



**acted**

The background features a stylized illustration of a globe with a plant growing from the top. The globe is light gray with darker gray outlines of continents. The plant has a thin stem and three leaves. The globe is surrounded by soft, light gray clouds.

**CIRCULARITY IN  
DADAAB  
RAPID ASSESSMENT**

**JUNE 2023**

Acted works towards a '3ZERO' world, Zero Carbon, Zero Exclusion and Zero Poverty. As part of our work towards Zero Carbon, Acted has undertaken a rapid assessment in Dadaab, Kenya, to identify opportunities to i) investigate circularity within the agriculture, plastics and e-waste value chains, and ii) develop programming that catalyzes on these opportunities.

Dadaab, including Dadaab town, and the refugee camps of Ifo, Dagahaley and Hagadera represent a key economic ecosystem within Kenya. Dadaab hosts 218,873 refugees currently (UNHCR 2023), a number that has fluctuated over the last 30 years.

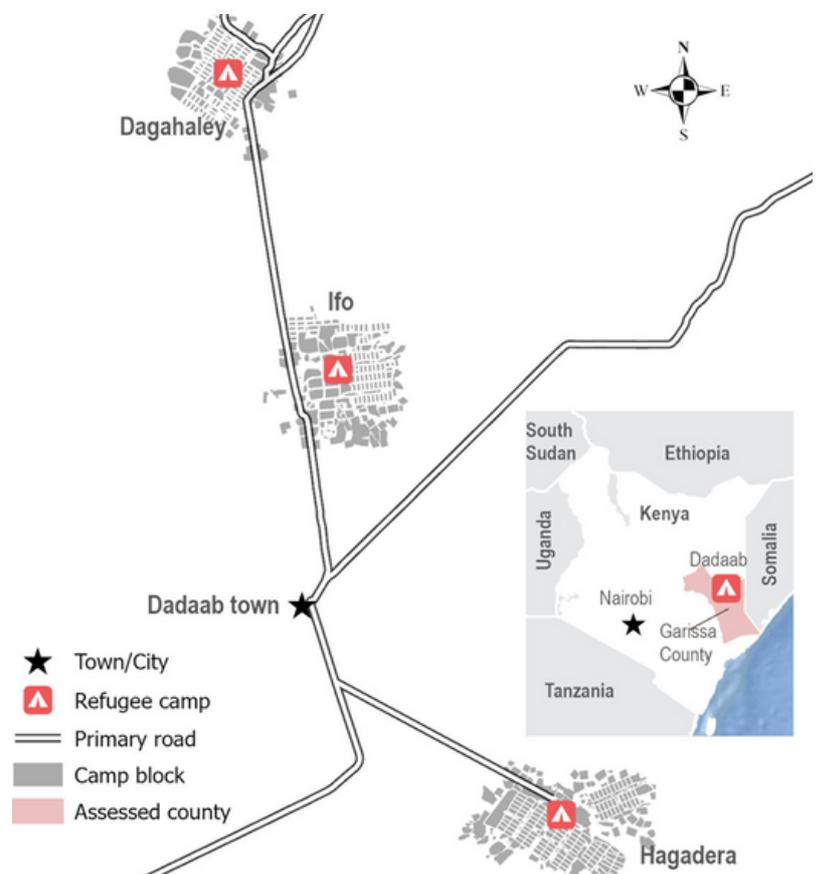
Dadaab produces 80 tons of waste every day (UNHCR 2021) and whilst the distance from Nairobi limits access to the market potential for re-use and recycling there, with certain adaptations, there remain exciting opportunities for re-use within Dadaab. In Kenya, the agricultural sector has had good opportunities for re-use, by using waste as feed for animals or manure for their farms.

The regulatory and private sector environment in Kenya is ripe to support circular interventions. The government of Kenya has been making efforts to develop policies aiming at improving circularity in various value chains. In 2017 the government banned the use of plastic bags and bottles and established a task force to enforce this policy. Simultaneously, private actors in the country have made steps towards sustainability through agreements between themselves and the government on their waste product management and recycling.

Working closely with the Ministry of Environment, the private sector in Kenya formed a business plan model for the Plastic Producer Responsibility Organization (PRO) which enhanced the adoption of a circular economic model.

