

The pre-selection of suitable sites for small underground dams in arid areas using GIS (A case study in Yazd_Ardakan watershed)

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Abstract

A good location for underground dams meets a set of local and environmental criteria. Not all of these criteria are known and are nowadays partly underestimated during sitting of locations, resulting in minor efficiency of constructed dams. In most cases only large-scale database maps as geology, topography is available, which does not provide adequate information on detail environmental parameters. For this purpose, remote sensing techniques can supply large amount of data with high spatial and temporal resolution, and are therefore a very useful mapping tool especially in areas where very little information is available such as most developing countries. In this work, we present a methodology for the assessment of the suitability of sites for the installation of small underground dams, a technology widely used for water harvesting in arid climates. The selection criteria are defined both in a qualitative and quantitative way, and are based on a territorial analysis using satellite data and hydrological and climatological information that are easily and freely available. The methodology, applied to Yazd_Ardakan watershed in central Iran, allowed the individuation of 35 sites for subsurface dam and 114 sits for sand storage dam passed the proposed selection criteria. The validation results showed, Most of underground dam sites (46.7%) were found within the moderately suitable followed by highly suitable with 26.6%. The fact that most of predicted underground dam sits were found within marginally to highly suitable this indicates that the developed GIS and decision tools can reliably be used to predict potential sites for underground dam sites.

Keywords: Site selection, Small underground dams; Morphological parameters remotely sensed, GIS, RS