Flood Aftermath Impact on Business: A Case Study of Kuala Krai, Kelantan, Malaysia

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Abstract

Floods are natural disasters which can cause problems and adverse effects on the population. These events will also cause destruction on a large scale. This study aims to identify loss of business property and determine the relationship between the type of business and the level of losses incurred by the trader. The methodology used was a survey using questionnaires. A total of 175 traders in Kuala Krai town was involved in the study and randomly selected. This study used a descriptive analysis of frequency, mean and cross tabulation analysis. The results of the analysis indicate that goods (Mean = 1.56, SD = 0.894) and premises / stalls / kiosks (mean = 1.56, SD = 0531) is a business property with the highest losses or impact. The study also found that the type of business goods (68.0%) is the highest type of business losses compared with business services (32.0%). This situation shows that the business of goods is a type of business experiencing the highest losses due to the destruction of goods and premises / stalls / kiosks. Therefore, an integrated flood management should play an important role in reducing the impact of flooding among traders, especially in terms of preparations to face floods in the future. These efforts will indirectly help to reduce losses among traders in the Bandar Kuala Krai.

Keywords: Losses, Traders, Kuala Krai, Floods

Introduction

Flood is the most common hydrological disaster that occurs in every country. According to Ibrahim (2007), flood is defined as a significant increase in water level of rivers, lakes, basins or beach area. In Malaysia, flood consists of flash flood and monsoon flood (Chan, 1997) which are commonly associated with natural factors (rainfall and winds) and human factors (logging, settlement and agriculture). However, monsoon flood incident is the most dominant disaster that occurs in the East Coast area of Peninsular Malaysia due to the Northeast monsoon winds (November – March) that bring heavy rainfall. Among the affected areas are the states of Kelantan, Terengganu, Pahang and Johor. Monsoon flood is a

predictable phenomenon except in the case of flash flood (Ibrahim, 2007). This disastrous incident also causes problems and negatively affects the victims. The most significant effect that can be seen is in the damage and loss of property, loss of life, pollution, disruption of social activity and health problems. In addition, a long period of flooding also increases population's property damages (Rahman, Haque, Khan, Salehin, & Bala, 2005). Malaysia too is not excluded in experiencing major flood disaster like the ones that happened in 1886, 1926, 1967, 1971 and 1986.

At the end of 2014, Kelantan was hit by massive floods which involved all districts. However, a significant impact can be seen in Kuala Krai as there were much damages and loss of properties occurred. The economic situation of Kuala Krai's population at that time was one hundred percent paralyzed due to the floods and most of the road network was also closed to all light vehicles. Therefore, this research is limited to the flood effect assessment towards the economic aspect by evaluating the level of loss faced by the traders in Bandar Kuala Krai, Kelantan as it is a focus area for traders to conduct business activities. Commonly, the loss caused by a disaster is stated as direct loss which referred to the damages of physical property and infrastructure affected by flood water (Hammond, Chen, Djordjevic, Butler, & Mark, 2015). Flood damage assessment is a crucial matter that needs to be studied in order to reduce the risk of destruction and loss should the next flood disaster hits and to increase the level of preparation to face flood among the traders in Bandar Kuala Krai. Thus, this article will discuss on the assessment of loss level faced by the traders in that town due to the 2014 flood incident. The aim of this research is to identify the highest loss of business property faced by the traders and to determine the relationship between types of business and level of loss the traders had to deal with.

