A GIS – BASED CATASTROPHY THEORY FOR MAPPING FLOOD-PRONE AREA, IRAQ AS A CASE STUDY

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ABSTRACT

Flood is one of the most natural disasters that cause severe damage to both life and property. It is considered as the most recurring, widespread, disastrous, and frequency natural hazards of the world. The top ranking of flooding phenomena among other natural disasters in terms of both the number of people affected globally and proportion of individual fatalities make the flooding disaster is of concern in hydrological and natural hazards studies.

The main objective of the study is to create the flood model, the model was applied to delineate the flood prone zones in southeastern parts of Iraq (Ali Al-Ghurbi area), where flash flood is a recurrent natural hazard that causes damage to civil property almost every year.

A new method has been proposed in this study for delineation of flood prone areas through integration of catastrophe theory and analytical hierarchy process (AHP) in a geographical information system (GIS). Six causative flood factors were selected for this purpose based on data availability and literature reviews, namely, ground surface elevation, slope angle, curvature, topographic wetness index (TWI), stream power index (SPI), and curve number (CN).

The raster maps of the factors were prepared with a cell size of 30 × 30 m from the USGS. The catastrophe models were used to derive weights of the factors using weighted linear combination technique, while AHP was used to compute normalized ranks of the classes of each factor.

The study classifies the area into five regions the very low, low, and moderate, high and very high susceptible to flood. The high flood susceptible zones are mainly distributed around the intermittent streams and the low lands, while the low flood susceptible zones are found in the hilly regions.

***Keywords**: analytical hierarchy process, catastrophe theory, flash flood, geographical information system, Iraq.*