

# **The Mathare Safi Project.**

*How might we reduce plastic dumping in the drainage systems in Mathare Slums?*

**A Project Report by Team Planyo.**

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## **Abstract.**

This report is on a project focusing on how communities, especially the low income, can manage their plastic waste. Essentially, are the communities dealing with plastic from within and outside their communities. This is not to mean however that outsiders should take advantage of the situation and dump their waste in these communities.

In our case, we took Mathare Slums and focused on the plastic waste on the drainage system.

Fundamental in coming up with what might fit into a solution for the people of Mathare, is the *Human Centered Design Thinking Approach* which is not a linear process towards coming up with a solution to the challenge at hand. At the center of the approach, is the emphasis on highly engaging the people you are creating solutions for, as you will want to get the solutions from the people that are facing the problem at hand.

For our case, we aim to use plastic in art to manage the plastic menace in Mathare Slums.

# 1.Introduction.

## *1.1 Mathare: An Overview.*

Nairobi's Mathare is Kenya's most densely populated area, with 68,941 persons living within a square kilometre in contrast to the national average of a paltry 82 persons per square kilometer. It has a population of 206,564 and has had a number of social and health challenges, ranging from cholera outbreaks to gang violence and collapsed buildings due to unplanned developments that have denied residents access to essential amenities. Most of the areas do not have access to clean drinking water, there is a lack of sewer lines meaning that the highrise buildings empty their waste into the Nairobi River. Land officials have also colluded with individuals to sell off public spaces in Mathere, including land meant for road expansion, riverbanks and public amenities. This has meant that there are inadequacies in managing waste. As most of the secondary data shows and the primary data agrees with, the former challenges are accompanied by poor urban planning, lack of implementation of existing laws and regulations, and the political relations that arise from this problem. The biggest waste menace has been plastic waste and for very obvious reasons. The most affected areas being the drainage systems and its accompanying effects, it becomes important to engage all stakeholders on how best to handle the challenge.

## *1.2 The challenge.*

With most areas not having disposal points, the government failing to play its role and the political relation that arises from the plastic waste menace, the question becomes: *How well might we reduce the plastic waste dumped in the drainage systems in Mathare Slums?*



*Plastic waste in a trench, one of the drainage systems in Mathare.*



*Plastic waste in the Mathare River, which forms part of the Nairobi River and which should be ideally draining water.*



*Plastic waste in a small trench outside a highrise residential building, a trench meant for draining waste water.*



### ***1.3 The Project Team.***

We were a team of five, consisting of students, waiting graduate and a community engagement worker based in Mathare Slums.



*Team Planyo during a discussion session.*

## 2. Background.

### *2.1 The case for a clean environment and proper management of waste.*

At the international level, and in line with the Sustainable Development Goals, both states and non-state actors agree that we need a clean environment and there is need to manage both chemical and solid waste.

*Goal 12 "Ensure sustainable consumption and production patterns", target 12.4, Member States reiterated to "by 2020, achieve the environmentally sound management of chemicals and all wastes throughout their life cycle, in accordance with agreed international frameworks, and significantly reduce their release to air, water and soil in order to minimize their adverse impacts on human health and the environment".*

At the World Summit on Sustainable Development in 2002, governments underscored the need to manage solid waste. They highlighted the need to focus on waste prevention and minimization, reuse and recycling, and having proper disposal facilities.

*In "Transforming our world: the 2030 Agenda for Sustainable Development", in Sustainable Development Goal 11 " Make cities and human settlements inclusive, safe, resilient and sustainable", target 11.6, Member States decided to "by 2030, reduce the adverse per capita environmental impact of cities, including by paying special attention to air quality and municipal and other waste management". In Goal 12 "Ensure sustainable consumption and production patterns",*

All these are to be in tandem with the international frameworks whether “soft” laws or “hard” laws.

