

Suitable Site Selection of Small Dams Using Geo-Spatial Technique: A Case Study of Dadu Tehsil, Sindh

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Abstract : Decision making about identifying suitable sites for any project by considering different parameters is difficult. Using GIS and Multi-Criteria Analysis (MCA) can make it easy for those projects. This technology has proved to be an efficient and adequate in acquiring the desired information. In this study, GIS and MCA were employed to identify the suitable sites for small dams in Dadu Tehsil, Sindh. The GIS software is used to create all the spatial parameters for the analysis. The parameters that derived are slope, drainage density, rainfall, land use / land cover, soil groups, Curve Number (CN) and runoff index with a spatial resolution of 30m. The data used for deriving above layers include 30-meter resolution SRTM DEM, Landsat 8 imagery, and rainfall from National Centre of Environment Prediction (NCEP) and soil data from World Harmonized Soil Data (WHSD). Land use/Land cover map is derived from Landsat 8 using supervised classification. Slope, drainage network and watershed are delineated by terrain processing of DEM. The Soil Conservation Services (SCS) method is implemented to estimate the surface runoff from the rainfall. Prior to this, SCS-CN grid is developed by integrating the soil and land use/land cover raster. These layers with some technical and ecological constraints are assigned weights on the basis of suitability criteria. The pairwise comparison method, also known as Analytical Hierarchy Process (AHP) is taken into account as MCA for assigning weights on each decision element. All the parameters and group of parameters are integrated using weighted overlay in GIS environment to produce suitable sites for the Dams. The resultant layer is then classified into four classes namely, best suitable, suitable, moderate and less suitable. This study reveals a contribution to decision-making about suitable sites analysis for small dams using geospatial data with minimal amount of ground data. This suitability maps can be helpful for water resource management organizations in determination of feasible rainwater harvesting structures (RWH).

Keywords : Remote sensing, GIS, AHP, RWH

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