

## The Poetry of Natural Calamities: Revisited the Great Flood 2014 on Malay Community in Kota Bharu, Kelantan

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**Abstract:** Malaysia, as any other country, is constantly evolving in all facets of life, including architecture, economy, and culture. Despite that, the Malay settlement on the river's fringe remains an early settlement due to the Malays' strong connections to agriculture and socio-culture. It is in the tropical zone and high rainfall areas that are often hit by floods when the monsoon season is approaching. This hydro hazard has become one of the major concerns for the government and non-government sectors. High floods lead to financial damage, and it is related to human life. Kelantan is one of the challenging catchment areas that mostly experiences floods and heavy rains. Floods in the Kelantan water catchment area are associated with misfortune and loss of life. This study reviews the damage and nightmares of Kota Bharu residents. Some of their settlements located in the city were badly damaged. The research methodology employs previous researchers' exploratory techniques focusing on the effects of natural calamities, as well as socioeconomic data from 350 local respondents collected during the field survey in April 2019, and observation analysis information commonly used by architects to evaluate the context of the discussion. These include physical, social, cultural, and public amenities, and the data gathered then was amalgamated using IBM SPSS V26, supplemented by interview techniques and pictorial documentation. The study found that the infrastructure system in the Kota Bharu is in very poor condition. The floods that occur every year affect the quality of life of the Malay community in Kota Bharu. Until now, the Malay community is still traumatised by the disaster.

Keyword: Flood, Malay community, Malay settlement, Kelantan

### 1.0 Introduction

*Mankind's a monster,  
and th' ungodly times confed'rate into guilt,  
are sworn to crimes.  
All are alike involv'd in ill,  
and all must by the same relentless fury fall  
(The Roman poet Ovid (43 BCE–17 CE: Metamorphoses)*

Volcanic eruptions, earthquakes, tsunamis, avalanches, lava (volcanic mud), landslides, blizzards, heat waves, hurricanes, hurricanes, tornadoes, floods, and other natural disasters are among the natural calamities that destroy human settlements. Whatever type of natural disaster occurs, it usually results in financial, environmental, and human losses. According to the United States Department of Health and Human Services (2009), natural disasters are defined as "violent natural events that can affect, either directly or indirectly, public health and well-being". Floods are one of the most common natural disasters all over the world. Flood-related problems are now widespread, necessitating an effective analysis of the effects of floods to comprehend the issue and mitigate its negative consequences in various situations. Human activities such as unplanned rapid settlement development, uncontrolled building construction work in general, and large changes in land use are thought to impact hazard patterns. According to Khan (2014), several factors contribute to the flood problem, including topography, geomorphology, drainage, engineering structures, and climate. He went on to say that floods are mostly caused by storms in which a large amount of precipitation or material falls in a short period, including both types of rain, convection, and future storms.

Changes in hydrological patterns and weather patterns have been seen due to changes in climate scenarios around the world. Because of global warming over the last century, extreme heat that had previously occurred only once every 1,000 days now occurs four to five times more frequently (Fischer and Knutti, 2015). Extreme weather seems to be on the increase, affecting water availability and, as a result, sometimes water abundance. Climate change encompasses both changes in the average climate and extreme weather. Several researchers have demonstrated that several occurrences of significant heat waves and heavy rainfall events are linked to human contributions (Sippel and Otto, 2014). Climate change was found to have an impact on extreme weather in 2015, including scorching summer heatwaves in Europe, flooding on a clear day in Miami, one of the worst forest fire seasons in Alaska, and heavy rains in China (<https://www.ncdc.noaa.gov/bams/2015>). Extreme weather is also on the rise, with several examples from China, Europe, and the United States. This phenomenon is related to the effects of extreme weather, where most hurricanes and storms, floods, and landslides occur; mudslides are among the cases associated with extreme weather ([http://www.ssec.wisc.edu/kossin/articles/Chapter\\_2.pdf](http://www.ssec.wisc.edu/kossin/articles/Chapter_2.pdf)).

