Multi-criteria based hydrological zonation for water harvesting site suitability in Nuh watershed of Haryana, India

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The present study aims to develop a protocol for determining the suitability of ponds in Nuh watershed, Haryana, India, using hydrological zoning, analytic hierarchy process, weighted overlay approach and geospatial techniques. Maximum area is in moderate and low run-off zones, with 50.43% and 32.4% of the area covering 104 and 129 ponds respectively. Area under least, moderate, high suitable zones are 33.2%, 51.92% and 11.38% respectively. Also, 137 more ponds are proposed, with 2, 49 and 86 ponds having very high, high and moderate suitable zones respectively. If these 472 ponds are revived, additional areas can be brought under irrigation in the watershed.

Keywords: Analytic hierarchy process, hydrological zonation, site suitability, watershed, water harvesting.

government programmes. In Mewat, many waterbodies are available, but most are defunct[2]. Therefore, for augmentation, there is a need to study the performance of existing water bodies and determine the suitability of sites for constructing new waterbodies through hydrologic zonation.

The combination of multi-criteria analysis and Geographic Information System (GIS) provides a unique and useful solution to the issues concerning spatial decision for preparing hydrological zones[3]. Use of the GIS-multi-criteria decision analysis (MCDA) approach integrates capabilities of GIS and MCDA's flexibility to combine value-based information for delineating hydrological zones[4–8]. Analytical hierarchical process (AHP), a multi-criteria decision-making approach is utilized to organize and analyse elements in the complex decision processes, incorporating mathematics and expert knowledge[9]. Th