

Survey on Disaster Management in Developing Countries and Developed Countries

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Abstract--This paper focuses on social responsibility of governments in face with natural disasters, investment, control and decreasing Human and material losses of these disasters that its results will affect natural disaster management. In this paper disaster and disaster management are defined and then the infrastructure damage of different disasters is explained with some examples. A comparison is performed between the disaster management in a developing country and a developed country (Iran and Japan) based on their ability in services for managing disasters that shows the difference in losses and deaths.

Keywords- Disaster Management; Disaster; Tsunami; Disaster Preparation

I. INTRODUCTION

Disaster is a natural or man-made event which causes intensive negative impacts on people, goods, services and/or the environment, exceeding the affected community's capability to respond and Disaster management can be defined as the organization and management of resources and responsibilities for dealing with all humanitarian aspects of emergencies, in particular preparedness, response and recovery in order to lessen the impact of disasters.

Aim of disaster management is reducing the negative impact or consequences of adverse events. Disasters cannot always be prevented, but the adverse effects can be minimized. All communities are vulnerable to disasters, both natural and man-made. Increasing knowledge of disaster management will help to reduce this vulnerability and improving disaster responsiveness. Information that reaches the public on disasters has tended to focus on disasters of large magnitude, involving tremendous loss of life, property and infrastructure. This has helped create a public perception that disasters are comparatively rare. The dissociation of disasters from the normal has had serious consequences, in particular the mindset that normal development decisions on settlement, construction, production, trade and commerce can proceed without considering the hazards that they may create or disaster vulnerabilities that they may exacerbate.

More than half of disasters in the world occur in Asia, making this region the world's most vulnerable area.

Investment in disaster management infrastructure falls into two categories: (a) investment in infrastructure to support sustainable socioeconomic development; and (b) investment in infrastructure for reconstruction and recovery.

A study by the Asian Disaster Preparedness Center on the impact of the 2004 tsunami estimated infrastructure losses at about \$4 billion, about 70 per cent of total damage of \$5.6 billion. Disaster preparedness involves forecasting and taking precautionary measures prior to an imminent threat when advance warnings are possible. Preparedness planning improves the response to the effects of a disaster by organizing the delivery of timely and effective rescue, relief and assistance. Preparedness involves the development and regular testing of warning systems (linked to forecasting systems) and plans for evacuation or other measures to be taken during a disaster alert period to minimize potential loss of life and physical damage.

Based on existing resources and comparison that is performed between a disaster in Bam province in Iran and Tōhoku in Japan, a huge difference can be seen in disaster management and consequently, the mortality rate and losses in Developing countries and developed countries.

The remainder of the paper is organized as follows: Disaster and disaster management are defined in Section 2. In Section 3 physical infrastructures and damages of them in disasters are explained. Disaster preparedness is described in detail in Section 4. In Section 5, a comparison is performed between disaster management in Iran and Japan. A criterion for disaster management is given in section 6. Finally, conclusions are presented in Section 7.

II. DEFINITION

Any significant discussion of disaster management theories need to sketch out what exactly a disaster is, and what if anything human beings can do when one occurs. Like many issues relating to society and culture, a universal definition of a "disaster" tends to elude us, being instead contingent on the

particular attitudes and ideals of the day. Still, a disaster can be generally understood as "a natural or human-caused event, occurring with or without warning, causing or threatening death, injury or disease, damage to property, infrastructure or the environment, which exceeds the ability of the affected society to cope using only its own resources."

The above definition has certain consequences when we speak about "disaster management" because it implies that the particular area which is being affected does not have the ability to fight through the event on its own. For many, the memory of Hurricane Katrina, and its effects on New Orleans in 2005, evokes just that sort of destruction. It seemed that the whole of the city was engulfed in chaos, misery and death. It is in such situations that disaster management comes into play to minimize the disruption caused by the event, and in doing so protect life and property, and civilization itself. Disaster management therefore must always concern itself with analyzing potential threats, protecting against those threats, having contingency plans ready should threats materialize, and finally have a concrete plan or system in place to repair any damage sustained. This represents the standard theory of disaster management. Disaster management (DM) has attracted immense public interest at the national and international level.

Disaster management can be defined as a continuous and integrated process of planning, organizing, coordinating and implementing measures which are necessary or expedient for prevention of danger or threat of any disaster; mitigation or reduction of risk of any disaster or its severity or consequences; capacity building; preparedness to deal with any disaster; prompt response to any threatening disaster situation or disaster; assessing the severity or magnitude of effects of any disaster; evacuation, rescue and relief; and rehabilitation and reconstruction.