Kenya too underscores the need to have a clean environment and proper management of waste. This is clear in the Constitution of Kenya 2010 and the various policy papers on the environment. Article 42 in the Constitution of Kenya (COK 2010) acknowledges that every person has the right to a clean and healthy environment.

National Waste Management Policy 2019 outlines how waste and why we need to manage waste. *Waste is a resource that can be managed to achieve economic, social and environmental benefits. Addressing the waste management challenge effectively in Kenya is critical to delivering on*

*Kenya's constitutional right to a clean and healthy environment for all, advancing the circular economy to create green jobs and wealth from the waste sector, and realization of the nation's sustainable development goals.*

## **2.2 The Subject and the Object: Communitization**

People and the environment cannot be decoupled. The two indeed have affect one another. A change in the environment would have an effect on the people and their activities. Human activities also affect the environment. This becomes a circular process with human beings being the most affected. However, the effect varies from place to place even though there might be some commonalities in the effects experienced. There is therefore a need to engage the people to get the real story of the people facing the problem. Otherwise not engaging the people risks coming up with solutions based on assumptions or even the danger of misdiagnosing the challenge or looking at a challenge from the 'outsider's' angle. We want to get the solutions from the people experiencing the problem before innovating a solution that suits their challenge in their context. We want to know the *unknown unknowns*.

## **2.3 Some General Reflections on Waste Management and Plastic Waste in Mathare Slums: Could this give us the Pathogenesis of Plastic Pollution in the Low-Income Areas?**

According to the *Informal settlements' vulnerability mapping in Kenya: FACILITIES AND PARTNERS' MAPPING IN NAIROBI AND KISUMU SETTLEMENTS, The Case of Mathare June, 2020* report by UN-HABITAT. "The settlement has generally a poor system of solid waste management. Mapped waste disposal and collection points were few and in dilapidated conditions. Over 70% of them exist in the form of open dumping. The survey established that there are at least 15 organizations involved in waste collection and management, and there is need for coordinated action and common strategy in waste management."

Primary data from the research we conducted also reveals a sorry state of the place as there are no proper waste collection points with most of the available points being open dumping sites, and some being controlled by gangs. This has meant that most of the waste ends in the drainage systems in the area. The lacuna in the legal and regulations framework coupled with poor urban planning and the political relations that arise has rendered efforts to manage waste almost

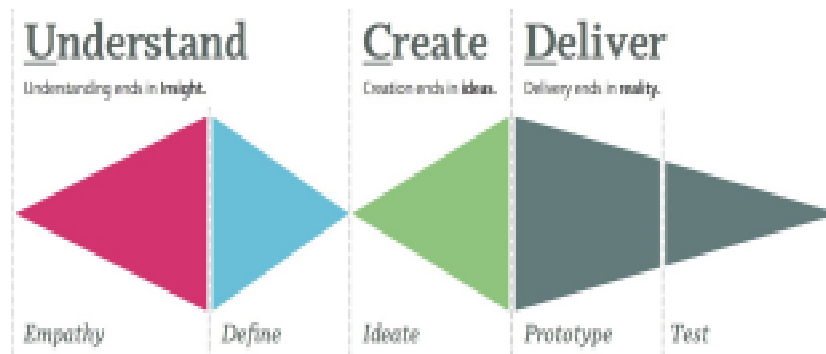
useless. From the people we held interviews with, the other types of solid waste are not a big menace to them. This, even the community based organizations that do clean ups agree. This is confirmed by the existence of enterprises dealing in waste management that try to convert the other types of waste into energy. Indeed both the secondary and primary research agree that on a comparison basis, plastic waste is more problematic due to the complex nature of dealing with it.



*The photos we took of the plastic waste in trenches and the Mathare River.*

## 2.4 Methodology.

Since we want to know the experience from the people experiencing the challenges, we used the Human Centered Design Thinking Approach to finally come up with a possible idea on how to manage the challenge at hand. An approach which in itself, is not linear, it has a back and forth nature. We got it wrong right from the beginning. With our challenge having to be redefined and contextualized thrice. However, due to the fast paced approach the course took, as this report is being written, we have not yet tested out our idea.



