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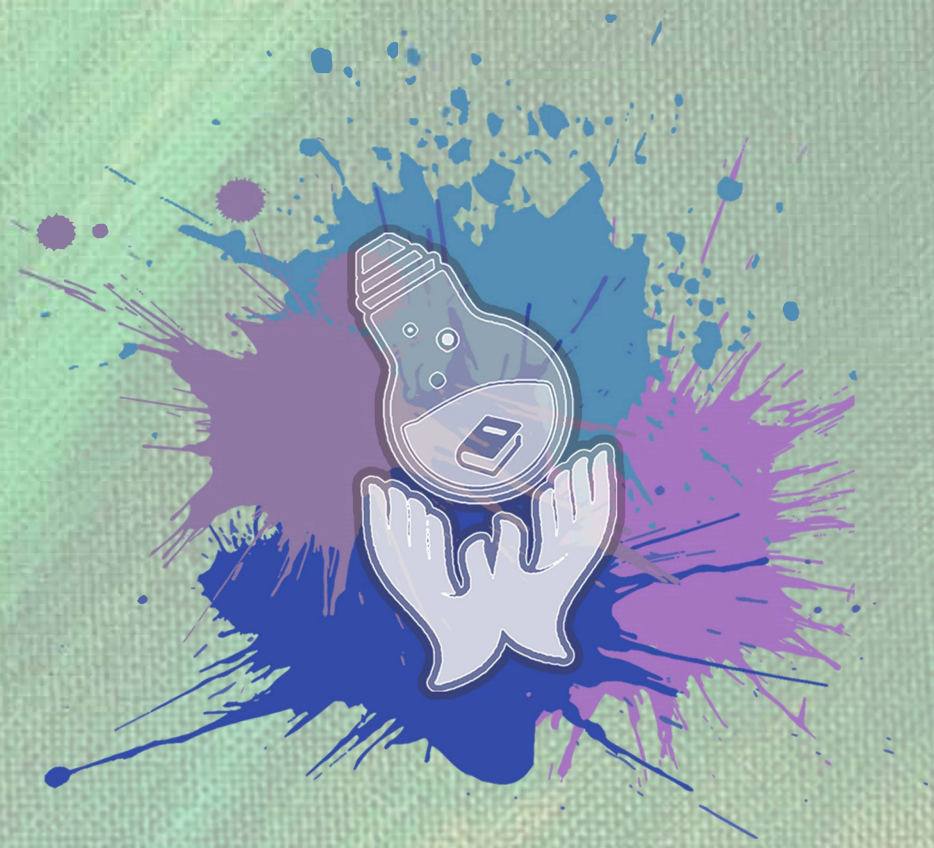