More than half of disasters in the world occur in Asia, making this region the world's most vulnerable area. Indian continent accounts for 24% of all disasters in Asia. 58.6% of India is prone to Earthquakes and 12% to river floods, affecting more than 1 million people every year. 7200 km out of 7516 km of Indian coastline is prone to cyclones and tsunami and 3% of landmass is vulnerable to landslides. Snow avalanches are frequent and drought occurs almost every alternate year. More than 80,000 people get killed in road accidents alone and India stands at number two position, after Iraq, in number of people who died due to terrorist related activities during 2008. There is no known disaster, natural or man-made, which is not taking place in India. Some of the reasons for increase in the frequency of natural disasters are population explosion, rapid and uncontrolled urbanization leading to mushrooming of not so well planned growth of cities, unplanned land use and global warming [1, 2].

III. PHYSICAL INFRASTRUCTURE

Investment in disaster management infrastructure falls into two categories: (a) investment in infrastructure to support sustainable socioeconomic development; and (b) investment in infrastructure for reconstruction and recovery. Recent World Bank data showed that the level of Asian and Pacific investment in infrastructure development during the past 15 years has been much lower than the economic value of the infrastructure damaged by natural disasters. The level of investment required was estimated at \$224 billion or about \$15 billion per year. The annual damage in the Asian and Pacific region was equivalent to about two-thirds of global annual lending by the World Bank. Disaster related lending by the World Bank over the past 25 years has totaled only \$20 billion for Asia and the Pacific. Disaster related lending is shown in fig.1 [3].

Recent studies by ESCAP in seven pilot countries of Asia also indicate the vulnerability of infrastructure to natural disasters. The loss of infrastructure, including housing facilities, was estimated to be three quarters of total damage, and about 70 per cent of the damaged infrastructure belonged to the private sector. A study by the Asian Disaster Preparedness Center on the impact of the 2004 tsunami estimated infrastructure losses at about \$4 billion, about 70 per cent of total damage of \$5.6 billion [2].

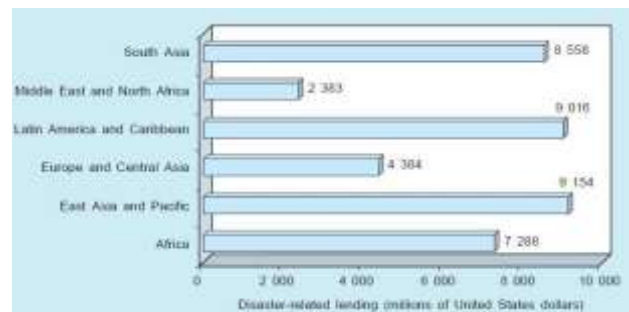


Fig.1 Disaster related lending in Asia and the Pacific

IV. DISASTER PREPAREDNESS

NDMA is mandated by DM Act 2005, to lay down national policy and plan on disaster management and issue guidelines for various types of natural & manmade disasters. One of the tasks also envisages monitoring and coordinating the implementation of the policies & plans. It is in this regard, an initiative has been taken by NDMA to conduct table top and mock exercises on various types of disasters, initially in the most vulnerable areas of the country [4, 5]. The aim of the initiative is to inculcate a culture of preparedness and secure effective participation of the community and other stakeholders. Some of the objectives for conduct of the mock exercises are, to highlight the roles and responsibilities and enhance the coordination among the stake holders, identify

gaps in the resources, communications & systems, identify areas for public-private partnership and empower the community to face disasters squarely. Mock exercises on natural and manmade disasters (except chemical industrial disasters) are conducted at districts level. The chemical (industrial) disaster mock exercises are organized in most accident hazardous industries.

Disaster preparedness involves forecasting and taking precautionary measures prior to an imminent threat when advance warnings are possible. Preparedness planning improves the response to the effects of a disaster by organizing the delivery of timely and effective rescue, relief and assistance. Preparedness involves the development and regular testing of warning systems (linked to forecasting systems) and plans for evacuation or other measures to be taken during a disaster alert period to minimize potential loss of life and physical damage. It also involves the education and training of officials and the population at risk, the training of intervention teams, and the establishment of policies, standards, organizational arrangements and operational plans to be applied following a disaster. Disaster preparedness minimizes the adverse effects of a hazard through effective precautionary actions, rehabilitation and recovery to ensure the timely, appropriate and effective organization and delivery of relief and assistance following a disaster.