Floods are common in Malaysia, but the recent monsoon floods from December 2014 to January 2015 were widely considered one of the most devastating floods to affect the region in recent decades, with over 100,000 flood victims forced to flee their homes (Reuters, 2014). The floods in Kelantan were primarily caused by continuous heavy rains from December 21–23, 2014, which amounted to more than 60 rainy days, with the water level in the river exceeding flood levels recorded in 1967 and 2004 (Nurul Farahen et al., 2017). Jaafar et al. (2016) reported that the amount of rainfall accumulated in December and throughout 2014 at Gagau station showed that the contribution of rainfall in December was about 50% of the total of 2014. As of 17 December 2014, 3390 people in Kelantan and 4209 in Terengganu had been relocated (Khaosod English, 2014). Due to the continued precipitation, water levels in most rivers in Kelantan, Pahang, Perak, and Terengganu exceeded safety embankments, forcing approximately 60,000 people to evacuate the following day. The Malaysian government estimated flood damage at 1 billion ringgit (USD 284 million), of which 100 million ringgit was spent to repair roads in Kelantan and 132 million ringgit was used to repair roads in Terengganu (INQUIRERNET, 2015).

### 2.0 Research Methodology

This paper employs a case study of Malay settlements in Kota Bharu that are severely threatened by the flood disaster to explain the scenario in detail in a series of findings based on residents' experiences facing the disaster. In 2019, questionnaires were distributed to case study areas using random sampling techniques to collect primary data. Direct and participant observation techniques, visual analysis, and interviews were also used to describe the experiences of local residents who were frequently affected by floods in 2014. A total of 350 questionnaire surveys were distributed via various methods, including face-to-face interviews, group discussions, and the assistance of villagers with access to the area as native sponsors. IBM SPSS was used to analyse settlement transformation, then merged with human settlement theory and respondents' interrogation.

### 3.0 The Great Flood 2014 and the Malay Settlement

One of the issues that occur in Kota Bharu, Kelantan (Figure 1) is the annual floods. After the 2014 Great Flood, it took some time for the local social and economic system to recover. In addition, it had a significant impact on Malay settlement, geographical structure, and lifestyle patterns. Nonetheless, the situation has recovered completely. The local populace should also be prepared for future flooding catastrophes. Their past experiences have taught them to always be prepared and to imbue their communities with a resilient spirit.

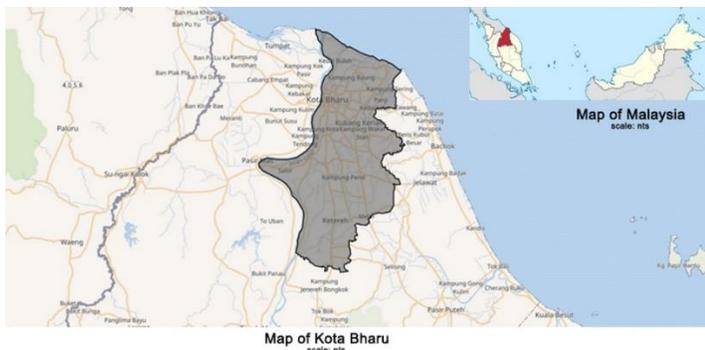


Figure 1: Map of Kota Bharu, Kelantan.

Nevertheless, in 2020, observations found that floods did not occur in the research area. The heavy rains during the monsoon season do not cause flooding in these settlements. This situation happens due to the construction of the flood wall, which can control the water level of the Kelantan River from entering the Budor River. Although the Budor River is a relatively small river in size, it can significantly impact the Malay settlement in the event of rising water levels. Previously, the fringe of the Budor River had eroded and changed the geographical structure. Observations found that the riverbanks eroded and jeopardised Malay settlements (Figure 2).



Figure 2. The condition of the Budor River fringe after eight years from the Great Flood 2014 event (Source: Abdullah, 2021)

#### 4.0 Analysis: The Great Flood 2014

The results of the questionnaire of 350 respondents are analysed in Table 1. Crosstabulation analysis showed that a total of 326 respondents had experienced flood events in the study area. This situation indicates that the majority of respondents have had experience facing floods. Table 1 also shows that a total of 214 respondents (61.1%) said that floods occur every year.

