
TECHNICAL NOTE

COMMON ISSUES IN POST-DISASTER RECONSTRUCTION

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Abstract: This paper examines the types, degrees and effects of disaster, presents the phases in post-disaster response, and describes the issues arisen during post-disaster reconstruction phase. Disasters considered in this paper are only the ones that had caused great loss in terms of human lives and facilities. These conditions require well-coordinated works in the reconstruction process. There are many issues arise in the reconstruction process, ranging from operational, personnel, ethical, and funding issues. The main purpose of the paper is to identify the problems commonly occurred in the post-disaster reconstruction for various types of disaster. This study is carried out as a basis or as an initial step to develop a framework, method, and technologies to improve efficiency and effectiveness of post-disaster project. The method of this study comprises literature review from other researches in post-disaster reconstruction.

Keywords: *Disaster, post-disaster, reconstruction*

1.0 Introduction

The word disaster means a devastating and unexpected experience. A disaster could result in thousands of people being homeless, substantial economic and social misfortune, or even death. There is no standard in categorizing a disaster. However, scientists classify disasters into two main groups, namely natural disaster and man-made disaster. These classifications can be found in Disaster Management No. 24 (ISDR Disaster Management Act, 2010). According to this reference, natural disaster is a disaster caused by an event or a series of events induced by natural phenomena. This includes earthquakes, tsunamis, volcanic eruptions, floods, droughts, hurricanes, and landslides. On the other hand, in man-made disaster, the events are induced by human negligence or mistakes such as failure of technology, failure of modernization, and outbreaks of diseases.

Disasters bring the excessive damages therefore the challenge is to get the life of the affected people back to normal. In post-disaster reconstruction, facilities and infrastructures required for the victims are reconstructed. As a result, reconstruction becomes an essential phase in post-disaster remedial process.

Many issues have been identified in post-disaster reconstruction project, starting from operational, personnel, ethical, funding issues, etc. This study will explore those issues with the aim to help others to develop new methods and technologies to address the issues.

This paper will present various types of disasters along with the classifications, and followed by their effects. The effect of disasters will be classified based on the types of disasters. Then, the paper will discuss post-disaster reconstruction hence the common issues will be explained in more details. In the conclusion, the common issues will be summarized.

2.0 Types, Degrees and Effects of Disasters

2.1 Types of Disasters

There are different types of disasters. Certain types of natural disaster are more likely to occur in different part of the world. For instance, earthquakes which mostly happens in the area where tectonic plate fault present, whilst hurricanes can only occur at the area adjacent to the sea. Another example is major volcanic eruption which can only happen in area with high volcanic activity. With the current technology, some of the disasters can be predicted while some others cannot. Examples of possible disasters that can be predicted are storms and floods. In contrast, disasters like epidemic and earthquake are unpredictable.

Table 1 show few examples of recent disasters which had happened during the last 10 years. From the table, it can be seen that Asia and America are two continents which hit by large scale disasters frequently. Due to relatively higher population and larger area of these two continents therefore the risk of human lives loss and damages during disasters become prominent.

According to the World Bank report (2010), the principal categories of disasters are also divided into 2 types, which are natural and technological disasters. Thereupon it is divided into 5 subcategories, i.e; biological, geophysical, hydrological, meteorological, and climatological. From figure 1 below, it can be seen that biological can be group into man-made disasters. Whereas geophysical, hydrological, meteorological, and climatological can be grouped into natural disasters.

Although there is no direct relation to large scale disaster, global warming is considered as one of the most devastating disaster. Global warming leads the ice at the North Pole and South Pole to rapidly melt. This, in turn will lead to the increase of sea water level. Significant increase in sea water level will affect people in the whole world. Scientist

also assess that the global warming as a cause of extreme weather that has been felt by the people of the world in the last period of time.

