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2014 Malaysia flood: impacts & factors contributing towards the restoration of damages

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Abstract: The 2014 flood that happened from December 2014 to January 2015 is considered to be the worst flood in a decade. There was an outpouring support from other international officials in terms of moral, physical and also donations. The impact of this flood left the nation with expensive damages and great devastation as well. This paper looks into the impact of the flood in terms of losses, damages and costs towards the nation. The impact is illustrated by obtaining data, statistics and also visuals of the recent flood. From this paper, a correlation between the restorations of abandoned projects in Malaysia with future restoration that is intended for the damages caused by this flood is also shown here, where these factors were developed through observation and measurements from literature reviews and other officials related to project restorations. An understandable and clear view has been established on this catastrophe. Here, some guidelines and factors has also been identified, hoping to contribute towards the restoration of this damages in Malaysia. The estimation on the damages due to the massive flood is in the vicinity of RM 1 billion. Therefore, the restoration should be completed adequately with proper planning and management.

Key words: Flood; Damages; Restoration; Abandoned projects; Factors; Guidelines

1. Introduction

Natural disaster is commonly known to be disasters caused by the nature. These natural disasters consist of volcano eruptions, earthquakes, tsunami, avalanches, lahars (volcanic mudslides), landslides, blizzards, heat waves, hurricanes, typhoons, tornadoes, floods and others. No matter what types of natural disasters it may be, it usually leads to financial, environmental and human loses. It is indeed a great danger for the earth if these sort of natural disasters tend to continue. Natural disasters are said to be cataclysmic or in other words a violent natural event that could give either a direct or indirect impact towards the public health and well-being, as stated by the United States Department of Health and Human Services, (2009).

One of the most common natural disasters that happen all around the world is flooding. The flood takes place when a river bursts its banks and the water spills out onto the floodplain. This scenario is far more likely to happen with the contribution of heavy rains. Therefore, during this wet season, flood warnings are usually often put in place. There are other noticeable risk factors for flooding too, for example steep-sided channels causes fast surface run-off, while a lack of vegetation or woodland to both break the flow of water and drink the water means that there is little to slow the floodwater down (Pradhan, 2010). Drainage basins of impermeable rock also cause the water to run faster over the surface (Sinnakaudan, 2002).

The problems relating to flood are in an extensive situation now, therefore the necessity for an effective analysis on the impacts due to flood is much needed so that it would be able to understand the problem and mitigate its' disastrous effects in various situations.

There are activities conducted by human for example the unplanned rapid settlement development, uncontrolled construction works of buildings in general and major changes in the use of land, that are considered to be influences towards the pattern of hazards. There are several factors contributing to the flooding problem, and they are ranging from topography, geomorphology, drainage, engineering structures and also climate, as explained by Khan (2014). He further elaborated that it is also known that floods are mostly caused by storms, in which a lot of precipitation or substance falls in a short period of time, of both types of rainfall, convective and frontal storms. The forceful factor and the lengthy time scale of the rain, are the most contributing factors for the occurrence of flood hazards.

In the year of 2014, there was a rapid case of flood that occurred from the northeast monsoon which hit certain countries, such as Indonesia, West Malaysia, Southern Thailand and later Sri Lanka, in South Asia (Borneo Post, 2014). The following table

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shows the affected regions due to the massive flood in 2014, with its' estimated total of evacuees.

Table 1: Regions affected by 2014 flood

Country	Fatalities	Evacuees	Sources
Indonesia	0	120, 000	Insurance Journal, (2014)
Malaysia	21	237, 037	Malaysiakini, (2014)
Thailand	15	10, 000	ABC online, (2014)
Sri Lanka	39	50, 832	Customs Today, (2015)
Total	75	417, 869	

It was reported by the Jakarta Post (2014) that on the 19th of December 2014, the occurrence of flood in some parts of Indonesia, left approximately 525 hectares (1,300 acres) of farmland damaged in eight districts in Indragiri Hulu Regency, Riau. It was also reported that there were hundreds of houses in the Bengkalis Regency of Riau, submerged waist-deep (1 meter (3.3 ft.), but yet the total of 500 residents are still at home as there is no place to take refuge. As for Malaysia, the massive flood hit the country from 15th of December 2014 to 3rd of January 2015. According to a report by Asia One (2015), more than 200,000 Malaysians were affected while, sadly 21 people were killed due to floods. The damages caused by this flood has affected badly on the people causing them a great devastation, especially when it came to loss of homes and other infrastructures. The 2014 flood in Malaysia has been described by the Malaysian Insider (2014) as the worst floods in decades. Simultaneously, there are provinces in Thailand, which were declared as disaster zones with total of 115,853 residents totaling 30,624 households being affected by the occurrence of flood in the country, (Phuket Ghazette, 2014). Another country in Asia affected by the 2014 flood that is worth mentioning here is Sri Lanka. It was estimated that a number of 1.1 million people were affected by the rapid rainfall, extensive floods, landslides, mudslides and high winds, according to The Watchers (2015). According to the same source as well, the damages consists of 6,400 houses that are reported to be fully destroyed and an estimated of 18,537 houses that are partially damaged too. There are 39 deaths, with 20 other Sri Lankans injured and 2 others till now reported to be still missing, as stated by the United Nation's Office for the Coordination of Humanitarian Affairs (OCHA, 2015).

