Geoinformatics Applications in Rural Development

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Hyderabad

Outline of the Presentation

- Changing Landscape of Rural Development
- Geoinformatics Application for Gram Panchayat
- Geohydrology Model for Watershed Planning
- Satellite based Watershed Projects Monitoring
- Customized Watershed Planning and Estimation Software
- Agro Climatic Planning and Information Bank
- Web GIS Based Decision Support System for Agriculture & Crop Monitoring System
- Geoinformatics Applications in MGNREGA

Changing Landscape of Rural Development

- Rural Development : ever evolving scenario

- Development of Area, People, environment, aspirations, empowerment, leadership, information, voice of people, Common interest groups

- Policies & Programmes
- Diversities
- Economies of Scale
- Resource Sharing and Optimisation

Changing Landscape of Rural Development

- Infrastructure
- Institutions
- Women
- Training & Capacity Building
- Pooling Rural Talents
- Networking with Resource Organisations
- Panchayati Raj for Decentralised Governance

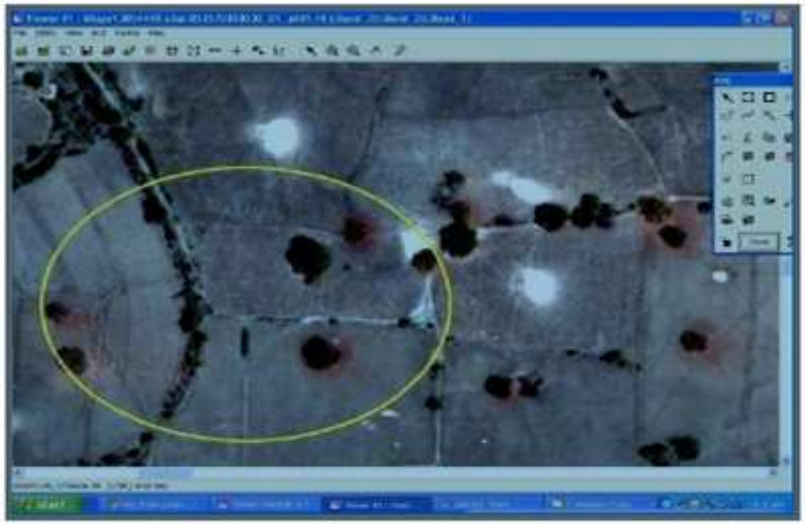
Geoinformatics Applications at Gram Panchayat

Converging development initiatives for:

- Planning
- Monitoring by local people at Gram Panchayat and by local bodies
- For developing a reliable database
- Decisions for developing area and people
- Resource optimisation
- Priorities set by the community

- To empower and enable through village GIS

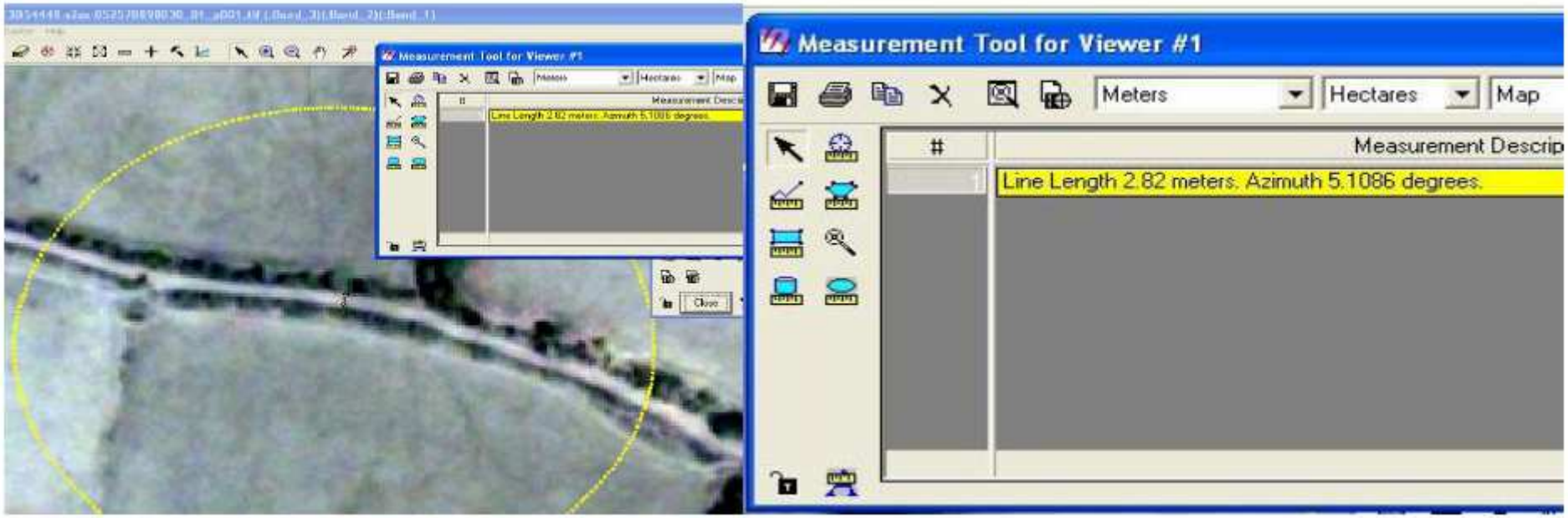
Geoinformatics based MGNREGA Evaluation



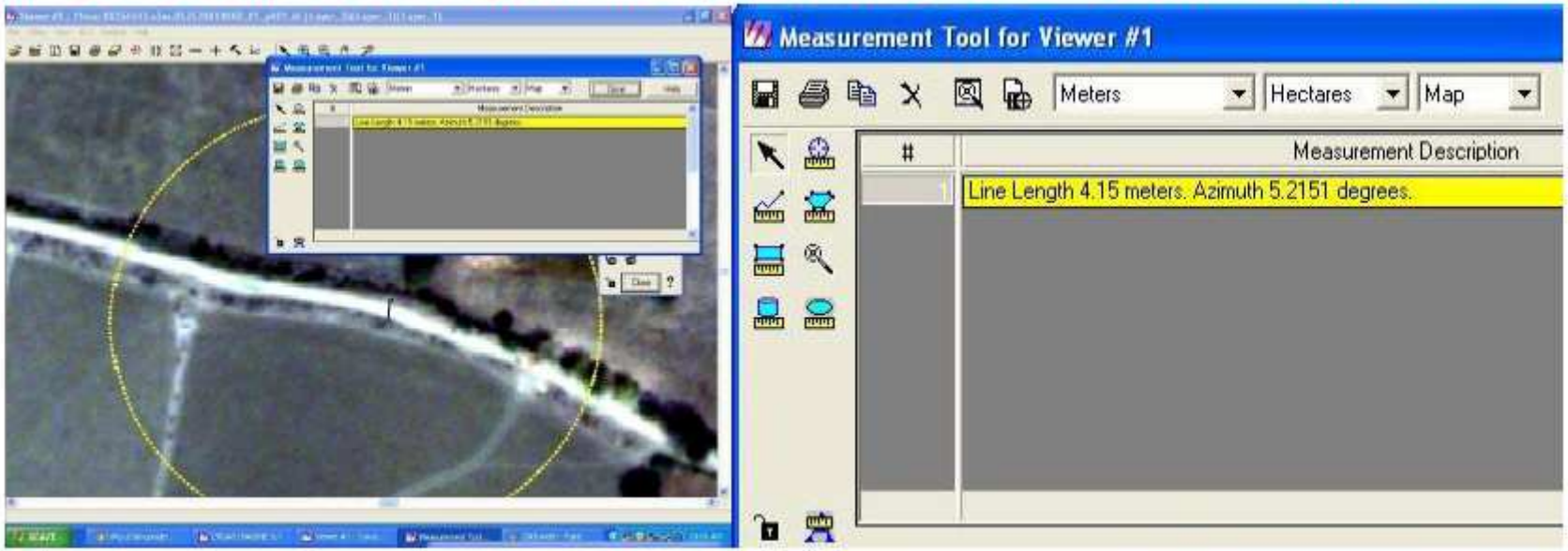
Non-existence of Road in 2006

Appearance of Road in 2011

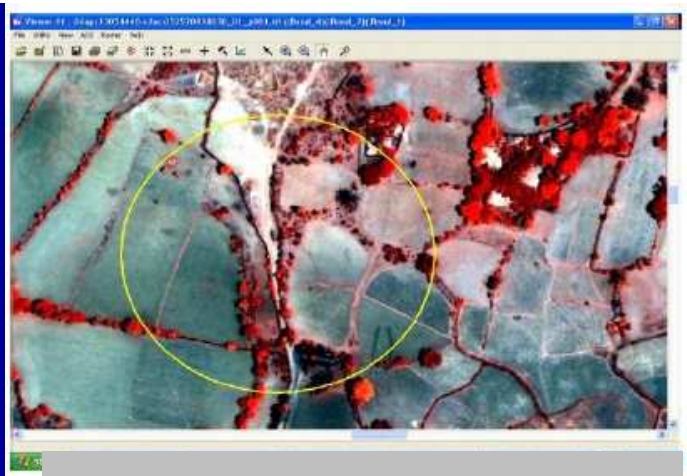
To verify the statement regarding the road expansion, the width of the road for the year 2006 and 2011 was measured from the satellite imagery. The snap shots of the road measurements are given below. The road width measured from the satellite imagery matched with that of the official information given in the report and field.



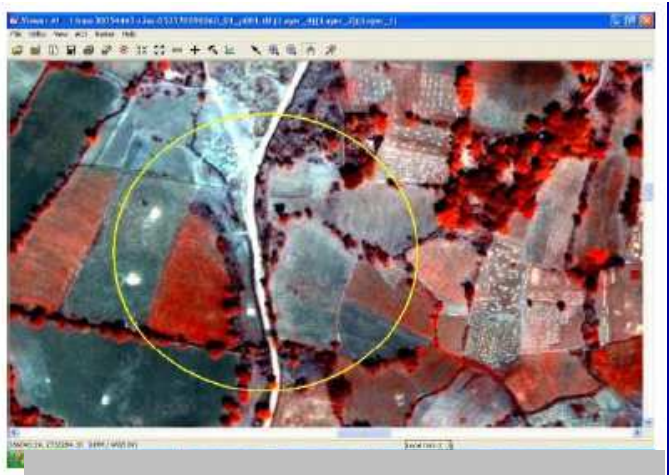
Width of the Road as evident from the satellite image below measured at 2.82 meters in 2006



Width of the Road measured at 4.15 meters in 2011 as evident from the satellite image



Road 2006



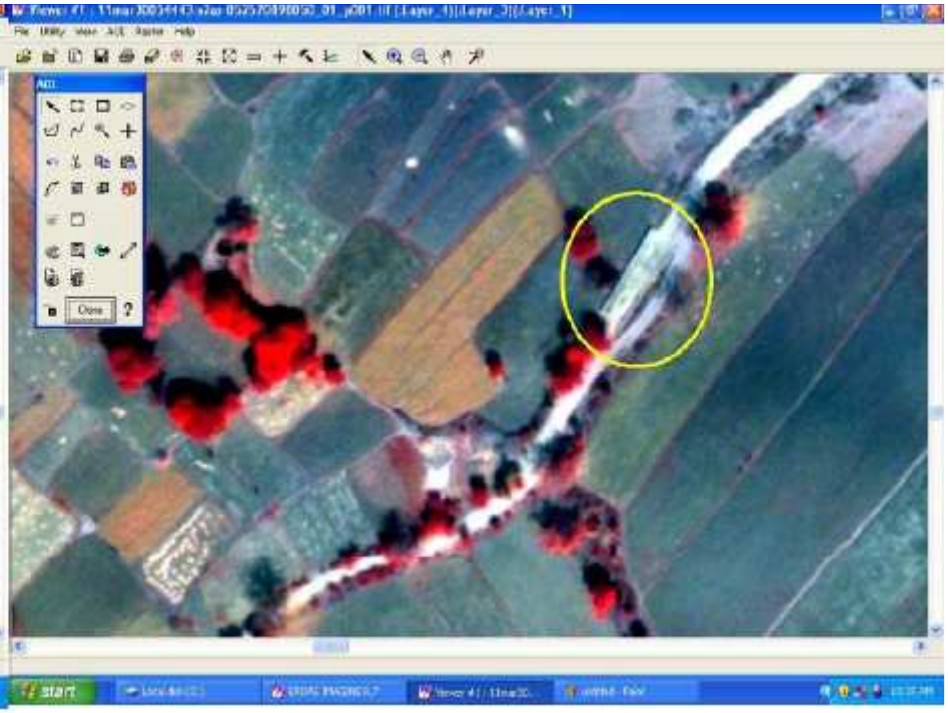
Road 2011

GPS / Satellite Imagery based Observations:

The GPS coordinates for all the five locations of the culverts were taken. These were superimposed on the quick bird satellite imagery. From the imagery, one can observe that the culverts did not exist in the year 2006 and 2008. But in the 2011 imagery, one can see the existence of the culverts. The snapshots of the imageries at two locations are given below.

Culvert 2006

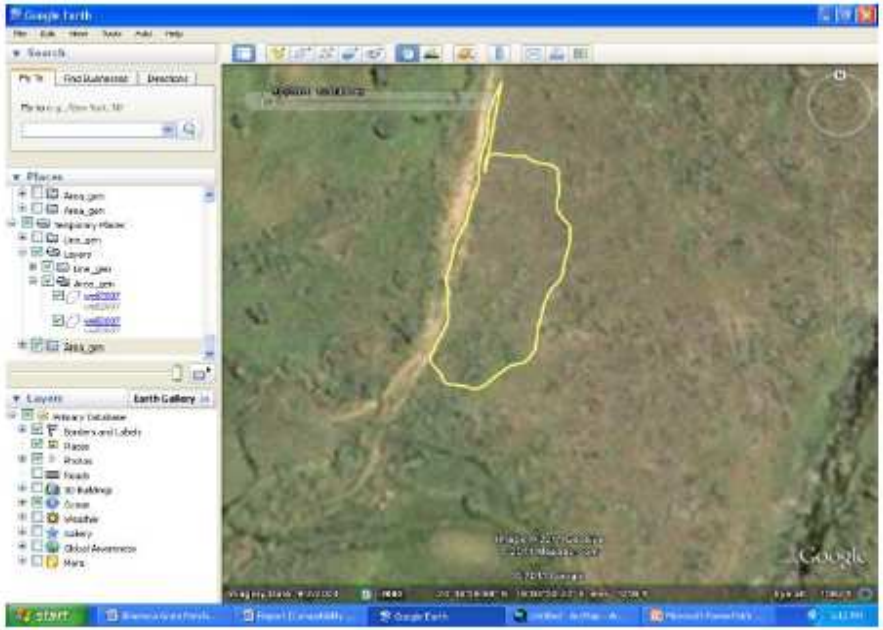
Culvert 2011



Culvert 2006	Culvert 2011

GPS / Satellite Imagery based Observations:

The GPS locations were taken for the plantation area. These coordinates were overlaid on the google earthy imagery of the year 2004.The plantation area was looking mostly barren with some scrubs. The same coordinates were overlaid on the quick bird imagery of year 2008. In the 2008 imagery also, there were no signs of any plantation activity. The satellite data for the other years could not be used as it was not available. During the field visit in the year 2011, the team did not notice any signs of plantation on the ground.

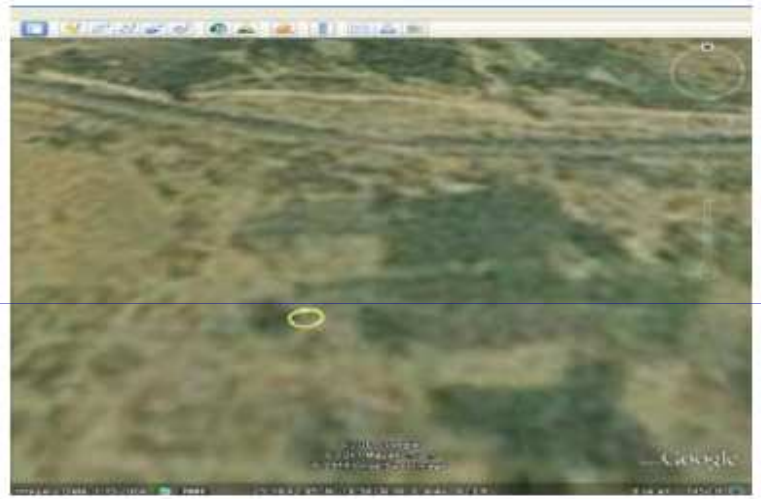


Google earth imagery of the year 2004

Quick bird satellite imagery of 2008

GPS / Satellite Imagery based Observations:

The GPS observations collected during the field visit were superimposed on the google earth imagery. From the analysis, it was observed that no well was existing at the location in the year 2004. During the field visit in the year 2011, a well was existing at that location.



The yellow circle in the imagery shows the location of the well. The imagery belongs to the year 2004. From the imagery, it is observed that there is no well existing at that site in the year 2004. The quick bird imagery for the year 2008 is given below. The yellow circle in the imagery is showing the existing of the well in the year 2008. It can be seen in the ligth blue colour in the snap shot.

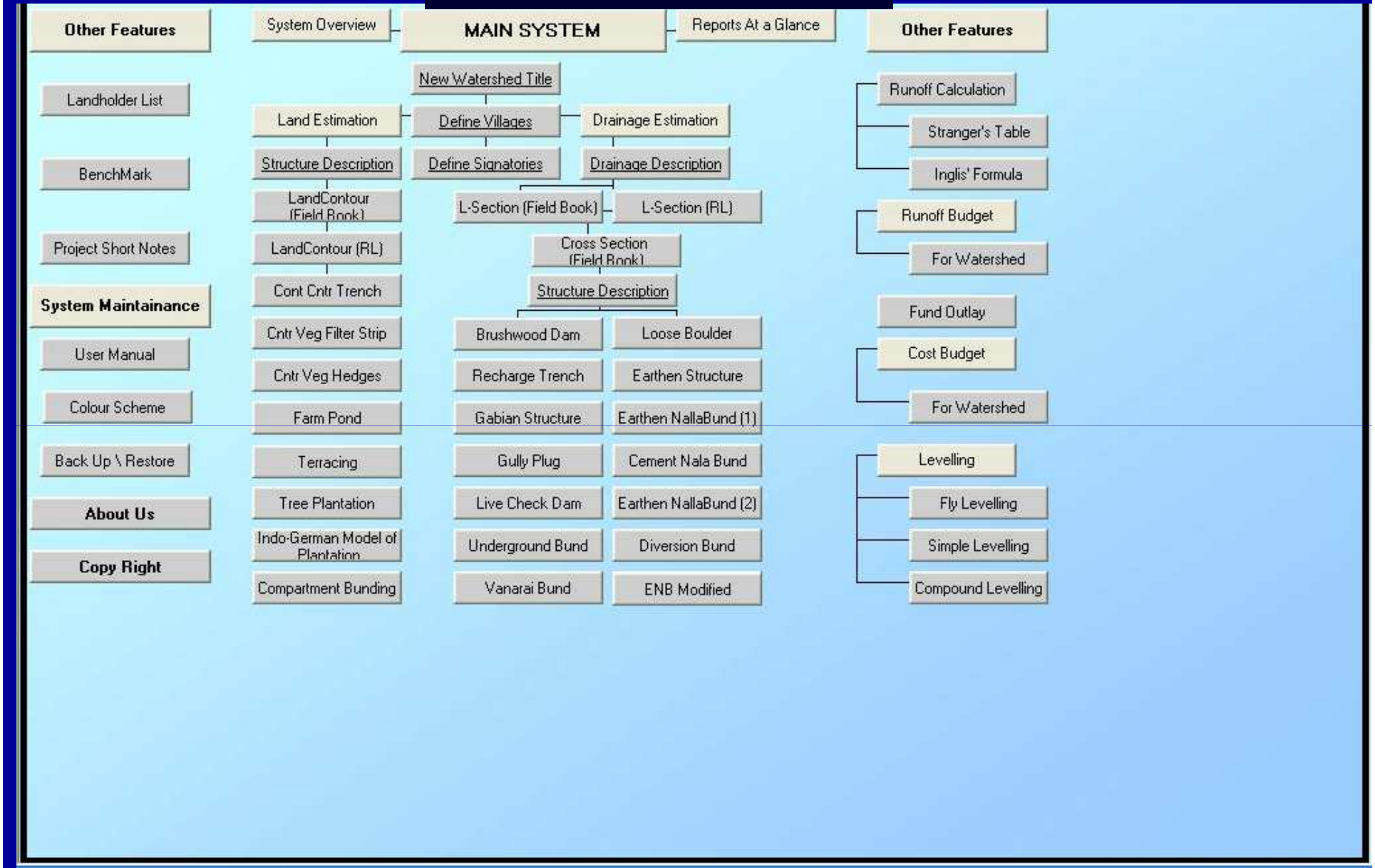
CUSTOMISED WATERSHED PLANNING & ESTIMATION SOFTWARE WITH LANGUAGE INTERFACE

(State Specific)

1. Andhra Pradesh
2. Assam
3. Arunachal Pradesh
4. Bihar
5. Chattishgarh
6. Himachal Pradesh
7. Kerala
8. Tamilnadu
9. Orissa
10. Uttar Pradesh
11. West Bengal

Cadastral Layers of Gram Panchayat

Main Screen


Other Features
Landholder List
BenchMark
Project Short Notes
System Maintainance
User Manual
Colour Scheme
Back Up \ Restore
About Us
Copy Right
System Overview
MAIN SYSTEM
Reports At a Glance
New Watershed Title
Land Estimation
Define Villages
Drainage Estimation
Structure Description
Define Signatories
Drainage Description
LandContour (Field Book)
L-Section (Field Book)
L-Section (RL)
LandContour (RL)
Cross Section (Field Book)
Cont Cntr Trench
Structure Description
Cntr Veg Filter Strip
Brushwood Dam
Loose Boulder
Cntr Veg Hedges
Recharge Trench
Earthen Structure
Farm Pond
Gabian Structure
Earthen NallaBund (1)
Terracing
Gully Plug
Cement Nala Bund
Tree Plantation
Live Check Dam
Earthen NallaBund (2)
Indo-German Model of Plantation
Underground Bund
Diversion Bund
Compartment Bunding
Vanarai Bund
ENB Modified
Other Features
Runoff Calculation
Stranger's Table
Inglis' Formula
Runoff Budget
For Watershed
Fund Outlay
Cost Budget
For Watershed
Levelling
Fly Levelling
Simple Levelling
Compound Levelling

Design Estimation

Watershed Title : Sample // BM 18/IV/2a

Drainage Line : Sample/Main Drain No. 1

Estimation Title : Sample Gabian Structure 1

Estimation Details

Distance : 7 (m) Panmandal : 3 Region : Hilly Region

Nala No	1
Block No	GS 1
Bund No	1
Survey No	1021

State	Maharashtra
District	Pune
Taluka	Ambegaon
Village	Gadewadi

Estimation for Gabian Structure | Reports

Reference : Original means data as per guidelines. Last Modified is as modified by you.