## Methodology

Primary data was collected through 10 key informant interviews. The interviews and all field data collection was undertaken by Acted and RRDO, Acted's partner. The targeted key informants were from Dadaab Sub-county. The informants included one cooperative representative, four trade department reps, two people from TVET institutions, a rep from each UNHCR & NRC, and two people dealing with waste management. The respondents were reached through purposive sampling and snowballing to identify respondents with useful knowledge. Additionally, the primary data was complimented through observation from a transect movement in Dadaab township, Hagadera and Ifo, as well as the use of secondary sources to triangulate and inform the assessment findings.



## Key findings

**Opportunities for circularity in Dadaab exist** for the agriculture, plastic and e-waste value chains.

### 1. Collection, sorting & processing of plastic waste.

Notwithstanding existing efforts by the KRCS and Safi cooperative to run a plastic processing centre in Dadaab, there remain huge amounts of plastic that are disposed of by burning or burying. There is the potential for the involvement of refugee and host communities, in particular women, in the collection, sorting and disposal of waste. Key would be the identification of private sector partners interested to purchase processed plastic.

### 2. Reuse of plastic or glass waste.

Cooperatives working in other value chains in Dadaab, for example, the milk value chain) require packaging for their products. This packaging is most commonly transported from Nairobi and made from virgin materials. A positive view of recycled products was expressed by those interviewed, indicating a growing acceptance of recycled or re-used products. There is the potential to re-use, with appropriate sterilization, existing products.

### 3. Refurbishment of e-waste.

While the generation of e-waste is not on a large scale, the lack of awareness, knowledge, and skills on e-waste handling and its potential for circularity creates a barrier for effective re-use. There are very few repair shops within Dadaab, meaning there is a potential for jobs and a market for those who are able to refurbish e-waste. For items that cannot be repaired, the on-selling of precious metals in e-waste is a key revenue stream.

### 4. Climate-smart agricultural practices & use of agricultural waste.

Agencies operating in Dadaab have established initial activities related to agricultural development. Whilst Garissa remains a topographically dry and arid county, the large and long-term presence of refugees has necessitated access to water, and this water now presents an opportunity to expand agricultural production in an area that was previously predominately livestock-based. Further, both household organic waste, agricultural waste and manure have the potential to be re-used in biogas digesters, to produce gas for cooking and bio-slurry for fertilizer.

## Market for plastic waste

Moulded agricultural pipes and fittings for irrigation, as well as household items such as chairs, tables, basins and jugs, are in high demand amongst host communities and refugees in Dadaab. Polythene plastics from carrier bags and polyethylene terephthalate (PETE) plastics from drinking water and soft drink (including juice) bottles are the predominant plastic wastes in Dadaab both within the host community and in the camps.

Early-stage attempts have been made within the recycling sub-sector by various organizations (NRC, CARE and the KRCS) in a bid to recycle plastic in Dadaab. In the recent past, the KRCS recycling facility has focused on shredding and compressing plastic before transporting it to Nairobi for further processing by Premier Limited Company (PLC).

PLC in partnership with the KRCS has engaged with the informal sectors for plastic waste management. Through the recycling of the plastic waste collected in Dadaab at the KRCS plant, PLC provided subsidized water storage tanks to the refugee community. Additionally, private individuals and groups collected assorted plastic waste and sold it to Nairobi-based recycling companies. The readily available plastic waste and an existent market for plastic is an opportunity for this value chain in Dadaab.

## Plastic Waste Circularity

Through observation after a transect movement across Dadaab, Hagadera and Ifo, polythene plastics from carrier bags and PETE plastics from drinking water bottles and other beverages are the predominant plastic waste both within the camps and amongst the host community.

Most of this plastic waste is collected, dumped at a centralized place, and incinerated. Either in a group or at an individual level specifically within Ifo camp, PETE is collected and resold to private entities from Nairobi for recycling. A business representative from IFO Camp said 'there are around six groups here in Ifo camp who collect plastic waste and sell them to companies from Nairobi'. On a small scale milk, juice, and water vendors collect PETE plastics, sort them, clean them, and use them for repackaging milk juice and water from local sources for resale. Apart from this initiative, other interventions include the KRCS/Care initiatives to collect, sort and shred plastic waste, though the centre is currently not operational.

