ANNUAL REPORT 2017-18

Odisha Space Applications Centre
Department of Science & Technology
Government of Odisha
www.orsac.gov.in

- **Nodal agency of the state in providing Remote Sensing, GIS and GPS applications solutions to all the departments / offices and agencies of the state.**

- **Nodal agency of the State Government for the purpose of DGPS and ETS survey to facilitate digitization and Geo-referencing of mining maps.**

- **Nodal agency of the state for submission of Geo-referenced digital data (using Geo-referenced image, ETS/DGPS survey outputs) for proposal submission to Central and State Govt. for diversion of Forest land for non-forest use under Forest Conservation Act. 1980**

- **State centre for implementing projects of ISRO, Dept. of Space, Govt. of India in Odisha state.**

- **Nodal agency for implementation of Odisha Spatial Data Infrastructure (OSDI) under Odisha State Data Policy-2015.**

ANNUAL REPORT 2017-18

Odisha Space Applications Centre
Department of Science & Technology
Govt. of Odisha
www.orsac.gov.in

IMPORTANT APPLICATION PROJECTS UNDERTAKEN DURING **2017-18**

NATIONAL LEVEL PROJECTS

- Natural Resources Census (NRC) Landuse Project
- FASAL (Forecasting Agricultural output using Space, Agro-meteorology and Land based observations)
- Coordinated Horticulture Assessment and Management using Geoinformatics (CHAMAN)

CENTRAL & STATE JOINT PROGRAMMES

- DILRMP- (Digital India Land Records Modernisation Programme) - Cadastral Resurvey
- Dissemination of Educational Services through EDUSAT
- Remote Sensing Application for Sericulture Development in Odisha
- OSDI-Odisha Spatial Data Infrastructure

STATE SPONSORED PROGRAMMES

- ODIIS-Odisha Irrigation Information System under Sanitisation of Cultivated and Irrigated area data of Odisha
- Digital Database creation of Irrigation ayacuts/schemes of Odisha
- Monitoring of OIIPCRA (Odisha Integrated Irrigation Project for Climate Resilient Agriculture) project
- Monitoring of Nuapada NAFCC (National Adoptive Fund for Climate Change) project
- Plantation monitoring of Odisha State
- DGPS survey for Forest Diversion Proposals
- Forest Working Plan Input generation for the state
- Geo-spatial Technology for Rural & Urban development programme on web-GIS platform
- Cadastral level Geo-Spatial Database generation (1:4K) for Odisha
- RS & GIS inputs for Comprehensive Development Plan (CDP) preparation of towns
- Odisha Land Bank Development
- GOPLUS- Govt. of Odisha's Portal for Land Use Services
- DGPS survey, Infrastructure and Land use mapping of OTELP/Power-GIS project
- DST Climate Change project--Assessment of erosion prone areas of Odisha State and Study of effects of erosion
- Mining Lease Boundary survey through High-Tech method
- TS/DGPS survey of Miner Minerals of the state

IMPORTANT INITIATIVES 2017-18

- Geo-coordinate library of landmarks/important locations of the state
- Utilization of 'RISAT' all weather satellite data & ISRO 'GAGAN' Network
- Industrial infrastructure data supply services through GOPLUS
- Database for implementing Crop Technology Mission
- Survey and Mapping using Unmanned Aerial System (UAV)
- Hyperspectral Remote Sensing applications
- Training on GIS/GPS/Geospatial Technology

Hon'ble Minister, School & Mass Education, Science & Technology, Govt. of Odisha
Phone : +94-674-2536751

MESSAGE

I am happy to present the Annual Report 2017-18 of ORSAC which reflects significant achievements and contribution of the Centre in assisting the state administration in its mandated objective of appropriate resources management along with accelerated economic growth and sustainable development.

During 2017-18, the centre provided geospatial datasets as inputs for state's development planning process. Various types of decision support solutions are also provided to State Government for effective governance using remote sensing, satellite communication, geo-informatics, Geo-ICT, satellite navigation and computer technologies.

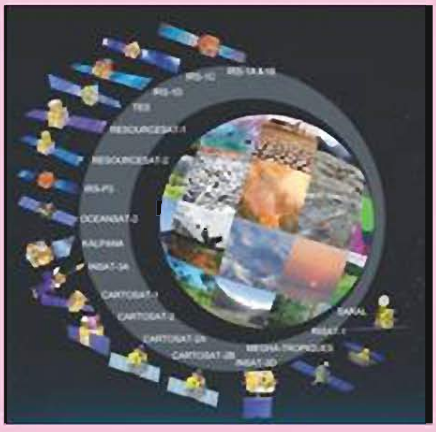
Significant contribution of the center in last year is to establish a platform in the state to facilitate collation of standard spatial data in an inter-operable and open protocol for development planning and e-governance purposes. I am happy to state that The Geospatial World Forum (GWF) conferred the coveted "Geospatial World Excellence Award" to ORSAC during 2017-18 for the project "GPS based tracking of Mineral Carrying Vehicles." The Centre played an important role in providing database solution to state departments for land bank development, establishing vehicle tracking system for mineral carrying vehicles, sanitization of cultivable and irrigated area data of the state, forest Working Plan preparation, urban area database development for Comprehensive Development Plan (CDP) preparations of towns of the state, wasteland mapping of the state, desertification status survey and DGPS based survey of mining areas, minor minerals and for the purpose of forest diversion.

I take this opportunity to record my appreciation for the efforts and activities conducted by the staff of the centre and wish all success to the organization.

(BADRINARAYAN PATRA)
24.5.18

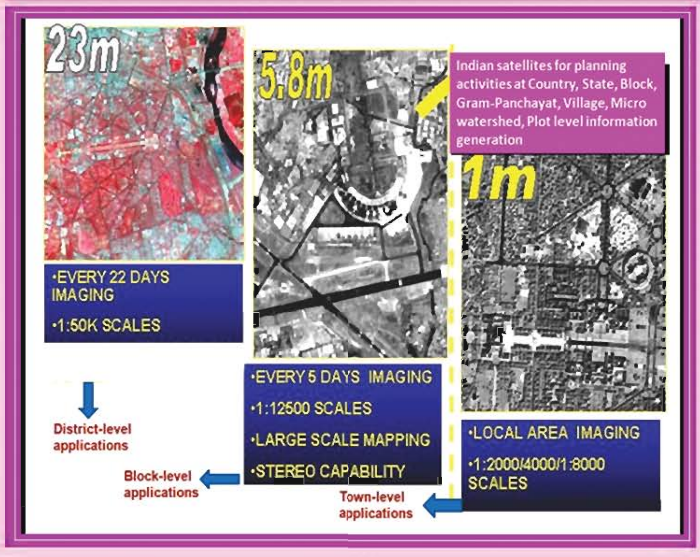
34 year's Service

Data Support for State's development planning initiatives



Presently Odisha is one of the leading state of the country having most of the spatial datasets. Datasets are generated by using Satellite data. 45 data layers relating to natural resources, services, utilities, developed infrastructure and geo-environment are generated and provided to Central & State Government for various development planning initiatives.

During 1985-90 the centre started its efforts in generating datasets at 1:250000 scale by using 80 & 23 m satellite data. Since 2016, the state departments are supported by 1:2000/4000 scale datasets by using 0.3 m satellite data.



Cartosat 2A (0.8 m)

QuickBird (0.6 m)

WorldView (0.5 m)

Revenue Plot level Info

Geo EYE (0.3 m)

Chief Secretary, Govt. of Odisha
and Chairman, ORSAC
Phone : +94-674-2536700
Fax : +91-674-2396660
E-mail : csodi@nic.in

MESSAGE

I am glad to present the Annual Report of Odisha Space Applications Centre (ORSAC) for the year 2017-18 documented for dissemination of information about its activities.

ORSAC has been mandated as the nodal centre for space technology applications in Odisha. It has been immensely contributing to the geospatial database for planning, implementation and evaluation of the developmental interventions in various sectors ranging from farming to forestry, industry use to technological applications. The centre has created a repository of GIS database for the entire State. The objective of the data collected through remote sensing has also been quite helpful in surveillance, monitoring and decision making processes. ORSAC through its technical excellence and strategic work schedule has bagged the prestigious international awards like Geospatial World Excellence Award from the World Geospatial Forum and Special Achievement in GIS (SAG) from Environmental System Research Institute (ESRI), USA.

Presently ORSAC has extended its frontiers of action to mapping of urban land utilization, identification of land for development of land bank, development of irrigated area database, data analysis and UAV applications, assessment of crop condition, mapping of wet and moisture level of soil etc. The Centre has also entered into partnership with NASA, ISRO and Department of Space, Government of India for carrying forward of Research & Development projects in the areas of innovative application of remote sensing technology. I hope the entire ORSAC team will keep up its hard work and search for innovation to achieve newer heights in coming years.

I record my appreciation for the services rendered by ORSAC Team and wish publication of the Annual Report all success.

A.P. Padhi

34 year's Service

Data Support for State's development planning initiatives

At present the major thrust of the centre is to provide geospatial data based solutions for problem solving & decision support system creations for all major departments of the state. Beside that we also generate geospatial datasets using RS images, TS & GPS data and GIS.

The centre is providing solutions in resource management, environment monitoring, infrastructure development, surveillance, sustainable development, food security, resource conservation and asset management.

Principal Secretary
Dept. of Science and Technology
Govt. of Odisha
Phone : +94-674-2536772
Fax : +91-674-2393496
E-mail : dstsec.or@nic.in

MESSAGE

It is my privilege to present the Annual Report 2017-18 of Odisha Space Applications Centre an agency of Department of Science and Technology, Government of Odisha. In recent times, use of Remote Sensing and Geographical Information System for formulation and implementation of public policy has gained wider acceptance. ORSAC is the nodal agency of the State for providing Remote Sensing, GIS and GPS application solutions to various government departments and agencies of the State.

ORSAC also acts as focal point for ISRO & Dept. of Space, Govt. of India for implementing various space application projects in the State as per the guidelines of NRSC, ISRO & Dept. of Space. The centre is also identified as the implementing agency for operationalization of "Odisha State Data Policy" and for maintenance of "Odisha Spatial Data Infrastructure." The centre has also taken initiatives in adoption of new technological applications like UAV (unmanned aerial vehicle) based data acquisition, hyperspectral remote sensing and geo-analytics based web-portal development.

ORSAC has done a commendable job in collection, analysis and dissemination of geographical information for the benefit of various government departments and the people of Odisha. I take this opportunity to record my appreciation of the good works undertaken by the centre in promoting use of spatial data for public good in the State.

Nikunja Dhal
5/5/18

(Nikunja B. Dhal)

34 year's Service

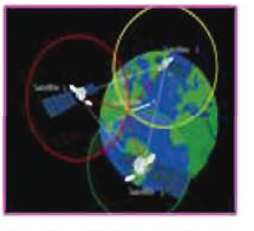
Data Support for State's development planning initiatives

Bringing High-tech technologies at affordable cost & customised solutions to Government departments, public sector undertakings and entrepreneurs.

Most advanced state of the country in utilising precision technologies for data capture, data processing, data integration & analytics and data infrastructure development for development planning purposes.

Data Capture technologies









Data Processing/Analytics/Visualisation






From the desk of
Chief Executive

It is my privilege to present the Annual Report of 2017-18 which reflects upon the significant achievements and contribution of the Centre in assisting the state administration in providing required geospatial data inputs for resources management and development planning. As a multidisciplinary organization and in line with its mandate, the center is continuously engaged in providing support solutions for effective governance using remote sensing, satellite communication, geo-informatics, geo-ICT, satellite navigation and computer technologies. During 2017-18, the center provided datasets to state departments like Revenue and Disaster Management, Industries, Steel and Mines, Water Resources, Energy, Forest and Environment, Agriculture, Commerce and Transport, Tourism & Culture, Home, General Administration, Housing and Urban development and Panchayatiraj Department etc. The centre also provided datasets to public sector undertakings like NTPC, CIL,SAIL, GAIL and MCL etc. It is pertinent to mention here that this year the centre supported the state administration in providing spatial and geo-analytics inputs for land bank development, forest Working Plan preparation, survey of sariyat lands, mineral carrying vehicle tracking, mapping of irrigation ayacuts and irrigated area data sanitization, plantation monitoring, climate change parameter data analysis, desertification status survey, road network connectivity and urban geospatial database development. Further, the centre is identified as the agency for sanitizing the irrigated and agricultural area data of Odisha and development of Web-GIS portal on irrigation.

I take this opportunity to record the initiatives taken for the welfare of the employees in implementing new pay scales as per 7th Pay Commission and introduction of Retirement Benefit Scheme. The HR policy for the centre is also approved by the Government.

I take this opportunity to record my gratefulness to Shri A. P. Padhi, IAS, Chief Secretary who in his capacity as Chairman of the Centre has provided much needed direction and guidance for the growth of the center. I also thank the staff of the center for their immense contribution to the success of the organization in 2017-18.

(Dr. Sandeep Tripathi)

Odisha Space Applications Centre is acting as the apex body of the State for space technology applications and comprises of a pool of multidisciplinary application scientists to undertake remote sensing, GIS, GPS, Geospatial Data management, Geo-ICT and satellite communication technology applications. State Government vide resolution No.3765/ST dated 30th July, 2009 of the Science & Technology Department declared the centre as the sole Nodal Agency for providing remote sensing, GIS, GPS and SATCOM application solution to all Govt. departments, public sector undertakings and other research organisations as per their requirements.

Mandate / Objectives

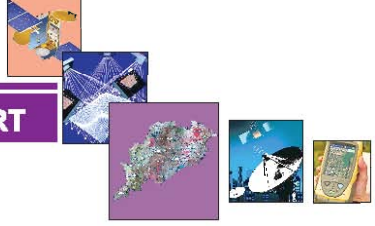
- Establishment of up-to-date library of satellite data, topo-maps, cadastral and Geo-coordinates for the State.
- Demonstration and operationalisation of space technology applications in State for several development planning activities.
- Supply of up-to-date accurate and geo-referenced database to all users of the state.
- Operationalisation of district / block / village level GIS database through internet / Web services.
- Participation in Remote sensing and SATCOM programmes of Indian Space Research Organization (ISRO), Department of Space, Govt. of India.
- Reaching quality teaching to school students uniformly across the state through EDUSAT network.
- Popularization of space technology through Space Information Centre and Vigyan Prasar program.
- Capacity building of Government employees in the use of Remote Sensing, GIS, DGPS & Geospatial Technology for development planning.
- Implementing agency for "Odisha State Data Policy" and maintenance of "Odisha Spatial Data Infrastructure" (OSDI).
- Demonstration of multi-disciplinary application projects for mapping, monitoring and management of natural resources and environment.

Resources & Infrastructure

Human Resources

24 Scientists and 46 Engineering/ Technical staff having specialization in optical and microwave Remote Sensing, Image Processing, GIS, ICT, Digital Photogrammetry, GPS & Computer Applications etc. having subject background of applied geography, geology, physics, botany, oceanography, marine science, mathematics and civil/mining/electrical engineering etc. are working now at the centre.

For completion of multiple sponsored projects, the centre have engaged more than 80 contractual staff (project scientists, project assistants, engineering assistants, MIS/CAD and GIS operators) during 2017-18.



HARDWARE

System	Nos
Blade servers (2 x Intel Xeon Ten Core E5-2660 V3 @ 2.6 GHz)	3
Blade servers (2 x Intel Xeon Eight Core E5-2650 V2@ 2.6 GHz)	4
Blade servers (2 x Intel Xeon 22 Core E5-2699 V4@ 2.2 GHz)	2
Blade servers (2 x Intel Xeon 16 Core E5-2667 V4@ 3.2 GHz)	2
SuperMicro Blade servers (Intel® Xeon E5-2609V4 processors X 2 CPU)	8
Rack Server (2 x Intel Xeon Processor E5-4620 v2@2.6GHz)	6
Dell Rack Server	5
Xeon based Tower Servers	6
High-end Workstation for Digital Photogrammetry	4
High-end Desktop (Intel core-i5) with Graphics and 24" LCD Monitor	50
Desktop - Intel core-i5 and i3	24
Workstation - Intel core-i7	18
Desktop - Pentium Quad core	50
Pentium IV	35
Storage	
On -Line Storage (36 TB) with Tape Backup System	1
Mini - Storage attached with Blade servers (14TB)	1
SAN Storage attached with Blade servers (16TB)	1
Scanner	
(VIDAR) AO Size (Titan H36) (1 - colour, 1 B&W)	2
HP - A4 size	3
Printer/MFP	
Inkjet / Deskjet / Laserjet - A4 / Multi Function Printer	18
HP ColourLasser Jet 5550dn - A3	1
Plotter	
HP Design Jet 4000 —A0 (36 inch)	1
HP Design T 7100 — EA0 (42 inch)	1
GPS/DGPS	
Hand held GPS (Garmin — 12)	21
DGPS (Base) + ROVER (Trimble/Leica)	1
ETS (Total Station)	4+10
SAT COM	
ISRO supported Gramsat/Edusat Studio Earth Station	

SOFTWARE

GIS	Nos
Arc GIS Desktop Version 10.5.1	24
Auto CAD + Auto CAD Map	1+1
Geomedia Webmap/Desktop	3
Terrago Geo PDF (2D & 3D)	1

Image Processing	
ERDAS WITH LPS (Leica Photogrammetry Suite)	2+4
ENVI / TNT MIPS / ERDAS APOLLO (Enterprise GIS)	4
Intergraph Geospatial Server 2016	3
Arc GIS Server	2

Others	
ORACLE 11g R2/12c	1
Postgress EDB (Enterprise + Developer)	2
OfficeStd 2013 and 2016 SNGL OLP NL	5
VMware Virtualization Kit	1
SYMC ENDPOINT PROTECTION 12.1	11
EMS Tool (CA UIM)	1
RDBMS (+) MS SQL 2008 (2) ORACLE	1
Client Supporting / CITRIX	70
Exchange Server 2013	1