Particulars	For 25 m					For 7 m				
	Item	Quantity	Unit	Rate	Amount	Item	Quantity	Unit	Rate	Amount
Survey of Alignment		1.00	per bund	10.00	10.00		1.00	per bund	10.00	10.00
Excavation of both banks for Keying	A2	19.60	cu.m.	23.50	460.60	A2	19.60	cu.m.	23.50	460.60
Excavation for Foundation	A2	9.18	cu.m.	23.50	215.73	A2	2.57	cu.m.	23.50	60.39
Bund Construction: Collection of dry rubble	43	36.25	cu.m.	35.25	1277.81	43	15.95	cu.m.	35.25	562.23
Foundation for Pitching	A2	2.94	cu.m.	23.50	69.09	A2	2.94	cu.m.	23.50	69.09
Pitching On Both Banks	B1	10.90	sq.m.	41.15	448.53	B1	10.90	sq.m.	41.15	448.53
Transportation Charge for dry rubble (upto 50% of total)	H2	18.12	cu.m.	70.98	1286.15	H2	7.97	cu.m.	70.98	565.71
Galvanized wire mesh 15 x 15 cm wire mesh having 3 mm dia		150.00	sq.m.	60.00	9000.00		66.00	sq.m.	60.00	3960.00
Transportation of wire mesh upto 50 km		1.00	Rs/Total Mesh	150.00	150.00		1.00	Rs/Total Mesh	150.00	150.00
Survey During Construction		1.00	per bund	100.00	100.00		1.00	per bund	100.00	100.00
Total					**13017.91**					**6386.54**
Contingencies 2%					260.35					127.73
Grand Total					**13278.26**					**6514.28**

Find | New | Save | Cancel | Edit | Delete | Report | Sketch | Close

2. DRAINAGE STRUCTURE ESTIMATE REPORTS

2.0 Graphical Features

2.0.1 Cross - Section (RL) Map
2.0.2 L - section (RL) Map
2.0.3 Earthen Nala Bund - Foundation Map

2.1 Brushwood Dam

2.1.1 Brushwood Dam - Material Structure
2.1.2 Abstract of Detail Estimate
2.1.3 Brushwood Dam - Detail Estimate
2.1.4 Abstract of Estimated Cost

2.2 Cement Nala Bund (CNB)

2.2.1 Calculation of Water Discharge and Other Factors
2.2.2 Calculation of Avg.Height for Foundation Exc.
2.2.3 Trial Pit
2.2.4 Foundation Excavation Description
2.2.5 Remaining Foundation Filling with Soil
2.2.6 Soil Work Cost
2.2.7 Cement Work Description
2.2.8 Cement Work - Surface Pointing
2.2.9 Cement Work - Cost Description
2.2.10 Construction Material
2.2.11 Cement Work - Material Transportation
2.2.12 Abstract of Estimated Cost
2.2.13 Calculation of TCM
2.2.14 Rate Analysis
2.2.15 Rate Analysis
2.2.16 Main Nala Bund - Information

2.3 Earthern Structure

2.3.1 Earthen Structure - Soil Work Description
2.3.2 Abstract of Earthen Structure
2.3.3 Earthen Structure - Detail Estimate
2.3.4 Abstract of Detail Estimate
2.3.5 Abstract of Estimated Cost

2.4 Gabian Structure

2.4.1 Gabian Structure - Detail Estimate

2.8 Earthen Nala Bund

2.8.1 Calculation of Water Discharge
2.8.2 Main Nala Bund
2.8.3 Core Wall Quantity Description
2.8.4 Stone Pitching Quantity Description
2.8.5 Soil Work Abstract
2.8.6 ENB Estimate
2.8.7 Abstract of Estimated Cost
2.8.8 General Information
2.8.9 Lift Quantity Description(1)
2.8.10 Lift Quantity Description(2)

2.9 Earthen Nala Bund (Konkan Region)

2.9.1 Calculation of Water Discharge
2.9.2 Main Nala Bund
2.9.3 Core Wall Quantity Description
2.9.4 Stone Pitching Quantity Description
2.9.5 Soil Work Abstract
2.9.6 ENB Estimate
2.9.7 Abstract of Estimated Cost
2.9.8 General Information
2.9.9 Lift Quantity Description(1)
2.8.10 Lift Quantity Description(2)

2.10 Underground Bund

2.10.1 Trial Pit
2.10.2 Excavation Description
2.10.3 Core Wall , Murram Casing Quantity Description
2.10.4 Cost Description - Excavation
2.10.5 Cost Description - Core Wall
2.10.6 Cost Description - Murram
2.10.7 Abstract of Soil Work
2.10.8 Abstract of Estimated Cost

2.11 Diversion bund

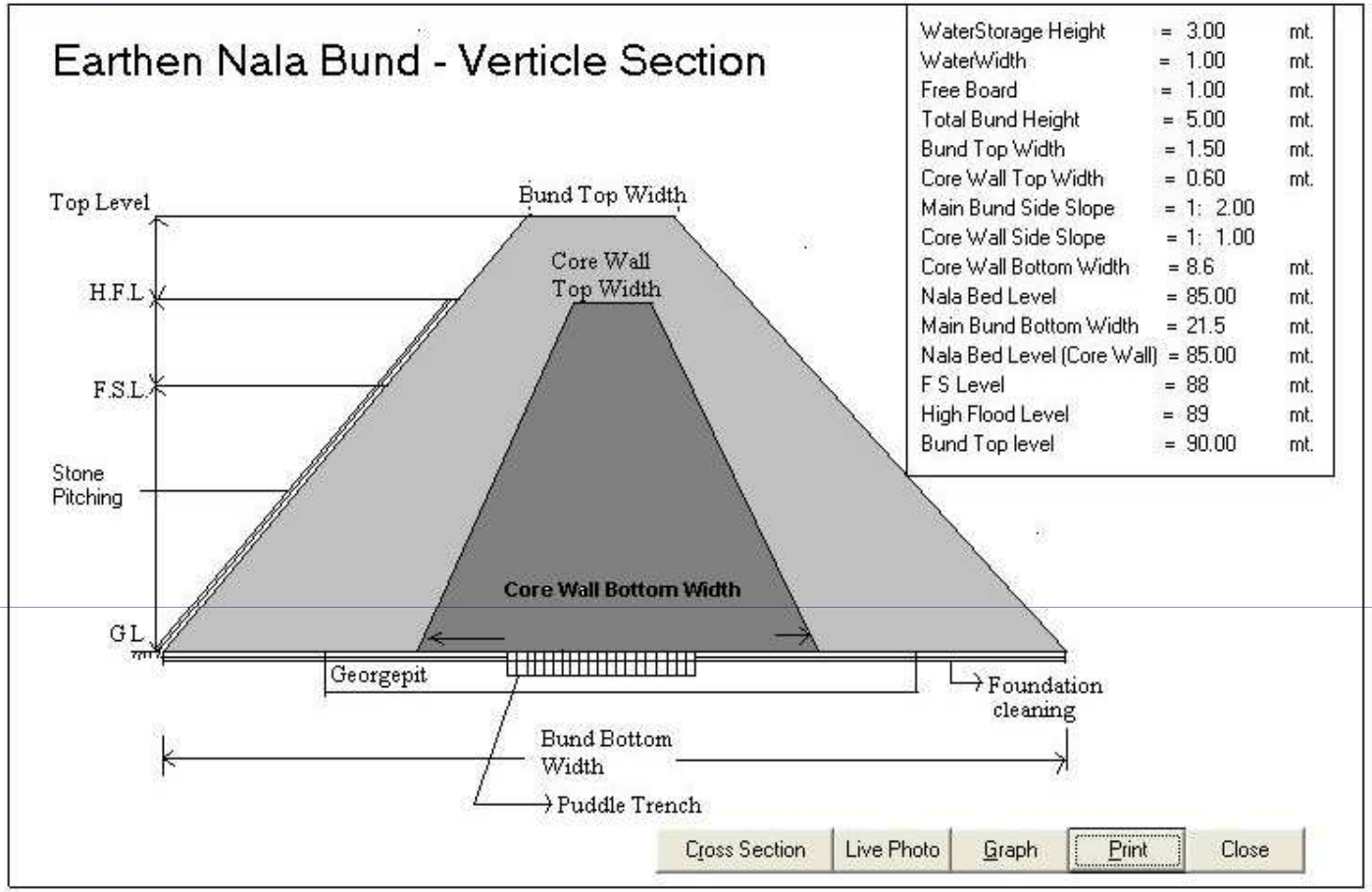
2.11.1 Calculation of Water Discharge and Other Factors
2.11.2 Calculation of Avg. Height for Foundation Exc.

Main System
Land Structure Reports
Other Reports
Print

VEGETATIVE CONTOUR HEDGES ESTIMATION

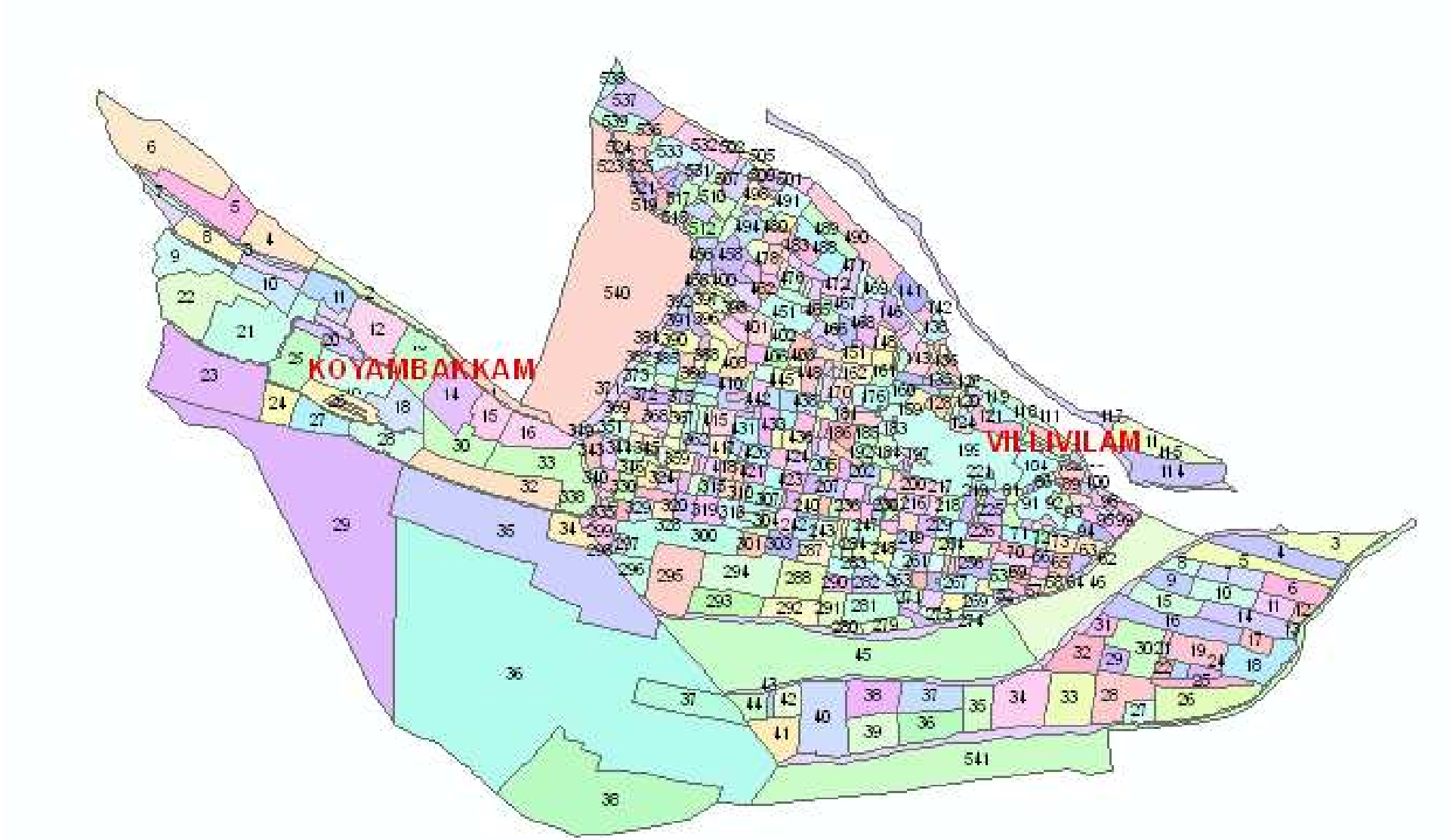
Watershed Title	:	Sample // BM 18/IV/2a	**Estimation Title**	:	Sample.Con.Veg.He.No.1
State	:	Maharashtra	**Block Number**	:	C.V.H
District	:	Pune	**Survey Number**	:	125
Taluka	:	Ambegaon	**Slope**	:	Upto 4 %
Village	:	Gadewadi	**Area in Hectares**	:	10.00

		For 1 Hectare				For 10.00 Hectares			
Sr.No	**Particular**	**Qty**	**Unit**	**Rate**	**Amt (Rs)**	**Qty**	**Unit**	**Rate**	**Amt (Rs)**
	First Year Work								
1	Survey & Alignment	0.5	man days	37.00	18.50	5.00	man days	37.00	185.00
2	Excavation of trench (L * W * D=120 * 0.30 * 0.15 m)	5.4	cu.m.	17.02	91.91	54.00	cu.m.	17.02	919.08
3	Purchase & Transportation of Vetivera/local grass	35	kg	2.00	70.00	350.00	kg	2.00	700.00
4	Transplanting of vetivera grass	1.35	man days	37.00	49.95	13.50	man days	37.00	499.50
5	Other		-				-		
	Total of Group A				**230.36**				**2,303.58**



Design Estimation

VILLIVILAM GRAM PANCHAYAT



VILLI_HOUSES

G.VARADHARA
GANAPRAKAS.
GANESAN
Gnanamoorthi
GOBALAKRISH
GOPAL
GOVINTHARA.
JAYABAL
JAYAMANI
JEYASEELAN

Total : 341

- Land Information
- Family Information
- Agriculture
- Irrigation Facilities
- Climate Conditions
- Industries
- Transportation
- Education
- Tourism Places
- Groups
- Hospitals
- Govt and Other
- Ration Shop

Exit

GANESAN

Family Information

House No: 207

Ration Card No: 88Y334 type: PINK

Family Size: 6

Caste: OBC

Asset Holding: HOUSE

House holds: TV, SCOOTER

Live Stock

Total No	Type
2	BUFFA LO

Household Profile

S.No	Name	Sex	Age	Relation	Edu.	Occupation	Source of Income	Annual Incom
1	GANESAN	M	36	HEAD	6	FARMER	AGRICULTURE	6000
2	LAXMI	F	32	WIFE	2			
3	EMILY	F	5	DAUGH	1			

