

# Geographic Information System (GIS) Applications in SUPARCO

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## Introduction

A Geographic Information System (GIS) is a general purpose tool similar to a Database Management System. It was designed to handle and manage large volumes of spatial data derived from a variety of different sources. A GIS can efficiently store, retrieve, manipulate, analyze, and display these spatial data according to user-defined specifications. Originally most of the operational GIS were designed to use data from various sources and remote sensing data was only one of them. But nowadays Satellite Remote Sensing (SRS) data on account of its cost and time effectiveness has obtained a significant role in creating and maintaining a digital resource geographic information database when integrated with a GIS.

SUPARCO has carried out numerous application projects for users of SRS and GIS data and applications. Some of the projects undertaken are discussed below:

## Bunji Hydro Electric Power Project

SUPARCO along with Bunji Hydropower Consultants BHC carried out pre-feasibility study for the Bunji Hydro Electric Power project. SUPARCO focused on the processing and interpretation of satellite imagery, preparation of GIS layers (roads/tracks, towns/villages, rivers, drainage network, forest etc.), Development of Digital Elevation Model (DEM) along with contours

having interval of 10m. The proposed dam & tunnel sites were demarcated, and different extents of dam reservoir capacity were simulated to visualize its impact on the environment and surrounding areas. Under the HRD program training was given to the WAPDA officials on use and applications of remote sensing and GIS.



## Rapid Response Mapping Tool

It was realized during mapping of flood-2010 that a large number of maps were required to be prepared on daily basis according to the most recent situation. Therefore a customized GIS based tool was developed to enable automated creation of maps according to the defined criteria. The purpose

of this customized tool was to create professional and standardized maps in shortest possible time and to simplify map development to few click operation. It also facilitates undertaking different analysis and provide results for a range of datasets for various applications such as estimation of the affected settlements and infrastructure and aggregated and separated calculation of affected areas etc.

### **Digitization of Karachi Circular Railway (KCR) Line and Delineation of Encroachments on Railway Land**

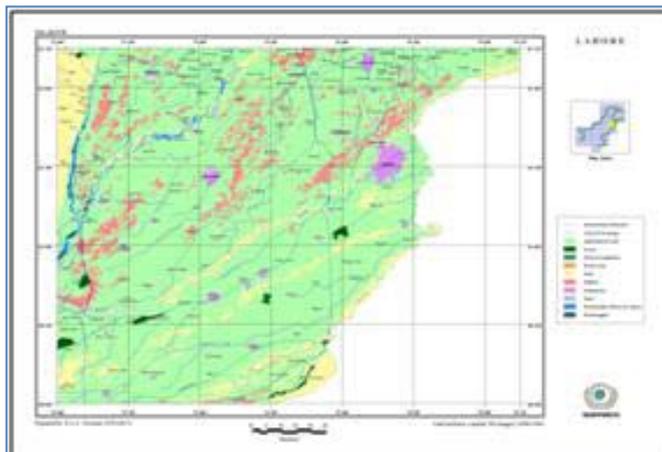
Karachi Circular Railway required to update old survey maps (1945) of railway line and update status of their land on both sides of the rail track for further planning. It approached SUPARCO to carry out a study for delineation of old track.



SUPARCO used latest satellite imagery, GPS ground surveys along with existing KCR maps/drawings to identify and measure encroachments along the said tracks. Also the existing outdated maps/drawings prepared in 1945 by the British Administration were updated.

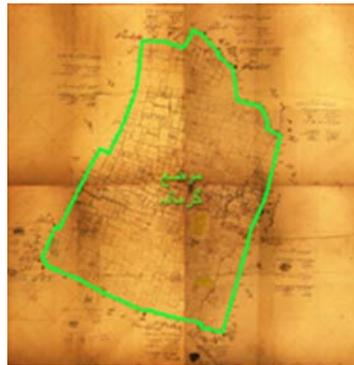
### **National Landuse Plan of Pakistan**

Ministry of Environment, Govt. of Pakistan initiated a project titled 'National Landuse Plan', in April 2001. SUPARCO as a stakeholder was assigned the responsibility to generate Satellite Remote Sensing (SRS) data based thematic layers of the existing landuse in the country. These landuse layers included agricultural land, forests, rocky areas, water bodies, waterlogging, salinity, deserts, snow cover and built-up areas. The information provided by SUPARCO and other collaborating organizations has been integrated for further analysis and use by the concerned organizations.



## Spatial Mapping of Land Revenue Maps

SUPARCO is carrying out a project on 'Spatial Mapping of Land revenue Maps' for the Government of Punjab. In this project, the old land revenue maps (Musavis) are converted into digital format and are spatially referenced using satellite imagery.



Musavi



Latest Satellite Image of Musavi Area

## Conclusion

GIS along with its allied technologies has become an industry in itself. SUPARCO is the pioneer in introducing these technologies in the country. Turnkey solutions and services are being provided to different users in varied fields including but not limited to agriculture, forestry, landuse/landcover, water resources, coastal and marine applications, surveying, vehicle tracking and navigation etc. SUPARCO provides technical assistance for collaborative research/commercial projects and conducts technical training in the related fields of SRS & GIS for users / organizations both in public and private sectors. Under GIS applications programme, SUPARCO has also developed databases pertaining to various thematic applications.