Accounts

Receipt

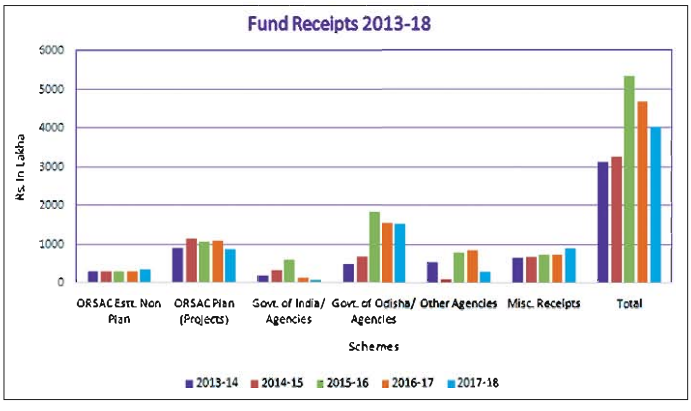
(Rupees in Lakh)

Schemes	Nature of funding	2013-14	2014-15	2015-16	2016-17	2017-18
ORSAC Estt. Non Plan	Grant-in-aid	309.00	309.00	309.00	309.00	355.35
ORSAC Plan (Projects)	Projects	900.00	1146.12	1063.53	1100.00	867.25
Govt. of India/ Agencies	Projects	195.28	318.86	595.70	131.33	72.39
Govt. of Odisha/ Agencies	Projects	492.48	679.95	1839.71	1572.91	1524.95
Other Agencies	Projects	560.45	120.09	786.66	845.61	305.12
Misc. Receipts		655.36	671.98	746.33	729.70	891.82
Total		**3112.57**	**3246.00**	**5340.93**	**4688.55**	**4016.88**

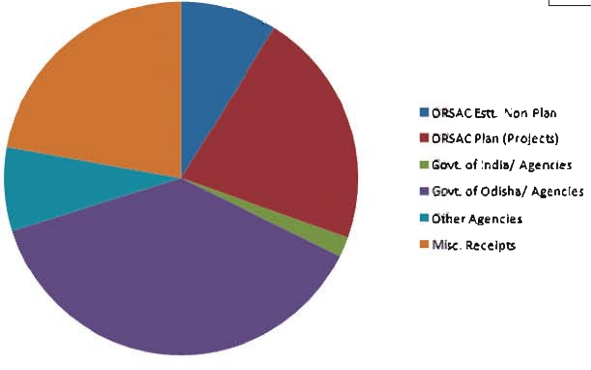
Expenditure

(Rupees in Lakh)

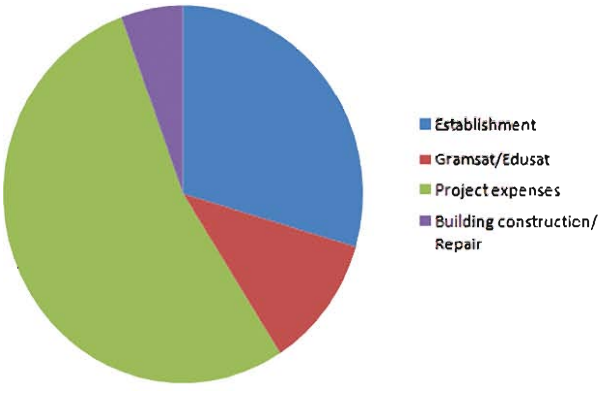
Head of expenditure	2013-14	2014-15	2015-16	2016-17	2017-18
Establishment	660.53	658.33	831.64	937.71	816.81
Gramsat/Edusat	135.31	835.30	205.61	151.75	315.87
Project expenses	869.18	1092.00	503.59	819.19	1478.64
Building construction/ Repair	96.23	59.66	47.83	121.77	153.64
Total	**1761.25**	**2645.29**	**1588.67**	**2030.42**	**2764.96**



Receipts: 2017-18



Expenditure: 2017-18



Odisha Spatial Data Infrastructure (OSDI)

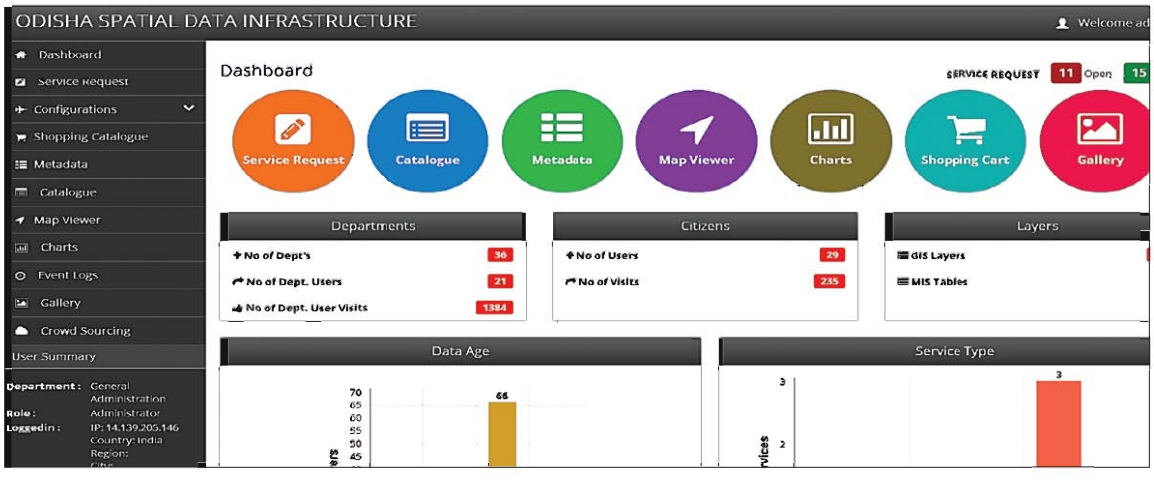
The Government of Odisha adopted the "Odisha State Data Policy (OSDP)", in the line of NSDI to facilitate easy access and sharing of Government owned data in open format for supporting sustainable and inclusive governance and effective planning; for implementation and monitoring of developmental programmes; for managing and mitigating disasters and for scientific research aiding informed decisions for public good vide Gazette of Govt. of Odisha Notification No. 1270, 29th August 2015. The centre has the responsibility to implement the policy in the State. Department of Science & Technology, Govt. of India has sponsored the OSDI Project to create Odisha Spatial Data Infrastructure. This project duration is for three years and its budget is shared between GOI and State Govt. in 60:40 ratio respectively.

Scopes under the Project

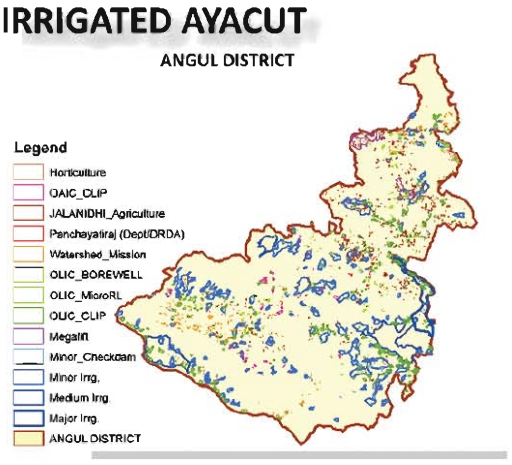
- Providing a design for the Geoportal and Clearing House
- Supplying the required hardware/software
- Infrastructure deployment and integration of software and hardware for the OSDI
- Data Modeling
- GIS Database preparation in Postgre SQL
- Geoportal & Customization of GIS solution
- Porting OGC-compliant services

Thirty-five (35) Departments of Govt. of Odisha have identified their Nodal Officers to put forth the spatial data requirements and its use by the respective departments for their decision making process. Till date, ORSAC has conducted four Workshops. The first one was an appraisal about OSDI to the Govt. Departments before taking up the project, the second one was about the Awareness-cum-Requirement Workshop and the third one, a one-day event organized on 7th April, 2017 involving the nodal officers of 35 Govt. Departments of Govt. of Odisha to show case the available data layers and models. The fourth one was one-day workshop on 18th April, 2018 involving nodal officers for Live Demo of OSDI Geoportal.

Dashboard of the Geo-Portal Clearing House



Geo-spatial Database of Irrigation Projects & Schemes



In Odisha state, besides Water Resources Department, Agriculture Dept., Panchayatiraj Dept. and Dept. of SC & ST are engaged in irrigation activities. Database on status of irrigation ayacuts, its network and site map of scheme implementation is not available for the state in systematic manner and also single window data availability facility is not created. Considering the present situation, Dept. of Water Resources has taken initiative to create digital data base of all ayacuts and irrigation schemes of the state in collaboration with the centre. At present, data from Dept. of Water Resources, (Irrigation Dept.-Major, Medium, Minor, Creek; Watershed Mission, OLIC and Mega Lift); Dept. of Agriculture (Jalanidhi-I, OAIC-Jalanidhi-II, Horticulture); Dept. of SC/ST (ITDA) and Dept. of Panchayatiraj (DRDA /BLOCK) are collected and GIS database generation is continuing. During 2017-18 2.3 lakh numbers of maps in cadastral scale are generated along with GIS database generation.

Department	Organization	Category/ Scheme	No. of Projects & Schemes
Dept. of Water Resource	MAJOR	MAJOR Irrigation Project	16
	MEDIUM	MEDIUM Irrigation Project	53
		Creek	23
	MINOR	MINOR Irrigation Project	3922
		Check Dam	3182
	O.L.I.C	CLIP (Community Lift Irrigation Project)	24993
		STW (Shallow Tube Well)	1150
		MRL (Micro River Lift)	504
		BW (Bore Well)	40120
	Mega Lift	Clusters	102
Dept. of Agriculture	Agriculture	JALANIDHI 1	125536
	OAIC	MRL	6080
		CLIP	1402
	Watershed Mission	Scheme	10852
	Horticulture	Scheme	5968
Dept. of SC & ST	SC & ST Dept. (ITDA)	Scheme	395
Dept. of Panchayatiraj	DRDA/ BLOCKS	Scheme	5014
Total			229312

Odisha Irrigation Web-GIS portal

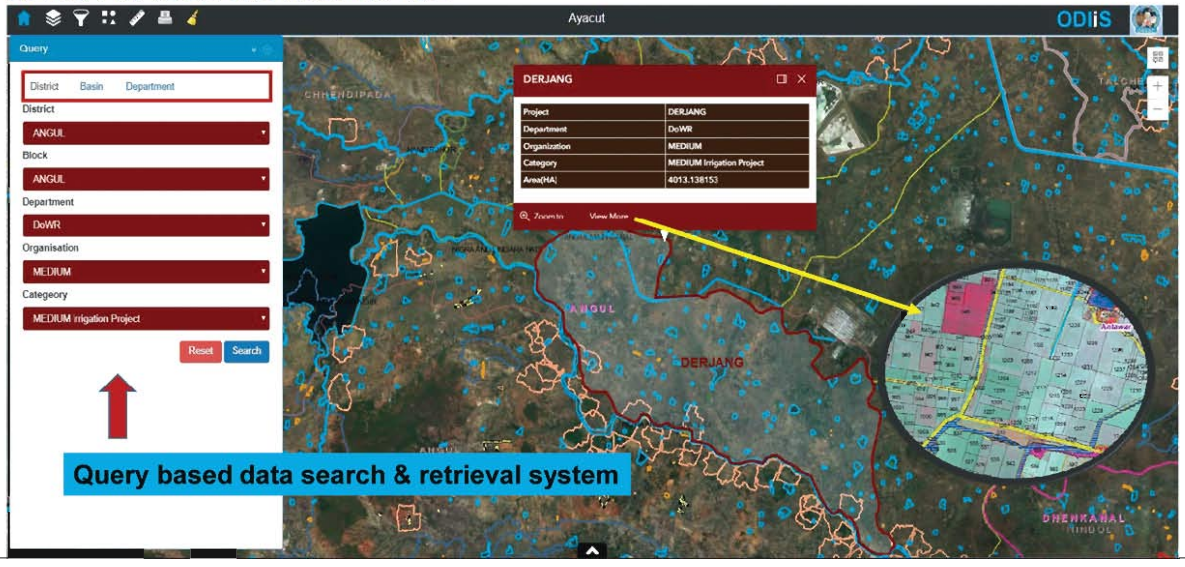
ODIIS – Odisha Irrigation Information System

- Digital Database of area under Ayacut and different irrigation schemes in Georeferenced cadastral base are web enabled to create the ODIIS portal.
- Web based facility created to access the maps and data in query mode – Department wise, Organisation and scheme wise.
- Visualisation and identification of duplicate reporting and overlapping of ayacut – Inter & Intra departmental.
- High resolution image integration, revenue cadastral maps and ayacut maps are integrated to estimate actual cultivable lands in ayacut and plot level irrigated land estimate.
- Dashboard to show the GCA, CCA, Irrigation Intensity and statistics about different schemes on click over a district or Block. Facilities to know about Block level Irrigation Intensity to have better efficiency study and implementation of schemes.
- Web based portal as a repository of Assets of irrigation infrastructure.

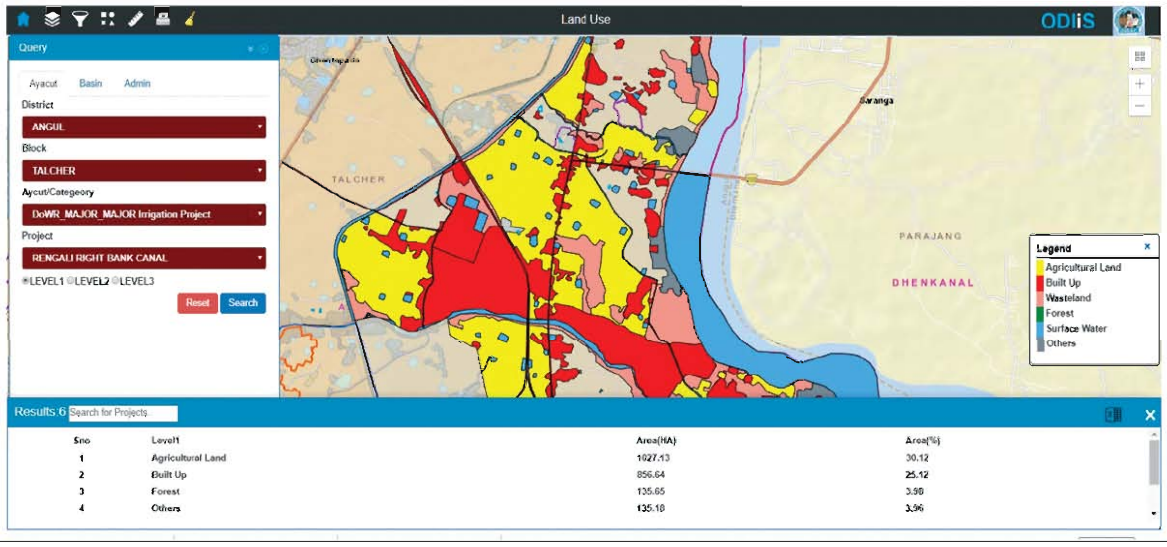
Geographical database of the irrigation network, its asset and functioning status in digital format are not available for the state. In addition to this, accurate data relating to cultivated area and irrigated area are also not available in standardized manner. Interdepartmental co-ordination issues and absence of proper system for data collection, collation, storage and dissemination are major factors for varying statistics by various departments. In view of the above, Dept. of Water Resources assigned to this centre to undertake the work for generating data on cultivated and irrigated area of the state in the first phase and asset database generation in second phase under "Strategy for Sanitizing the Data on Cultivated area and Irrigated area of the State" Programme.

At present, data from Dept. of Water Resources, (Irrigation Dept.-Major, Medium, Minor, Creek; Watershed Mission, OLIC and Mega Lift); Dept. of Agriculture (Jalanidhi-I, OAIC-Jalanidhi-II, Horticulture); Dept. of SC/ST (ITDA) and Dept. of Panchayatiraj (DRDA /BLOCK) are collected and GIS database generation is completed. Sanitizing the data is also continuing. Sanitisation of cultivated and irrigated area data is based on application of Satellite Remote Sensing (SRS), Geo-informatics and Geo-ICT technology by using 2.3 lakh maps and excel data (Plot details of ayacut/schemes) provided by 11 organisations of 4 departments. The database is used to create ODIIS (Odisha Irrigation Information System), a Web-GIS portal for use by different departments of Govt. of Odisha.

