Optimal Temporary Settlement Area Identification Post-Flood Using Crisis Management and Fuzzy MCE (Dehaghan County)

Introduction: This study addresses the critical issue of identifying optimal locations for temporary settlement areas following flood disasters in Dehaghan County, Isfahan Province, Iran. The research employs a combination of Geographic Information Systems (GIS) and multi-criteria evaluation methods, specifically the Analytic Hierarchy Process (AHP) and Fuzzy Multi-Criteria Evaluation (Fuzzy MCE), to assess and determine suitable sites for emergency shelters. The primary objective is to enhance crisis management strategies by providing a systematic approach to site selection, thereby reducing human and financial losses associated with natural disasters.

Material and Methods: The study area, Dehaghan County, is prone to natural disasters, particularly floods, due to its geographical and topographical characteristics. The region experiences significant rainfall and snowmelt during spring and summer, leading to frequent flooding. The research methodology involves a comprehensive analysis of various criteria, including proximity to roads, waterways, land slope, and land use, to identify low-risk areas suitable for temporary accommodation.

Results and Discussion: The results indicate that the northeastern regions of Dehaghan County are the most suitable for temporary settlements, with land slope percentage being the most influential factor (0.20), followed by distance from waterways (0.18) and distance from roads (0.15). The application of fuzzy membership functions in the evaluation process has significantly improved the accuracy of the analyses, enabling the identification of safer areas with greater precision. The study concludes with several recommendations for improving crisis management and optimizing emergency shelter site selection. These include the creation of a comprehensive database, conducting training sessions, and designing resilient infrastructure to enhance community preparedness and resilience.

Conclusion: The research highlights the importance of integrating advanced geospatial technologies and multi-criteria decision-making methods in disaster management. By leveraging GIS and fuzzy logic, the study provides a robust framework for identifying optimal temporary settlement areas, which can be adapted to other regions facing similar challenges. The findings underscore the need for proactive planning and the development of resilient infrastructure to mitigate the impacts of natural disasters and ensure the safety and well-being of affected communities.

Keywords: Crisis Management, Emergency Shelter, Site Selection, Flood, Geographic Information Systems, Dehaghan.