Effects of Flood Incidents towards the Population's Economy

Flood is considered as one of the most widespread disaster to hit countries all over the world and causes loss in large scale (Glaser et al., 2010). According to the World Meteorological Organisation (MWO), flood is the third most devastating natural disaster in the world in which it had claimed thousands of lives and caused destruction of hundred thousand million worth of properties (Tuan Pah Rokiah, Baharum, & Hamidi, 2014). In the context of flooding impacts, a disaster like flood is classified into three categories by most researchers, namely hazard, risk and disaster. Flood is considered hazardous if it occurs in an area that is inhabited by humans and has a potential to cause damage and loss of property, impact on health, injury and loss of life. The hazard of flood can also turn into a disaster if its effect can cause a lot of damages and loss of humans' lives (Sundar & Sezhiyan, 2007). Similarly with risk, such flood incident can be considered risky if it has a potential to cause negative impact on humans and humans' activity. In the context of disaster, an incident can be considered a disaster if the overall loss suffered by the community is so bad that most of the public facilities, private facilities, buildings, business premises and others are destructed (Eshghi & Larson, 2008).

The scenario of the 2014 massive flood incident in Bandar Kuala Krai clearly shows that it covers the concept of hazard, risk and disaster. This is due to the reason that the flooding occurred when the water level of Sungai Kelantan and its branches, Sungai Galas and Sungai Lebir, increased from their usual levels due to the heavy rainfalls that went on for several consecutive days which resulted in river overflows. That situation happened because the river was not able to accommodate large quantity of water which resulted in spill over

into the whole population's area of Bandar Kuala Krai and affected humans and physical environment including disrupted the economy of the population. At that time, the highest water level recorded of Sungai Kelantan at Tangga Krai, Kuala Krai was 34.17 metres which surpassed the dangerous level of 25 metres (eBanjir Negeri Kelantan, 2015). That year's massive flood also caused a large scale destruction and the population faced losses of approximately billion Malaysian Ringgit (Wan Nur Tasnim, Nor Hidayati, & Mohammad Nazir, 2015).

According to McBean, Gorrie, Fortin, Ding and Moulton (1988), the amount of destruction caused by flood depends on the constantly changing flood parameters such as flood water depth, velocity of flood water, the year of flood incident, the period of flooding, sediment and effluent content, protected flooded area and flood warning system. Damages consist of two types of main damages which are tangible and intangible damages. Both of these damages are also divisible into directly and indirectly. The different types of damages are shown in Table 1. However, the main focus of this study is on the direct, tangible damage which involves business property damage and disruption of business activity within the flood-stricken area.

Table 1:
Different types of disaster

	Tangible	Intangible
Direct	Damage to private property; disruption of infrastructure such as roads; railways; erosion of agricultural land; the destruction of harvests; damage to livestock; evacuation measures and rescue; business interruption in the flooded areas; cleaning costs	Loss of life; injury; loss of memorabilia; psychological pressure, damage to the cultural heritage; negative impacts on ecosystems
Indirect	Interruption of public services outside the flooded areas; due to loss of production to companies outside the flooded areas (e.g. Flood provider company); the cost of traffic disruption; loss of tax revenue due to the migration of internal company after floods	Trauma; loss of confidence in the authorities

Sources: Noor Suraya, Khushren, Zulkifli, & Zulhilmi (2015); Merz, Kreibich, Schwarze, & Thieken (2010)

Kuala Krai is an area that gets hit by flood almost every year. The level of flooding faced commonly causes severe damages of properties of the population especially the traders. In fact, business premises or business sites as well as the sale items are mostly destroyed and swept away by flood water. Based on the history of flood incidents in Kuala Krai, there was an increase in its frequency and magnitude from 2001 to 2006 (Tuan Pah Rokiah, Hamidi, & Raman, 2011). Such condition often causes disruption of business activity each time a disaster occurs. In order to restart the operation of business activity, it depends on the amount of loss and the process to recover the business capital. In general, the significant impact that can be seen on the occurrence of floods is related to the very high damage and destruction of property. A study by Tuan Pah Rokiah, Hamidi and Raman (2011)

concludes that Kuala Krai is the district that suffered the highest property damage compared to other districts in Kelantan state from 1981 to 2005 with a total value of almost RM 20 million. Therefore, this matter should be addressed by each dweller, especially those living in the low area that gets flooded easily to make preparation for the flood every year.

