



## A REVIEW OF FLOOD CATASTROPHIC MANAGEMENT IN MALAYSIA

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### ABSTRACT

Flood Catastrophic occurs every year in Malaysia. Recently, the end of 2014, the worst disaster occurred in Kelantan and followed by Pahang, Terengganu and Sabah. Therefore, need to advance flood catastrophic management to fast action when disaster is occurred. There were existing flood management systems that developed by *Infobanjir* website and Department of Irrigation and Drainage Malaysia which conducted by short message system (SMS) as one of the delivering systems. Whereas, in the Flood Preparedness and Response in Malaysia was developed by Disaster Management and Relief Committee as well as Malaysia Disaster Preparedness Centre (MDPC). However, ineffective information distribution to the society become main issue to solve, because may have some peoples have changed their phone number which hamper that information. Therefore, the main purpose of this research is to review the flood catastrophic management system in Malaysia to enhance the effectiveness and adapted in flood disaster management in Malaysia. From the result mention that the emergency responds management is divided into 4 phase which are preparedness phase, response phase recovery phase and mitigation phase. It conducted into every level of the country which consists of central, state, district and area levels.

**Keywords:** emergency response, flood, flood management.

### INTRODUCTION

In the developing country like Malaysia and also located in wet equatorial country with high intensity rainfall. It cause storm water which generate not only flooding but also increase surface water pollution. Therefore, storm water is become one big priority agendas of government, non-government, local authority and agency in order to solve the problems (flood) and surface water pollution [1, 2]. Flood is a situation where the water has risen exceed the danger level and the floods are declared by the authorities [1]. However, the local authorities is not inform that the continuous rainfall is potential to generate the flooding. Therefore, need to early anticipation for disaster especially for flood catastrophic. It will effective to reduce the victims, cost damage and cost for repairing the area. According to Organization World Meteorology, (2007), [2] the floods are the third largest of natural disasters which has generate many victims and destruction of property. The floods problem in Malaysia is closely linked to the floods which occur during the monsoon season and flash floods [3]. The increasing populations in the basin and river valleys causing flood disaster difficult to avoided. The frequency of flooding has increased due to the land use is change, therefore in low-lying areas is not able to drain the heavy rain and drainage systems which are experiencing the sedimentation due to development.

### FLOOD CATASTROPHIC MANAGEMENT

There are two flood management systems which generated in the world which are Integrated Flood Management (IFM) and Role of Emergency Management

in Flood Policy. Those systems are detail described in sub section.

#### Integrated flood management (IFM)

The definition of Flood risks is the expected losses from actual flood events over a specified period. It consist of flood hazard magnitude and the exposure of human activity to flooding anticipation [4]. Therefore, IFM has have main objective in reducing flood risk [4]. Individual view on future flood disaster is possible to decreasing victims through the several stages which includes evacuation from flooding area and nursing from disease spread. Economic activity may stag because flood and it must have early attention in economic sustainability [4].

#### Role of emergency management in flood policy

Flood emergency management plays a vital role divided into three stages :(1) Preparedness: pre-flood measures to ensure effective response; (2) Response: measures to reduce adverse impacts during flooding; (3) Recovery: measures to assist the affected community to rebuild itself.

Preparedness includes the issuance of timely and effective early warnings and the temporary evacuation of individuals and property from threatened locations. Education and public awareness, coordination among governmental and non-governmental agencies, effective stakeholder participation, and early warning systems are key components of preparedness planning.

Flood emergency response can be defined as the implementation of pre-planned activities during flooding to reduce the adverse impacts to the population and



material values and infrastructure. It can be differentiated from post-flood recovery and rebuilding. During this stage, the effectiveness of the preparatory work is conducted during the pre-flood season which validated.

The post-flood recovery and reconstruction phase creates opportunities as well as challenges for development projects in make sure that post-flood recovery and rebuilding can to eliminate the possibility of future flood. It also provides the opportunity to move vulnerable activities away from risk areas and introduce flood-proof infrastructures during rebuilding.

### Managing flood problem in Malaysia

Referring to Bulletin ingenious, there are several main causes of flooding in Malaysia which are loss of storages, increase runoff due to urbanization, inadequate drainage system, localized continuous heavy rainfall, tidal backwater and inadequate river capacity. By this thing of flooding, the government took the positive step to face the

flood problem which establish the permanent flood control commission, establishment of flood disaster relief machinery, setting up the flood forecasting and warning system, also carrying out of river basin studies and preparation of drainage master plan for major towns and implement of structural and non-structural measurement. The structural measurement including flood control dams, canalization and related works, bounding of rivers, storage ponds of flood attenuation, and flood diversion channel or tunnel. Meanwhile, the non-structural measures are integrated to River Basin Management (IRBM), prepared the Guidelines and Design Standards, Resettlement of population, flood proofing and flood forecasting as well as warning systems.

The existing disaster management system can be accessed in Majlis Keselamatan Negara (MKN) website as shown in Figure-1.



Figure-1. Majlis Keselamatan Negara (MKN), Malaysia.

### Phase of flood the flood delivery in Malaysia

In Malaysia, there are several management process which conducted by the government include delivery system. The Delivery System is an important mechanism that will use and also it is the one of the flood policy used by government in the management of non-structure measurement [5]. The Government has developed the relief machinery and emergency flood

management, and for post-disaster, funding and aid delivery system to help the victims recovery after disaster [6].