2. Flood in Malaysia

In Malaysia it is safe to state that the country is blessed not to be experiencing some of the natural disasters that are happening around the world such as the earthquakes, volcano, typhoons and others. The most intense natural disaster experienced in Malaysia is the flood. The two vital types of flood that is occurring in Malaysia are the monsoon flood and flash flood. The monsoon flood occurs mainly from Northeast Monsoon which conquers during the months of November to March with heavy rains to the east coast states of the Peninsula, northern part of Sabah and also the southern part of Sarawak as well (Hassan and Ghani, 2006).

The Department of Hydrology (2011) has a record showing the occurrence of flood in Malaysia in the past years, such as in 1926, 1931, 1947, 1954, 1957, 1963, 1965, 1967, 1969, 1971, 1973, 1983, 1988, 1993, 1998, 2001, 2006, 2007 and 2010. There is also a report from the Department of Irrigation and Drainage (2011), stating that about 29,000 sq. km or 9% of the total land area and more than 4.82 million people (22%) are affected by flooding per annum. The damages caused by flood are estimated to be RM 915 million worth. Floods governed by heavy and long durations of rainfall, has affected certain states in Malaysia over the years. The following table shows the occurrence of flood in the recent years in some parts of the country.

Table 2: History of flood in Malaysia

Num.	Years	States affected by flood
1.	April, 2002	Kuala Lumpur
2.	October, 2002	Kuala Lumpur
3.	October, 2003	Kedah Penang Northern Perak
4.	February, 2006	Shah Alam
5.	October, 2006	Klang Kedah Perlis

(Source: Hassan & Ghani, 2006)

These floods as stated in the table above have been recognized due to the out of controlled development and activities within the collection of rainfall caused by the flood occurrences at flat lands (Hassan and Ghani, 2006). The happening of floods in a large scale during those years has been reported to have damaged properties, public utilities, and cultivation, in fact there are also loss of lives and also caused obstruction to social activities and slowed down economy as well.

3. 2014 Malaysia Flood

The recent Malaysia flood which happened from 15 December 2014 – 3 January 2015, has been described as the worst floods in decades, where more than 200,000 people were affected while 21 people were killed due to this. The following figure shows a much clearer view of the affected areas in Malaysia due to flood.

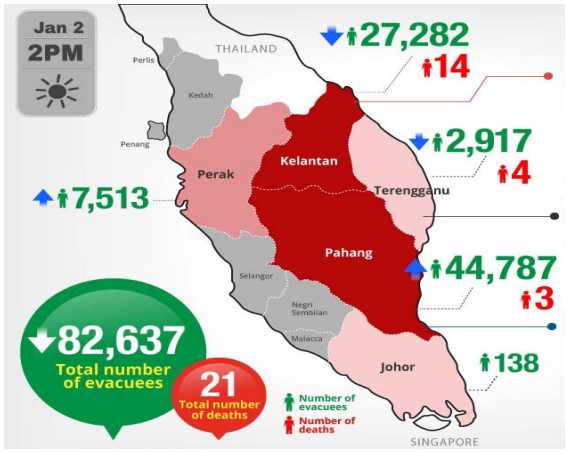

Fig. 1: Affected Areas caused by 2014 Flood (Source: Bernama and Portal Bencana, 2014)

Following the heavy rains in Kelantan and Terengganu, about 3,390 and 4,209 people from these respective states were forced to evacuate their homes (Sky News Australia, 2015). There were several Keretapi Tanah Melayu (KTM), intercity train services along the East Coast route were interrupted following the occurrence of these floods as well (The Malaysian Insider, 2014). Along with these events, the area of Kajang in Selangor was also the target of these serious floods (Brown et al., 2014). By end of 2014, most of the rivers in Kelantan, Pahang, Perak and Terengganu had reached dangerous levels (The Rakyat Post, 2014). Due to this, many businesses were affected and about 60,000 people were displaced by the following day. It is reported by the Borneo Post (2014) that Kelantan had the most evacuees with an estimation of 20,468 to 24,765 people, followed by other states in Malaysia as shown in the table below.