Even though research on the flood damage assessment towards the economic aspect of the population is no longer a new field to be studied by researchers from inside or outside the country, but such studies are important in creating a flood risk management that is able to reduce the risk of flooding, especially in terms of reducing property loss among the population. According to Merz *et al.* (2010), flood impact assessment is an important part of flood risk management. Thus, the value of loss suffered by the population can be minimised by the implementation of flood risk management that is built based on the studies of flood impact assessment, especially in terms of economy. Among the studies discussing about the effects of flood in the aspect of economy are by Tuan Pah Rokiah *et al.* (2011), Merz *et al.* (2010), Tran, Marincioni, Shaw, Sarti and Van An (2008) and Hammond *et al.* (2015). However, those studies only discuss on the effects of flood in the aspect of economy in general. The situation is different with this study that discusses the effects of flood to the traders in detail and includes two types of business which are sale items business and services business.

Study Area

This study has been conducted in Kuala Krai town, Kelantan which is located in Batu Mengkebang District that lies between the longitude 5° 31' 51.07" N and latitude 102° 12' 7.2" E (Figure 1). It covers an area of 6.9 km^2 with a total population of 5,278 people (Department of Town and Country Planning, 2011). Kuala Krai town is an area with the highest population density compared to other parishes in Kuala Krai District. This is because the town is the administration centre and the main business district that supports the state sub-regional centre with limited functions and services. In addition, the town also provides other support services such as housing, facilities, infrastructures and recreation.
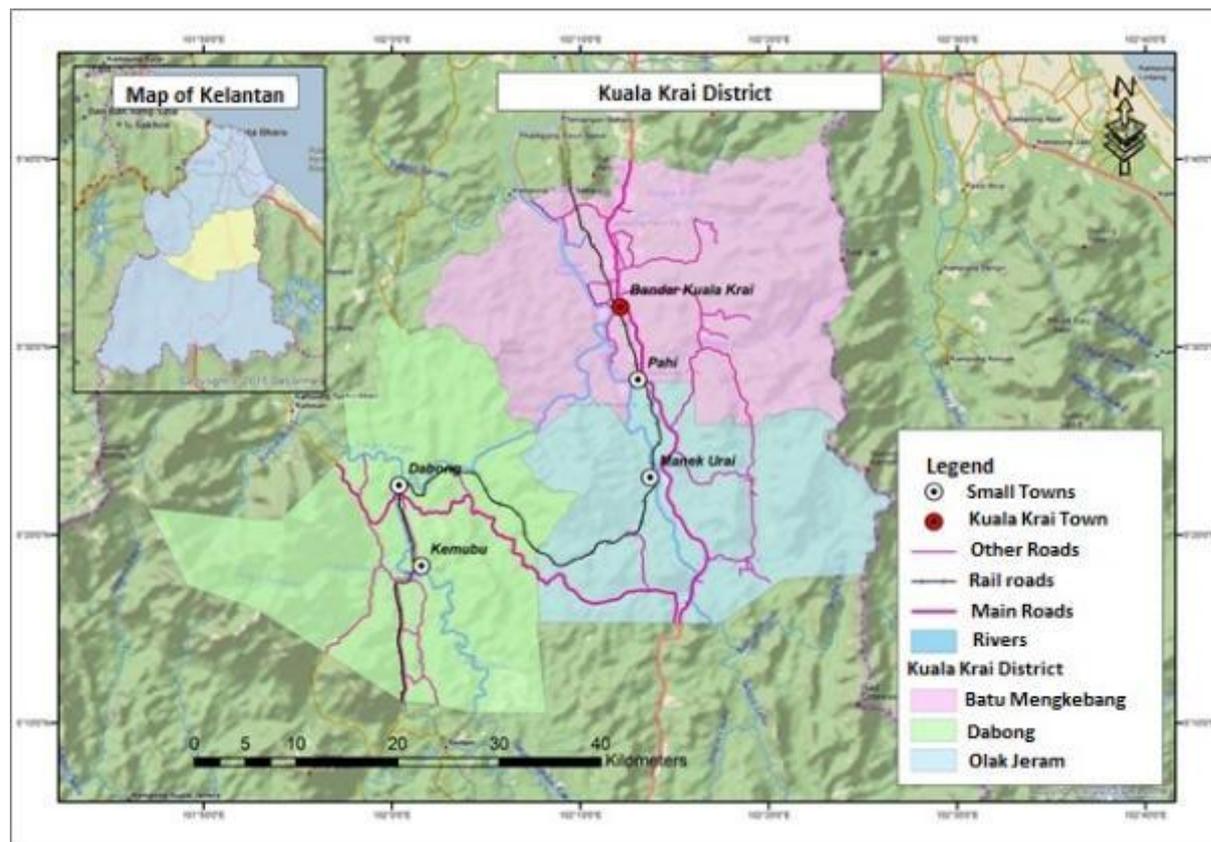
Figure 1: Study area

