

GEOSPATIAL BASED MONITORING OF FOREST RESOURCES



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Chief Executive
Odisha Space Applications Centre
Bhubaneswar**

11/02/2015 – IGF 2015

ORSAC : Sole Nodal Agency for remote sensing and GIS application solutions to all the offices including public sector undertakings, Govt. departments, Govt. societies etc. of the State

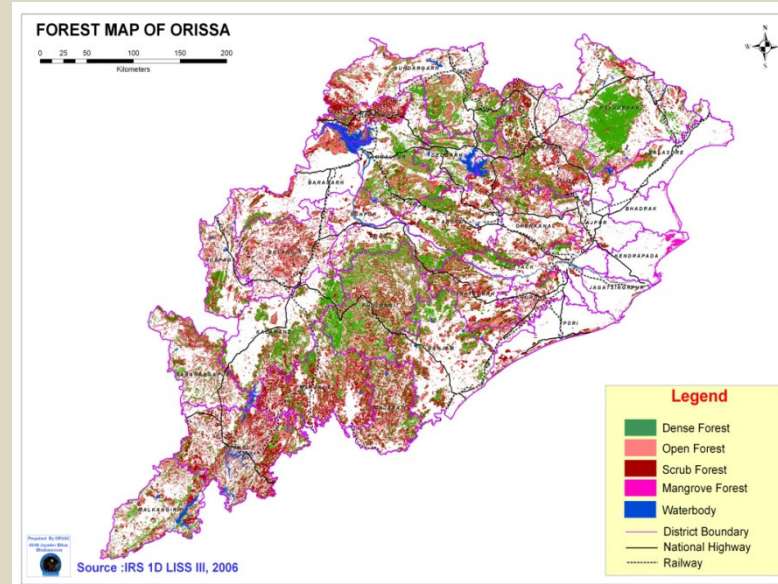
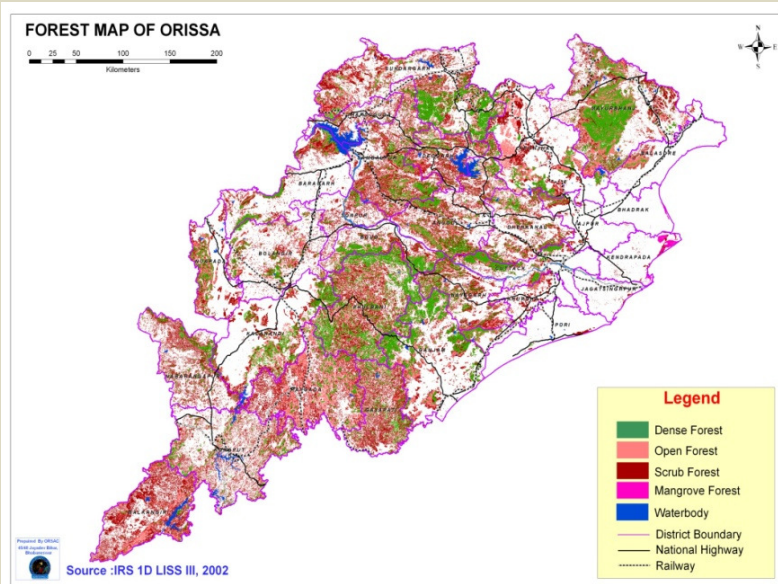
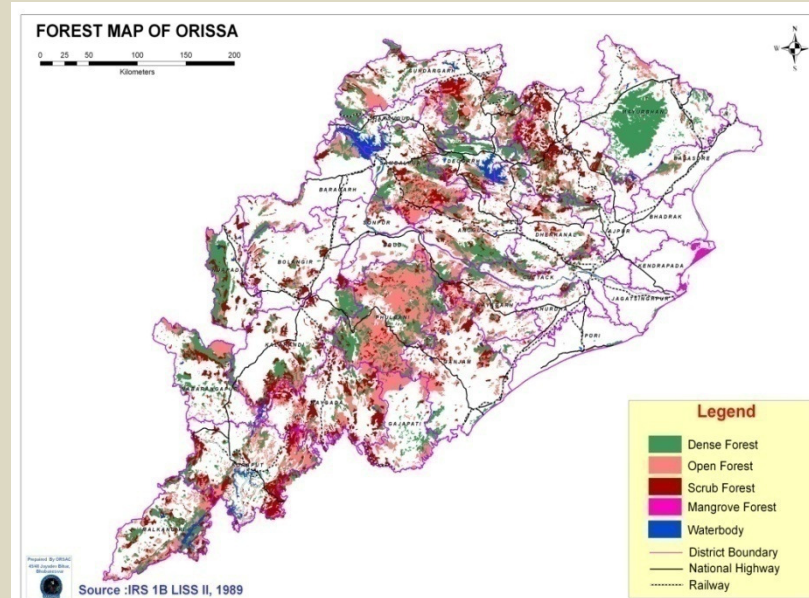
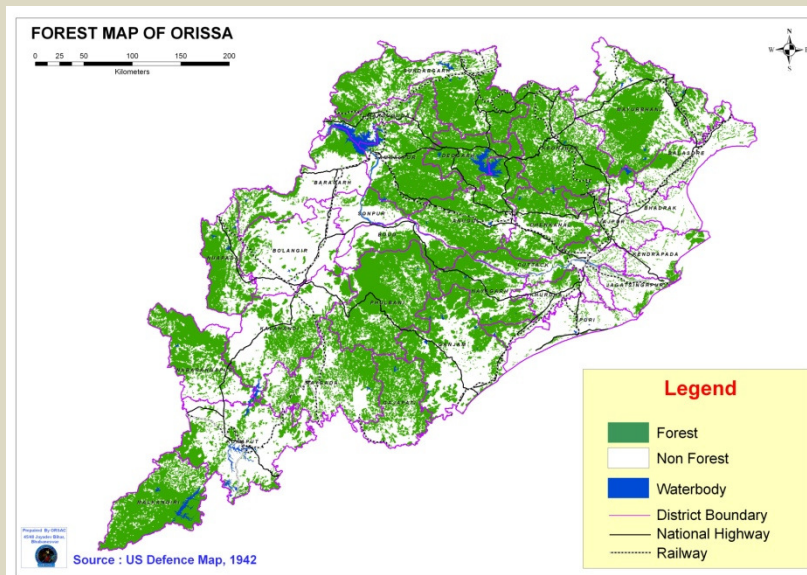
Nodal Agency of the state for the purpose of

- DGPS & ETS survey to facilitate digitization and Geo –referencing of mining maps
- Geo-referenced digital data for proposal submission to central and state Govt for diversion of forest land for non-forest use under forest conservation act. Maps
- Quality checking of cadastral data sets for Revenue & Disaster Management Department

MANPOWER:

Strength 104 - 24 SCIENTISTS, 46 TECHNICAL, 34 ADMINISTRATIVE & 50 CONTRACTUAL STAFF

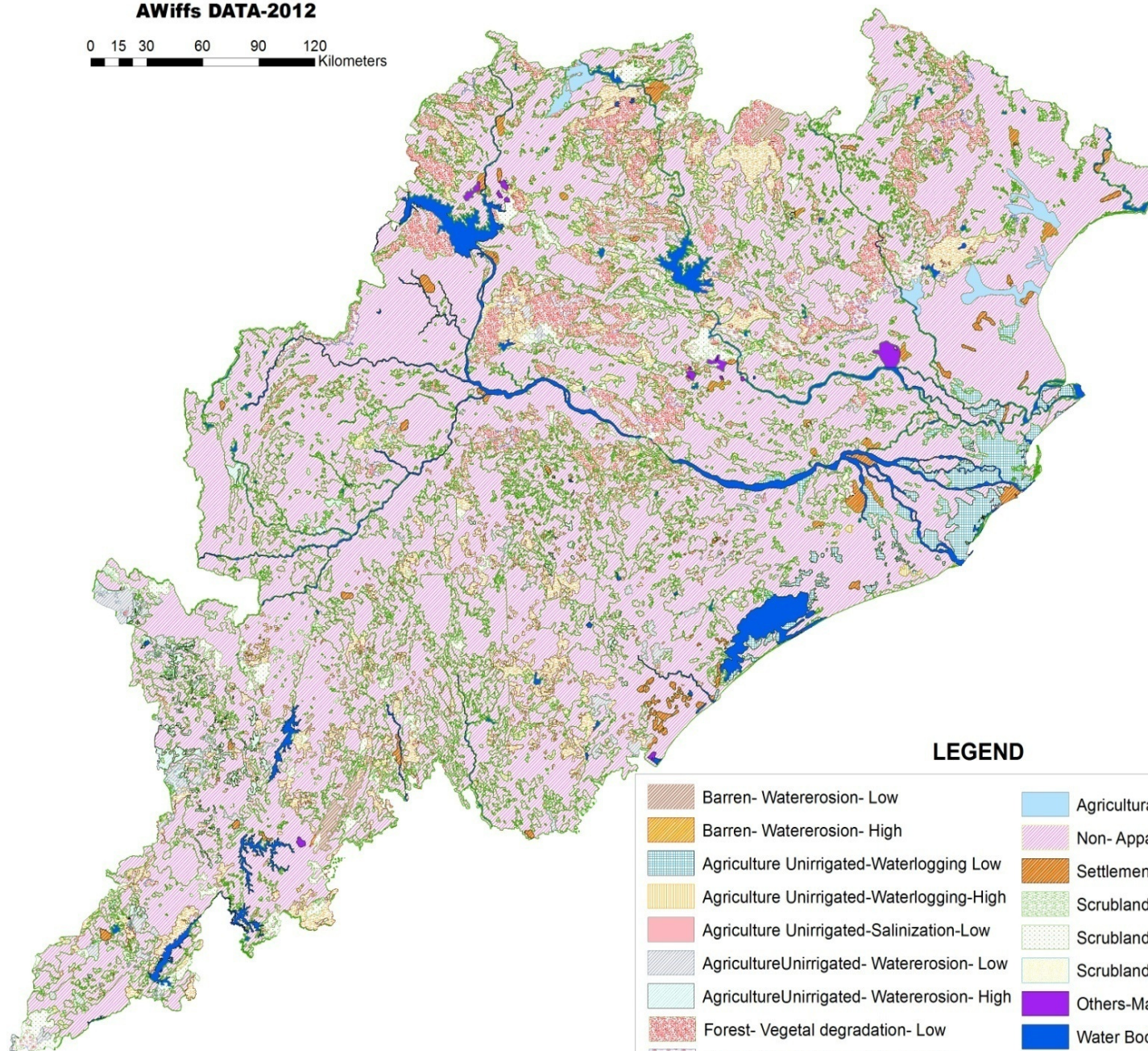
MONITORING OF FOREST COVER IN ODISHA



DESERTIFICATION STATUS MAPPING (Cycle-2)