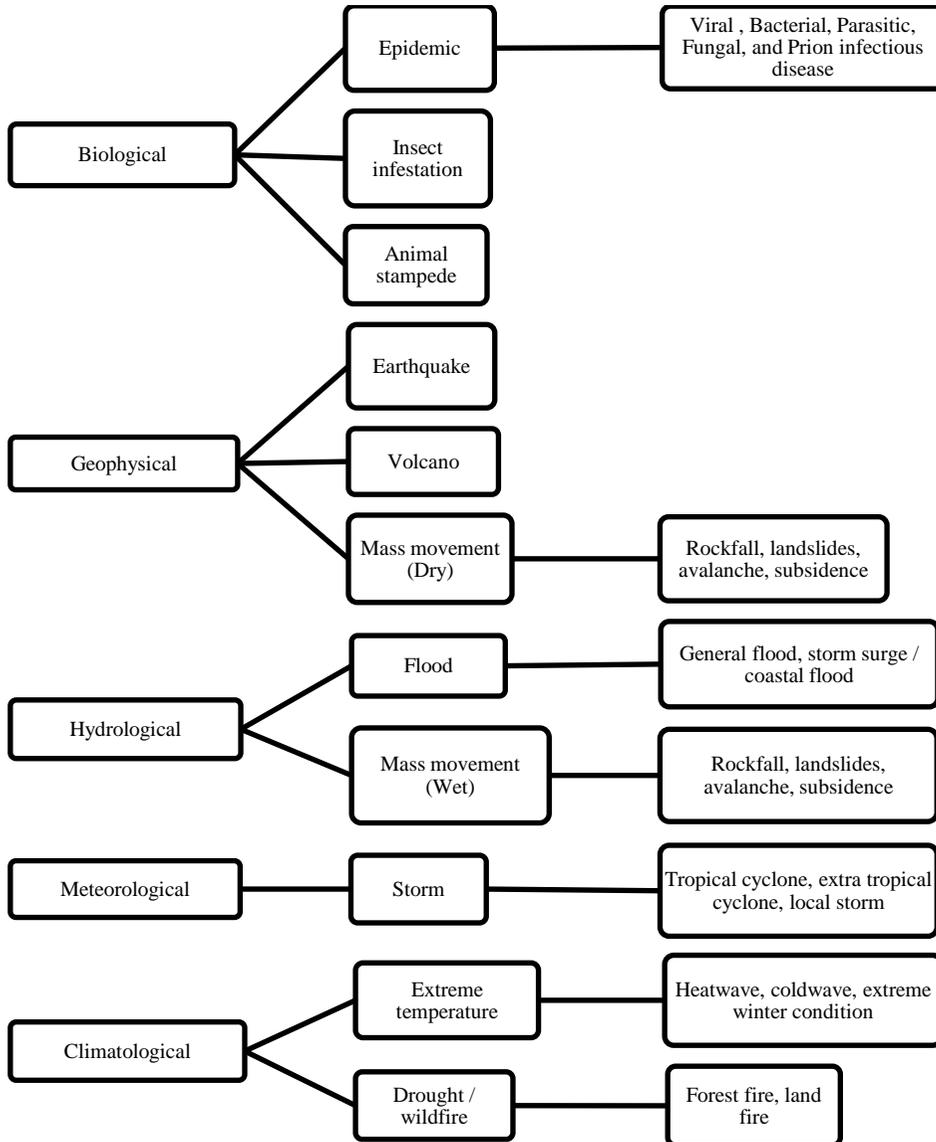


Figure 1: Disaster categories (The World Bank, 2010)

Table 1: Types of disasters during the last 10 years

No	Type of Disasters	Year	Country	
1	Hurricane	2005	United States (Katrina)	Natural Disaster
		2011	United States (Irene)	
2	Earthquakes	2008	China	
		2011	Japan	
3	Tsunami	2004	Indonesia	
		2011	Japan	
4	Flood	2010	Pakistan	
		2012	Sri Lanka	
5	Landslides	2012	Sri Lanka	
1	Epidemics	2003	Singapore (SARS)	
		2009	United States (Swine Flu)	
		2011	Japan	
		2010	Gulf of Mexico (Oil spill)	
4	Fire outbreak	2009	United States (California)	

2.2 Degrees of Disasters

Another important classification of disaster is degree or scope of disasters. For this classification, Gad-el-Hak (2008) indicated that the scope of a disaster can be classified based on two categories. First category is the number of people that are displaced, tormented, injured, and killed. The second category is the area that is adversely affected in the event of disasters. This classification can be seen in the following table.

Table 2: Disaster scope according to number of casualties and geographic area affected

Scope	Disaster Category	Number of Casualties or the Area Affected
I	Small	Less than 10 persons or less than 1 km ²
II	Medium	10-100 persons or 1-10 km ²
III	Large	100-1,000 persons or 10-100 km ²
IV	Enormous	1,000-10,000 persons or 100-1,000 km ²
V	Gargantuan	More than 10,000 persons or more than 1,000 km ²

(Source: Gad-el-Hak, 2008)

According to EERI Earthquake Special Report (2005), the fatalities in Sumatra earthquake were about 294,533 deaths and based on CRS Report for Congress (2005), the affected area hit by Hurricane Katrina was about 711,698 km². Refer to table 2 above, it can be seen that Sumatra earthquake 2004 and Hurricane Katrina 2005 are classified as gargantuan or large scale disasters.