Table 3: Total of evacuees in states affected by 2014 flood

Num.	States	Total Evacuees
1.	Kelantan	20, 468-24, 765
2.	Terengganu	21, 606
3.	Pahang	10, 825
4.	Perak	1, 030
5.	Sabah	336
6.	Negeri Sembilan	350
7.	Johor	300
8.	Perlis	143
9.	Kedah	51

(Source: The Star, 2014)

The 2014 flood in Malaysia has given an adverse effect to some part of the country's economy, especially in agricultural sector. Palm oil and rubber prices have escalated where the flood has disrupted supplies from Malaysia to other countries. The rubber output in Thailand and Malaysia has been said to be dropping at least 30 per cent and the prices are predicted to rise up as well. As floodwaters in Malaysia are not subsiding, the production of palm oil has been declining majorly (The Economic Times, 2014).

There are also severe damages due to this current flood in Malaysia. The reported damages that was caused by the floods extensively in parts of peninsular Malaysia is expected to cost Putrajaya and state the governments over RM1 billion (Berita Harian, 2014). Here is look at the cost of damages according to the states affected by this flood, referring to Table 4.

Table 4: Cost of damages according to states

Num.	States	Cost of Damages (RM)
1.	Kelantan Pahang Terengganu	204 million
2.	Johor Melaka Negeri Sembilan	78 million
3.	Perak Kedah Perlis	55.6 million

(Source: JKR, 2015)

As for Table 5 below shows the type of effect and damages suffered, with its restoration cost according to states in Malaysia.

Table 5: Types of damages and restoration cost

Num.	Types of effects/damages	Restoration Cost
1.	Public Works Department (PWD)	RM 100 million
2.	Tenaga Nasional Berhad (TNB)	RM 10 million
3.	Air Kelantan Sdn. Bhd.	RM 3 million
4.	Police Department	RM 8 million
5.	Roads in Kelantan	RM 100 million
6.	Roads in Terengganu	RM 132 million
7.	Infrastructures in Kelantan	RM 200 million
8.	Schools in 5 states	RM 350 million
9.	Homes	RM 200 million

(Source: JKR, 2015)

To have a clearer view and understanding on this estimated costs over the damages due to the 2014 flood in Malaysia, the following figures shows the impact and damages.

Fig. 2: Flood in Kelantan (Source: JKR Kelantan, 2014)

Fig. 3: Flood in Terengganu (Source: JKR, 2015)

Fig. 4: Impact of flood in Kelantan (Source: Berita Harian, 2014)

Fig. 5: Road Damages (Source: Berita Harian, 2014)

Fig. 6: Damages of Homes (Source: Berita Harian, 2014)

Fig. 7: Infrastructure Damages (Source: Berita Harian, 2014)

Whatever that has been illustrated at this point shows clearly the seriousness of the impact left by the 2014 flood in Malaysia, which also resulted in the devastation faced by the civilians as well. Although, there is absolutely nothing that could be done to revert the situation from happening, but yet the impact and devastation left by this natural disaster has to be looked into meticulously to help all the concerned parties and the public as well.

4. Factors towards the restoration of damages caused by 2014 flood

The recovery process after the occurrence of a disaster involves the restoration of normal community activities that were disrupted by disaster impacts. For the people to able to carry on with their normal life, there should be a restoration process that has to be carried out effectively based on the damages caused by the flood. A proper management cycle should be put forward in establishing the restoration process in this situation.

Abandoned projects are an issue that is not uncommon in Malaysia at the moment. At the same time there are efforts that have been taken immensely to revive these abandoned projects in Malaysia. There are various factors that have been identified through observations and measurements regarding the restoration of abandoned projects. With the huge scale of damages that has occurred due to the 2014 flood damaging the infrastructure and houses, the factors contributing to the restoration of abandoned projects could be used as a guideline and as well as standards in the restoration process for the damages, where the restoration of these damages are now treated or categorized as a new projects to be focused on to. The following table is the category of factors that should be looked into and achieved to start a restoration process of an abandoned project, which subsequently be the factors in the restoration of the 2014 flood damages as well.

