

**ASSESSING THE QUANTITY OF PLASTIC WASTE TRANSPORTED ALONG
NAKIVUBO CHANNEL TOWARDS LAKE VICTORIA**

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ABSTRACT

In Uganda, most people show little regard for the environment resulting people to use non biodegradable plastic materials which are usually poorly disposed of. The overall objective for the study was to assess the quantity of plastic wastes transported by Nakivubo channel towards

Lake Victoria. Data was gathered via one-on-one interviews, observation, and lastly, the use of a weighbridge to determine the weight of the plastic trash trapped in the channel from the areas close to the channel, including Bugolobi, Owino market, and industrial area, among others.

According to the findings, industrial development and commercial operations around the Nakivubo Channel, as well as the locals who dump their plastic garbage in the channel, are the sources of plastic waste. About 520 kilograms more plastic garbage was caught during the wet season than throughout the dry season, which saw only 99 kg more.

Additional organizations should be hired to collect plastic waste, people should be made aware that plastic consumes are materials which can be used to produce additional substances, and more recycling businesses should be established, according to the KCCA. Plastic debris are supplies that can be used to produce additional substances.

Key words: plastics, KCCA, Nakivubo and recycling

Background of the study

The Nakivubo channel is a waste and storm water open canal that originates in the Makerere Hill foothills. Before releasing its water at Murchison-bay in Lake Victoria, it passes through the densely populated slum of Makerere Kivulu, three busy markets, and the Kampala industrial sector. These constitute all significant sources of the high level of plastic pollution. Scientists are concerned about this, which has gotten much worse in Uganda.

Plastics are employed in a wide range of applications around the globe. Nevertheless, using it raises a lot of sustainability problems. Plastic dissolves slowly since it is a robust material. Production of plastic materials, primarily polyethylene, polystyrene, and polypropylene, is presently booming. Jugs, bottles, buckets, plastic bags, and packaging materials are examples of standard polyethylene items. According to Doria (2006), the plastic bag and bottle businesses are experiencing the fastest development. Considering they are inexpensive, robust, portable, useful, and a clean and hygienic method to transport items, plastic bags are frequently supplied to clients by shops and plastic water bottles are frequently used as a simple way to drink water (Nicholas et al., 2023). According to Adane and Muleta (2001), these goods are regrettably one of the main contributors of contamination. The rise in plastic manufacturing and accompanying consumer disposal of the garbage has only worsened the environment and enveloped living things. According to studies, food and beverages kept in plastic packaging may contain trace amounts of BPA, a man-made substance that disrupts the body's natural hormonal communication system.

Plastic in the trash is a problem for more reasons than the fact that the material might have been properly recycled. When plastic is simply thrown away, the plastic consumes organic contaminants that were already present, boosting the general pollution in a number of ways. These chemicals end up in the environment and ultimately end up in the digestive tracts of animals when they consume the water (Jackline et al., 2023).

Problem statement

Diverse plastic waste products produced by multiple operations in the Nakivubo channel area pose a threat to the aquatic habitat. Water contamination and water flow obstruction are two possible outcomes. These have a significant impact on the water's quality when it enters Lake Victoria. Lake Victoria is at serious risk of contamination due to the improper disposal of plastic garbage in the Nakivubo canal and its immediate surroundings. There may have been some reports regarding the presence of plastic wastes in the channel, although this has not yet been extensively investigated (Daily Monitor, April 2, 2013). Understanding plastic trash types, treatment methods, and any deficiencies is necessary for reducing pollution in the Nakivubo stream. The knowledge gained from this investigation can help direct the administration of plastic garbage near the channel.

The purpose of this study was to evaluate the amount of plastic garbage that was transferred via the Nakivubo channel, as well as the catchment's local populations' methods for handling waste.

to give a thorough picture of how much plastic debris is moved through the Nakivubo waterway and how it is managed as it travels towards Lake Victoria

Specific objectives

- 1. To identify the types and sources of plastic wastes transported by Nakivubo channel.*
- 2. To determine the quantity of plastic wastes transported by Nakivubo channel.*
- 3. To establish the strategies used by KCCA and local communities to control plastic wastes that may end up in Lake Victoria via Nakivubo channel.*

Research questions

- 1. What are the types of plastic wastes removed from Nakivubo channel?*
- 2. What mechanisms are used to remove the plastic wastes from Nakivubo channel?*
- 3. What strategies are used to reduce the quantity of plastic wastes in Nakivubo channel?*

Methodology

Research design

The research used a mixed design; it involved use of qualitative and quantitative methods.

That is observation, interviews and measurements. This helped to understand the plastic wastes generated and how they are managed along Nakivubo channel for Lake Victoria pollution prevention.

Determining sample size

Sample size determination for the target respondents for the interview using Krejcie and

Morgan formula/ table (1970); was used.

$s = NP \sqrt{1 - P} \sqrt{d(N - 1) + X P (1 - P)}$.

s = required sample size.

X = the table value of chi-square for 1 degree of freedom at the desired confidence level

(3.841).

N = the population size.