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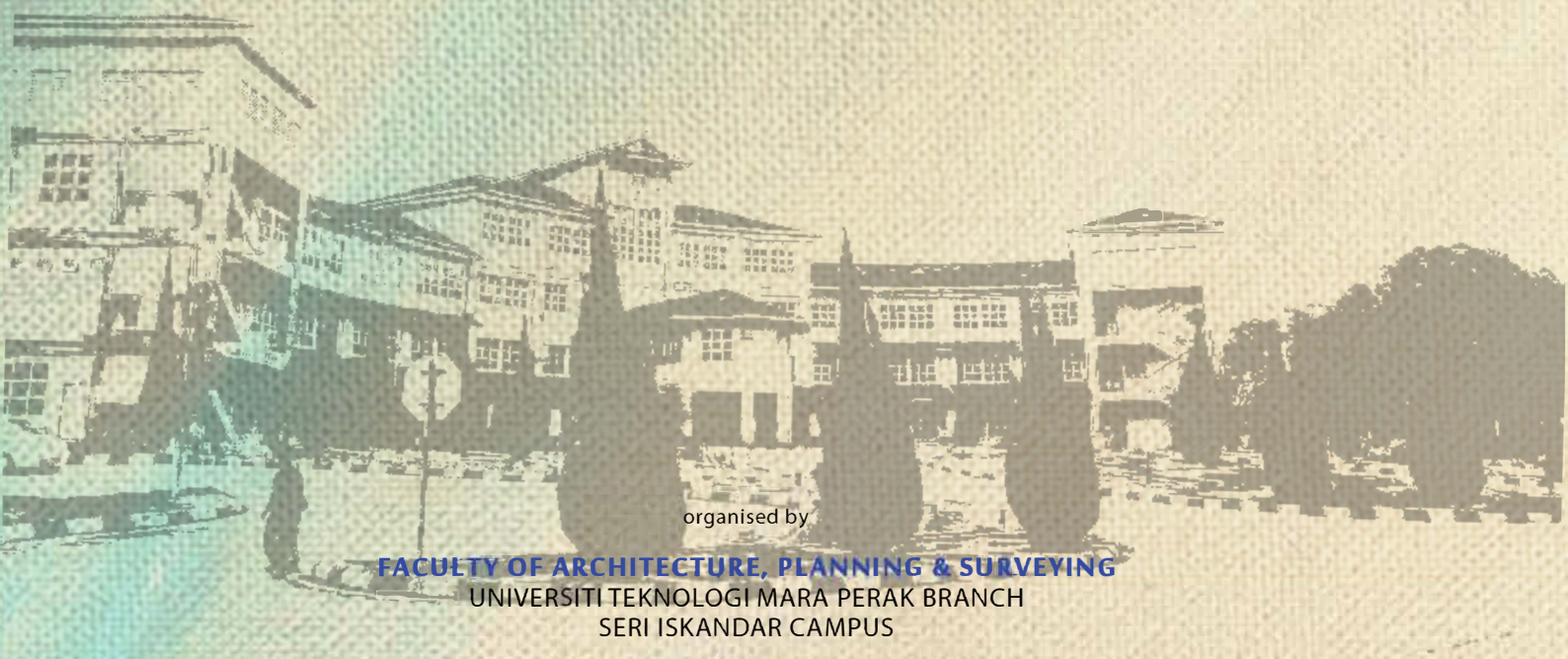

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THE LEVEL OF AWARENESS OF PEOPLE ON GREY WATER HARVESTING AND RAINWATER HARVESTING TO SOLVE WATER ISSUES IN KELANTAN DURING FLOODS

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Abstract:
In 2014, major floods have occurred in the east coast states especially in Kelantan. The floods have crippled nearly 80% of the districts in Kelantan. This natural disaster has caused water supply to be cut off throughout the affected areas. Therefore, flood victims had to wait for clean water supply to be distributed during large floods from the government and the private sector. The purpose of this study was to measure the level of flood victims' awareness of Gray Water and Rain Water Harvesting Technology which gave alternative to flood victims to get clean water supply and introduced Grey Water and Rain Water Harvesting Technology that could be used during the large flood supply clean water through stored waste water and filtered rain water. This study was conducted in areas affected by floods such as Kuala Krai, Machang and Tanah Merah using qualitative and quantitative method. Through this research method, 89% of flood victims unaware about Rain Water and Grey Water Harvesting technology. Therefore, the government or the private sector should take the initiative to introduce this technology to be provided at flood evacuation centers and at flood victims' homes.

Keywords:
Flood; Water Harvesting; Greywater; Rainwater; Water Efficiency

1.0 INTRODUCTION

Floods can be interpreted as excessive or excessive quantities of water that can burst into a wide area or property. Seasonal floods such as the monsoon season often occur in Malaysia. The prone position of Kelantan state at the South China Sea override the north eastern monsoon winds with heavy rains that can cause a flood disaster to be impossible to happen. The floods also occur due to human factors by forest clearing and logging work near the river will cause erosion of the earth that leads to the river. Flood affects people in terms of property and life. In the event of a flood, residents face a range of problems between the absence of clean water supply, the use of wells, and the current and post-flood health problems. The problem of disruption of water supply occurs when the breakdown of electricity during a large flood in an area. The objective of this study are to identify the impact of flood disaster on water supply in Kelantan and to assess the degree of awareness of Kelantan's People on the grey water harvesting and rainwater harvesting to solve water issues in Kelantan during flood.

2.0 LITERATURE REVIEW

Kelantan faces a major flood disaster especially at Kuala Krai, Machang and Tanah Merah that cut off clean water supply and affect clean water supplies for the flood victims. Other initiatives should be used to provide continuous water supply to all areas affected by the flood disaster. The use of green design by implement the rain water harvesting system and the grey water harvesting system will reduce the problem of water cut-off during floods and post-flood.

