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**UN COMMITTEE OF EXPERTS IN GLOBAL GEOSPATIAL  
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**Country Report of Pakistan\***

\* Submitted by: Pakistan Space & Upper Atmosphere Research  
Commission (SUPARCO)

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## **1. Background**

### **Pakistan**

It is a country of rivers, fertile lands, glaciers and snow covered mountains, deserts, mineral rich hills and a vast coastal belt covers an area of 796,096 Sq Km with a population of approximately 180 million. Administratively, Pakistan is divided in five provinces i.e. Sindh, Baluchistan, Punjab, Khyber-Pakhtunkhwa and Gilgit-Baltistan. Pakistan falls in three geographical regions namely the northern highlands, the Indus River plain and the Baluchistan Plateau. Himalayas, Hindu Kush and Karakoram ranges constitute northern and north western highlands. Pakistan lies in temperate zone above the tropic of cancer. The climate varies from tropical to temperate. Bordering countries of Pakistan are China, Afghanistan, Iran and India.

### **SUPARCO – The national space agency**

SUPARCO undertakes R&D in space science, space technology and their peaceful applications. It works towards developing indigenous capabilities in space technology and promoting space applications for socio-economic uplift of the country. These include remote sensing applications, atmospheric and environmental studies, development of satellites and it also closely collaborates with the academia.

## **2. Satellite data acquisition**

In order to attain self sufficiency in acquisition of satellite remote sensing data, a satellite ground receiving station was setup in 1989 at Islamabad to acquire data from Landsat and SPOT series of satellites. This station was upgraded to acquire SPOT 5 data in



2004. Besides, a ground receiving station for reception of Aqua/Terra and other meteorological satellites data has been established in Karachi, Pakistan.

Currently SUPARCO is involved in the use of satellite remote sensing data for resource mapping; agriculture; forestry; land use and land cover mapping; water resource management; environmental change detection and impact assessment; snow and glaciers melt studies; natural hazards monitoring and impact assessment; urban planning; environment monitoring; and disaster management.

Some of the other major remote sensing application programs are as follows:

### **3. Remote Sensing Applications**

The primary objective of this Program of SUPARCO is to promote remote sensing, GIS, telecommunication and navigation technology applications in the country, to develop indigenous capabilities for undertaking projects that contribute to that socio-economic development of the country and to develop a strong scientific and technological base.

Pakistan initiated its remote sensing applications program in 1973 after the launch of Landsat 1 satellite. Initially, remote sensing application projects were undertaken in the fields of flood monitoring; river course change mapping, and land use/ land cover classification.

Over the years the country has built competence and developed the necessary infrastructure in the field of satellite remote sensing technology and its applications for undertaking important projects for government and private sector organizations and agencies. A

National Centre for Remote Sensing and Geo-informatics has been established to promote space science and applications in the country. These efforts have borne fruit and the technology is now being extensively utilized for the socio-economic development and technological uplift.

### **Spatial Database Development**

Development of integrated applications of remote sensing and GIS in fields that include cartography and mapping, spatial analysis and processing, spatial decision support system, geo-database management and development, surveying, web GIS, mobile GIS and location based services.

### **Environmental Applications**

Laboratories for air and water quality sampling and testing have been established for country-wide environmental information management and database development. The environmental satellite remote sensing applications have also been developed for national and regional level studies.

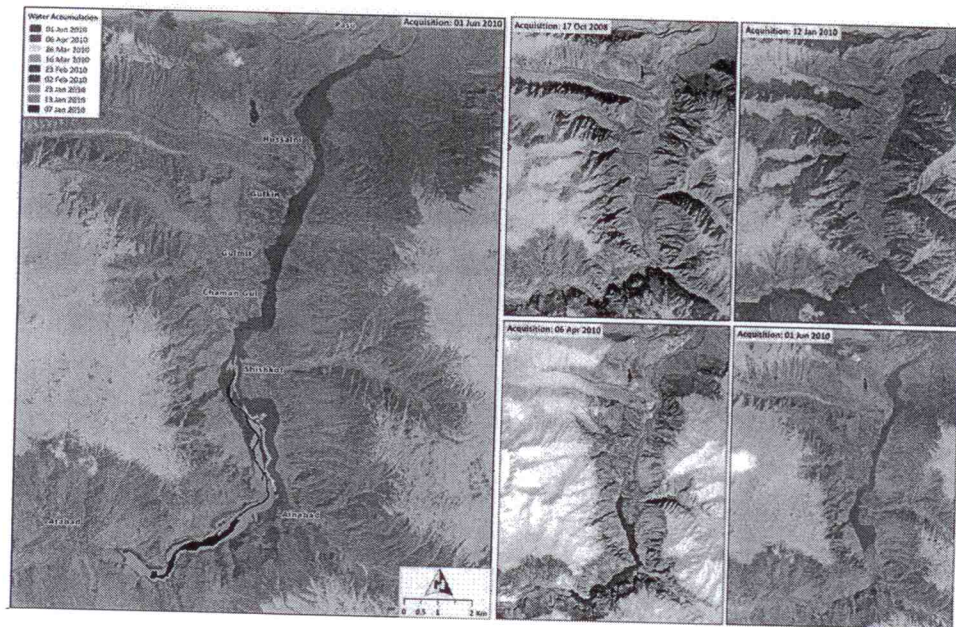
### **Global Navigation Satellite System (GNSS)**

