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A CONCEPTUAL FRAMEWORK ON STRENGTHENING PHYSICAL RESILIENCE COMPONENTS FOR COMMUNITY IN FLOOD-PRONE AREAS IN KELANTAN

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ABSTRACT

Natural disasters have become more frequent and intense around the world. Malaysia has no exception where the flood is the most devastating natural disaster experienced by this country. Flood has caused massive damage and disruption to physical resilience components such as energy and water supply, transportation and telecommunication systems, and critical facilities like hospitals and shelters, particularly in Kelantan. Thus there is an extreme need to have physical resilience components to resist, absorb, accommodate and recover from the effect of floods in a timely and efficient manner as addressing global sustainability measures defined by the United Nations, including Goal 9 regarding resilient infrastructure, Goal 11 regarding resilient cities and Priorities 3 Sendai Framework for Disaster Risk Reduction 2015 – 2030 which to invest in disaster risk reduction for resilience and strengthen critical infrastructure. Therefore, this study aims to develop a framework on strengthening physical resilience components for the community in flood-prone areas in Kelantan. To achieve the aim of this study, this study emphasizes the three objectives: (1) To determine the most important resilience criteria to strengthen physical resilience components for the community in flood-prone areas in Kelantan; (2) To identify the most important physical resilience components for the community in flood-prone areas in Kelantan; (3) To develop a framework for strengthening physical resilience components for the community in flood-prone areas in Kelantan. A quantitative research approach was adopted for this study. The questionnaire surveys were distributed among selected communities (government, private sectors, learning institutions, and local communities) impacted by the floods. Data collected were analysed by using three methods of analysis: (1) Descriptive analysis used was the Relative Importance Index analysis (RII), supported with mean analysis by using IBM SPSS version 26 to identify the importance level of each resilience criteria (RO1) and physical components (RO2); (2) Pearson's correlation coefficient was used to evaluate the relationship between resilience criteria, physical resilience components and the flood-prone areas by districts in Kelantan by utilizing IBM SPSS version 26; (3) Multivariate analyses were used to test the hypotheses based on the proposed conceptual framework employing SmartPLS version 3.2.4. In addressing the research aim, this study identified the top five most important resilience criteria: availability of material and manpower, corrective maintenance, equipment availability, and material mobilization. Furthermore, the top five most important physical resilience components are critical facilities, radio networks, television broadcasts, air transportation, and water supply systems. Then, further analysis found a significant positive correlation between resilience criteria and physical resilience components in the flood-prone areas by districts in Kelantan. Additionally, this study explores the relationship of the proposed conceptual framework between resilience criteria and physical resilience components using SmartPLS version 3.2.4. The finding indicates robustness and rapidity have a significant positive relationship with physical resilience components. However, resourcefulness and redundancy were found not to support the hypothesis with a statistically insignificant. Even though based on conducted expert validation, most of the experts favoured the outcomes from the hypotheses testing, and there was no change in the result of hypotheses testing. This study is expected to assist the communities (government, private sectors, learning institutions and local communities) by highlighting the resilience criteria to strengthen physical resilience components in flood-prone areas.

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Build Back Better

Build Back Safer Towards Resilience Community

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CHAPTER ONE
INTRODUCTION

1.1 Research Background

Natural disasters have become more frequent and intense worldwide and have caused severe disruptions that affected extensive lives and property losses to people in the affected areas. As evidence, between 2000 and 2021, natural disasters had killed 1.368 million people and left a further 6.619 billion injured, homeless, displaced or in need of emergency assistance. While most fatalities were due to geophysical events, mostly earthquakes and tsunamis, 91% of all disasters were caused by floods, storms, droughts, heatwaves and other extreme weather events. Besides, between 2000 and 2021, disaster-hit countries experienced direct economic losses valued at USD 2.829 billion, of which climate-related disasters caused USD 2.265 billion or 80% of the total losses. This is an increased from 67% (USD1.899 billion) of losses (USD 930 million) reported between 1980 and 2000. Overall, reported losses from extreme weather events had increased by 300% between these 20-year periods in economic losses (EM-DAT, 2021a). There is a higher likelihood that more frequent and intense disasters, incredibly natural disasters, will expected to occur. The increased number of natural disasters like floods, droughts, cyclones, typhoons and landslides would be a significant threat to society's livelihood (Hakaloba et al., 2016; IFRC, 2020; Joerin et al., 2013; Shaw et al., 2009).

Malaysia is located outside of the 'Pacific Ring of Fire.' It is safe from the severe natural disasters such as earthquakes, hurricanes and volcano eruptions. However, Malaysia is vulnerable to natural disasters such as floods, landslides, drought, forest fires and seismic activity (Baharuddin et al., 2015). Floods are the major natural disaster threat faced by Malaysia. Approximately four million people in Malaysia live in flood-prone areas, increasing their susceptibility to face the impact of floods (Ismail et al., 2015). On the other hand, the Centre for Excellence in Disaster Management and Humanitarian Assistance (CFE-DM) highlighted that Malaysia has many vulnerable communities, including the poor, children, refugees, unregistered migrants and trafficked persons. Most of them have limited capabilities, which limits their ability to expect, cope with, resist and recover from natural disasters (CFE-DM, 2016, 2019).