

Prioritizing Temporary Shelter Areas for Disaster Affected People Using Hybrid Decision Support Model

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Abstract : In the recent years, the magnitude and frequency of disasters have increased at an alarming rate. Every year, more than 400 natural disasters affect global population. A large-scale disaster leads to destruction or damage to houses, thereby rendering a notable number of residents homeless. Since humanitarian response and recovery process takes considerable time, temporary establishments are arranged in order to provide shelter to affected population. These shelter areas are vital for an effective humanitarian relief; therefore, they must be strategically planned. Choosing the locations of temporary shelter areas for accommodating homeless people is critical to the quality of humanitarian assistance provided after a large-scale emergency. There has been extensive research on the facility location problem both in theory and in application. In order to deliver sufficient relief aid within a relatively short timeframe, humanitarian relief organisations pre-position warehouses at strategic locations. However, such approaches have received limited attention from the perspective of providing shelters to disaster-affected people. In present research work, this aspect of humanitarian logistics is considered. The present work proposes a hybrid decision support model to determine relative preference of potential shelter locations by assessing them based on key subjective criteria. Initially, the factors that are kept in mind while locating potential areas for establishing temporary shelters are identified by reviewing extant literature and through consultation from a panel of disaster management experts. In order to determine relative importance of individual criteria by taking into account subjectivity of judgements, a hybrid approach of fuzzy sets and Analytic Hierarchy Process (AHP) was adopted. Further, Technique for order preference by similarity to ideal solution (TOPSIS) was applied on an illustrative data set to evaluate potential locations for establishing temporary shelter areas for homeless people in a disaster scenario. The contribution of this work is to propose a range of possible shelter locations for a humanitarian relief organization, using a robust multi criteria decision support framework.

Keywords : AHP, disaster preparedness, fuzzy set theory, humanitarian logistics, TOPSIS, temporary shelters

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