AWiffs DATA-2012

0 15 30 60 90 120
Kilometers



LEGEND

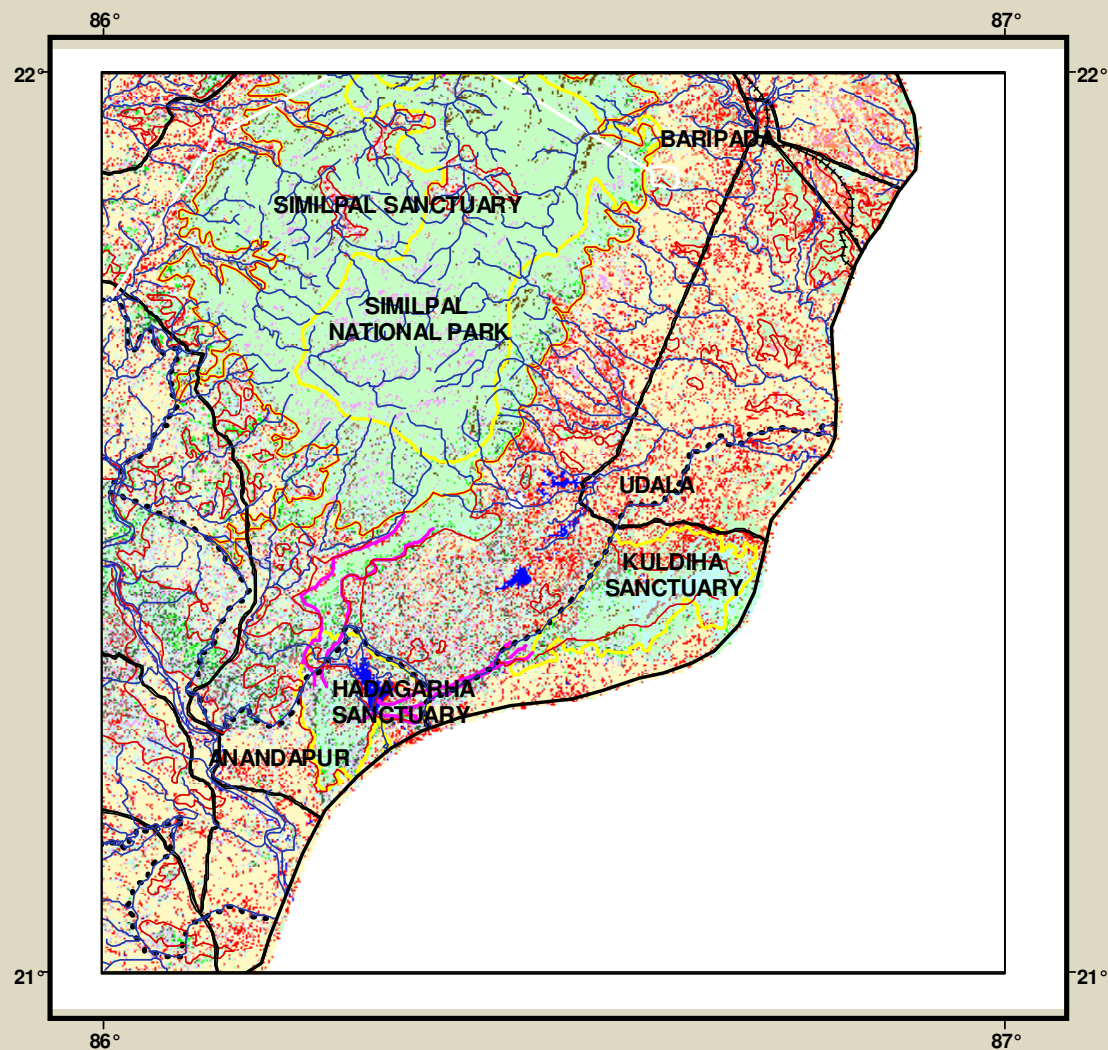
Barren- Watererosion- Low	Agricultural Irrigated- Watererosion- Low
Barren- Watererosion- High	Non- Apparent-Degradation
Agriculture Unirrigated-Waterlogging Low	Settlement
Agriculture Unirrigated-Waterlogging-High	Scrubland- Vegetal degradation- Low
Agriculture Unirrigated-Salinization-Low	Scrubland- Vegetal degradation- High
AgricultureUnirrigated- Watererosion- Low	Scrubland- Watererosion- Low
AgricultureUnirrigated- Watererosion- High	Others-Manmade-Low
Forest- Vegetal degradation- Low	Water Bodies
Forest- Vegetal degradation- High	

Prepared By



Fig. 8 (1)

CHARACTERISATION OF ELEPHANT HABITATS AND CORRIDORS (ORISSA & PART OF BIHAR)



N

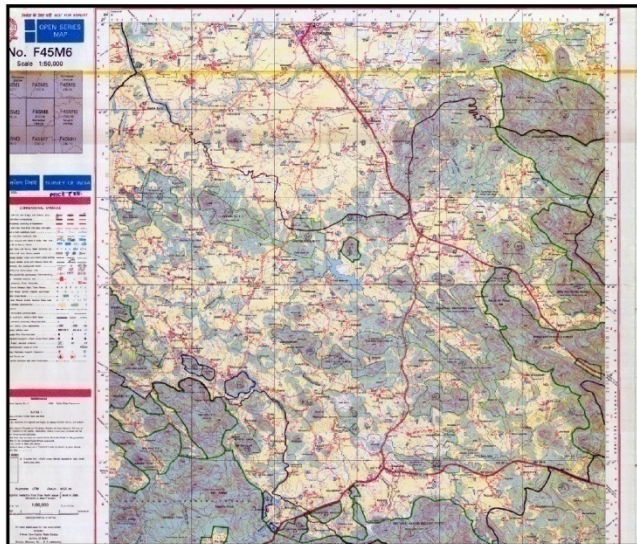
DATA : IRS - 1C - LISS-III, 1997
Orissa Remote Sensing Application Centre
Bhubaneswar

GEO REFERENCEING OF FOREST BLOCKS OF ODISHA

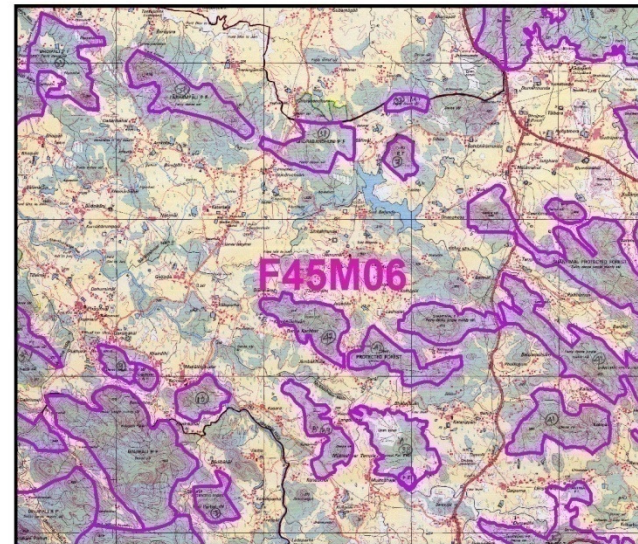
ORSAC has initiated “Geo-referencing of all the forest blocks of 50 forest divisions of Odisha state”.

- The forest blocks (RF, PRF, PF, DPF and UDPF) maps provided by Forest Department have been scanned, digitized and geo-referenced with respect to the ortho image (Cartosat-I) created under SIS-DP project.
- Geo-coordinate values of forest block boundaries mainly DPF and UDPF are also received in .xls format which are converted into polygons
- Geo-referencing of forest blocks with respect to the ortho image(cartosat-1)
- Seamless geo-referenced digital forest block boundaries for 900 sections of all 50 Forest Divisions (42,573.52 sq.km) completed and output submitted to the Forest Department.

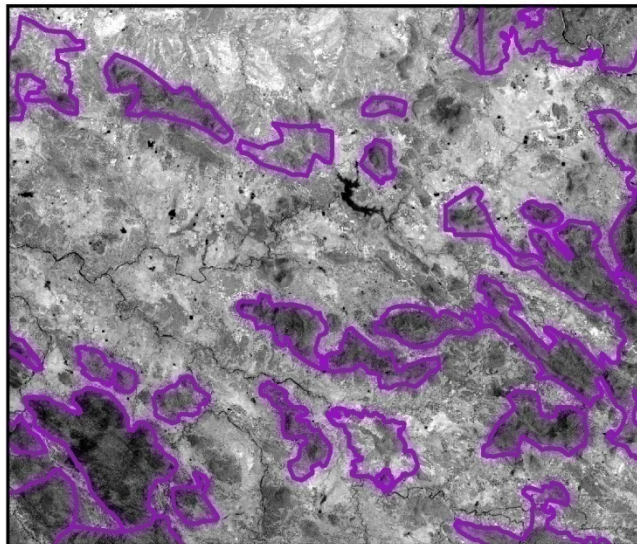
GENERATION OF FOREST BLOCKS IN ODISHA USING ORTHO IMAGE (CARTOSAT-I) (A PART OF BAMRA WILD LIFE DIVISION : TOPO NO.- F45M6 OPEN SERIES)



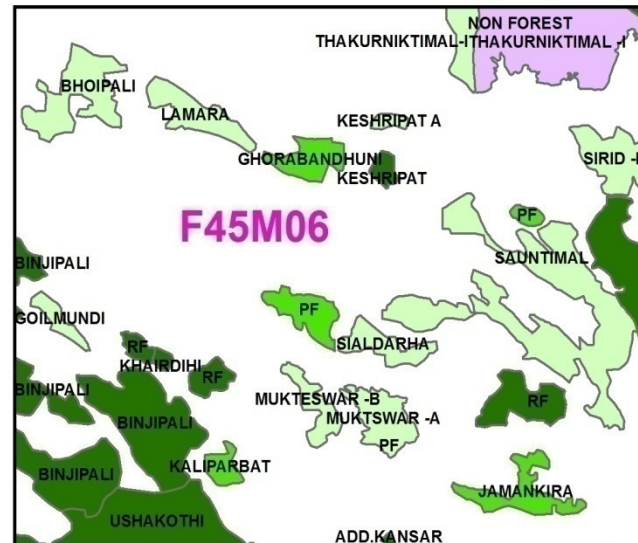
FOREST BLOCK BOUNDARIES PROVIDED BY FOREST DEPT.