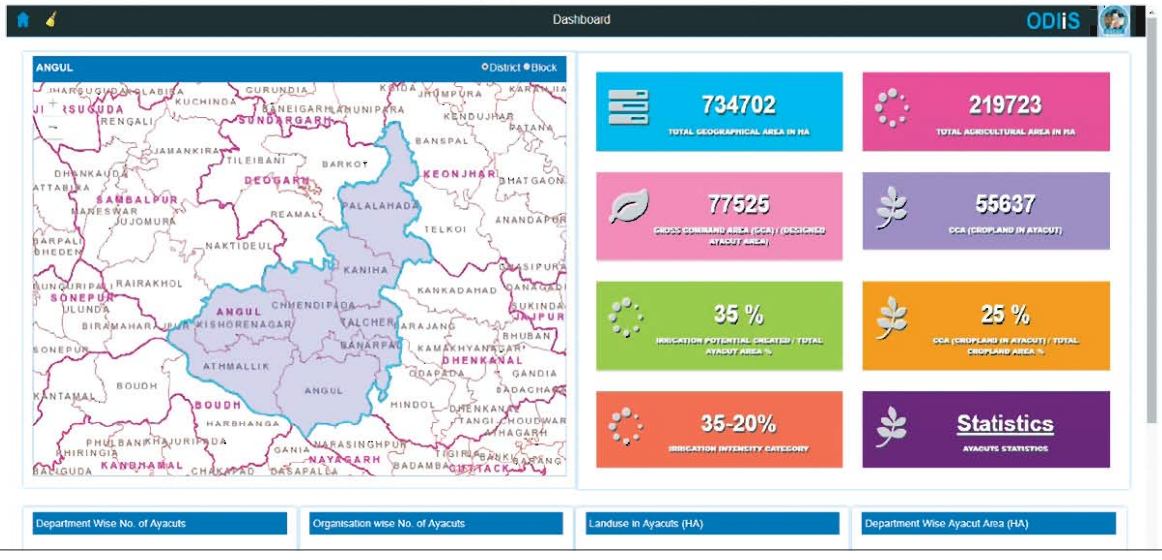
ODIIS AYACUT INFO SERVICE



ODIIS LANDUSE INFO SERVICE

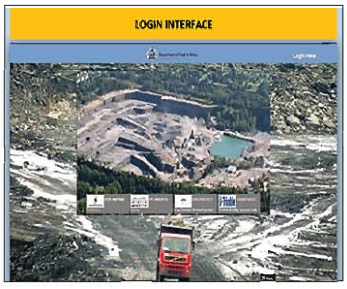


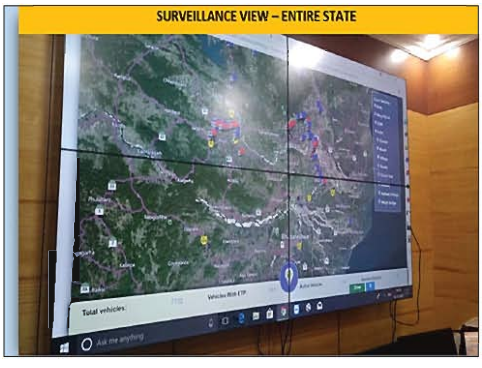
ODIIS DASHBOARD (Information display on click over a district / block)



GPS Based Tracking of Mineral Carrying Vehicles

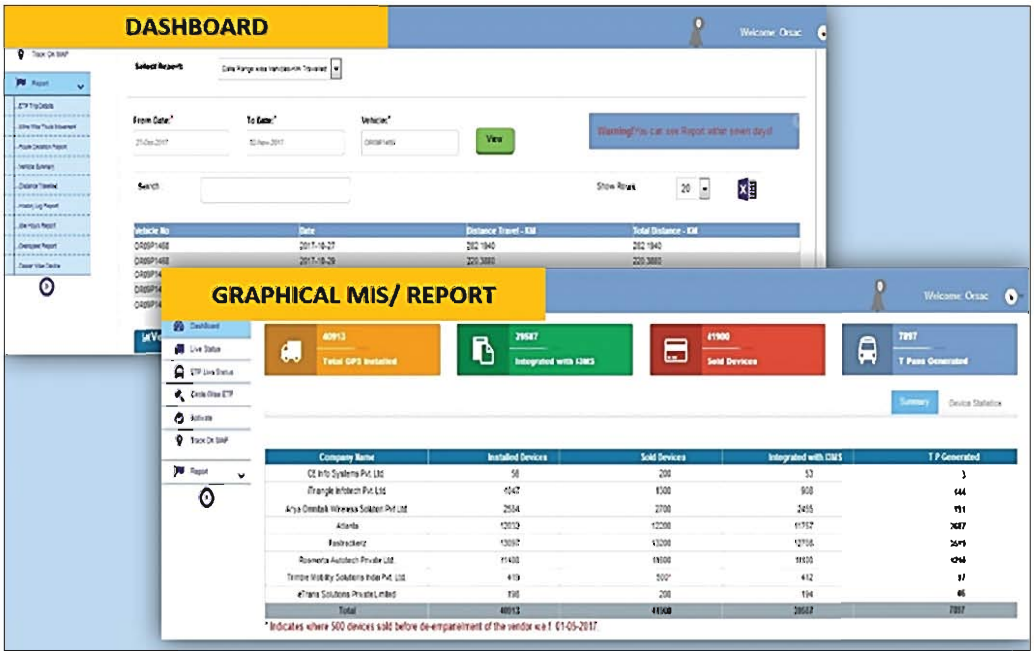
Vehicle Tracking Solution for Mineral Carrying Vehicles in Odisha State is introduced by Department of Steel & Mines for mineral transporting vehicles for bringing efficiency to logistics. All Vehicles registered for mineral transportation in Odisha were mandated to get GPS mounted from GPS service providers empaneled by Directorate of Mines/ ORSAC. GPS service providers under the guidance of the center are installing and maintaining the GPS devices on the Mineral Transporting Vehicles

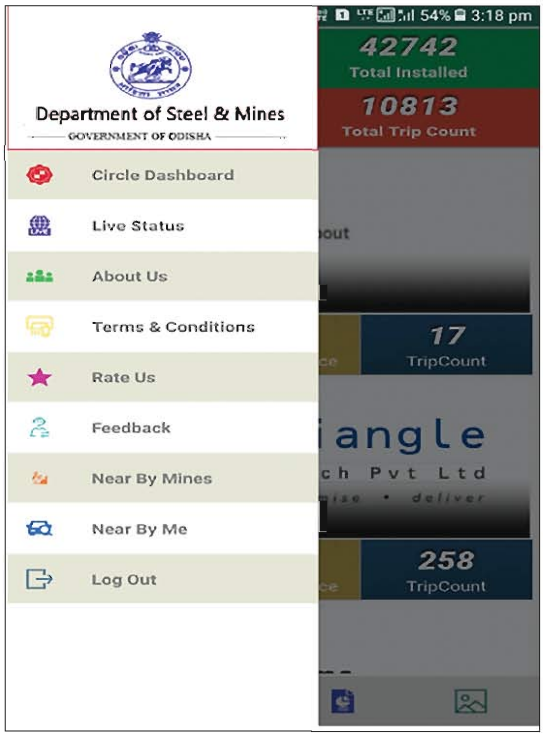




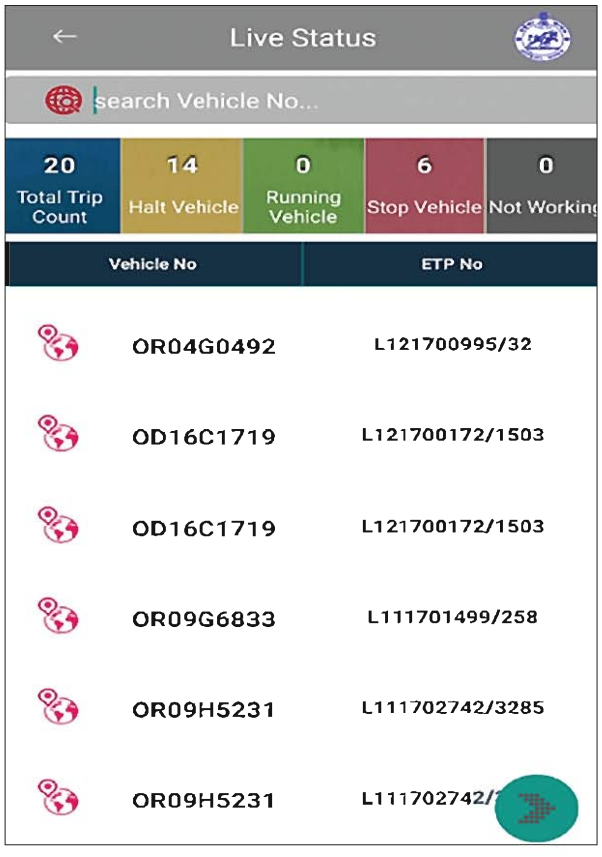
- The Combined Count of vehicles fitted with GPS is about 52325.
- GPS devi ce on mineral transporting vehicles shall enable on-line, real-time monitoring of their movement and effective enforcement through a web based Vehicle Tracking Application. The application solution is integrated with Integrated Mines and Mineral Management System (i3MS) of the Department of Steel & Mines. Along with the web application there is a mobile based application also.

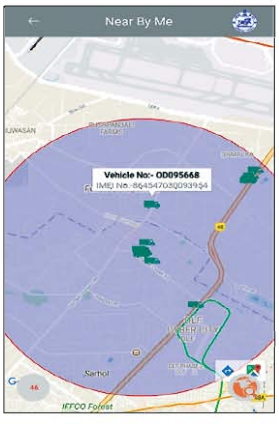
- This project is awarded with **"Geospatial World Excellence Award"** for the year 2018





Web-enabled services designed to obtain real time information on live status of vehicles, total trip count and vehicle location on interactive map and also the inventory of GPS instillation in vehicles.





Geospatial Technology for Rural and Urban Development

Geospatial technology for Rural and Urban Development project is a web based solution on GIS platform for visualization, planning and management of rural and urban development programmes/ schemes in Odisha state. The objective is to develop a dynamic application with MIS support having capabilities for generating queries, both generic and specific and working as a Decision Support System. This can be used as a Programme / Scheme Monitoring System for Odisha State at 1:4000 scale. All the infrastructures/utilities/amenities created under Government schemes are being mapped from high resolution satellite images (World View-II with 50 cm resolution) and ground truth collection using Mobile App. The Centre is also creating the land use database of entire state at 1:4000 scale under the project. This is a sponsored project of Science & Technology Department of Govt. of Odisha.

GEOSPATIAL TECHNOLOGY FOR RURAL AND URBAN DEVELOPMENT

LINE DEPARTMENTS

PANCHAYATI RAJ DEPT.
- Indira Awas Yojana
- Cement concrete Road
- Backward Region Grant Fund
- Gopabandhu Grameen Yojana
- National Rural livelihood Mission
- Rajiv Gandhi Panchayat Sashaktikaran Abhiyan
- MNREGS

AGRICULTURE & FOOD PROD. DEPT
- FIAC Building
- Agro Service Centre
- Departmental Lab.
- Agricultural Farms
- Dealer Network for Fertilizers, Pesticides, Seeds
- Commercial Agri Enterprises

HOUSING & URBAN DEV. DEPT
- Water Supply
- City Bus Infrastructure
- Swerage Project
- JICA project

FOOD SUPPLY & CONSUMER WELFARE. DEPT
- Paddy Procurement
- Public Distribution

RURAL DEV. DEPT
- Rural Works
- Rural Water Supply

SCHOOL AND MASS EDUCATION DEPT
- Mid Day Meals

WOMEN & CHILD DEV. DEPT
- Anganwadi

ST & SC DEV. DEPT
- Tribal School and Hostel Monitoring

WATER RESOURCES DEPT
- Deep Borewell Secha Karyakaram

FISHERIES & ANIMAL RESOURCES DEPT
- Brakish Water Shrimp Farm

WORKS DEPT
- Works

GEOSPATIAL PORTAL

GEOSPATIAL DATABASE FOR DIFFERENT DEPARTMENTS

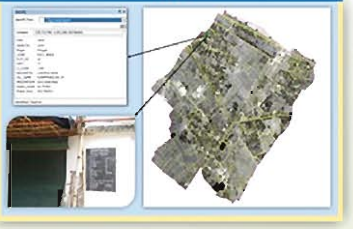
TUBEWELL INFORMATION SYSTEM

INDIRA AWAS LOCATION

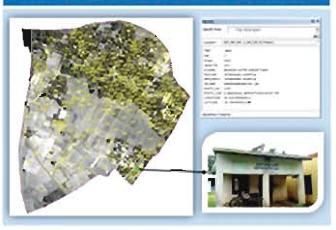
ANGANWADI CENTRE

SCHOOL INFORMATION SYSTEM

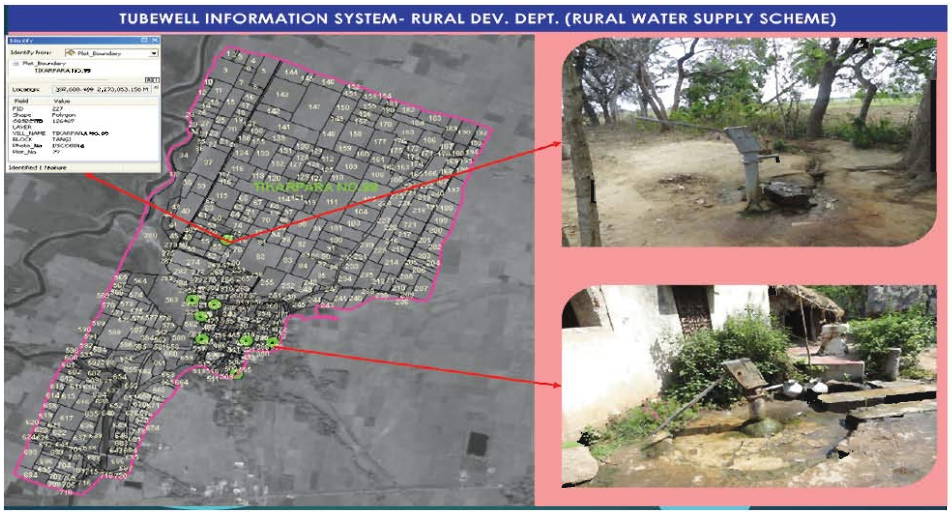
PDS



ANIMAL HUSBANDRY & VETERINARY SERVICES



TUBEWELL INFORMATION SYSTEM- RURAL DEV. DEPT. (RURAL WATER SUPPLY SCHEME)



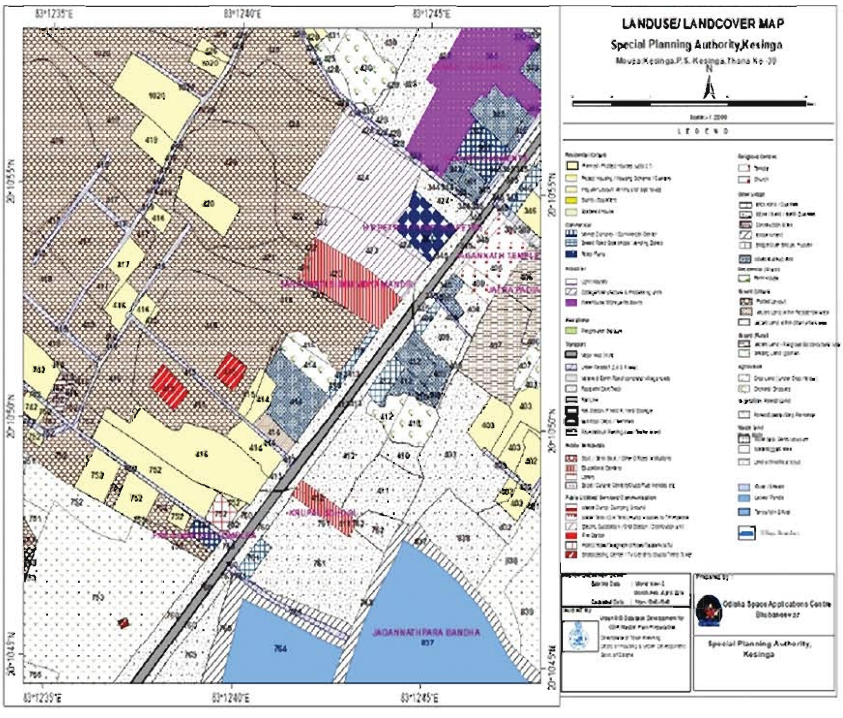
SCHOOL INFORMATION SYSTEM- SCHOOL AND MASS EDUCATION (MID DAY MEAL SCHEME)

Geospatial Inputs for CDP Preparation of Towns of Odisha

Housing and Urban Development Department Govt.of Odisha has assigned the task to the Centre to prepare Remote Sensing and GIS database for CDP preparation of Towns of the state. The maps are prepared on 1:2000/4000 scale. The main objectives for preparation of GIS based inputs are: -

- To capture cadastral maps in digital format and to use this as base for all types of urban and infrastructure development planning.
- Generation of RS & GIS inputs for Comprehensive Development Plan (CDP) on cadastral base for Town Planning Area/ Development Authority Area, Special Planning Authority Area and Regional ImprovementTrust Area.
- Plot level Digital Urban Land use Database Generation on cadastral base.

During 2017-18 inputs of 25 towns namely Athamallik, Kamakhyanagar, Balimela, Bhuban, Binika, Kesinga, Hindol, Kotpad, Junagarh, Khariar, Khariar Road, Rairakhola, Dhamnagar, Gudari, Gunupur, Jaleswar, Khasinager, Umarkote, G.Udayagiri, Hinjilicut, Karanjia, Nuapada, Titlagarh, Kantabhanji and Tushuraon have been completed by using Worldview satellite data in 1:2000/4000 scale.



The GIS database in complete format is supplied to planning section of respective Town Planning Units for Comprehensive Development Plan (CDP) preparation. The database has been generated to establish an Urban Database Information System in the urban local bodies for planning, monitoring and management purposes.

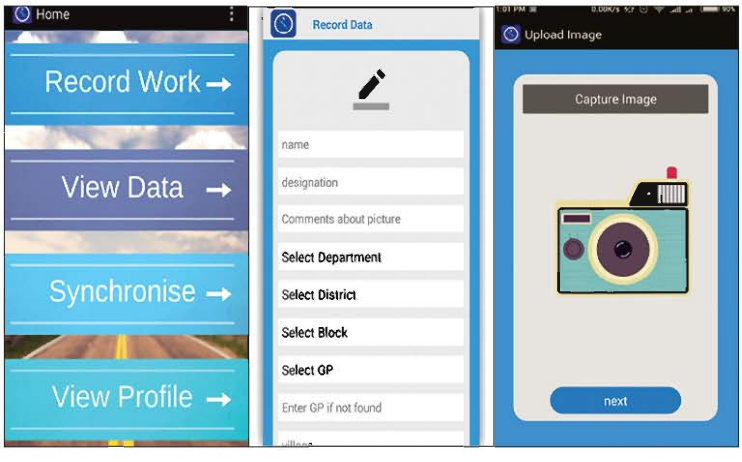
Ama Ghara- Mobile Application

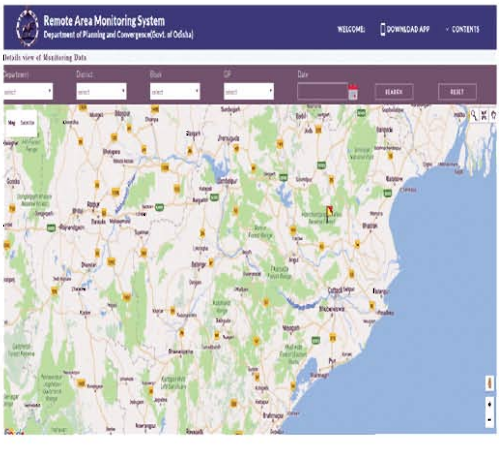
Rural Housing is the flagship programme of State Government and Government commits to provide pucca houses to all eligible rural households living in the kutcha houses. In this endeavor, four Rural Housing Schemes are implemented across the State i.e. Pradhan Mantri Awaas Yojana (Grameen), Biju Pucca Ghar Yojana (Mining), Nirman Shramik Pucca Ghar Yojana.