Land Holding

Total: 4 ACRES PADDY

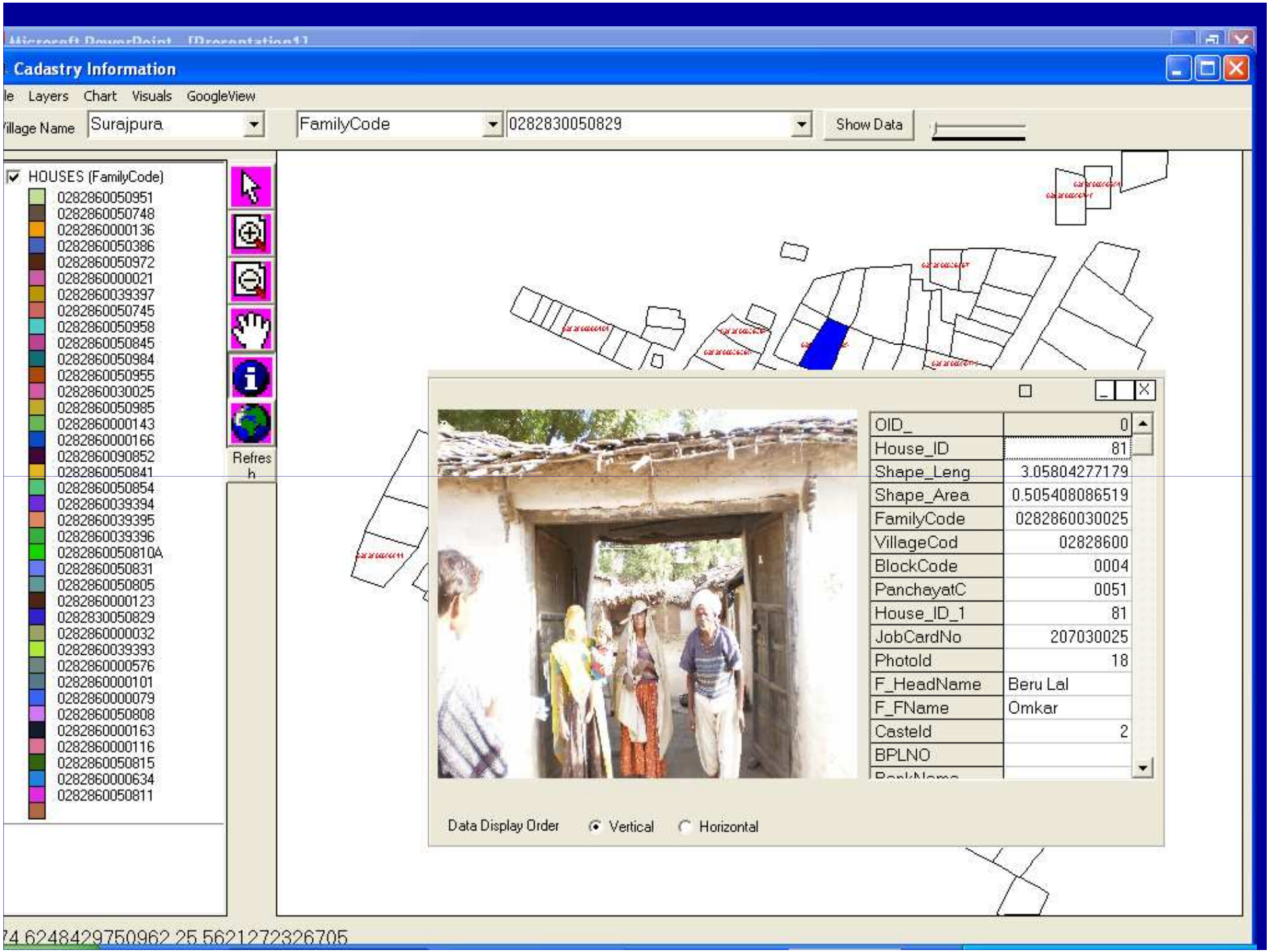
Irrigation Status: YES

Crops Grown: PADDY

Housing

Type: 1 No.of Rooms: 4

Kitchen: 2 Cattle Shed: 1


Cadastry Information
le Layers Chart Visuals GoogleView
Village Name
Surajpura
FamilyCode
0282830050829
Show Data
HOUSES (FamilyCode)
0282860050951
0282860050748
0282860000136
0282860050386
0282860050972
0282860000021
0282860039397
0282860050745
0282860050958
0282860050845
0282860050984
0282860050955
0282860030025
0282860050985
0282860000143
0282860000166
0282860090852
0282860050841
0282860050854
0282860039394
0282860039395
0282860039396
028286005081OA
0282860050831
0282860050805
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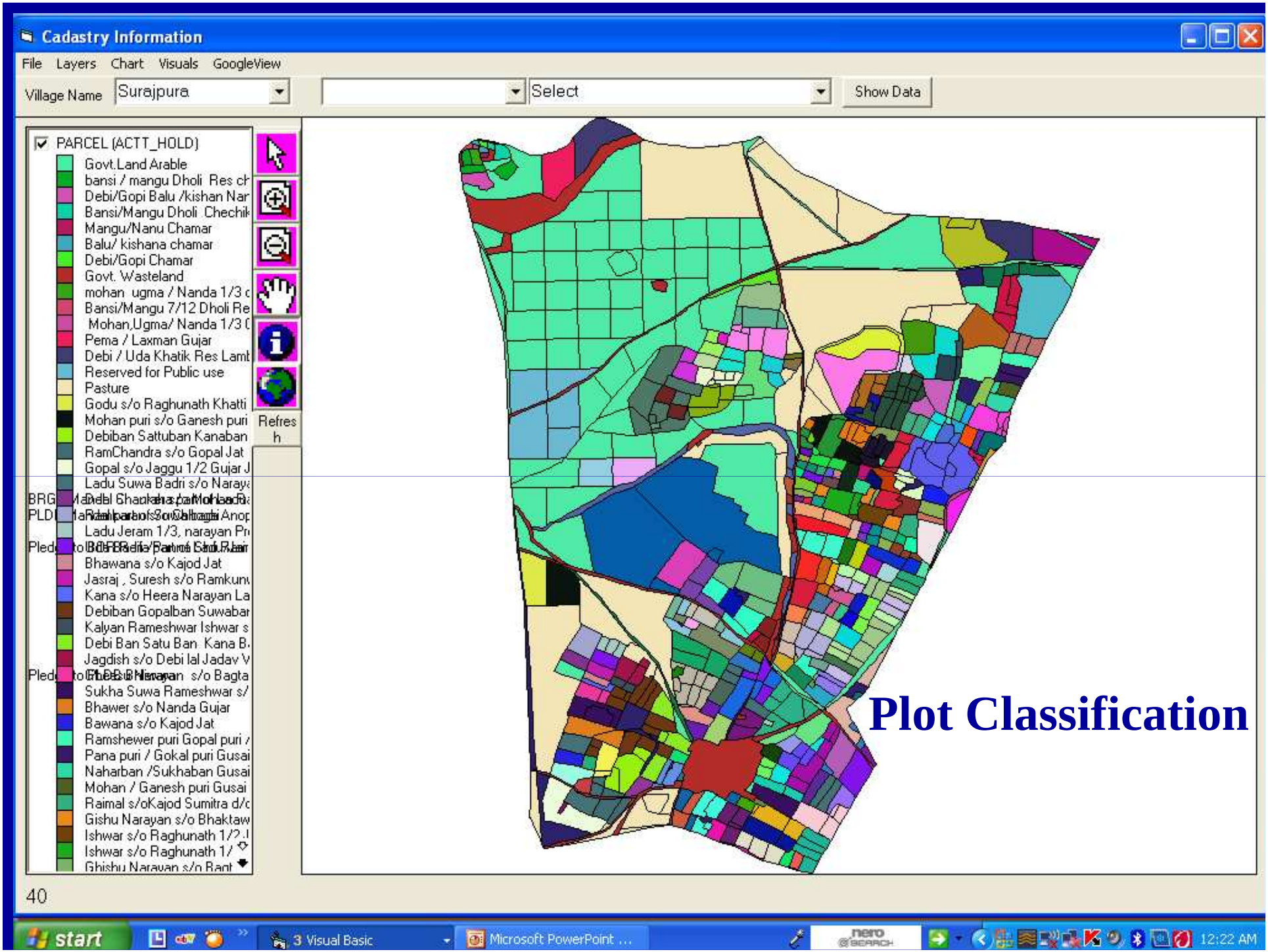
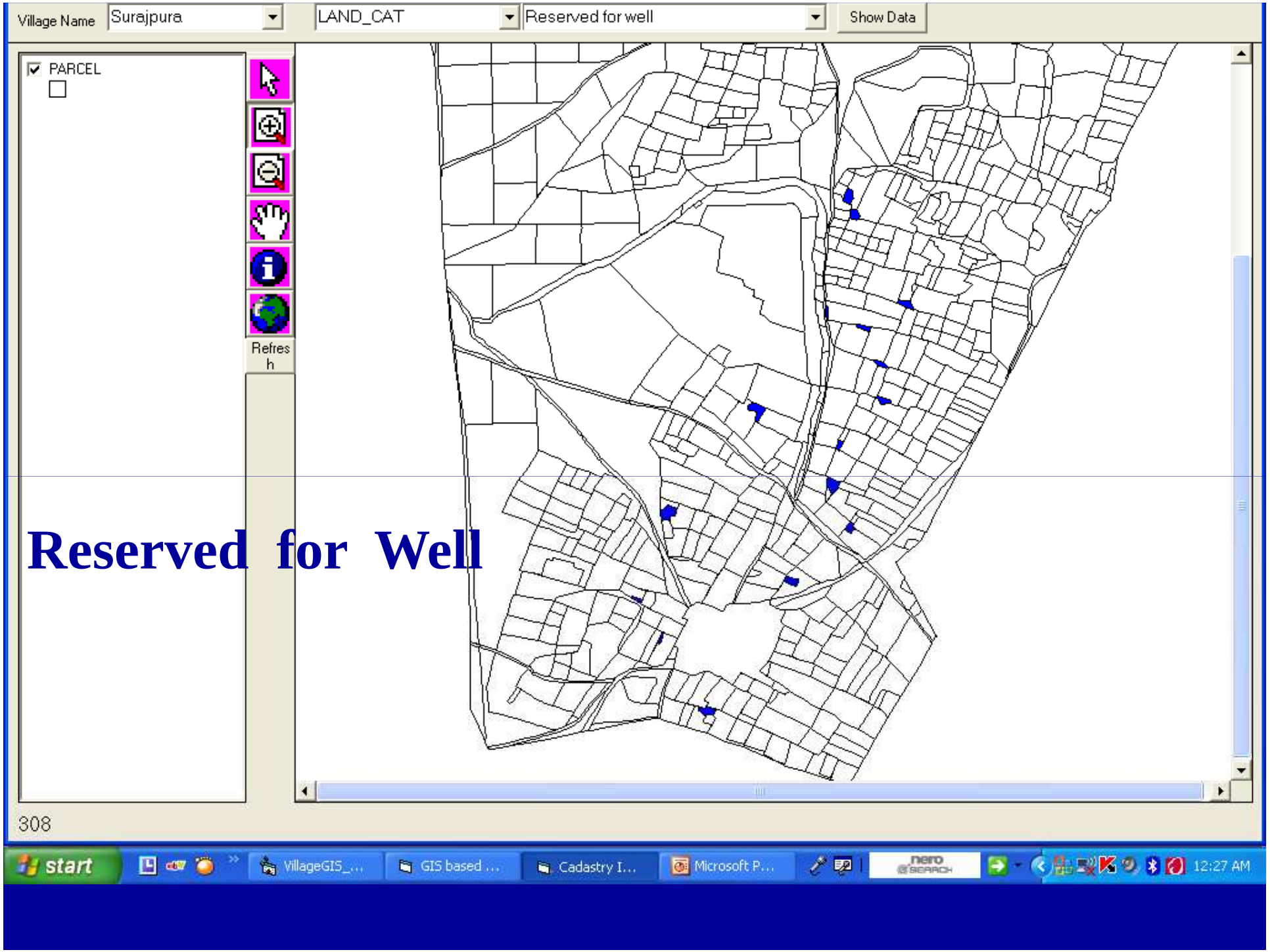
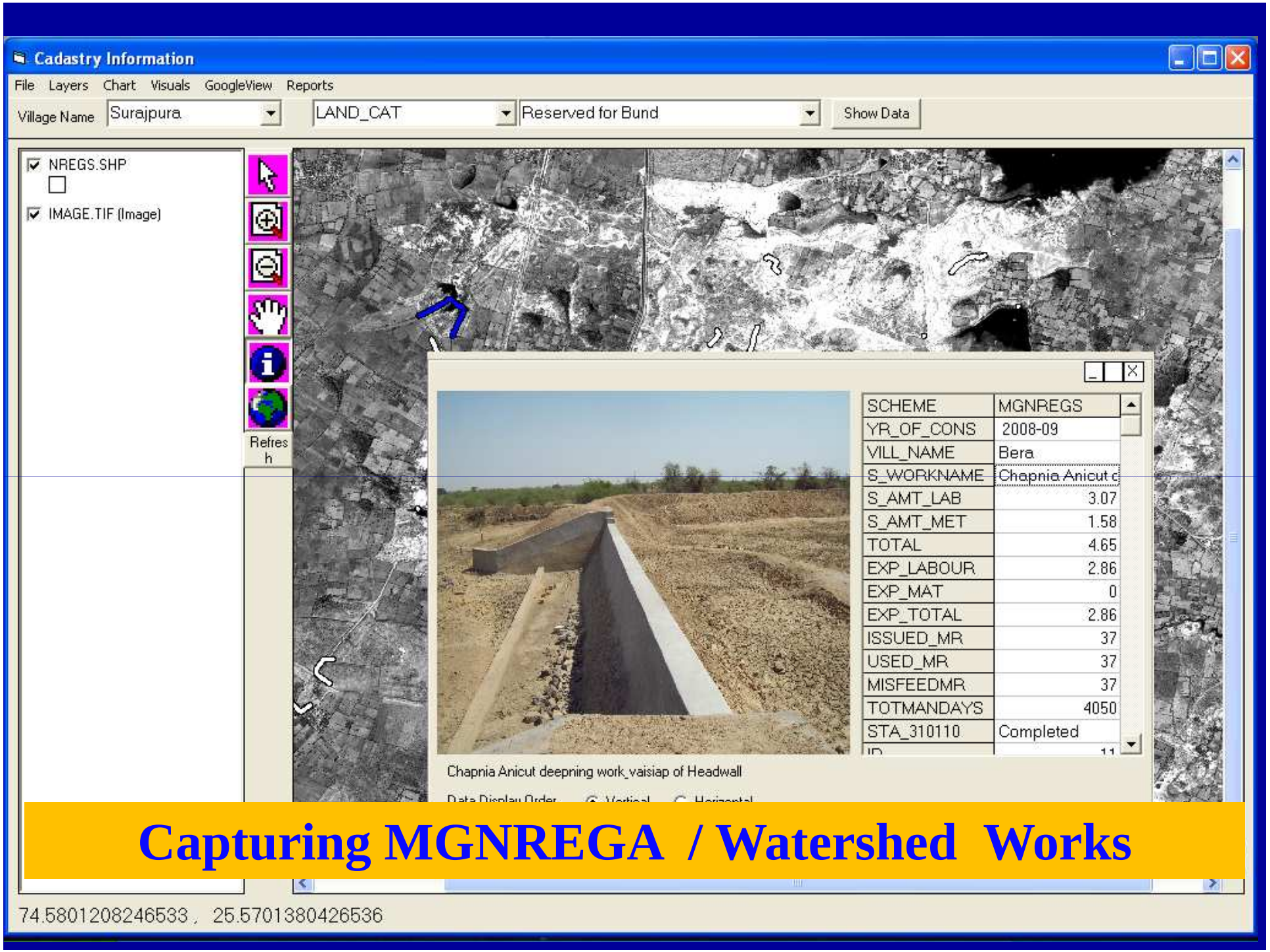
0282830050829
0282860000032
0282860039393
0282860000576
0282860000101
0282860000079
0282860050808
0282860000163
0282860000116
0282860050815
0282860000634
0282860050811
Refres h
OID_ 0
House_ID 81
Shape_Leng 3.05804277179
Shape_Area 0.505408086519
FamilyCode 0282860030025
VillageCod 02828600
BlockCode 0004
PanchayatC 0051
House_ID_1 81
JobCardNo 207030025
PhotoId 18
F_HeadName Beru Lal
F_FName Omkar
CasteId 2
BPLNO
Data Display Order
Vertical
Horizontal
74.6248429750962 25.5621272326705



Plot Classification

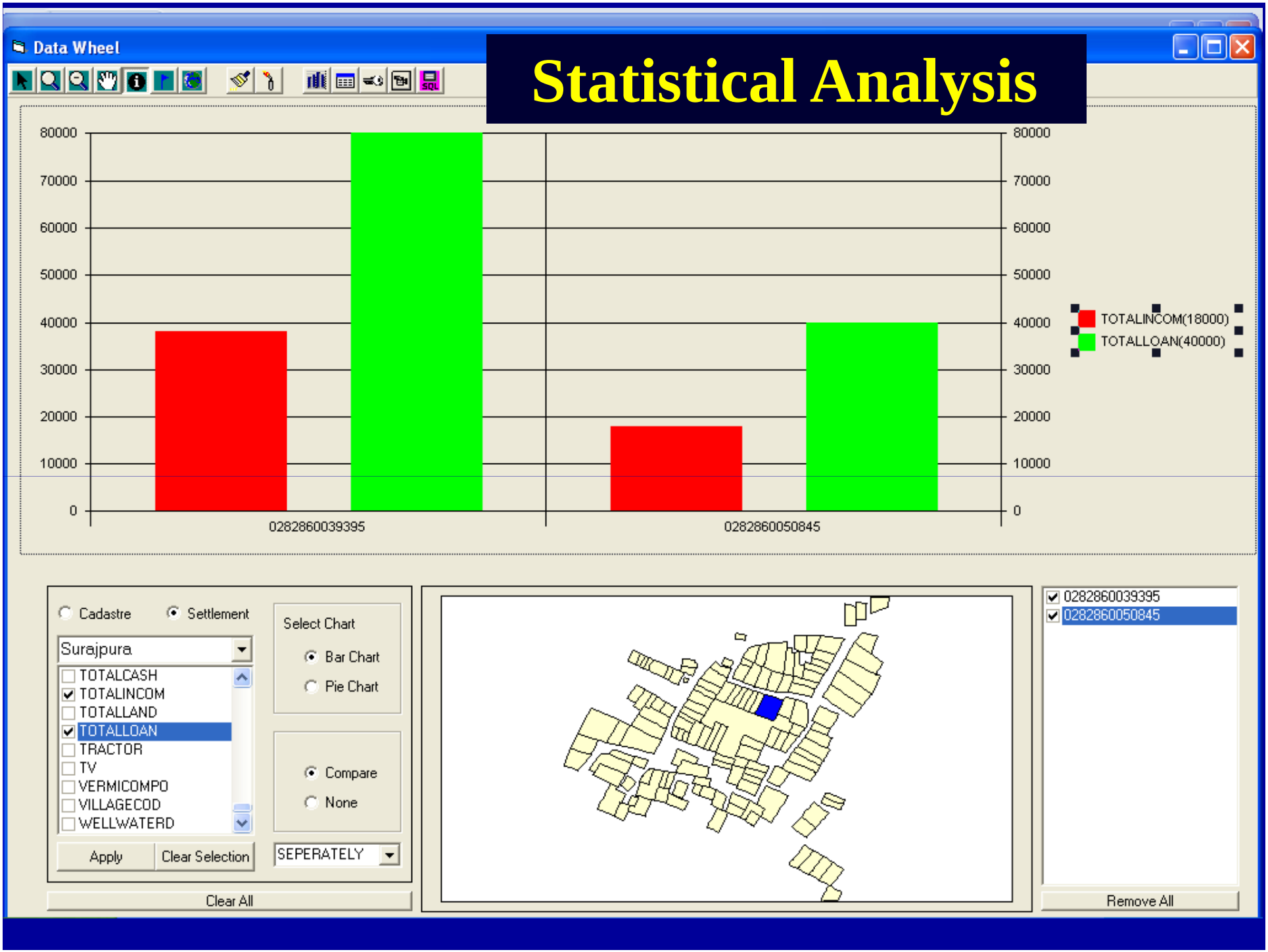


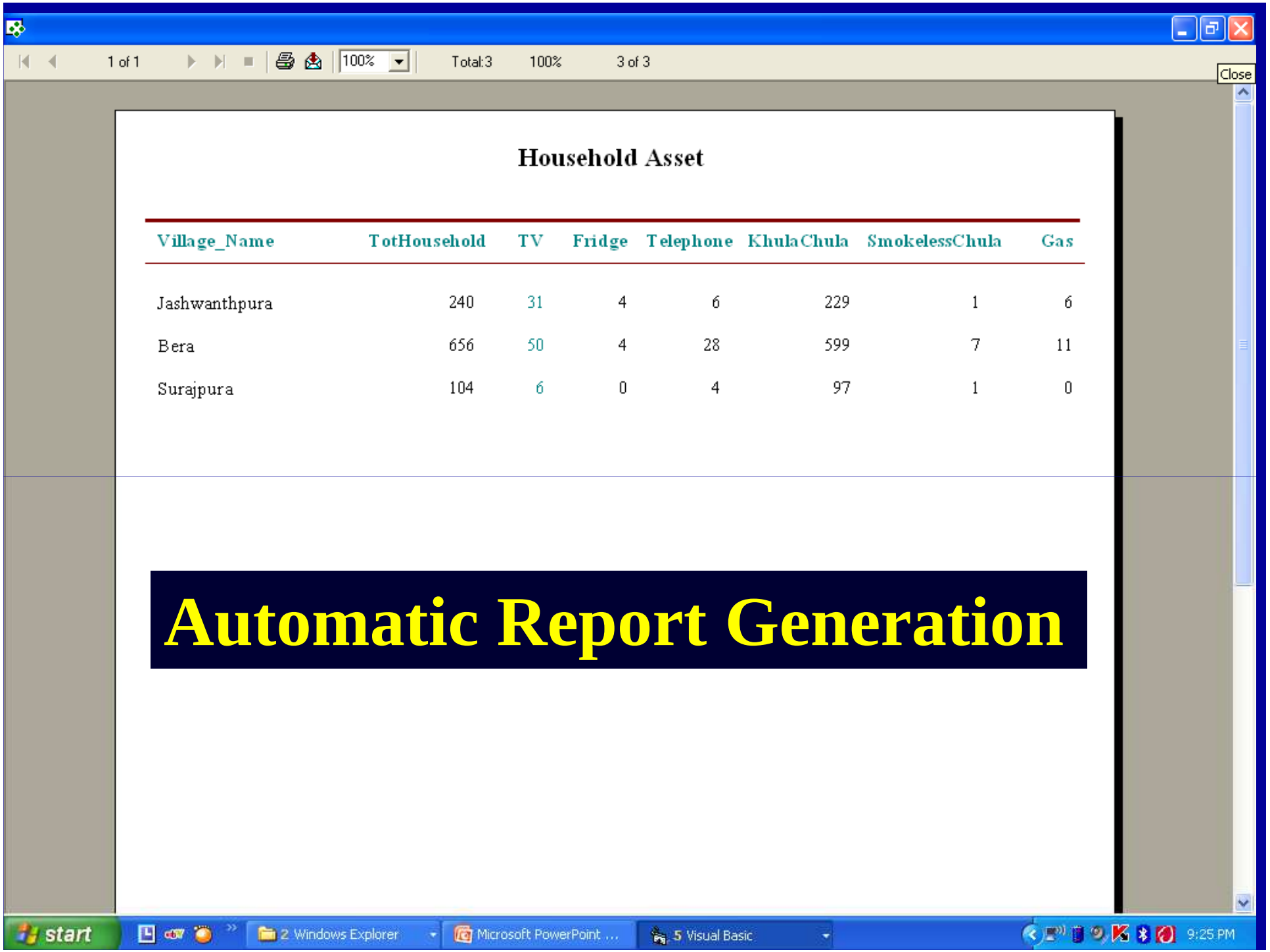
Reserved for Well



Capturing MGNREGA / Watershed Works

Statistical Analysis




1 of 1
100%
Total:3
100%
3 of 3
Close
Household Asset
Village_Name TotHousehold TV Fridge Telephone KhulaChula SmokelessChula Gas
Jashwanthpura 240 31 4 6 229 1 6
Bera 656 50 4 28 599 7 11
Surajpura 104 6 0 4 97 1 0
Automatic Report Generation
start
2 Windows Explorer
Microsoft PowerPoint ...
5 Visual Basic
9:25 PM

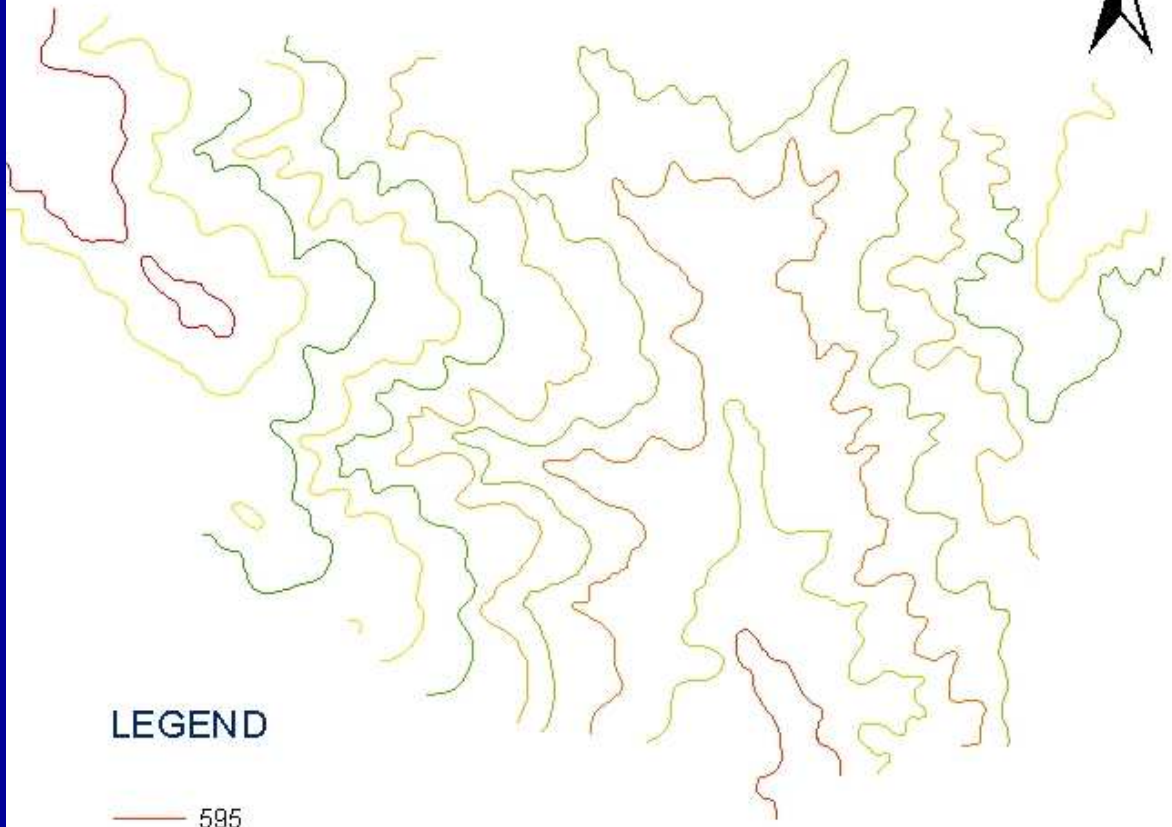
GEOHYDROLOGY MODELLING FOR WATERSHED PLANNING

Utility of GIS & RS Satellite Analysis for DPRs

- **Direct Application of GIS & RS to Field for generation of Action Plans / DPRs**
- **Serves as practical reference and guide for Field Level Implementation**

STUDY AREA ON SATELLITE IMAGE
(IRS P6 LISS-III 23.5 m Resolution)

