

Disaster Management for Compound Disasters: Research Trends and Gaps

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Introduction Modern societies have experienced diverse and dynamic changes in the environment, economics, and politics for several decades. With these changes, natural, technological or manmade disaster risks have switched to become complicated and unforeseeable, as well as the vulnerability is increased in local communities. While a small hazard affects only one area or makes simple consequence, one or more hazards trigger other disasters or extended consequences in wide areas exceeding affected area recently. Also, emerging multi-hazards risks is influenced by various factors from the communities. For reducing these multi-hazards risks, international organizations and several nations have invested to establish international frameworks and researches for changing disaster risk. However, despite these efforts, economic and human losses are increased in some compound or catastrophic disasters, and the first affected local communities are still suffering from those disasters.

Thus, this study investigates 1) how disaster risk management has evolved through the international frameworks and different studies, 2) what disaster research trends and gaps based on some key disasters and documents, and 3) how disaster risk management must be advanced against potential compound disasters.

Background Various technologies and environmental improvement have led to rapid and unplanned urbanization, the concentration of population, and the degradation of the natural environment with high interlinkage and vulnerability to multi-hazards. These have influenced climate

changes and changing disaster patterns that single events turn into more complex, extensive, unpredictable and cascading impacts. It is called a compound disaster, which is well-known as a cascading or complex disaster, or a technological disaster triggered by natural hazards.

The consequences of increasing compound disaster are affected by diverse factors such as social, environmental, political and economic things of local communities. Some key disasters have shown the features of compound disaster. For example, 2005 Hurricane Katrina has occurred heavy rain, a break in a levee and spill of hazardous materials from some industrial facilities, and the 2011 Great East Japan Earthquake (GEJE) has made tsunami, Fukushima nuclear power plant explosion, as well as economic damage globally. Also, 2018 Japan Heavy rain has triggered flood, landslides, and an explosion of a chemical factory. In these disasters, the local communities have been damaged simultaneously, unpredictably and seriously, and disaster response and recovery were prolonged and extended.

Evolution of Disaster Risk Management To reduce disaster risks, strategies and plans for disaster risk management and international frameworks have been established and adopted universally. In the 1920s, disaster management started as a civil defense for rescuing, searching and saving the survivors from the World War II. In the 1970s, the focus of disaster management has changed to protecting citizens against natural hazards such as meteorological hazards, it is centered upon the phases of response and recovery after disasters.

However, societies have become more vulnerable, and the impact of disasters on populations and economy has risen. In this regard, in 1994 the Yokohama Strategy and Plan of Action for a Safer World highlighted the need to develop disaster management based on four elements including prevention, mitigation, preparedness, and relief. The Yokohama Strategy has underlined the requirement for comprehensive disaster risk management through improvement of local community capacities, adoption of prevention measures, consideration of the response to complex situations, and participation of all stakeholders with local communities.

Following the Kobe earthquake of 1995 in Japan and other events such as the 9/11 terrorist attack on the World Trade Center in the U.S., the Hyogo Framework for Action (2005-2015) was approved in 2005. The Hyogo Framework calls for building resilience to disasters, reducing risks and vulnerability, and enhancing disaster capacity at the local and national levels. It also calls for the analysis of disaster impacts and inter-related risks resulting from economic, social, and demographic factors.

Even though both strategy and framework have reduced disaster risks, the GEJE in 2011 and tsunami resulted in severe damages and cascading and complex secondary disasters such as the Fukushima nuclear power plant accident. During this disaster, the local communities and students have helped and saved their neighborhood by their judgment in Kamaishi. It has shown the important role of local communities during compound disasters. Based on lessons from past experiences, the Sendai Framework for Disaster Risk Reduction (2015-2030) was approved in 2015. This Framework emphasizes the implementation of practical strategies to support disaster risk management at the local level, improve disaster capacity of all stakeholders, and to prevent and reduce disaster risks in terms of the all-hazard approach based on technological and scientific skills.

The Needs of Advanced Disaster Risk Management Despite the international efforts, several studies have pointed out that disaster risk management is needed to consider real opinions and capacity of local communities during compound disasters [1]. Also, it is underlined to improve disaster capacity of residents against multi-hazards since compound disasters often affect various local communities including residents and marginalized group concurrently.

It means that all stakeholders at the local level should be first responders until the arrival of professional response team with rescue or medical aid from internal and external agencies or organizations [2]. As local stakeholders are aware of their localities, and their advantages and disadvantages, the local member's role and voices are valuable and needed to put into compound disaster risk management within the national disaster risk management. However, the local administration has just started to consider compound disaster risks and multi-hazards at the administrative level in some countries. Also, it is still needed to improve compound disaster capacity at the local level.

Conclusion Even though disaster risk management has been developed gradually, it is realized that acknowledgment on multi-hazards and different factors in a practical area is still needed to improve as well as local capacities. In this study, it is identified that advanced governance for compound disaster risk management is required to prepare multi-hazards at the local level including the local community as a resource.

References

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