Monitoring and evaluating the stages of construction of houses is one of the major scope of the project. The centre has taken the initiative for monitoring and evaluating the present status of the houses under construction through an android based mobile application. Images of the mobile application that is developed by the center are shown. The Mobile app can be downloaded from the http://rhodisha.gov.in/ portal.

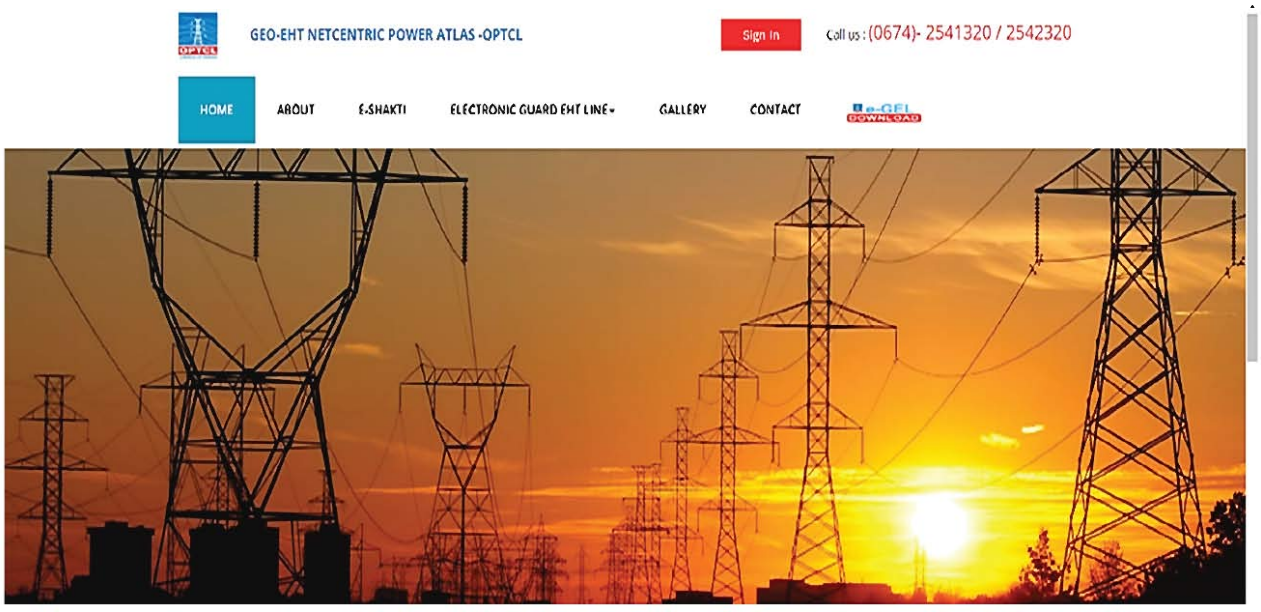
Remote Area Connectivity Planning Program

The objective of the project is to find connectivity status of remote villages in under developed regions of the state and also to connect the unconnected villages in close proximity to existing roads. Under this the road, settlement, slope, drainage and existing infrastructure maps available in the centre are integrated with high resolution ortho images. The outputs (unconnected villages and potential villages for developing connectivity) are provided to P & C Department Govt. of Odisha. One RAMS (Remote Area Monitoring System) mobile app was developed at the centre to meet the objective. It can be downloaded from the Google Play Store by searching "rams orsac" in the search bar. Web-Application is also developed and hosted in ORSAC server for visualization of the unconnected / under developed sites of the state under this programme.





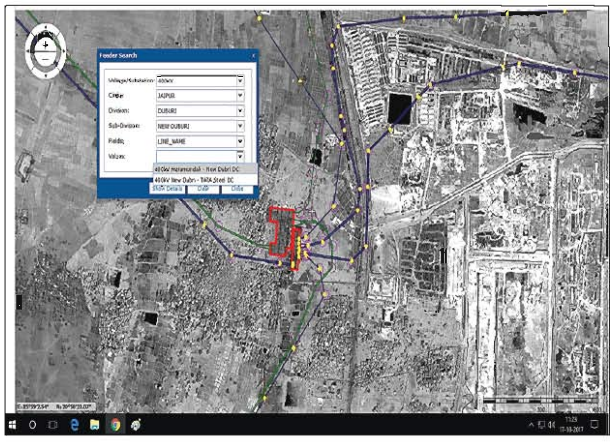
GIS Enabled Web Based Power Atlas

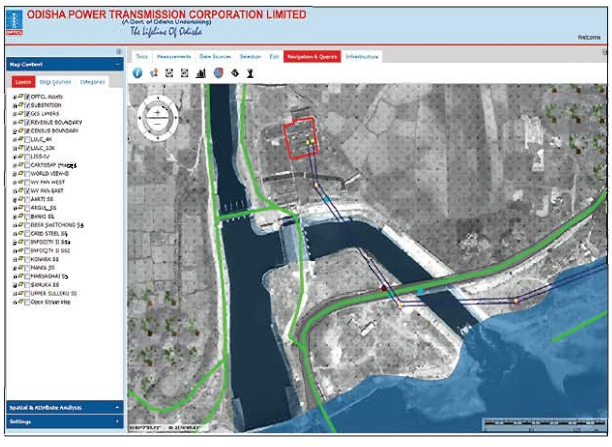


The project is assigned by Odisha Power Transmission Corporation Limited (OPTCL) and the scopes under the project are the following.

- Survey of EHT (400kV, 220kV &132kV) Sub Stations, EHT Lines (24,289 Towers) covering 6952.975 route km having 3-5meter accuracy using GPS Instruments with Geographic Coordinate System (GCS) and WGS84 spheroid datum and generation of GIS Data base (based on Survey data using World View-II Multispectral 2mtr and World View-II Panchromatic for Sub-Station Areas only with 0.5mtr resolution).
- Generation of database of all the EHT lines with integrated Land Use/ Land Cover maps of the patch of the land under the EHT line in 1:4,000 Scales.

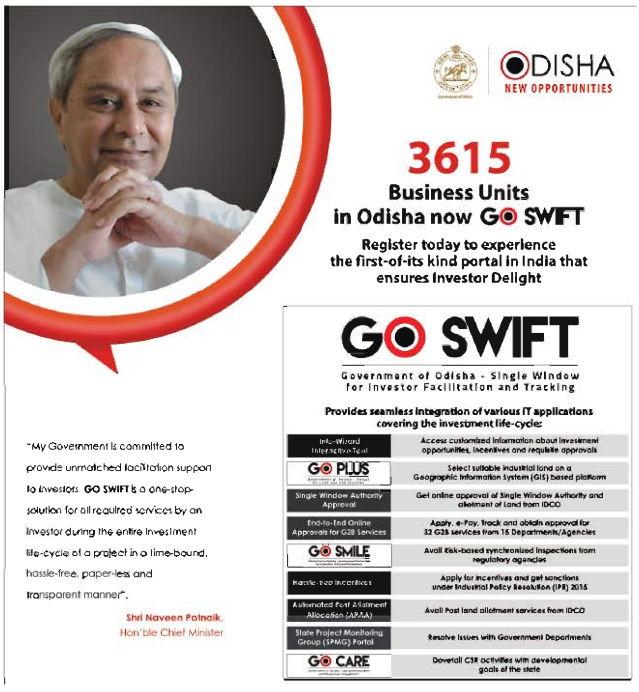
Web Based customization is done using Geospatial Server for easy access of Web Based Power Atlas and for Crowd sourcing facility. RDBMS power is implemented on GIS for web atlas. The web portal is now under operational and used by OPTCL.





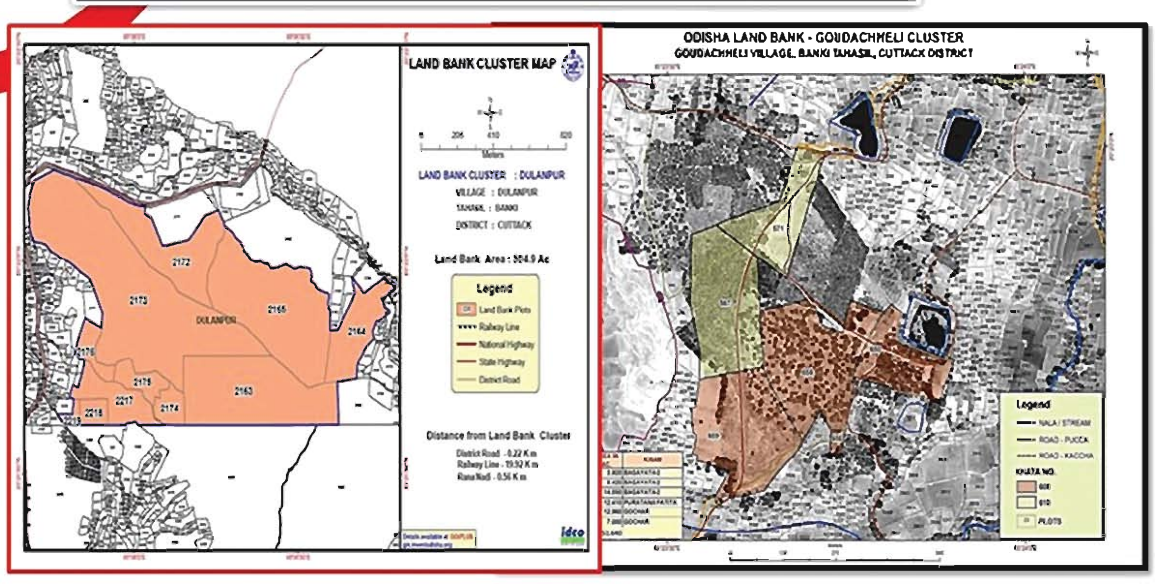
Odisha Land Bank Web services

Geo-ICT, space technology inputs and geospatial data modelling was used to create the Web-GIS based Land Bank portal. The portal provides detailed information with regards to availability of land and utility / services around it. A prospective investor can define preferred parameters such as the district, size of land required, facilities available in the vicinity and environmental categorisation etc. based on which the portal identifies and returns information regarding the suitable and available land parcels in the State. Through the System, a prospective investor can get information not only about land availability but also the key attributes of existing developed and operational infrastructure required for industrial activities. It also provides information on zoning of the industrial land in terms of environmental categories i.e. Green, Orange and Red to enable an investor decide on suitable location for investment based on the proposed business activities.



The portal provides land bank details covering 1,22,673 acres of land in 29 districts of the State and also Industrial plots available at KNIMZ, Kalinga Nagar; PCPIR, Paradeep; SEZ, Gopalpur and plots available at focus sectors zone like metal, chemicals, plastic & petro-chemicals, electronics manufacturing, food processing, tourism, textile and apparels.

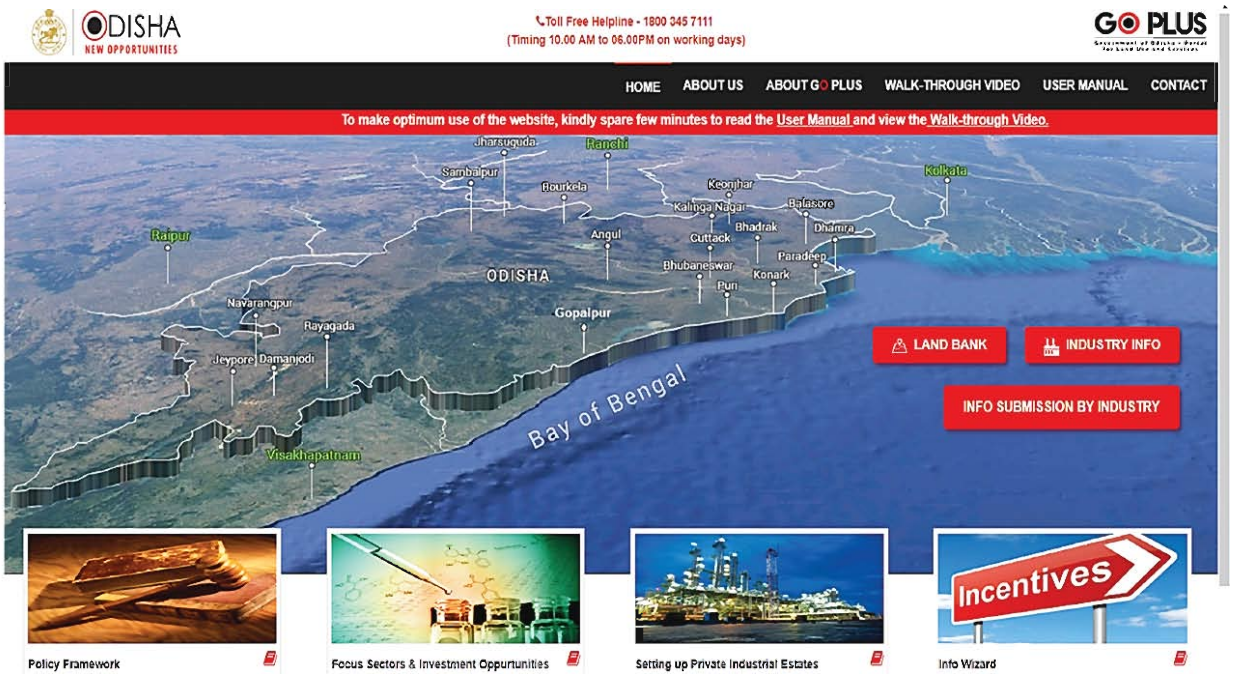
Land Bank Created for Industrial Development



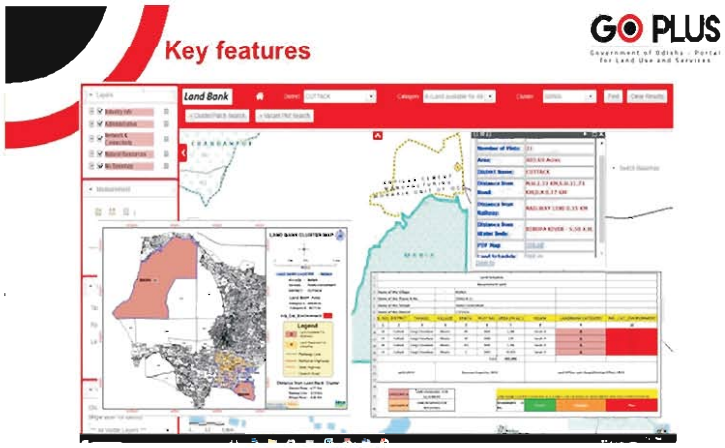
GOPLUS Ver 2.1

Government of Odisha's Portal for Land Use and Services

For Invest Odisha, the centre developed GOiPLUS as a repository of Land Bank, Industrial estates and Industries of the state under IDCO and IPICOL. The web service was upadated regularly and the third version (Ver 2.1) is released as GOPLUS. Land Bank map and land schedule data for 1,22,673 acres of land in 29 districts of the State are made available in public domain through www.gis.investodisha.org. GIS database of 106 Industrial Estates, industry locations outside estates (750 industries), industrial parks and database of sector specific cluster development are generated. Cadastral maps of the entire state are digitised, coded, standardised and geo-referenced with ortho-images of the entire Odisha. Multisource data are used to generate data on landuse, network infrastructure and social infrastructure of the state.



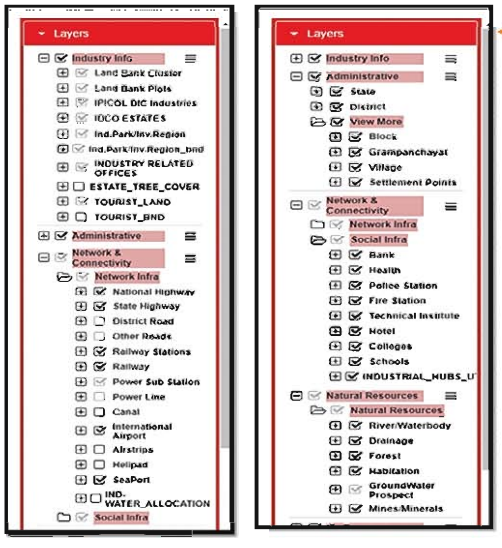
The system provides detailed information pertaining to land with regards to availability of industries, plots under land bank cluster and location specific attributes in terms of connectivity, linkages and availability of other utilities, amenities and services. Significantly under this project, query based spatial and attribute search and information extraction is provided in web-portal in public domain for benefits of all types of stakeholders. In ver 2.1 new query modules and thematic spatial data are added considering the requirement of the Industries Department.



Database used to generate web-portal

Component	Attributes
Industry Info	IDCO Industrial Estates IPICOL Industries Industrial Parks Estate tree cover Industrial hubs Industry water allocation
Land Bank Clusters	Geo-coded cadastral level plot boundaries, Size of land parcels land bank clusters Infrastructure/ amenities/ services around Land Bank Tourism Land Bank Clusters
Infrastructure	Surface water Power supply- Transmission & distribution Electric substations
Transportation	Transport Corridors – National & State Highways/ Other major roads Rail Networks/ Rly stations Port connectivity - Air Port, Air Strip, Helipad and Sea Port
Social Infrastructure	Schools Colleges Hotels Medical facilities Bank/ATM Technical Institutions Police stations Fire stations
Environmental attributes	Rivers/ Waterbody Forests (RF/PF) Ground Water Prospects Mines and Minerals Habitation
Administrative zones	Settlement locations/ village/ Gram Panchayat/Tahsil/Block/ District

In version 2.1, three new search query options are added namely (i) Land Bank at a Glance, (ii) Search by location and (iii) Search for plots around utilities.



New spatial data layers are added to the portal and for updating industry information a new module **"Info Submission by Industry"** is developed.