### Flood forecasting and warning systems (Pre-Disaster)

The Department of Irrigation and Drainage Malaysia (DID) is responsible for providing flood forecasting and warning services to the public [10]. One of



starting warning system such as short messages system (SMS) is used to mitigate the effect of flood disaster. This system is provided to give alert to the relevant inter-agency in-charge. Referring to Sahu, (2006) [7], SMS is an effective alert or notification system which can be used to distribute the information to all people and functional to resilience disaster. Besides that, the people can obtain the accurate information about the rainfall and water level through on-line via *infobanjir* webpage. This system is effective as early flood warnings dissemination to the public [8]. According to Husaini, (2007) [9], the flood forecasting and warning systems had been installed on the telemetric rainfall stations, telemetric water level stations, manual stick gauges, flood warning boards, flood sirens, real time flood forecasting and warning systems in nine river basins [10].

#### **Flood relief machinery (During Disaster)**

The Department of Irrigation and Drainage Malaysia (DID) is engage in the procedures under the flood relief mechanism, DID begins to monitor closely the flood situation when the river stage as flood warning station which reaches the "alert" level [9]. The DID will advise the relevant flood control centres that the flood relief mechanism shall be activated in certain level of river. The respective state DID office should be conduct the flood forecast operation using the real time telemetric data and river forecasting computer models during the flood season. When the river water stage is over the normal level, the National Security Division and the national and state control centre for flood relief and operation must be activated immediately [9]

#### **Emergency flood management (During Disaster)**

The flood operation during the disaster quite requires the cooperation and understanding among various parties involved at the flood plain including coordination in every level area to be efficient and successful in rescuing victims and reduction of property losses [11]. The chaos and scary condition in the flood rescue operations, especially when both road transport and telecommunications are disrupted and short-circuited electricity supply is occurred when rescue operations should be continued throughout the night. Obviously, the flood emergency response to rescue the victims is led by Army and Public Defence Services [11]. Therefore, an advanced and accurate flood warning information system strictly provided in a timely manner before and throughout the flood duration. It also helpful to reduce the number of death, trauma and property damages. Flood hazard maps should be produced early and disseminated to the public beforehand to help and guide the flood victims toward safety in the fastest possible routes when flooding occurs [9].

#### **Funding and aid delivery system (Post-Disaster)**

The aid delivery system for flood victims in Malaysia is based on two forms which are financial and non-financial assistance [12]. A tremendous amount of financial allocation in areas such as physical infrastructure development will be needed to carry out an effective flood management strategy. This includes the construction of large dams, canalization of rivers and building high capacity sewage treatment plants to restore polluted rivers for their original clean water quality condition.

#### **Flood preparedness and response**

According to United State Department of Labour, (2015) [13], the main focuses of floods preparedness are planning, equipping, training, exercises, climate change preparedness and resilience. Besides that, the flood response and recovery take a part in driving during flood condition, hazard and precautions.

In Malaysia, the policy on Disaster and Relief Management is governed by National Security Council (NSC) Directive No. 20: Policy and Mechanism of Disaster Management and Relief Committee (Jusoh and Bahari). The responsible of NSC is for coordinating activities related to the preparation, prevention, response and handling disaster. Otherwise, the disaster management and relief committee handled managing disaster in Malaysia at central, state and district level (Jusoh and Bahari,) to mitigate the effect of disaster event.

In strategic initiative, the stakeholders build the preparedness centre for the disaster which is called Malaysia Disaster Preparedness Centre (MDPC) which as a principal coordinator of flood and future disaster relief [14]. The objectives of the MDPC are to promote the improvement of awareness, knowledge and practice about the disaster. In addition, MDPC are organizations, communities and individuals strengthened their own capacity in all respect to reduce impacts of disasters [14]. Another objective of MDPC is emphasize on promoting partnership among the stakeholders and other organization. In some of important regional centre, MDPC will encompass all state in Malaysia [14].

#### **EMERGENCY RESPONSE PLAN**

The one of the critical parts in Disaster Management System life cycle is response phases [15]. The emergency response plans are an action plan to organize and employee the action during workplaces emergency [16]. The great developed emergency plans and the correct training will decrease the injuries and less structural damage to facilitate the evacuation during emergencies [17].



**Figure-2.** The process of emergency management.

Figure-2 shows the process of emergency management which consists of four phases which are preparedness, response, recovery and mitigation phase. The first phase is preparedness phase which consist of the activities which carry out to improve emergency response. For an example in flood catastrophic event, risk analysis, exercises, emergency plan, procedure, joint cooperation consensus and response plan are needed to face the catastrophic events. Second phase is response phase which consist of the immediate emergency response to minimize loss of life and destruction of property and facilities. In that phase are include the notification measurement, emergency plans implementation, activation of emergency operation centres, mobilization of resources, provision of medical, social services assistance and an announcement of emergencies by the stakeholder and management. The third phase is recovery phase, according to Faulkner (2001) [18] mentioned that recovery is the stage where self-analysis, healing, the time are needed to rebuild damages, and employed the actions [18]. Some researcher mentions that in the stage of recovery an effective communication system should be activated with key stakeholders to share the information and manage the emergency situation [19]. The last phase is mitigation phase, this phase also known as prevention phase. According to FEMA, (2006) [20], illustrate that mitigation refers to activities that designed to reduce eliminate risk which effect into the person or property and lessen the actual or potential effects or consequences and incident. There are several types of mitigation activities such as hazard identification, risk analysis, evaluation, research and education.

## CONCLUSIONS

Flood emergency management contributes to the flood risk reduction where it is an important objective of integrated flood management. Flood emergency management plays a vital role in each stage of the flood management cycle which are preparedness, response, recovery from flood disasters and mitigation as well as prevention. The emergency plan should clearly spell out the responsibilities involved in disseminating flood forecasts and warnings, identify the necessary implementation activities, responsible authorities and organizing under various emergency flood scenarios.

Emergency management requires cooperation across sectors and administrative levels horizontally and vertically. Individuals' participation is essential in all steps undertaken as part of a comprehensive and integrative approach for emergency flood management.

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