CONTOUR MAP



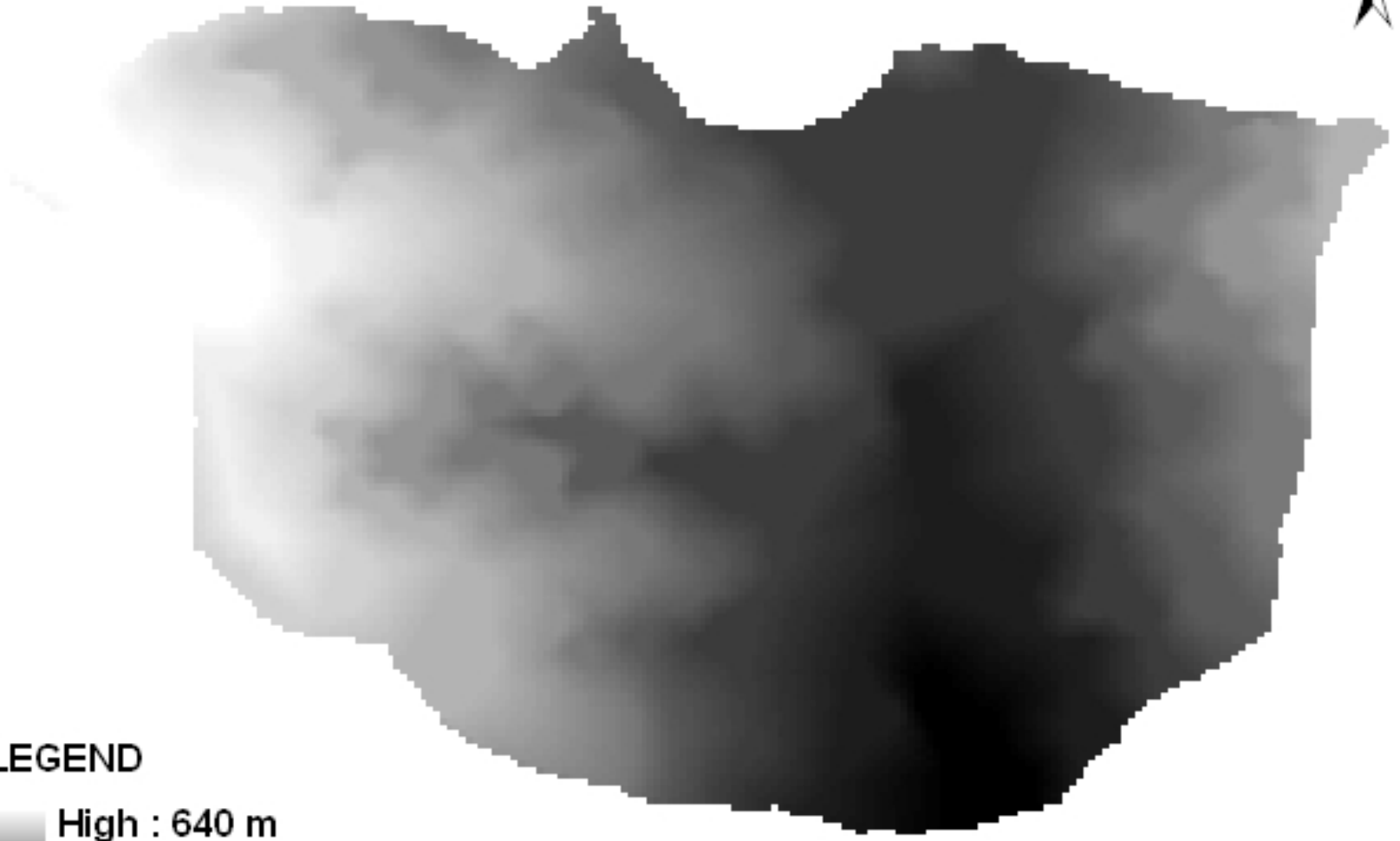
N

LEGEND

595
600
605
610
615
620
625
630
635
640

Scale : 1:25000

DIGITAL ELEVATION MODEL

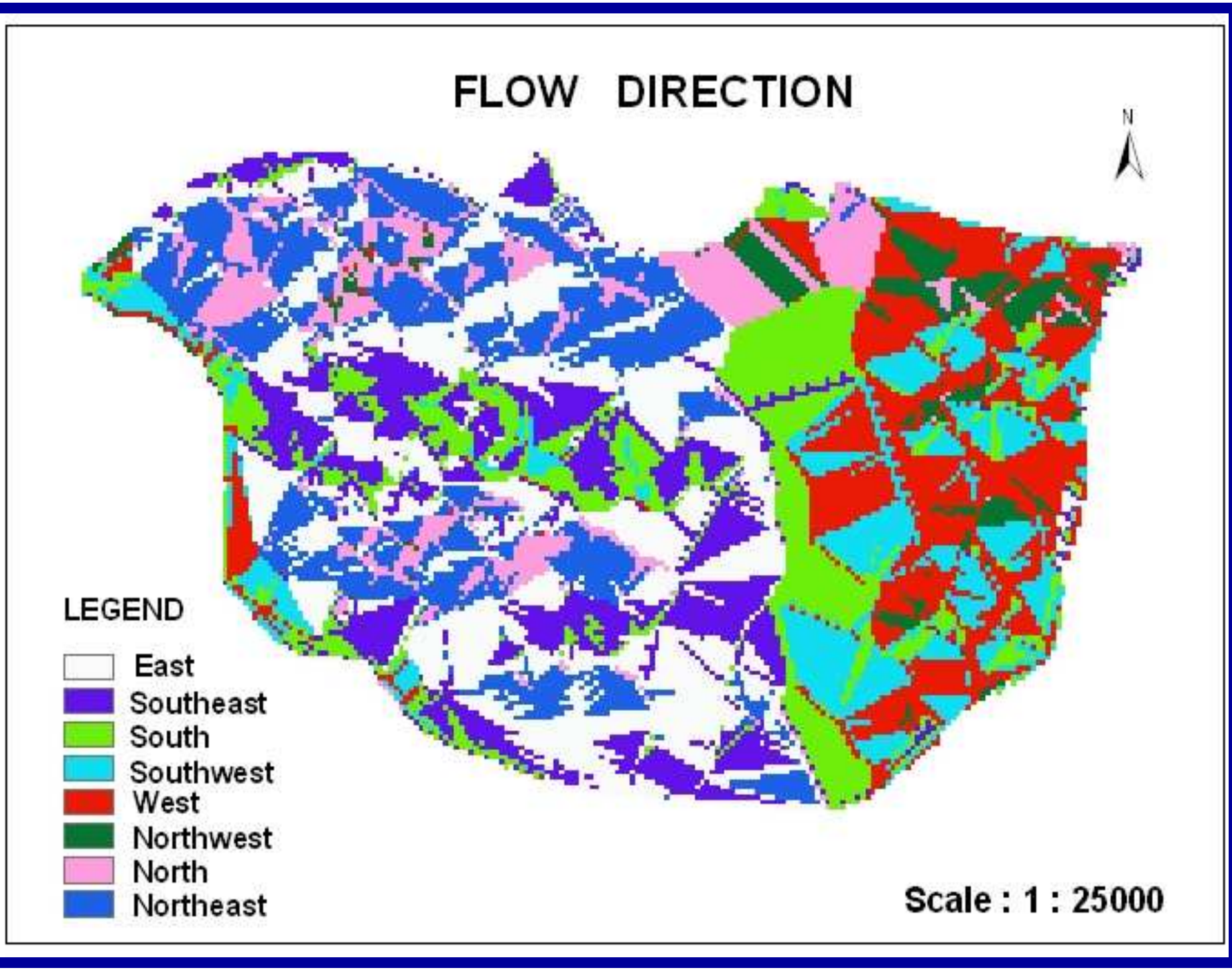


LEGEND

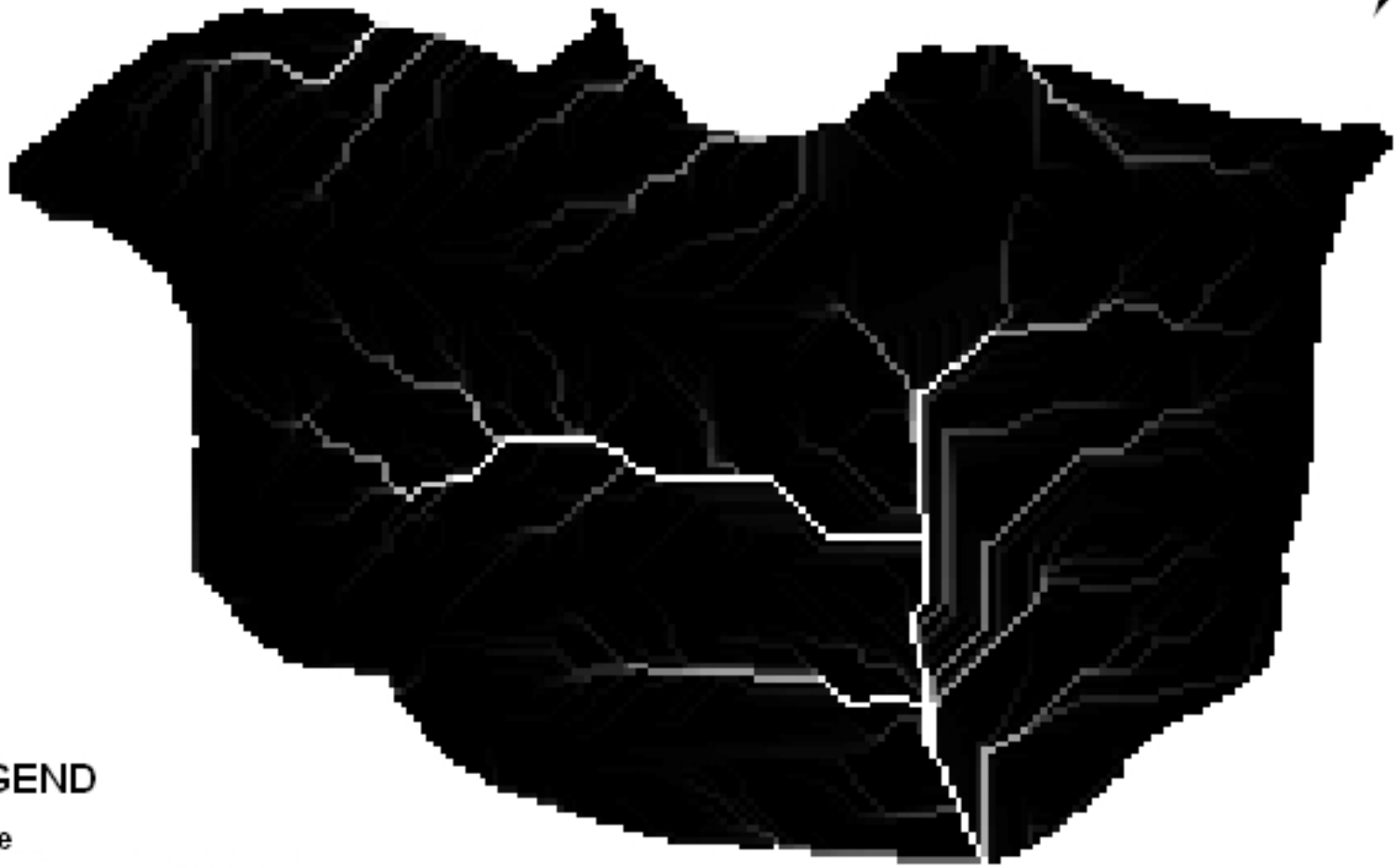
High : 640 m

Low : 595 m

Scale : 1 : 25000


FLOW DIRECTION
N
LEGEND
East
Southeast
South
Southwest
West
Northwest
North
Northeast
Scale : 1 : 25000

FLOW ACCUMULATION



LEGEND

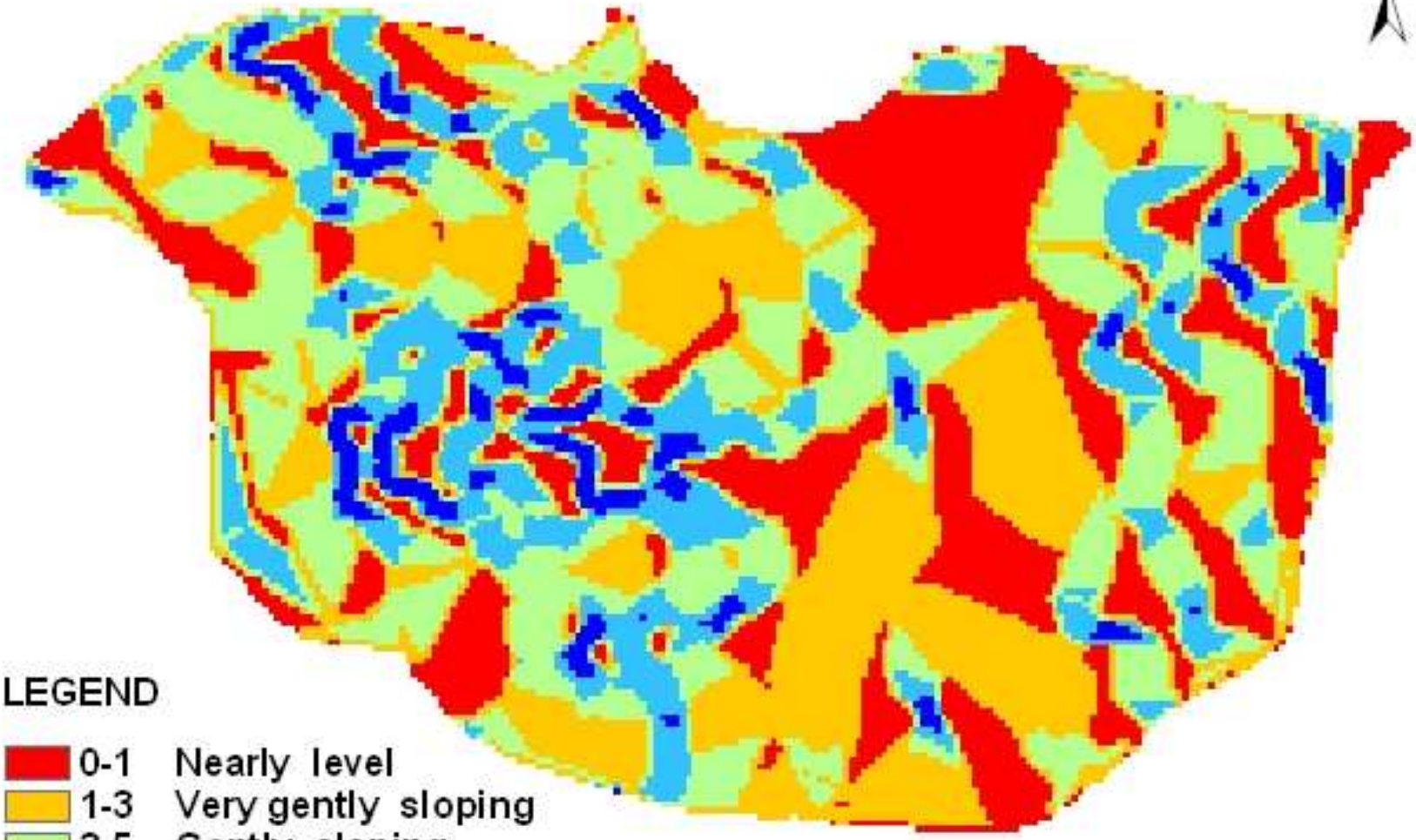
Value

High : 7682369

Low : 0

Scale : 1:25000

SLOPE

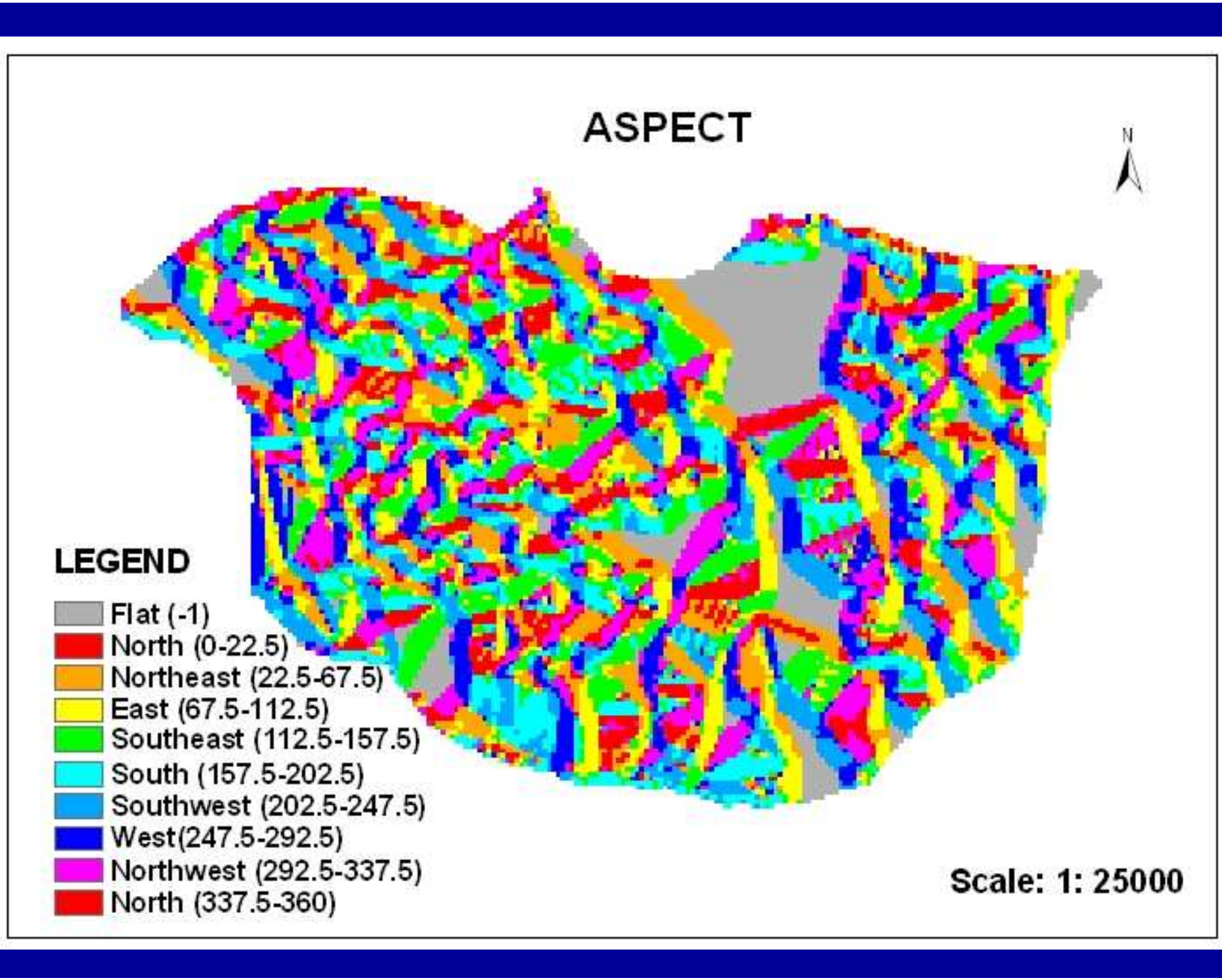


N

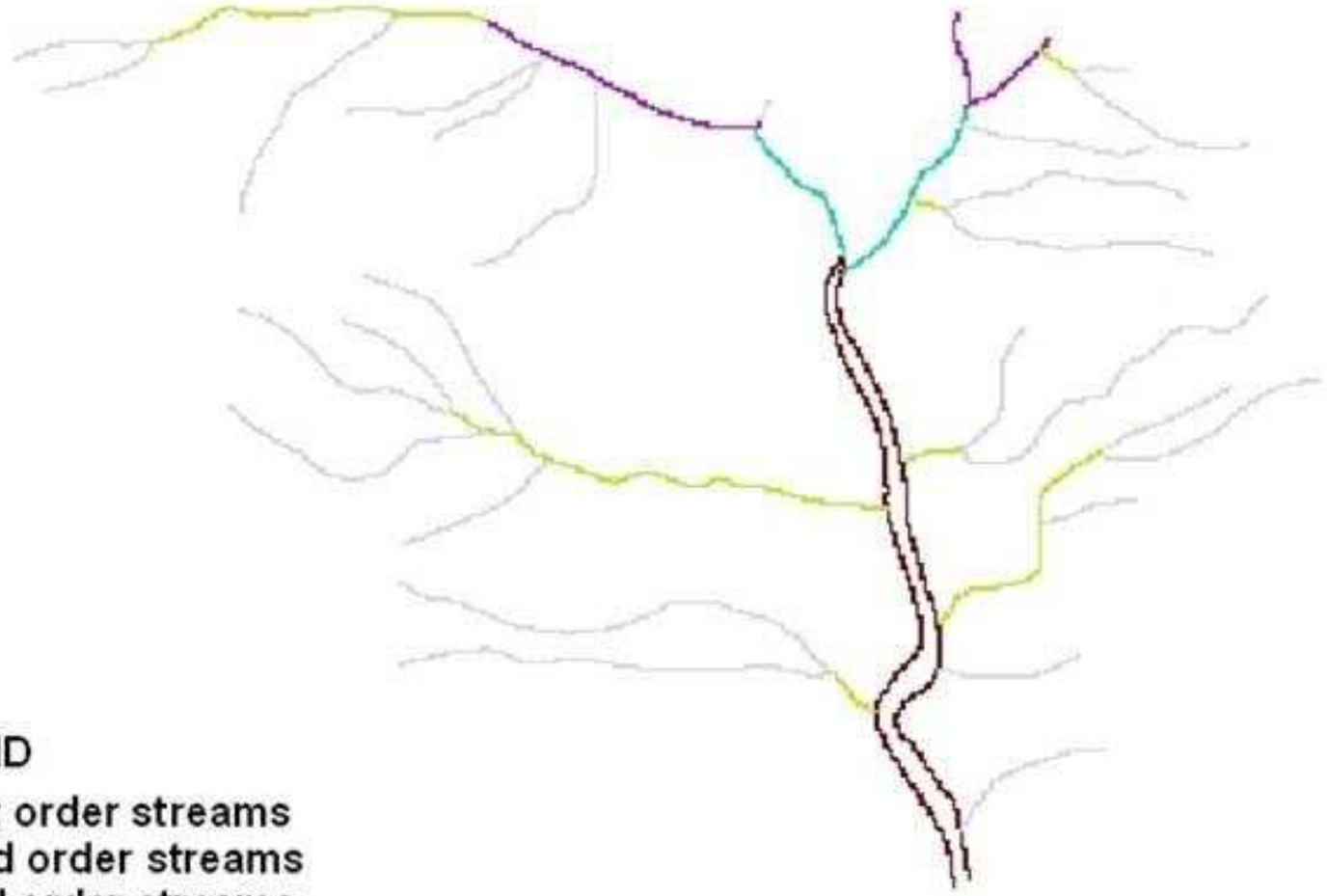
LEGEND

- 0-1 Nearly level
- 1-3 Very gently sloping
- 3-5 Gently sloping
- 5-10 Moderately sloping
- >10 Strongly sloping

Scale : 1 : 25000


ASPECT
N
LEGEND
Flat (-1)
North (0-22.5)
Northeast (22.5-67.5)
East (67.5-112.5)
Southeast (112.5-157.5)
South (157.5-202.5)
Southwest (202.5-247.5)
West(247.5-292.5)
Northwest (292.5-337.5)
North (337.5-360)
Scale: 1: 25000