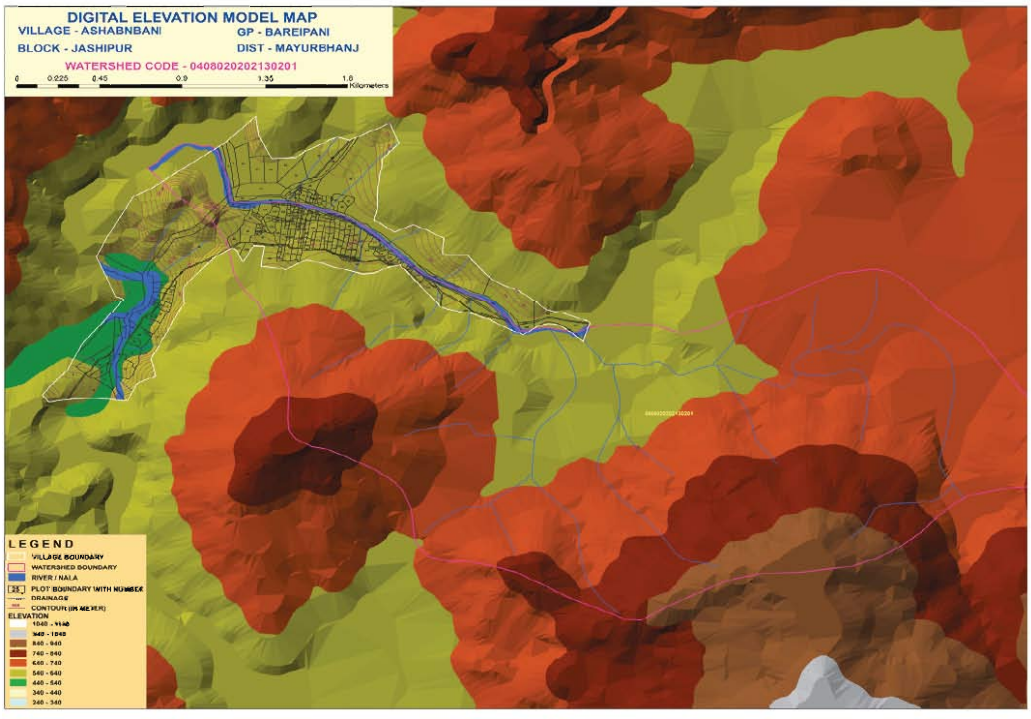
41% reduction in time taken by State Level Single Window Clearance Authority for project approvals after introduction of GO SWIFT*

First-of-its-kind single window portal in India to ensure investor facilitation through the entire Project Lifecycle

Climate Change Action Plan

Assessment of erosion prone areas of Odisha state and study of Micro & Meso level effects of erosion on coastal roads and settlements is being undertaken under the Climate Change Action Plan of Odisha state. The project is funded by Department of Science & Technology, Govt. of Odisha. The Project has two phases. Development of Digital Elevation Model for the state is undertaken under Phase-I. Cartosat DEM is being developed at a contour interval of 5 meter to delineate the erosion prone areas of entire Odisha at 1:10k. Under Phase-II, World view III DEM is being developed with a contour interval of 60 centimeters for coastal Odisha to find out the impact of erosion on coastal roads and settlements at cadastral scale.

During 2017-18, DGPS survey is conducted and 29 Primary Control Points and 200 Secondary Control Points are established to create geocordinates as inputs for DEM creation. Survey activities are completed in Puri, Jagatsinghpur and part of Kendrapara district. Landuse maps of 12 districts is in progress namely, Balasore, Puri, Jharsuguda, Deogarh, Anugul, Kendrapara, Sonepur, Baragarh, Ganjam, Nawapara, Dhenkanal, & Bhadrak districts. Drainage map (through updation using HR Satellite data) of the state is also under development.

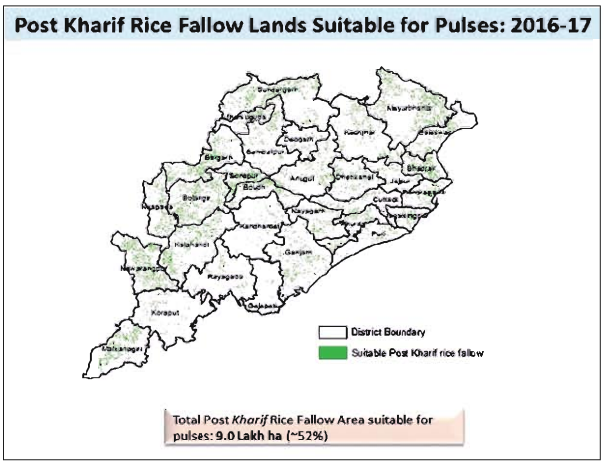


Coordinated Horticulture Assessment and Management using Geoinformatics (CHAMAN)

CHAMAN project aims at horticulture crop inventory and management using Remote Sensing, GIS and collateral data. This project is being coordinated by Mahanalobis National Crop Forecast Centre (MNCFC), Ministry of Agriculture and Farmers Welfare, Govt. of India, New Delhi. Inventory for Tomato crop for five selected districts of Odisha namely, Keonjhar, Khurda, Kalahandi, Mayurbhanj and Ganjam and Chilli crop for six districts namely, Ganjam, Sambalpur, Balasore, Cuttack, Koraput and Kalahandi has been undertaken using RS data, GIS and multiple groundtruth.

Crop Intensification Mapping

This project aims at mapping of suitable areas for growing short duration rabi season crops in the post kharif rice fallow lands of Odisha in collaboration with Mahanalobis National Crop Forecast Centre (MNCFC), Ministry of Agriculture and Farmers Welfare, Govt. of India, New Delhi and National Remote Sensing Centre (NRSC), Hyderabad. Mapping of kharif rice area using RISAT SAR data and delineation of Rabi cropped area using LISS III & Landsat-8 OLI data for the year 2016-17 has been completed. Suitability analysis has been made based on edaphic, climatic and other relevant parameters. Nine lakh hectares of suitable land have been identified for Rabi pulses during the year 2016-17.

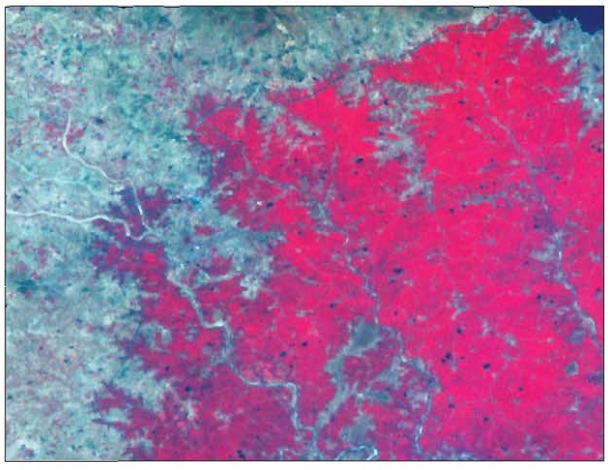


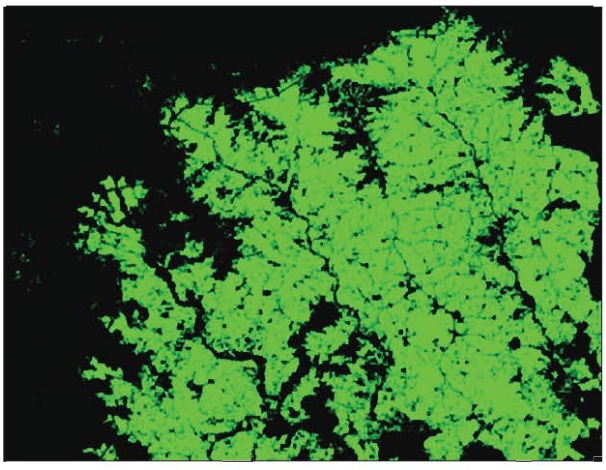
Forecasting Agricultural output using Space, Agro-meteorology and Land based observations (FASAL)

District wise Kharif rice acreage estimation and production forecast in Odisha has been made in collaboration with Mahanalobis National Crop Forecast Centre (MNCFC), Ministry of Agriculture & Farmers Welfare, Govt. of India, New Delhi. Three dates of Sentinel-1 SAR (Synthetic Aperture Radar) data were used for acreage estimation. Data from July 07 to September 12, 2017 were used for acreage estimation. Rice yield has been estimated by using a combination of district level correlation weighted Agro-met model by IMD and remote sensing based

vegetation index. The Kharif rice acreage and production has been estimated at 3.54 million ha. and 6.88 million tons respectively for the year 2017-18. Geotagging of Crop Cutting Experiment (CCE) sites for Kharif rice from all 30 districts of Odisha has been validated with reference to georeferenced cadastral database.

Rabi rice acreage estimation has been undertaken using Sentinel-1 SAR data (20m. resolution) and Landsat-8 OLI data (30m. resolution). District level yield forecast have been made by integrating the estimates of IMD developed correlation weighted Agro-met model and MNCFC developed remote sensing weather data upto March first fortnight, 2018.

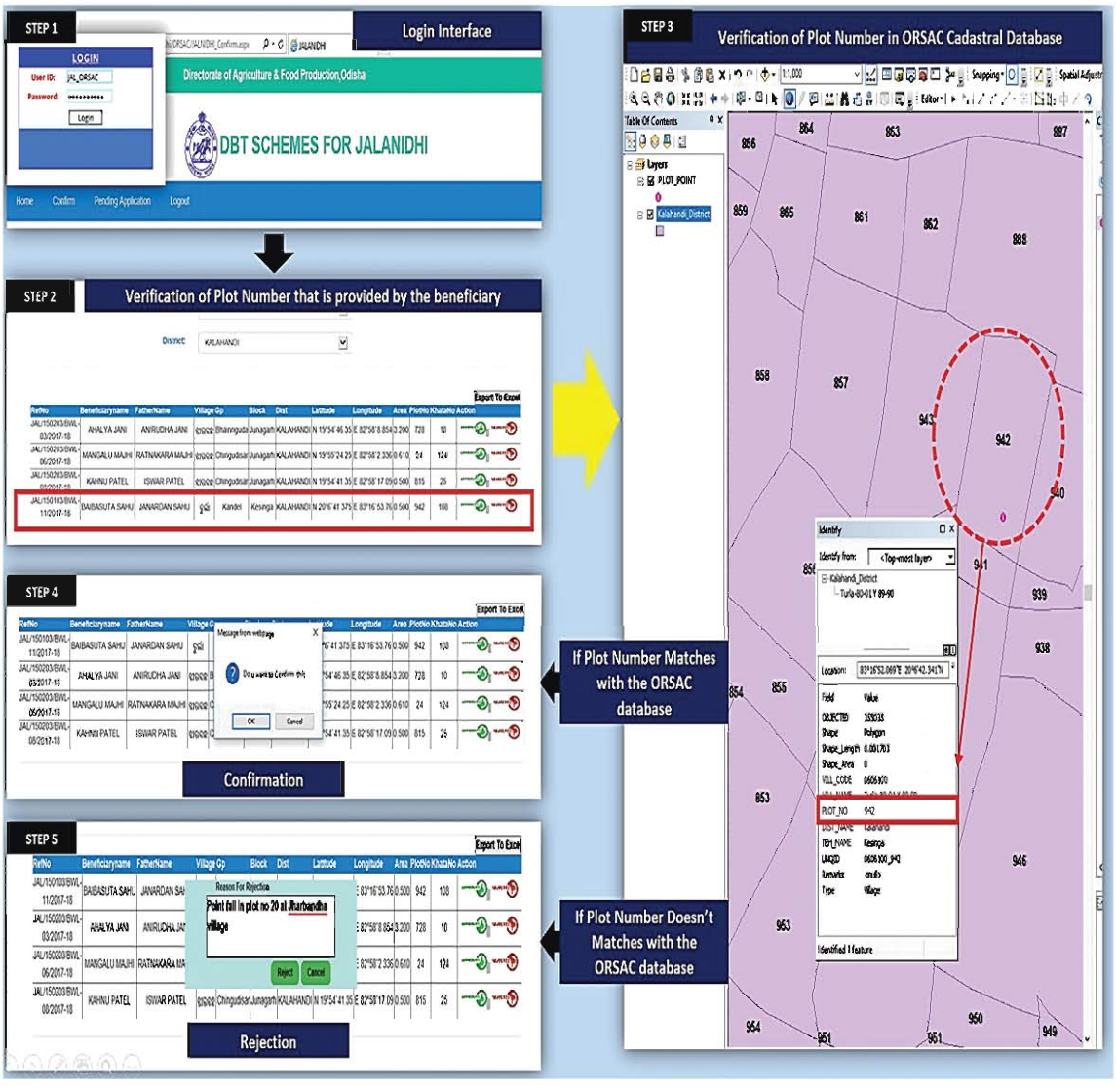




Authentication of Direct Benefit Transfer (DBT) Scheme - Jalanidhi

Odisha has vast ground water potential which is available for exploration. So far, only 28% of ground water resources have been tapped for irrigation purpose. Thus, there is scope for expanding area under irrigated agriculture. Realizing the need to increase the irrigation potential and to utilize untapped ground water potential in the state, the farmers are encouraged to go for own captive irrigation (Bore well & Shallow Tube well) projects under the State Agriculture Policy.

Under this project, the centre has taken the initiative for authentication of Direct Benefit Transfer (DBT) Schemes for Jalanidhi which includes the authentication of plot number (using Georeferenced cadastral information) provided by the beneficiary. Once the beneficiary plot number is verified with the ORSAC Orthoimage based Georeferenced Cadastral dataset, then the application will be confirmed or rejected through the online web-portal of Jalanidhi by the Dept of Agriculture, Odisha.

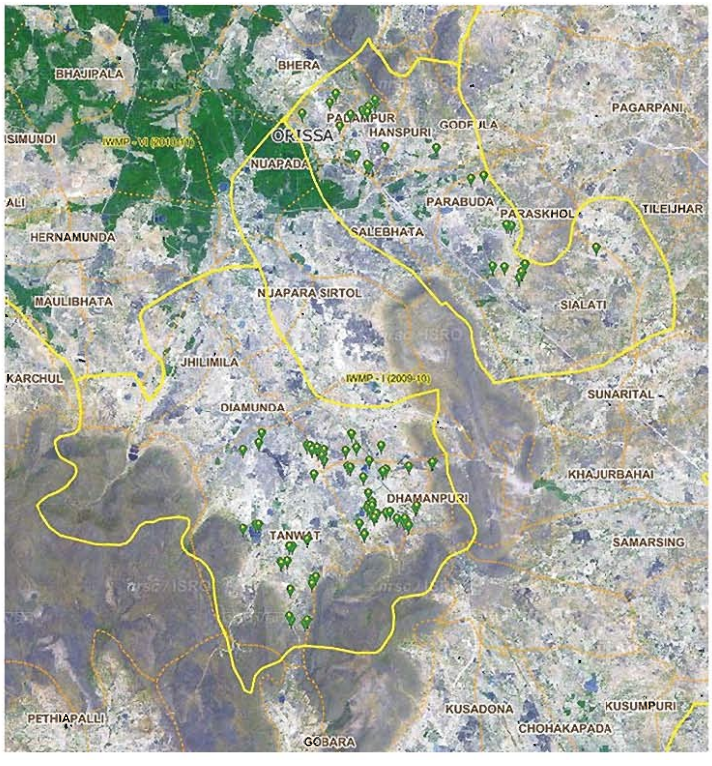


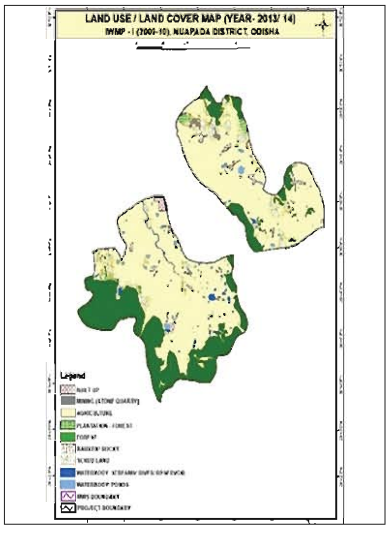
Monitoring of IWMP Watersheds

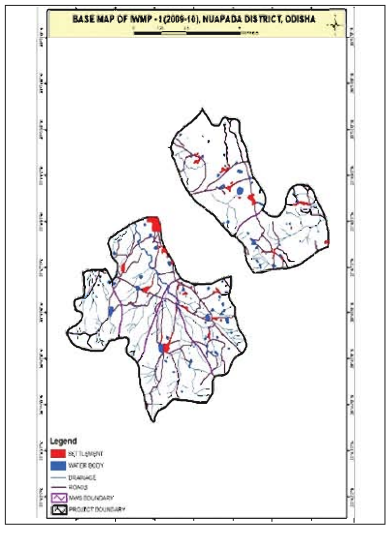
Integrated Watershed Management Programme (IWMP) deals with the integrated use of land, vegetation and water in geographically discrete drainage area for the benefit of the people and addresses key issues related to land and water resources by incorporation of environmentally benign or clean technologies. Space technology with the high spatial and temporal resolution satellite data are used for effectively planning, monitoring and evaluation of IWMP activities.

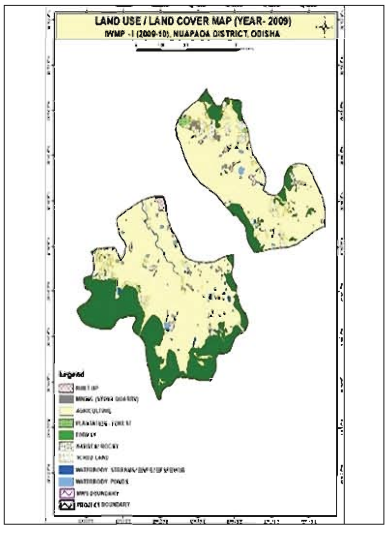
The centre has been assigned 310 number of projects through National Remote Sensing Centre (NRSC), ISRO for monitoring and evaluation of IWMP watersheds using the Bhuvan Geo-ICT Web portal tools namely- **SRISHTI and DRISHTI.**

Srishti facilities decision makers at National and state level to monitor program implementation at different levels, including at the local level on the geoportal, while State Level Nodal Agencies (SLNA) and Watershed Cell cum Data Centres (WCDC) are facilitated with necessary tools on the package to provide specific inputs on implementation of the program at micro-watershed level. DRISHTI, a smart phone based application is suitably designed and developed towards realizing the objective of modernizing the field data collection process for monitoring watershed activities, wherein it can be used at field level to capture actual field realities of project implementation and sending the same to the Bhuvan Server.