*Human Centered Design Thinking Process.*

### ***3. The Human Centered Design Thinking Experience: You will fail until you get it right.***

For us, it was chaotic all along. From the very beginning, having a minor misdiagnosis of the problem, engaging the wrong people for the context and finally settling on an almost similar challenge.

#### ***3.1. Empathize.***

We begin by engaging stakeholders at the expert level, a project lead and co-founder dealing in the circular economy, looking at how best their project can best create awareness on the need to end single use plastic and recycling plastic for some other means in Lamu, one of the areas in Kenya dealing with an acute problem of plastic waste, but just like Mathare, it also deals with plastic from within and outside Lamu. The unique thing about Lamu is that it is isolated, making the problem more acute. From the project lead however, we got analogous inspiration and some of the ways in which to best approach the challenge we were trying to look at. We begin with the challenge of how best we can encourage recycling and reuse of plastic in Mathare Slums, later discarding it as we had not engaged the community in Mathare. Later, we decided to look at how best we can reduce plastic waste in the drainage system in Mathare, and had interviews with 7 people from the area. Three of them were volunteers and leaders of community based organizations dealing with clean-ups and waste management from Mathare. From the interviews, we picked a number of sentiments that are common even from the secondary research we did:

1. Plastic waste is a big menace compared with the other solid waste as it is difficult to deal with.
2. Drainage blockage due to plastic waste is one of the causes of some diseases in the area such as cholera.
3. There are no common points for collecting waste so that waste is best managed.
4. Where the collection points exist, they are controlled by gangs.
5. Waste management should begin at the individual level.
6. The authorities concerned are not doing enough.

### ***Reflections deduced from the interview.***

While some people are aware of the plastic menace in the drainage system, some have a low awareness of this problem. If more awareness is created, then waste management will begin at the individual level. Moreover, the lack of common collection points and the control of the existing collection points means waste will definitely end in the drainage systems. Additionally, the proximity of the collection points is an obstruction to waste management. The entire problem has created what we label as “*Siasa ya Takataka*”

#### ***3.1.1 Personas.***

We used personas to give us the different angles from which the problem is viewed.



**1.Meet Nduta, Nduta** is a mother of two who has been living in Mathare Slums for over twenty years and a mother of two. She lives near Mathare River, which forms part of the Nairobi River ecosystem. Like the rest of the interviewees we have met, she laments that drainage due to plastic waste is a big challenge especially during the rainy season and to their children who get sick. She also cites disease, bad smell and contaminated plastic being picked by children from the stream as toys. Naomi thinks that there should be a common collection point(s) then the waste be dumped in some safe place.



**2.Meet Wangezi**, she is a mother and a grandmother who has been living in Mathare for over 40 years. She is a fruits and vegetables vendor, commonly called *Mama Mboga* in Kenya. Like the rest of the interviewees, she tells us that drainage blockage in Mathare is a big challenge to them, in her case as a *Mama Mboga* since blockage near the trench she has her kiosk is not good for her business. She also cites diseases to her grandchildren. She tells us that in the past, they were given plastic bags to collect their domestic waste then later is collected. She also says that if people are told not to dump anywhere then they can do that. She also thinks that waste is an individual problem and that the lack of a common point for collection is a big challenge for them.



**3.Meet Anyango**, she is a mother of two and she lives near Mathare River. Mathare river is however blocked with waste but mostly plastic waste. She tells us that they are the ones at the



receiving end with the bad smell coming from the stream, mosquito menace, water-borne diseases and their children getting sick. Like the rest she thinks that there should be a common collection point and that waste management should begin at the individual level.