DRAINAGE

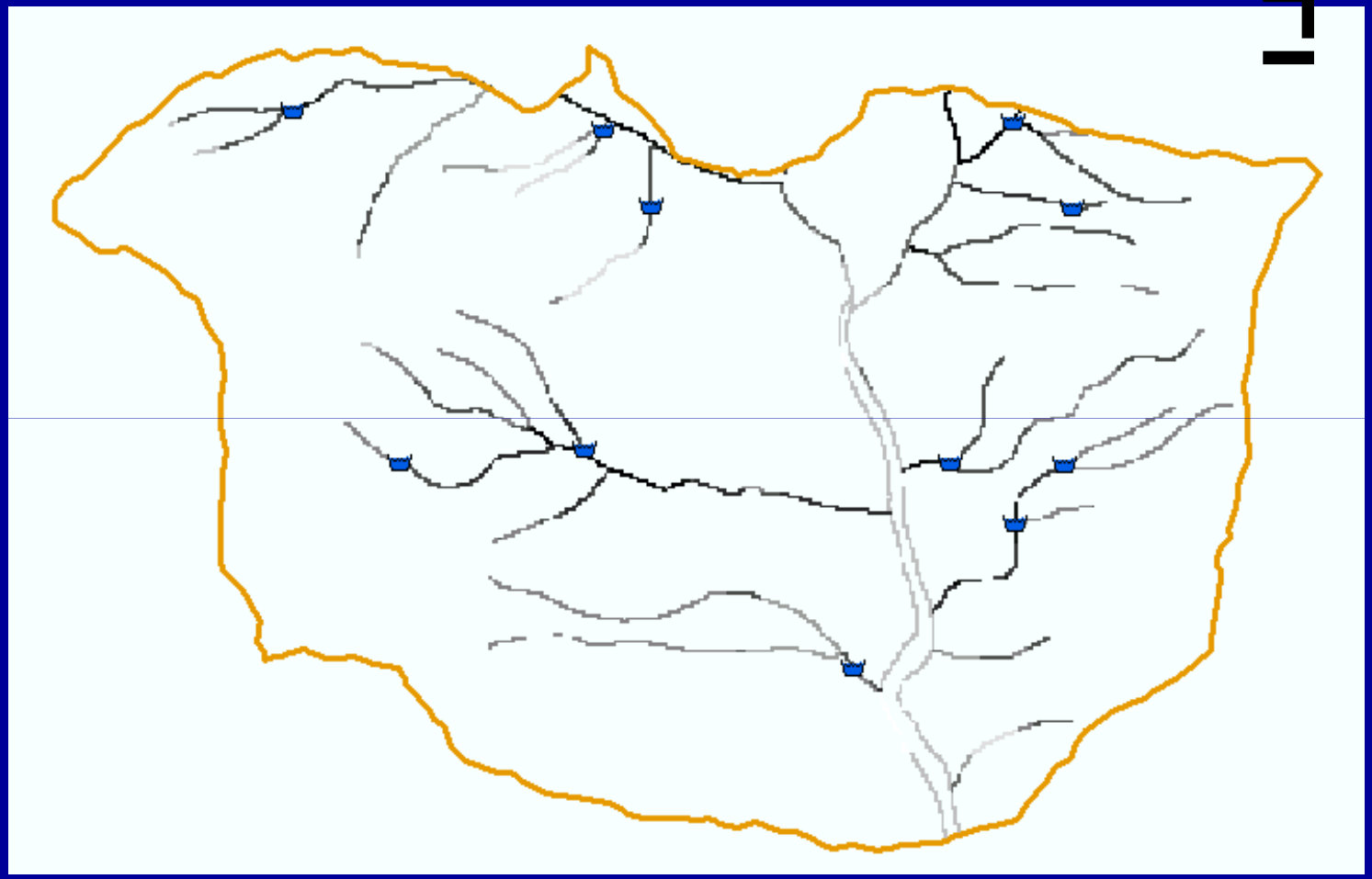


LEGEND

- 1st order streams
- 2nd order streams
- 3rd order streams
- 4th order streams
- 5th order streams

Scale : 1 : 25000

PROPOSITION OF STRUCTURES (CHECK DAMS) BASED ON PRIORITY

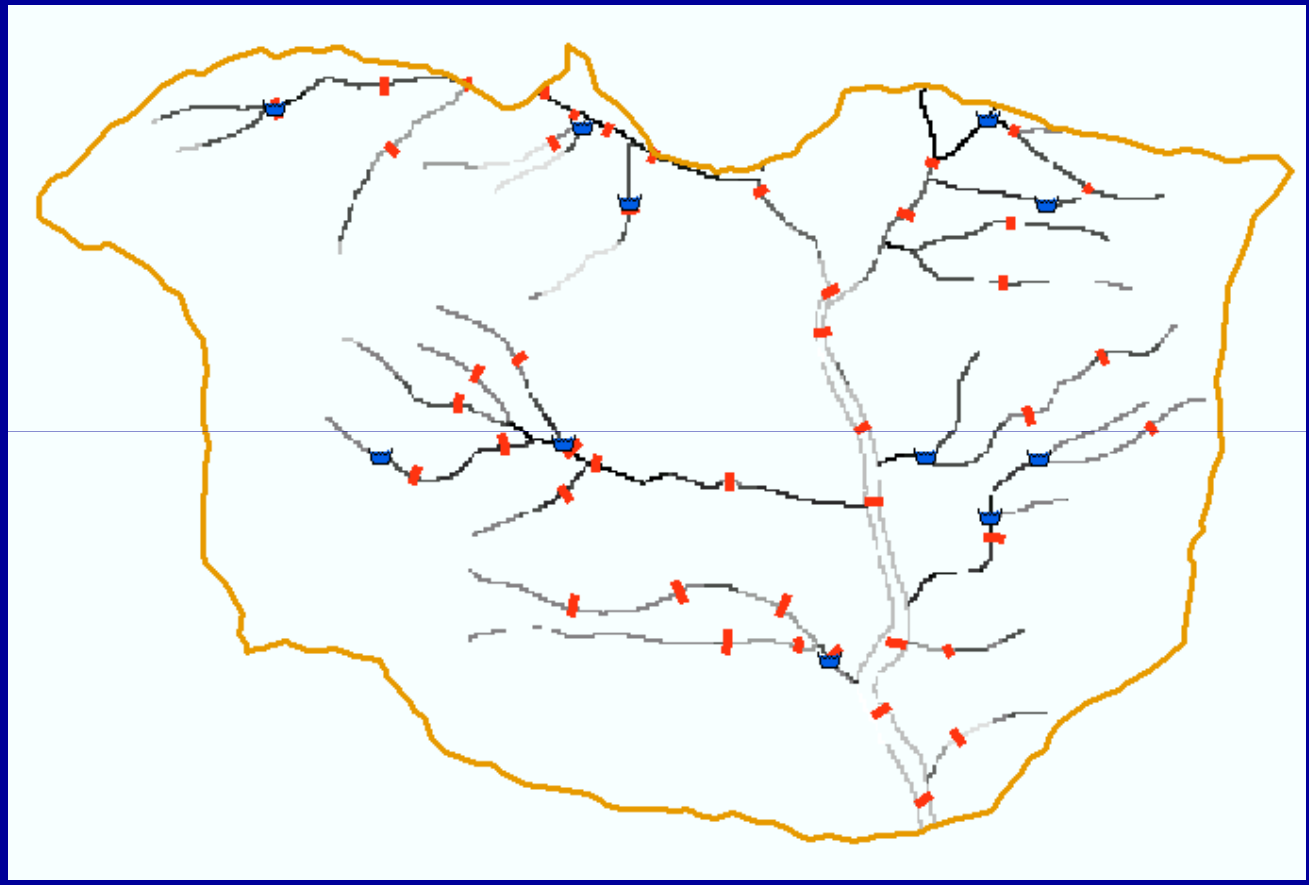


High : 2.1 (Low priority)

Low : 1 (High priority)

Analyzed Check Dams

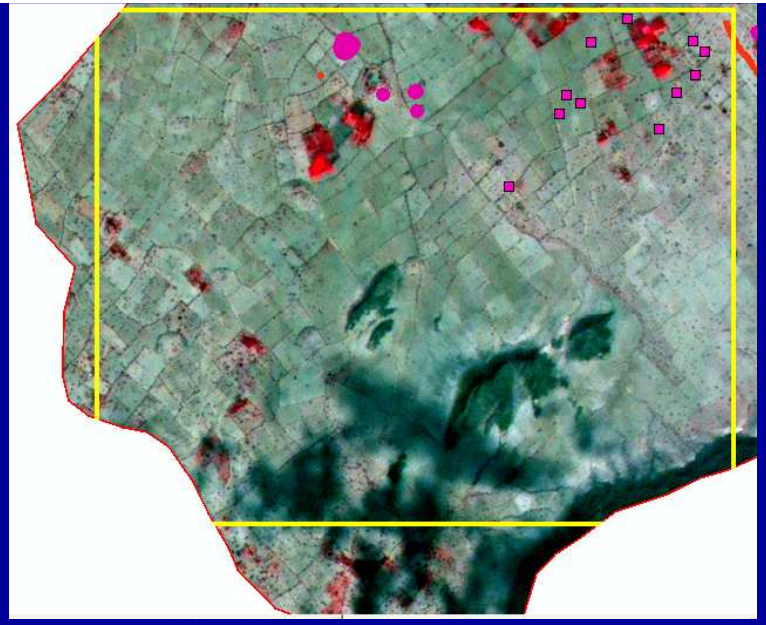
COMPARISON OF DPR & ANALYZED CHECK DAMS / ROCK FILLLED DAMS



? Analyzed Check Dams

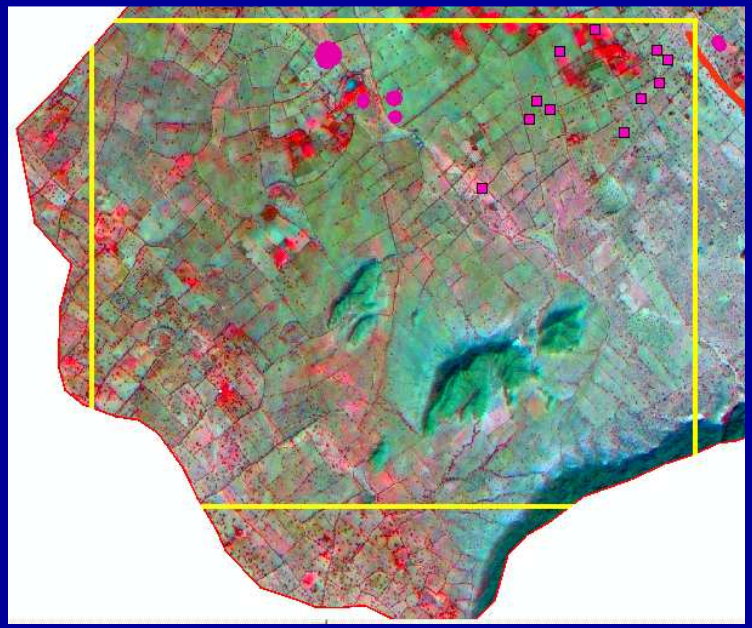
DPR Check Dams

EVALUATION OF WATERSHED PROJECTS IN RAJASTAN STATE USING SATELLITE IMAGERY

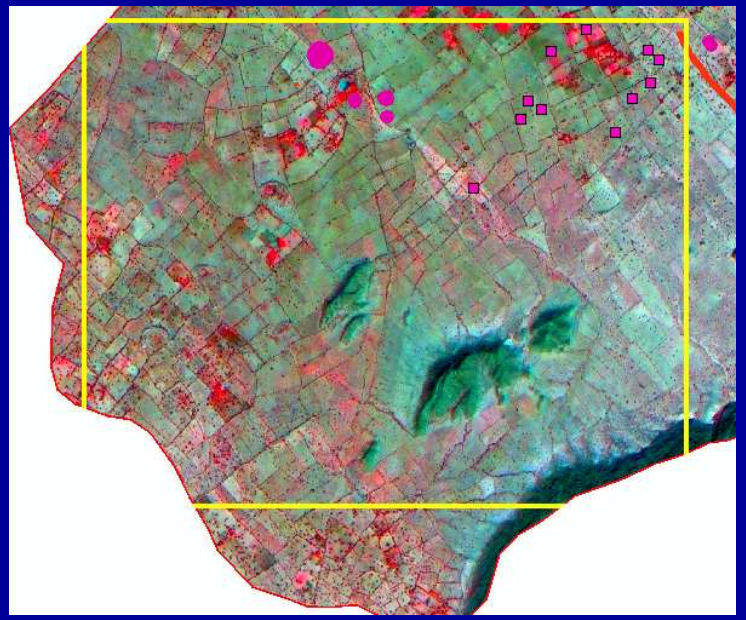


September 2002 Imagery (Rainfall 73.85)

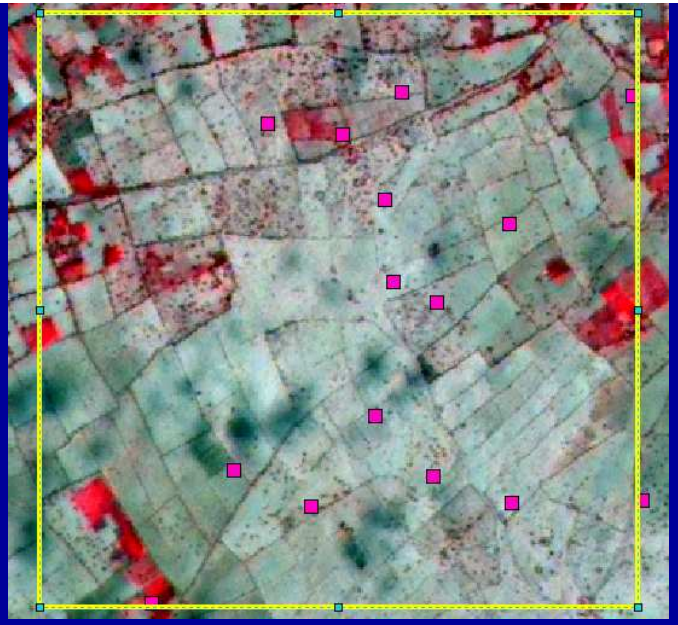
October 2005 Imagery (Rainfall 185.7 mm)



October 2006 Imagery (Rainfall 697.4 mm)



October 2008 Imagery (Rainfall 280.3 mm)



September 2002 Imagery (Rainfall 73.85)

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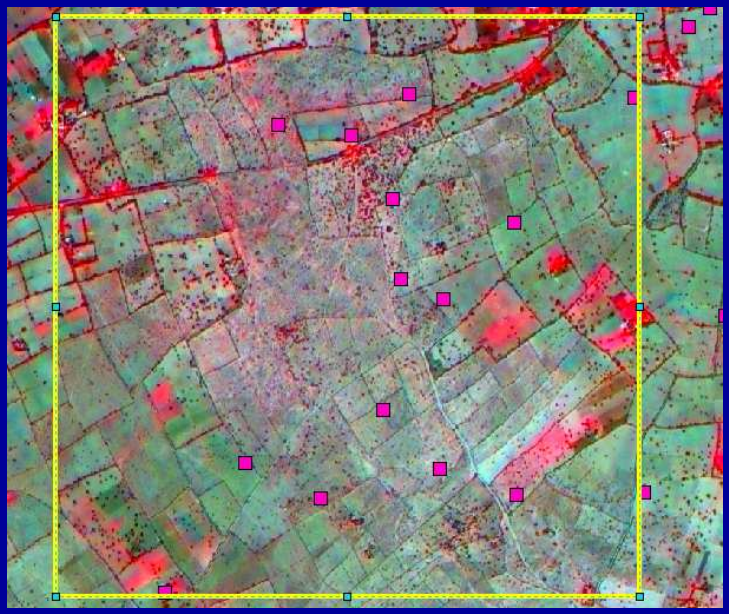
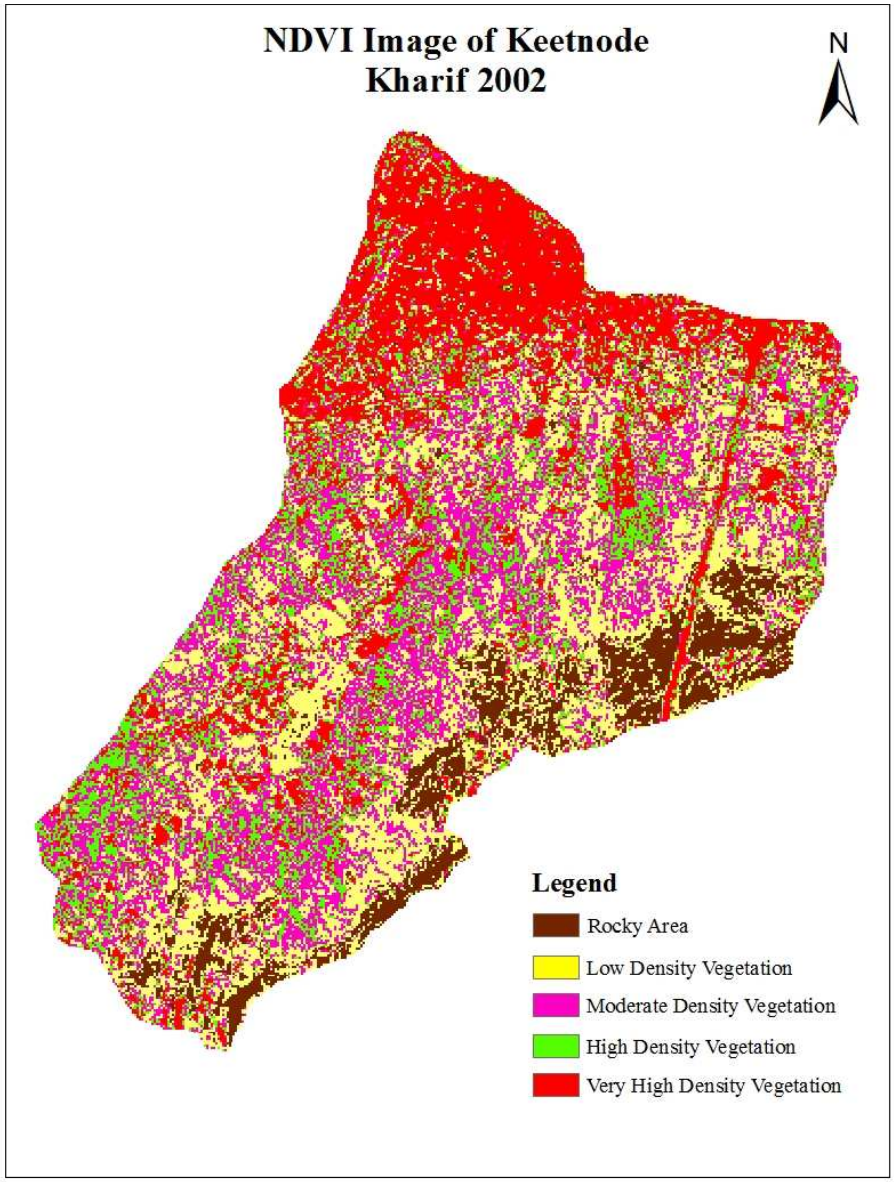
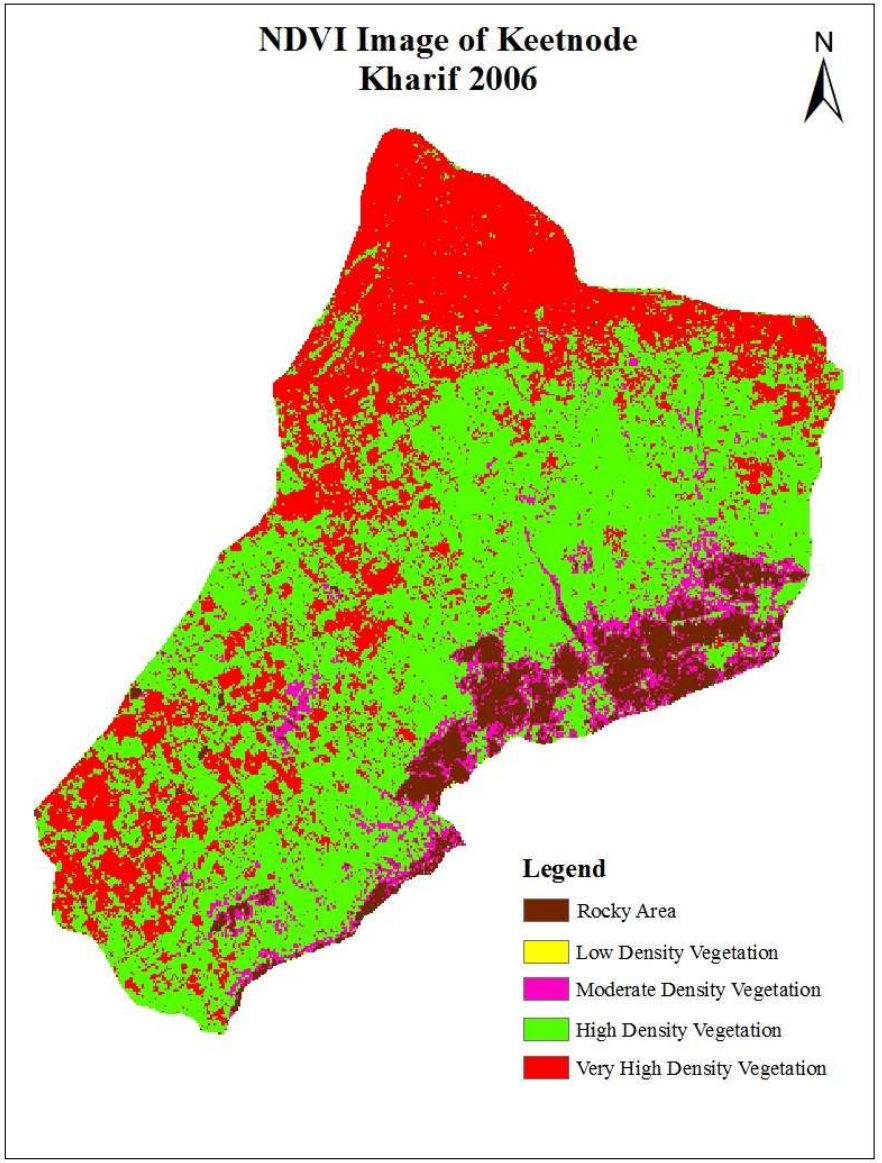
October 2006 Imagery (Rainfall 697.4 mm)

