

## Geospatial Techniques for Impact Assessment of Canal Rehabilitation Program in Sindh, Pakistan

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**Abstract :** Indus Basin Irrigation System (IBIS) is the largest contiguous irrigation system of the world comprising Indus River and its tributaries, canals, distributaries, and watercourses. A big challenge faced by IBIS is transmission losses through seepage and leaks that account to 41 percent of the total water derived from the river and about 40 percent of that is through watercourses. Irrigation system rehabilitation programs in Pakistan are focused on improvement of canal system at the watercourse level (tertiary channels). Under these irrigation system management programs more than 22,800 watercourses have been improved or lined out of 43,000 (12,900 Kilometers) watercourses. The evaluation of the improvement work is required at this stage to testify the success of the programs. In this paper, emerging technologies of GIS and satellite remote sensing are used for impact assessment of watercourse rehabilitation work in Sindh. To evaluate the efficiency of the improved watercourses, few parameters are selected like soil moisture along watercourses, availability of water at tail end and changes in cultivable command areas. Improved watercourses details and maps are acquired from National Program for Improvement of Watercourses (NPIW) and Space and Upper Atmospheric Research Commission (SUPARCO). High resolution satellite images of Google Earth for the year of 2004 to 2013 are used for digitizing command areas. Temporal maps of cultivable command areas show a noticeable increase in the cultivable land served by improved watercourses. Field visits are conducted to validate the results. Interviews with farmers and landowners also reveal their overall satisfaction in terms of availability of water at the tail end and increased crop production.

**Keywords :** geospatial, impact assessment, watercourses, GIS, remote sensing, seepage, canal lining

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