

CENTRE OF STUDIES FOR BUILDING SURVEYING  
FACULTY OF ARCHITECTURE, PLANNING AND SURVEYING  
UNIVERSITI TEKNOLOGI MARA

ENVIRONMENTAL SUSTAINABLE INITIATIVE: RAINWATER  
HARVESTING

NIK MUHAMMAD FARIS BIN NIK HASSIM

Academic Project submitted in partial fulfillment of the requirements  
for the degree of  
Bachelor of Building Surveying (Hons)  
Center of Studies for Building Surveying  
Faculty of Architecture, Planning & Surveying

June 2014

# ENVIRONMENT SUSTAINABILITY INITIATIVE : RAINWATER HARVESTING

---

## **Abstract**

The purpose of this research is to identify the benefit of rainwater harvesting system. Other than that, this research also carried out to identify the problem relating to rainwater harvesting and to see whether this system is practical to be applied in order to reduced monthly cost. This research is carried out to various of case study. The area of the research location is around Selangor and Kuala Lumpur. The number of case study for this research is five building that applied this system in their building. The method of carrying out this research is by using interview. The target respondent is the competent person who handle and taking care of rainwater harvesting system. That is because to obtained the detail and accurate data from the person that had been interviewed. The conversation from interview will be recorded and it will be transcribed. Only the important data will be transcribed which related to the research. Then, all the data will be analysed to get the finding and to achieved the objectives of this research. When the data analysis completed, it indicate that the main function of rainwater harvesting system is for irrigation of landscape and garden. Besides that, the result of finding also shows that the rainwater harvesting system is still quite new because all of case study building have apply this system below than 5 years. Mostly the reason why this system is applying in the building due to reduce monthly water bill cost. For the initial cost, the result of the finding indicate that it is quite expensive but the installation cost is depend type of system that has been used. If the system is simple and the usage of the water is only for one purpose, there is no need to installed additional component of rainwater harvesting. For the main problem of rainwater harvesting system that usually arise relating to rainwater harvesting is high initial cost and faulty on pump. From this research, it can be conclude that the rainwater

## ENVIRONMENT SUSTAINABILITY INITIATIVE : RAINWATER HARVESTING

---

harvesting system is a practical approach and have potential to be applied widely in Malaysia due to climate and other factors that make rainwater harvesting is needed. It is also has lot of benefits to the human being and environment.

# ENVIRONMENT SUSTAINABILITY INITIATIVE : RAINWATER HARVESTING

---

## **Acknowledgement**

A very grateful and utmost gratitude to Allah SWT because with His bless, I successfully managed to complete my thesis. In order to make the report well I had faced many challenging period during do this thesis. However, this would not be possible without all the help from all the people around me.

First and foremost, I would like to acknowledge my sincere gratitude and special appreciation goes to my supervisor, Dr. Sr. Mohamad Sufian bin Hasim for his supervision and constant support. His invaluable help of constructive comments and suggestions throughout the experimental and thesis works have contributed to the success of this research. It has been my pleasure to work with him. I also would like to express my appreciation to my coordinator, Pn Rohimah Khoiriyah for her valuable advice, constructive criticism and their extensive discussions around my work.

Sincere thanks to all my friends especially and others for their kindness and moral support during my study. Thank you for remind me to performed and put all my commitment and effort to ensure that the thesis will be perfect and finished by time. Even though we had a tough time, we experienced something new that might we use for our own future. Thanks for the friendship and memories.

Last but not least, my deepest gratitude goes to my beloved parents, and I and also my siblings for their endless love, prayers and

# ENVIRONMENT SUSTAINABILITY INITIATIVE : RAINWATER HARVESTING

## Table of Content

|   |    |
|---|----|
| CHAPTER 1.....  | 2  |
| 1.1 INTRODUCTION.....   | 2  |
| 1.2 PROBLEM STATEMENT.....  | 4  |
| 1.3 OBJECTIVES OF STUDY.....  | 7  |
| 1.4 SIGNIFICANT OF STUDY.....   | 8  |
| 1.5 SCOPE OF STUDY.....   | 9  |
| 1.6 METHODOLOGY.....  | 10 |
| 1.7 CHAPTER OUTLINE.....  | 11 |
| CHAPTER 2 : LITERATURE REVIEW.....                                      | 14 |
| 2.1 DEFINITION OF SUSTAINABILITY.....                                   | 14 |
| 2.2 HISTORY OF SUSTAINABILITY.....                                      | 16 |
| 2.3 ENVIRONMENT SUSTAINABILITY.....                                     | 19 |
| 2.3.1 ENERGY IN ENVIRONMENTAL SUSTAINABLE.....                          | 20 |
| 2.3.2 WASTE IN ENVIRONMENTAL SUSTAINABLE.....                           | 21 |
| 2.3.3 WATER IN ENVIRONMENT SUSTAINABLE.....                             | 22 |
| 2.4 RAINWATER HARVESTING TECHNIQUE.....                                 | 24 |
| 2.5 ARGRICULTURAL RAINWATER HARVESTING.....                             | 27 |
| 2.6 DOMESTIC RAINWATER HARVESTING.....                                  | 29 |
| 2.7 CRITERIA FOR SELECTION OF RAINWATER HARVESTING.....                 | 32 |
| 2.8 METHOD OF RAINWATER COLLECTION.....                                 | 33 |
| 2.8.1 COLLECTION OR CATCHMENT SYSTEM.....                               | 34 |
| 2.8.2 CONVEYANCE SYSTEM.....  | 36 |
| 2.8.3 STORAGE TANK OR CISTERN.....                                      | 37 |
| 2.8.4 DELIVERY SYSTEM.....  | 38 |
| 2.9 RAINWATER HARVESTING EFFICIENCY.....                                | 39 |
| 2.10 QUALITY OF HARVESTED RAINWATER.....                                | 40 |
| 2.11 DEVICES & TECHNIQUES THAT FURTHER AID IN BETTER WATER QUALITY..... | 42 |
| 2.11.1 FIRST FLUSH AND FILTER SCREENS.....                              | 42 |
| 2.12 ADVANTAGE OF RAINWATER HARVESTING.....                             | 46 |
| CHAPTER 3 : RESEARCH METHODOLOGY.....                                   | 51 |
| 3.1 INTRODUCTION.....   | 51 |