How to cite this paper:

Mohamad Firdaus Mat Saad, Aliza Abdul Latif, & Marini Othman. (2017). The 2014 flood disaster in Kemaman, Terengganu: Lessons from the Kemaman experience in Zulikha, J. & N. H. Zakaria (Eds.), Proceedings of the 6th International Conference on Computing & Informatics (pp 628-635). Sintok: School of Computing.

THE 2014 FLOOD DISASTER IN KEMAMAN, TERENGGANU: LESSONS FROM THE KEMAMAN EXPERIENCE

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ABSTRACT. The worsening flood condition in Malaysia has pressed for researches towards improved handling to the overall aspect of flood management. A special interest was stirred by the success of the Kemaman district over its success in reducing the impact during the severe flood of December 2014. This paper hope to shed some light on the factors and characteristics of the Kemaman practices that has made it successful. A field study had brought the researcher to the site to interview actual personalities instrumental in the execution of the Kemaman Standard Operating Procedure during the flood incident, which resulted in the identification of several factors, characters, and interesting points: planning and preparation at district area, a flood management system, clear authority & leadership and community-based flood process.

Keywords: Standard Operating Procedure (SOP), Fixed Regulation Operation (PTO), flood management, flood management system, community-based, culture, authority, leadership.

INTRODUCTION

The heavy rainfall brought by the Northeast Monsoon through mid-December 2014 until early January 2015 has recorded a high of 255mm and inundated several states throughout Malaysia: Terengganu, Pahang, Kelantan, Perak, Johor, Selangor, and Perlis (Societies, 2014). Sources indicated this flood as being worse than the notorious floods of 2004 and 1967 and is probably the worst in the history of Kelantan (Richard, 2015). Water levels of Sungai Kelantan at Tambatan DiRaja which assumes danger level at 25 meters reached 34.14 meters in December 2014, compared to 29.70 meters in 2004 and 33.61 meters in 1967(Richard, 2015). The overflows from three main rivers: Lebir, Kelantan and Golok in the state of Kelantan had closed 16 roads in six districts. Similarly, in Terengganu 15 major roads in five districts were closed (Societies, 2014). These closures of land access, compounded by limited number of transports such as boats and helicopters, have hampered rescue activities (Societies, 2014). According to the Center for Public Policy Studies (2015), nearly 250,000 people have been evacuated, close to 20 death reported and property loss of about RM1 billion (AHA, 2015; Richard, 2015).

However, in the midst of the tough flood conditions, the district of Kemaman Terengganu, despite sharing the similar disaster, has reported a milder impact. Preparations through implementation of the Standard Operating Procedure (SOP) for Flood Management was claimed to have alleviated the impact: A well recorded database of flood victims and stakeholders; clear roles and responsibilities shared and assigned to the community leaders; and well-

stocked relief centers are amongst the preparation undertaken in anticipation of the disaster. Following that the practices of Kemaman was looked upon as a standard that could be emulated by other flood areas in Malaysia. The Prime Minister Datuk Seri Najib Abdul Razak said that "*the Kemaman district flood management plan will become the model for the standard operating procedure for floods in the affected areas in future*" (Bernama, 2014). Therefore, this study aims to gain insight on the Kemaman SOP as to how it was able to minimize the impact of the flood disaster of December 2014.

This paper is organized in four main sections. The immediate section that follows, review significant articles and documents regarding Malaysian flood practices in the recent years. Next, the approaches used in investigating the Kemaman case are explained. Then, a discussion which centers on governance and management of resources as well as other characteristics which made the Kemaman SOP special are then presented.

METHODOLOGY

In this research, identification of gaps was first made through review of literatures with regards to practices in governing and managing the recurring and worsening condition of floods in Malaysia. The review was aimed to establish a baseline for the Malaysian practice in governing and managing flood disaster. The exploration for the baseline led to a field investigation to understand how Kemaman, Terengganu was able to minimize the impact of flood despite the unprecedented condition of the disaster. Where neighboring states suffered the worst recorded loss, the District of Kemaman were applauded for its success of excellent flood handling. On site interviews with key people involved in the flood incident, coupled with post-disaster visits to relief shelter, command center and locations badly ruined by the disaster, have provided suggestion to what are the factors and characteristics that have marked the Kemaman practice as being the better practice. Further literature review was conducted to compare the practices within the field in Malaysia to deepen and confirm the findings.

