

***“DEVELOPMENT OF STANDARD BASED UTTARAKHAND STATE
GEOPORTAL FOR DECENTRALISED GOVERNANCE”***

SSDI

(STATE SPATIAL DATA INFRASTRUCTURE)

**GOVERNMENT OF
UTTARAKHAND**



STATE SPATIAL DATA INFRASTRUCTURE (SSDI), GOVERNMENT OF UTTARAKHAND

Background

The existing e-Governance system is now shifting towards g-Governance system, i.e. geospatial Governance system. In the recent years, with increasing emphasis on timely response to local people's aspirations and needs, and on setting up systems for effective planning and administration, concept of g-Governance is gradually gaining ground. </br>

It is hoped that the coming decade will see this major transformation of e-Governance systems to g-Governance systems. Under the g-Governance system, geospatial information will be quickly accessed as digital maps through a Geoportal by clicking few mouse buttons on a computer. Geoportal is a web based geo-database accessible to the end user through a computer browser. </br>

Web-accessible geo-database is an important requirement in sharing of up-to-date geo-spatial data from the data provider to the end user. Primary goal of such a geo-database is to effectively manage geo-spatial data and related metadata so as to facilitate their delivery to the end-users through the GeoPortal. A GeoPortal is capable of providing access to a wide range of data and information through provision of interoperable geographic information services that allow a user to browse and download the required geo-spatial information usually made available by a host of associated organisations. Development of a geo-database interfaced through a GeoPortal is considered as an important requirement in sharing and exchange of geo-spatial data for establishing g-Governance systems. The Geo Portal also provides access to metadata and acts as a gateway to a network of geo-spatial data repositories. Geoportal also acts as a single window gateway to an extensive metadata catalog to search and discover available data .

With above improvement possible in access to geospatial data on one hand, the process and practice of planning are getting decentralised to lower area units (e.g., districts, blocks, or villages), on the other, to make those area-specific and responsive to local people's aspirations and needs. Twenty-nine and eighteen sectors have been identified in the Eleventh and Twelfth Schedules of the Constitution respectively where the panchayats and nagarpalikas (municipalities) are expected to draw up developmental strategies. The XI Five Year Plan (2007-2012) lays emphasis on the need for building the capacity of these Institutions to ensure that schemes/programmes evolved at the ground level are technically viable and effectively coordinated with higher level strategies. To enforce accountability, the Plan further highlights the requirement of sharing developmental information with the beneficiaries. Evolving technically viable schemes/ programmes at the ground level being complex and information-intensive requires use of relevant geographical (spatial) data and appropriate tools/ technologies for their management and analysis.

In spite of several initiatives launched by the Government over the past decades to promote the use of spatial data and tools/technologies like GIS, GPS, DGPS, and Remote Sensing at different levels of planning, there has not been adequate improvement in the quality of resource management decisions/ strategies. Non-availability of and inaccessibility to spatial data of desired resolution and currency, incompatible data sets; lack of user-friendliness of the processing tools; and inadequate capacity amongst the end-users have been the major bottlenecks. It has therefore been imperative to improve the

spatial data management practices and appropriately align the tools/ technologies with the work flow or business processes of the panchayats/ nagarpalikas in the framework of Spatial Data Infrastructures (SDIs).

Context

Taking note of some of the issues stated above, several policy level changes have been brought about recently. For providing better access to the spatial data holdings of different national level Survey/Data Providing Agencies, Government of India has constituted the National Spatial Data Infrastructure (NSDI) in 2006. The National Map Policy has been further liberalized to make available spatial data sets as Open Series Maps to support developmental decision-making. Different Ministries and Departments working in the sectors of Land Resources, Water Resources, Biodiversity, Agriculture, and Disaster management have framed strategies highlighting the utility of spatial data and technologies in their work flow or business processes and decision-making. State Governments are increasingly showing interest in setting up State Level Spatial Data Infrastructures (SDIs) to support Decentralised Planning. Several State Governments like Government of National Capital Territory of Delhi, Kerala, Karnataka, West Bengal, Jammu & Kashmir, Haryana etc. have already launched initiatives to develop State level Spatial Data Infrastructures (SSDIs). State level Coordination Steering and Executive Committees have been set up to support implementation of SSDIs.

</br>

Information & Communication Technologies (ICT), on the other hand have further evolved with advancements in the fields of Database Management; Workflow Management; Internet; and Web-based Services. Under the new/revised policies and the emerging scenario of requirement of SDIs, spatial data management strategies/ICT set up of organisations are required to be re-oriented/upgraded with the deployment of advanced tools/ technologies. Databases of various Data Providing Organisations need to be re-engineered so as to make the relevant data sets available and accessible to potential user agencies like panchayats, nagarpalikas, Line Departments, or the civil society. Emerging concepts like Enterprise GIS, Geo-spatial Interoperability; Geo-Web Services; Geo-visualisation; and the Geo-Semantic Web etc. in this context are required to be explored and utilized.