DIGITIZED FOREST BLOCK BOUNDARIES



FOREST BLOCK BOUNDARIES GEO-REFERENCED ON ORTHO IMAGE

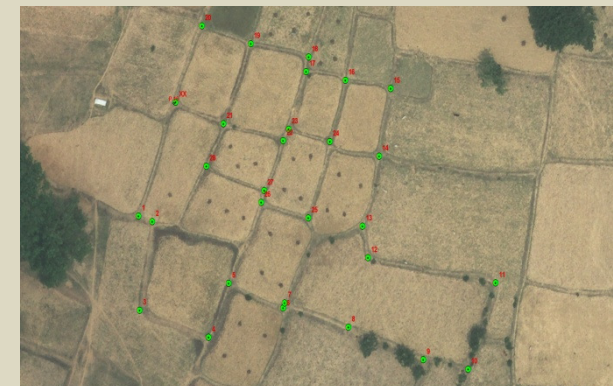
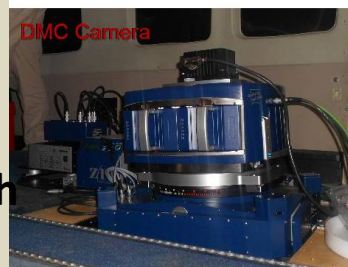
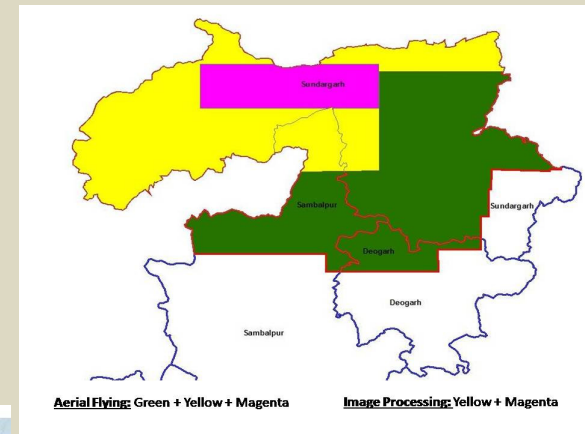
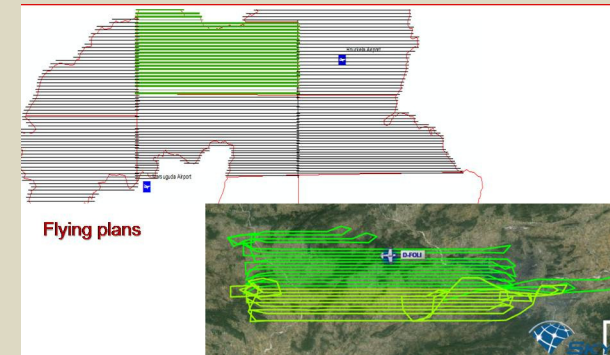


FINAL FOREST BLOCK MAP



CADASTRAL RESURVEY USING AERIAL SURVEY METHODOLOGY

- GCP monumentation for the five districts completed.
- At Present one Aircraft1 is being used for Aerial Survey.
- Aircraft2 would be used to accelerate the data acquisition
- DMC camera from Leica is being used for this survey, to take aerial data of 8cm GSD.
- Aerial data acquisition for Sundargarh, part of Deogarh and Sambalpur Districts completed till date.



CADASTRAL SURVEY USING HRSI-GROUND CONTROL POINT NETWORK

1. Ground Control Observation & Monumentation undertaken in 4 districts under Cadastral Resurvey Using HRSI [PCP – 16kmx16 km, SCP – 4kmx4km, TCP 1kmx1km]



1. Ground Control Observation & Monumentation undertaken in 5 districts under Cadastral Resurvey Using Aerial Survey [PCP – 16kmx16 km, SCP – 4kmx4km, TCP 1kmx1km]



DISTRICTS WISE GCP PLANNED/EXECUTED

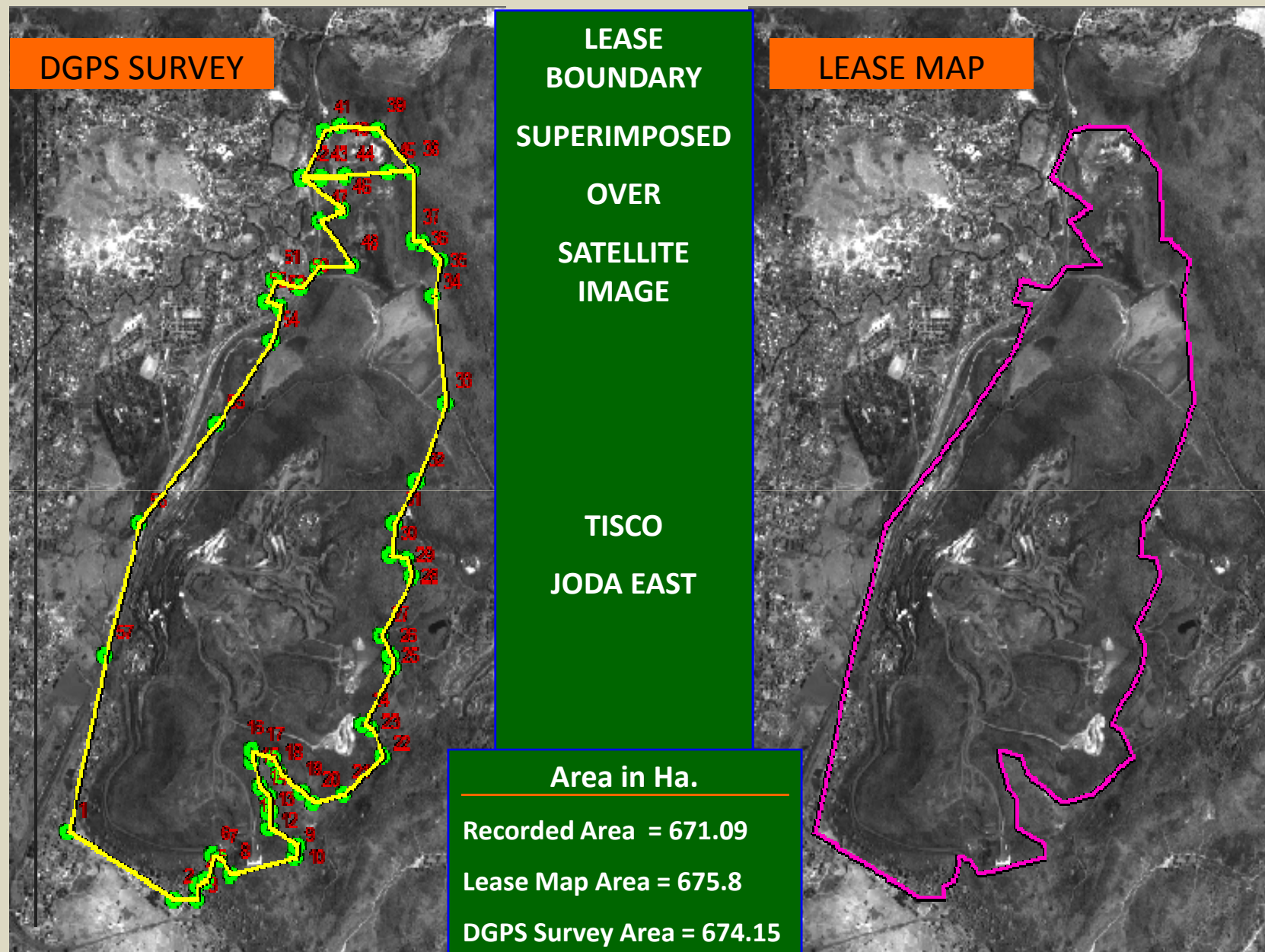
- **Ganjam** (Primary-35/32, Secondary-498/465)
- **Cuttack** (Primary-15/15, Secondary-230/226)
- **Keonjhar** (Primary-32/31, Secondary-481/472)
- **Khurda** (Primary-12/12, Secondary-172/165)

Total Planned- 1475

Total Executed- 1418

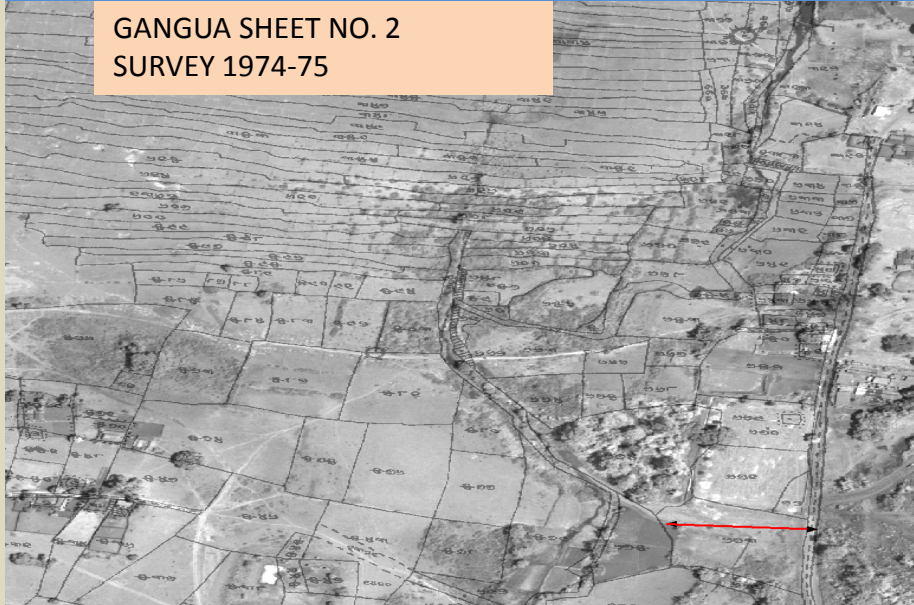
SURVEY OF MINING vis-à-vis VILLAGE/FOREST BOUNDARIES

- ❖ Out of 187 Iron/Manganese mining lease within the state, ORSAC has done DGPS survey of lease boundary for 168 mines.
- ORSAC is undertaking Georeferencing of all mining lease areas . It entails georeferencing of village cadastral sheets with Ortho-rectified satellite image using network adjusted GCPs from DGPS survey & superimposition of DGPS/ETS survey lease boundary over mosaic geo-referenced cadastral base.
- ❖ The Necessary corrections for each mining lease as per their recorded area will be undertaken considering the existing land schedule of lease, adjacent lease boundaries and present ground possession as observed earlier. The corrected maps being executed in the field at the time of joint survey.

