

# Monsoon Flood Disaster in Kota Bharu, Kelantan

## Case Study: A Comprehensive Review

Ang Kean Hua

Department of Geography, Faculty of Arts and Social Science, University of Malaya, 50603 Kuala Lumpur, Malaysia

**Abstract:** A flood is a large amount of water covering an area that is usually dry, and a disaster is something that happens suddenly and causes suffering or loss to many people. Flood disasters can be categorized into flash, mud, and monsoon floods. Flash floods exist because of human activities, mud floods happen as a result of highlands, and monsoon floods occur due to the rainy seasons that happen naturally. Therefore, this review study has been conducted to evaluate the effectiveness of local residents in adapting the monsoon flood disaster in Kota Bharu, Kelantan. Monsoon floods can be divided into northeast monsoon and southwest monsoon floods. Northeast monsoon floods bring heavy rain, but southwest monsoon floods bring little rain. Hence, northeast monsoon floods hit Kelantan, and the study area will only be concentrated in the city of Kota Bharu. As a result, monsoon floods cause destruction and changes in physical and mental characteristics of local residents. So, they made some physical in (like house condition, high area for documents placing, emergency roof top, and flood warning system) and mental (like daily need sources, evacuation centers, boats and buoys, and involvement of authorities) changes in characteristics to prepare for facing the monsoon flood. Therefore, local residents proved that they successfully adapt to monsoon flood disasters.

**Keywords:** Monsoon flood disaster, raining season, adapting, physical, mentality

### 1. Introduction

Floods are defined as a general and temporary condition of partial or complete inundation of normally dry land areas from overflow of inland or tidal waters from the unusual and rapid accumulation of runoff of surface waters from any source [6]. In other words, floods can be simplified as a large amount of water covering an area of land that is usually dry, or a rising and overflowing of a body of water especially onto normally dry land [10]. A flood is a naturally occurring incident, and may be categorized as a disaster. As general information, a disaster can be referred to as a sudden, calamitous event that seriously disrupts the functioning of a community or society and causes human, material and economic or environmental losses that exceed the community's or society's ability to cope using its own resources [7]. Thus, flood disasters will bring fewer benefits than disadvantages to society. Floods disasters can be categorized into two types, namely fast flood and slow flood. Both types of floods lead to negative impacts through primary and secondary long term effects on people. Primary effects can be referred to as direct impacts including the loss of life, damaging building and other infrastructures, sewage systems failure, shortage of daily resources (e.g. food, drinking water, and electricity), and others [3]. Meanwhile, secondary effects can impact the community indirectly, as people may become homeless, lose a family member, suffer an increase in the cost of daily resources, spreading of infectious disease, and so on [4]. Therefore, flood disasters should be 'avoided' in order to reduce the exposure and experience of negative impacts on local residents.

There are several categories in fast and slow floods, but in Malaysia, there are only three types that flood disasters, namely flash flood, mud flood, and monsoon flood. Flash floods refer to a situation which happens suddenly due to prolonged heavy rain [11]. Basically, these floods happen in a very fast and short time due to the failure of drainage system in an urban area, such as Kuala Lumpur [2]. Next, a

mud flood is a flood that occurs as a result of a landslide [5]. In other words, mud floods happen when raining causes water to lead to mud in a situation in which there is a lack of trees to buffer the soil, such as those which occur in Cameron Highlands [13]. Lastly, monsoon floods can be defined as flooding that happens due to the result of wind that brings a lot of rain [1]. Generally, this monsoon flood will affect many areas in Malaysia and it happen in certain seasons. This season can be divided into two, which is northeast monsoon flood and southwest monsoon flood. Normally, northeast monsoon floods occur from October to February and bring heavy rainfall to Malaysia, especially Kelantan, Terengganu, Pahang, Sabah and Sarawak, while southwest monsoon floods happen from May to August and bring little rainfall to the west coast of the peninsula, including Kuala Lumpur, Selangor, Melaka, Johor, Perak, and Penang [12]. Interestingly, northeast monsoon floods that hit several states in the east coast not only bring disadvantages, but also have many benefits to society. The benefits which can be highlighted include playing with flood water and catching fish as recreational activity during flooding, recharging ground water, making soil fertile, and increasing nutrients in some soils [3] [4]. Therefore, this review study has been conducted to determine the monsoon flood disaster in Kota Bharu, Kelantan.

Indeed, monsoon floods can be prevented or reduced by several methods such as improving the drainage system or deepening river, build a flood warning system, fortifications, building water pumps, awareness campaigns, and others. However, flood disasters happening naturally cannot be stopped. Therefore, the Kota Bharu of Kelantan has been chosen as studied location due to the directly exposed of northeast monsoon and are the earliest area to receive a lot of heavy rain during that season. In additional, Kota Bharu is a suitable area to conduct research, because there is evidence about biggest monsoon flood that hit the city in 2014, almost paralyzing the entire state of Kelantan. Hence, it is important to analyze the exposure and experience of society; especially local residents suffering

the most negative impact accept the experience and trauma of flood disasters. So, this review study has not only evaluated the changes in physical characteristic, but also evaluates the perception and acceptance of local people concerning the monsoon flood disaster.