The concept of Spatial Data Infrastructure (SDI)

Spatial Data Infrastructure (SDI) is a collection of technologies, policies, institutional arrangements, financial and human resources to facilitate availability, access and effective utilization of spatial data. SDI provides an environment for connecting user applications to appropriate data sets over a network (e.g. Internet) either through a direct access mechanism or via services. Core technical components of an SDI include Databases, Catalogues, Geo-processing/ catalogue services, and User applications in the form of software utilities built on the data sets or services to address specific information needs of the user community

SDI is potentially capable of providing the requisite spatial data/information support in the task of operationalising the concept of Decentralised Planning. Under NRDMS, several tools/ technologies useful in setting up and using SDIs have been developed and tested in the recent past in different real-life environments/application studies.

**DISTRICT WISE LIST OF SPATIAL DATA LYERS DEVELOPED IN THE
UTTARAKHAND STATE**

District	Department	Spatial Lyres
Almora	Police Department	Kotwali Boundary, Thana Boundary, Reporting Chaukee, Police Barrier, Kotwali Head Quarter, Thana Head Quarter, Police line, SP Office, Mahila Thana Boundary, Mahila Thana Head Quarter,
	PWD	District Boundary, Block Boundary, Villages, National Highway, State Highway, Major District Roads, Other District Road, Village Roads, PMGSY Roads, PWD Guest Houses
	Health Department	Base Hospital, District Hospital, Women Hospital, Civil Hospital, Community Health Centers, Primary Health Centers, Additional Primary Health Centers, Ayurvedic Hospital, Allopathic Hospital, District TB Unit, DOT Centers, Child and Maternity Welfare Centers.
	Education Department	Government Inter Colleges, Inter Colleges, Government Girls Inter Colleges, Government High School, Government Girls High School, High School, Junior High School, Primary Schools.
	Election Department	Assembly Constituency Boundary, Polling Booths.
	Jal Nigam Department	Perennial Streams, Non-Perennial Streams, Water Supply Schemes, Hand pumps
	Forest Department	Reserve Forest, Civil Forest, Barren Area
	Agriculture Department	Agricultural Land
	Revenue Department	Digital Cadastral Maps of Village Patherkot, Village Phalseema, Village Barsila, Village Paner
Nainital	Police Department	Kotwali Boundary, Thana Boundary, Reporting Chaukee, Police Barrier, Kotwali Head Quarter, Thana Head Quarter, Police line.
	PWD	District Boundary, Block Boundary, Villages, National Highway, State Highway, Major District Roads, Other District Road, Village Roads, PMGSY Roads, PWD Guest Houses

	Health Department	Base Hospital, District Hospital, Women Hospital, Civil Hospital, Community Health Centers, Primary Health Centers, Additional Primary Health Centers, Ayurvedic Hospital, Allopathic Hospital, District TB Unit.
	Forest Department	Reserve Forest, Civil Forest,
	Agriculture Department	Agricultural Land, Barren Land
	Revenue Department	Digital Cadastral Maps of Village Bajun, Village Gahalna, Village Mangoli
Pauri Garhwal	Police Department	Kotwali Boundary, Thana Boundary, Reporting Chaukee, Police Barrier, Kotwali Head Quarter, Thana Head Quarter, Police line.
	PWD	District Boundary, Block Boundary, Villages, National Highway, State Highway, Major District Roads, Other District Road, Village Roads
	Forest Department	Forest Boundary
	Agriculture Department	Agricultural Land, Barren Land
	Revenue Department	Digital Cadastral Maps of 47 Villages of Kot Development Block of District Pauri Garhwal
	Jal Nigam	Perennial Stream, Non-Perennial Stream
Tehri Garhwal	Panchayatraj Department	District Boundary, Block Boundary, Villages, Gram Panchayat.
	Election Department	Assembly Constituency Boundary, Polling Booths.
	Forest Department	Forest Boundary
	Agriculture Department	Agricultural Land, Barren Land
	Jal Nigam	Perennial Streams, Non-Perennial Streams
Rudraprayag	PWD	District Boundary, Block Boundary, Villages, Roads
	Forest Department	Forest Boundary
	Agriculture Department	Agricultural Land, Barren Land
	Jal Nigam	Perennial Streams, Non-Perennial Streams
Udham Singh Nagar	Police Department	Reporting Chaukee, Police Barrier, Thana Head Quarter,
	PWD	District Boundary, Block Boundary, Villages, Roads



PROGRESS SUMMARY

1.0 BACKGROUND

National Spatial Data Infrastructure (NSDI) defined as the technologies, policies, and people necessary to promote sharing of geospatial data throughout all levels of government, the private and non-profit sectors, and the academic community. The goal of this Infrastructure is to reduce duplication of effort among agencies, improve quality and reduce costs related to geographic information, to make geographic data more accessible to the public, to increase the benefits of using available data, and to establish key partnerships with states, counties, cities, tribal nations, academia and the private sector to increase data availability.

