

UNIVERSITI TEKNOLOGI MARA

**DEVELOPMENT OF A RAINWATER
HARVESTING SYSTEM**

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Dissertation submitted in partial fulfillment
of the requirements for the degree of
Diploma
(Mechanical Engineering)

College of Engineering

Feb 2024

ABSTRACT

The demand for sustainable water management solutions has prompted the development of a portable rainwater harvesting tank system equipped with its own filtration mechanism suitable for residential and transportability. Thus, this project proposed the development and design of a portable rainwater harvesting system that includes the filtering system, water storage and efficient piping infrastructure. The primary objectives are to design a portable water tank adaptable to various settings and fabricate a cost-effective rainwater harvesting system. The fabrication method employs innovative techniques to construct the tank and integrate a low-maintenance filtration system. The expected result is a flexible rainwater collection tank system designed to tackle water shortage challenges while providing convenience and cost-effectiveness for household use.

ACKNOWLEDGEMENT

Firstly, I want to thank God for giving me the opportunity to embark on this. The diploma and for completing this long and challenging journey successfully.

My gratitude and thanks go to my supervisor, Dr. Kamariah Binti Md Isa for always being there to give support, advice, and suggestions when I was struggling to complete this course.

Next, I will also truly grateful for my friend especially Muhammad Syamil Sew Bin Muhamd Rodhi Sew who always give me tips on how to do my final year project and giving advice when I was down.

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Finally, this dissertation is dedicated to my biggest supporters which are my father and mother for the advice, support, vision, and determination to educate me. This piece of victory is dedicated to both of you. Alhamdullilah.

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CHAPTER ONE

INTRODUCTION

1.1 Background of Study

The practice of rainwater harvesting dates back thousands of years and has been utilized across diverse cultures and geographical regions. Early civilizations, such as those in Mesopotamia, Egypt, and India, developed sophisticated rainwater harvesting systems to capture and store rainwater for agricultural, domestic, and industrial use [1].

Historically, rainwater harvesting was essential for communities living in arid and semi-arid regions where water scarcity was a constant challenge. These communities relied on various techniques, such as cisterns, reservoirs, and rooftop catchment systems, to collect rainwater during wet seasons for use during dry periods.

In recent years, the significance of rainwater harvesting has been re-evaluated in response to modern challenges such as population growth, urbanization, and climate change. Rapid urbanization has led to increased impervious surfaces, reducing natural infiltration and increasing surface runoff, exacerbating urban flooding and stormwater pollution [2].

Simultaneously, climate change has altered precipitation patterns, leading to more frequent and intense rainfall events in some regions and prolonged droughts in others. These changes underscore the importance of sustainable water management practices like rainwater harvesting to mitigate the impacts of water scarcity, flooding, and water pollution [3].

Contemporary rainwater harvesting systems range from simple rain barrels and rooftop catchment systems to more complex setups involving storage tanks, filtration systems, and pumps. These systems can be adapted to various scales, from individual households to large commercial and institutional buildings, as well as entire communities.

Research in the field of rainwater harvesting focuses on optimizing system design, enhancing water quality, improving storage capacity, and developing innovative technologies to make rainwater harvesting more efficient, cost-effective, and sustainable. Additionally, studies explore the social, economic, and environmental