**4.Meet Nafula**, she is a volunteer with MotoBrix, a social impact enterprise in the Green economy. They also do community clean-ups. She acknowledges that drainage blockage due to plastic waste is a reality that they are living with. Their organization in the past have tried coming up with common collection points but these were never embraced. She thinks that waste management should begin at the individual level and that gangs control of the existing points to be dealt with. But then, why did their initiative fail?



**5.Meet Joe**, he is a project lead with Ghetto Youth, a community based organization that does community clean ups. He says that in their clean ups, the most difficult waste to deal with in the drainage systems is plastic waste. He says that plastic waste from outside Mathare forms part of the problem especially in the Mathare River. He says that having a common collection point and

sensitizing the community would help mitigate the problem. He also says that the relevant authorities need to be put on toes.

### ***3.2 Define.***

From the above interviews, fundamental for us was to come up with some ways in which the community can easily identify with as had been directed by an expert who has been dealing in plastic waste reduction and also deducing from the responses given. Essential in this was how to best engage the community based on the different needs they want to help them deal with the challenge. From the community engagement approach we took as a conduit to dealing with the challenge we were able to come up with the ideas that could help the community. For us this was the most chaotic phase with a lot of mistakes, since we had our idea transferring the problem to another place, that is the Dandora Dumping Site which is poorly managed by Nairobi County authorities that is responsible for that but then that is understandable due to the capacity indefencies that is ubiquitous in the at the local level governments when it comes to waste management. We really appreciate the correction we were given by the instructors, and for us, this was a learning opportunity.

### ***3.3 Ideating and Prototyping.***

From the approach we took, that is how to best engage the community, we came up with seventeen ideas which we thereafter categorized under three main themes. From these themes, we had three main insights. It is these insights that gave us the first ideas that we thought would possibly help the community. The themes were:

1. Education (lack of awareness and attitude)
2. Legal and political frameworks
3. Resources

The insights were:

1. **Education (lack of awareness and attitude):** Mathare residents should be taught on proper ways of waste disposal, recycling and their rights to live in a clean environment
2. **Legal and political frameworks:** There is need for laws guiding waste disposal and encouraging local authorities to control waste disposal and youth gangs

3. **Resources:** There is need for common collection(s) points for plastic waste

From these we also had the how might we questions that helped us all the way with coming up with the final idea and the prototype. The questions are drawn from the themes and insights. These are:

1. **Education:** How might we increase awareness of the Mathare residents on the proper disposal and reuse of plastic waste?
2. **Legal and political frameworks:** How might we come up with proper policies contextualized for Mathare residents?
3. **Resources:** How might we help Mather residents come up with common collection point(s) for plastic waste?

### ***3.3.1 Initial Ideas and Prototyping: Getting it wrong!***

We decided to come up with three main ideas that we thought would possibly help the community. But after doing a presentation on that, we received insights based on critical analysis on what we should consider. For the team, this was really great as we had not seen things from a greater angle. The initial ideas were:

### ***3.3.2 Community Education.***

Based on the research we had done and the needs that the people told us they needed as pertaining how to manage waste properly, particularly on the question of waste management beginning at the individual level, we thought it wise that we the community need to be educated so that to create awareness and change the attitude, but then from the criticism we received, it seemed that educating the community was not the main approach to use as from the interviews, people already were aware of the causes of improper waste disposal and the effects it has on the community. The twists and turns however are that from the people that have been doing clean-ups in the area, there needs to be some form of awareness among the people. Thus, we had to do away with these, not entirely though since we still needed to do some community awareness. In this, we were to have kind of sessions to help create awareness and change the attitude of the people. Football matches were to be the platforms to achieve this.