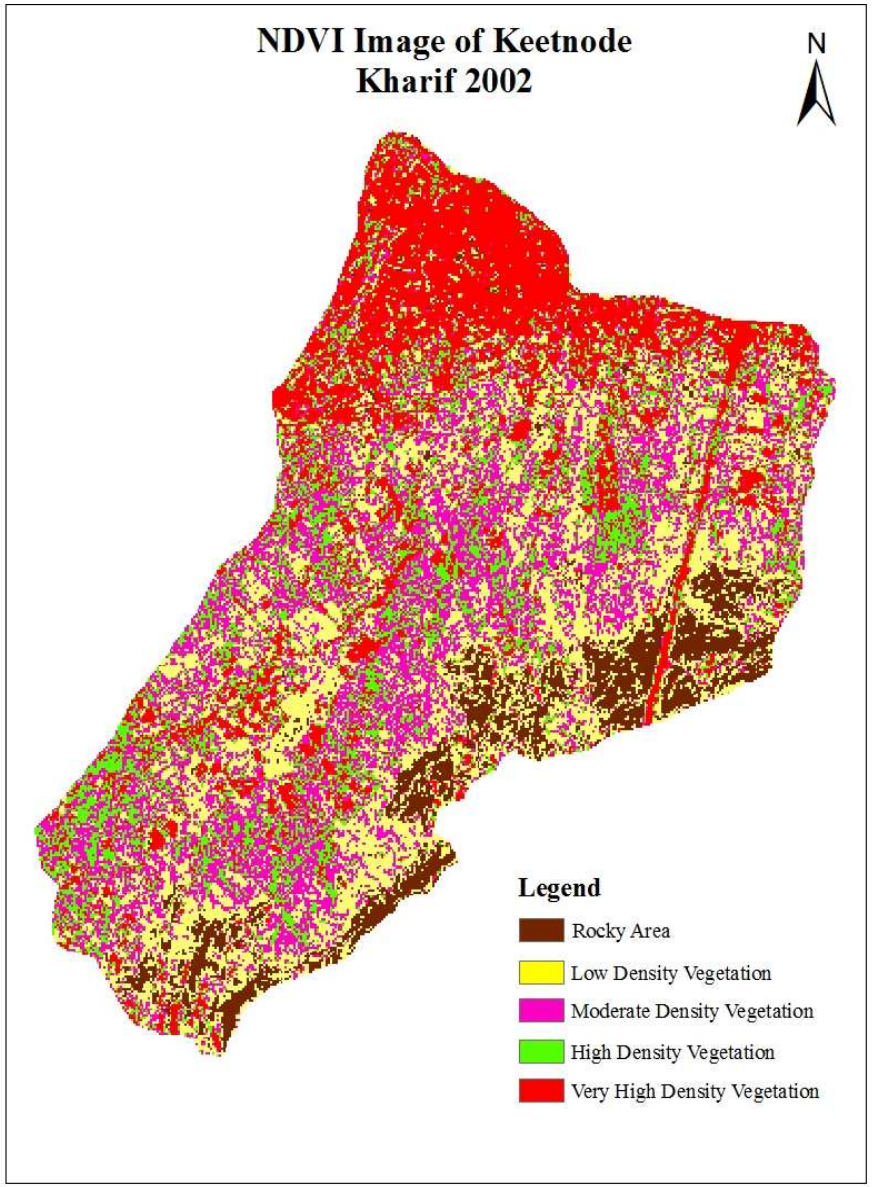


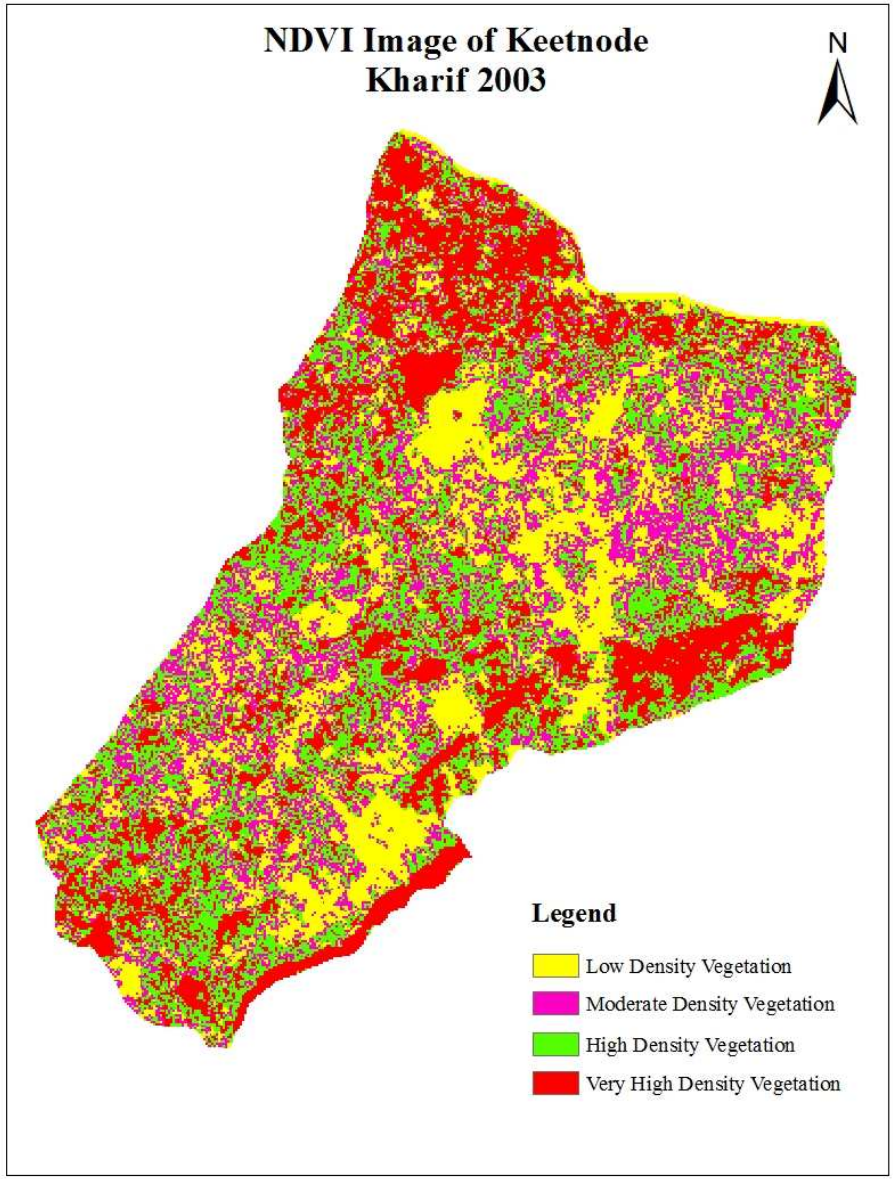
October 2008 Imagery (Rainfall 280.3 mm)



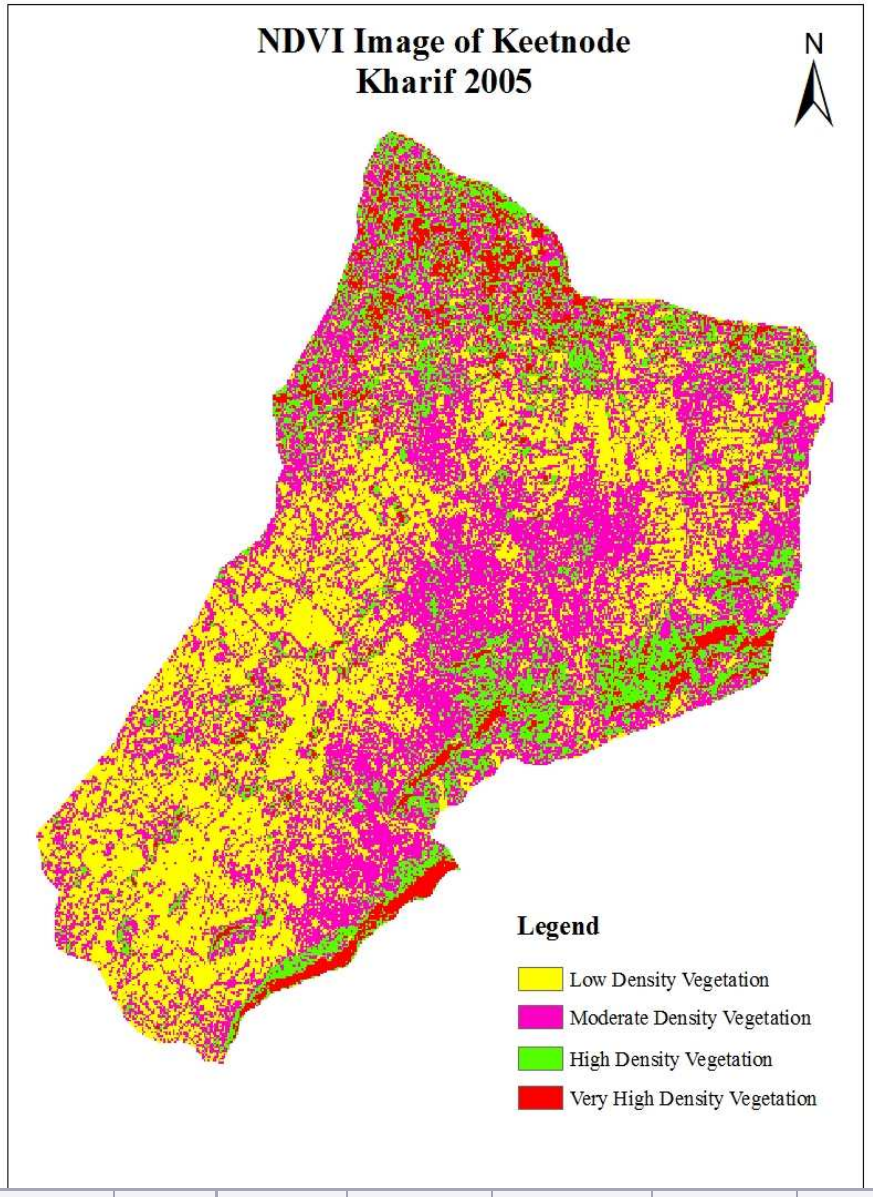


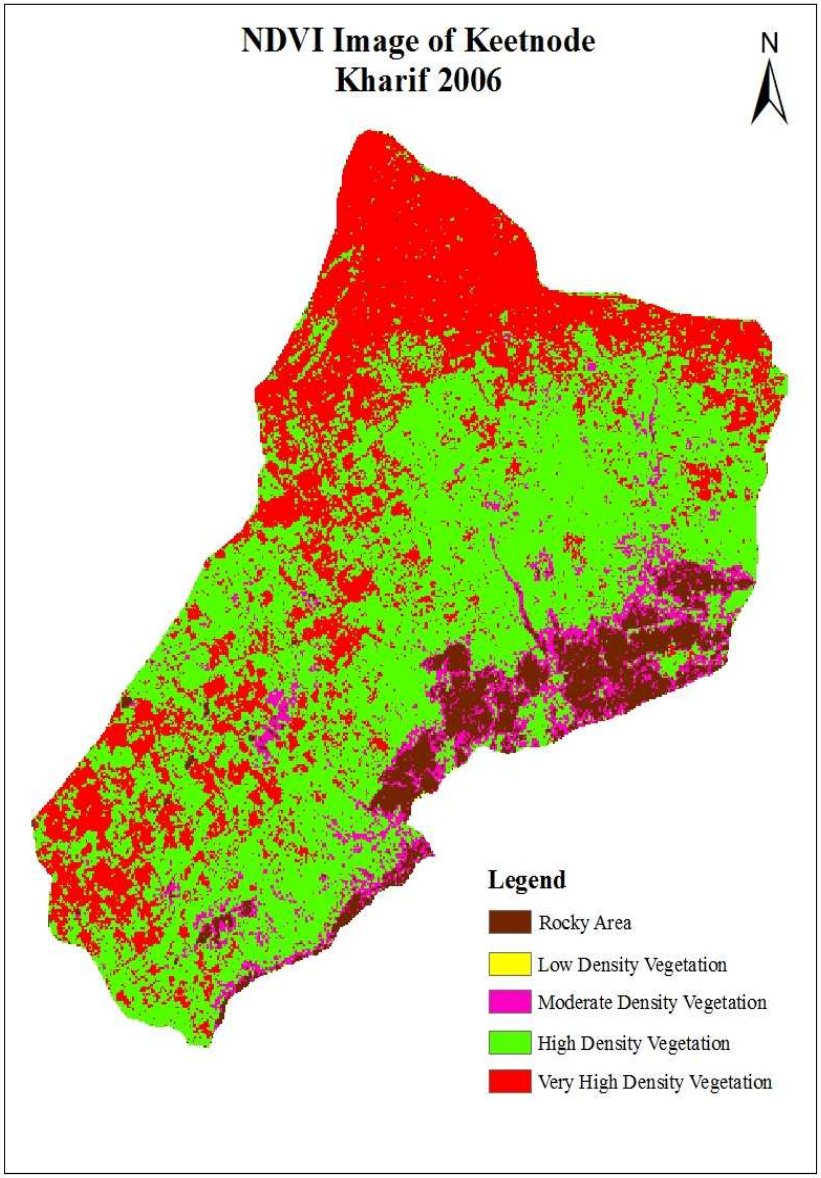
YEAR	JAN	FEB	MAR	APRIL	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC	Total in mm
2002	0	0	0.09	0.22	4.19	15.51	29.97	9.36	6.61	0	4.93	2.97	73.85
2006	0.00	0.00	35.50	2.60	2.80	22.20	64.50	509.0	60.60	0.20	0.00	0.00	697.4



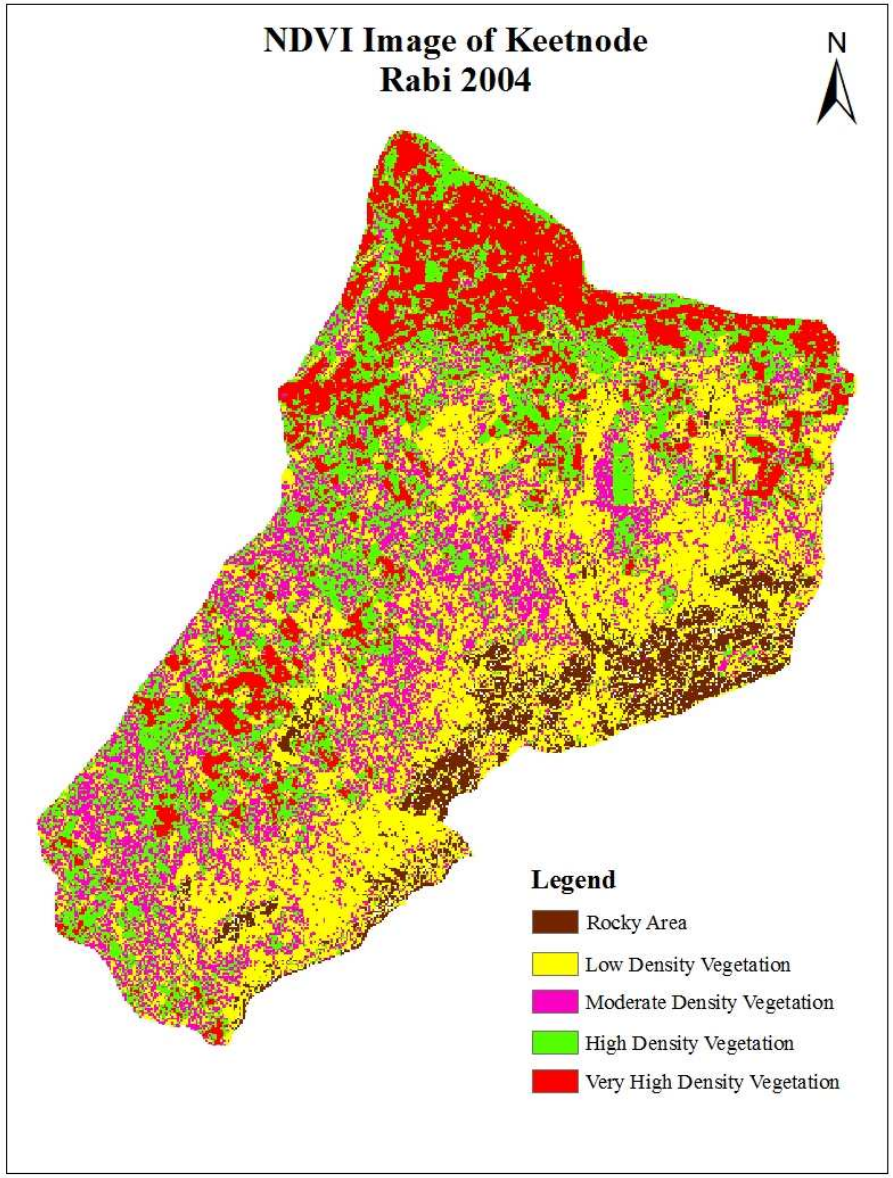


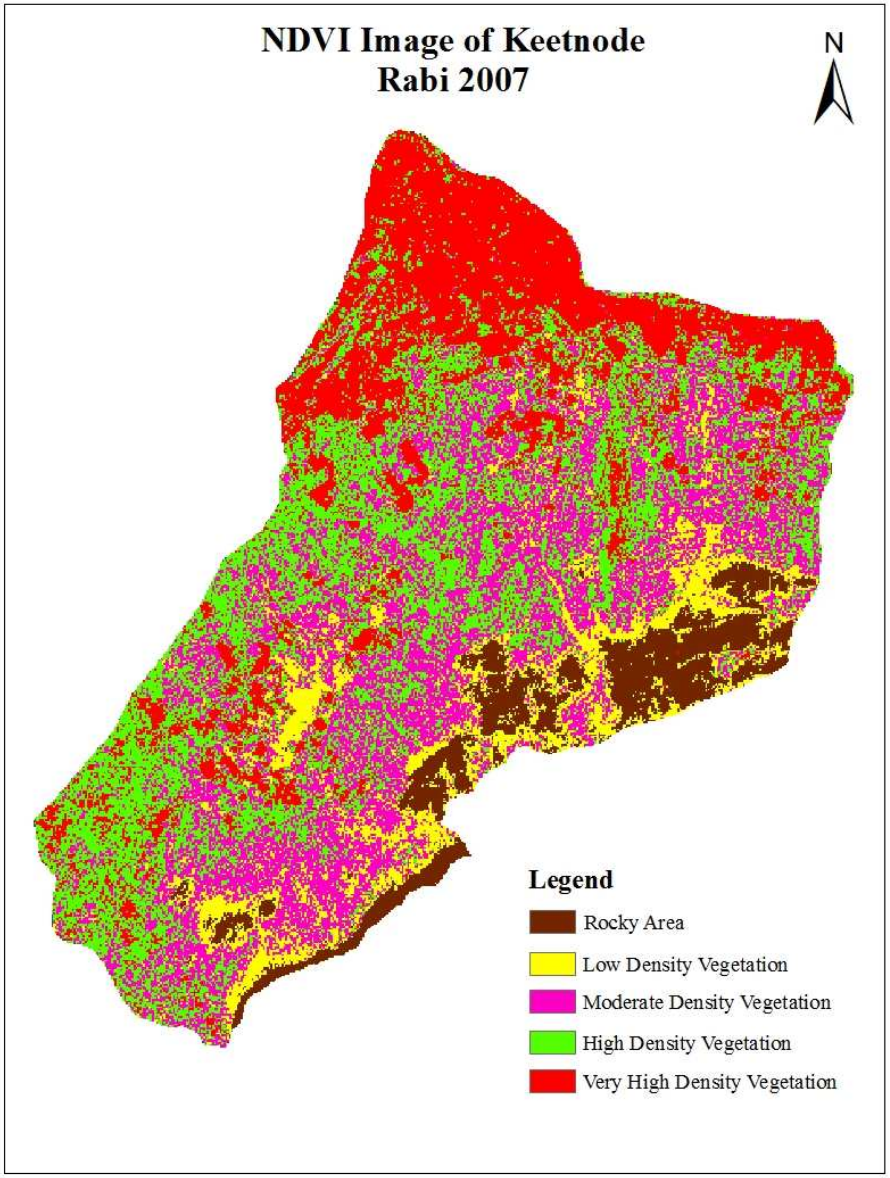
YEAR	JAN	FEB	MAR	APRIL	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC	Total in mm
2002	0	0	0.09	0.22	4.19	15.51	29.97	9.36	6.61	0	4.93	2.97	73.85
2006	0.00	0.00	35.50	2.60	2.80	22.20	64.50	509.0	60.60	0.20	0.00	0.00	697.4

