**Identification of Potential Sites for a Multi-Purpose Dam Using a Dam Suitability Stream Model**

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**Abstract**

Optimal site selection of a dam is one of the crucial tasks in water resource management. In this study, a dam suitability stream model (DSSM) is utilized to identify potential sites for constructing multi-purpose dams. In DSSM, each input parameter is weighted using the analytic hierarchy process (AHP), and then weighted overlay analysis is performed in a Geographical Information System (GIS) environment. Compared to the previous studies, this study showed different results based on the crucial parameter that is “stream order”. Two resultant site suitability maps are prepared to differentiate the importance of stream order. Each of the resulting maps visualizes four classes of suitability from highly suitable to least suitable. The proposed sites will store water for a variety of uses at the local and regional level and reduce flood risk, which can be very useful for hydrologists and disaster risk managers.

A new model DSSM is being proposed in the current study based on integrating GIS, remote sensing, and AHP to spot a feasible site for constructing a multi-purpose dam in the Panjkora Basin, northwest of Pakistan. The selection of sites for multi-purpose dams involves several factors. Therefore, DSSM can utilize all factors combined with streams and their order in an efficient way to solve this problem. DSSM uses AHP to assign weights for each criterion, where the highest weight is given to the most crucial parameter of the DSSM model, named as stream order.