

## **Disaster Management: Empirical Study of 2009 Jeddah Flood**

**Nabaz Nawzad Abdullah <sup>\*1</sup>, Masayu Binti Othman<sup>2</sup>**

<sup>1</sup> School of Law, Government and International Studies, Universiti Utara Malaysia  
11J002, DPP Maybank, UUM, 06010 Sintok, Kedah, Malaysia

<sup>2</sup> School of Law, Government and International Studies, Universiti Utara Malaysia  
11J002, DPP Maybank, UUM, 06010 Sintok, Kedah, Malaysia.

### **\*Corresponding Author:**

Nabaz Nawzad Abdullah

**Email:** [nabaz4u@yahoo.com](mailto:nabaz4u@yahoo.com)

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**Abstract:** Jeddah flood was one the most catastrophic natural disaster in the history of Saudi Arabia which resulted in the death of more than one hundred people. This study intends to identify the significance of disaster management and the mechanism to help government in order to mitigate hazards. It also aims to define the factors and challenges that defied Saudi authorities to fail in managing 2009 Jeddah flooding. The study found that due to the lack of disaster management policy, urban settlement, precaution, preparation, mitigation, preparedness, disaster relief plan, disaster recovery plan, corruption and organizational behavior, the side effects of the flood was larger than the scale of the disaster. The study concluded that Saudi government is the lack of clear policy and technology to deal with natural disaster.

**Keywords:** Disaster management, Jeddah, flooding, Saudi Arabia, natural disaster, preparedness

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### **INTRODUCTION**

More recently, natural disasters have become a global issue [1]. Due to the climate change and global warming, the number of natural hazards has increased. The countries that have rarely struck by natural hazards, now seriously affected and according to the World Health Organization [2] more than 3.4 million death in the last two decades for that reason. The death toll is also very high during the period of 2004 to 2013. According to the International Federation of Red Cross and Red Crescent Societies (IFRC) almost of 97,954 died per year since 2004. The effect on vulnerable groups and poor population is higher compare to other social groups and it is also difficult for them to sharply recover. Thus, it is very important for governments to prepare a mechanism to minimize the damages of such disasters.

Disaster alone means the devastating and unexpected event which sometimes happens outside of human control [3]. Gunn [4] defines disaster as the consequence of the major ecological breakdown that marks environmental as well as social-economic changes [4]. Disaster could also be defined in relationship to science. Disaster is explained as the science to manage the trends and movements which need to be mitigated so as to minimize its negative effects on human lives and the environment. Al-Dahash, Kulatunga, and Amartunga [5]; Abulnur [6] classified

disaster into natural and human disaster. The human caused disaster is defined as a disaster that results from laxity and mistakes of individuals or the system [7]. Man-made disaster might also happen due to the misappropriation of technology or social conflict. Human activities could be a major contributor in causing pollution and global warming, which then causes natural disaster. However, it is still called natural disasters. A natural disaster could be an earthquake, volcano eruption, floods, hurricanes, cyclone, damaging houses and sinking agricultural sides. Natural disaster creates exacerbate the situation in which needs to deal with through prevention, mitigation, management and control. Such activities are known as disaster management. According to WCPT [8] disaster management is managing and organizing available resources to deal with the natural phenomenon of disaster before, during, and after happening so as to lessen the side effects.

Maybe natural disaster more likely happens in some parts of the world such as Asian and Pacific regions. According to Pady and Habibullah [9], the average of 33 percent of all natural disaster happening is in Asia and Pacific region comparing to Middle East and North Africa which is only 4 percent. The frequent happening of natural disaster makes people in those regions to be more experienced and more professional in dealing with natural incidents. However, it does not