### ***3.3.3 Engaging the Relevant Authorities.***

We thought that the existing legal and political framework need to be fixed for the challenge to be properly handled, but then we were told to revisit the policies and the existing political relations which are a function of the waste management in Mathare and dissect the two issues practically to see if they can really work in the short term for the benefit of the community. But as existing research and the various policy papers shows, there are capacity issues that will take time to be addressed especially if we are to use the legal approach and need for the relevant authorities to act accordingly. The idea was to engage the local authorities and ensure that they provide collection points, deal with the gangs that control the dumping sites and allow outsiders to dump waste in Mathare. But then this would take time while we needed to tailor an idea for the challenge that would work in the shortest time possible. In fact this was the worst idea that we came up with. We had to forget about it.

### ***3.3.4 Providing the Community with Bins/ Building Common Collection Points.***

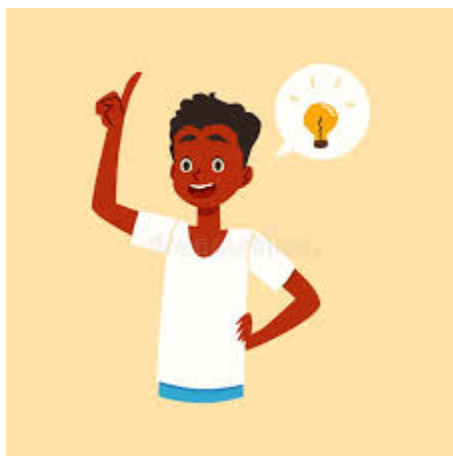
We thought it wise to come up with bins for each *“plot”*. In the slums, a *“plot”* is basically a plot size piece of land with structures on it that acts as shelter for people. So the idea was that we provide each house with a plastic bag to collect their waste, while outside each plot, we provide a mobile bin made from locally sourced materials so that each *“plot”* can take their waste to the dumping sites available which can later be collected with the relevant authorities. The motivation was that this would be working in turns where at the end of each week and in a chronological manner, individual persons in the spirit of neighborhood and community would be responsible to go and empty the *“plot’s”* bin. For us, we saw this as a way of enforcing individual responsibility and people checking on one another on how to have a clean environment. The main shortcoming with this idea was that we were simply transferring a problem to another area, the Dandora Dumping Site, which itself is not well managed and raises a number of issues. We had to drop the idea after being helped to take this into consideration.



Cartoonistic imagination of the nins we were supposed to come up with.

### 3.3.5 Back to the Drawing Board- You did not get it right, you need to iterate.

Since the initial ideation and prototyping proved not to be good enough, we had to relook at our *themes, insights* and *how might we questions* in order to come up with a better idea. We looked at how we can avoid transferring the problem to Dandora Dumping Site but then doing this sustainably. This means coming with an idea that resonates with the issues of the community and how we can create employment to sustain such an idea. We came up with the idea of using plastic in art.



*Cartoonistic illustration of the team rethinking.*

### 3.3.6 Plastic in Art.

According to the Projects Lead at FlipFlopi, an organization that is working on reusing and recycling plastic, to adequately address this issue, one needs to come up with something that resonates with the community and can easily draw their attention to the challenge of plastic waste. Drawing from his insights, we therefore thought of how best we can tailor our idea for the people of Mathare.





*Works made from plastic.*



## **4.Settling for the Plastic in Art Idea.**

### ***4.1 The opinionated opinions.***

Up to this point, the interviews that we did at the community level were indeed very important as we had to do an amalgamation of the themes, insights and the how might we questions we had come up with. However, we still had to go back to the projects lead for their thoughts on this someone who has been dealing in art using plastics.

### ***Feedback from Projects Leads.***

These are leaders of community based projects and organizations that do clean ups and waste management. For them, the idea is good but it has to be accompanied by a number of things that are fundamental for it to be accepted/work for the people. That since there are different perceptions on the issue of waste generally, two of the leads had some commonalities in the insights they gave us. That we need to engage the community in order to create awareness on the need to look at waste management. When coming up with the final concept we should highlight such important items such as the problem we are addressing with our idea, the effects of the problem, how the solution resonates with the community and most importantly we ensure that it creates employment for the people especially the youth. We also need to tell the community why our project. We need to show them either a picture or a video of how our final concept will be working and how pragmatic it will be.