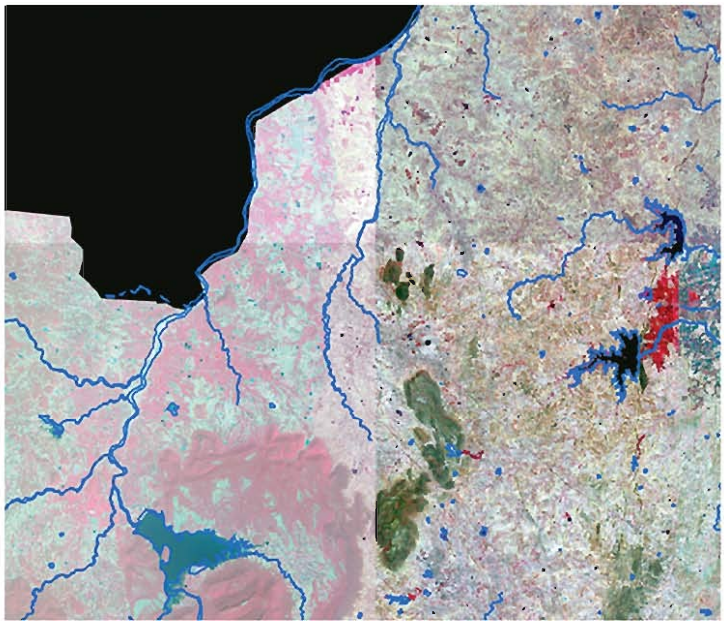


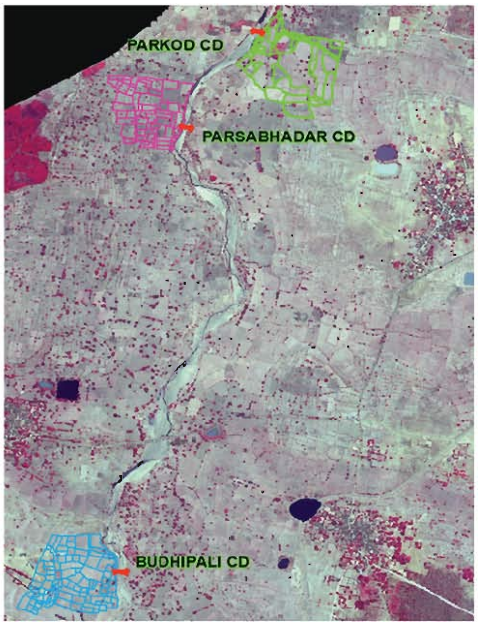




Temporal Geodatabase creation and GIS based monitoring of NAFCC project sites

The Nuapada Adoption Project is a programme under National Adaptation Fund for Climate Change (NAFCC) and NAF is a competitive challenge fund established by MoEFCC (GoI). The funding to the centre is through DoWR, Govt. of Odisha by NABARD. Dept. of Water Resources through local Minor Irrigation Dept. is establishing Check dams along Kharkhara Nala as part of the initiative under NAFCC. The project envisages generation of GIS datasets for NAFCC project sites at temporal intervals. The datasets are to be developed at cadastral scale using temporal remote sensing data, ground truth and lab data by the centre. Digital datasets as per requirement of DoWR along with datasets generated under different time period in cadastral scale will be used for WEB-GIS based Monitoring System generation. Project sites are taken at Amlidadar, Baloda, Burhipali, Parkor, Prasabhadar, Bhainsatal, and Jangula villages. Base level data sets are collected alongwith acquisition of stereo data for DEM creation. Dashboard for monitoring purpose is also under development.

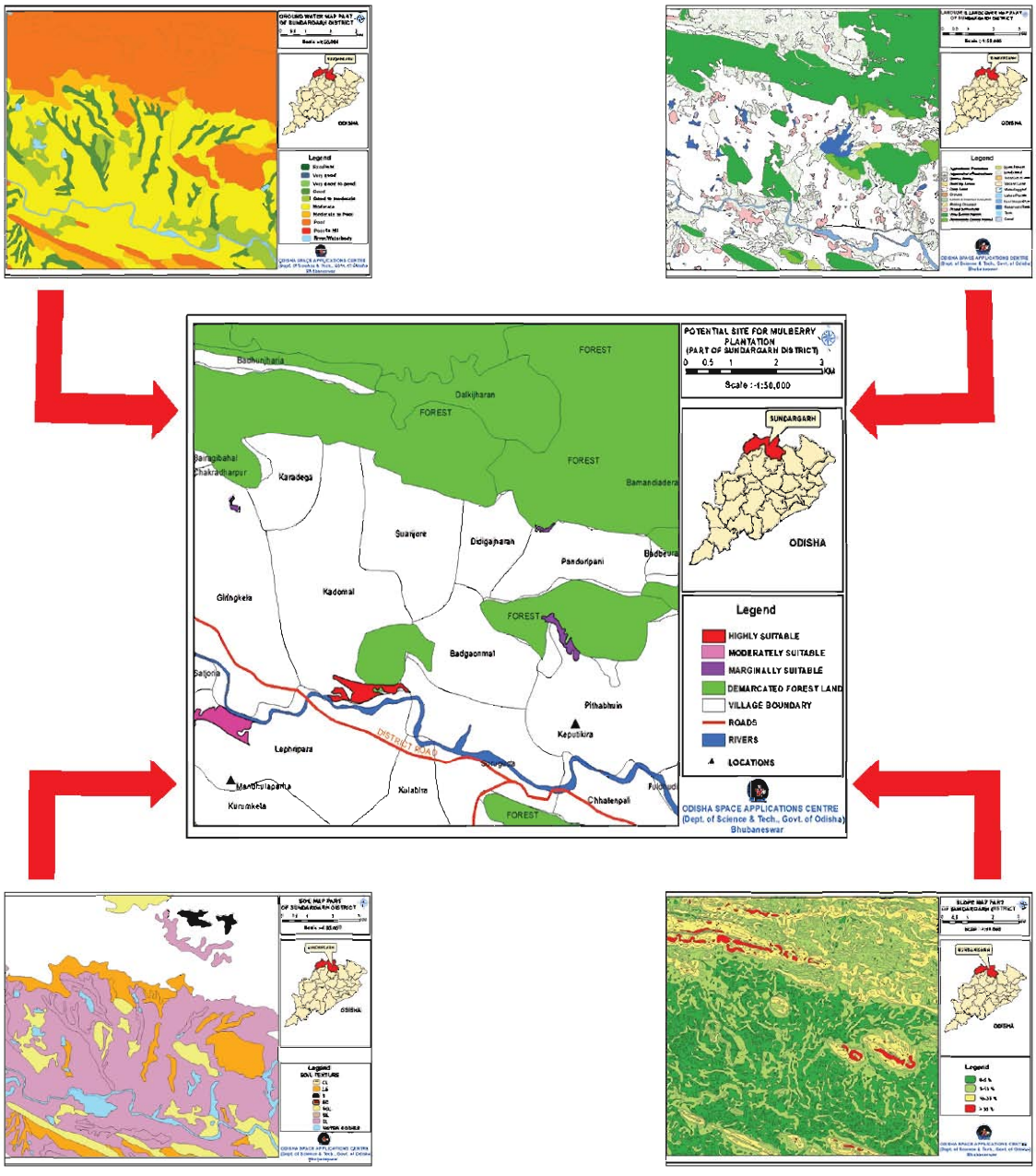




(Checkdams under construction along Kharkhara Nala, Nuapada District by DoWR, Govt. of Odisha)

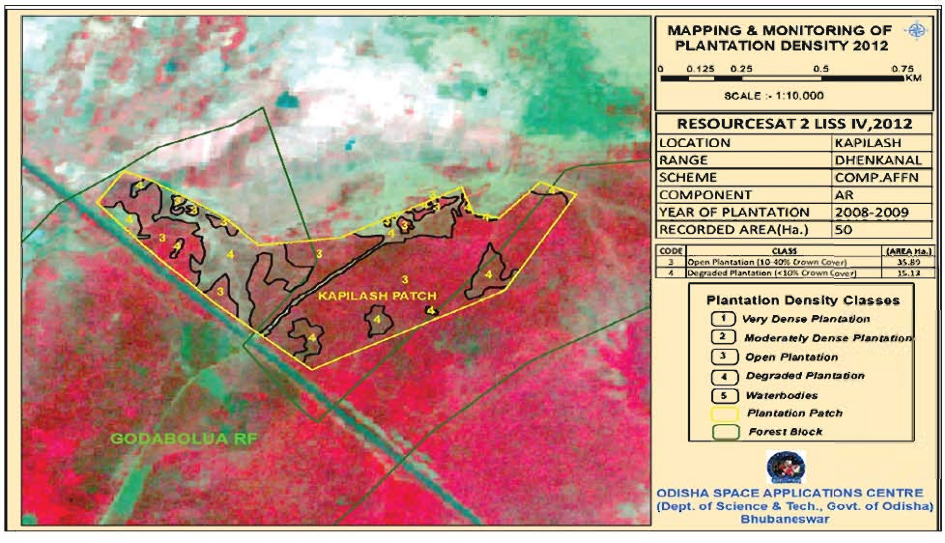
Site Selection for Sericulture Development

Department of Space, Govt. of India assigned the centre to carry out the project for potential site selection of mulberry silk and non-mulberry silk plants specially tasar food bearing plants using remote sensing technique. Landuse and land cover layer, soil layer, ground water potential layer and slope layer are prepared and integrated at GIS environment along with non-spatial data namely temperature, rainfall and humidity (with suitable parameters) for potential site selection of mulberry and non-mulberry plants.

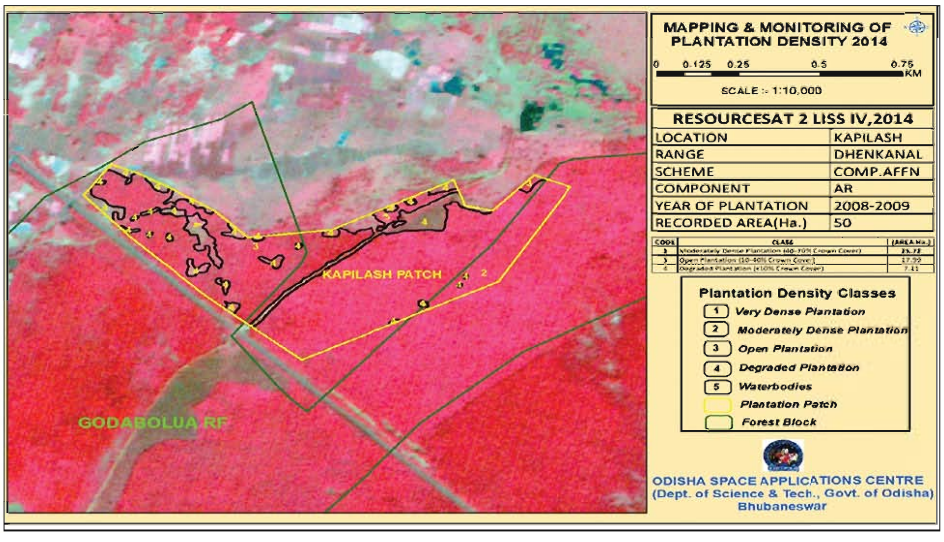


Monitoring of Afforestations / Plantations Inside the Forests

Plantation programmes like block plantation, gap plantation & avenue plantations are carried out inside forest areas by Forest & Environment Dept., Govt. of Odisha. Due to non-availability of consolidated maps showing plantation areas, it is difficult to access the survival of plantations on the field. In order to access the survival rate of the plantations, density mapping & monitoring of plantations inside the forests in all 50 divisions of Odisha is carried out using temporal satellite data. The KML File of plantation patch boundaries of the Forest Divisions along with the recorded data of the plantation patches was provided to the centre.

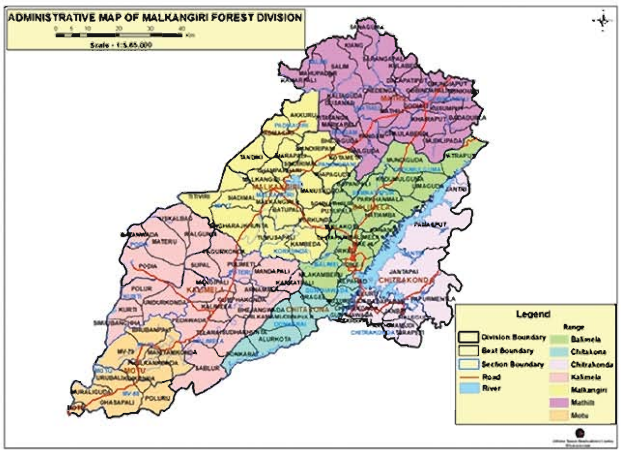


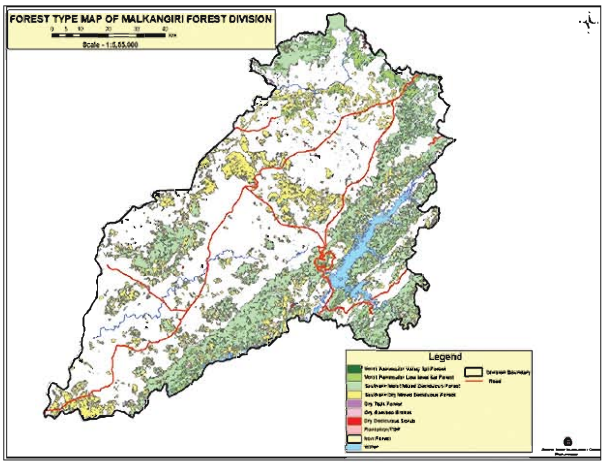
Temporal satellite data i.e. Resourcesat 2 LISS IV were used for mapping and monitoring of plantation. Different types of crown density layers of plantation patches namely. 1.Very Dense Plantation (>70% crown cover), 2. Moderately Dense Plantation (40-70% crown cover), 3. Open Plantation (10-40% crown cover) and 4. Degraded Plantation (<10% crown cover) were prepared and the maps are generated on scale 1:10,000. A change detection study of the individual plantation patches was carried out in all 50 Forest Divisions.

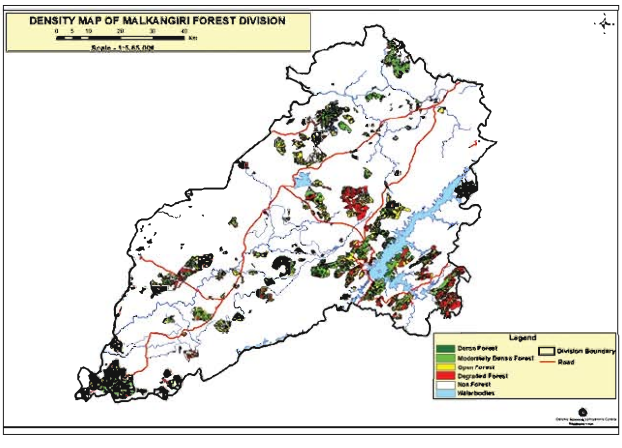


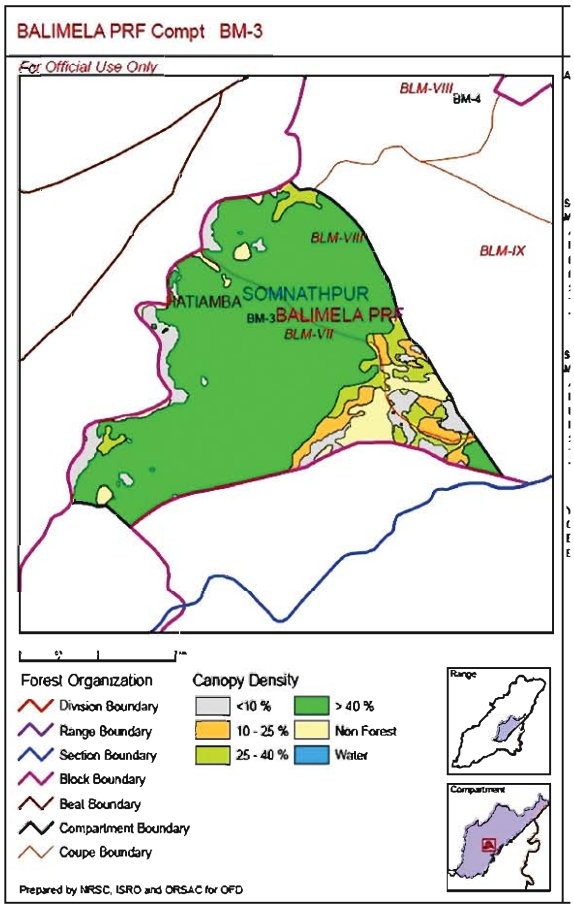
Preparation of Working Plan Inputs in Forest Divisions

Forest & Environment Dept. of Govt. of Odisha in collaboration with NRSC, Hyderabad & Odisha Forest Department (OFD), Odisha is undertaking preparation of working plan inputs for Working Plan Divisions of the state. The centre is entrusted to carry out for preparation of working plan inputs using Remote Sensing & GIS technology in collaboration with NRSC & OFD for the 34 Territorial and Wildlife Divisions, completing the Working Plan periods for the year 2016-17 & 2017-18.





