

Remote Sensing and GIS Based Methodology for Identification of Low Crop Productivity in Gautam Buddha Nagar District

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Abstract : Poor crop productivity in salt-affected environment in the country is due to insufficient and untimely canal supply to agricultural land and inefficient field water management practices. This could further degrade due to inadequate maintenance of canal network, ongoing secondary soil salinization and waterlogging, worsening of groundwater quality. Large patches of low productivity in irrigation commands are occurring due to waterlogging and salt-affected soil, particularly in the scarcity rainfall year. Satellite remote sensing has been used for mapping of areas of low crop productivity, waterlogging and salt in irrigation commands. The spatial results obtained for these problems so far are less reliable for further use due to rapid change in soil quality parameters over the years. The existing spatial databases of canal network and flow data, groundwater quality and salt-affected soil were obtained from the central and state line departments/agencies and were integrated with GIS. Therefore, an integrated methodology based on remote sensing and GIS has been developed in ArcGIS environment on the basis of canal supply status, groundwater quality, salt-affected soils, and satellite-derived vegetation index (NDVI), salinity index (NDSI) and waterlogging index (NSWI). This methodology was tested for identification and delineation of area of low productivity in the Gautam Buddha Nagar district (Uttar Pradesh). It was found that the area affected by this problem lies mainly in Dankaur and Jewar blocks of the district. The problem area was verified with ground data and was found to be approximately 78% accurate. The methodology has potential to be used in other irrigation commands in the country to obtain reliable spatial data on low crop productivity.

Keywords : remote sensing, GIS, salt affected soil, crop productivity, Gautam Buddha Nagar

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