LITERATURE REVIEW

The occurrence of the dramatic flood that hits the country had caused significant losses of live and property close up to RM 1 Billion (Richard, 2015), which saw the Government of Malaysia, with Non-Government Organization (NGO) and other private organization to take some action with a better plan to address the flood problems. From the hard structure planning to the soft structure planning, Malaysian have developed few flood mitigations under the Department of Irrigation and Drainage (DID) and the implementation of the Directive No.20. According to Directive No.20, Disaster Management and handling level and executive committee are regulate based on the disaster level which are Leve1 I Disaster, Level II Disaster and Level III Disaster.

Disaster in Malaysia are categorized based on the level of the disaster which can be monitored and managed either by the District, State and Federal. Flood disaster on December 2014, are monitored and managed by all three levels. However, managing flood is chaotic, and it required a dynamic planning since every disaster happened is unique in nature (Marini el at, 2014; Magiswary el at, 2014). Although, flood management is chaotic because of its dependence on the nature of the disaster itself, but, in 2014, SOP Kemaman, has been recognized as an SOP that meet the Gold Standard in the management of floods in that areas.

Standard Operating Procedure (SOP) and Fixed Operating Regulation (PTO)

An SOP is a detailed, written instructions used to achieve uniformity in the performance of a specific function (Clinical Research Management, 2015). In Malaysia, the SOP being used in managing disaster management is contained in Directive No.20 that was prepared and maintained by the National Security Council (NSC) that reports to the Prime Minister (Zaharah et al., 2013; Badruddin, 2012). Latest, flood event was reported direct to The National

Disaster Management Agency (NADMA) which is an agency established by the government acting as the coordinator of government agencies involved in the enforcement of disasters including floods. The establishment of NADMA was announced by Deputy Prime Minister of Malaysia, Datuk Seri Dr Ahmad Zahid Hamidi in December 2015 in Kemaman, which is hoping to ensure that the aid for flood victims can be delivered more effectively and organized (Astro Awani, 2015).

Primarily, Directives No.20 acts as Policy and Mechanism in handling national disaster management and relief activities. It also establishes a systematic coordination among the agencies involved. It is designed to provide clear guidelines and compliances on disaster management including the responsibilities and function of the various agencies involved in the disaster (Mohamad and Shazwani, 2015 & Badruddin, 2012).

In addition to the main document, all agencies involve in flood management in Malaysia has created their own Fixed Operating Regulation (PTO) with the specific planning including the phases of flood and the activities in managing flood. PTO served as the guidelines in managing the flood in specific created by the own department or organization that involve with the flood management in details. Every PTO created had outlined the steps that should be implemented at every level, which is the preparation of the Local Disaster Response Plan at the district and state (Parliamentary Documents, 2015). Same as the SOP, PTO also were prepared to handle different phases of flood which are before, during and after with assign of person in charge in making sure the activities are well addresses.

Technology and Human Factory

To overcome the problems of flood disaster in Malaysia, several forecasting warning systems had been undertaken to predict flooding instances, such as flood maps, telemetric rainfall stations, telemetric water level stations, flood warning boards, flood sirens, weather radar, satellites, and real-time flood forecasting warning system (Center for Public Policy Studies, 2015). Referring to Hyogo Framework for Action (2005-2015), priority action 2: identify, assess and monitor disaster risk and enhance early warning is one out of five priorities that been highlighted to map and well plan for better disaster plan.

Consequently, early warning system is one important factor in the management of disasters, especially floods. The importance of early warning system are to monitoring of rainfall and river flows that may lead to flooding, to predicting of flood severity and the time of onset of particular level of flooding, to interpretation of the prediction to determine the likely flood impacts on the community, to construction of warning messages describing what is happening and will happen, the expected impact and what actions should be taken, to dissemination of warning messages, to response to the warning by agencies involved and community members and to review of the warning system after flood events (Paridah, 2014).