According to UNHCR, in a year each household in the camp receives at least two 20 litre jerrycans, with the previous years jerrycans being disposed of. Each jerrycan depending on the materials averagely weighs 0.9kgs and there are approximately 70,000 households from all three camps. From this estimation, a total of 126 tons is generated in the camps in this intervention alone.

There is a positive uptake of recycled plastic products in Dadaab from both the host community and refugees including molded household items (e.g., chairs, tables, basins, buckets, jugs & mugs), which are in high demand in Dadaab. Safi Women's milk cooperative are an example of an MSME that is engaged in milk processing, packaging, and reselling in Dadaab. The cooperative uses plastic bottles for milk and water bottling. There is no circularity component in the use of these plastic materials once they are out in the market. Below is a model following the findings from this assessment on the engagement of the cooperative, KRCS, and the community in plastic waste management.

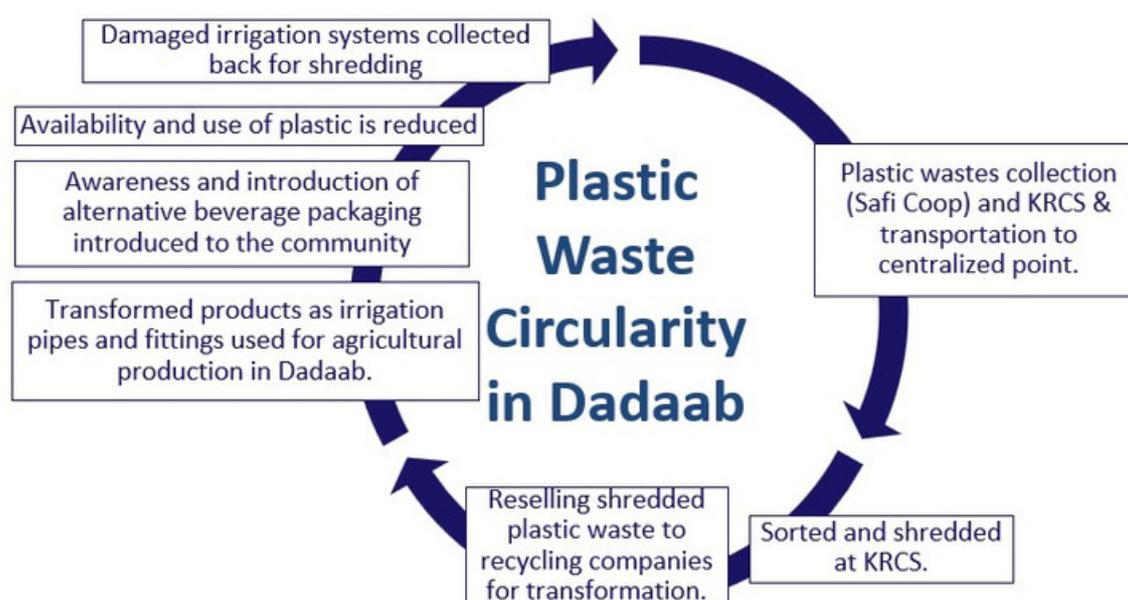


Figure 1: Diagram on Plastic Waste Circularity in Dadaab based on this assessment's findings

The model developed by the ILO proposes that plastic wastes be collected at the community level by Safi Cooperative, supported by KRCS in the camps, and that it is sorted in a recycling plant.

At the KRCS centralized plastic waste collection point, the plastic waste is shredded. However, the following suggested next steps have not yet been implemented: the shredded products could be sold to recycling companies who transform the waste into other useful products. In this case, a liaison can be established with a Polyvinyl Chloride (PVC) company or any similar company to produce irrigation pipes and fittings. This product will be sold back to community at a subsidized price to support agricultural practices.

Awareness of plastic waste management within Dadaab and in the camps forms part of the design. This includes the introduction of alternative packaging for beverages e.g., using glass bottles, especially among private sectors existing in Dadaab. An example given Safi Cooperative, who buy milk from small vendors process milk into various products (including pasteurized and homogenized), and package and resell it to the community in Dadaab and Camps using plastic bottles.