mean the countries that rarely experience natural disaster to underestimate the impacts, but they need to use necessary resources to deal with any occurrences. Saudi Arabia is one of the countries in the Middle East that recently struck by series natural disasters. The most intense and hazardous natural disaster ever happened in Saudi Arabia was in November 2009 when the Saudi coastline city of Jeddah on the Red Sea flooded which was later known as “the Black Wednesday”. It’s the largest city in the country and it’s the gate of the two Holy Mosques and the leading way to the pilgrimages who visits the holy land of Mecca and Medina. Economically, for the strategic location of Jeddah, the city is characterized as the gateway of international trade. The 2009 flood was due to intense rainfall and left harmful impacts on the city. According to the official reports this catastrophic flooding caused the death of 121 people and about 30 people missed. Moreover, the government compensation to the long installation of facilities’ estimated to 5.1 billion Riyals, and 10913 cars have been damaged and many buildings and residential areas collapsed and epidemics have emerged. Further, many villages were completely floated by the effect of large amounts of running water and sediments. Hence, the government provided shelter for 26,711 people in furnished apartment plus the substances that has been provided to 8 thousand families [10]. The hazardous impacts of the disaster left mental disorders among affected citizens. Due to the lack of government control and security, looting cars and equipment has been widespread and homes were evacuated [11]. If comparing the scale of the flood and damages, there will be a doubt on the success of Saudi officials in managing the incident with all the capacities they had. In this study, we intend to identify the importance of disaster management in accordance to the 2009 Judah flood. We evaluate the role of a government institution and obstacles they had in sorting out the Black Wednesday. This study also overview the issue of corruption and the lack of precaution, reports, studies and to lower the impacts.

## LITRERATURE REVIEW

Disaster management encompassed certain phases and scales that requires a different intervention by the government and humanitarian organization. For instance, Lechat [22] and UNDP [23] demonstrates that disaster management is an integrated approach in which requires different kinds of intervention. Similarly, YOJANA [12] portrayed disaster management as a multi-disciplinary area encompasses disaster forecasting, warning, search and rescue, relief, reconstruction and rehabilitation. The impacts of disaster could be very high if the government fails to respond properly; in contrast, it could be very low if public administrators empowered to deal with emergencies. Countries to deal with natural disasters need to be prepared in all aspects. If the country has enough trained and skilled personals, it possibly helps

to lessen the impacts of natural hazards. Thayparan et al, [1] and IDKN [24] in their studies found a positive relationship between disaster management and education. So, educating officials and those who are responsible in dealing with natural disaster is very effective. Thayparan et al. [1] and IDKN[24] arguing that higher education is an essential tool in empowering individuals with knowledge, skills and experiences and training personnel to better respond challenges of natural disaster. Pena-Mora [13] on the same issue indicates that higher education helps professionals to get information on how to cope with disasters, and that helps them to define a proper mechanism to handle natural incidents [13].

In the developed countries the environment is much friendlier to manage disasters and the casualties are always less compared to developing countries [14]. It is due to the financial limitation and poor managerial system in developing nations as explained by Ritchie (2004). He asserts that the availability of modern technology or experiences they have in managing disasters. The author also argues that developed countries can recover faster from hazards. The main reason for this as explained by Venter and Waldt [15] is because of the presence of various measures of risk managements such as insurance, capacity of public administrators, technology, early warning system, first aid, and better infrastructure. In contrast, developing countries are lack of early warning system; they are suffering from ineffective mitigation programs. Lucini et al. [16] arguing that disaster is happening more in the countries that are not ready to respond and fail to take necessary steps in order to prevent or to reduce the impacts.

Annelise Venter, Gerrit Van der Waldt, [15] identified the importance of the organizational behavior in disaster management. The authors asserted that when the sense of voluntary increases within the organization and the rescue team are ready to take risks to protect lives, impacts of disaster will probably become less. The emergence of such behavior within organizations maximizes the efficiency and effectiveness of the organization and their challenges and risks would be honored by communities.

According to the Federal Emergency Management Agency disaster management could be classified into four steps, including disaster prevention, disaster preparedness, disaster relief, and disaster recovery. It could also explain based on the period of the incident into pre and post disaster management or as Momani and Fadil [11] call them disaster precaution and disaster preparation. Each of the types requiring different resources and different plans. In pre-disaster management stage, state is mobilizing its resources, human capital, taking all the necessary steps to prevent, mitigate and prepare to handle disaster [6]. However,

the post disaster referred to the relief and recovering stage mainly to restore citizens in the normal life.