Table 1: Crosstabulation between Experienced a flood event and how often do floods phenomenon (n = 350)

|                                  |            | How often do floods phenomenon     |              |                    |      |        | Total |        |
|----------------------------------|------------|------------------------------------|--------------|--------------------|------|--------|-------|--------|
|                                  |            | Once a year                        | Twice a year | Three times a year | None | Others |       |        |
| <b>Experienced a flood event</b> | <b>Yes</b> | Count                              | 204          | 7                  | 20   | 14     | 81    | 326    |
|                                  |            | % Within Experienced a flood event | 62.6%        | 2.1%               | 6.1% | 4.3%   | 24.8% | 100.0% |
|                                  | <b>No</b>  | Count                              | 10           | 0                  | 0    | 14     | 0     | 24     |
|                                  |            | % Within Experienced a flood event | 41.7%        | 0.0%               | 0.0% | 58.3%  | 0.0%  | 100.0% |
| <b>Total</b>                     |            | Count                              | 214          | 7                  | 20   | 28     | 81    | 350    |
|                                  |            | % Within Experienced a flood event | 61.1%        | 2.0%               | 5.7% | 8.0%   | 23.1% | 100.0% |

(Source: Abdullah, 2021)

The condition of the riverbanks experiencing erosion will create a sense of insecurity for the residents living here. When combined with the settlement construction system that uses timber structures, the impact of building materials on the settlement is seen. Moreover, through Table 1, only 14 respondents had never had experience dealing with the threat of floods. This situation indicates that it is possible that the new respondents were living here. They have not yet faced the experience of dealing with flood disasters. They only heard about the flood events through the verbal stories of the community. There are residents here who consider the floods not a big issue in their lives. If there are warning signs at the flood control gate, they will be prepared for the following action.

*'... floods are not a big problem for us. We are always ready for the monsoon season when there is heavy rain. Some blame the State Government for not having any plans in facing the floods. For us, there is nothing to do with the State Government because floods are a natural phenomenon that we must face ...'(R-1)*

The statement shows that there are residents who are still old-fashioned-minded. This thinking is due to the attitudes of people who are too obsessed with political parties. According to informal interviews with several residents, the researcher found that some groups of respondents consider floods as a natural phenomenon that has been used as a political agenda by some parties to show the wrong image of the state government. This thought had a great impact on other Malay people. They do not realise that flooding has a devastating impact on the Malay settlement here. It is observed that severe infrastructure systems and systems are one of the major impacts on the Malay settlements. The government should adequately provide this infrastructure system. The government should develop a better infrastructure system and provide job opportunities to avoid this migration. However, this topic was not addressed by the Malay community here. Their obsession with the political party eventually makes them a community that the government can manipulate. Their settlement was going into a poor infrastructure system and did not have any plans that benefited the Malay population. They are still unaware that flood disasters are the most frequent, widespread, and consequential (Dhar & Nandargi, 2003). The effect of the destruction during the floods will damage the Malay settlement. Therefore, they will always struggle with problems in the local socio-economic system.

#### 4.1 The Lost of Settlements

According to Table 2, 222 of 350 respondents agreed that their community was affected by the floods. Meanwhile, 128 respondents were not affected by flooding in their communities. This finding indicates that the Malay settlement has always been impacted by flooding. The researcher discovered through observation that one of the primary causes of settlement damage is the building material itself. The majority of human settlements are made of wood. Even though the majority of settlements are constructed using the stilt in the ground system, it is impossible to predict floodwater levels. According to Loucks (2019) and Panin (1999), the community was densely populated near the river; settlement was then expanded to prevent annual floods and high tides and to respond to them.

During the 2014 flood, some communities were submerged to a height of four metres. It has completely submerged the communities. In addition, 131 respondents (or 59%) reported property damage as a result of the flood disaster. A property is required for a community to improve its quality of life. According to Mirza (2003) and Chen et al. (2010), extreme floods have struck many regions around the world, particularly in developing nations, causing severe economic damage and human suffering, particularly in rural areas. After the floods, residents will struggle to adapt to a new way of life in order to lead a comfortable existence. The destroyed property will have an impact on their standard of living. Residents were required to purchase new equipment with their savings. In addition, the survey results revealed that 24 respondents (10.8%) were unable to conduct business during the floods. These results indicate that their economic system has been completely paralysed by the floods, which damaged property and livestock and made it difficult for people to earn a living. This situation affects those who operate small and medium-sized enterprises. Since the settlement had been flooded, they were unable to conduct business as usual. In addition, some residents will have to close grocery stores that have opened near their communities. The following informal interviews with respondents support these findings:

*'...the 2014 floods have caused me to close my source of income. I run a small business at Pasar Kubang Pasu. The preparation of the business could not be carried out because the house was flooded ...'(R-2).*

*'... I had no income during the 2014 floods because this grocery store completely sank and suffered many losses ...'(R-3).*