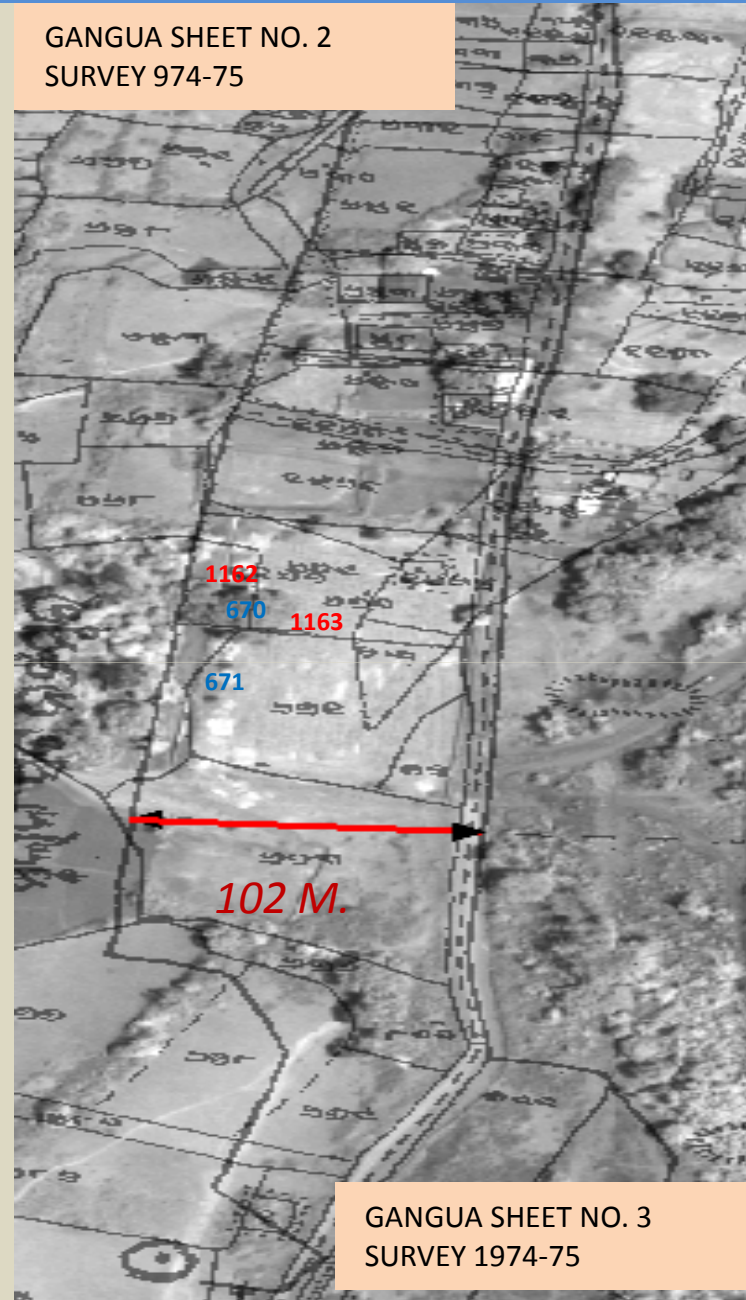


CADASTRAL INHERENT ERROR –OVERLAP

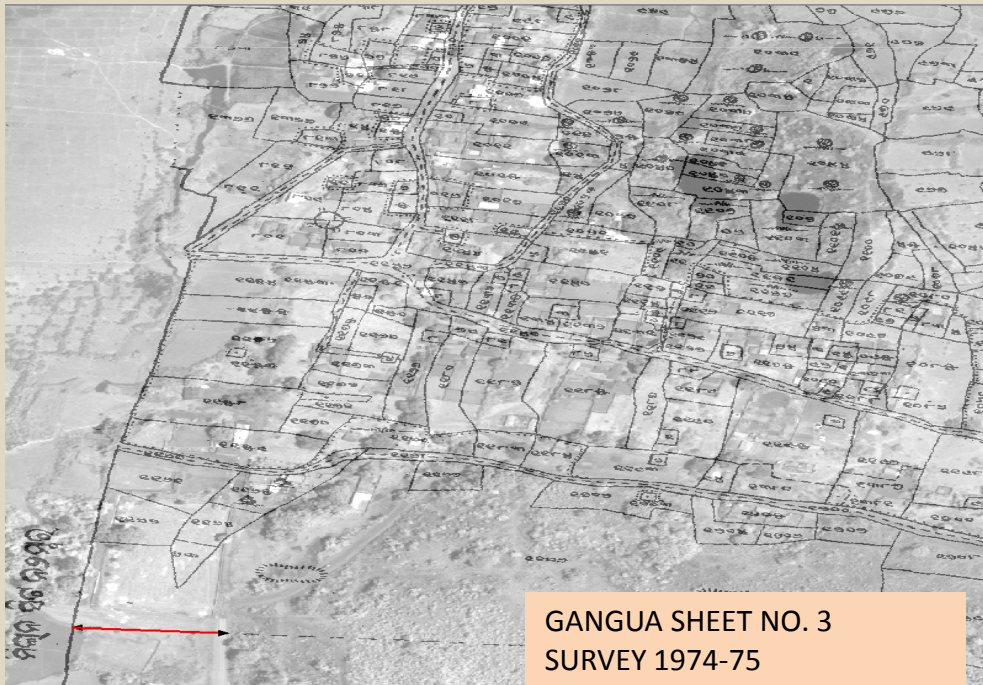
GANGUA SHEET NO. 2
SURVEY 1974-75



GANGUA SHEET NO. 2
SURVEY 974-75



GANGUA SHEET NO. 3
SURVEY 1974-75



GANGUA SHEET NO. 3
SURVEY 1974-75

OVERLAPPING OF 102M. BETWEEN GEOREFERENCED SHEET NO.2 & 3

CADASTRAL INHERENT ERROR –GAP

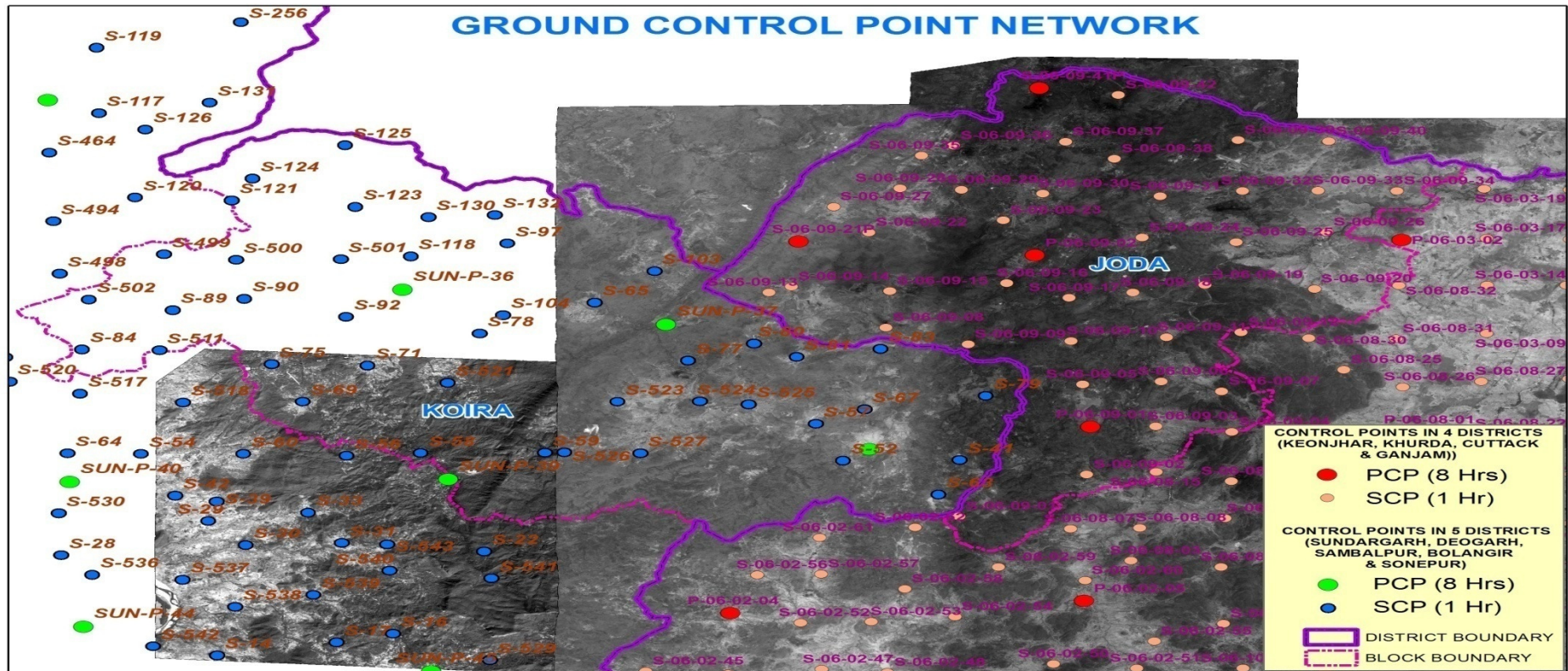
RENGALBEDA NO. 5
SURVEY 1974-75

NADIKASIRA NO. 4
SURVEY 1974-75

92 M.

GAP OF 92 M. BETWEEN GEOREFERENCED VILLAGES

GROUND CONTROL POINT NETWORK



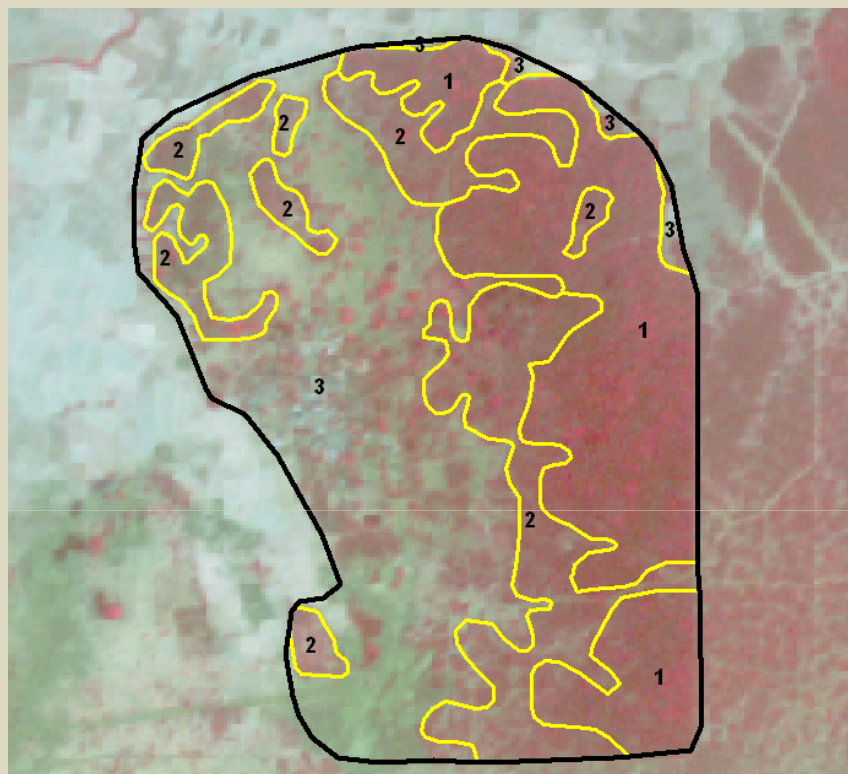
Monitoring of Afforestation/Plantation Programme in Odisha using Remote Sensing and GIS

- Satellite image (CARTOSAT-I stereo pair and RESOURCESAT-2 LISS IV MX) for the year 2012 and 2014 .
- Shape files creation of plantation areas from year 2009 to 2014 as provided by Forest Department.
- Geo-coordinates of plantation patches where the .shp files are not available provided by Forest Department in .xls format. The polygons of plantation patches are created.
