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THE IMPACTS OF FLASH FLOOD TOWARDS THE RESIDENT OF TAMAN KENARI JAYA

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ABSTRACT

Managing and controlling excess water after heavy rainfall or flash flood events requires an efficient drainage system. Flash floods may pose substantial threats and effects on society, the environment, and the economy to the citizens of the residential area. Within the context of flash flood impacts, the efficacy of the drainage system is crucial in lowering flood severity. Good awareness from the public and maintained drainage system can assist reduce flood risks, property loss, and environmental harm. The purpose of this research is to determine the level of awareness among Taman Kenari Jaya inhabitants on the effects of flash floods. This study will evaluate the community's view of flood hazards and the need for enhanced drainage management by identifying the rank of flash flood consequences on society, environment, and economy. Through the quantitative method approach, spreading of questionnaire with locals to examine their knowledge and opinions of flash flood impacts. The study intends to shed light on the urgent need for enhanced drainage management and flood protection techniques by studying locals' resident awareness and understanding of the impacts. Ultimately, the study aims to improve the community's resilience to flash floods and to provide a safer and more sustainable living environment.

Keywords: *flash flood, residents, awareness, quantitative method, maintenance*

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INTRODUCTION

Flash floods most commonly occur in rapidly developing areas or high-density places. Flash floods are caused by factors such as rainfall intensity and duration, as well as slow water runoff, broken dams and the ineffectiveness of drainage systems. Because of the removal of vegetation, paving and replacement of ground cover with impermeable surfaces that increase runoff, and the construction of drainage systems that increase the speed of runoff, flash flooding is becoming an increasingly serious problem in urban areas. (Buslima et al., 2018) In Malaysia, for example, river catchments are heavily influenced by the monsoons in terms of long-duration rains. As a result, many stretches of Malaysian rivers experienced prolonged flash floods (Hafiz et al., 2013)

Flooding in urban areas has a negative impact on human lives and property, as well as the surrounding society, economy, and environment. Flash floods are one of the most devastating natural hazards, causing numerous casualties (Barredo, 2007) and tremendous economic losses (Gaume et al., 2009, Paprotny et al., 2018). The most difficult aspects that increase the danger of disasters in most developed countries are ineffective governmental action to reduce flood disaster risk, a lack of management, a lack of public awareness, a lack of money, and a lack of support from stakeholders. Disasters have two types of consequences: physical and social (Lindell et al., 2003).

This study is able to shed light on the varied effects of flash floods on society, the environment, and the economy in the residential area, in order to enhance drainage management and flood protection strategies. Several recommendations for future study can be made to expand on these useful findings and further improve our understanding of flash floods and their effects on communities.

LITERATURE REVIEW

Flooding incidences have increased due to an increase in the number of impervious areas, which has been exacerbated by the construction of paved roads and buildings. What is clear is that the connection between development and the natural environment is undervalued. (Chan, 2015) Increased urbanization has also made it more difficult to upgrade streams, ditches, and ponds to accommodate runoff. Other factors include an old sewage system that is poorly irrigated. Inadequate retention ponds were constructed to prevent runoff from entering the drainage system.

Adaptive strategies are required to address the uncertainty of future growth, which is mostly influenced by climate change (IPCC, 2012) or fast urbanisation. Because of its adaptable or multifunctional nature, Drainage Systems (DS) are increasingly regarded as the best technique for controlling storm water in cities (Wong THF, 2013). In urban locations, these techniques include infiltration, retention, and storage devices to drain water naturally. (Mikovits C, 2017) They are made up of restricted capacity and design thresholds source control structures (usually vegetated), like as subsurface storage, permeable pavements or green roofs. Controlling overflow currents in the event of a hurricane that exceeds DS capacity requires special attention. Excess flow from the drainage system might be directed to the road or surface.

Flood disaster management is a strategy that should be focused on communities in order to reduce vulnerability to hazards and cope with disasters. Disaster management, as defined by the International Federation of Red Cross and Red Crescent Societies (IFRC) (2016), is the organisation and human resource management responsible for dealing with all humanitarian aspects of emergencies, particularly preparedness, response, and recovery, in order to lessen the impact of disasters. The primary goal of a flood mitigation plan is to reduce vulnerability to floods and the resulting loss of lives, livelihood systems, property, infrastructure and public utilities. The flood mitigation plan, according to Kamarulazizi Ibrahim et al. (2015), consists of five activity areas: prevention, preparedness, response, recovery, and governance. The flood events that occur before, during, or after the incident are referred to by these five activity areas.

