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Location specific *insitu* soil and water conservation interventions for sustainable management of drylands

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ABSTRACT

Identifying the suitable sites for *insitu* and *ex-situ* soil and water conservation interventions with the help of survey is one of the giant tasks for planners. Considering the time consumption for conventional geographical surveys for identification of potential sites, a methodology is being developed using the remote sensing and GIS techniques to find the suitable locations for different *insitu* soil and water conservation interventions. Different thematic layers of slope, soil, rainfall and land use land cover was intersected in ARCGIS and the selected criteria for each intervention was applied for identifying the suitable locations. This methodology was applied for identifying the suitable locations of different *insitu* soil and water conservation interventions such as contour bunds, semi-circular bunds, small pits, contour bench terraces, contour ridges and stone bunds in Adilabad District of Telangana state. Among the different interventions selected, stone bunds, contour bunds and small pits are more suitable for major portion of the Adilabad District. This methodology deciphers more precise, easier and less time consuming planning technique which has the ability to process districts or even large catchments.

Key words: Adilabad, GIS, soil and water conservation interventions

Dryland in India is experiencing more frequent water scarcity events usually in summer months as well as in years with deficient monsoon rainfall and drought years. In these regions, agriculture is the prime source of income for local inhabitants and recent environmental externality is a threat to the agricultural sustainability. One of the major constraints for agricultural production is the availability of irrigation water during dry spells. Sometimes, droughts may generate severe water shortage even for drinking purpose due to decline of groundwater table. Adoption of *insitu* soil and water conservation techniques and construction of rainwater harvesting structures are very essential for the semi arid and rainfed regions due to the erratic nature of monsoon rainfall. The integrated watershed management is a concept and approach in the sustainable development of land and water resources. Watershed development projects are designed to harmonize the use of water, soil, forest and pasture resources while raising agricultural productivity by conserving moisture in the soil and increasing irrigation through tank and aquifer based water harvesting.

Many workers from all over the world have confirmed the potential of soil and water conservation and rainwater harvesting to enhance the productivity (Ramakrishnan *et al.,* 2009; Kadam *et al.,* 2012). The construction of some of these structures decreases the runoff rate, retards the soil erosion, increases the soil moisture content and recharges the aquifer (Ramakrishnan *et al.* 2009; Aladenola and Adeboye, 2010). Failure of structures are mainly due to improper selection, spacing, improper construction and due to no proper treatment of adjacent area contributing to the catchment area. Identifying the suitable sites for rainwater harvesting structures with the help of survey is one of the giant tasks for planner. Considering the time consumption of conventional geographical surveys for identification of potential rainwater harvesting structures, the remote sensing and GIS have been used by several workers (Jasrotia *et al.,* 2009; Singh et al., 2009; Chowdary *et al.,* 2009; Ramakrishnan *et al*., 2008; Ramakrishnan *et al.,* 2009; Shanwad *et al.,* 2011). Thematic layers of landuse/land cover, lithology, soils, slope, rainfall and drainage naps were generated, a set of criteria was applied and potential site suitability map was derived (Ramakrishnan *et al.,* 2008). The accuracy of prediction was estimated on the basis of proximity between derived and field validated sites. In 75% of the cases, the sites derived fall within 15 m distance of field identified sites.