Rescue operations in the collapse of man-made structures such as bridges, buildings and natural disasters such as earthquakes, landslides in various parts of the world, have involved the use of canines as a way to detect victims. However, major weakness in the use of canine is that it cannot work independently, and require assistance (dependent) of humans (Geetha & Dr., 2015). Thus, the **human sensor** is also a major factor that is play as important role in disaster operations.

The human sensor as highlighted in this article points to the reliability of person(s) to predict what will happen, how deep it (flood level) will be, what preparations are required, what action/plan to be executed, who will be involved and any related questions that seek for answers in managing the flood. In addition, the human sensor is also very important because many-a-time, the existing systems are flawed and inaccurate in its rainfall reading. Hence, human experience needed to be consulted (Mokhtar, 2016).

Governance Structure

Disaster operations require a leader to be in charge to manage and be responsible for activities before, during and after the disaster. Denis (2015), emphasized the importance and necessity of effective leadership in emergency management system. Accordingly, the NSC Directive 20 have assigned leader(s) that will lead the activities in the disaster operation as outlined in its SOP. A good leader will take a lead and be responsible for the proactive and reactive generic plan in prevention, preparedness, and, response and recovery process. Thus, in his (Denis, 2015) study, a theory of **transformational leadership** was proposed that fosters systemic collaboration, strengthens emergency prevention, preparedness, response and recovery, and encourage proactive strategies in facing the threat of an emergency.

Transformational leader is a leader who engage and motivate professionals and communities to integrate their efforts will lead to increased systemic in emergency management (Denis, 2015). Hasan, (2010) his thesis, wrote that transformational leadership is a blend of mutual encouragement that converts followers into leaders and possibly, leader into moral agent. Thus, the leader plays an important role in the operation of a disaster management especially on search and rescue as the characteristics can vary according to the circumstances in which it possibly of victim who have experienced on the disaster. This is because the knowledge, skills and experience existing in the victim allow it be used as a guideline to help manage disasters such as flood.

FINDINGS

With regards to formal and informal governance, authority and leadership, the research has interviewed three main personalities involved in the 2014 flood disaster: The District Officer of Kemaman, the Assemblyman of Air Putih, Kemaman and Person in-charge in managing the flood situation in Kemaman. Interviews were conducted at their formal workplace while more discussion and questions took place at incident sites.

Observation method was used to gain better understanding the scenario of Kemaman flood management. Several selected places including the site of where the flood started, the Kemaman District and Land Office where river water level is monitored, the evacuation center and the flood watershed.

Besides the interview and observation, document study on the SOP for flood management and the best practices in managing flood by the Land and District of Kemaman was conducted. Then, this paper seeks to explain the implementation of the SOP and any related practices that are used in Kemaman, Terengganu. The suggestions from Kemaman will be use as references and knowledges sharing for the future affect flood areas in managing the flood operation before the disaster. A disaster management system used by District and Land Office was presented to show the collaboration among the agencies involved during disaster and how it was used to update on the current information regarding the disaster in Kemaman as well as all the information about the residents in district of Kemaman.

Planning and Preparation at District Area

Directive No. 20 has helped Kemaman to plan for a better strategy in dealing with the three stages of flood - before, during and after. This paper focused on the first stage which is planning before a flood hits. Kemaman District Disaster Management meeting was carried out to develop main committee and the Head of sector to align all agencies involve at Operational Room and to collect logistic data as well as development of Flood Disaster Committee which involve the Villages Community Committee. On top of that, the authority will ensure all the supply of daily necessities are sufficient for 7 days such as food, toothpaste including the asset such as engine boats, lorry, mobile toilet is well prepared and delivered early at evacuation centers and designated areas. Safety training and disaster management simulations was

carried out to the agencies and among the leader of residential involve in order to make sure they are well prepared to face the unexpected opportunities.

Kemaman also has prepared a specific and strategic evacuation center at Kampung Air Putih which is located at a high ground within the district and considered as a safe area. The center, in preparation of the flood has been prepped to accommodate 3000 victims. Supplies of food, clean water, and other sanitary goods are prepared in advance. Other form of aids such as tents and blankets are on standby to be allocated according to family.

