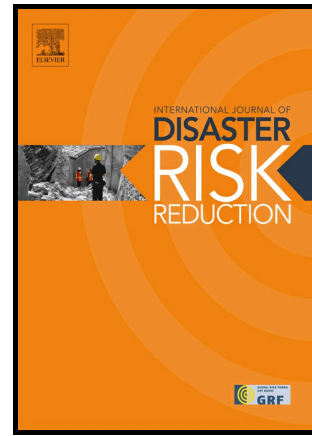


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Disaster preparedness for better response: Logistics perspectives

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Abstract

Disaster occurs frequently around the world and is no more considered an isolated event. Thus, disaster management has become a hot issue in urban development and human security. However, selecting suitable measures in disaster preparedness is a complex task. Some mitigation measures, which include making dams and updating building codes, prove ineffective and can themselves become a source of added vulnerability. Therefore, the importance of preparedness cannot be ignored, and the relief distribution aspect needs to be appraised as a measure of disaster preparedness. This study integrates disaster preparedness and response. Many parameters cannot be known before a disaster, while relief demand is a key parameter in disaster preparedness modelling. A decision maker needs to identify the properties of relief demand. Seven influencing factors of relief demand are identified. Then, a facility location model is proposed, and the model results are analysed. The results show that the hub-and-spoke distribution system brings higher social benefits.

Keywords: Preparedness, Response, Facility location model, Decision making, Multi-objective model

1. INTRODUCTION

Disaster is defined as an event concentrated in time and space, in which a society undergoes severe danger and incurs such losses to its members and physical appurtenances that the social structure is disrupted and the fulfilment of all or some of the essential functions of the society is prevented (Fritz, 1961). Disaster occurs frequently around the world and is no more considered an isolated event. Thus, disaster management has become a hot issue in urban development and human security.

Large-scale disasters, for example, the 2011 Great East Japan Earthquake and the 2010 Pakistan Flood, create a long-lasting effect on the people in an affected area, which forces many countries to incorporate disaster management as an integral part of national policy. Disaster management consists of four steps: mitigation, preparation, response and recovery (Altay and Green, 2006). Mitigation actions that are taken before a disaster to decrease vulnerability incorporate land-use regulations that reduce hazard exposure and building codes designed to ensure that structures resist the physical impacts created by hazards. Preparedness actions taken before a disaster enable social units to respond actively when disaster does strike. The aim of response actions taken a short period before, during, and after a disaster is to reduce casualties, damage, and disruption. These measures include detecting

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