V. COMPARISON BETWEEN MANAGING DISASTER IN IRAN AND JAPAN

There is little earthquake education in Iran although the International Institute of Earthquake Engineering and Seismology established a Public Education Department in 1990 to improve the safety, preventing, and preparedness culture against the earthquake among all groups of the society. The 2003 Bam earthquake was a major earthquake that struck Bam and the surrounding Kerman province of southeastern Iran on December 26, 2003. The most widely accepted estimate for the magnitude of the earthquake is a moment magnitude (M_w) of 6.6; estimated by the United States Geological Survey. The earthquake was particularly destructive, with the death toll amounting to 26,271 people and injuring an additional 30,000. 85% to 95% of buildings and infrastructure in the Bam area were either damaged or destroyed, with 75% of houses being completely destroyed, plus 70-90% of Bam's residential areas. This left an estimated 100,000 homeless. Not a single house was standing in Baravat. The effects of the earthquake were exacerbated by the use of mud brick as the standard construction medium [6].

On the other side, the 2011 earthquake off the Pacific coast of Tōhoku, also known as the 2011 Tohoku earthquake, the Great East Japan Earthquake, and the 3.11 Earthquake, was a magnitude 9.0 (M_w) undersea mega thrust earthquake off the coast of Japan that occurred on, 11 March 2011, with the epicenter approximately 70 kilometers (43 mi) east of the Oshika Peninsula of Tōhoku and the hypocenter at an underwater depth of approximately 32 km (20 mi). It was the most powerful known earthquake ever to have hit Japan, and

one of the five most powerful earthquakes in the world since modern record-keeping began in 1900. The earthquake triggered powerful tsunami waves that reached heights of up to 40.5 meters (133 ft) in Miyako in Tōhoku's Iwate Prefecture, and which, in the Sendai area, travelled up to 10 km (6 mi) inland. The earthquake moved Honshu 2.4 m (8 ft) east and shifted the Earth on its axis by estimates of between 10 cm (4 in) and 25 cm (10 in) [7]. There are approximately 100,000 displaced children (according to Save the Children estimates) as a result of the devastating earthquake and tsunami that took place on March 11, 2011 in Japan.

The National Police Agency of Japan reports that as of September 11, 2011 a total of 15,839 have died and 5,950 were injured. Fig.2 is showing affected population figures broken down by prefecture together with 2010 National Census figures [7]. Total Casualties in Japan tsunami in compare to the Bam earthquake is very less based on the depth of the disaster and the total population in affected areas. There are dramatic differences between Japan and Bam in the mortality rate and losses.

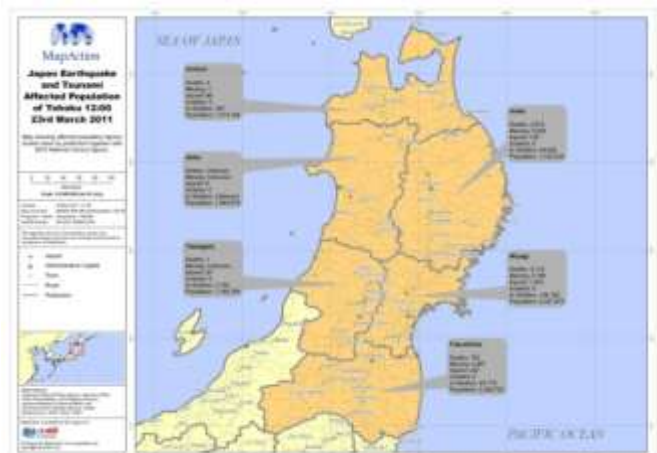


Fig.2 Japan Earthquake and Tsunami Affected Population of Tohoku 23rd March 2011

Based on existing resources, a huge Difference can be seen in disaster management in Developing countries and developed countries. After Bam earthquake experience in Iran, many program on the disaster management education for the managers; general public; and especially children's earthquake safety education in schools are provided but still there is a long way to go to achieve a fully prepared and seismically safe community and for this stronger cooperation and participation of the whole of society are necessary for enhancing public safety. Table 1 shows the satisfaction level of the disaster management programs provided in Iran after Bam earthquake [8].

Questions of equity and access to resources can be raised about any of the phases of the disaster cycle: risk reduction

(disaster mitigation), preparation, emergency management, recovery and reconstruction.

