

## Geoinformatics application to investigate agricultural potential in the Cholistan Desert

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**Introduction** Cholistan is an extension of the Great Indian Desert , which includes the Thar Desert in Sindh province of Pakistan and the Rajasthan Desert in India , covering an area of 26,330 km<sup>2</sup> , it lies within Southeast quadrant of Punjab province between 27°42' and 29°45' North latitude and 69°52' and 73°05' East longitude (Ahmad , 2005 ; Ahmad , 2007) . The area was once green and prosperous , where cultivation was practiced . With the drying up of the river , the area became desert through desertification processes and only a few grazing lands are left .

**Materials and methods** The use of spatial data for drylands-resource management and planning has been recognized worldwide . However , spatial data are less useful if they are not transformable into information which can be analyzed and interpreted in a systematic and quick way . Hence there is a requirement to transfer and keep spatial data related to agriculture in a standard computer format preferably in a GIS environment (Khali , 2001) . A GIS is an integrated resource data base system that has the capability to store , edit and process digital data ; and that supports development planning and policy analysis . The use of GIS for evaluating the potential of drylands is becoming very important , especially when immense accumulation of data is unavoidable (Khali , 2001) . The Ministry of Environment , Government of Pakistan has set up an Environmental Monitoring System combining NOAA AVHRR data with high resolution Landsat TM data (FAO , 1997) and ground observations with the objective of developing an operational GIS for more effective planning , management , conservation and sustainable development of resources .

**GPS application to investigate agricultural compartments** Global Positioning System (GPS) is a highly accurate satellite based radio navigation system providing three-dimensional positioning , velocity and time information . In order to achieve GPS coordinate readings , the GPS unit transmitter must detect a minimum of four satellites and the more satellites detected by the transmitter , the more accurate the readings tend to be . Better accuracy can also be achieved if differential GPS (DGPS) is used (Spencer et al , 2003) . The idea behind the DGPS is to correct bias errors at one location with measured bias errors at a known position . A reference receiver , or base station , computes corrections for each satellite signal . Some of the potential and useful GPS applications in drylands resources include tree location mapping , potential agricultural compartment boundary survey , ground truth activities and resources inventory (Khali , 2001) .

**Conclusions** The analysis of Cholistan desert resources help us to know that the desert tract is full of plant resources , which have not been exploited on a large scale or commercial basis , because of their low output , sparse distribution and very poor management . For the overall development of the desert , it is an urgent need that the existing plant resources should be exploited on sound scientific lines using modern technologies . Because of a traditionally limited approach to dryland management , development , and assessment , current dryland initiatives fail to build the support necessary to effectively accomplish their objectives . On the other hand , an ecosystem approach to drylands monitoring and assessment holds great promise for generating enthusiasm , precisely because of its more comprehensive , forward-looking focus .

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