



Team PlastiX

SUMMER ACADEMY 2021

Recommendations for the Global Livingston Institute (GLI)

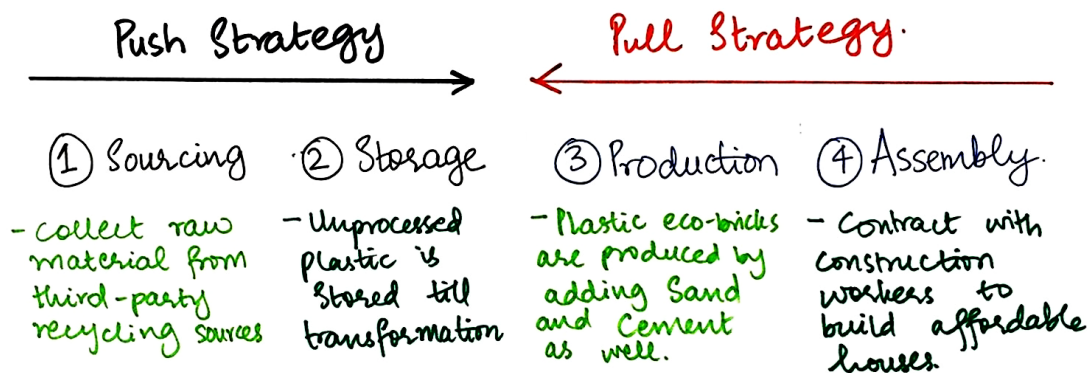
Recommendation 1.

Increase efficiency of process: **CUT THE MIDDLEMAN**

1.1 Create more of a circular model rather than a linear model, including Life Cycle Assessment for your outputs and rethinking your Supply Chain Structure.

- Raw material is procured according to supply availability

- Bricks are manufactured to demand on a per-project basis



1.2 Engage the general public in the waste management plans and strategies.

Efforts should be made to educate and sensitize the waste generators about the impacts of their waste on the environment and its livability as well as what they can do or change to achieve the sustainable development goal of their community. Since most disposal sites in developing African countries are generally located in peri-urban areas to manage waste from the cities, city dwellers are often not fully aware of or concerned about the impacts of their waste disposal. **Suggested platforms:** radio, social media, Online TV channels, etc.

1.3 Engage people at the niche level into waste sorting at the source, followed by subsequent collection and transformation into plastic-based construction bricks.

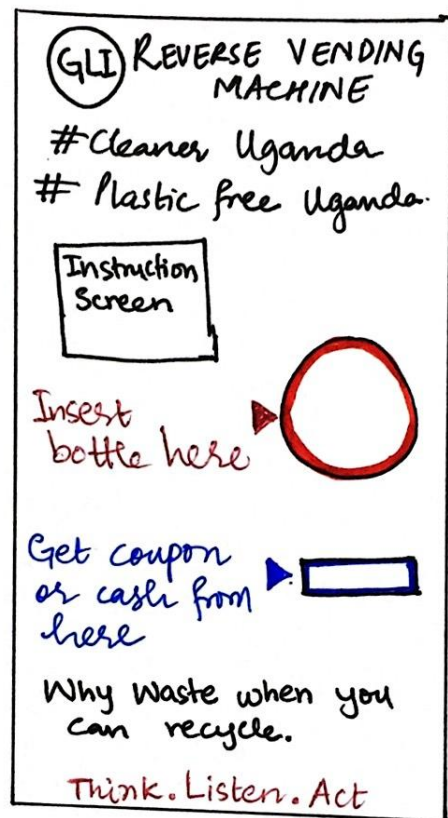
This will help alleviate poverty, curb illegal disposal of waste, and discourage illegal settlement construction, shifting the community towards a more sustainable environment. The financial aspect of such an endeavour should be executed through a public-private partnership due to its empowering power role upon the local population.

1.4 Incentivize plastic collection through a Cashback system - “Cash for Trash” (paying cash to individuals who collect and bring plastic).

These individuals can be informal recycling sector workers, small enterprise waste collectors, general population, and employees.

1.5 Use reverse vending machines in places like schools, malls, main community centers, public places, etc.

Reverse Vending Machine



“It is only one bottle,” said 45 million people...

- The “**bring waste collection system**” is used in Kampala where the waste generators have to take their waste to a particular collection point. Commercial areas like markets are well defined and people can dispose of waste at any time. On the other hand, in residential areas, residents have to take the waste to the collection vehicles at the time of collection. This waste collection system is useful for ensuring the collection of waste from areas that cannot be reached by the vehicles. However, it discourages people who are far from the collection points from taking their waste to these points, resulting in the disposal of waste in abandoned areas or water channels.
- An important measure **to increase waste collection is the increase in the number of collection vehicles or number of trips made per vehicle**. Nonetheless, for optimum functioning of the private sector in waste management, a better policy framework should be developed to regulate private actors and ensure that the public’s needs are met. Specifically, **provision of incentives to private waste collectors** would be useful in increasing their efficiency during waste collection.