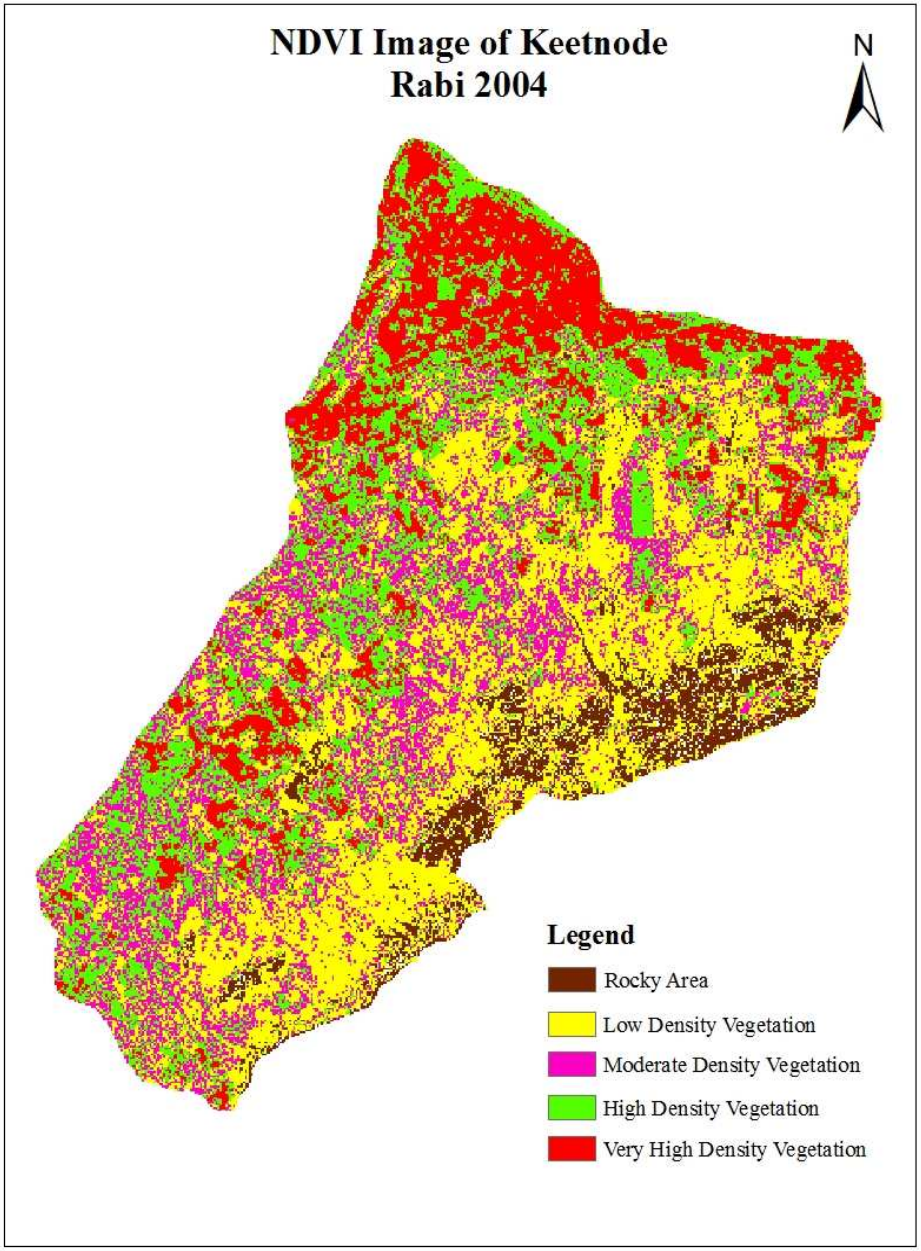


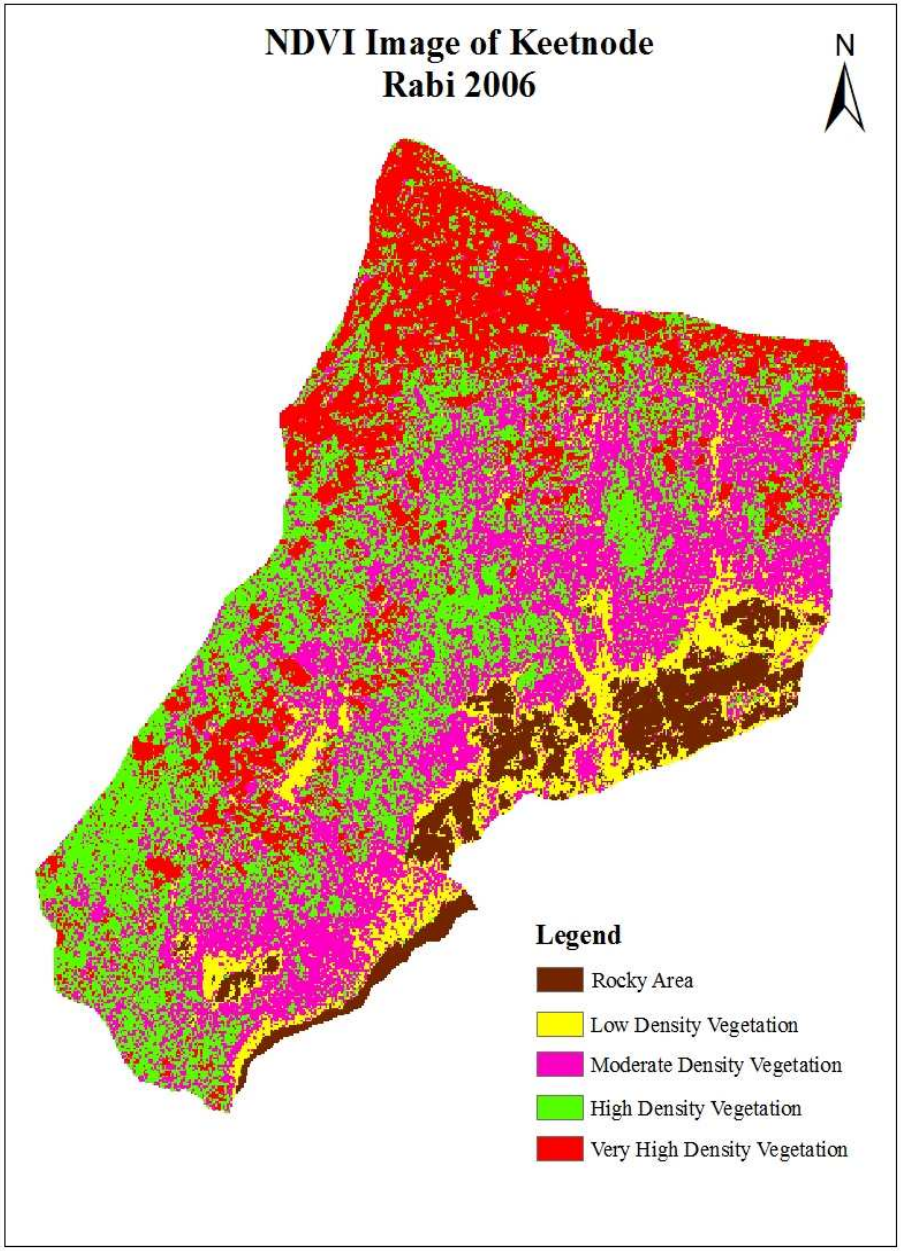


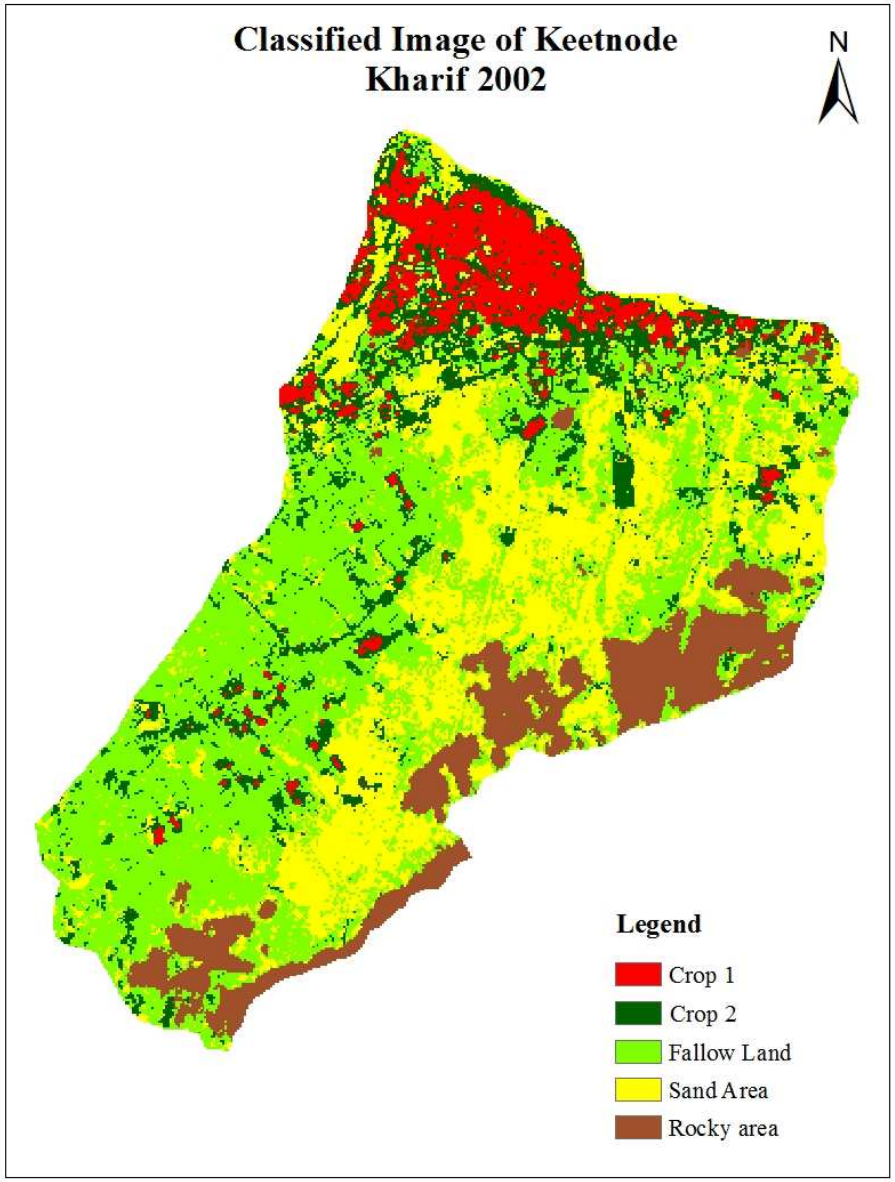
YEAR	JAN	FEB	MAR	APRIL	MAY	JUNE	JULY	AUG	SEPT	OCT	NOV	DEC	Total in mm
2005	0.30	0.90	0.00	3.80	12.20	26.20	50.70	43.20	48.40	0.00	0.00	0.00	185.7
2006	0.00	0.00	35.50	2.60	2.80	22.20	64.50	509.0	60.60	0.20	0.00	0.00	697.4

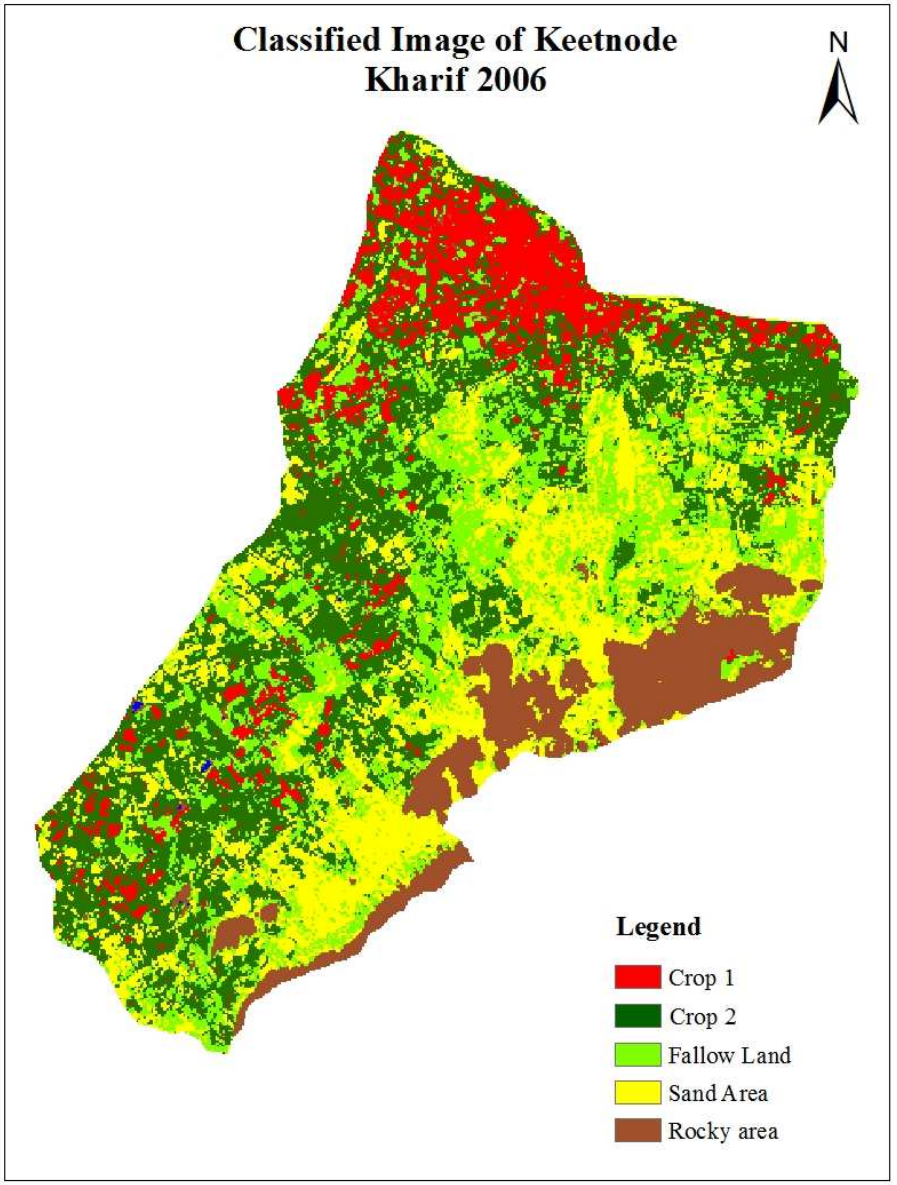

NDVI Image of Keetnode
Rabi 2004
N
Legend
Rocky Area
Low Density Vegetation
Moderate Density Vegetation
High Density Vegetation
Very High Density Vegetation


NDVI Image of Keetnode
Rabi 2007
N
Legend
Rocky Area
Low Density Vegetation
Moderate Density Vegetation
High Density Vegetation
Very High Density Vegetation


NDVI Image of Keetnode
Rabi 2004
N
Legend
Rocky Area
Low Density Vegetation
Moderate Density Vegetation
High Density Vegetation
Very High Density Vegetation


NDVI Image of Keetnode
Rabi 2006
N
Legend
Rocky Area
Low Density Vegetation
Moderate Density Vegetation
High Density Vegetation
Very High Density Vegetation


Classified Image of Keetnode
Kharif 2002
N
Legend
Crop 1
Crop 2
Fallow Land
Sand Area
Rocky area


Classified Image of Keetnode
Kharif 2006
N
Legend
Crop 1
Crop 2
Fallow Land
Sand Area
Rocky area

Changes In Land Use Pattern from Sep 2002 to 2007

Land Use Class	Sep 2002	Sep 2003	Sep 2005	Sep 2006	Sep 2007
Crop1	453.85	684.30	636.91	623.92	363.11
Crop2	818.33	2319.38	2828.62	2060.17	1149.69
Fallow	2402.96	431.83	333.94	1279.46	2764.62
Sandy Area	1708.88	1660.16	1819.32	1491.72	1214.89
Rocky Area	671.33	948.08	432.35	591.09	556.99
Water Body	0	7.00	0	3.11	0
Total	6055.38	6050.76	6051.16	6049.49	6049.32

Changes In Land Use Pattern from Sep 2002 to 2007

Land Use Class	Sep 2002	Sep 2007	Change(Area in ha)
Crop1	453.86	363.11	-90.75
Crop2	818.34	1149.70	331.36
Fallow	2402.96	2764.63	361.67
Sandy Area	1708.88	1214.90	-493.98
Rocky Area	671.34	556.98	-114.36
Total	6055.38	6051.54	

Agro Climatic Planning and Information Bank Project (APIB)
Champawat and Dehradun Districts
Uttarakhand State

DRAINAGE MAP

CHAMPAWAT DISTRICT, UTTARAKHAND

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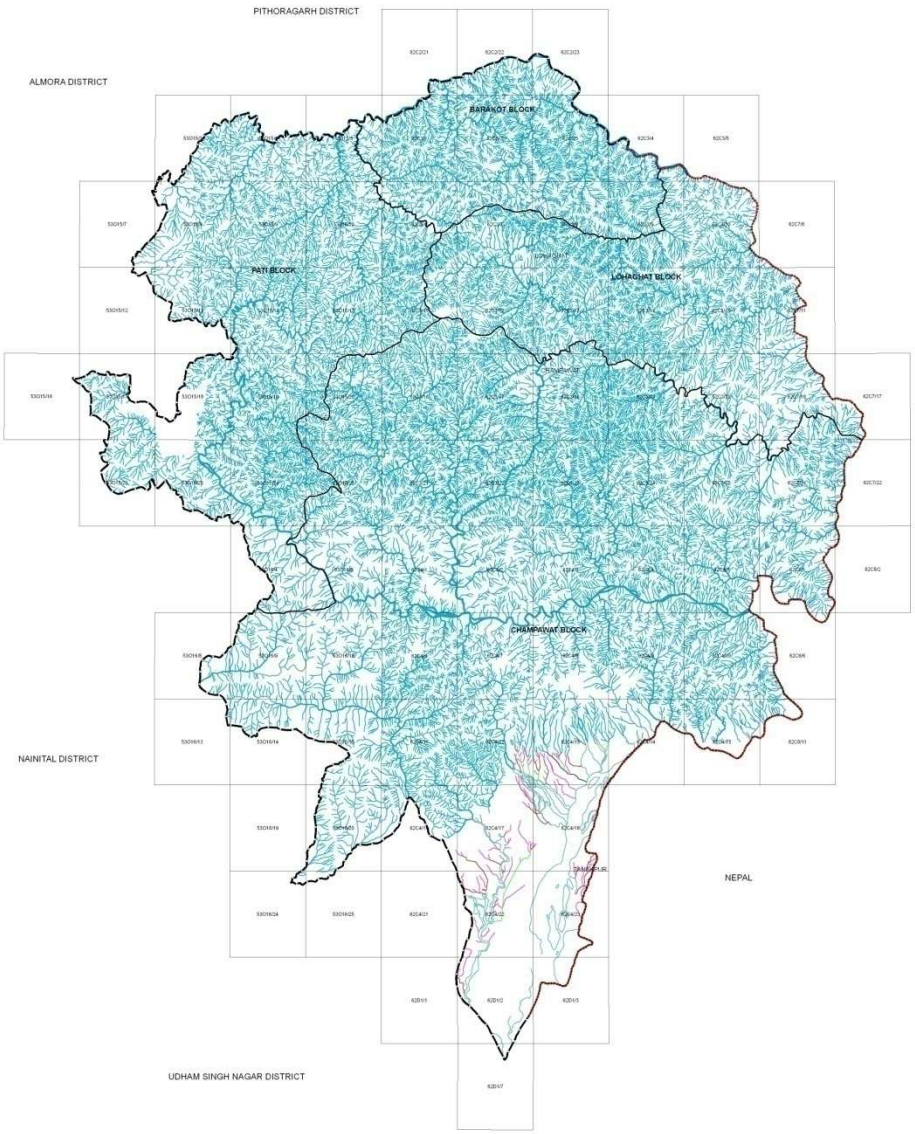


Kilometers
0 2 4 8 12 16

Scale 1 : 1,00,000

LEGEND

STREAM ORDER

- 1
- 2
- 3
- 4
- 5
- 6
- 7

- Settlement
- Road
- Stream
- Railway
- Internatinal Boundary
- River
- Lake
- 300m Contour
- 700m Contour
- District Boundary
- Canal
- Settlements
- 1200m Contour
- 1800m Contour
- Block Boundary

E1 - Very high altitude(More than 1800 meters MSL)
E2 - High altitude(More than 1200 - 1800 meters MSL)
E3 - Medium altitude(More than 700 - 1200 meters MSL)
E4 - Low altitude(More than 300 - 700 meters MSL)
E5 - Very low altitude/Plain (Less than 300 meters MSL)

SOURCE :
1) SATELLITE DATA - CARTOSAT I & RESOURCESAT LISS IV
2) SURVEY OF INDIA TOPOSHEET
3) ANCILLARY DATA

Prepared For

Department of Agriculture
Government of Uttarakhand
Dehradun ,Uttarakhand

Prepared By

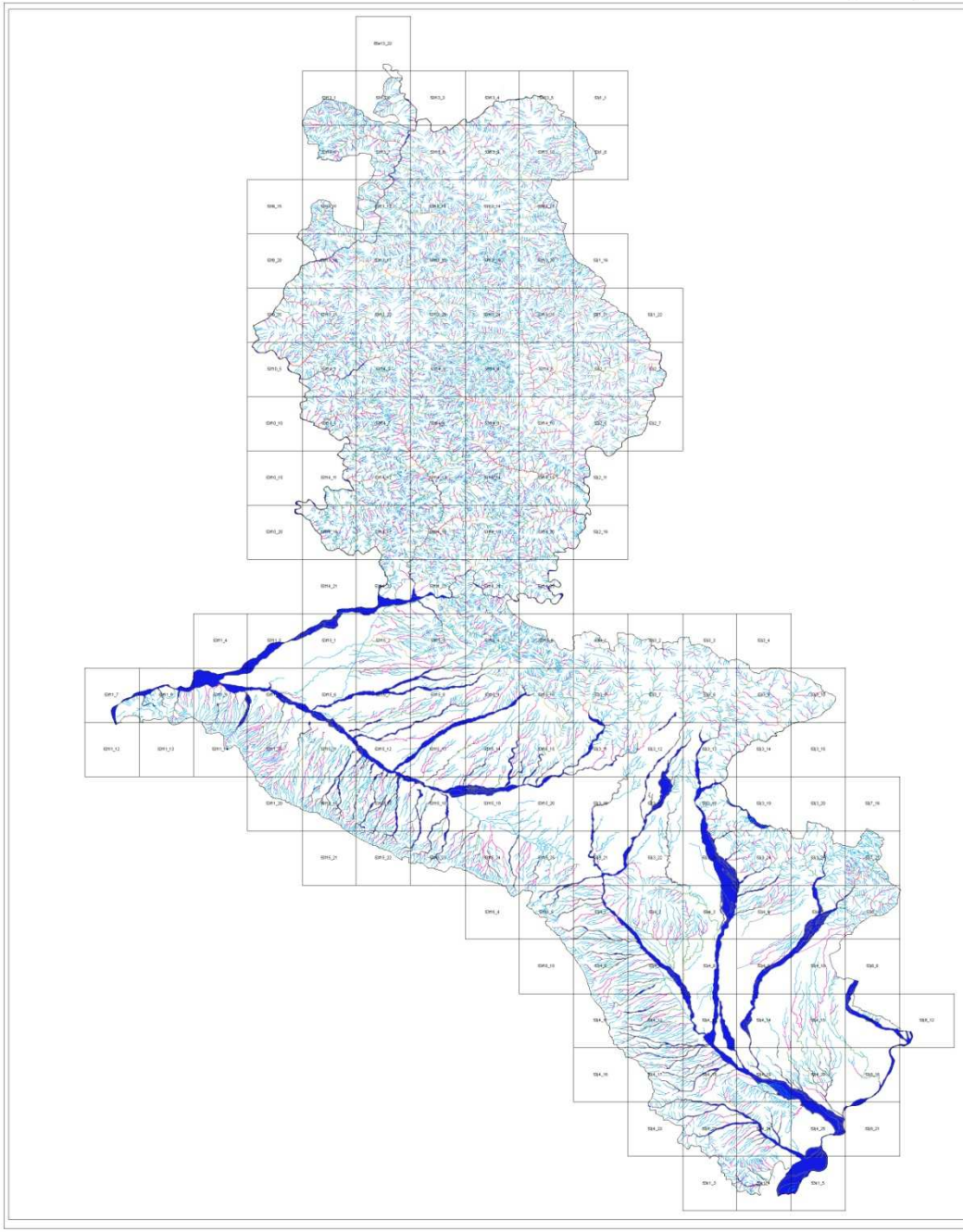
Centre on Geo-Informatics Application in Rural Development
National Institute of Rural Development (NIRD), Hyderabad.

