

- **Economic Mobility**: Bale sizes, grades and pricing were found to vary widely, accommodating market participants from various financial backgrounds. Vendors, in particular, benefit from the ability to mix grades and optimise their sales. Fagi provide a crucial affordable option for individuals who cannot afford clothing from the first and second sub-categories, both in terms of entry to the market for traders and for a significant segment of consumers to purchase wearable clothes at low cost.

Objective C: Understanding Owino Market Waste Management Practices and Textile Waste Characteristics

- **Waste Sources**: As a percentage of waste per bale estimated by traders, waste is relatively low, ranging from 0.9-1%. In various visual inspections of the textile waste almost only offcuts were visible, thus the primary source of waste removed by the council's formal and informal workers is the tailors operating within Owino Market, rather than full pieces of clothing from the SHC trade. Nevertheless, this percentage represents 800,000 kg per annum based on URA data for 2023 which would warrant some further exploration in terms of how this is discarded.

- **Volume and Characteristics**: An estimated 14,535-16,915 kg of uncontaminated textile waste is generated weekly, or 755,820-879,580 kg annually. Most of this appears to be offcuts, varying in size and composition, which creates challenges for consistent sorting and processing with implications for reuse options. However, as shown in the sorting and prototyping pilot, these are not insurmountable.

- **Waste Management Systems**: Both formal and informal systems operate within the market, with informal collectors playing a critical role in repurposing textile offcuts for uses like pillow stuffing and fuel. Formal waste collection is managed by KCCA, which operates cleaning shifts after market hours.

- **Offcut Value:** There is some value to the textile offcuts, with prices varying based on the source and level of sorting. Most offcuts (69%) are available for free collection, while the remainder is available for sale. Informal collectors and tailors sell these offcuts (sometimes used a cooking fuel), contributing to a secondary market within the waste management ecosystem.

Objective D: Creating Solutions to Address Textile Waste Generated from Owino Market

- **Adapting Global Recycling Techniques**: Lessons from Panipat, India, were adapted to the local context to create a detailed sorting process by fabric construction colour, size, fibre composition, and condition of the textile as a first step in finding repurposing solutions. In the pilot, this step prompted a shift in perception from the designers, tailors and students involved: from seeing the material as discarded waste to seeing its potential as a resource with value for making.

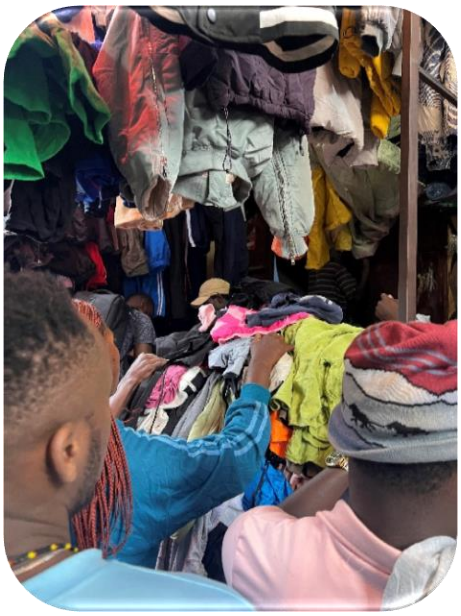
- **Product Development and Feasibility**: Various products like tops and floor mats were prototyped from sorted textile offcuts and found to be viable in terms of generating a profit on the local market. This demonstrates that with proper sorting, processing, and marketing, the production of new items from textile offcuts could be both economically and environmentally sustainable.

- **Environmental Impact**: A project to divert waste textiles in Owino Market into reuse would support a reduction in the volumes of waste requiring management, i.e. collection, transfer, dumping and/or burning, and therefore contribute to carbon reductions in the most significant SHC and textile market in Uganda. A methodology to capture this was examined, which looked firstly at the GHG emissions avoided by diverting textiles away from burning for reuse, and secondly, the GHG emissions avoided by not producing and using virgin materials in manufacturing, but rather reusing textiles.

OVERALL CONCLUSIONS

The study on textile waste at Owino Market highlights both opportunities and challenges in dealing with the waste arising from a linear market and of transitioning towards a circular textile economy in Uganda.

The East African Community (EAC) accounts for 12.5% of global imports of SHC and Uganda ranks as the fifth largest importer of SHC in Africa, accounting for 6.3% of the continent's total SHC imports. There are inconsistencies in the reported amounts of waste in such imports, potentially linked to inconsistent definitions of textile waste across different countries. There is little research on the SHC market and its waste in Uganda, so this research provides an important snapshot of the SHC flow from import of bales to sale of individual pieces, the waste arising in the process and its management.



The SHC market provides livelihood for 50,000 people and accommodates individuals with varying levels of capital and from diverse educational and economic backgrounds in the trade, whether as vendors operating in or entering into the market or as consumers purchasing second-hand clothing. Over 58% of the retailers, both male and female, experienced economic mobility. For men, the journey often begins as bale carriers if they lack the capital to start as vendors, a role less common for women who tend to begin their careers as vendors. The market plays an important role, therefore, in economic inclusion and providing options for people in poverty.

The findings in relation to waste align with those in the Mitumba Consortium Association Kenya report[17] which suggests that waste – items discarded as having no further worth or use – from imported SHC in the retail trade is minimal, constituting no more than 2%. In Owino Market, 96.4% of the pieces in an imported bale were reused as first class, second class or fagi clothing, with 3.6% comprising items that do not meet the intended reuse as clothing criteria. Disaggregated, this represents 2.6% rags and 0.9-1% waste. Whilst not a significant percentage this still represents 800,000 kg of waste arising from the import of bales at the point of opening them.