Research Methodology

This research is a survey-based study that applied quantitative method through a questionnaire. This is because the questionnaire was used to evaluate the loss suffered by the traders in Bandar Kuala Krai as a consequence of the floods in 2014. According to the data from Majlis Daerah Kuala Krai, in 2014 there were as many as 324 traders in Kuala Krai town. In order to determine research sample, based on the sample size of Krejcie and Morgan (1970), the number of samples to be taken was 175 people at a confidence level of 95 percent and 5 percent sampling error (significance $\alpha = 0.05$). The sampling method used was simple random sampling which was done by identifying the target population and choosing the samples randomly to answer the questionnaires distributed. According to Othman (2014), this technique is only suitable to be used if the target population of the study has homogeneous characteristics.

After the primary data were obtained from the questionnaires, the data were analysed using Statistical Package for Social Science version 17.0 software. This study only used descriptive analysis; frequency, percentage, mean, standard deviation and cross tabulation. To identify the business property with the highest loss experienced by the traders, a mean analysis was used to determine the average value of the values given for each business property. While a cross tabulation was used to determine the cross connection between type of business and level of loss.

Findings and Discussion

The results of the survey found that 76 respondents were comprised of 43.3 percent men and 56.6 percent women. Most of the respondents were aged 41-50 years old which accounted for 40.6 percent, followed by 24.6 percent of respondents aged 31-40, 21.7 percent of respondents aged 51 years and above and 13.1 percent of respondents aged 21-30 years old. Respondents were also consisted of three races, namely Malay of 78.3 percent, the Chinese of 15.4 percent and Indian of 6.3 percent. The majority of respondents were married, which was 86.3 percent, followed by 12.0 percent of respondents were single and 1.7 percent were widowed/widowers. In terms of educational level, 72.0 percent of respondents with SPM/MCE, followed by 13.7 percent of respondents with PMR/SRP, 13.1 percent of respondents with STPM/STAM/Diploma and only 1.1 percent of respondents were graduates with a Degree / Advanced Degree.

In terms of the business profile (Table 2), it shows that 68.0 percent of respondents traded goods and 32.0 percent of respondents ran services type of business. Most respondents had private premises with the percentage of 67.4 percent compared with 32.6 percent of respondents who were tenants. In terms of business performance of the respondents from 2014 to 2015, it shows that 71.4 percent of respondents experienced a decline, 23.4 percent had no changes and only 5.1 percent of respondents had an increase.

Table 2:
Frequency distribution and percentage of the business profile of respondents

Business profiles		Frequency	Percentage
Business type	Goods	119	68.0
	Services	56	32.0
Premises ownership status	Rent	57	32.6
	Owner	118	67.4
Business performance compared to the year 2014	Increased	9	5.1
	Decreased	125	71.4
	Unchanged	41	23.4

Business Property Losses Analysis

Based on Table 3, business property consists of seven types, namely sale items, machinery/equipment, furniture, premises decorative items, business vehicles, electrical appliances, kitchen appliances, raw food, premises/stall/kiosk and cash money. The findings of the survey found that the highest mean value was of sale items (mean=1.56, SD=0.894) and premises/stall/kiosk (mean=1.56, SD=0531) compared to other business properties. While the lowest mean value of the business was vehicles (mean=1.01, SD=0.076), raw foods (mean=1.01, SD=0.076) and cash money (mean=1.01, SD=0.151).