TABLE I. RESPONSE OF PEOPLE OF TEHRAN AFTER BAM EARTHQUAKE OF 26 DECEMBER 2003

Item	Media performance on information dissemination on earthquake safety %	Did the educational program increase after Bam earthquake? %	Did Bam earthquake have effect on Iran's policy toward disaster reduction? %
Good	74.9	49	47.4
Not Enough	18.7	34	29.8
No Comments	6.4	17	22.8
Total	100	100	100

It seems that our world is steadily becoming more unstable and unpredictable, from terrorism, to climate change, to a possible economic collapse; disaster looks as if it is right around the corner. Disaster management seeks to mitigate those risks and protect society from disintegration following the aftermath of terrible destruction. Understanding it requires a look at the theoretical assumptions that underlie current approaches and future changes in the field.

But we have to consider this point that A typhoon, like an earthquake, is certainly a hazard, but it need not lead to disaster if shelters are appropriately built since this process culminates in minimizing social vulnerability. In contemporary disaster research, "it is generally accepted among environmental geographers that there is no such thing as a natural disaster. In every phase and aspect of a disaster causes, vulnerability, preparedness, results and response, and reconstruction the contours of disaster and the difference between who lives and dies is to a greater or lesser extent a social calculus". Based on the results, we can say that natural disasters can be controlled if they correctly manage. Suitable infrastructures can control the disaster before it becomes catastrophe and preparedness before disasters can significantly decrease losses.

VI. CRITERIA FOR DISASTER MANAGEMENT

Disaster management is not a separate sector or discipline but an approach to solving problems relating to disasters impacting any sector - agricultural, industrial, environmental, social etc. Ultimately, disaster management is the responsibility of all sectors, all organizations and all agencies that may be potentially affected by a disaster. Utilizing existing resources ensures efficiency in resource utilization and lower costs. A disaster management can be based on the following factors:

- Disaster management is the responsibility of all spheres of government. No single service or department in itself has the capability to achieve comprehensive disaster management. Each affected service or department must have a disaster

management plan which is coordinated through the Disaster Management Advisory Forum.

- Disaster management should use resources that exist for a day-to-day purpose. There are limited resources available specifically for disasters, and it would be neither cost effective nor practical to have large holdings of dedicated disaster resources. However, municipalities must ensure that there is a minimum budget allocation to enable appropriate response to incidents as they arise, and to prepare for and reduce the risk of disasters occurring.

- Organizations should function as an extension of their core business. Disaster management is about the use of resources in the most effective manner. To achieve this during disasters, organizations should be employed in a manner that reflects their day-to-day role. But it should be done in a coordinated manner across all relevant organizations, so that it is multidisciplinary and multi-agency.

- Individuals are responsible for their own safety. Individuals need to be aware of the hazards that could affect their community and the counter measures, which include the Municipal Disaster Management Plan, that are in place to deal with them.

- Disaster management planning should focus on large-scale events. It is easier to scale down a response than it is to scale up if arrangements have been based on incident scale events. If you are well prepared for a major disaster you will be able to respond very well to smaller incidents and emergencies, nevertheless, good multi agency responses to incidents do help in the event of a major disaster.

- Disaster management planning should recognize the difference between incidents and disasters. Incidents - e.g. fires that occur in informal settlements, floods that occur regularly, still require multi-agency and multi-jurisdictional coordination. The scale of the disaster will indicate when it is beyond the capacity of the municipality to respond, and when it needs the involvement of other agencies.

- Disaster management operational arrangements are additional to and do not replace incident management operational arrangements. Single service incident management operational arrangements will need to continue, whenever practical, during disaster operations.

- Disaster management planning must take account of the type of physical environment and the structure of the population. The physical shape and size of the Municipality and the spread of population must be considered when developing counter disaster plans to ensure that appropriate prevention, preparation, response and recovery mechanisms can be put in place in a timely manner.

- Disaster management arrangements must recognize the involvement and potential role of non-government agencies.

Significant skills and resources needed during disaster operations are controlled by non-government agencies. These agencies must be consulted and included in the planning process.

VII. CONCLUSION

In this paper disaster and disaster management are defined, the infrastructures that are damaged in different disasters are mentioned and then a comparison is performed between 2003 Bam earthquake in Iran and 2010 Tōhoku earthquake and tsunami in Japan that shows disaster management in developing countries significantly can decrease the losses in case of different disasters. Based on the results, we can say that natural disasters can be controlled if they correctly manage. Suitable infrastructures can control the disaster before it becomes catastrophe and preparedness before disasters can significantly decrease losses. Finally criteria for disaster management is given that could be helpful for further disaster management planning and disaster studies.

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