Table 2: Crosstabulation between Damage in settlement and the loss from the flood event (n= 350)

|                      |       | The Loss from the Great Flood 2014     |           |       |                            |        |       |        |
|----------------------|-------|----------------------------------------|-----------|-------|----------------------------|--------|-------|--------|
|                      |       | Property                               | Livestock | Life  | The business not operating | Others | Total |        |
| Damage in settlement | Yes   | Count                                  | 131       | 60    | 1                          | 24     | 6     | 222    |
|                      |       | % Within The loss from the flood event | 59.0%     | 27.0% | 0.5%                       | 10.8%  | 2.7%  | 100.0% |
|                      | No    | Count                                  | 74        | 15    | 0                          | 18     | 21    | 128    |
|                      |       | % Within The loss from the flood event | 57.8%     | 11.7% | 0.0%                       | 14.1%  | 16.4% | 100.0% |
|                      | Total | Count                                  | 205       | 75    | 1                          | 42     | 27    | 350    |
|                      |       | % Within The loss from the flood event | 58.6%     | 21.4% | 0.3%                       | 12.0%  | 7.7%  | 100.0% |

(Source: Abdullah, 2021)

The following statement is accepted as one of the effects on the Malay family's economy here. Before the flood wall was constructed, this pattern occurred nearly every year. As a result, researchers discovered that flooding has enhanced the mental resilience of the local populace. The Malay settlement continues to be destroyed, perhaps because they have no other option and because the government's efforts to prevent this threat have not been sufficient. If the government does not improve its planning, it is feared that there will be an increase in migration to other regions. This is because the annual monsoon season poses a threat to them. Even though they have faced this danger for decades, they may no longer be able to survive if radical changes are not made. The results of the interviews presented in Table 3 below support these findings.

Table 3: Do you feel safe during the monsoon? (n = 350)

|       | Valid | Frequency | Percent |
|-------|-------|-----------|---------|
| Yes   |       | 150       | 42.9    |
| No    |       | 200       | 57.1    |
| Total |       | 350       | 100.0   |

(Source: Abdullah, 2021)

The results of a survey of 350 respondents are presented in Table 3, which reveals that 200 respondents (57.1%) felt safe during the monsoon season. In Malay settlements, insecurity will disrupt the emotional state of the inhabitants. It is possible that this sentiment will prompt their migration to other regions. Perhaps the settlement is still owned by parents who continue to feel a "sense of belonging" there. However, after their deaths, it will be passed on to their children. Typically, informal settlements are situated in flood-risk zones near river areas, so they are susceptible to flooding (Melore, Tamirat & Nel, Verna, 2020; Ndebele et al., 2020). Due to the frequency of flood disasters that affect them physically and emotionally, young people no longer wish to continue living in this region. This is the current circumstance in the study area. Observations and surveys indicate that the majority of young people no longer desire to reside in this area. Settlement areas that were formerly rented out to others appear to be ignored by their original owners.

4.2 The Water Level in Great Flood 2014

The study of the Malay settlements on the river fringe was conducted in 2021 after seven years of flood disaster in 2014. That natural calamity affects changes in the geographical structure of Sungai Budor, the destruction of property and economic community, and the emotions of people.

Table 4: Crosstabulation between flood in the settlement in 2014 and water level (n=350)

|                     |       | The Water Level During 2014       |          |          |          |          |                | Total |        |
|---------------------|-------|-----------------------------------|----------|----------|----------|----------|----------------|-------|--------|
|                     |       | 1 metre below                     | 2 metres | 3 metres | 4 metres | 5 metres | Above 5 metres |       |        |
| Flood in settlement | Yes   | Count                             | 110      | 61       | 46       | 46       | 59             | 15    | 337    |
|                     |       | % Within flood 2014 in settlement | 32.6%    | 18.1%    | 13.6%    | 13.6%    | 17.5%          | 4.5%  | 100.0% |
|                     | No    | Count                             | 8        | 0        | 0        | 5        | 0              | 0     | 13     |
|                     |       | % Within flood 2014 in settlement | 61.5%    | 0.0%     | 0.0%     | 38.5%    | 0.0%           | 0.0%  | 100.0% |
|                     | Total | Count                             | 118      | 61       | 46       | 51       | 59             | 15    | 350    |
|                     |       | % Within flood 2014 in settlement | 33.7%    | 17.4%    | 13.1%    | 14.6%    | 16.9%          | 4.3%  | 100.0% |

(Source: Abdullah, 2021)

According to Table 4, the questionnaire results found that almost 337 out of 350 respondents said their settlements were flooded in this area. Although the settlement construction uses the technique of stilts on the ground, flood disaster is inevitable. It cripples community activities here. The floodwater level, as high as almost 5 meters, had repeatedly submerged the area. According to Table 200, as many as 110 respondents (32.6%) said water as high as 1 metre had flooded their homes. Observations found that the water area as high as 1 metre occurred near Jalan Post Office Lama and Jalan Kubang Pasu. This situation is due to the area's being higher than other areas. Also, 212 respondents (62.8%) said that 2 to 5 metres of water reached the majority of settlements.