Table 6: Aspects and factors contributing towards the restoration process

Aspects based on inception point/stage	
1	Accessing the basic information & details of the project/damages
2	Projects/damages consisting of high number of units/total with maximum purchasers/population
3	Surety on the ability of the restoration on the project/damages is able to advance & not a helpless project/item
4	Negotiations conducted with the stakeholders
5	Obtaining & achieving agreement with all the parties involved
6	Complying with all the approval conditions & amendments that has been put forward by the technical agency
7	Coordinating the revival efforts through the original developer & the savior developer.
8	Obtaining professional team & authorized developer for the project
Management Aspects	
9	Determination & understanding the project goals
10	Senior management involvement & support
11	Better understanding on the works in terms of contract
12	Identifying various problems & suitable decision-making in solving/tackling it
13	Identifying effective & necessary changes
14	Having early & complete planning & design
15	Approval of Building Plan
16	Availability & proper management of the needed resources including adequate funds, trained personnel & technology, based on the restoration plan
17	Putting forward project updates & reviews conduction regularity(project controlling & monitoring)
18	Putting forward project risk assessment & analysis
19	Having an efficient restoration practice with logical sequence of various activities to be followed in the restoration process
Client Aspects	
20	Knowing the cultural significance & social values of the project/type of damages towards the target group/clients/population
21	Taking account the number of occupants/population intended in the project.
22	Taking account the surrounding community & resolve any occurring issues.
23	Resolving land issues/disputes (approval of land)
24	Having the proper collaboration & giving the needed focus on the importance of the clients/community/population
Aspects based on Government Policies	
25	Taking account the current political conditions.
26	Taking account the current legislative mandates.
27	Having & conducting proper steps in consideration of the economy condition or crisis.
28	Political influences in bias contract rewarding
29	Focus on new project developments by new political party, failing to focus & complete previous housing projects.
Building/project Aspects	
30	Looking into the behavior of material used & structural system in the projects.
31	Identifying the possibility of deterioration, its' causes & mechanisms.
32	Focus on the existing documents of the project.
33	Evaluation on the remaining structure to expose its' actual physical condition/the type and the extend level of the damages.
34	Making assessment & further gaining physical evidence on the condition of the existing structure by inspection, diagnosis & cause analysis.
35	Knowing the environmental conditions of the building (building safety).
36	Knowing the maintenance aspect & efficiency in hence, by having the knowledge of the whole-life of the building.

There are also some guidelines that could be focused on as a part of mitigation approach towards the restoration on the damages caused by the national flood. They are, 1) giving preferences to local contractors, who are qualified and have experiences in delivering quality works as intended,

2) adopting an open tender system for contracts valued above a certain quantum, 3) conducting a rigorous pre-qualification screening of all intending contractors, 4) ensuring that all proposed contracts be accompanied by maintenance systems that will ensure sustainability of the damaged infrastructures, 5) targeting areas in the purpose of flood mitigation by using scientific, technical, demographic and socio-economic data, 6) forming a team who will scrutinize and decide on the areas that need priority based on flood risk assessment and socio-economic impact and also forming another team which plays the technical role in deciding on the types and the suitable scale of mitigation for the infrastructures, costs and other factors as well, and 7) the need to explore on cost-effective approaches such as removal of sand from silted river mouths and forest preservation. However, the question on the level prevention of wastage, abuse, mismanagement and corruption by using the suggested guidelines are yet to be known, which therefore an alternative approach should also be thought off to be developed and implemented to succeed the restoration process of these damages.

5. Conclusion

Natural disasters are something that happens all over the world, and they leave a tremendous impact on people's lives and the environments in which they live in, which is therefore it's utterly devastating to all. Although natural disasters are caused by nature and there is nothing that we can do to prevent them from happening, but yet being aware of its impact and also being prepared ahead with a disaster recovery plan is a much required process that should be looked into thoroughly.

The current devastation that has to be faced in Malaysia was the 2014 flood. The impacts left by this are mainly damages caused by the physical contact of floodwaters with materials and are therefore related to the materials which are declining physically. Indirect impacts are much more difficult to be dealt with, where there is involvement by the surrounding community who are affected by the flooding events.

The goal of the government and the hope of the people affected by the 2014 flood in Malaysia and as well in other regions is to restore houses, infrastructures, business and government activities to the usual state as before the flood occurred. In able to achieve this, the restoration of buildings and infrastructures should be conducted vastly. A proper restoration plan with a proper management system and as well as a potential team has to be put forward in establishing the intended goal. However, in the aim to restore the damages, one has to understand and know that the environment is in a vulnerable and as well as in peril state. Therefore, it is important to take account all the factors in a restoration process and work in hence.

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