



Estimation of area under major crops and corresponding irrigation requirements in district Tando Allahyar using field, historical and satellite data

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Abstract Information of potential crop acreage and yield, and crop water requirements at an early stage is vital not only for the farmers, but also for countries that mainly depend on irrigated agricultural production to fulfill the national needs for food and also for earning return through exports. The present study was thus conducted to estimate area under major crops and the corresponding irrigation water requirements for district Tando Allahyar during Rabi season 2013-2014. The required field, satellite and historical data was gathered and analyzed statistically as well as through ArcGIS 10.1 software. The results of the study show that the wheat cultivated area was maximum i.e. 36 400 ha during the year 2010-2011 with total crop production of 148 200 tons, while the maximum area under sugarcane crop was 21 700 ha during 2007-2008 in with total cane production of 1 374 400 tons. There was a strong linear relationship ($R^2 = 0.960$) between the wheat cropped area and the total wheat grain production in the district. Classified satellite imagery revealed that the wheat was a major Rabi crop of the district Tando Allahyar, which was cultivated on an area of about 32 358 ha occupying 21% of the total geographical area of district. The estimated total area under vegetation was about 73%, while the area without vegetative was 27% of total geographical area of the district. NDVI based crop yield model forecasted 3.64 tons/ha of wheat grain against 3.86 tons/ha of wheat grain reported by Crop Reporting Services (CRS). The total crop water requirement was estimated as 0.39 million acre feet (MAF) while the irrigation water delivered by the SIDA/PID from canal system to the district was 0.21 MAF at the field. Thus, there was a shortfall of 0.184 MAF (about 46%) which might have been supplemented from other sources of water. Remote Sensing (RS) and Geo-Information System (GIS) are vital tools for timely, reliable and accurate acquisition of data related to estimation of cropped area, yield forecast and crop water requirements, therefore their use in cropped area estimation, yield forecast of agricultural products and estimation of crop water requirements is suggested in Sindh.