METHODOLOGY

The study's goal is to evaluate the level of awareness among Taman Kenari Jaya inhabitants about the effects of flash floods. Therefore, the research took place at a residential area in Sungai Petani that is known as "Taman Kenari Jaya". Based on the title of the study, using this residential area as a case study for the research is extremely relevant in order to obtain the study's objective. The case study location, Taman Kenari Jaya, is quite well known to be the "victim" of flash flood occurrence around their residential area if not once than more than twice a year.

The research design involves conducting a literature review, collecting data through a quantitative approach, and summarising the data using statistical analysis. For the data collection, the quantitative method of collecting data was conducted using questionnaires via Google Form as the main platform. The prepared questionnaire was distributed to the related residents of Taman Kenari Jaya. The primary objective of the study is to interpret the level of awareness of Taman Kenari Jaya's residents towards the impacts of flash floods, as well as to identify the rank of impacts of flash floods. The sample size is usually 10% of the total population. There is approximately a total of 100 unit houses in the case study residential area. With each unit of residence had 1 to 2 representatives involve with the questionnaire, there were a total of 80 respondents.

FINDING AND ANALYSIS

The case study surveyed 80 respondents who are currently residents of Taman Kenari Jaya, Sungai Petani, with 50% of them having been living at the residence for more than 10 years. The findings revealed that the people of Taman Kenari Jaya are aware of the presence of flash floods in their area, with the majority of respondents experiencing flash flood events at least once a year, notably during the transition from the Southwest to the Northeast Monsoon seasons.

Furthermore, the study found that residents have a thorough understanding of the possible problems posed by an inadequate drainage system and a lack of retention ponds in their community. This shows that they are more aware of the weaknesses and limitations in their existing infrastructure, which could raise the risk of flooding during heavy rains. Therefore, the study's goal of evaluating the level of awareness among Taman Kenari Jaya inhabitants about the effects of flash floods was met with success.

Table 1: Awareness About The Drainage Management and Maintenance in Preventing Flash Flood Occurrence

No.	Awareness About The Drainage Management and Maintenance in Preventing Flash Flood Occurrence	Mean Score
1	Efforts of the Local Government Authority in Maintenance of Drainage System	2.43
2	Efforts from Public and Neighbours in Upkeeping of Drainage System	2.03

Table 1 shows the awareness of residents towards the efforts of different bodies and agencies in the maintenance of drainage systems and flood preventive strategies in their residential area. The efforts that got more recognition from the residents were from the Local Government Authority. However, the total average mean score shows that the level of effort is still very low, and this could potentially be the reason for the occurrence of flash floods in the residence area.

Table 2: Rank of Impacts of Flash Flood Towards Society

No.	Rank of Impacts of Flash Flood Towards Society	Mean Score
1	Mental Health Impacts	4.01
2	Social and Cultural Impacts	3.98
3	Disruptions of Communities	3.80
4	Loss of Life	3.65

Table 2 shows the awareness of residents as well as their ranking of the impacts of flash floods towards society in their residential area. The mean score calculated shows that the highest possibility of flash flood impacts towards society is mental health impacts. Flash floods can be devastating experiences, generating worry, dread, and anxiety among those who are affected. Distress can also spread to their families and communities, impairing social functioning and overall well-being.

Table 3: Rank of Impacts of Flash Flood Towards Economy

No.	Rank of Impacts of Flash Flood Towards Economy	Mean Score
1	Property Damage	4.16
2	Infrastructure Damage	4.06
3	Business Interruptions	4.05
4	Increase Insurance Cost	4.03

Table 3 shows the awareness of residents as well as their ranking of the impacts of flash floods towards the economy. The mean score calculated shows that the highest possibility of flash flood impacts towards the economy is property damage. The impact on property can be extensive and very costly. Homes and properties may be inundated, destroying structures, furnishings, and assets. Individuals and communities may suffer financial losses because of the destruction, as well as disruptions in housing and key services.

Table 4: Rank of Impacts of Flash Flood Towards Environment

No.	Rank of Impacts of Flash Flood Towards Environment	Mean Score
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1	Water Quality Impacts	4.11
2	Soil Erosion and Sedimentation	4.10
3	Disruption of Ecosystem	4.05
4	Climate Change Impacts	3.94

Table 4 shows the awareness of residents as well as their ranking of the impacts of flash floods towards the environment in their residential. The mean score calculated shows that the highest possibility of flash flood impacts towards the environment is water quality impacts. The effects of water quality can be hazardous to both the environment and human health. Flash floods can carry pollutants and sediment into rivers, lakes, and coastal areas, increasing turbidity, decreasing oxygen levels, and potentially contaminating them.

