



An Integrated Approach of AHP-GIS Based Dam Site Suitability Mapping - A Novel Approach for Flood Alleviating Measures

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Surat is a district that has seen numerous floods and high rainfall over the last two decades. The solution to the problem, and the primary aim of this study, is to construct a storage facility, such as a dam, as part of flood prevention measures. The concept of multi-criteria decision making (MCDM) is now widely employed for everyday real-life challenges. Recent advancements and diverse approaches in geographic information systems (GIS) and remote sensing, along with the MCDM technique, will enable us to make an informed decision about where to build a dam site location model (DSLML). The Analytic Hierarchy Process (AHP) is the most frequently utilised MCDM technique for resolving water-related issues. To produce DSLML, ten thematic layers were considered: precipitation, stream order, geomorphology, geology, LULC, soil, distance to road, elevation, slope, and major fault fracture. Precipitation and stream order were the two most important elements affecting the DSLML. The weights of the thematic map layers were determined using the analytical hierarchy process (AHP) technique. These thematic maps and weights are used to perform overlay analysis, resulting in a suitability map with five classes ranging from high to low suitability. Three main sites have been selected as the best candidates for the construction of a new dam. By implementing this low-cost strategy, we may be able to reduce the amount of effort required in the traditional method of dam site selection while increasing decision-makers' accuracy. Approximately 14% of the Surat district is classified as a very high adaptability area, while 27.2 percent is classified as a high suitability area. This method can be applied all over the world to locate possible dam sites, which can be helpful for flood mitigation measures. In addition to that, the presented approach unveiled the scientific method for flood mitigation measures, which are in immediate demand all over the globe, especially in data-scarce regions.