2.0 OBJECTIVES OF THE PROJECT:

The fundamental objectives of the present project are:

- i. To develop a standards-based GeoPortal and Clearinghouse for Uttarakhand State and demonstrate its utility in Decentralized Governance.
- ii. To build technical capacity of various government departments in geographic information management for sustained maintenance and use of the Portal, and
- iii. To increase awareness and understanding of the vision, concepts, and benefits of Spatial Data Infrastructure at different hierarchical levels.

2.0 WORK DONE DURING THE PERIOD (1st Nov 2012 to 31st October 2014)

(State in detail targets completed/Work done along with adequate technical details)

A brief account of work done on SDI development at District and State level; Web GIS Development; Uttarakhand Geoportal Development; and Technical Capacity Building is presented in the following paragraphs.

2.1 Spatial Data Infrastructure Developed

During the reported period the following District and State level SDI has been developed.

2.1.1 District Level SDI

- 2.1.1.1 For six districts (i.e., Almora, Nainital, Rudrapraya, Pauri, Haridwar and Tehri) of the Uttarakhand State, the following SDI has been prepared: Landuse pattern, Streams, Rivers, Lakes and Dams.
- 2.1.1.2 For five districts (i.e., Almora, Nainital, Rudraprayag, Pauri and Tehri) of the Uttarakhand State, the following SDI has been developed in association with the line departments, i.e. PWD: Roads. The non-spatial data are also attached.
- 2.1.1.3 For two districts (i.e., Almora and Nainital) of the Uttarakhand State, the following SDI has been developed in association with the line departments, i.e., PWD: Classified Roads (i.e., *National Highways State Highways, Minor Districts Roads, Other District Roads, Village Roads, Pradhan Mantri Gramin Rojgar Road, Unmatelled Roads, Metalled Roads*). The non-spatial data are also attached.
- 2.1.1.4 For three districts (i.e., Almora, Nainital, Pauri and Udham Singh Nagar) of the Uttarakhand State the following SDI has been developed in association with the Police Department: Kotwalis Boundary; Thanas Boundary; Location of Kotwali and Thana Headquarters; Locations of Police Barriers, Police Chaukees and Fire Stations. Besides these Non-Spatial data of Kotwali, Thanas including crime data are attached.
- 2.1.1.5 For two districts (i.e., Almora and Nainital) of the Uttarakhand State the following SDI has been developed in association with Education and Health Departments: Locations of Education Centres (i.e., *Primary Schools, Junior High Schools, High Schools, GIC, GGIC, Degree Colleges and Unviversity Campus, and University*); and Location of Health Centres (i.e., *Base Hospital, District Hospitals, Primary Health Centres, Community Health Centres, Ayurvedic Centres, Homeopathic Centres, TB Clinics, Dot Centres and Child and Maternity Welfare Centres*).
- 2.1.1.6 For two districts (i.e., Almora and Tehri) of the Uttarakhand State the following SDI has been developed in association with the Election Department: Assembly Constituencies Boundary, Locations of Polling Booths with attribute data.
- 2.1.1.7 For two districts (i.e., Almora and Nainital) of the Uttarakhand State the following SDI has been developed in association with the Tourism Department: Tourist Spots, Tourists Sites, Relegious Places, National Parks, Lakes, Wild Life Centuries, Rest Houses, Hotels etc.
- 2.1.1.8 For one district (i.e. Almora) of the Uttarakhand State the following SDI has been developed in association with the Forest Department and Watershed Management Department: Macro and Micro Watershed Boundaries, Non-Perennial and Perennial Streams, Natural Springs, Canals, Panchyat Ghars, Temples, Reserved Forest, Civil Forests, Guest Houses.
- 2.1.1.9 In four districts (i.e., Pauri, Almora, Bagheshwer and Nainital) the work of Modernization of Cadestral Maps using GIS has been started by imparting handson training to the personnel of Watershed Management and Revenue Departments. Development of digital cadestral maps of some villages have been completed by the concerned departments as detailed below:
- District Pauri – Digital Cadastral Mapping of 47 villages has been completed.
 - District Almora – Digital Cadastral Mapping of 50 villages has been completed.
 - District Bageshwer- Digital Cadastral Mapping of 5 villages has been completed.
 - District Nainital - Digital Cadastral Mapping of 5 villages has been completed

2.1.2 State Level SDI

During the reported period, the following State level Spatial Data Infrastructure have been developed: State Boundary, District Boundaries, District Headquarters with their Attributes, Roads, Geological Formations, Vegetation Line (1972, 1990, 1999 and 2010), Glaciers (total-1439), Rivers and Streams, Glacial Lakes (total-127), Uttarakhand Devastation 2013 (about 11702 incidences of damage, i.e., buildings, roads, bridges, culverts, natural resources etc sites recorded under MANU project of the NRDMS Division, DST, Government of India).