Leader at the evacuation center was tasked with monitoring of activities which was pre-planned during the pre-disaster stage to ensure its alignment to the SOP and PTO used. However, according to the Assistant District Officer at the Land and District Office, the main issues was in ensuring the SOP and PTO are well carried out by the person in-charge during the flood. Besides, the SOP and PTO might not support some unexpected issues arising during the disaster, such as continuous increase of the water level (which may compromise the safety of the center) that may require spontaneous decision-making.

A Flood Management Systems

Several factors have significantly contributed to the effectiveness of flood management in Kemaman. One of the primary factors highlighted by the district officer, was the use of Flood Management Systems that are placed and was under the control and custody of the Kemaman District and Land Office.

The system, named, District of Kemaman Integrated Flood Disaster Management Portal, is a complete system which was developed by the Communications and Multimedia Commission (MCMC). The system consists of a utility which allow the Kemaman residents to pre-registered their and their family members' information such as name, address, telephone number for the purpose of management and preparation of evacuation center, locating victims and preparation of food supply after floods. This information has facilitated many parties in managing and controlling the evacuation during floods and at the same time, in monitoring of family members who have lost contact during the flood.

Apart from that, the authorities had set up Flood Insurance Protection Scheme which allows victims (based on the pre-registered details to the system) to receive compensation up to RM1000 with premium payments as low as RM70 to all residents who are prone to flood (Astro Awani, 2015). This insurance will be arranged after the disaster, in which all registered residents, will receive monetary compensation to reduce the burden resulting from the flood.

The system maintains a list the various evacuation centers stating details such as its capacity, assemblage of necessities and food, with the inclusion of the list of goods and quantity as well as stating the availability of helipad crucial for the operation of disaster agencies involved, (including firefighters, police and army) to facilitate the distribution of food and supplies as well as rescue. It is also able to list the names of the organizations that provide the food and supplies for the victims either the Government, NGOs or private companies. Apart from that, the system was able to obtain GPS data from the camera located at selected locations to help predict impending disaster. However, the system is not capable to identify roads that can be use as evacuation route due to the fast increase of water level.

Clear Authority and Leadership

Besides having a good computerized system, good leadership is also one of the factors that has positive influence in flood management in Kemaman. It is an advantage to have a leader that have good background and knowledge regarding flood and able to understand the scenarios of the disaster. The leader may know and understand from the rainfall rates to the increasing water level and a good mapping of river overflow to the main road in monitoring the situation of the flood.

The operational leader is very important in ensuring the need of people, during disaster such as evacuation centers, depository of food and supplies are well planned. Leader should have the background and knowledge of the flood disaster since the flood disaster is a critical process that required discipline and agility in managing the flood through the history and experience of dealing with the phenomena (Boehm & Turner, 2004). Hence, leader should be someone who can be categorized as "Transformational Leader" to react and adapt, to take the advantages of unexpected opportunities accordingly (Boehm & Turner, 2004) to the level of flood hits. Kemaman has practiced this by involving the local people who had experienced in managing the flood and taking the responsibilities by instructing the daily operation activities. Since the local people widely understand flood situation and serious extent to which it would be dangerous based on the experienced, the search and rescue activities are more organized and manageable.

Community-based and Culture

One of the strategy used by the District and Land Office of Kemaman in disseminating flood-related information to the community is to include head of village in the flood management activities. Head of villages are invited to pre-disaster activities that may include briefing on flood disaster, and also joining the preparation activities in the conducted at the village or residential level. Some of the information passed to the head of village during the briefing include the portal used in the flood management, which was developed by MCMC, the planning and preparation activities that District and Land Office had planned for the community.

Head of village is also required to be involved in evacuation center activities and this help the flood management activities easier to be governed as the head know the resident better and information can be relayed faster and easier. Selected head of village plays a key role in ensuring their people safe from disaster and to get sufficient supplies before, during and after the flood. The establishment of Village Community Committee which consists of residents of flood-free area can be seen as a good move because indirectly it can help victims or potential victims respond to disasters (Wan, Nor & Mohammad, 2015). Flood simulation, such as the rescuing the flood victims in the water, training for those involved to assist the process when the floods hit, and other flood management campaigns, help expose and prepare flood community member to undergo the disaster. Thus, minimizing the impact and promoting better relief for the disaster.