- On screen digitization of crown densities for each plantation area prepared using temporal satellite data.
- Ortho image generation, Digital Elevation Model, contour mapping as well as village boundary being generated and provided to the Forest Department.

MONITORING OF AFFORESTATION / PLANTATIONS IN ODISHA

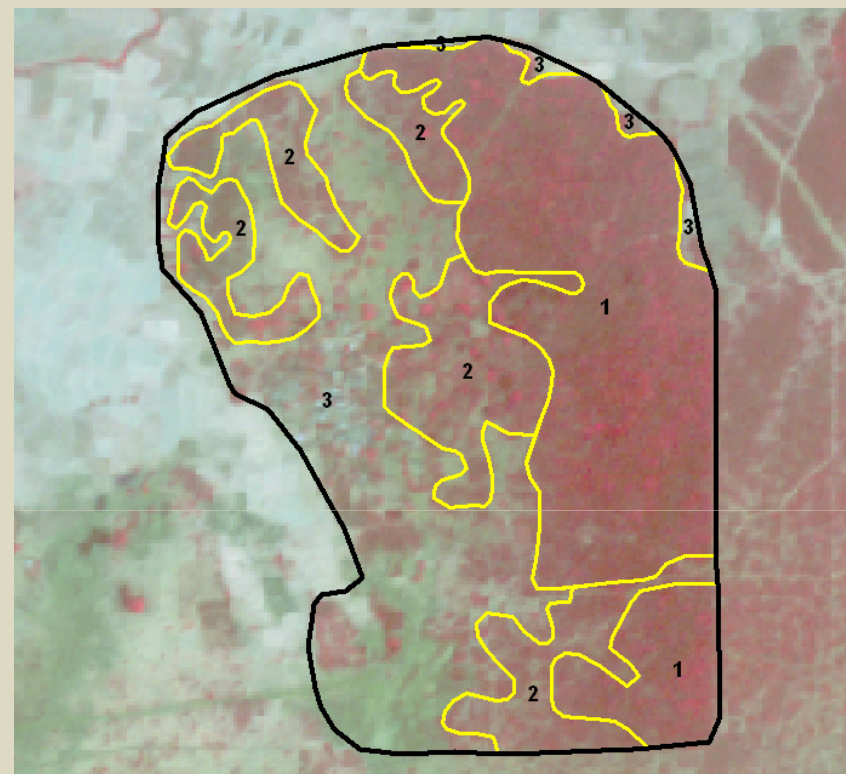
(PART OF KHURDHA DISTRICT)

TOPO NO 73 H/12



RESOURCESAT -1 LISS IV ,2012

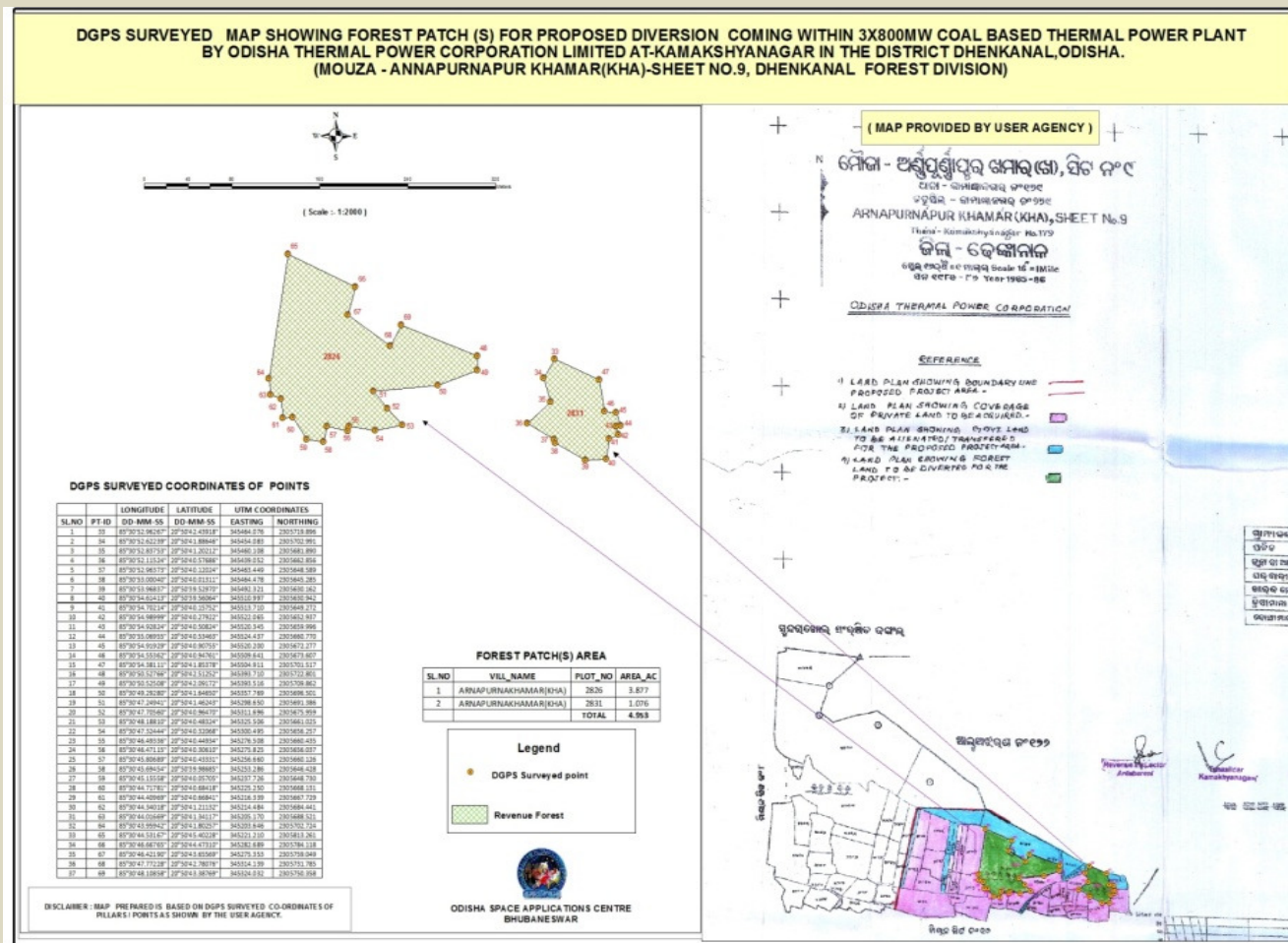
AREA STATISTICS OF 2012		
CODE	DESCRIPTION	AREA IN HECT.
1	Dense Plantation (>40% Crown Cover)	29.92
2	Open Plantation (10 - 40% Crown Cover)	23.05
3	Degraded Plantation (<10% Crown Cover)	41.13
Total Area		94.10



RESOURCESAT -2 LISS IV ,2014

AREA STATISTICS OF 2014		
CODE	DESCRIPTION	AREA IN HECT.
1	Dense Plantation (>40% Crown Cover)	36.36
2	Open Plantation (10 - 40% Crown Cover)	21.79
3	Degraded Plantation (<10% Crown Cover)	35.94
Total Area		94.10