1.6 Reduce transportation costs.

It is advised that Kabale should transform plastics into useful products such as eco-bricks to increase their market value by selling repurposed plastic products to relevant companies and buyers. Whereas, transportation costs from Lira to Kampala are lower in comparison to Kabale due to easy access via the Gulu Highway.

1.7 Review your waste management and change the model as necessary.

Waste management and change at the niche level needs to be scrutinised at three levels:

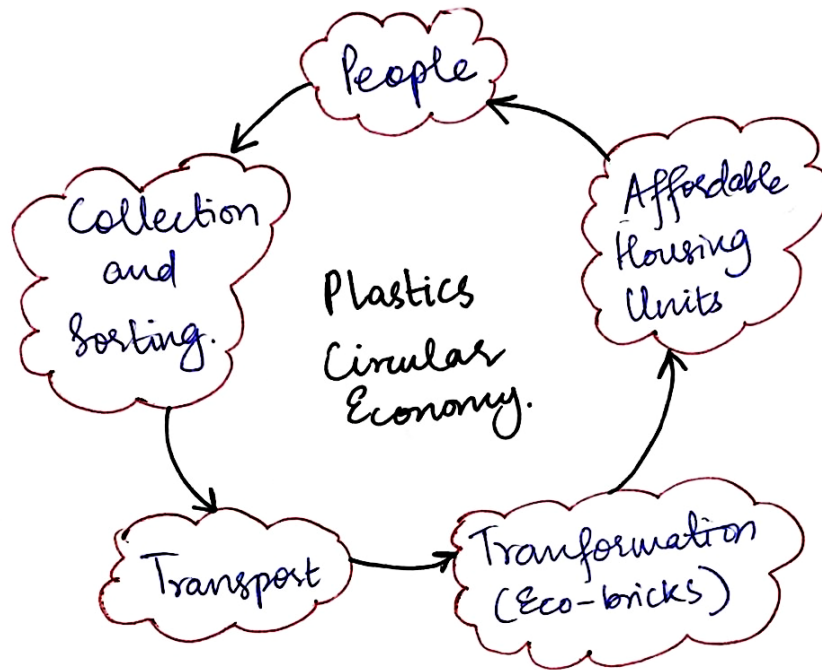
- (1) Waste collection and sorting,**
- (2) Transportation, and**
- (3) Transformation.**

The three levels, as stated above, have particular characteristics of serving a human population because the human population is the primary recipient of jobs at each level. The third level, transformation, is the end result where housing units can be made, which in turn directly provides shelter for the local population; hence, closing the loop and rendering a circular model.

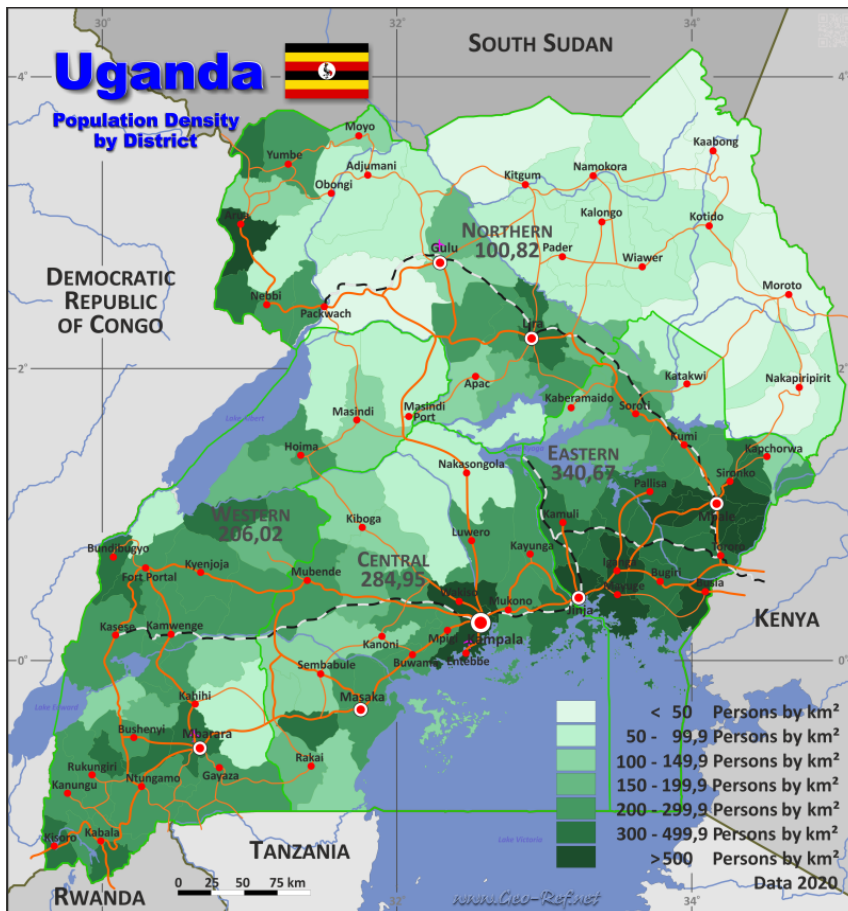
1.8 Sign contracts with construction companies and provide affordable construction services. Also, sell eco-bricks with the help of relevant distributors.