*Source: ILO (2019) Doing Business in Dadaab Kenya. Interest and Demand – Purchasing Waste Material*

From the assessment monthly plastic waste was estimated to be between 1-5kgs at the household level, 5-7kgs at an enterprise level and 20kg from an organized group who collect this waste and resell it to private entities in Nairobi for further processing.

Overall, **collection, sorting and distribution were emerging as a stage of the biggest cost for plastic circularity.** *"even though there is not much engagement on circularity in Dadaab currently, from experience, this will be profitable if the circularity stages are to be completed at the community level as recycling materials are available in plenty here"* (NRC). At the cooperative level, **improvement of the circularity to a point of having completely recycled products back into the community with the entire circularity process taking place in Dadaab.**

Kenya banned single-use plastic bottles and bags in 2017. There are different organizations influencing sustainable circular business specifically on plastic waste management, just to mention a few, the Ministry of Environment, Kenya Association of Manufacturers, and National Management Authority (NEMA). Within Dadaab, there are gaps in the regulation of plastic use, specifically in plastic bags and bottles.

*"the porous border contributes a lot to the flow of polythene bags within the camps and in Dadaab" shared by UNHCR.*

Of importance, as reported by the informants, **both the refugees and host community members who happen to share a common language, religion, and culture, with a sense of kinship are cooperative and can be engaged in matters that make the community better.**

Currently, existing institutions engage the community through awareness of waste collection and disposal. This is through local radio stations, a public address system used by the public health department, and field visits by different agencies supporting the sanitation component in the camps.

*"the community is cooperative and appreciative on matters making the community better" shared by UNHCR.*

It has been suggested by the informants that the existing KRCS plastic sorting centres in Hagadera and Dadaab should be further upgraded, rather than any new projects planned. This needs to be coupled with awareness raising in the community on plastic, and indeed all waste, collection and disposal.

**In earlier attempts at plastic waste circularity, women were central in the collection and sorting stages.** To involve further women and youth, the **informant recommended to monetize the initial stages of collection and sorting where these groups are involved.** This will not only act as a source of income for their households but makes the plastic waste circularity more effective. **This is in addition to awareness of the damaging of the plastic waste to the entire community.**

*“having a complete recycling process within Dadaab will be of key importance to have women and youths taking part in the initial stages of collection and sorting and the end stage of market/putting into use the recycled products” said an informant from Safi Women Milk Cooperative Society.*

## E-waste Circularity

E-waste remains a grey area within Dadaab both from the host community and in the camps. Following the discussions with the informants, this is being handled at the initial stages of collection, disposal and incineration at a centralized point but quite often disposed of improperly, especially cell phones after a repair attempt failure.

Through observation, there exists a few repair shops, especially in Hagadera camp which handles the repair of cell phones and other basic household electronics such as solar lighting, radio, and fans. “...repaired electronic devices/items and jua kali products have a good uptake in the community” shared the TVET representative. There also exist garages which handle vehicle repairs. **The TVET institution in Dadaab has been providing short courses on motor vehicle mechanics (MVM), electrical handling and repairs to both the refugees and the host communities. After the training, the students were provided with incentives to start small repair shops, though this was not sustainable as the entire TVET institution is donor dependent.**

At organization level, the TVET institution in Dadaab handle this component by distributing old electronics (computer, keyboards) to students and where possible returned to manufacturers for either repair or getting a new one at a subsidized price. This is often for Hewlett-Packard Company (HP) and Epson Company products.

Other agencies, such as the UNHCR, have contracted a company that handles their e-waste major primarily through auctioneering unused electronics. A representative from UNHCR said, “we take old/unused electronics to Leakey Auctioneers who are contracted by UNHCR to handle this”. In some instances, the e-waste from the organization is piled or stored in a specific space within the organization where it is handled by the organizational logistics. Within Dadaab there are no any companies processing the recycling of e-waste, not even collection alone. The sub county commissioners shared “I have not yet heard of any circularity company for either e-waste or plastic waste in Dadaab sub county” during a courtesy call visit to his office.

**The predominant E-waste in Dadaab is cell phones, and small household electronics such as radios, solar lamps, and solar panels.** Though not on a large-scale, refrigerators and fans are another type of e-waste that exists within Dadaab. From the informant discussions, **computers, and computer accessories (keyboards and computer wiring), printers and air conditioners** are predominantly generated by the organizations operating in Dadaab though most of them have their internal handling processes for this waste.