SURVEY OF FOREST AREAS PROPOSED FOR DIVERSION PROJECTS UNDER F.C ACT 1980

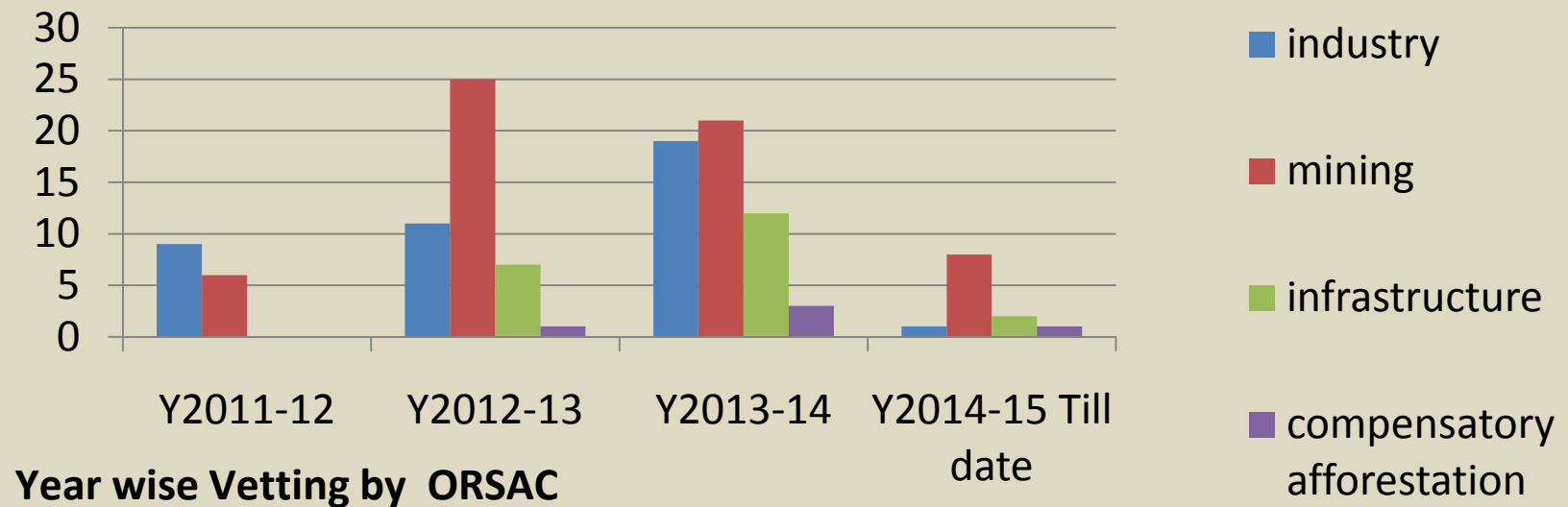


During Year 2014-15

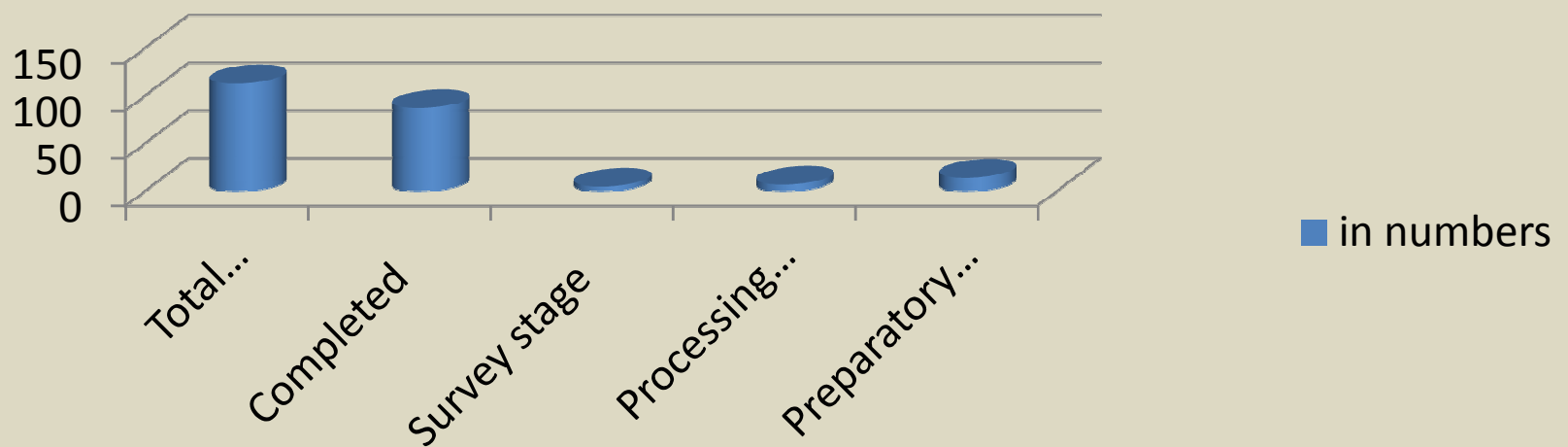
Survey Done Directly by ORSAC:18

Vetting of Forest Areas Proposed for Diversion Project: 36

ORSAC is undertaking DGPS survey of Forest Area proposed for diversion under F.C Act. as well as taking up technically vetting of DGPS surveyed maps of such area where survey is done through other survey firms.



Survey done directly by ORSAC during 2014-15





Samay Pattanaik
DFO (Khurda Division)
[\[+more info\]](#)

GODOWNS

PHADI

☒ Collection ☐ sale ☐ Stock

GODOWN 1

475 BAGS

GODOWN 2

384 BAGS

GODOWN 3

504 BAGS

GODOWN 4

154 BAGS

GODOWN 5

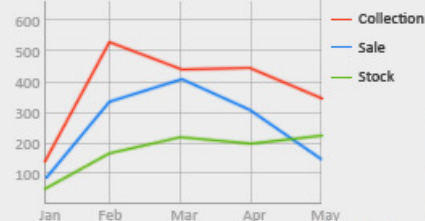
74 BAGS

Phadi name
Khurda Division,
Bolagarah Region
Total Members :21
Area: 210 sq ft.
Type: Permanent
Avg Collection: 54 bags/Month
Nearest Godown:



[View Performance](#)

Godown Name
Last Five Month Performance



[View Profile](#)

FOREST COVER CHANGE ANALYSIS AND PREPARATION OF ATLAS OF ODISHA

FOREST CHANGE

The forest cover layers of 2011 and 2013 of FSI, Dehradun used for preparation of forest change maps, Division wise on scale 1:50,000. The Forest administrative layers namely Division, Range, Section and Beat along with important roads, drainage and locations are superimposed on the maps.

The following information generated at beat level:

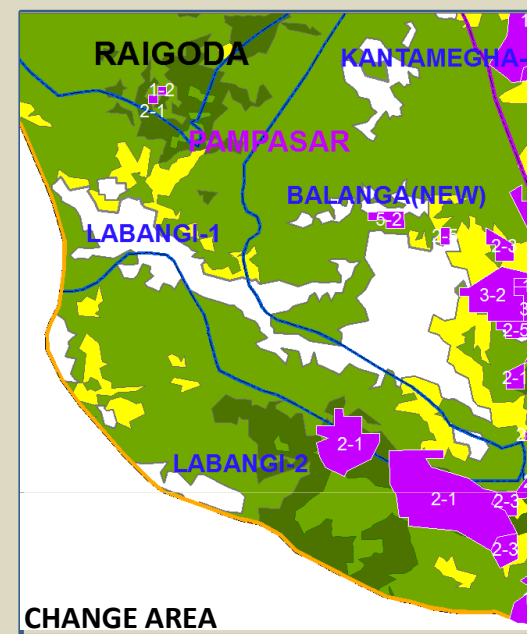
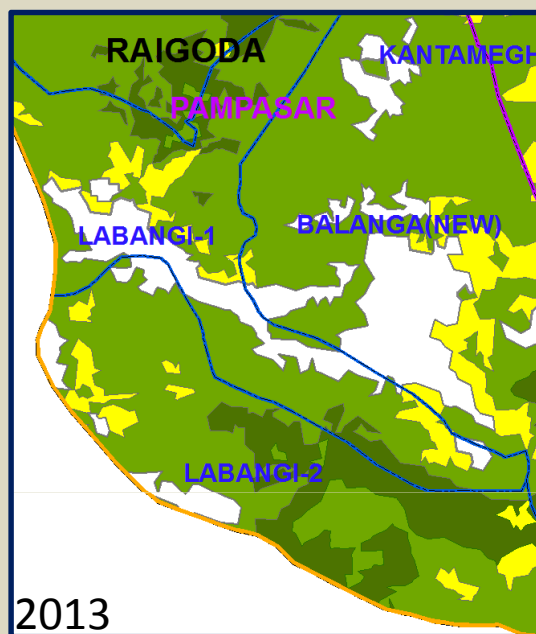
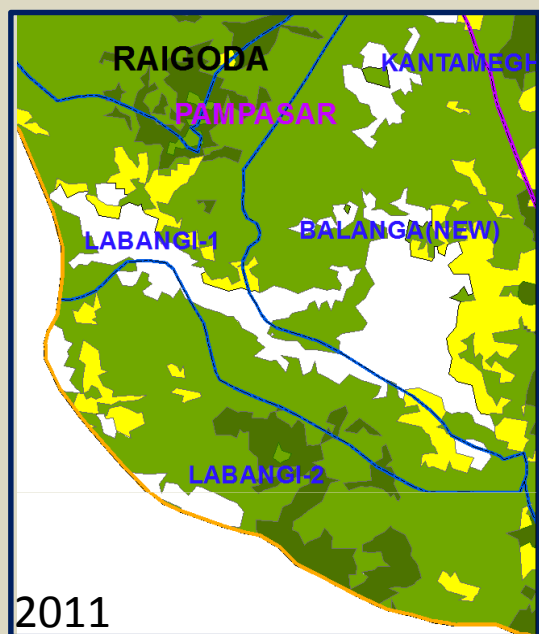
- Forest change matrix
- Forest change area
- Geo-coordinates of the central points of the change area

FOREST ATLAS

The forest atlas prepared for each administrative units namely Division, Range, Section, and Beat in A3 size paper format along with detailed information. The following information are superimposed on maps:

- Forest cover layers(2011 and 2013)
- Administrative boundaries (Division, Range, Section, and Beat)
- Management boundaries (Forest blocks, Compartments and coupes)
- Important roads, drainage and settlements

FOREST COVER CHANGE LABANGI-2 BEAT, PAPMASAR SECTION , RAIGODA RANGE ANGUL FOREST DIVISION (TOPO NO 73D14)