At the point of sale 13.4% of respondents reported no residual items as all items are sold. For those with unsold inventory the primary strategy to manage it, cited by 75.8% of respondents, is to offer discounts on items. Others store items for future sale in peak seasons, donate to charities or giving significant discounts as a form of charity donation or sell to industry. Nevertheless, 54.8% of traders reported that they are left with pieces they cannot sell after stock management strategies have been applied.

Reusing clothes is fundamental to the principles of the circular economy and the second-hand market plays a crucial role in extending a linear economy through the consumption of pre-existing goods rather than new ones.

The majority of waste in Owino Market arises from tailors' offcuts, for which circa a third already appears to have reuse options. In a move towards a circular economy it will be crucial to put in place collection systems for the remainder and to also intercept SHC and other textiles from consumers at their end of life to circle them back into reuse, whether that is through upcycling, recycling or downcycling.

Whilst a collection system for the project is still being designed, the study was able to demonstrate an efficient sorting process (in this case for offcuts but also applicable to other textile waste) which shifts the materials from being perceived as waste by tailors, students and designers to being seen as useful, with a range of products prototyped for production. Outside of the market there is potential to source further textile waste, such as industrial offcuts or post-consumer. If a collection (and eventually aggregation) system of textile waste can be aligned with improved sorting efficiency and reuse options to optimise resource use, as is envisaged in a new Textile Reuse Hub under the Sustainable Manufacturing and Environmental Pollution Programme, then this will be an important initial step to address the ubiquitous issue of textile waste in Owino Market and the wider Kampala area. At the same time, it would reduce environmental impact, support local industries and create new job opportunities, ultimately promoting a more sustainable and circular economy in Uganda. Uganda's Owino Market has the potential to become a model for sustainable textile waste management by addressing an environmental necessity whilst creating green jobs, and positioning Uganda as a regional leader in sustainable textile practices.

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ACRONYMS & DEFINITIONS

Bale: A bundle of clothes that is collected, sorted, and compressed for resale or recycling purposes.

Circular Economy: A model of production and consumption that involves sharing, leasing, reusing, repairing, refurbishing, and recycling existing materials and products for as long as possible to extend the lifecycle of products.

Collaboration with Sorting Facilities: Importers work closely with sorting facilities to ensure the quality of second-hand clothing before it is imported, by providing clear specifications and feedback.

Distributor: Entities that purchase bales from importers and sell them to various retailers, ensuring alignment with fluctuating market demand and supply dynamics.

EAC (East African Community): An intergovernmental organisation composed of six countries in the African Great Lakes region that promotes economic cooperation and integration.

Fagi: A term used in Uganda's second-hand clothing market to describe items of lower value, typically sold at a discount.

First: The category of items within a bale that has the highest turnover and economic value, typically consisting of the most desirable and sellable clothing pieces.

Grade A: The highest quality items in a second-hand clothing bale, often nearly new and in excellent condition.

Grade B: Good quality items with minor defects or slight signs of use, valued lower than Grade A items.

Grade C: Items with noticeable wear, considered lower quality, and sold at the lowest prices.

Importer: Individuals or businesses that source second-hand clothing (SHC) from global sorting facilities and import them into Uganda, responsible for quality control and compliance with local regulations.

Informal Textile Waste Collectors: Independent individuals who collect textile waste, such as offcuts and discarded clothing, from various sources without formal employment or ties to official waste management bodies.

Kampala Capital City Authority (KCCA): The administrative body responsible for the governance and management of Kampala, including waste management and market regulation.

Market Participation: The engagement of various stakeholders, including importers, distributors, retailers, vendors, and tailors, in the buying, selling, and trading of goods within the second-hand clothing market.

National Environment Management Authority (NEMA): The agency responsible for overseeing environmental policies and ensuring sustainable management of natural resources in Uganda.

Offcuts: Smaller pieces of fabric, typically originating from tailors, that vary in size and composition, often sold or repurposed into new products.

Pre-Sorting: A method used by some retailers to sort bales before customers arrive, aligning the items with market demand.

Rags: Items with the lowest economic value, typically sold at the lowest prices and used primarily for cleaning purposes.

Retailer: Individuals or businesses that acquire bales of second-hand clothing from importers or distributors and sell the pieces of clothes individually to resellers and end consumers.

Second (Sub-category): Items that are highly sought after but have a lower market value than the first category.

SHC (Second-Hand Clothing): Clothing that has been previously owned and is being resold or donated for reuse.

Sub-categories: Classifications of clothing items within a bale based on their economic value and market demand. The primary sub-categories include First (Top), Second, Fagi (Fagia), and Rags.

Tailors: Skilled professionals within the market who provide services such as designing new clothing, resizing, repurposing textiles, and patchwork.

Textile Waste: Material designated for final disposal that is not subject to any recycling or reuse measures, often including clothing that is torn, old, heavily faded, or stained beyond repair.

Uganda Ministry of Trade Industry and Cooperatives: The government ministry responsible for promoting trade, industry, and cooperative development in Uganda.

Uganda Revenue Authority (URA): The government agency responsible for tax collection, trade facilitation, and enforcing revenue laws in Uganda.

Vendor: Smaller-scale sellers who purchase individual items from retailers and resell them directly to consumers, operating from stalls or as hawkers without a fixed location.