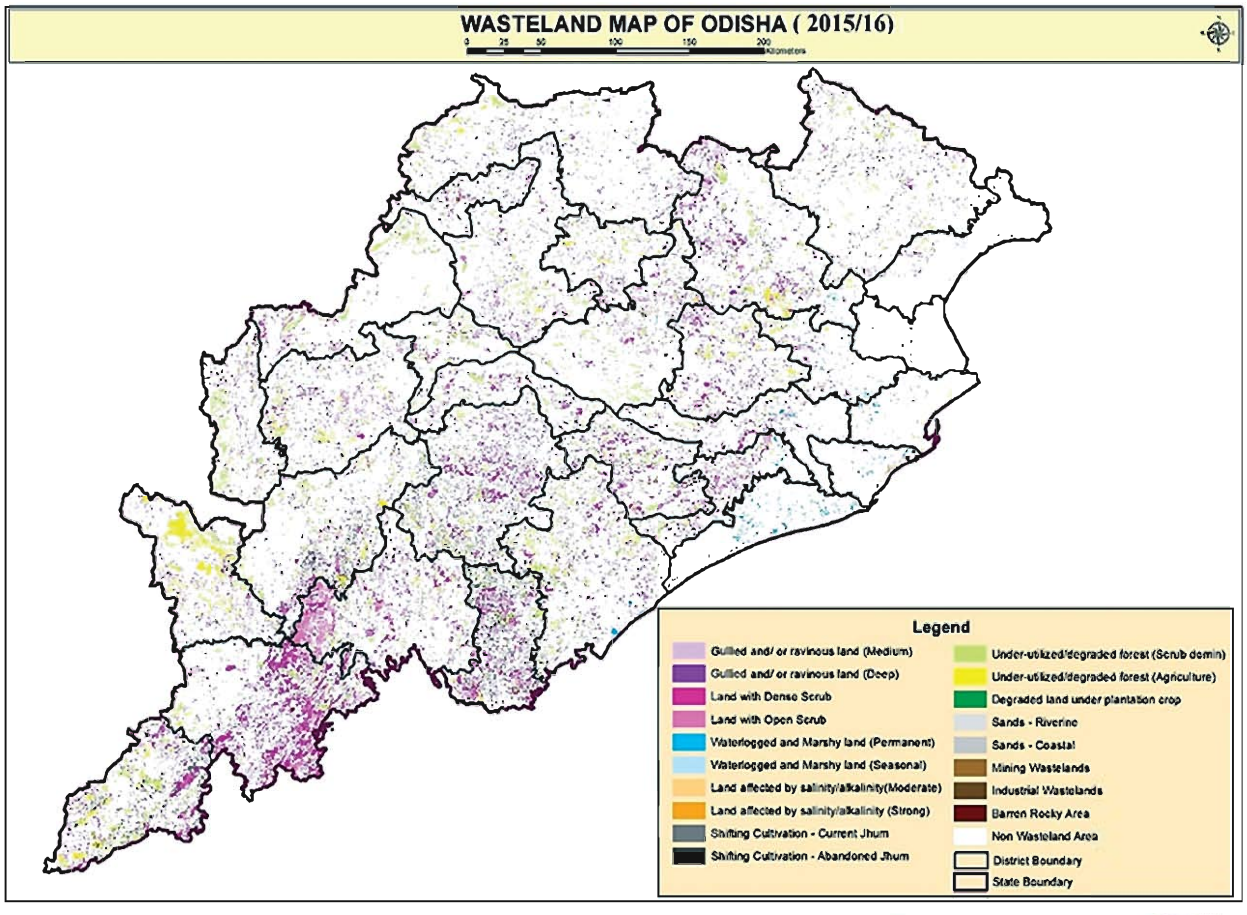




Thematic maps namely Forest Density, Forest Administrative & Forest Management are prepared on scale 1: 50,000 using Wold View MS satellite data. NRSC, Hyderabad prepared forest type map on scale 1:50,000, generated sample points as per National Working Plan Code 2014 and developed software for stock and yield calculation at compartment level. Forest department carried out the forest inventory data collection from the field. The final outputs are being prepared on scale 1:50,000 & 1: 25,000 scale for 34 Forest Divisions.

Natural Resources Census - Wasteland Mapping of Odisha

Wastelands mapping on 1:50,000 scale was carried out in different phases in Odisha using multi-temporal satellite image Under NR Census programme sponsored by NRSC, Hyderabad. The atlas prepared during 2015-17 are finalised and at present the state is having 20,327 sq.km. under various types of wasteland.

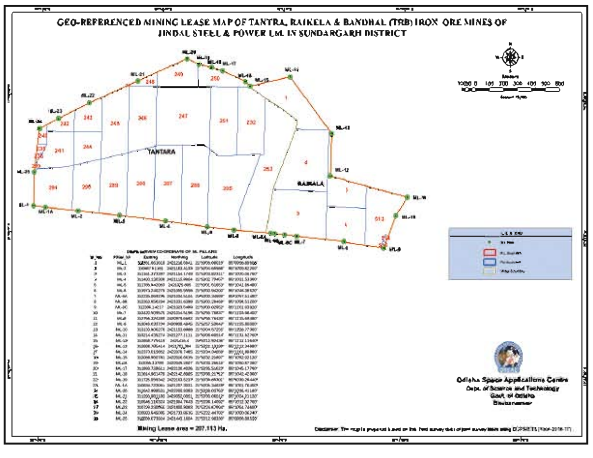


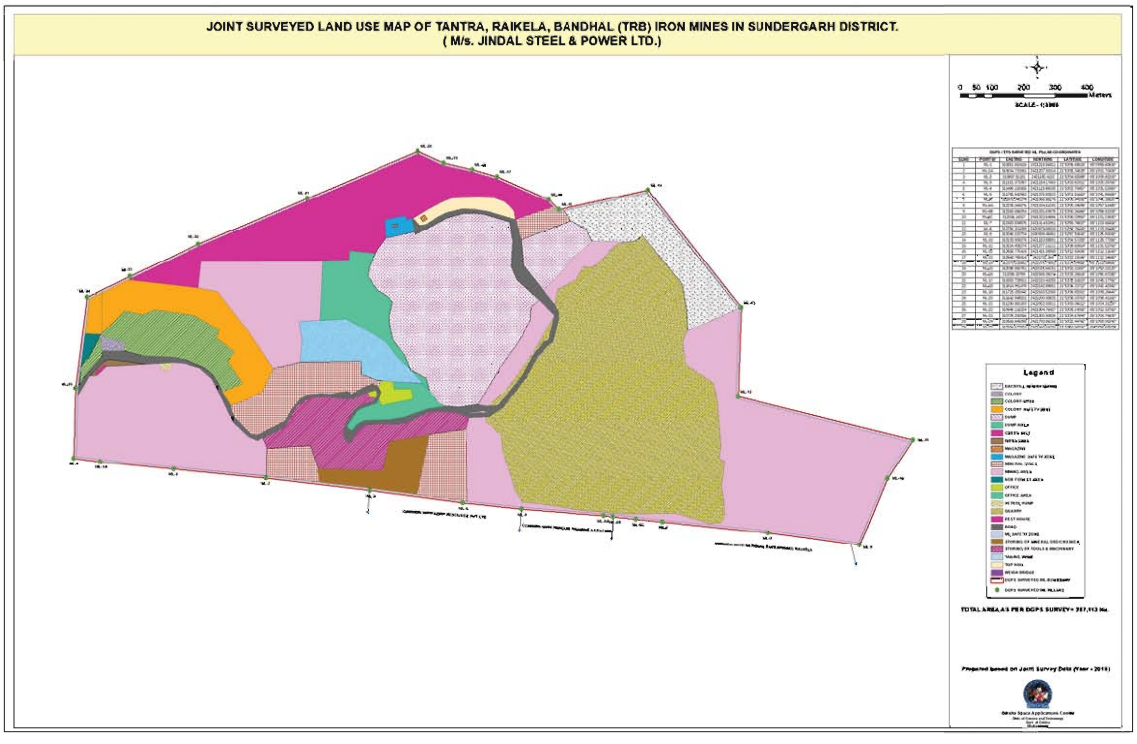
WASTELAND CLASS	AREA IN SqKm
Gullied and/ or ravinous land (Medium)	595.83
Gullied and/ or ravinous land (Deep)	18.09
Land with Dense Scrub	5230.77
Land with Open Scrub	4787.36
Waterlogged and Marshy land (Permanent)	289.76
Waterlogged and Marshy land (Seasonal)	4.26
Land affected by salinity/alkalinity(Moderate)	10.76
Land affected by salinity/alkalinity (Strong)	16.13
Shifting Cultivation - Current Jhum	856.12
Shifting Cultivation - Abandoned Jhum	791.27
Under-utilized/degraded forest (Scrub domin)	5505.41
Under-utilized/degraded forest (Agriculture)	1614.63
Degraded land under plantation crop	0.06
Sands - Riverine	3.66
Sands - Coastal	35.17
Mining Wastelands	17.02
Industrial Wastelands	40.20
Barren Rocky Area	510.35
TOTAL	20326.85

Mining Lease Area Survey

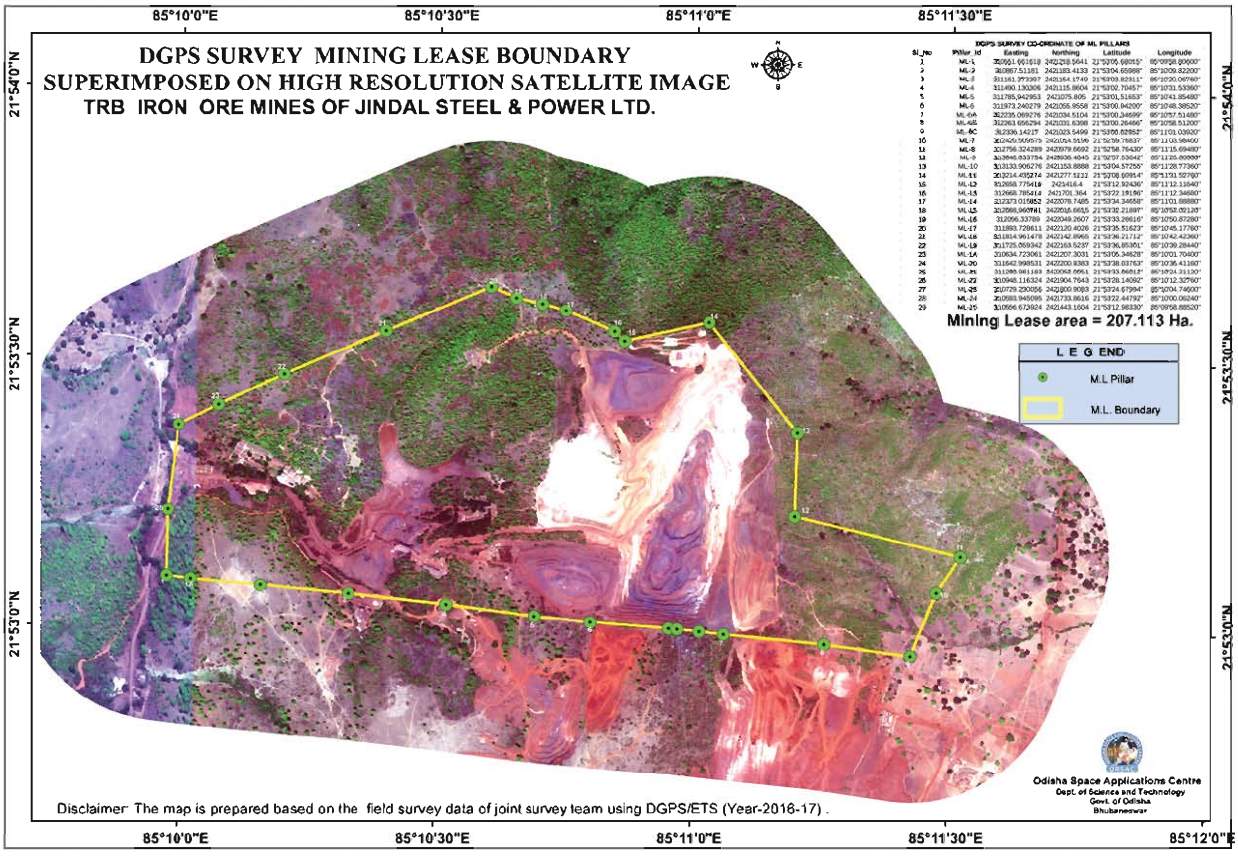
Govt. of Odisha has recognized the centre as the Nodal agency for the purpose of DGPS survey to facilitate digitization and geo-referencing of mining lease map (Letter No: 4276/IV(A)SM-92/09 dt-17.7.2010). Accordingly, each Lessee of the individual mining lease apply to the centre for DGPS survey of their lease. Further, Steel & Mines Department, Govt of Odisha issued an order in 2014 for joint survey of all Iron & Manganese mines of the state by constituting Joint Survey teams comprising of representatives from ORSAC, Revenue, Forest and Mining Department and also for survey of other mineral leases of the state in 2017.

As per the requirement of Revenue & Disaster Management Dept. and Steel & Mines Department, Govt. of Odisha, the DGPS survey exercise for all the minor minerals and sairat sources (sand, stone, morrum quarry etc.) of the state is initiated. The survey of 185 sairat leases in Cuttack, Jajpur and Nuapada districts have been completed so far in the field. The field demarcations of remaining sairats are under progress by the field officers of Revenue Department and will be undertaken in the year 2018-19.





The center along with the Joint survey team has already completed survey in 130 leases including 39 leases in the year 2017-18. The DGPS survey map for 15 mineral blocks to be put up for auction are also completed as per the requirement of Steel & Mines Department. The DGPS survey exercise for another 131 mining lease areas of which possession have been taken over by the concerned mining circles is initiated and the field survey will be undertaken in the year 2018-19. Further, the exercise for Space-borne temporal monitoring of the mining area for detection of illegal mining outside the lease hold is undertaken by the Centre as per the requirement of Steel & Mines Department, Govt of Odisha.



YEAR	JOINT SURVEY OF MINING LEASES USING DGPS/ETS	JOINT SURVEY OF MINERAL BLOCKS FOR AUCTION PURPOSE USING DGPS/ETS	DGPS/ETS SURVEY FOR GEO-REFERENCING OF COAL BLOCK	DGPS/ETS SURVEY OF MINING LEASE BOUNDARY
2010-2011				29
2011-2012				139
2012-2013				24
2013-2014	39		11	25
2014-2015			3	11
2015-2016	12		2	4
2016-2017	40	9	1	
2017-2018	39	6	2	2
TOTAL	130	15	19	238

RS-GIS-GPS based Mapping & Survey for Forest Diversion

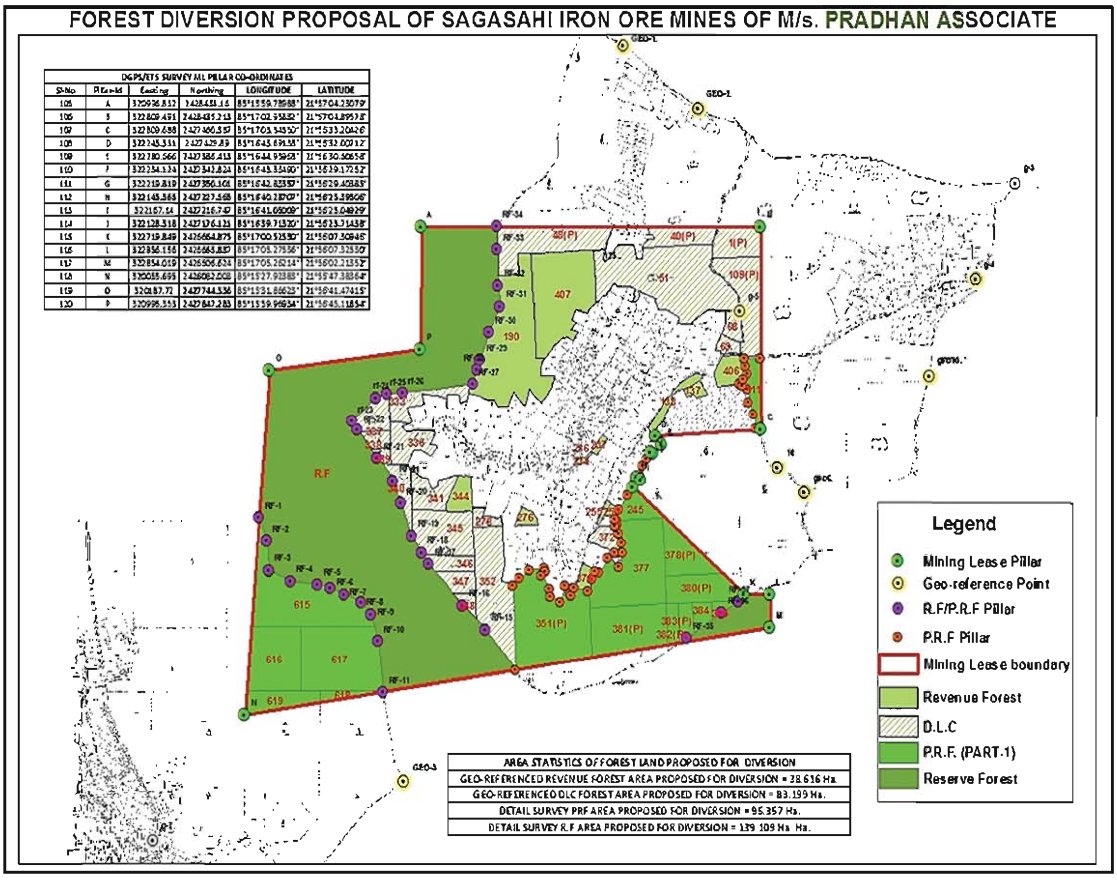
As per the circular of Ministry of Environment and Forests, Govt. of India (No.F.No.-11-9/98-FC, dated 08-07-2011) and State Govt. in Forest & Environment Department notification on forest areas proposed to be diverted for non-forest use (vide letter no.18393/F&E, dt.13-10-2011); the centre (as the nodal agency) is undertaking DGPS/ETS survey as well as technically authenticate survey undertaken by empanelled DGPS/ETS survey agencies.

STATUS REPORT ON FOREST DIVERSION PROPOSAL AUTHENTICATED BY ORSAC (APRIL 2017 TO MARCH 2018)

Category	Completed
Road	50
Railway	8
Irrigation	8
Power	3
Industry	13
Mines	11
Misc.	9
Compensatory Afforestation	8
Total	110

STATUS REPORT ON ORSAC SURVEY FOR FOREST DIVERSION PROPOSAL (APRIL 2017 TO MARCH 2018)

Project type	Forest Diversion
Irrigation	2
Tourism	1
Coal (MCL/NTPC)	1
Rural Development	2
Energy	1
Road	1
Other Dev. project	3
Compensatory Afforestation	8
Total	19



Digital India Land Records Modernization Programme (DILRMP)

Major components of DILRMP programme are computerization of all land records, survey/re-survey of lands and updation of all survey and settlement records including creation of original cadastral records. In Odisha state, Revenue and Disaster Management Dept. is implementing the program. The centre is associated in two major project components, i.e. Quality Checking of digitized cadastral maps and Cadastral Resurvey.