**Lack of identified handlers, transportation and centralized disposal points are costs related to the collection of e-waste** as reported by a representative from Dadaab TVET and the waste management unit. Additionally, as reported by the health officer in charge of the Dadaab Sub-County, **awareness on the collection packaging, and transportation of the e-waste also has an accompanied cost related to personnel and transport.**

The UNHCR representative mentioned that there is a noticeable profit margin where handlers of e-waste have been identified. The informant added that refurbished and new products are acquired at a subsidized cost if sourced from the e-waste handlers (including from manufacturers of different electronics).

The representative of the waste management unit said that due to a lack of awareness and the fact that there is limited electronic waste within Dadaab communities, the collection sorting and handling of the e-waste has a damaging effect on those involved as some contain radiation elements which may have different health hazards to their handlers, thus the need for sensitization and awareness about e-waste.

**It is important to build on the existing blocks from the TVET on basic electronic handling soft skills**, which remains a grey area in the Dadaab community. short-term courses ranging in between 3-6 months may be a point of focus should there be an opportunity to engage the TVET.

**Awareness of the negative impact of the e-waste to this group is key.** Indeed, this will enhance its handling and be more effective where private sectors handling e-waste are linked with the community. Quite often **some of the refugees are already well equipped with some skills that may be enhanced in handling e-waste**; as the TVET representative highlight, *“in the camps 70% of the population are youths who have some level of education and skills, post mapping of such groups in the camps will be vital on e-waste management”*.

UNHCR informant added that *“besides the collection equipping these group with knowledge and skills for group basic repairs knowledge and skills will contribute to re-use the e-waste products”* and the waste management unit informant similarly said *“women and youths may take part in the collection of the e-waste which I can say it is at a lower percentage based on the Dadaab community set up and the nature of livelihood”*.



Image 1: Baled plastics at KRCS Recycling plant for in Dadaab



Image 2: Safi Women Cooperative Chair Lady at the Processing plant in Dadaab

## Agriculture value chain

**Agriculture is another opportunity in Dadaab where there is a demand for an array of agricultural products from vegetables (onions, kales, spinach, okra, tomatoes), tubers (potatoes), cereals (maize, sorghum, millets) and fruits (watermelon, bananas, pawpaw, sweet melon, pineapples, lemons, and mangoes).**

This is possible through the provision of **water and land management skills and practices that provides land and water from boreholes, which can then be used for irrigation.** Moreover, if most of the community in Dadaab are pastoralists and business enthusiasts, some of the Somali community members have embraced agriculture at small scale. The NRC representative shared that both host community and refugees are *engaged in agricultural practices at Kulan and Hagadera*. **The market as well is readily available from the host community and the refugees in the camps.**

Where agriculture has been practised on a small scale within Dadaab, **there has been cost linked to agriculture production under water supply and management, pesticides and insecticides control and general agricultural inputs** (seeds, fertilizer and farm tools). This is in addition to limited knowledge and practices on modern and climate-smart agricultural practices. According to a trade representative who has past experiences working as an agriculture officer in the sub-county, *lack of knowledge on the use of climate-smart practices for climate adaptable crops/plants and education to farmers on cropping patterns*. Other forms of crop loss to small-scale farmers are **infestation by pests and diseases at farm and post-harvest handling losses** (e.g., damage during packaging and transportation to the market).

Noted in the Kulan area in Dadaab, small-scale farmers practice crop rotation on maize, sorghum, watermelon, chillis, tomatoes and beans as reported by the UNHCR and NRC representatives. From the informants, both integrated pests and crop management practices can be adopted by the farming communities in Dadaab.

Once again, it was highlighted that women have been largely involved in the agricultural value chain, from land preparation to harvesting and marketing of agricultural produce. Despite this, there is a need for awareness among the youth. A trade representative informant shared “in Somali community women are not only involved in land preparation, but also crops management, and taking the harvest to the markets”. These sentiments were echoed by the UNHCR and NRC representatives that women can easily be integrated into the agricultural value chain.