### ***Insights from Vong Wong.***

Vong has been using plastic in art to tell stories on the need to deal with plastic waste. For him, talking about a challenge without giving solutions is not helpful. Also using plastic in art is somehow a systemic approach to the challenge as it draws the attention of all the stakeholders in the sector, the community, government, global organizations and plastics producing companies. Such an approach also has a lot of angles in determining your success. Success is not limited to just one area. It is multifaceted.

### ***Conclusions from insights and the feedback.***

From the above, we settled on the idea of plastic in art since it is somehow systematic and more likely to meet the issues raised by the projects leads. We therefore had to tailor it to fit the needs of the people of Mathare.

### ***4.2 Empathizing, Defining and Ideating the Plastic in Art for Mathare Slums.***

We used the *themes, insights, and the how might we questions* together with the insights and the feedback in these three stages. This amalgamation helped us to come up with the idea. Looking at the needs of the different people we had interviewed, we wanted to capture them and ensure that they are best addressed. Based on the needs and hindrances associated with why waste management is a big issue for the community, we decided that we would come up with a cultural/recreational center where artists using plastic for art could come and market their works. Ideally:

- The center should be located somewhere central, where the community can easily access.
- The main purpose of the center is to draw the attention of the people on the need to have a clean environment and other issues facing the community such as alcohol and substance abuse and crime. Should be giving the story about waste management and the stories of the people of Mathare.
- It should be having a systemic approach especially regarding the plastic waste challenge, that is how best all the stakeholders can be brought on board to tackle the challenge; the government, plastic producing companies, the community, global organizations looking at the threats on the environment.

### ***4.3 Prototyping.***

From the ideas we had on the cultural center, we mapped Mathare to see where we can put the center, how we will be getting the plastic waste, where we will be having the collection points, and who are the most affected people within Mathare, that is, in which areas exactly are people facing the problem the most? For our case from the beginning, are the people living near Mathare River, the sewer systems and the trenches.

Our prototype therefore takes into consideration the entire waste disposal, that is, right from where the user throws away the waste. For us, if this can be collected then it will supply the center with the plastic that we will be giving the artists to use in their works. This way, we hope to support the artists who will not be able to get the materials that they need.

#### *Collection from the “Plots”*

Outside each “*plot*” there will be a bin made out of plastic using locally sourced materials so that the people from each “*ploti*” will be collecting their waste then our waste collectors will be collecting to the designated collection points. This will help create employment for the youths.



*Cartoonistic imagination of how the waste will be collected.*



*Cartoonistic imagination of where to place the bins.*

### *The Collection Points.*

We will be having two main collection points meant for the segregation of the waste. One of the centers will be located near the main road while the other one will be located inside the ghetto. At the collection points, there will be people who shall have been trained or will be trained on the type of plastic that we will be using based on a number of considerations relating to safety.



*Cartoonistic imagination of segregation.*



*Cartoonistic imagination of the collection center.*

*The Center.*

- The center will be made of plastic with the walls and the foundation being made from eco bricks- basically, plastic bottles and used plastic packages, to prevent such but especially the plastic packaging from ending in the drainage systems.
- Inside the center, there will be a stage meant for performance and talks on current issues affecting the community, exhibition places for the works made from plastic and the seats made from plastic to complement the center.
- Outside the center, there will be some sculptures made from plastic for the purpose of drawing the attention of the people.



*The image of our prototype.*



*The possible center that we might come up with.*



*Team Planyo during the rapid prototyping.*



*Team Planyo during the rapid prototyping.*



## **Conclusion.**

All along, it has been a learning process for us from the very beginning to this point. We especially learned from our mistakes.

We hope that the prototype will work once we test it. This will help us to come with the final concept on how more practically the center will work.

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