Comparative Assessment of Ranking Methods for Natural Disasters in Rural Regions
(Case Study: Zanjan Province)

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Extended Abstract

Introduction

A natural hazard is a threat of a naturally occurring event which has negative effects on human lives. This negative effect is called a natural disaster. Natural Hazards (and the resulting disasters) are the out comes of naturally occurring processes that have operated throughout the history of Earth. The assessment of vulnerability at the community level is currently strongly evolving. Also participatory methods are seen as the way forward to act successfully at the local/community level. In order to carry out effective measures for risk reduction, information has to be available about the certain hazards that threaten a certain area, the elements at risk (population, buildings, infrastructure, economic activities) that are exposed to these hazards, the vulnerability of these elements at risk and an estimation on the expected losses. The concept of vulnerability has not been finally defined yet and the indicators and agreements on how to measure the "measurelss"es are still on its way. Natural hazards have always been among the most important problems in rural community and planning opposition and prevention from these disasters and their obnoxious effects had been among the long term goals of these communities. Risk Assessment involves not only the assessment of hazards from a scientific point of view, but also the socio-economic impacts of a hazardous event. Risk is a statement of probability that an event will cause x amount of damage, or a statement of the economic impact in monetary terms that an event will cause. Risk assessment involves: 1- hazard assessment, 2- location of buildings and other infrastructure in the areas subject to hazards, 3- potential exposure to the physical effects of a hazardous situation, 4- the vulnerability of the community when subjected to the physical effects of the event. Therefore Risk assessment helps the decision - makers and scientists to compare and evaluate potential hazards, set priorities on what kinds of mitigation are possible, and set priorities on where to focus resources and further study.

Methodology

To improve the capacity of communities and local governments to measure key elements of their current disaster risk, a community based indicator system was developed. Using indicators on community level in this context is a rather new and innovative approach. The established conceptual framework systemizes the key elements of disaster risk into the factors of Hazard, Exposure, Vulnerability and Capacity & Measures. The framework helps to understand the driving forces (factors) at work and served to identify appropriate indicators. Hence, using the scientific and new methodology is so important in these areas. In this way, application the decision making methods and models is an important tool for accessing to optimum organizing and planning that play main role in multiple goals such as measurement, weighting, decision making, selection, etc. in such action extent. These techniques categorized in two main groups: multi criteria, and multi objective decision making models. The multi criteria decision making model as for their more efficiency, cleave to Non-Compensatory Model and Compensatory Model. Thus, current study, first measured the priority of weighting method from experts attitude and then with regard to set of criteria for disaster in rural of Sojasrud village, with

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47 rural in council level, by employing one model from each subgroup of Non- Compensatory Model and Compensatory Model, compared the results accuracy in measurement of 12 hazards types.

Results & Discussion

Ranking methods, similarity measures and uncertainty measures are very important concepts for interval Comparative assessment. In this report, several ranking methods, similarity measures and uncertainty measures for Comparative assessment natural hazard in rural area were evaluated based on real survey data. the SAW ranking method was the best one, according to the results.

Conclusion

In the first step, it was shown that between many waiting method, AHP weighting technique from expert's attitude has been the best technique for weighting. In second step, Results introduced that from expert attitude, the best method for weighting was AHP method and SAW method had a great correlation with other methods (TOPSIS, ELECTRE, LEXICOGRAPH). Therefore the SAW method acted as an ideal option in natural hazards measurement in rural area. The results of this research will help rural Decision making, risk management, Natural Disasters management and planning for rural area for better understanding how to use methods effectively in rural planning and management processing.

Keywords: Natural Disasters, Decision making model, TOPSIS, ELECTRE, SAW, LEXICOGRAPH, Sojasrud village.