2.3 Effects of Disasters

Each type of disasters has different impact to the people. For instance, earthquake caused damage to houses, buildings, and infrastructures whilst the damage caused by volcanic eruption may not be as severe as the damage caused in the event of earthquake but it will still have major impact in terms of transportation and distribution of goods. Table 3 below presents more detail on the immediate effect of disasters. The table is important in order to identify which sectors to be prioritize in post-disaster reconstruction. It can be seen, among all facilities and infrastructures affected by the disasters, housing is hit with the most effect.

Table 3: Immediate Effect of Natural Disasters (Source: Otero and Marti, 1995)

Type of Effect	Earthquake	Cyclone	Flood	Tsunami	Volcanic Eruption	Fire
Loss of housing	x	x	x	x	x	x
Loss of industrial production	x	x	x	x		x
Loss of commerce	x	x	x	x		x
Damage to infrastructure	x	x	x	x		x
Disordered markets and distribution	x	x			x	
Interrupted transportation systems	x		x			
Breakdown communication	x	x	x	x		x

3.0 Post-disaster Response

As explained in the earlier passage, there are several phases in post-disaster response. According to researchers (Fengler et al., 2008; Brandon, 2011), the response is separated into three phases, namely: emergency, transition, and reconstruction. In emergency phase, the priority is to do relief effort such as food distribution, evacuation of victims, setting up emergency shelters and health facilities. The level of activities is high but the time is relatively short. Depends on the severity of the disasters, this phase may take several days, weeks, or a few months (Brandon, 2011). Most likely, this relief effort will be led by local and national government and military along with United Nation agencies (Fengler et al., 2008).

The second phase is the transition. According to Fengler et al. (2008) and Brandon (2011), this phase is the critical phase especially for the third phase, i.e. reconstruction phase. The reason is because in this phase, the initial preparation for the actual and full scale reconstruction is put in place. At the same time, relief effort is not fully completed. Therefore in this phase, there will be two tasks with different emphasis have to be done

concurrently. In many cases of post disaster response, the transition phase is poorly managed (Fengler *et al.*, 2008). This creates an unnecessary gap before the actual reconstruction phase.

Third phase is full scale reconstruction. In contrast to the emergency phase, the level of activities in reconstruction phase is relatively lower and the time frame is longer. The main activities in reconstruction phase are to rebuild all public facilities and infrastructures, and institutions in the affected area. The objective is to re-establish all aspects of life both individual and public, social and cultural rights, the enforcement of law, etc. The focus of work depends on the needs of the victims. For instance, in the aftermath of Indian Ocean tsunami 2004, the focus in India was re-establishing livelihoods whilst in Aceh was housing reconstruction (Fengler *et al.*, 2008). In the subsequent part of this paper, common issues in post disaster reconstruction will be discussed.

4.0 Issues in post-disaster reconstruction

Post-disaster reconstruction is a task with high complexity. In this phase, many complex issues in multi-dimensions have been dealt. Some of these issues are very common as they occur repeatedly in many post-disaster reconstruction projects. Many researchers have studied the issues in post-disaster reconstruction (McEntire, 1999; Skertchly 2001, Soliman and Rogge, 2002; Thomas and Kopczak, 2005; Rotimi *et al.*, 2006; Van Wassenhove, 2006; Maon *et al.*, 2009; Von Meding *et al.*, 2009; Ergum *et al.*, (2010); Chang *et al.*, 2011; Kulatunga, 2011; Day *et al.*, 2012; Sadiqi *et al.*, 2012). Although these researchers have studied the issues, they did not make any classification of each issue. This will lead to the difficulty in examining the issues in more detail. Especially when the number of issues found is increased and more complex. A good example of issues classification in post-disaster reconstruction can be found in the study by Altay (2008). Even though the main focus of his study is logistic issues, the idea of classification could be helpful to study the issues in more detail. In this paper, the issues in post-disaster reconstruction are categorized into 4 categories: operational, funding, personnel, and ethical issues.

4.1 Operational Issues

The main issue in operational is slow pace of reconstruction work. This is also the most common problem as highlighted by McEntire (1999), Skertchly (2001), Soliman and Rogge (2002), Thomas and Kopczak (2005), Rotimi *et al.*, (2006); Van Wassenhove (2006), Altay (2008), Maon *et al.* (2009), Von Meding *et al.* (2009), Chang *et al.* (2011), Kulatunga (2011), Day *et al.* (2012); and Sadiqi *et al.* (2012). This problem is understandable because in post-disaster reconstruction work one deals with a condition

where the demand is high, shorter timeframe, and the customer with high level of stress. Furthermore, reconstruction work is not a routine construction therefore the people involved in the work may need some time to be familiar with the situation.