Disaster prevention is a method that has been used by some authors. Actually, one of the key objectives in disaster management is to prevent it from happening. The government institutions must regulate a framework to eliminate the possibility of occurring. For instance, when the government uses scientific methods, it could be easy to spot the time of occurring natural disasters especially the flood and earthquakes. Recently, due to the advancement of technology and the use of scientific methods, natural disasters could easily be forecasted [6]. The government in this case may erect levees and dams to prevent the effects of flooding or through the evacuation plans, environmental planning and mitigation, disaster resilience, and formulating a guideline for reducing the causes of disaster by providing medical care to treat any health issues caused by disaster such as epidemic and emotional distress. Therefore, the facts indicating that not all natural disasters could be prevented. According to the United Nations Disaster Relief Organization the use of "prevention" for a natural disaster is incorrect since they believe natural disaster could not be prevented but mitigated[21]. Mitigation means activities to reduce damage or losses and the improvement of preparedness and management. It has to be interdisciplinary spanning and covers all the sectors of development to be attracted by policy makers to minimize the impacts, particularly in the poorest areas where damages are possibly higher [12]. Venter and Waldt [15] argued that improvement of disaster management ensures the realization of the factors of disaster and it risks through the employment of professional consciousness and the intervention of administrative agencies to define the risks and mechanism to manage it. In addition to that, Venter and Waldt [15] cited in the work of Rosenthal et al that technological advancement facilitates rescue operations and provides crucial resources to mitigate the effects of natural disasters and supplying emergency assistance such as sudden procurement and shipment of food and the establishment of the warehouses for emergency food stock.

Disaster preparedness is another method that needs to be mitigated to lessen the dimension of the damages and casualties that might be resulted from the disaster such as moving people from the disaster location to the safe area through the use of effective means to rescue, relief and rehabilitations in the timely and effective manner. The management of community based alertness should be taken as priority to manage disasters. This step is significant since it can minimize fear, anxiety and losses. Ronald W. Perry and Alvin H. Mushkatel [17] long time ago claimed in their book that this step could encounter two major problems which are the designer and the execution of the evacuation warning system to preserve the life of families and relocating them. The authors highlighted the issue of

warning message to the citizens and the mechanism to deliver the message to the citizens in order to keep themselves far from affected areas and managing them to the safe area [17]. Also, when the government expecting disaster, they will be able to move people to the safe destination and even to move their properties and materials. That decreases the human casualties and makes the process of recovery much easier.

The period between forecasted disaster and happening disaster could be very critical. Officials that deal with natural disasters may warn the population to evacuate their places [6]. The responds of officials must be quick. Therefore, they may also have strategically planned, if natural disasters likely happen frequently. For instance, countries that have more floods like Thailand, Indonesia, and Malaysia, may improve the sewage system as well plant more trees and build more dams to minimize the effects of floods or improving, apartments and houses materials in the countries where earth quick more likely to happen such as Japan.

Disaster relief is another method to reduce the effects of natural hazards after occurring. In this stage certain activities should be performed in accordance with government as well as agencies to minimize the effects of disaster, including rescue, relocation, allocating food and clean water, minimizing disaster impacts and supporting disables, reconstructing telecommunication and transporting channels, providing adequate shelter and health care to the victims. However, Michael Hopmeier, President of Unconventional Concepts, Inc., addressed in the North Atlantic Treaty Organization (NATO) workshop in 2005 that providing medical services and health care during disaster does not make sense, but policy makers should utilize their resources and experiences to respond natural hazards. This could be achieved with commands of good leadership, commanded military fashion and trained military personals [18].

The last stage of disaster management could be recovered through the application of some mechanism to restore people to the normal life, rebuild and reconstruct affected buildings, houses, and providing basic services. This stage also includes activities that performed by policy makers to provide construction, rehabilitation and development of affected people and areas [6]. Actually, recovery stage is challenging for the government, but it could be easier and very effective in the presence of the good governance system. Nonetheless, it should be linked to proper innovation, technology deployment and a good education system, and then the impacts of disaster could successfully diminish[20]. Moreover, disaster recovery requires providing excellent healthcare and maintaining development strategies to promote human resource, building schools and hospitals and conducting researches and studies to find out the results as well as

the impacts of the disaster in order to provide better policy for the future.

#### **SOURCE OF DATA**

This study mainly relies on the secondary data that has been received from secondary sources and previous works. Using secondary data is due to the difficulties of getting the real data from officials. So, the study finds important to rely on the secondary sources which somehow more accurate and effective in completing this study. For the data on the number of casualties and damages that caused by the flood, we received from several sources including the news channels, and some organizations. This study also relies on the interviews and works that has been done previously by other scholars and channels such as [10, 11, 19] where they observed and evaluate the situation. In this study, we provided our interpretation through the use of their data, and we come out with our finding and recommendations.

#### **RESULTS AND DISCUSSION**

The findings of this study indicate that the lack of mitigation and endemic corruption aggravated the problem and increased casualties. The report by the Arab News [19] indicates that more than 4 million people in Jeddah don't have sewage and treatment facility.