P = the population proportion (assumed to be .50 since this would provide the maximum sample size).

d = the degree of accuracy expressed as a proportion (.05).

Therefore,

N= 47, giving a sample size (s) of 40

Data collection methods

Identifying the different types and sources of plastic wastes

A field survey was conducted where observation was used to collect data to draw conclusions on the socio-economic activities carried out along the channel. A check list was also used to record activities observed (Appendix 2). The checklist was used during data collection that involved physically inspecting the different socio-economic activities carried out along Nakivubo channel.

Determining the quantity of plastic waste

Field study volunteers who were chosen from the neighborhoods along the waterway helped with this. They received training on trash measurement methods. At the selected trapping spots, a nylon net measuring 2.44 m by 7.32 m and measuring 3 by 3 inches was set in the channel (Figure 1). For convenient monitoring and evaluation, capturing points were selected based on the positions of the bridges. Throughout the dry and wet seasons, the nylon net was employed every day for two days to collect plastic debris. The waste plastic that had been captured was manually separated based on shape and color, and then it was weighed in kilograms using a weighing scale.

Strategies used to prevent the plastic wastes from reaching Lake Victoria via Nakivubo channel

This involved interviewing 40 residents along the channel, Kampala City Council Authority (KCCA) officials to collect data on the different strategies used to prevent plastic wastes from reaching Lake Victoria (Appendix 1). A review of secondary sources of data was carried out for example; NEMA reports, KCCA reports, Journals and non-government organizations (Jackline et al., 2023).

Data analysis

Data was entered into a computer, edited, and coded. The analysis was done using the statistical package for social science (SPSS) version 16 spread sheets to generate descriptive analysis (Nelson et al., 2022). Qualitative data analysis approach was used including summarizing, categorizing and presented content of the interviews. Quantitative data was also analyzed using frequency and percentages

RESULTS

Major activities carried out along Nakivubo channel.

Means of collecting plastic waste

Results in table 1 show that picking of plastic wastes from the sides of the channel and the bridges along the channel are the commonly used means of collecting plastic wastes from Nakivubo channel

Table 1: Means of collecting plastic wastes

Means of collecting plastic waste.	N	Percentage of cases(%)
Using a rake	4	22.2
Picked from the side of the channel	9	50.0
Picked from the bridges of the channel	11	61.1
Tractors are also used to collect plastic wastes from the channel	4	22.2
Defilters also collect plastic wastes from the channel	7	38.9

Removal from trapping points	5	27.8
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Flooding and a decline in water quality were the most generally reported effects of plastic trash, according to respondents in Table 2.

There have been 20 reports of this impact, or 90.9% of all reports. Flooding can have serious repercussions, including property destruction, evictions, and transportation interruption. Given that it pertains to the vast majority of the examples cited, it is a serious issue (Willies et al., 2022).

In 14 cases, or 63.6% of all cases, this impact has been documented. Water sources may get contaminated as a result of flooding, lowering the quality of the water. This may endanger people's health and limit access to safe water to ingest for both people and animals. This impact is reported in 6 cases, accounting for 27.3% of the total. Stagnant water, often resulting from flooding, can create breeding grounds for mosquitoes and other pests. This can increase the risk of diseases such as malaria, dengue fever, and other waterborne illnesses.

<i>Impacts</i>	<i>N</i>	<i>Percent of cases(%)</i>
<i>Flooding</i>	<i>20</i>	<i>90.9</i>
<i>Reduced quality of water</i>	<i>14</i>	<i>63.6</i>
<i>Stagnant water and associated effects</i>	<i>6</i>	<i>27.3</i>

Results in Table 3 show that majority of the respondents (92%) agreed that more plastic wastes are collected and sold to recycling companies and 68.0% reported that plastic wastes are loaded on trucks and transported to Kitezi land fill.

<i>Disposal</i>	<i>N</i>	<i>Percentage of cases(%)</i>
<i>Collected and sold to recycling companies</i>	23	92.0
<i>Loaded on tracks and transported to kitezi land fill</i>	17	68.0

Limited awareness and inadequate collection methods were recognized as the main obstacles faced when dealing with plastic wastes, as illustrated in Table 4 discharge of wastewater in the channel. Limited PPE (Personal Protective Equipment): 6 cases, or 42.9% of the total, reported this difficulty. PPE that is difficult to obtain or access could endanger the safety of those tackling garbage management and environmental control-related problems. It can exacerbate concerns about health and safety and raise the risk of being exposed to hazardous substances.

Discharge of sewerage in the channel leading to plastic waste accumulation: In 10 cases, or 71.4% of all cases, this problem was reported. The issue of plastic garbage buildup may be made worse by sewerage discharge into channels. In addition to detracting from the area's aesthetic attractiveness, plastic garbage also poses potential hazards because it can kill wildlife, obstruct streams, and cause water contamination.