1.9 Create partnerships with community based organizations and small enterprises involved in waste management.

Partnerships can generate multiple economic and social benefits in a sector otherwise notorious for appalling conditions and the vulnerability of workers.



2.0 Transit nearby densely populated areas instead of going straight to Kampala.



- If the goal is to reduce plastic pollution in Uganda holistically, all of the plastics collected does not have to be necessarily taken in Kabale/Lira alone. Instead, inter-route stops in cities like Mbarara and Masaka can be made. By doing the itinerary Kabale > Mbarara > Masaka > Kampala (414 km instead of 403 kms) and setting up shredders in the intermediary cities, plastics can be collected in those centers as well in coordination with local authorities by purchasing plastics from residents (see above “Cashback system”). This system allows GLI to collect lower amounts of plastics from different centers; hence, diversifying the risk of collecting less than expected or any other risk associated with having a single geographical source of plastic collection. By collecting and shredding plastics in 3 different locations, the entire supply chain becomes more resilient, more easily scalable, and it further enables a cascade of informal employment with a first-come-first-serve (FCFS) basis for plastic sale and different geographical distribution of collected plastics based on demographic density.

Recommendation 2.

Become self-sustaining: **INVEST IN SHREDDERS!**

- how to economically empower communities aside from straight employment in collecting and sorting

Plastic shredders play a key role in plastic recycling plants and production facilities. Shredders are an indispensable component of efficient and cost-effective operations in the recycling and waste management industry.

Some benefits of using plastic shredders in waste management:

- shredded waste is easier to handle or re-use
- shredding is an efficient waste disposal method which greatly reduces the cost of recycling for several industries
- plastic shredders are used to generate revenue by facilities that sell shredded plastic for use as raw material
- they convert plastic waste into reusable raw material for manufacturing plastic containers, PET bottles, and PVC products
- they help recoup waste disposed from commercial units
- by recycling and repurposing the plastic waste, carbon footprint can be reduced

Shredded plastic can be sold at a higher price and more industries other than Coca-Cola may be open to buy them as well. Shredding the plastic bottles will also allow more plastic to be transported in one trip from the centers in Lira and Kabale to Kampala.

Type of plastic shredder:

Depending on the size and type of plastic scrap to be processed, different industrial shredders are available for plastic shredding. There are six types: hammer mills, granulators, chippers, grinders, shear shredders, and all-purpose shredders. From the research, a small sized granulator may be the right type for the GLI's recycling initiatives in Uganda as it is a popular machine among small-scale recycling facilities due to its compact design and small footprint.

An example of a small sized plastic granulator:

Small Sized Plastic Granulator / Plastic Grinder



PROSINO PS-C-M Series Small Sized Plastic Granulator is also popular as plastic grinder. It features with compact design and small footprint. This is a popular [granulating machine](#) mainly used in small-scaled recycling facilities. It is also adopted by some manufacturing plants as a solution of internal waste management. Those small-sized plastic granulator machines are specialized in granulating/crushing small size plastic (soft plastic & hard plastic) and rubber material, including PET bottles, HDPE sanitary containers, nylon, molding sprues, molding runners, purgings, PP sheets, plastic packaging, rubber rings, rubber sheets etc.. No matter the scrap material before granulating is in the forms of ball, block, strips, or sheets, this series granulators can easily handle it with high efficiency. A screen is mounted at the discharging port of the machine to control the crushed granules below certain size. So it can make the final granules suitable to be processed in next recycling step.

Granulating Application For Plastic Granulator Machine:

Plastic: PET bottles, HDPE containers, plastic pipes/tubes, nylon scrap, PP sheets, plastic packaging, molding scrap(sprues, runners, purgings)

Recommendation 3.

Switch from occasional contracts to FCFS basis: **ALL KABALE TO COLLECT!**

We recommend that instead of hiring occasional workers, Uganda makes collection of plastic a first-come-first-serve basis rather than contract work.