The integrated applications of remote sensing GIS and positioning technologies have been progressively introduced and developed in the country for location-based services; asset & fleet management and mapping. The research and development on advanced applications of GNSS such as aviation, precision agriculture and geodesy are under way.



## Disaster Management

Satellite remote sensing and GIS is being extensively utilized by the National Disaster Management Authority (NDMA) as well as provincial authorities during crises and emergency situations from relief to early recovery, rehabilitation and reconstruction phases. SUPARCO, is also the regional support office for United Nation's Centre for Space based Information on Disaster & Emergency Response (UN-SPIDER). A call for major disaster was activated by UN-SPIDER on behalf of SUPARCO during calamitous floods of 2010. Besides, SUPARCO hosts a Local User Terminal and Mission Control Centre of international satellite aided COSPAS-SARSAT search and rescue programme.



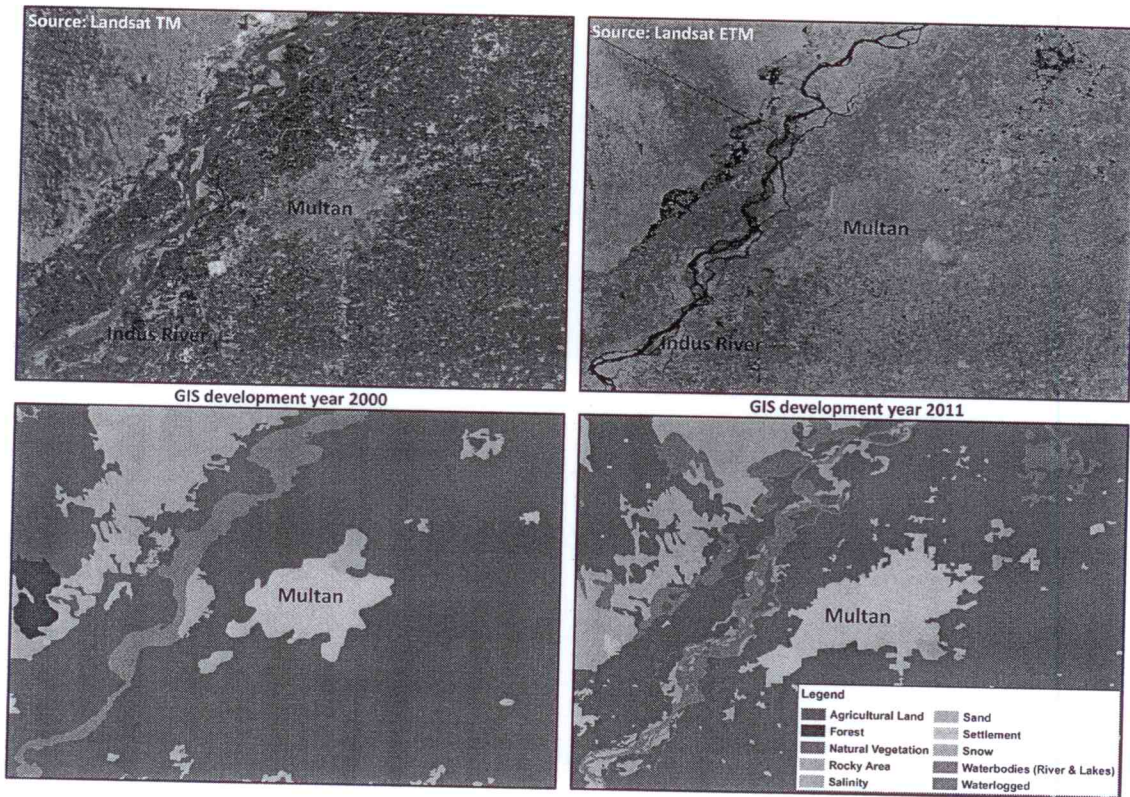
Temporal Analysis of Water Accumulation, Ataabad Northern Pakistan

## National Environmental Management Information System

In 2011 the Ministry of Disaster Management initiated a project for the effective implementation of the National Environmental



Information Management System (NEIMS) at the national level. The objectives of the project include development of temporal environmental monitoring applications at national level, analysis of dominant environmental changes covering parameters such as; air pollution, water, biodiversity (agriculture, forest), desertification (water logging, salinity), sea surface temperatures mapping and trend analysis. The project would contribute to the promotion of sustainable development through building of national capacity in developing, managing and utilizing environmental information for informed decision making.