During the 2009 flood, the government of Saudi Arabia was unable to properly safe its citizens; instead the government criticized victims for breaching government orders. The senior government officials were lack of expertise in disaster management, so they were unable to deal with the situation.

The study found that the infrastructure and houses were built in unplanned areas where drains blocked. Also, several houses were built illegally in the place where the disaster occurred and some buildings were flouted and make others to collapse. It also discovered that more than 4 million people in Jeddah don't have sewage and treatment facilities. The drain system was entirely blocked with wastes and sands. Al Saud [10] emphasizes natural disaster impacts is higher in the areas where human activities are developed. He also maintained that identification of the methods of water flows through draining networks that the source of flooded water could be determined. He maintains that the draining system should have to be assessed, therefore the government failed to do so [10]. Additionally, no prior technology has been used for inspection and evaluation of draining the system. Momani and Fadil [11] cited from consulting engineer Nizar Abdullah and he relates the flooding to the failure of government in maintaining the floodplain and drainage channels. Abdullah has no doubt that if it was in the proper condition, the disaster might not happen in the first place. Another Saudi Arabian consulting

engineer Zaki Farsi highlight that only 8 percent of the city was covered by the sewer system. So, the inspection and installation of the sewer system can help the water to easily and quickly get away and it ensures the safety of the draining system.

On the other hands, the study initiated that the Saudi government failed to implement proper disaster relief plan. The Arab News relates the failure of government to the lack of regulation, inspection, incompetence, lack of skills and professions, complexity of operation and plan. The rescue operation was also unsuccessful. Clearly, one of the failures of the government agencies and rescue operations was the lack of coordination, command and control. According to Arab news, despite the failure of the government agencies to practice disaster relief, the same scenario was duplicated in 2010 Jeddah flood.

One of the ways to manage disaster is the number trainees' staff to deal with the hazards and the behavior of the organization as explained in the literature, but during the time of Jeddah flooding, the number of police, emergency staffs, and military were busy with pilgrimages and border tensions with Hauthis in Yemen. So, the government was unable to mobilize its forces to assist victims [11].

#### **DIRECTION FOR FUTURE STUDIES**

As the result finds several factors that contribute to the failure of the government agencies to deal with Jeddah flooding of 2009. There are several gaps to be studied in order to manage the future disasters that Saudi Arabia may challenge. The main research area that should be improved could be the quality of the investment projects and developing sewer system. Further studies can be done to examine the failure of Saudi Arabian policy makers in overcoming disaster related problems and the lack of precaution and preparation for natural hazards.

#### **CONCLUSION AND RECOMMENDATIONS**

Natural disaster management has become a fundamental issue for some country. It requires proper engagement of policy makers to formulate a policy and preparation that could be effective at anytime that natural disaster expected. Disaster management needs human and capital resources to be mitigated. For that countries need to provide a fund for emergencies that could happen at any moment. This study also concluded that the government of Saudi Arabia was failed to deal with 2009 Jeddah flood. The incident was understated by Saudi officials. Surprisingly, the people, especially the poor and vulnerable communities were blamed by officials while they were traumatized by the disaster. The 2009 flood was higher in underdeveloped neighborhood due to the poor sewage system. As the result of the flood and carelessness of the Saudi officials, more than one hundred lives lost. This paper

concludes that the lack of mitigation, the lack of precaution, disaster preparation, organizational behavior, corruption, poor sewage system, and leadership commands are among the major factors of 2009 Jeddah flood. Lastly, the following recommendations could be very significant for policy makers in disaster management:

- i. Review and identifying government failure, shortcoming and regulations that deployed in the past to enforce successful future plan through the development of awareness program to prevent the danger flooding.
- ii. Policy makers should formulate proper plans, preparedness awareness and mitigation measures to lessen the consequences of natural disaster in the future.
- iii. Empowers the role of citizens and developing organizational behavior.
- iv. Establishing counter corruption institution to review all the tenders and contract between local authorities and investors and monitor the implementation and the quality of the projects.
- v. Check and balance in the implementation of the projects and evaluating through the use of quality control to ensure contractors using good quality and right quantity of materials.
- vi. The new drainage-oriented schemes should be in place to ensure that that no catastrophic natural disaster happens.
- vii. Install or fixed flood prevention schemes.
- viii. Establishing natural disaster prevention committee to mitigate and manage the risk of natural disaster.
- ix. Improving early warning system.

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