Plastic Vending Machine

What if we implemented vending machines around major cities in Uganda where local citizens could return their plastic and receive instant cash? This would not only encourage less plastic waste to be disposed of in public spaces but plastic collected in the vending machines can then be sold to other companies or repurposed. Meanwhile, local residents can receive an instant cash reward, which is inserting monetary value into the local economy. It's a win-win.

First-Come-First-Serve Basis

Research supports that first-come-first-serve works in other parts of Uganda. For example, according to the Renew Our World Campaign (<https://renewourworld.net/2020/05/turning-plastic-into-products-in-uganda/>), there are already little collection hubs in the town of Masaka, a couple hours south of Kampala, where anyone in the community can come with their plastic and receive instant cash for it. There are multiple collection hubs, at least 28, strategically placed in areas which draw a large population of people, such as trading centers, market spaces, and churches. For these community members, the ability to take their plastic to these hubs means more money in their pockets. At the same time, plastic pollution is reduced. If we created such hubs in cities such as Lira and Kabale, it can be theorized that community members would engage and participate in returning plastic for cash.

Contract Work Benefits/Downfalls

- “Partnerships with community based organizations and small enterprises involved in waste management can generate multiple economic and social benefits in a sector otherwise notorious for appalling conditions and the vulnerability of workers. Private firm Plastic Recycling Industries (PRI) contracted 120 community based organizations and small enterprises to collect almost one fifth of Kampala’s plastic waste.”
- “Plastics Recycling Industries collect and recycle 3,600 tonnes of plastic waste every year. PRI contracted 120 community based organisations and small enterprises to collect plastic waste, which is then recycled at its capital plant. The average weekly wage of the 1,200 waste collectors indirectly employed by PRI is around UGX 65,000 (USD 17), a nearly threefold increase over the wage of the average waste picker in the city.”
- “Volunteerism is at the very core of the pillars of sustainability and should be considered in any waste management program. Two ways of sorting out plastic waste that would also ensure a source of income for a large number of inhabitants in the lower economic sector. First, through manual recovery of solid waste on an individual basis, and second, through large-scale manual and mechanical processes.”

Recommendation 4.

Create instead of giving back to the polluter: **PRODUCE SOMETHING**

- Market research for products such as eco-bricks that could potentially address other challenges such as housing shortages as well as drive up profit margins for GLI's centers in Kabale and Lira

Eco-bricks! One eco-brick could be sold for approximately 400 UG shillings

- The how:
 - Plastic bottles collected
 - Locally made machines
 - Melt plastic bottles and make a composite with sand and cement
 - About 20 melted plastic bottles for one eco-brick
 - Could add PVC to make it waterproof
 - Brick-shaped metallic mold where liquid plastics can be poured (can be made through a welder in the community)
- Applications:
 - WALLS: sand and cement are needed to be solid enough for walls (waterproof and impermeable)
 - PAVEMENTS: possible, also in different configurations and shapes
 - ROADS: filling potholes
 - TILES

Recommendation 5.

We strongly recommend that GLI use the GoFundMe, which will be created by our team to raise funds for necessary equipment.

Team PlastiX GoFundMe Page Plan:

The goal of this page is to raise money for PPE safety equipment for the staff and collectors. If the staff are safe, we can better ensure a steady stream of plastics and business continuity.

Engaging Target Populations

It is important to be intentional about engaging certain target populations within the Ugandan community. For example:

- expat connections (international schools, etc.)
- religious organizations (churches, etc)

Page Design

The design of the page is also key to draw attention and garner interest from potential donors.

For example: include photos of

- the current recycling center
- balers
- trash dumps
- shredders

The goal of showing these specific pictures is to help potential donors understand how Uganda is recycling plastic, show how big the plastic pollution problem has gotten, and emphasize how vital it is to continue to work on a sustainable solution to plastic pollution. The pictures of the current trash dumps will hopefully shock potential donors and pull them in emotionally to learn more about how they can help and contribute financially in meaningful ways.

Don't Exploit

It can be easy to turn a real-world problem into a sob story that could exploit the local Ugandan people, their lifestyle, and culture. Our goal is in no way to do such a thing, but instead to show the facts and how we can contribute to a solution rather than glorifying the problem itself in an exploitative way.

Highlight COVID-19

We also want to emphasize the effects that COVID-19 has had and is continuing to have on the Ugandan communities of Kabale and Lira, and how necessary it is to protect the employees working in these recycling centers. One way to do this is by raising funds to purchase PPE equipment. Another way would be to turn plastic waste into medical equipment and supplies, such as face shields. In order to do this, we need to raise funds to buy shredders and other machines to make this possible.