Table 3:
The mean value and standard deviation for each property business

Business property	Mean	Standard Deviation
Vendible goods	1.56	.894
Machinery	1.23	.949

Furniture (example: chair, table, shelf and others)	1.10	.373
Accessories premises (example: windows, doors, etc.)	1.03	.199
Business transport (which is used to pick up and deliver the goods to a destination one)	1.01	.076
Electrical goods	1.03	.167
Kitchen hardware/utensils	1.06	.243
Raw foods	1.01	.076
Premises/ stall/ kiosk	1.56	.531
Cash (for saving)	1.01	.151

Cross tabulation test of type of business and level of loss

Using cross tabulation test (Table 4), the results of the analysis show that the sale items business (67.3%) recorded the highest percentage of low level of loss than services business (32.7%). In addition, the sale items business (100%) also recorded the highest percentage of medium level of loss compared to services business (0.0%). This situation also clearly shows that the sale items business recorded the highest overall percentage of 68.0 percent compared to services business that just recorded an overall percentage of 32.0 percent.

Table 4:
Cross tabulation analysis on business type and loss level

Business type	Loss level				Total	
	Low		Medium			
	N	%	N	%	N	%
Goods	115	67.3	4	100.0	119	68.0
Services	56	32.7	0	0.0	56	32.0
Total	171	100.0	4	100.0	175	100.0

In overall, the results of the mean analysis show that sale items and premises/shop/kiosk are the business properties with the highest loss among the traders in Kuala Krai town. In addition, the cross tabulation test on the other hand shows that sale items business is the type of business with the highest loss after the devastating floods in 2014, especially at a low level of loss. These findings clearly indicate that the flood incident has caused the traders in Kuala Krai town to bear huge loss in 2014 especially the sale items business.

However, the impact of natural disasters such as floods can be reduced through natural disaster management before and after the disaster (Soetanto & Proverbs, 2004). In addition, an efficient disaster management is also able to reduce the impact of disaster and prevent disaster from happening and minimise the impact of disaster (Eden & Matthews, 1997; Khan, Vasilescu and Khan, 2008). However, an efficient flood management of other countries cannot be applied in our own country. This is because each disaster that hits a country varies according to its frequency and magnitude. Instead, Kaklauskas, Amaratunga and Haigh (2009) explains that flood management can only be adapted based on the country's existing state or the actual situation, economic, social, cultural, institutional, technological, technical, environmental and legal/regulations. Therefore, the flood management needs to be improved so that the damage and loss suffered by the traders in Kuala Krai town can be minimised, especially at the preparatory phase. Therefore, cooperation of all authorities is

important in raising awareness among the traders on the threat of flood and flood preparation steps such as an exposure through formal or informal education, workshops, courses or campaigns. If no initiative measures are implemented, flood incidents in the future will cause greater damage and loss due to the lack of preparation among traders.

Conclusion

It was found that the traders in the Kuala Krai town suffered much damage and losses during the flooding event in 2014 especially the sale items business. This is because of the high destruction and damage of the sale items and premises/stall/kiosk. The threatening flood disaster has shown that flood incident is a natural occurrence that must be addressed by all parties, especially on the flood preparation measures. Apart from that, an integrated flood management also plays an important role in reducing the impact towards people and damage to property. With the improvements in terms of early preparation for the flood among traders, it will be able to reduce the loss suffered by traders, especially in areas that are submerged. Indirectly, this approach will be able to build a sustainable society and able to survive after a flooding incident.

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