Table 5: Ranking of Overall Flash Flood Impacts

No.	Ranking of Flash Flood Impacts	Category	Mean Score
1	Property Damage	Economy	4.16
2	Water Quality Impacts	Environment	4.11
3	Soil Erosion and Sedimentation	Environment	4.10
4	Disruptions of Ecosystem	Environment	4.06
5	Infrastructure Damage	Economy	4.05
6	Business Interruptions	Economy	4.05
7	Increase Insurance Cost	Economy	4.03
8	Mental Health Impacts	Society	4.01
9	Social and Cultural Impacts	Society	3.98
10	Climate Change Impacts	Environment	3.94
11	Disruptions of Communities	Society	3.80
12	Loss of Life	Society	3.65




 Economy	 Environment	 S Society
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Table 5 shows the overall ranking of flash flood impacts from the discussed categories including the society, economy and environment. The data collected proves that the most influential flash flood impact for the residents is the property damage with the highest mean score of 4.16. Overall, based on the category of impacts, the economy category has the highest mean score, followed closely by the environment category. The lowest mean score is the impact towards society. The higher mean score for the economy category indicates that the impacts related to the economy, such as property damage, infrastructure damage, business interruptions, and increased insurance costs, are considered more severe or have a greater overall impact compared to the impacts in the other categories.

In summary, the research has effectively achieved its aim and objectives by revealing the level of awareness among Taman Kenari Jaya's residents regarding the impacts of flash floods. It has provided valuable information about which impact categories are better understood by the residents and how these impacts are ranked in terms of severity. This information can guide strategies to enhance awareness and preparedness efforts, particularly focusing on areas where residents might have less awareness, and subsequently contribute to preventing or mitigating the occurrence of flash floods through improved maintenance and care of drainage systems.

CONCLUSION

The research study examined the level of awareness from the affected residents on the impacts of flash flood occurrence, as well as the rank of impacts once they occur. It was found that the residents are aware of the impacts, however, their efforts still need to be improvised. Based on the rank of flash flood impacts, it also shows that the residents are very affected in terms of either socially, economically or environmentally. However, based on the ranking for overall flash flood impact data, it was proven that residents are mainly affected by the economic impacts. Therefore, the significance of proper drainage management, community involvement, and investment in robust infrastructure are some of the suggestions in mitigating flash flood incidents. Adopting a multidisciplinary approach will be critical in strengthening resilience and reducing the impact of flash floods on vulnerable areas.

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REFERENCES

- Barredo, J. I. (2007). *Major flood disasters in Europe: 1950–2005*. *Natural Hazards*, 42, 125-148.
- Buslima, F. S., Omar, R. C., Jamaluddin, T. A., & Taha, H. (2018). *Flood and flash flood geo-hazards in Malaysia*. *Int. J. Eng. Technol*, 7(4), 760-764.
- Chan, N. W. (2015). *Impacts of disasters and disaster risk management in Malaysia: The case of floods*. *Resilience and recovery in Asian disasters*, Springer, p. 239-265.
- Gaume, E., Bain, V., Bernardara, P., Newinger, O., Barbuc, M., Bateman, A., ... & Viglione, A. (2009). *A compilation of data on European flash floods*. *Journal of Hydrology*, 367(1-2), 70-78.
- Hafiz, I., M. Nor, et al. (2013). *Flood forecasting and early warning system for Dungun River Basin*. *IOP Conference Series: Earth and Environmental Science*, IOP Publishing Ltd. p 012-129
- IPCC. (2012). *Managing the Risks of Extreme Events and Disasters to Advance Climate Change Adaptation A Special Report of Working Groups I and II* (Cam, UK, and NY, USA, Cambridge University Press)
- Kamarulazizi Ibrahim, Kanayathu Chacko Koshy, Noor Adelyna Mohammed Akib, Radieah Mohd Nor, Normaliza Abdul Manaf, Sharifah Nurlaili Farhana Syed Azhar & Marlinah Muslim. (2015)
- Lindell, M. K and Prater, C. S. (2003). *Assessing community impacts of natural disasters*. *Natural Hazards Review ASCE*. November: 176-185.
- Mikovits C, et al. (2017). *Decision support for adaptation planning of urban drainage systems*. *J. Water Resour. Plann. Manage.* 143 04017069.
- Paprotny, D., Sebastian, A., Morales-Nápoles, O., & Jonkman, S. N. (2018). *Trends in flood losses in Europe over the past 150 years*. *Nature communications*, 9(1), 1985.
- Wong T H F, et al. (2013). *Stormwater Management in A Water Sensitive City* (Australia: Cooperative Research Centre for Water Sensitive Cities)

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