Poor collection services: This issue was raised in 9 instances, or 64.3% of all cases. Poor garbage disposal methods and the buildup of trash in public areas might result from insufficient garbage pickup services. It may lead to health concerns, environmental contamination, and an increase in diseases and pests. Limited compliance to laws: There has been 5 reports of this difficulty, representing 35.7% of all reports. Ineffective supervision and oversight of waste disposal procedures might be hampered

by a lack of compliance with waste management rules. To promote compliance and proper waste management, it could be necessary to step up enforcement activities, run public awareness programs, and impose harsher penalties.

Political interference: 3 instances, or 21.4% of the total, of this difficulty have been documented. Political meddling can make it difficult to make wise decisions and put regulations concerning waste management into practice. It is crucial to make sure that waste management procedures are supported by scientific research and give the health of everyone their first priority.

<i>Challenges</i>	<i>N</i>	<i>Percentage of cases(%)</i>
<i>Limited PPE</i>	<i>6</i>	<i>42.9</i>
<i>Discharge of sewerage in the channel which makes collection of plastic wastes in the channel</i>	<i>10</i>	<i>71.4</i>
<i>Inadequate collection services</i>	<i>9</i>	<i>64.3</i>
<i>Limited compliance to laws</i>	<i>5</i>	<i>35.7</i>
<i>Political interference</i>	<i>3</i>	<i>21.4</i>
<i>Limited awareness whereby people dispose plastic waste in the channel</i>	<i>7</i>	<i>50.0</i>

According to Table 5's findings, increasing the number of recycling businesses and raising awareness were the most often expressed future ideas for cutting back on plastic trash in the Nakivubo channel.

Developing additional recycling businesses: This possibility is stated in 12 occurrences, or 85.7% of all cases. Creating new recycling businesses might offer a number of advantages. It can increase options for recycling plastic garbage, support the circular economy, and lessen the total amount of waste that pollutes the surroundings or ends up in landfills.

Creating collection points: This possibility is stated in 4 instances, or 28.6% of all instances. Setting up gathering locations might make it easier to dispose of waste properly and recycle. People can drop off their recyclable material at these places conveniently, guaranteeing that it is properly disposed of. More sensitization: Of the total cases, 11, or 78.6%, acknowledge this possibility. Increased enlightenment is the process of informing and teaching individuals and neighborhoods on the value of responsible waste management, especially the handling of plastic trash. The stimulation campaigns can induce behavior modification, promote ethical waste management methods, and cultivate an attitude of environmental responsibility.

More awareness: This potential receives 8 mentions, or 57.8% of all mentions, making it more widely known. Similar to education, raising consciousness tries to inform people of the effects plastic waste has on the natural world and the advantages of collecting. This can be accomplished by promoting appropriate waste disposal procedures through initiatives, courses of study, and information sharing.

Contracting more companies that do plastic waste collection: This prospect is mentioned in 5 cases, representing 35.7% of the total. Engaging more companies specializing in plastic waste collection can help improve waste management infrastructure and services. It can enhance the efficiency and effectiveness of waste collection efforts, ensuring that plastic waste is properly collected and sent for recycling or proper disposal.

Prospects	N	Percent of cases(%)
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<i>Creating more recycling companies</i>	12	85.7
<i>Establishing collection points</i>	4	28.6
<i>More sensitization</i>	11	78.6
<i>More awareness</i>	8	57.8
<i>Contracting more companies that do plastic waste collection</i>	5	35.7

Conclusion

The results of the study show that the two main sources of plastic trash entering the Nakivubo Channel are commercial and industrial activity. Industrialization results in the production of numerous plastic-based substances that are traded and utilized for a variety of applications. Following their use, plastic garbage is produced in the communities nearby the channel and eventually ends up in Nakivubo. However, in addition to illegal settlements along the river's banks and the numerous companies established along the channel, industrialization and trade are also significant factors contributing to the large amount of plastic garbage in the Nakivubo channel.

Recommendation

To lessen the number of plastic debris entering Lake Victoria through the Nakivubo channel. To lessen the quantity of plastic debris that individuals dump into Nakivubo canal, unauthorized residents along the channel should be evicted. Along with this, the borders should be identified and defined with beacons, which can be concrete pillars or wooden poles placed along the channel to deter trespassers. Establishing

catch spots where recyclables could be caught at the various crossings along the channel. To make it easier to collect plastic garbage, a collection site should be set up at each catching location.

REFERENCES

- Jackline, N., Nicholas, K., Prudence, K., Christopher, F., Moses, N., Kazaara, I., & Ruth, N. (2023). Examining The Eeffect Of Urbanization On Wetlands Management In Uganda . A Case Of Lubigi Wetland , Wakiso District. 7(3), 61-66.*
- Nelson, K., Christopher, F., & Milton, N. (2022). Teach Yourself Spss and Stata. 6(7), 84-122.*
- Nicholas, K., Nelson, K., Kazaara, A. G., Deus, T., & Moses, N. (2023). Examining the Influence of Climatic Change Patterns on Tourism Activities in Uganda . A Case Study of Bududa District . 7(2), 72-79.*
- Willies, W., Christopher, F., Anthony, W., & Muhindo, M. E. (2022). Administrative Handling of the Calamities of Floods. 6(12), 16-18. <https://doi.org/10.1038/nc>*