In contrast, the worst settlements are along the Budor River, where water levels can reach nearly 5 metres, according to 15 respondents (4.5%). The area is completely submerged in 15-foot-high water. Every resident is required to relocate. According to Zehra et al. (2019) and Satterthwaite et al. (2020), settlements along the river cannot typically withstand floods due to heavy rains that frequently disrupt life in the environment due to inadequate infrastructure services and limited response from local communities. This settlement area has sustained severe damage, crippling the lives of its inhabitants. Observations also revealed that the construction pattern in this region is characterised by the use of taller stilts than in other settlement areas. However, it was unable to prevent their settlements from being submerged by the rising floodwaters.

According to Chan (2017), deforestation and urbanisation result in a change in sea level to a surface incapable of absorbing water, an increase in runoff emissions and flow velocity, and a substantial decrease in concentration time. In addition to power outages, food shortages, property destruction, the loss of settlements, infrastructure, and population shifts, the effects of the flood have caused a plethora of additional complications (Md. Akhir & Azman, 2018; Kaoje et al., 2020; Achmad Bahar et al., 2020). He did not anticipate that his settlement would begin to sink. He was transferred to the Kota Bharu Flood Settlement Centre for nearly two weeks. In addition, communities that are not severely impacted simply wait for the river's water level to recede as usual. According to Agamuthu et al. (2021) and Saraf et al. (2018), after the July 2015 flood, many villagers lived in tents, while others were housed in substandard conditions. After the floodwaters receded, however, some economically affluent individuals were able to rebuild their homes with modern brick and sand. However, this is not the case in the study area, which focuses on Malay settlements along the riverbanks in Manek Urai, Kuala Krai, and Kelantan. The lack of construction of flood walls near the river was one of the primary causes of the destruction of Malay riverside settlements in Kuala Krai. This circumstance differs from the case studies conducted on this site. The construction of the flood wall was able to save Malay settlements that had been destroyed by Sungai Kelantan's swift water flow.

#### 4.3 The Great Flood 2014: Malay Community Activity

According to the results of the questionnaire, Table 5 reveals that 258 respondents (or 73.7%) did not participate in any activities during the flood disaster. According to the researcher's personal experience, during floods, people typically refrain from engaging in any activities. Typically, they will remain at home to monitor the condition of their property. Currently, they will continuously monitor the water level to determine whether or not it is rising. According to the researcher's experience, at this time, family members will gather, and each will be engaged in moving valuable items such as furniture, appliances, etc. to a safer location. Likewise, residents who own a car or motorcycle will park their vehicle in a higher location and away from their community. As the elevation level of the main road is higher than that of their settlement area, the majority of them will park their vehicles on the main road.

Table 5: 2014 Flood Season Activities (n = 350)

| Item                   | Frequency | Per cent |
|------------------------|-----------|----------|
| No activities          | 258       | 73.7     |
| Business online (Home) | 22        | 6.3      |
| Business in the house  | 4         | 1.1      |
| Working                | 5         | 1.4      |
| Help the neighbours    | 57        | 16.3     |
| Others                 | 4         | 1.1      |
| Total                  | 350       | 100.0    |

(Source: Abdullah, 2021)

According to Table 5, a total of 57 respondents (16.3%) took advantage of this opportunity to assist their neighbours. As there are many elderly residents in this area, their neighbours help them move their belongings and relocate to other areas.

*'...during the 2014 floods, my boat was used to move residents' property. There are also residents that I moved to other areas using my boat ...'(R-3).*

*'...my neighbour is a senior citizen living alone. During the flood of 2104, I helped him move to the Flood Settlement centre ...'(R-4).*

The statement above shows the close community ties and harmonious neighbourhood spirit shown by the residents here. According to Wahid (2014), the urbanisation process should develop settlements that enable people to develop themselves, their families, and the community itself. Since these community relationships have existed, they will help neighbours facing difficulties during floods. In addition, the main mode of transportation used is by boat. Although boats are not the main mode of transportation during the non-flooding season, they are an option during floods as a few residents still have boats in their settlement areas (Figure 3).