2.2 Development of Web GIS

For developing UK Geoportal, the following WMS and WFS services have been created.

2.2.1 Development of WMS Service

- i. Created spatial database of all the district and state level SDI (as mentioned in Section 2.1.1 and 2.1.2 above) in Arc GIS 9.1 software.
- ii. Created Spatial Index for using open source software Degree-wms.
- iii. Created feature type definition (schema) file in degree-wms for each shape file (layer).
- iv. In wms_configuration.xml file, bounding box and SRS were edited for each layer.
- v. For each layer, style file created.
- vi. To get map, getmap files created for each layer.

2.2.2 Development of WFS Service

- i. For each shape file (layer) feature type definition (schema) file created.
- ii. In wms_configuration.xml file bounding box and SRS were edited for each layer.
- iii. To get feature, describe feature, configure feature and get feature files created for each layer.

2.3 Development of Uttarakhand Geoportal

All the above mentioned WMS and WFS services have been published into the Uttarakhand Geo-Portal which is tagged with the India Geoportal.

2.4 Technical Capacity Building And Awareness

To build technical capacity of various government departments in geographic information system development and management for sustained maintenance and use of the Geoportal; and to increase awareness and understanding of the vision, concepts, and benefits of Spatial Data Infrastructure, the following 7 training workshops at different districts head-quarter and at the Centre of Excellence for NRDMS in Uttarakhand, Kumaun University SSJ Campus Almora were organised. During the training workshops 370 administrators/planners/technocrats/engineers of district Almora, Nainital, Rudrapur, Pauri and Tehri were sensitized about the vision, concepts and benefits of Spatial Data Infrastructure and, SDI and GIS development techniques.

- 2.4.1 Seven Day Training Workshop on GIS Development of the Officials of the UCOST Dehradun, organized by the COE NRDMS, Kumaun University, 25 April -3 May, 2014.
- 2.4.2 Two Day Training Workshop on Modernization of Office Records and Maps for District Planning, organized jointly by COE NRDMS, Kumaun University and DESTO, Vikash Bhawan, Tehri at Collectorate, Tehri, 27-28 January, 2014.
- 2.4.3 Workshop on modernization of land records, organized at the Vikash Bhawan Pauri, District Pauri, and Sponsored by the Uttarakhand State Council of Science and Technology, Government of Uttarakhand and organized by COE NRDMS Almora, 6-7 Sept.2013.
- 2.4.4 Workshop on GIS and Its Applications in Police Administration, organized at the SSP Office Nainital, Sponsored by the Uttarakhand State Council of Science and Technology, Government of Uttarakhand and organized by COE NRDMS Almora, 10th June 2013.
- 2.4.5 Kumaun Division, PWD Engineers' Workshop for GIS Development, Sponsored by the Uttarakhand State Council of Science and Technology, Government of Uttarakhand and organized by COE NRDMS Almora, 11th February 2013.
- 2.4.6 Information Need Assessment Workshop for GIS Development for District Administration and Planning, organized jointly by COE NRDMS in Uttarakhand and District Administration Rudrapur at Collectrate Rudrapur, sponsored by the UCOST, Government of Uttarakhand, Dehradun and DST, Government of India, New Delhi, 2nd January 2013.

- 2.4.7 Workshop on GIS Development and GPS Data Capturing for participants of UGC Refresher Course for Geographers at the Centre of Excellence for NRDMS in Uttarakhand, participants-27 Geographers of four different states, i.e., Maharashtra, Uttarakhand, Uttar Pradesh and Bihar, 3rd November 2012.

2.5 Updating Mechanism and Sustenance of the Uttarakhand Geoportal

For updating of the Uttarakhand GeoPortal a self sustaining updating mechanism has been developed by establishing GIS Cells at Almora, Nainital, Pauri and Tehri district Headquarters. It is proposed that these GIS Cells shall be looked after by the District Coordination Committee (DCC) in which all the Heads of district line departments are members headed by the District Magistrate.

DETAILS OF MANPOWER:

1. **Mr. SANDEEP PETWAL**
Designation: System Analyst
E-mail: ucost.sanjay3@gmail.com
Contact No.: 9412363875

2. **Mr. MAYANK BAHUGUNA**
Designation: GIS Assistant
E-mail: bahuguna340@gmail.com
Contact No.: 9536111083

3. **Ms. DEEPA RAUTELA**
Designation: GIS Assistant
E-mail: deeparautela14@gmail.com
Contact No.: 8057419642