



## **FINAL YEAR PROJECT REPORT**

### **DESIGN AND CONSTRUCTION OF A FLOATING RIVER TRASH TRAP USING RECYCLED PLASTIC BOTTLES.**

**By**

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**APRIL 2023**

## **Abstract**

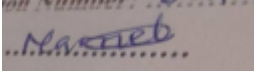
Plastic pollution in rivers is a growing environmental problem that poses threat to aquatic life and human health. Rivers and waterways serve as conduits for plastic waste which is carried downstream and accumulates in river banks, waterways and ocean. Plastic debris in rivers can harm aquatic life by entangling and suffocating them. Also, plastic waste in rivers can release toxic chemicals into the river threatening the life of the whole ecosystem. Some of the measures undertaken include improving waste management of the infrastructure and practices, promoting public awareness and education on the impacts of the plastic pollution and implementing the policies and regulations to limit the production of single- use plastics. In Uganda we have experienced the rapid increase in plastic waste disposal in recent years. With plastic being the major contributor to pollution in rivers and waterways. This problem is rampant especially in urban areas like Mbarara, where in adequate waste infrastructure and waste disposal practices have led to plastics end up in rivers. This project therefore aims to design and construct a floating river trash trap using recycled plastic bottles. This trap will be designed to trap and capture floating debris from rivers. This project involves use of recycled plastic bottles as the primary construction material for the trash trap. The project will contribute to the reduction of plastic waste in the environment while providing a low-cost solution to river pollution. The success of the project will be evaluated through physical testing of the traps effectiveness in trapping and retaining debris.

## Declaration

I the undersigned, declare that this research proposal is my original work, except where due acknowledgment has been made. I declare that this work has never been submitted to this University or any other institution for funding/or partial fulfillment for any award.

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**Date: 08/02/2024.....**

**Supervisor(s) Approval**

This research proposal is submitted as a partial fulfillment for the award of a Bachelor's Degree in Water Resources Engineering from Busitema University, with our approval as the academic supervisor(s).

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**Signature: ...**  **.....**

**Date: ...27/02/2024.....**

**Dedication**

This work is dedicated to my mother Ms. BAHATI JANE and brother Mr. ARINAITWE DEUS for nurturing me ever since I was born. I also dedicate this report to my friends for the love and support they gave me throughout my research period.

## **Acknowledgment**

I am thankful that the Almighty God has given me wisdom, grace, mercy life, and protection.

I am indebted to my parents, brothers, sisters, relatives, classmates, friends, and well-wishers who have supported me financially and through their pieces of advice and encouragement when we felt like quitting.

I am also indebted to my project supervisor Dr. Joseph Ddumba Lwanyaga who has guided me throughout the entire project time.

I extend my sincere thanks to all my lecturers and non-teaching staff of Busitema University at the Faculty of Engineering, especially the Department of Water Resources Engineering for equipping me with the necessary knowledge and skills that enable my academic excellence.

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# **1 CHAPTER ONE: INTRODUCTION**

## **1.1 BACKGROUND**

Marine Waste is described as any persistent solid substance produced or processed, disposed of, and abandoned in the marine environment purposefully or accidentally. The most common kind of trash in the river, which accounts for 80 percent of all marine debris from the surface to deep sediments, is plastic waste (Gacu, 2022) Plastic pollution in marine environments can also easily interact with aquatic life and threaten wildlife or habitat.

Plastic is a synthetic organic polymer made from petroleum with properties ideally suited for a wide variety of applications including packaging, building and construction, household and sports equipment, vehicles, electronics, and agriculture(Pinto Da Costa et al., 2020). Globally , it is estimated that between 1.15-2.41 million tonnes of plastics are released into the river and waterways every year.(Lebreton et al., 2020)

In Uganda, 53.6% of people live in crowded and slum settlement and lack access to proper waste disposal systems and often resort to dumping waste in rivers or other open spaces(Ssemugabo et al., 2020). Additionally, industries and businesses in urban areas also contribute to river pollution by discharging untreated wastewater and other hazardous materials directly into waterways.

The problem of river trash in Uganda is further compounded by poor enforcement of environmental laws and regulations, lack of awareness among the general population on the impact of their actions on the environment, and inadequate resources and infrastructure to manage waste properly (Report, 2016)

The accumulation of river trash has significant negative impacts on both the environment and human health, including the contamination of water sources, loss of aquatic life, and increased risk of waterborne diseases(Pinto Da Costa et al., 2020). Efforts are being made by the government and non-governmental organizations to address the issue of river pollution in Uganda, including through the implementation of waste management programs, awareness campaigns, and enforcement of environmental regulations.

River Rwizi originates from the Buhweju hills. It is a major source of water for the inhabitants of Mbarara Municipality and the surrounding environment. This major water source, however, 60% of Rwizi River catchment has been polluted by the empty plastic bottles that cover the surface of the water in Buremba Village, Mbarara City North(Egor et al., 2020) Kampala and Mbarara).The problems of the Rwizi River were landfall sewage, but plastic bottles also got on board(Gumisiriza & Kugonza, 2020)

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