As a component of agriculture, food waste (cooked and uncooked) in Dadaab is handled primarily as animal food. In some instances, they are taken to farms and used together with animals’ droppings as manure. The NRC informant representative shared “most households have livestock at least 2 goats and most of the biowaste including raw and cooked are being given to animals”. From the informants, between 2 to 50 kgs of biowaste were reported to be collected at the household level in a month.

## Competency assessment of farmers and landless labourers

The UNHCR, NRC, and trade representatives mentioned economies of scale (i.e., farmers cannot sell small quantities of products at a viable price), high cost of labour, drought impacts, and the lack of labour, knowledge and skills for polyculture, mechanization of agriculture and resources for agriculture inputs as the main challenges for micro-small farmers growing crops in a polyculture system.

To mitigate these challenges, the informants recommended scaled-up crop production, education and provision of knowledge and skills to farmers, provision of extension services for crop farming, pests and crop diseases management and scaling up/improving irrigation systems. Additionally, financial support, sensitization, and awareness of the importance of agriculture would help small-scale farmers.

As an effort to improve the agricultural chain in Dadaab, demonstration farms for the community in the camps exist. These were created under the efforts of NRC and DRC on dry land agricultural practices according to the UNHCR representative.

Additionally, a local national organization Relief Reconstruction and Development Organization (RRDO) has tree nurseries in all the camps. This could be used as a learning centre on agricultural practices for the community as they are well protected and supplied with water.

A lack of knowledge of climate-smart agriculture practices and commercialized agricultural practices were reported as the main skills among small-scale farmers. According to an NRC representative "...Planting techniques (Spacing), Dryland farming practices, align agriculture with business with some financial skills, pest and crop diseases control are among our skills and abilities lacking among small farmers...". This is aligned as well with the technological challenges on water management and general mechanization for climate-smart practices and climate-resilient crops. Indeed, the water management, use of pesticides and application of fertilizers remain gaps as well among the agricultural daily workers in Dadaab. On a large scale, the farmers use manure as fertilizer for farming. The volume and frequency concerning the **use of these fertilizers are very low and not available within Dadaab** unless sourced from Garissa or Nairobi. There is a potential opportunity here to market the bio-slurry from biogas digesters as an organic fertilizer.

Though not on a large scale, the informants also reported on small farmers using some land management practices (i.e., **contour ploughing and changing of crops based on seasonality**). Similarly, farmers **have used sack gardening, tower gardening sunken beds and drip irrigation on a small scale for growing vegetables**. As a closing remark during the interview, the trade representative shared, *"there is a positive uptake on agricultural practices by the community should there be support for the provision of necessary skills, knowledge and practices"*.



Image 1: Plastic waste

## Recommendations

In view of a robust successful circularity, integration of the lessons learnt is important. Leveraging existing expertise and resources will catalyze the growth of the circular economy in Dadaab. Specifically, the scaling up on the existing stages of collection and shredding for circularity to reduce the availability and use of plastic in Dadaab is key to future interventions.

Advocacy on policies and practices to relevant authorities is recommended, as well as the application of Kenya laws on plastic waste, alongside awareness of plastic management.

Besides land and water management, farmers should be trained on post-harvest handling practices and commercializing of agriculture practices in order to fully utilize the available resources and exploit the potential of the local markets within and outside Dadaab.

Through the existing TVET in Dadaab providing training for women and youths on various basic skills including general waste management, electronics repairs and fabrication are important. After training completion, these cohorts of trainees can be supported in establishing small businesses which creates employment opportunities within the community. The specific group to be funded should be identified through post-skills training evaluation and mapping to ensure success.

E-waste circularity should leverage on what other organizations in Dadaab are doing to fill gaps, complement, and avoid duplication with existing E-waste management practices. These collaborations should be at all levels of the circular value chains – collection, sorting, processing, sale and re-sale.

Agriculture value chain development for vegetables and fruits is recommended for the Dadaab community. The training on agriculture, especially climate-smart practices coupled with the provision of agricultural inputs and equipment support will enhance efforts towards circularity. For example, RRDO, a local NGO has tree nursery gardens in all the camps which are well protected and supplied with water. These facilities can be used to establish permaculture gardens and demonstration plots for the communities in Dadaab.



Image 2 & 3: Recycling plant for plastic Shredding at KRCS Dadaab.



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*This report was developed with the support of relief, reconstruction and development organisation (RRDO), Acted's partner .*