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Zoning of Sensitive Area and Environment Vulnerable in West of Fars Province using Fuzzy and AHP Classification

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Extended Abstract

Introduction

A natural disaster is the effect of a natural hazard (e.g. flood, earthquake, or landslide) that affects the environment, and leads to financial, environmental and/or human losses. The resulting loss depends on the capacity of population to support or resist the disaster, and their resilience. This understanding is concentrated in the formulation: "disasters occur when hazards meet vulnerability". A natural hazard will hence never result in a natural disaster in areas without vulnerability, e.g. strong earthquakes in uninhabited areas. Evidence indicates are continuously increased all types of natural crises, from frequency and severity. Natural factors always impose dangers throughout history and around the world to natural environments and built ones.

Materials and Methods

West of Fars region located in the Zagros Mountain Ranges zone, including areas that due to natural and geographical features such special geological structure and earthquake belt placement on active faults and major mountain features with variable climatic conditions and the existence of numerous torrential rivers and etc, there have Potential occurrence of natural hazards, especially earthquakes, floods, mass movements and erosion. West region of Fars province is situated in the Southwest of the Iranian mountain ranges known as Zagros. The area covers 10703 km², spanning latitude 29 to 30° 41'N., and longitude 50o34' to 52° 8'E.

In this study it was attempt to use data obtained from modeling criteria and effective environmental layers using Analytic Hierarchy Process (AHP) and fuzzy classification method with high spatial analysis and modeling capabilities of Geographic Information Systems (GIS),

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severity of environmental vulnerability of area was considered and were zoning. So the main data and materials are including data layers related to features of effective natural environment in vulnerability of humanity environments such Topography and hydrology of surface water (1:25000), Geology (1:100000), Pedology and vegetation (1:250000) and landuse (1:25000) maps, and Meteorology data and variables like precipitation, as well as satellite images of Ikonos and Quick birds were used in perform corrections on the various maps.

Methodology of research is based on expert choice of criteria and their priorities (Delphi questionnaire), normalizing methods (Fuzzy logic classification) and Multivariate models combining layers (AHP). So first Delphi questionnaire was prepared and then were completed by eight experts in specialized fields related to regional planning. Then using software expert choice were calculated coefficients of criteria and subcriteria according to Delphi questionnaire. Also, all the subcriteria coefficients with Fuzzy method were classified and they took fuzzy membership. At last coefficients obtained in the previous step were transferred to attribute of GIS information layers. In GIS all layers were Geo Referenced by UTM WGS84 coordinate system. and after entering AHP coefficients to attribute of information layers, all maps were converted to Raster format. So all related layers with EarthQuick, WaterFlood, Mass Movements and Erosion once separately overlaid and thus their integration was calculated environmental vulnerability map of the area.

Results and Discussion

According to results of calculations performed in the research process and Features of the area's natural and human environment, Earthquake, Flood and Mass movement, respectively are the highest risks and threats. Also, based on modeling results and risk zoning in West of Fars region are recognized more than 34% of study area with a range of relative to very high vulnerability features that mainly includes mountainous regions and their foothills in NE, East, Dra' mountain and the central strip. So in these areas, accumulation and overlaid of risk factors provides hazardous conditions. Also according to the risk zoning map, flat plains, have a low level of vulnerability. In areas with high risk and vulnerability, attention to concentration of residence with severe agglomeration of population and activity in middle axis, as well as having great ecological values of forests and their especial ecosystems, make increasing the value of considering to these studies.

Conclusion

Considering that so far, hasn't been done comprehensive and accurate studies about the sensitivity and vulnerability of study area, there is no detailed information about flood status, Landslide or landslip and or about the destruction and potential vulnerability of region to earthquake. It is necessary to studied vulnerability and various human and natural risks and or their combinations using detailed and accurate data and information layers.

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Keywords: *Environmental Vulnerability, West Fars region, Analysis hierarchy process (AHP), GIS, Natural Hazards.*