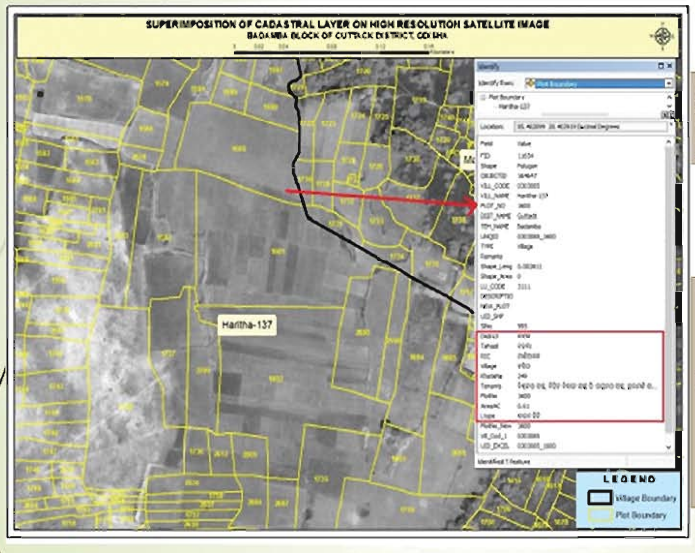
A. Quality Checking of digitized cadastral maps

Cadastral maps of 51,637 number of villages, out of 51681 villages are quality checked by Survey and Map Publication Office (S&MP), Cuttack on glass table for one to one check and also at the centre (QC of digitised layers). The newly published digitized cadastral maps of 2035 villages generated by Revenue Dept. are also quality checked. The centre is preparing GIS ready CAD files of digitized maps after quality check for linking of Bhulekh RoR data with cadastral map plots by NIC in form of shape files.

B. Cadastral Resurvey by Aerial survey/photography method

The centre is assisting the Revenue Dept. engaged vendor for preparing cadastral maps of 5 districts (Sundergarh, Deogarh, Samabalpur, Bolangir and Sonepur) using Aerial Photography method. 1000 maps of part of Sundargarh district prepared by the vendor have been quality checked and verification completed. Technical support is being provided for preparation of maps along with quality checking of maps. Base map preparation work in 50 villages is completed till date. Resurvey work in Deogarh and Sonepur is continuing by Revenue Dept. during 2018. Quality checking of draft maps of part of Deogarh district generated by the vendor are quality checked at the centre.

GEOREFERENCING OF VECTOR LAYERS OF CADASTRAL MAPS OF ODISHA STATE

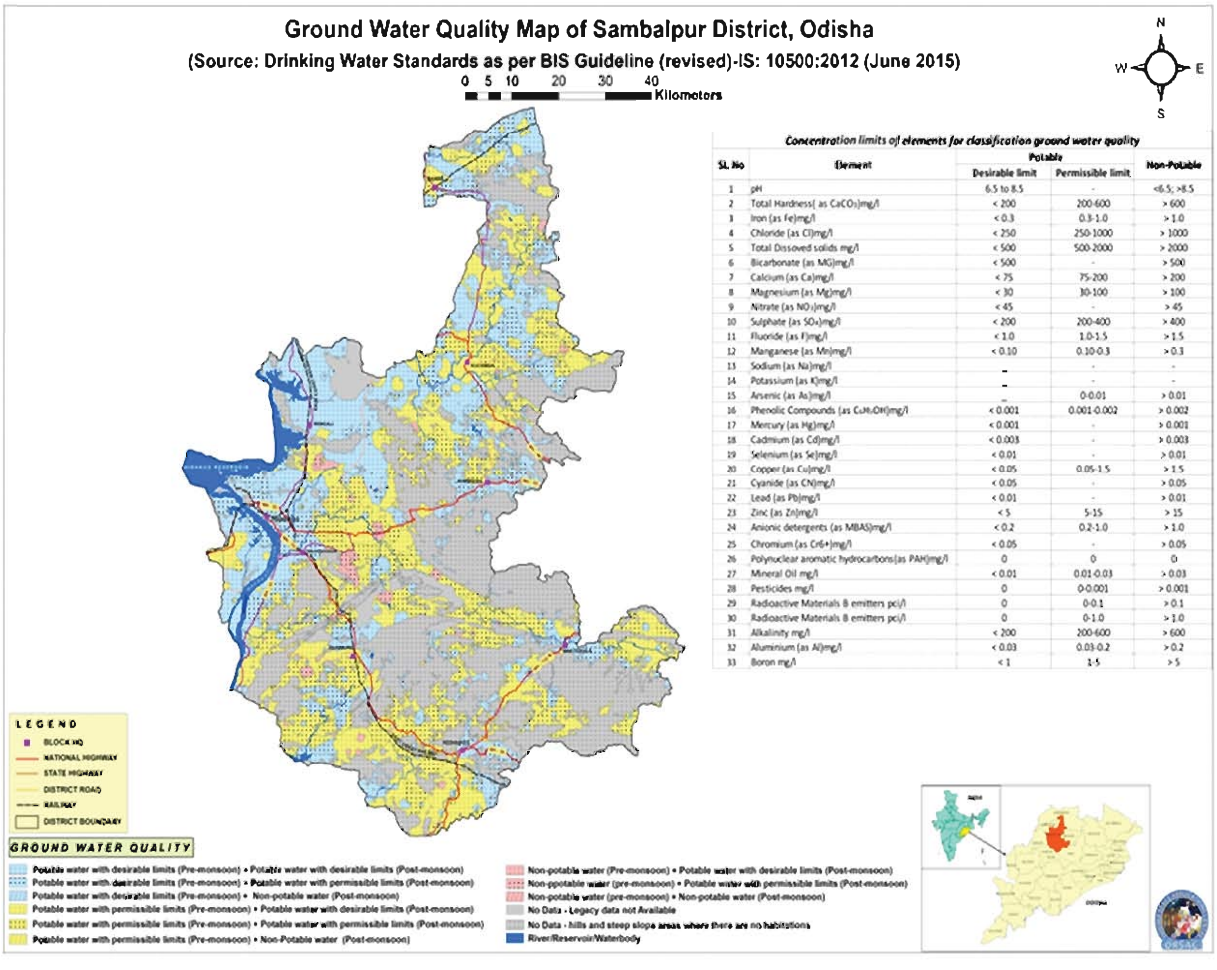


The centre has completed geo-referencing of cadastral vector layers linked with RoR of the entire Odisha state with recent high resolution satellite image (merged LISS IV and CARTOSAT 1 PAN)

- The seamless digital cadastral mosaic of the state is now available for use in any development project.
- This facilitates study of natural resources and infrastructures of the entire state on 1:4000 cadastral base.
- The database will also be very much useful during the disaster situation.

Groundwater Quality Monitoring Under Rajiv Gandhi National Drinking Water Mission (PH – IV)

In recent years, the increasing threat to groundwater quality due to human activities has become a matter of great concern. In view of this, Ministry of Drinking Water and Sanitation, Govt. of India has adopted a scheme Rajiv Gandhi National Drinking Water Mission for source targeting of Groundwater in phase manner. In the phase –IV, nationwide Groundwater Quality mapping has been included. For Groundwater Quality mapping, the water samples are collected and analysed for few parameters to understand the potable status of water. The potable status has been determined as per the BIS standards (June 2015) of the Groundwater Quality parameters approved by Ministry of Drinking Water and Sanitation, Govt. of India. Since groundwater is occurring in different geomorphic conditions, the mapping of Groundwater quality has been carried out element/parameter wise for each geomorphological unit. The mapping of Groundwater quality has also been done for pre and post monsoon seasons as monsoon plays a role in the quality of Groundwater. Finally, the layers thus prepared are integrated to get the Groundwater quality map of the area.



Concentration limits of elements for classification ground water quality

Sl. No	Element	Potable		Non-Potable
		Desirable limit	Permissible limit	
1	pH	6.5 to 8.5	-	<6.5; >8.5
2	Total Hardness(as $CaCO_3$)mg/l	< 200	200-600	> 600
3	Iron (as Fe)mg/l	< 0.3	0.3-1.0	> 1.0
4	Chloride (as Cl)mg/l	< 250	250-1000	> 1000
5	Total Dissoved solids mg/l	< 500	500-2000	> 2000
6	Bicarbonate (as MG)mg/l	< 500	-	> 500
7	Calcium (as Ca)mg/l	< 75	75-200	> 200
8	Magnesium (as Mg)mg/l	< 30	30-100	> 100
9	Nitrate (as NO_3)mg/l	< 45	-	> 45
10	Sulphate (as SO_4)mg/l	< 200	200-400	> 400
11	Fluoride (as F)mg/l	< 1.0	1.0-1.5	> 1.5
12	Manganese (as Mn)mg/l	< 0.10	0.10-0.3	> 0.3
13	Sodium (as Na)mg/l	-	-	-
14	Potassium (as K)mg/l	-	-	-
15	Arsenic (as As)mg/l	-	0-0.01	> 0.01
16	Phenolic Compounds (as C_6H_5OH)mg/l	< 0.001	0.001-0.002	> 0.002
17	Mercury (as Hg)mg/l	< 0.001	-	> 0.001
18	Cadmium (as Cd)mg/l	< 0.003	-	> 0.003
19	Selenium (as Se)mg/l	< 0.01	-	> 0.01
20	Copper (as Cu)mg/l	< 0.05	0.05-1.5	> 1.5
21	Cyanide (as CN)mg/l	< 0.05	-	> 0.05
22	Lead (as Pb)mg/l	< 0.01	-	> 0.01
23	Zinc (as Zn)mg/l	< 5	5-15	> 15
24	Anionic detergents (as MBAS)mg/l	< 0.2	0.2-1.0	> 1.0
25	Chromium (as $Cr6^+$)mg/l	< 0.05	-	> 0.05
26	Polynuclear aromatic hydrocarbons(as PAH)mg/l	0	0	0
27	Mineral Oil mg/l	< 0.01	0.01-0.03	> 0.03
28	Pesticides mg/l	0	0-0.001	> 0.001
29	Radioactive Materials B emitters pci/l	0	0-0.1	> 0.1
30	Radioactive Materials B emitters pci/l	0	0-1.0	> 1.0
31	Alkalinity mg/l	< 200	200-600	> 600
32	Aluminium (as Al)mg/l	< 0.03	0.03-0.2	> 0.2
33	Boron mg/l	< 1	1-5	> 5

Satellite Communication Project

GRAMSAT NETWORK IN ODISHA:

During the year 2017-18, GRAMSAT has produced public awareness video spots for Health & Family Welfare Dept. on mother & child care, immunity, video spots on solar pump maintenance for OREDA, video spots on energy conservation for Energy Dept. and video documentary on ORSAC.

EDUSAT NETWORK IN ODISHA:

During 2017-18, EDUSAT has transmitted 493 educational programmes utilizing 183 transmission days. The transmission has covered hardcore topics from IX & X syllabus on the subjects like English, Mathematics, Life Science, Physical Science and Physical Geography.

Production of Edusat programmes

- Target audience of Edusat transmission: The programmes are designed to cater to the requirement of secondary school students (Class-IX & X).
- Subjects covered- Mathematics, English, Physical Science, Life Science & Physical Geography.
- Live classroom programmes: 57 nos of trained resource teachers empanelled through an audition test are now operating from ORSAC studio as Resource Persons. The hard spots on Mathematics, English, Science and Physical Geography are being taught to the students with required visual support.
- Transmission timing- Monday to Friday : 12.30 PM to 01.30 PM, 03.00 PM to 04.00 PM, 07.00 PM to 08.00 PM. Saturday & Sunday : 11.00 AM to 01.00 PM.

(Evening transmissions on Saturdays & Sundays are meant for ST & SC Dev. Dept.'s Residential Schools). The transmission schedule is provided to all Edusat schools for information of students and teachers about the specific subject to be covered in each transmission slots.

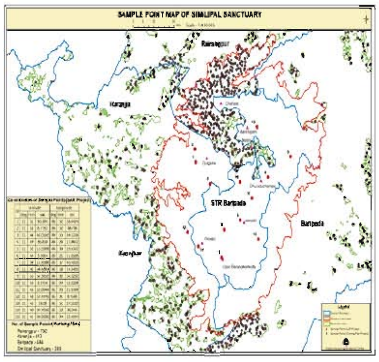
EDUSAT TRANSMISSION THROUGH DOORDARSHAN:

During 2017-18 (4th December 2017 to 20th February 2018) the centre has transmitted 46 episodes of Edusat programmes from 03.02 pm to 04.00 pm on all school days on the subjects like English, Mathematics, Life Science, Physical Science and Physical Geography for class IX & X students.

EDUSAT PROGRAMME FOR 4000 e-SCHOOLS THROUGH OKCL:

Edusat programmes are also uploaded in the OKCL server enabling 4000 e-school Class-IX & X students of the state to get benefit on the subject like Mathematics, English, Science and Physical Geography and the response is encouraging.

Development of Polarimetric SAR Model for Estimating above Ground Biomass of Forests



The project work is carried out in collaboration with Space Application Centre, Ahmadabad for two districts of Odisha i.e. Mayurbhanj and Gajapati. The study is aimed towards utilization of C-band and L-band SAR data to develop a generalised and robust vegetation biomass retrieval model. The SAR data are pre-processed with radiometric and geometric calibration and suitable filtering techniques are applied. SAR data are registered with various thematic maps and optical satellite data. The analysis of SAR data includes generation of backscatter signature, polarmetric parameters, scattering decomposition and feature classification.

Forest inventory in 94 sample points in Gajapati and 15 sample points in Mayurbhanj districts has been completed. The inventory data pertaining to species composition, type and number, height, diameter at breast height (DBH) are collected in each 0.1 hectare plot and under analysis. The project will bring out methodology for vegetation characterisation based on structure and density using polarmetric SAR data, especially hybrid polarmetric SAR data.

Training / Capacity building programme

ORSAC provides its services in disseminating knowledge on Remote Sensing & GIS and on hi-tech surveys to the students of different universities and technical institutions through summer training. Students from different universities are also allowed to carry out their project work/ dissertation work for partial fulfilment of M.Phil./ M.Sc/ B.Tech /PG Dip. Degree for a period upto six months.

Students of Marine Sciences Dept., Berhampur University, CET and KIIT, Bhubaneswar, completed their project work for fulfilment of their Degrees/Diploma.

Students from IGNOU, Bhubaneswar, Govt. Polytechnic, Bhubaneswar, XIMB, Bhubaneswar and North Odisha University visited ORSAC. They were given exposure on application of RS and GIS. Officer trainees from Gopabandhu Academy of Administration also visited ORSAC for exposure on RS & GIS.

Orientation Training is also provided to the officials of Government departments to enable them to use RS & GIS datasets and to handle the data in GIS environment. Centre is providing project based data, SW and portal handling software training to users and project sponsoring departments and agencies.

The scientists of the centre paid visit to different Universities of Odisha. They have delivered lectures at Gopabandhu Academy of Administration, Revenue Officer's Training Institute (ROTI) and at IMAGE regularly on topics related to technology use for development planning and decision support system development. Officers of IDCO were trained on preparation of Land Bank maps and Data Base at their end during 2017-18.

Scientists, engineers and technical support staffs of the centre are being trained regularly on advance application areas relating to CAD, GIS, DGPS operation, spatial data management, image processing, web service applications and Geo-ICT developments.

Glimpses of Activities

Participation at GWF, 2017
at HICC, Hyderabad, January, 2018

ORSAC Pavilion at Geospatial World Forum

Geospatial Excellence award to Dept. of
Steel & Mines Govt. of Odisha & ORSAC

Scientist receiving Trophy for ORSAC pavilion
at GWF, Hyderabad

Scientist delivering invited lecture on Geospatial
Technology for Industrial Development at GWF,18

Scientist receiving Geospatial excellence award

ORSAC Pavilion at GWF, Hyderabad 2018

ORSAC Scientists at GWF, HICC,
Hyderabd, January, 2018

Glimpses of Activities

ORSAC Participation at Asian Conference on Remote Sensing, ACRS, 2017, New Delhi

Scientist explaining RS/GIS/GPS application projects to students at ACRS, New Delhi

1st meeting of NAFCC (National Adoptive Fund for Climate Change) at Nuapada

DST Govt. of Odisha pavilion at Indian Science Congress, Manipur

ORSAC Staff on the eve of opening of new Geospatial Laboratory

Govt. of Odisha pavilion received the best State Presentation Award at Indian Science Congress

Subject Experts and Resource persons participating in EDUSAT Workshop

Commissioner-cum-Secretary, Sc. & Tech. reviewing the EDUSAT Activities

Glimpses of Activities

Review of ORSAC activities by Principal Secretary, Science and Technology Department

Celebration of Republic Day Function

Celebration of Independence Day Function

Chief Executive and Scientists with Awards received by the centre

ORSAC Staff on the eve of inauguration of new Annex Building

ORSAC presentation at National Workshop on Climate Change

ISRO- Space Information Centre at ORSAC new Annex Building

Glimpses of Activities

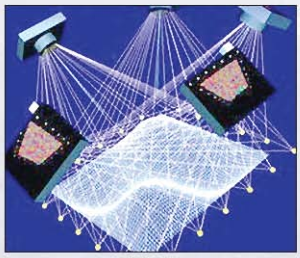
Inauguration of Annex Building of ORSAC

Puja ceremony at new building on the day of inauguration

Inauguration of the Annex Building of ORSAC by
Hon'ble Chief Minister of Odisha Sj. Naveen Patnaik

Awards received in last 5 years

2013	**Best GIS Utility Portal for Odisha Sampad**	**India Geospatial Forum**
2014	**India Geospatial Excellence Award for Kendu Leaves Procurement & Management Information System**	**India Geospatial Forum**
2015	**India Geospatial Leadership Award Odisha the Leading Geospatial State - 2014**	**India Geospatial Forum**
2016	**Geospatial World Forum Excellence Award for Govt. of Odisha Industrial Portal for Land Use and Services (GOiPLUS)**	**World Geospatial Forum**
2017	**Special Achievement in GIS (SAG) Award for GOiPLUS**	**Environmental Systems Research Institute (ESRI)**
2018	**Geospatial World Excellence Award for Application of Geospatial Technology in Mining**	**World Geospatial Forum**



Odisha Space Applications Centre (ORSAC)

Department of Science & Technology, Govt. of Odisha
Plot No. : 45/48(P), Jayadev Vihar
Near Gopabandhu Academy of Administration
Unit-16, Bhubaneswar - 751023, Odisha, India
Phone : 0674-2303625, 2300733 (EPBX)
E-mail : orsac.od@nic.in, Website : www.orsac.gov.in