However, community involvement with a clear role are not fully implemented throughout Malaysia and in most countries. New Zealand, on the other hand, has set a good example which could serve as reference for other countries to follow. New Zealand has defined clear roles for community involvement in its National Disaster Plan (Murali, Magiswary, Saravanan, & Maniam, 2014).

From the Kemaman experience, three factors in managing flood had been identified as factors that have brought about positive outcome (reduce disaster impact and promotes better relief). They are discussed as follow:

• **Communication**

A good communication can reduce the possibility of hazard from becoming a disaster (Magiswary, Murali, & Maniam, 2014). Among the important information conveyed during a disaster is warning of upcoming hazard or threat, which should be delivered immediately to the population at risk (Magiswary, Murali, & Maniam, 2014). The simplest way to do so, is by using Short Messaging System (SMS). However, the issues are who are responsible to transmit and acting out on the information to be delivered to the possible victims.

The used of SMS to deliver information to the possible victims are being used in the case in Air Putih, Kemaman, where Assemblyman of Air Putih, took the responsibilities to distrib-

ute the upcoming disaster information to the population at risk by using local dialects. The use of the common language (dialects) was an important element to convey the precise and correct meaning (of a message) to the victims. This is turn, partly contributed to the reduction of casualty and damage cause by the disaster.

Instead of using the medium of communication that are understood only by certain people or local authority, the local dialect is easiest means understood by the majority of the affected community members. The used of labeling such as "Green line = Safe level, Yellow line = Alert level, and Red line = Danger level" to deliver information to the possible victims on the danger level of the flood are wasted since the resident did not understand the labeling concept. (This was also partly due to the lack of training provided to the community with regards to labels used by the authorities). Information pertaining to status of flood and road closures were communicated to the flood community using the local dialects.

• Collaboration

The collaboration between all the stakeholders in managing the flood that hit Kemaman through the District of Kemaman Integrated Flood Disaster Management Portal is another key factor that led to successful management of the flood operation. Flood agencies, victim and management team are collaborated through the use of the system. The specialized flood portal provided information regarding the number of victim, details of Non-Government Organization (NGO) and private company which are crucial to provide assistance and support (such as foods, counseling, moral supports and other related supports) to the victims.

• Coordination

Flood management require a systematic coordination among the people, planning, and process. All the aspect must be seriously addressed in making sure the activities of search and rescue, and the entire activities are well carried out. Coordinating are the biggest issues that need serious attention where in Kemaman, all agencies involve in managing the flood should be based at the Land and District Office that also serve as Center of District Disaster Management (CDDM) during the flood. All the operations activities must go through the authorized officer stationed at CDDM.

On top of that, Kemaman had practices Individual Management Victim, where the focus is to bring out ailing person, disable person (OKU), pregnant women or people living far away from the more populous areas to the evacuation centers first before addressing the others based on the information key in by the resident through the portal.

CONCLUSION

Learning from the success story of Flood Management in Kemaman, December 2014, the discussion above described all the relevant input that can be adopted by other districts prone to flood. Factors highlighted in this paper were compared with the literature review in making sure that the point discussed are within the scope of the field of the study. Planning and preparation, flood management system, clear authority and leadership and community-based and culture are the main issues found during the interview and discussion session with all the person involve in managing flood in Kemaman. On top of that, the observation and document study were carried out to strengthen the findings of discussions.

Conclusively communication, collaboration, and coordination were identified as factors that have led to the success of Kemaman flood management The exploration regarding the practices of flood management in other areas, may help government, NGO and private organization to develop well SOP and PTO in managing the flood in details.

ACKNOWLEDGEMENT

We would like to express sincere appreciation to the Ministry of Education for the funding of this project under the Fundamental Research Grant Scheme (FRGS) and to the Land and District Office of Kemaman, Terengganu for providing information on the flood of December 2014.

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