Figure 3: Boats in the study area (Source: Abdullah, 2021)

This finding is supported by the results of the questionnaire in Table 6, which shows that 223 respondents (63.7%) use boats as their main mode of transportation during floods.

Table 6: Transportation During Flood Event (n = 350)

| Item       | Frequency | Percent |
|------------|-----------|---------|
| Sampan     | 223       | 63.7    |
| Boat       | 81        | 23.1    |
| Motorcycle | 15        | 4.3     |
| Bicycle    | 2         | .6      |
| Car        | 5         | 1.4     |
| Walking    | 24        | 6.9     |
| Total      | 350       | 100.0   |

(Source: Abdullah, 2021)

However, not all of these vessels are used by local boat owners. There are also boat owners from other regions who come to assist the locals. They consist of contacts from local boat owners. Consequently, it demonstrates that this close relationship has no boundaries among the Malay population during the 2014 flood. The following results from interviews with respondents support this finding:

*'...there was also my friend from Kampung Berek 12 Kota Bharu who came to help people in this area using his boat. He also has a boat as we are fishermen in Bachok ...'(R-5).*

The preceding statement indicates that there are residents who are employed as fishermen. They have a vast network of fishermen who assisted residents during the 2014 floods. As a result, Malay community relationships are not limited to the pre-flood situation. During floods, community ties demonstrate the Malays' concern for neighbourly relations. However, after the floods began to recede, the residents were required to clean up the mud in their communities. The cleaning process is laborious due to the wooden construction of the local communities. The attachment of mud to wood is difficult to remove, particularly after drying.

*'...the cleaning process is a difficult thing for me. It took me a week to clean up the dirt and mud on the house ...'(R-6).*

*'...the mud in the house is challenging to clean. It takes a lot of water to clean the mud in my house ...'(R-7).*

The statement above shows that residents had to clean up their settlements as quickly as possible before the mud dried. This process is very tiring and challenging if done individually. It requires a lot of energy to clean the entire interior space. The researcher's experience of cleaning the mud during the 2014 floods was extremely difficult and exhausting. Usually, mud as high as 300 mm (1 foot) is commonly experienced during the 2014 floods. The use of water and water jets is beneficial during this process. However, it has an emotional impact on the population to start life after the disaster.

### 5.0 Discussion and Conclusion

In conclusion, the researcher discovered that the locals have three phases of flood preparation. The monsoon season is the initial event preceding the flood. This season's heavy rainfall has had a significant impact on their lives. They are constantly terrified and prepared for any catastrophe. Similarly, the second phase occurs during floods. This phase involved property loss and settlement damage that had to be borne by them. The family's economic system was completely paralysed, and no business operations were possible. This phase is extremely difficult because they lack access to substantial financial resources. In addition, they had to endure losses due to property destruction. The third phase is the process of post-flood recovery. This phase requires the use of the cleaning solution. This phase should be completed as soon as possible to prevent the formation of dry mud and to eliminate harmful dust. Consequently, it appears that the floods have made the Malay population more depressed. Even though they were able to adapt to the disaster, it took a long time for them to resume their normal lives. If proper planning is not implemented to prevent the destruction of Malay settlements, those settlements that are threatened by flooding will also be destroyed. In addition, changes in geography have led to the erosion of the Budor River's banks, which threatens Malay settlements. If governance does not take strategic action, the future destruction of Malay settlements along the river will be greatly impacted. Despite the fact that natural disasters are unavoidable nothing can be done to prevent them, being aware of their consequences and even being prepared with a disaster recovery plan is a necessary and holistic process. Kelantan is currently coping with the destruction caused by the floods of 2014 in the region. When flood-affected communities in the surrounding area are involved, the indirect effects are more difficult to manage. Restoring homes, infrastructure, businesses, and government operations to pre-flood levels is the objective of the government and the hope of those affected by the 2014 floods in Malaysia and other regions. To achieve this objective, extensive rehabilitation of communities and infrastructure is necessary. To achieve the desired results, a proper recovery plan, an appropriate management system, and a potential team must be presented. However, in order to recover from damage, it is essential to comprehend and acknowledge that the environment is both fragile and hazardous. Consequently, it is essential to take into account all factors in the recovery process and to work accordingly.

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