2.1 The Impact of Flood on Water Supply

In rural area at Kelantan during flood, most of the tube-well and other safe water sources become submerged; as a result, safe water becomes scarce. Human and animal excreta, rubbish and contaminated soil mix with floodwater and pollute both surface and ground water. The impacts of flood on water sources are the inundation of water sources including tube-wells, ponds and channels by

contaminated flood water; disruption of access to safe water sources; and deteriorated quality of water due to pollution and high level of bacteriological contamination.

2.3 Water Strategy to Solve Water Issues

Green building water strategy need to develop in order to reduce potable water. There are a series of logical steps that can be used to develop a water sources strategy from green building. First of all, essential to select appropriate water resources for each purpose. Next, use employ technologies that minimize water consumption. Apart from that, need to evaluate the potential for a dual wastewater system that separates lightly contaminated greywater from human waste-contaminated black water sources. Lastly, apply life-cycle costing (LCC) to analyse the cost/ benefit ratio of proposed techniques to reduce water flow through the building and its landscape.

2.3 Rain Water Harvesting and Grey Water Harvesting

Rain Water Harvesting (RWH) is a common and old practice in which rain water is being collected and stored in order to be used for domestic and small scale agricultural uses. This system suitable to install in the rural area to reduce flood on rainy season and to supply water for the agriculture on hot season. Rain water harvesting is a renewable sources of clean water that is ideal for domestic and the greater attraction of a rainwater harvesting system is in its low cost, accessibly and simple maintenance at the household level. Suitable to use at rural housing area. Grey water is the waste water generated from households that has no faecal matter, for instance, water from washing machines, shower, baths, and dishwasher. This water is easier to treat as it contains fewer pathogens, to be reused on-site for non-potable uses such as for cleaning after post flood.

3.0 METHODOLOGY

A basic the methodology and process of collecting data and information was applied in this research will be explained in detailed. Qualitative and quantitative method was used to conduct this study as it is the most suitable method to used and was explained in order to achieve the research question and research objective to complete this study with the finding and recommendation. Also, the research design, research process, data collection and data analysis has be comprised.

4.0 ANALYSIS AND FINDINGS

There are 35 respondent involve in this data collection at case study Kuala Krai, Machang and Tanah Merah.

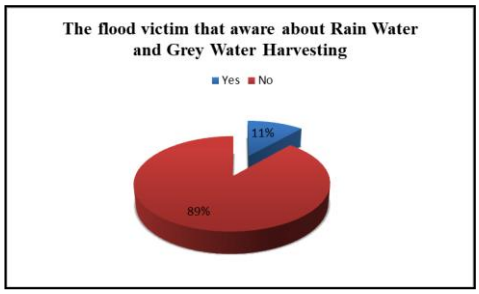

Figure 1: The percentages of flood victim that aware about Rain Water and Grey Water Harvesting

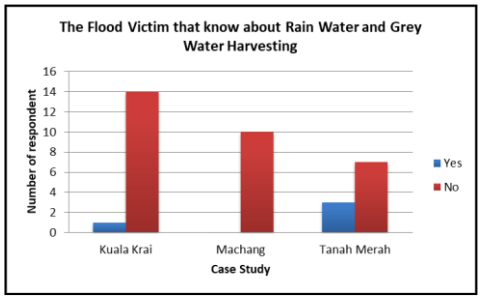

Figure 2: The numbers of flood victim that aware about Rain Water and Grey Water Harvesting

Based on the data collection, 89% respondents did not aware about this technology which is 40% respondents from Kuala Krai, 29% respondents from Machang and 20% respondents from Tanah Merah to solve water issues during flood. The respondents did not aware of this technology as this is because their standard of living, location of case study are located at rural area which did not exposed to this technology. Majority of the flood victim was 51-70 years old that did not exposed to the latest news in order to learn a new technology about water harvesting other than government initiative. This respondents majority has store rain water to use during flood disaster but they did not known about this technology appropriately. Also, respondents also consider that the installation of this technology also requires high capital.

5.0 CONCLUSION

For the conclusion, majority of the flood victims did not exposed to Rain Water and Grey Water Harvesting. Therefore, the government and private sector need to educate the flood victim by promote this technology through newspapers and radio, create campaigns and talks about awareness to reserve water, Also, the government can provide capital to install this technology at the evacuation center and houses at the affected area. Lastly, the government can enforce the obligation and standard for flood evacuation centers and at flood victims' homes to use this technology in order to solve this water issues during flood disaster.

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