## 2. Methodology

This review study is concentrated at the city of Kota Bharu, Kelantan, as that area has the highest percentage exposes to northeast monsoon floods. Kota Bharu is situated at 6°8'0"N 102°15'0" E [14] and a total area of 115.64 km [8], with a total population is 314,964 in 2010 [9]. The selected sampling area for this review study is the city of Kota Bharu because the area is situated near and adjacent to Kelantan River, which is the downstream river (figure 1). At the same time, there are many people concentrate at the city purposely to have job opportunities, better education, good services in term of transport and communications, and so on. Due to this reason, selection for respondents as sample size will be easily and widely available, where it becomes an important task in achieving the objective of research study. This is because the more respondents contribute in providing information for the research, then the more accurate and precise in analysis can be done to provide new result or information. Hence, mental and physical of respondents will be decisive in providing information or answers in a research study.



**Figure 1:** Kota Bharu located at downstream river of Kelantan.

Source: Google Map (2015).

## 3. Result and Discussion

Analysis from review study can be concluded that monsoon flood had hit Kota Bharu and resulting in various destructions like physical and mental of local residents. The physical destruction which leading to local residents to make some change in house characteristic (type of house, altitude of house form ground, and house distance from river), and safety and security (placing important document at high area, emergency roof top for temporarily settlement, and flood warning system). Meanwhile, destruction causes the mental state of local resident to become disrupted, making them prepare in terms of supplies (water, food, light, clothes, medicine), and safety (evacuation centers far from flood, boats and buoys for safety, involvement of authorities like firefighters).

### 3.1 Physical Characteristics

When monsoon flood disasters hit certain areas, they will destroy houses and other facilities. Due to this, local residents will build the house higher from the ground surface, which is the house with having pillars. Basically, these types of houses are built without cement and are referred to as house board. A majority of houses are situated adjacent to or near the Kelantan River. However, the condition is different for houses that built far from river, as most houses are built in cement with at least two stories. Residents remain alert on security of flood disaster through flood warning system in the raining season. For example, if heavy rain is continuous, local residents will automatically place important documents at high areas away from the water. If the flood becomes worse, they will move to emergency roof top locations or temporary settlements and wait for rescuers to arrive and save them. Therefore, local residents will ensure the security of family members to be totally safe from the monsoon flood disaster.

### 3.2 Mental Characteristic

Usually, monsoon floods that hit in Kota Bharu will awaken the local residents to make preparation before the disaster is repeated as in previous years. Basically, they will prepare the sources of daily needs, for example food, water, light, clothes, medicine, and mosquito coil. This is because when floods hit an area, a majority of markets will close due to lacking of stock for food supply from supplier. So, local residents have to prepare before the monsoon floods hit Kota Bharu. Resources can be in terms of food (rice, sardines, eggs, canned food, and other dry food), water (mineral water, beverage cans, and others), light (example candles), clothes, medication (pain killer medication, fever medication, diarrhea medication, and other temporarily used medication), and mosquito coils. Apart from internal usage, external preparations are also made, which can be involved with safety. These include evacuation centers far from the flood, boats and buoys for safety, and involvement of authorities like firefighters. Boats are prepared to act as transports and flooding and buoys are for safety especially to the children when they play with the water. Both actions are considered as dangerous when people have 'contact' with the flood. The involvement of firefighters to keep the local resident safe from any unwanted incident is compulsory. However, if the monsoon floods disaster rates continuously increase and lead to dangerous situations, then they have to move out from their house and stay at evacuation center that had been prepared for flood victims. Therefore, an evacuation center should be built far from the river and flood disaster spots so that flood victims can live in safety.

## 4. Conclusion

This review study of monsoon flood disasters in Kota Bharu, Kelantan proved that majority of local residents are exposed to and have experienced disaster, especially in terms of the negative impact that affects their quality of life through physical and mental characteristic. Due to this, local residents take the initiative to make changes in terms of physical characteristics (like type of house, height of the house from the ground, house distance from river, placing

important documents in a secure area, emergency roof top for temporarily settlement, and a flood warning system) and mental characteristic (example like daily need sources of water, food, light, clothes, medicine, evacuation centers that far from flood, boats and buoys for safety, and involvement of authorities like firefighters). The changes made by local residents benefit them in successfully adapting to monsoon floods and facing seasonal disaster.

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## Author Profile



**Ang Kean Hua** received the B.S. in Geography and M.S. in Science, Technology and Sustainability from University of Malaya in 2011 and 2013. Currently, he is doing PhD in Environmental Sciences in Universiti Putra Malaysia, focus on water quality modeling using GIS based in Malacca River. He is expert in water science, water management, flood management, Geographical Information System (GIS), Remote Sensing (RS), qualitative and quantitative approach.