Another issue is inadequate of technology as also stated in the paper of Thomas and Kopczak (2005), and Altay (2008). Mostly in the affected areas, the infrastructure and technology are not functional. Even for the basic technology such as telephone and internet. This condition has hindered the reconstruction process. The next issue is incomplete information and communication (McEntire, 1999; Altay, 2008; Kulatunga, 2011). In the reconstruction work, usually involve people with various backgrounds, cultures, and languages. Often, this condition will create barrier in communication that will result in necessary information to be missing. Consequently, it will cause a problem with the coordination.

Beside the backgrounds, cultures, and languages barriers, lack of coordination can also cause by high competition among major relief organizations in terms of obtaining fund and creating programs for the post-disaster reconstruction projects. Thus, this also resulted in the lack of collaboration between the members of the organization. This is also supported by Thomas and Kopczak (2005) said that although many of the organizations face the same challenges and know each other, or of each other, they do not often meet or talk to one another except during an actual disaster response operation. Lack or no accessibility is another problem. Damaged road as a result of disaster makes the cost higher and the time longer to deliver resources from one location to another. This was also highlighted in the study by McEntire (1999), Van Wassenhove (2006), and Chang *et al.* (2010).

Another issue is the lack of safety and security. This will become a significant issue when disaster happened in conflict area. In the conflict area, there will be additional cost to ensure the safety and security of the reconstruction operational work. However, it is not necessary in non-conflict area, security and safety is not an issue.

4.2 Funding issues

Van Wassenhove (2006), Altay (2008), Maon *et al.* (2009), Von Meding *et al.* (2009), Chang *et al.* (2011), Kulatunga (2011), and Day *et al.* (2012) discuss funding issues in their study. Mostly in the funding issue is lack of availability of fund. According to Van Wassenhove (2006), many people believe that the main issue holding back many relief organizations from better preparing disasters is the difficulty of finding funds for building capacity and capabilities for effective operations. Another issue in the funding is long procedure required to get financial support. This is normally because the funding comes from various sources, donors, etc. that requires high accountability. Another type of issue in funding albeit unlikely is uneven distribution of the funding. Uneven

distribution will lead to one organizations does not get sufficient financial support while others may have excess fund.

4.3 *Personnel issues*

The main issue is the lack of capable human resource availability. These topic was discussed in the study by McEntire (1999), Skertchly (2001), Thomas and Kopczak (2005), Ergun *et al.*, (2010), Rotimi *et al.* (2006), Van Wassenhove (2006), Maon *et al.* (2009), Chang *et al.* (2010), Kulatunga (2011), Day *et al.* (2012), and Sadiqi *et al.* (2012). Reconstruction work requires high demand of tasks often with high complexity. However, there are no availability of sufficient professionals and labours to fulfil the mandate. Therefore, it must be imported from other countries. In addition to the lack of human resource availability, the fact that there are multiple stakeholders is also a problem. The donors that provided fund for the project may come from different sources. Each one of them becomes the stakeholder of the project. The government and the local people is also the stakeholder. With their own needs and interests will result in complexities.

4.4 *Ethical issues*

With large amount of money involved in reconstruction projects, it is prone to discrimination and corruption. The discrimination problem most likely happen because there is a significant different between foreign worker and local worker in terms of salary, benefit, incentive and facilities.

5.0 **Conclusions**

Scientists classify disasters into two main groups, namely natural disaster and man-made disaster. In natural disasters includes earthquakes, tsunamis, volcanic eruptions, floods, droughts, hurricanes, and landslides whilst in man-made disaster, failure of technology, failure of modernization, and outbreaks of diseases. Disaster could result in thousands of people being homeless, substantial economic and social misfortune, or even death. Therefore, the challenge to restore people's lives back to normal is by doing post-disaster reconstruction.

Post disaster reconstruction involved multifarious tasks, wide range of skills and many stakeholders. Unlike in routine construction, the aim is to get higher profit in post-disaster reconstruction is to restore the lives of people affected by the disaster back to normal. Many problems encountered during the post-disaster reconstruction project. As explained in the passage earlier, this article outlines issues discovered that become

barriers to achieve effectiveness and efficiency in post disaster reconstruction. The issues are classified into 4 (four) categories, namely: operational, funding, personnel, and ethical issues.

Firstly, in operational issues, there are slow pace of reconstruction work, inadequate of technology, incomplete information and communication, lack of coordination, lack or no accessibility, and lack of safety and security. Secondly, in funding issues, there are lacks of availability of fund, long procedure required, uneven distribution of the funding, and excess fund. Thirdly, in personnel issues, there are lack of capable human resource availability, and multiple stakeholders. Lastly, ethical issues, there are discrimination and corruption. All these issues have the largest impact on the success of the reconstruction work. These could be interpreted as a future research direction in terms of mitigating or reducing the issues.

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