Reference

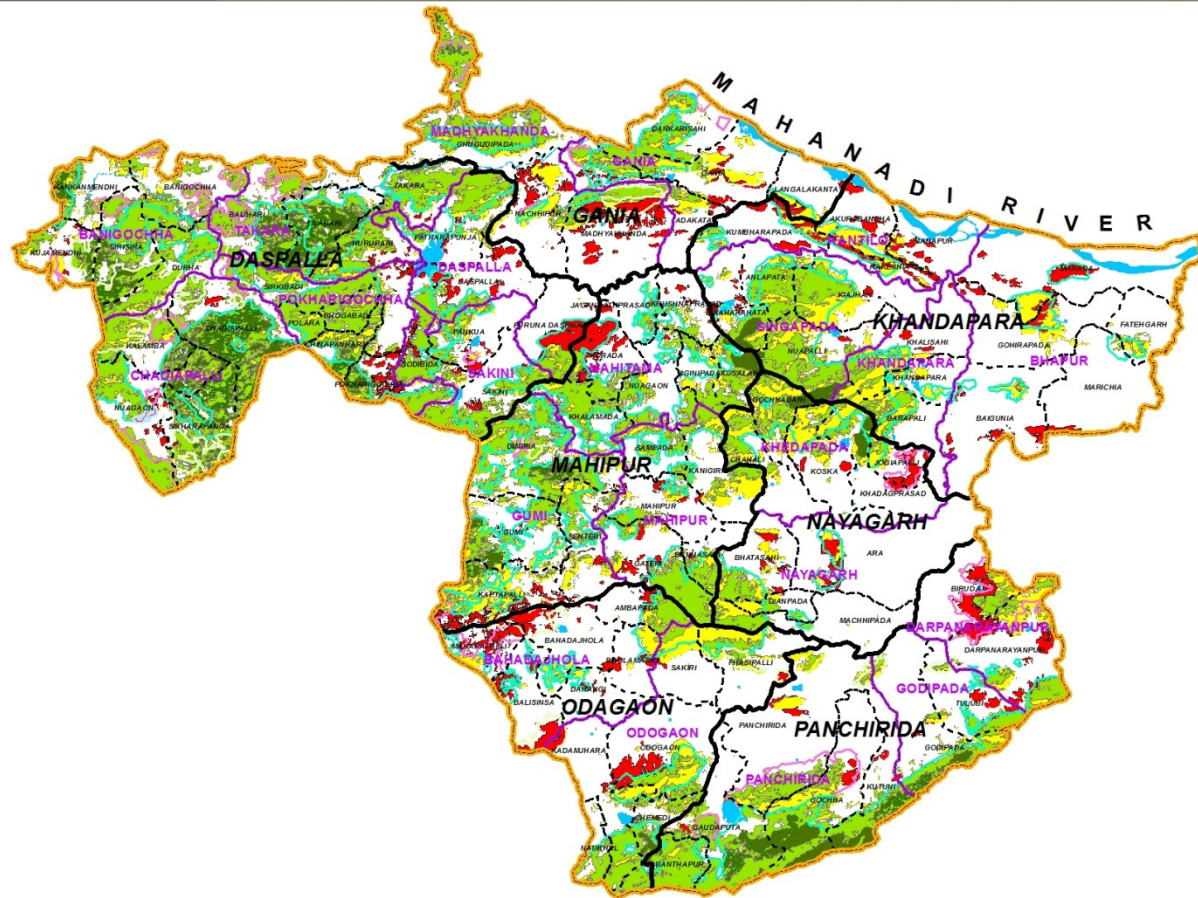
Forest Category	Code	Administrative & Management Boundary
Very Dense Forest	1	Division Boundary
Moderately Dense Forest	2	Range Boundary
Open Forest	3	Section Boundary
Scrub forest	4	Beat Boundary
Non-forest	5	Forest Block Boundary
Waterbodies	6	
Forest Change Area	5-3	

Change Matrix (Area in Hect.)

2011Assessment	2013 Assessment					Total 2011
	1	2	3	4	5	
1	144.63	11.59				156.22
2	51.51	294.26	7.62			353.38
3			20.59			20.59
4						0.00
5					27.66	27.66
Total 2013	196.13	305.85	28.21	0.00	27.66	557.86
Net Change	39.91	-47.53	7.62	0.00	0.00	

DIVISION ATLAS

NAYAGARH FOREST DIVISION



ODISHA

NAYAGARH DIVISION

LEGEND



- Very Dense Forest
- Mod-Dense Forest
- Open Forest
- Scrub forest
- Waterbodies
- Non-forest

- RESERVE FOREST
- PROTECTED RESERVE FOREST
- DEMARCATED PROTECTED FOREST
- UN-DEMARCATED PROTECTED FOREST

- DIVISION BOUNDARY
- RANGE BOUNDARY
- SECTION BOUNDARY
- BEAT BOUNDARY

0 2.25 4.5 9 13.5 18
Kilometers

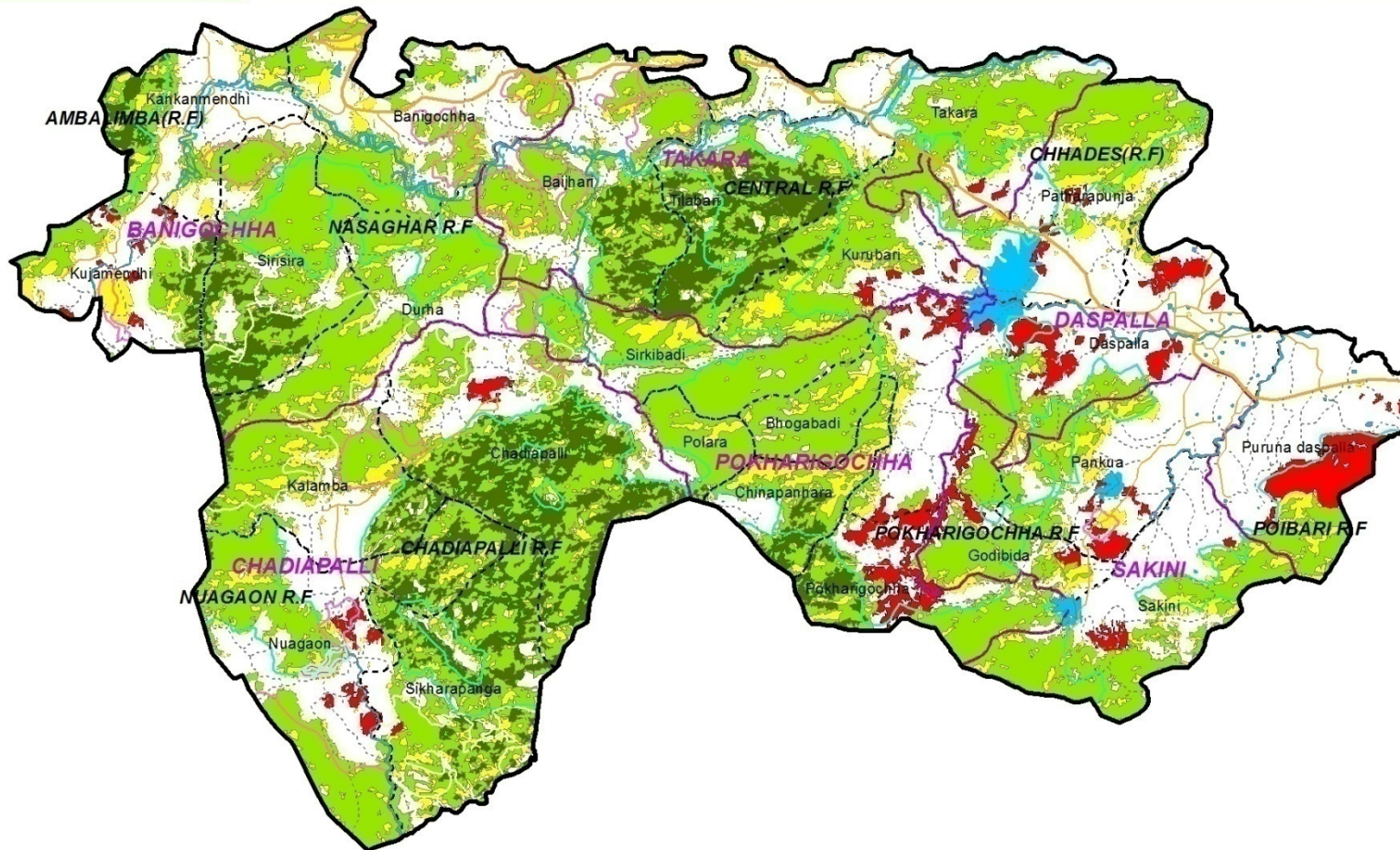


ODISHA SPACE APPLICATIONS CENTRE
45/48(P), Jayadev Viahr
Bhubaneswar

RANGE NAME : GANIA SECTION NAME : GODIPADA BEAT NAME : PANCHIRIDA

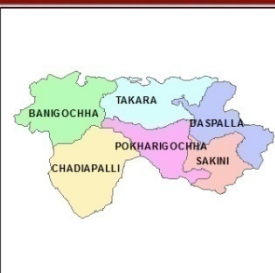
RANGE ATLAS

DASPALLA RANGE, NAYAGARH FOREST DIVISION



NAYAGARH FOREST DIV. DASPALLA RANGE

LEGEND



- Very Dense Forest
- Mod-Dense Forest
- Open Forest
- Scrub forest
- Waterbodies
- Non-forest

