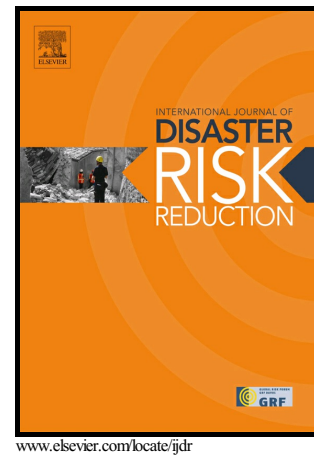


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A multi-criteria decision approach based on DEMATEL to assess determinants of shelter site selection in disaster response

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Abstract

The present study focuses on the analysis of complex interrelationships between determinants of shelter site selection for an effective disaster planning using Decision Making Trial and Evaluation Laboratory (DEMATEL). Useful insights are generated by analyzing and prioritizing all dimensions for locating shelter sites. Results reveal that favourability of terrain, community infrastructure, transportation infrastructure and type of ownership have a strong influence on other factors. There is a need to place a deep focus on topography and slope of terrain as well as on the presence of flora and fauna. Moreover, the extent of damage to community infrastructure and transportation network significantly impacts decisions of locating shelter sites and relocating affected population to them in case of destructive natural hazards like earthquakes, hurricanes, etc. The findings of the study in terms of contextual relationships can substantially contribute towards policy formation for an effective shelter location planning.

Keywords: DEMATEL, relationships, disaster response, humanitarian logistics, shelter planning

1. Introduction

Disaster is “a sudden, calamitous event that seriously disrupts the functioning of a community or society and causes human, material, and economic or environmental losses that exceed the community’s or society’s ability to cope using its own resources” [1]. More than 400 disasters affect world population annually. Large-scale natural calamities such as earthquake strike with little or no warning. Such situations result in the vast destruction of critical infrastructures such as homes, buildings, roads and other infrastructure. According to International Federation of Red Cross and Red Crescent Society (IFRC), disasters can be either naturally occurring or man-made. Natural disasters are naturally occurring physical phenomena caused either by rapid or slow onset events that can be geophysical, hydrological, climatological, meteorological or biological. On the other hand, man-made or technological hazards are caused by humans and occur in or close to human settlements [2]. According to Federal Emergency Management Agency (FEMA), annually, there are 45–75 disasters that require an evacuation effort [3]. Evacuation planning for large-scale hazards such as earthquakes, hurricanes, floods, etc. is of critical importance for an effective management of disasters.

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