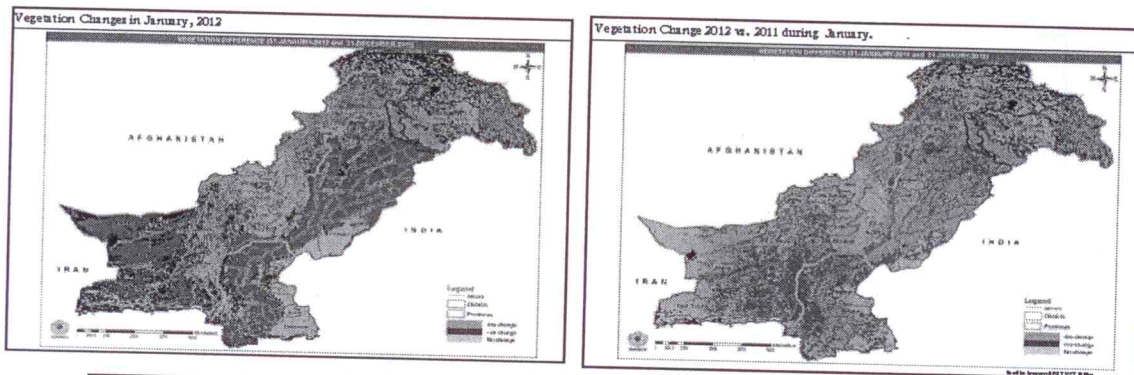


Land cover changes between year 2000 & 2011, Multan, Southern Pakistan

## Agriculture

Pakistan is country of diverse agro-climatic regions and agriculture plays a pivotal role in the economy as it contributes 21% to the national GDP. Agriculture provides employment to 45% of the country's labor force. Satellite-based monitoring of crops was started in Pakistan in 2005 in collaboration with FAO, UN. Integrated use of remotely sensed data has been conclusively demonstrated to improve agriculture statistics reporting in Pakistan. Since 2007, country-wide statistics are being provided to decision-makers and stakeholders for agriculture development, planning and policy formulation.

A monthly Pakistan Satellite-based Crop Monitoring System bulletin is also being published since January 2011. It provides critical and timely actionable reports to agencies involved in monitoring of agriculture. The bulletin is available at [www.suparco.gov.pk/pages/pak.scms.asp](http://www.suparco.gov.pk/pages/pak.scms.asp).



### Crop Statistics: 2011-12

The final estimates by SUPARCO for area, yield and production of autumn potato crop is as follows:

Potato: Autumn Crop, 2011-12			
Province	Area 000 ha	Yield tons/ha	Production million tons
Punjab	244.48	21.2	5.18
Khyber Pakhtunkhwa	7.69	12.9	0.099
<b>Total</b>	<b>252.17</b>	<b>20.9</b>	<b>5.279</b>



## **Land Cover Mapping**

A project on Land cover Mapping of Pakistan has been initiated by SUPARCO in collaboration with UN-FAO. The project aims to map the land cover of the country in two phases. The elements of the project are to develop a harmonized land cover classification and mapping strategy for Pakistan using Land Cover Classification System (LCCS) concepts and methods, improve linkages between global, regional and national studies on land cover and the environment. The first phase of the project is planned to be completed in October 2012.

## **4. Pakistan Geospatial Information Management System**

A consortium comprising SUPARCO, Population Census Organization (PCO), and Survey of Pakistan (SoP) has been mandated to devise and implement a National Spatial Database Infrastructure (NSDI) in Pakistan. Its aim is to:

- Define the approach needed to ensure that Pakistan's geospatial information infrastructure meets the needs of the country
- Provide a framework for effective decision making by government functionaries
- Ensure the availability of priority geospatial data to all concerned quarters.

Remote sensing is also gaining popularity in a wide domain of natural resource and environmental applications in Pakistan and a number of public and private sector organizations are engaged in developing value added products pertaining to geo-information.

National agencies responsible for cartography and mapping are also extensively utilizing remote sensing data and products, web based GIS applications to support projects of national significance are being developed and open access to a wide range of geospatial data is now being allowed to users in the country

## **5. Future Plans**

Pakistan is looking forward to collaborate with international organizations in finalization of national policy on spatial data infrastructure and standardization of data sets. It also plans to create awareness in country for geo-spatial technologies and its importance in decision support system.