- RESERVE FOREST
- PROTECTED FOREST
- DEMARCATED PROTECTED FOREST
- UN-DEMARCATED PROTECTED FOREST

Section Name **BANIGOCHHA** Beat Name Sirkibadi
R.F. Name **POIBARI R.F.**

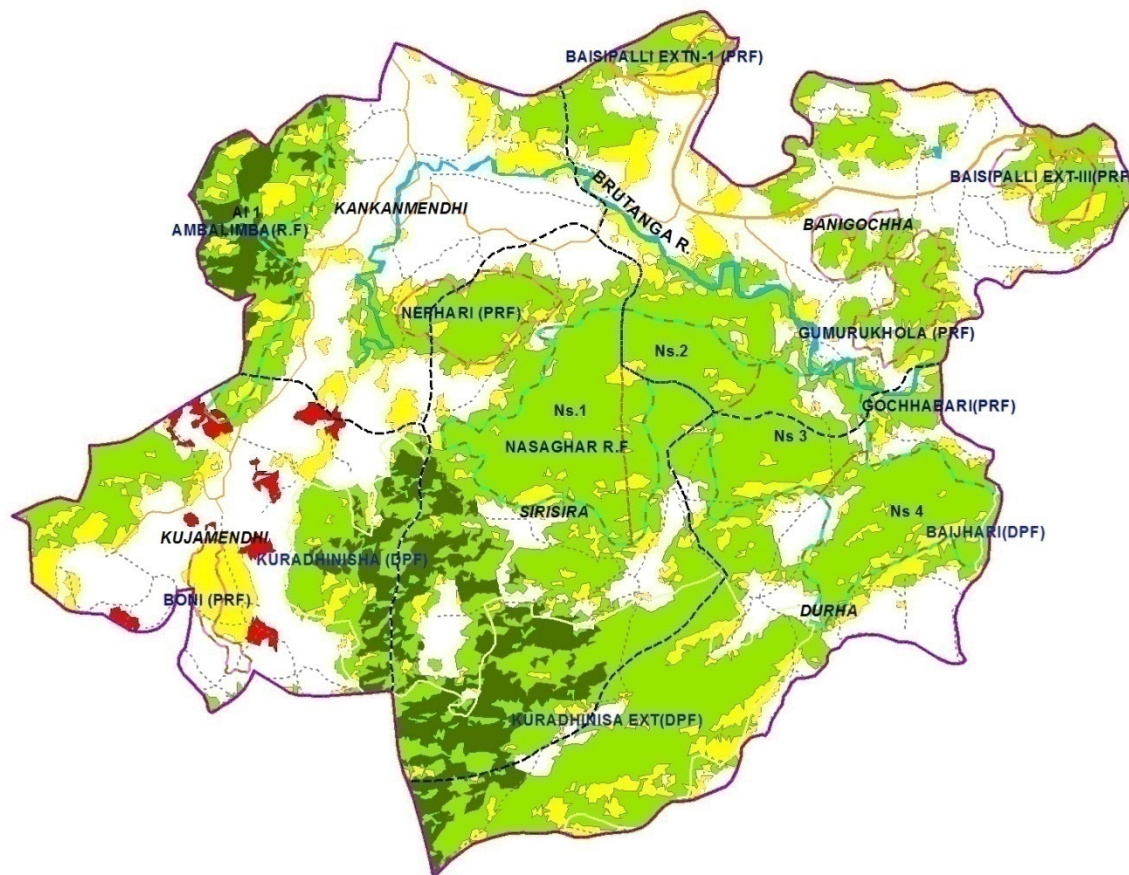
- RANGE BOUNDARY
- SECTION BOUNDARY
- BEAT BOUNDARY
- NATIONAL HIGHWAY
- MAJOR ROADS
- OTHER ROADS



ODISHA SPACE APPLICATIONS
45/48(P), Jayadev Vihar
Bhubaneswar

SECTION ATLAS

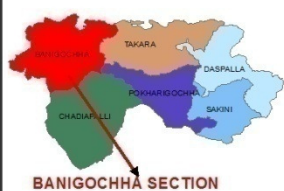
BANIGOCHHA SECTION, DASPALLA RANGE, NAYAGARH DIVISION



DASPALLA RANGE

BANIGOCHHA SECTION

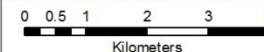
LEGEND



- Very Dense Forest
- Mod-Dense Forest
- Open Forest
- Scrub forest
- Waterbodies
- Non-forest

- RESERVE FOREST
 - PROTECTED FOREST
 - DEMARCATED PROTECTED FOREST
 - UN-DEMARCATED PROTECTED FOREST
- Compartment Name **Ns3** Beat Name **DURHA**
- RF/PRF Name **NASAGHAR R.F.**

- SECTION BOUNDARY
- BEAT BOUNDARY
- COMPARTMENT
- NATIONAL HIGHWAY
- MAJOR ROADS
- OTHER ROADS

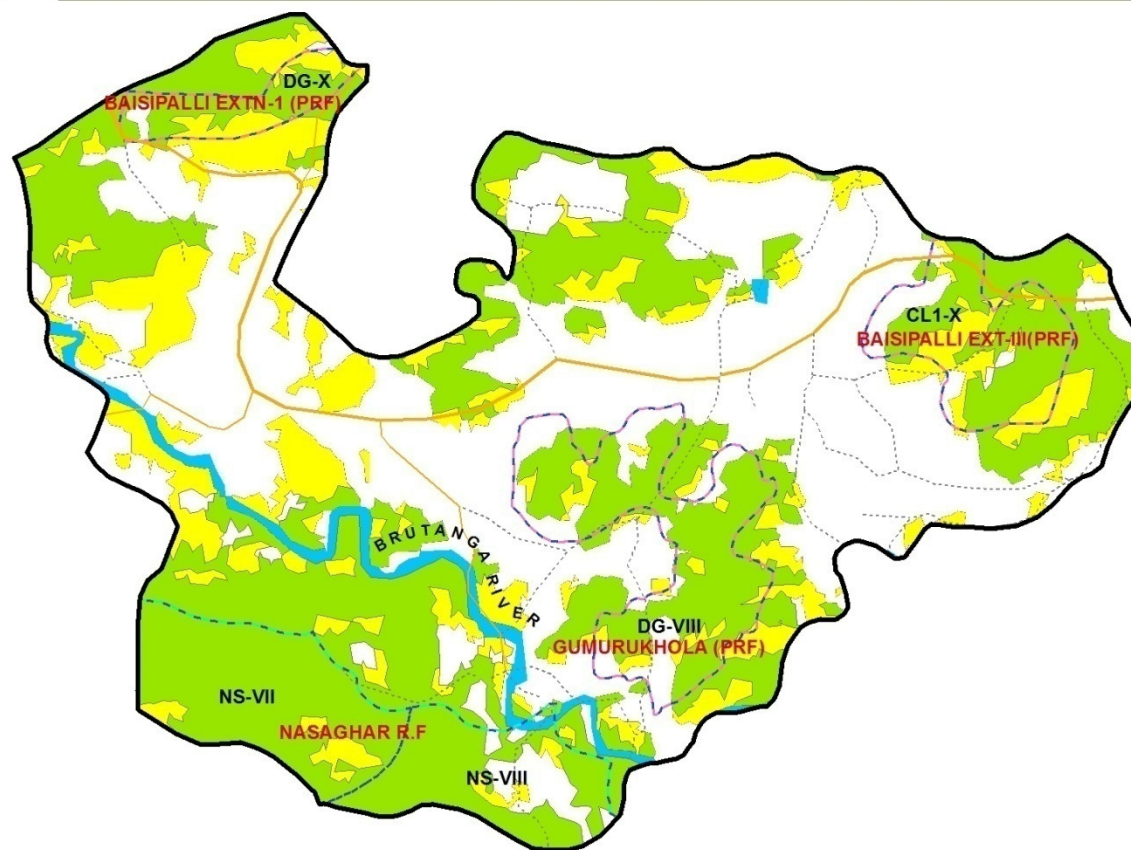


ODISHA SPACE APPLICATIONS CENTRE
45/48(P), Jayadev Vihar
Bhubaneswar

AREA STATISTICS – BANIGOCHHA SECTION

DIVISION : NAYAGARH RANGE : DASPALLA SECTION : BANIGOCHHA SECTION AREA : 14753.61 ha NO OF BEAT : 5 NO OF COMPARTMENT : 5	SL	COMPARTMENT NAME	Area (in Ha.)
	1	AI 1	554.42
	2	Ns 3	445.22
	3	Ns 4	478.07
	4	Ns.1	602.84
	5	Ns.2	331.25
SL	BEAT_NAME		Area (in Ha.)
1	BANIGOCHHA		3677.40
2	DURHA		2944.28
3	KANKANMENDHI		2419.85
4	KUJAMENDHI		2375.99
5	SIRISIRA		3336.09
	TOTAL		14753.61

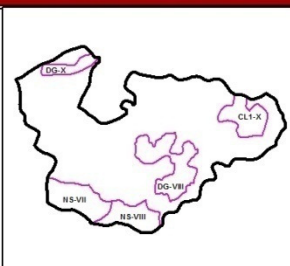
DPF-NAME	Area (in Ha)	PRF-NAME	Area (in Ha)	RF-NAME	Area (in Ha)
KURADHINISHA (DPF)	505.19	BAISIPALLI EXTN-1 (PRF)	73.23	AMBALIMBA(R.F)	554.52
BAIJHARI(DPF)	17.61	BAISIPALLI EXT-III(PRF)	163.64	NASAGHAR R.F	1857.31
KURADHINISA EXT(DPF)	1863.33	GUMURUKHOLA (PRF)	270.98		
		NEPHARI (PRF)	253.79		
		GOCHHABARI(PRF)	2.12		
		BONI (PRF)	79.32		
TOTAL	2386.14		843.09		2411.83



BANIGOCHHA SECTION

BANIGOCHHA BEAT

LEGEND



	Very Dense Forest
	Mod-Dense Forest
	Open Forest
	Scrub forest
	Waterbodies
	Non-forest

	RESERVE FOREST
	PROTECTED RESERVE FOREST
	BEAT BOUNDARY
	COUPE
	NATIONAL HIGHWAY
	MAJOR ROADS
	OTHER ROADS

Coupe Name **NS - VII** RF/PRF Name **NASAGHAR R.F**

0 0.325 0.65 1.3 1.95 2.6
Kilometers



ODISHA SPACE APPLICATIONS CENTRE
45/48(P), Jayadev Vihar
Bhubaneswar

AREA STATISTICS – BANIGOCHHA BEAT

DIVISION : NAYAGARH
RANGE : DASPALLA
SECTION : BANIGOCHHA
BEAT AREA : 3677.40 ha
NO OF COMPARTMENT : 2
NO OF COUPE : 5

SL	COMPARTMENT NAME	Area (in Ha.)
1	Ns 3	163.27
2	Ns.2	216.30
SL	COUPE_NAME	Area (in Ha.)
1	DG-X	73.26
2	CL1-X	163.65
3	DG-VIII	270.96
4	NS-VII	216.30
5	NS-VIII	163.27

FOREST DENSITY

CROWN_ID	Area (in Ha.)
40 - 70% Crown Cover	131.95
25 - 40% Crown Cover	268.2
10 - 25% Crown Cover	289.82
< 10% Crown cover	101.5
Non Forest	95.45
TOTAL	886.92

THANK YOU