AGRO - CLIMATIC PLANNING AND INFORMATION BANK (APIB)

DEHRADUN DISTRICT, UTTARAKHAND

For official use only

DRAINAGE MAP



Kilometers
0 2.5 5 10 15 20

LEGEND

- 1st Order
- 2nd Order
- 3rd Order
- 4th Order
- 5th Order
- 6th Order
- 7th Order
- Canals
- River
- District Boundary

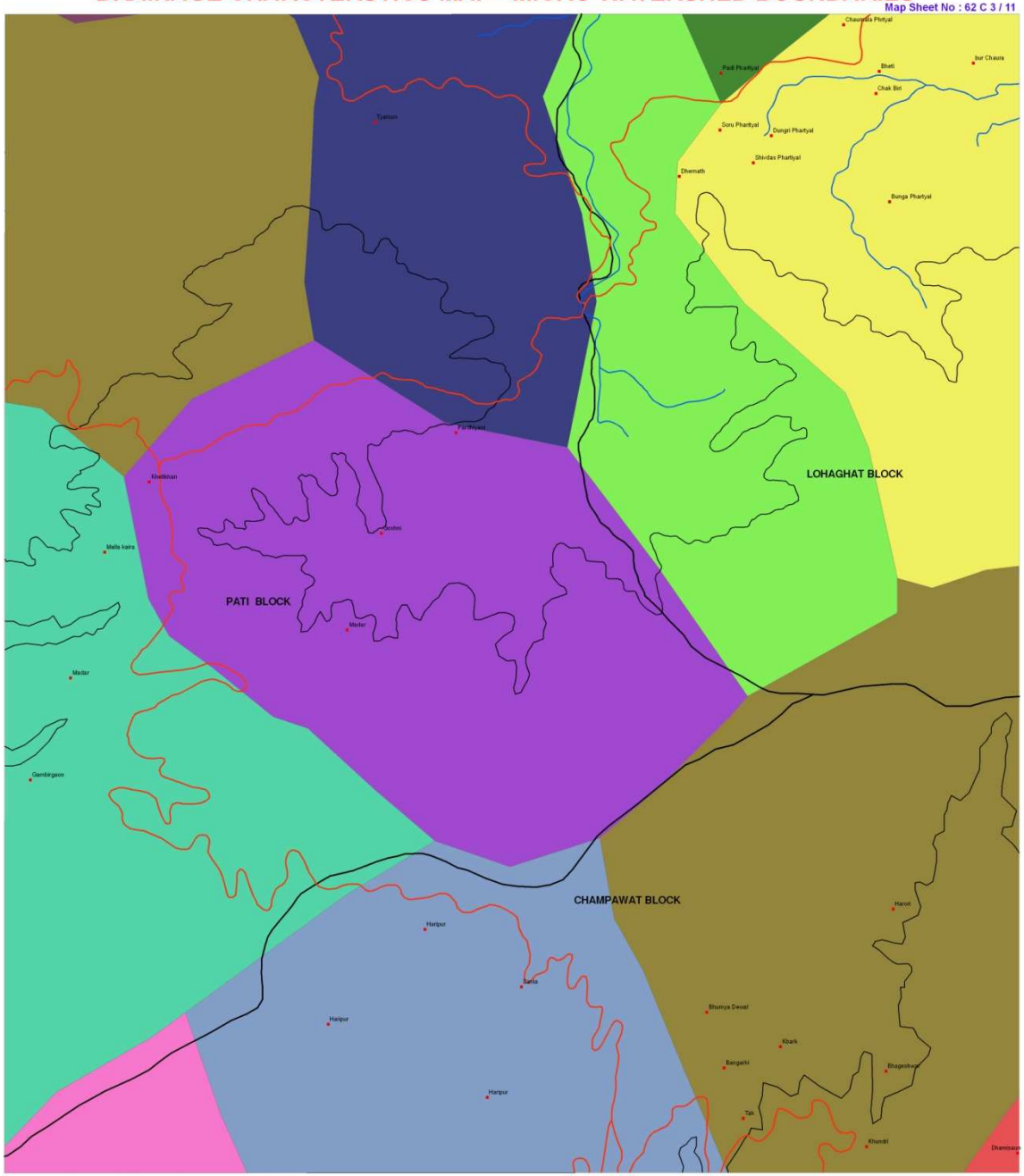
SOURCE :
1) SATELLITE DATA : CARTOSAT-1 & RESOURCESAT LISS IV
2) SURVEY OF INDIA TOPOSHEET
3) ANCILLARY DATA

Department of Agriculture
Government of Uttarakhand
Dehradun ,Uttarakhand

Prepared By :
Centre on Geo-Informatics Applications in Rural Development
National Institute of Rural Development (NIRD), Hyderabad.

DRAINAGE CHARCTERSTICS MAP - MICRO WATERSHED BOUNDARIES

Map Sheet No : 62 C 3 / 11



CHAMPAWAT DISTRICT, UTTARAKHAND

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N W E S

0 250 500 1,000 1,500 Meters

SCALE 1:10,000

LEGEND

- 2B1J3X7
- 2B1J3n8
- 2B1J4f6
- 2B1J4f7
- 2B1J4f8
- 2B1J4f9
- 2B1J4g2
- 2B1J4g5
- 2B1J4g7
- 2B1J4g8
- 2B1J4g9

Settlement	Road	Stream
Major Settlement	Railway Line	300m Contour
River/Lake	Block Boundary	700m Contour
Canal	District Boundary	1200m Contour
	Internatinal Boundary	1800m Contour

INDEX

E1 - Very high altitude(More than 1600 meters MSL)
E2 - High altitude(More than 1200 - 1800 meters MSL)
E3 - Medium altitude(More than 700 - 1200 meters MSL)
E4 - Low altitude(More than 300 - 700 meters MSL)
E5 - Very low altitude/Plain (Less than 300 meters MSL)

SOURCE :
1) SATELLITE DATA : CARTOSAT I & RESOURCESAT LISS IV
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National Institute of Rural Department (NIRD), Hyderabad.

Soil Profile Survey

AGRO - CLIMATIC PLANNING AND INFORMATION BANK (APIB)

CHAMPAWAT DISTRICT, UTTARAKHAND

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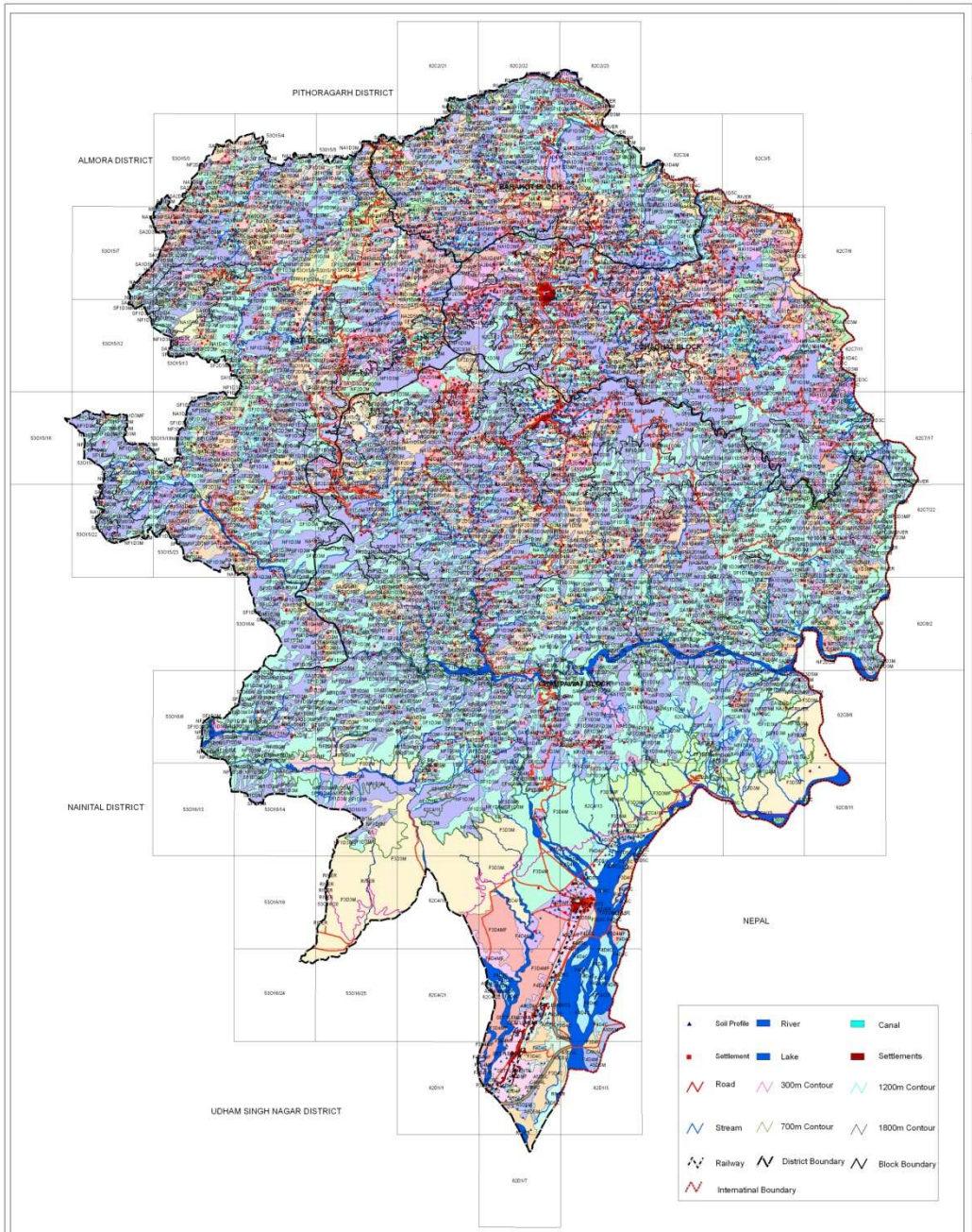


SOIL MAP

Kilometers

0 1.5 3 6 9 12

Scale 1 : 1,00,000

LEGEND

S.NO	UNITS	ASPECT	PHYSIOGRAPHY	EXISTING LAND USE	SOIL DEPTH	SOIL TEXTURE	SUITABILITY AGRICULTURE	SUITABILITY FORESTRY	SUITABILITY HORTICULTURE
1	A4D4C	---	Gently to very gently sloping piedmont plain	Agriculture	Deep	Coarse	Moderate	High	High
2	A4D5C	---	Gently to very gently sloping piedmont plain	Agriculture	Very deep	Coarse	Moderate	High	High
3	A4D5MF	---	Gently to very gently sloping piedmont plain	Agriculture	Very deep	Moderately fine	High	High	High
4	A5D4C	---	Very gently sloping flood plain	Agriculture	Deep	Coarse	Moderate	High	High
5	A5D4F	---	Very gently sloping flood plain	Agriculture	Deep	Medium	High	High	High
6	A5D4M	---	Very gently sloping flood plain	Agriculture	Deep	Medium	High	High	High
7	A5D5C	---	Very gently sloping flood plain	Agriculture	Very deep	Coarse	Moderate	High	High
8	A5D5M	---	Very gently sloping flood plain	Agriculture	Very deep	Medium	High	High	High
9	A5D5MF	---	Very gently sloping flood plain	Agriculture	Very deep	Moderately fine	High	High	High
10	B/S	---	Barren, rocky or landslides	Barren	---	Rocks	Not	Not	Not
12	F3D3C	---	Moderately steep to gently undulating lands	Dense forest	Moderately deep	Coarse	Marginal	High	High
13	F3D3M	---	Moderately steep to gently undulating lands	Dense forest	Moderately deep	Medium	Moderate	High	High
14	F3D3MF	---	Moderately steep to gently undulating lands	Dense forest	Moderately deep	Moderately fine	Moderate	High	High
15	F3D4C	---	Moderately steep to gently undulating lands	Dense forest	Deep	Coarse	Moderate	High	High
16	F3D4M	---	Moderately steep to gently undulating lands	Dense forest	Deep	Medium	High	High	High
17	F3D4MF	---	Moderately steep to gently undulating lands	Dense forest	Deep	Moderately fine	High	High	High
18	F3D5C	---	Moderately steep to gently undulating lands	Dense forest	Very deep	Coarse	Moderate	High	High
19	F3D5M	---	Moderately steep to gently undulating lands	Dense forest	Very deep	Medium	High	High	High
20	F4D3C	---	Moderately steep to gently undulating lands	Open forest	Moderately deep	Coarse	Marginal	High	High
21	F4D4C	---	Moderately steep to gently undulating lands	Open forest	Deep	Coarse	Moderate	High	High
22	F4D4M	---	Moderately steep to gently undulating lands	Open forest	Deep	Medium	High	High	High
23	F4D4MF	---	Moderately steep to gently undulating lands	Open forest	Deep	Moderately fine	High	High	High
24	F4D5C	---	Moderately steep to gently undulating lands	Open forest	Very deep	Coarse	Moderate	High	High
26	NA11D3C	Northern	Very steep to steep slopes, terraced	Fallow	Moderately deep	Coarse	Marginal	High	High
27	NA11D3M	Northern	Very steep to steep slopes, terraced	Fallow	Moderately deep	Medium	Moderate	High	High
28	NA11D3MF	Northern	Very steep to steep slopes, terraced	Fallow	Moderately deep	Moderately fine	Moderate	High	High
29	NA11D4M	Northern	Very steep to steep slopes, terraced	Fallow	Deep	Medium	High	High	High
30	NA11D4MF	Northern	Very steep to steep slopes, terraced	Fallow	Very deep	Moderately fine	High	High	High
31	NA11D5M	Northern	Very steep to steep slopes, terraced	Fallow	Very deep	Medium	High	High	High
32	NA11D5MF	Northern	Very steep to steep slopes, terraced	Fallow	Very deep	Moderately fine	High	High	High
33	NA1D2C	Northern	Very steep to steep slopes, terraced	Agriculture	Shallow	Coarse	Marginal	High	Moderate
34	NA1D2M	Northern	Very steep to steep slopes, terraced	Agriculture	Shallow	Medium	Marginal	High	High
35	NA1D2MF	Northern	Very steep to steep slopes, terraced	Agriculture	Shallow	Moderately fine	Marginal	High	High
36	NA1D3C	Northern	Very steep to steep slopes, terraced	Agriculture	Moderately deep	Coarse	Marginal	High	High
37	NA1D3M	Northern	Very steep to steep slopes, terraced	Agriculture	Moderately deep	Medium	Moderate	High	High
38	NA1D3MF	Northern	Very steep to steep slopes, terraced	Agriculture	Moderately deep	Moderately fine	Moderate	High	High
39	NA1D4C	Northern	Very steep to steep slopes, terraced	Agriculture	Deep	Coarse	Moderate	High	High
40	NA1D4M	Northern	Very steep to steep slopes, terraced	Agriculture	Deep	Medium	High	High	High
41	NA1D4MF	Northern	Very steep to steep slopes, terraced	Agriculture	Deep	Moderately fine	High	High	High
42	NA1D5C	Northern	Very steep to steep slopes, terraced	Agriculture	Very deep	Coarse	Moderate	High	High
43	NA1D5M	Northern	Very steep to steep slopes, terraced	Agriculture	Very deep	Medium	High	High	High
44	NA1D5MF	Northern	Very steep to steep slopes, terraced	Agriculture	Very deep	Moderately fine	High	High	High
45	NA21D5MF	Northern	Steep to moderately steep slopes, terraced	Fallow	Very deep	Moderately fine	High	High	High
46	NA2D2C	Northern	Steep to moderately steep slopes, terraced	Agriculture	Shallow	Coarse	Marginal	High	Moderate
47	NA2D3M	Northern	Steep to moderately steep slopes, terraced	Agriculture	Moderately deep	Medium	Moderate	High	High
48	NA2D4C	Northern	Steep to moderately steep slopes, terraced	Agriculture	Deep	Coarse	Moderate	High	High
49	NA2D4M	Northern	Steep to moderately steep slopes, terraced	Agriculture	Deep	Medium	High	High	High
50	NA2D4MF	Northern	Steep to moderately steep slopes, terraced	Agriculture	Deep	Moderately fine	High	High	High
51	NA2D5F	Northern	Steep to moderately steep slopes, terraced	Agriculture	Very deep	Fine	High	High	High
52	NA2D5M	Northern	Steep to moderately steep slopes, terraced	Agriculture	Very deep	Medium	High	High	High
53	NA2D5MF	Northern	Steep to moderately steep slopes, terraced	Agriculture	Very deep	Moderately fine	High	High	High
54	NA31D5MF	Northern	Moderately steep to gently slopes, terraced	Fallow	Very deep	Moderately fine	High	High	High
55	NF1D3M	Northern	Very steep, steep, moderately steep slopes	Dense forest	Moderately deep	Medium	Moderate	High	High
56	NF2D2M	Northern	Very steep, steep, moderately steep slopes	Open forest	Shallow	Medium	Marginal	High	High
57	NF2D3MF	Northern	Very steep, steep, moderately steep slopes	Open forest	Moderately deep	Moderately fine	Moderate	High	High
59	SA11D3M	Southern	Very steep to steep slopes, terraced	Fallow	Moderately deep	Medium	Moderate	High	High
60	SA11D3MF	Southern	Very steep to steep slopes, terraced	Fallow	Moderately deep	Moderately fine	Moderate	High	High
61	SA11D4C	Southern	Very steep to steep slopes, terraced	Fallow	Deep	Coarse	Moderate	High	High
62	SA11D4M	Southern	Very steep to steep slopes, terraced	Fallow	Deep	Medium	High	High	High
63	SA11D4MF	Southern	Very steep to steep slopes, terraced	Fallow	Deep	Moderately fine	High	High	High
64	SA11D5MF	Southern	Very steep to steep slopes, terraced	Fallow	Very deep	Moderately fine	High	High	High
65	SA1D2C	Southern	Very steep to steep slopes, terraced	Agriculture	Shallow	Coarse	Marginal	High	Moderate
66	SA1D2M	Southern	Very steep to steep slopes, terraced	Agriculture	Shallow	Medium	Marginal	High	High
67	SA1D3C	Southern	Very steep to steep slopes, terraced	Agriculture	Moderately deep	Coarse	Marginal	High	High
68	SA1D3M	Southern	Very steep to steep slopes, terraced	Agriculture	Moderately deep	Medium	Moderate	High	High
69	SA1D3MF	Southern	Very steep to steep slopes, terraced	Agriculture	Moderately deep	Moderately fine	Moderate	High	High
70	SA1D4C	Southern	Very steep to steep slopes, terraced	Agriculture	Deep	Coarse	Moderate	High	High
71	SA1D4M	Southern	Very steep to steep slopes, terraced	Agriculture	Deep	Medium	High	High	High
72	SA1D4MF	Southern	Very steep to steep slopes, terraced	Agriculture	Deep	Moderately fine	High	High	High
73	SA1D5C	Southern	Very steep to steep slopes, terraced	Agriculture	Very deep	Coarse	Moderate	High	High
74	SA1D5F	Southern	Very steep to steep slopes, terraced	Agriculture	Very deep	Fine	High	High	High
75	SA1D5M	Southern	Very steep to steep slopes, terraced	Agriculture	Very deep	Medium	High	High	High
76	SA1D5MF	Southern	Very steep to steep slopes, terraced	Agriculture	Very deep	Moderately fine	High	High	High
77	SA21D5MF	Southern	Steep to moderately steep slopes, terraced	Fallow	Moderately deep	Moderately fine	Moderate	High	High
78	SA21D5MF	Southern	Steep to moderately steep slopes, terraced	Fallow	Very deep	Moderately fine	High	High	High
79	SA2D2C	Southern	Steep to moderately steep slopes, terraced	Agriculture	Shallow	Coarse	Marginal	High	Moderate
80	SA2D2M	Southern	Steep to moderately steep slopes, terraced	Agriculture	Shallow	Medium	Moderate	High	High
81	SA2D3C	Southern	Steep to moderately steep slopes, terraced	Agriculture	Moderately deep	Coarse	Marginal	High	High
82	SA2D3M	Southern	Steep to moderately steep slopes, terraced	Agriculture	Moderately deep	Medium	Moderate	High	High
83	SA2D3MF	Southern	Steep to moderately steep slopes, terraced	Agriculture	Moderately deep	Moderately fine	Moderate	High	High
84	SA2D4M	Southern	Steep to moderately steep slopes, terraced	Agriculture	Deep	Medium	High	High	High
85	SA2D4MF	Southern	Steep to moderately steep slopes, terraced	Agriculture	Deep	Moderately fine	High	High	High
86	SA2D5C	Southern	Steep to moderately steep slopes, terraced	Agriculture	Very deep	Coarse	Moderate	High	High
87	SA2D5M	Southern	Steep to moderately steep slopes, terraced	Agriculture	Very deep	Medium	High	High	High
88	SA2D5MF	Southern	Steep to moderately steep slopes, terraced	Agriculture	Very deep	Moderately fine	High	High	High
89	SA31D5MF	Southern	Moderately steep to gently slopes, terraced	Fallow	Very deep	Moderately fine	High	High	High
90	SA3D3M	Southern	Moderately steep to gently slopes, terraced	Agriculture	Moderately deep	Medium	Moderate	High	High
91	SA3D3MF	Southern	Moderately steep to gently slopes, terraced	Agriculture	Moderately deep	Moderately fine	Moderate	High	High
92	SA3D5M	Southern	Moderately steep to gently slopes, terraced	Agriculture	Very deep	Medium	High	High	High
93	SA3D5MF	Southern	Moderately steep to gently slopes, terraced	Agriculture	Very deep	Moderately fine	High	High	High
95	SF1D3M	Southern	Very steep, steep, moderately steep slopes	Dense forest	Moderately deep	Medium	Moderate	High	High
96	SF1D4M	Southern	Very steep, steep, moderately steep slopes	Dense forest	Deep	Medium	High	High	High
97	SF2D3M	Southern	Very steep, steep, moderately steep slopes	Open forest	Moderately deep	Medium	Moderate	High	High
98	V1D3M	---	Very steep to steep slopes, terraced	Agriculture	Moderately deep	Medium	Moderate	High	High
99	V1D4C	---	Very steep to steep slopes, terraced	Agriculture	Deep	Coarse	Moderate	High	High
100	V1D5MF	---	Very steep to steep slopes, terraced	Agriculture	Very deep	Moderately fine	High	High	High
101	V2D4C	---	Steep to moderately steep slopes, terraced	Agriculture	Deep	Coarse	Moderate	High	High
102	V2D5MF	---	Steep to moderately steep slopes, terraced	Agriculture	Very deep	Moderately fine	High	High	High

E1 - Very high altitude(More than 1500 meters MSL)
E2 - High altitude(More than 1200 - 1800 meters MSL)
E3 - Medium altitude(More than 700 - 1200 meters MSL)
E4 - Low altitude(More than 200 - 700 meters MSL)
E5 - Very low altitude/Plain (Less than 300 meters MSL)

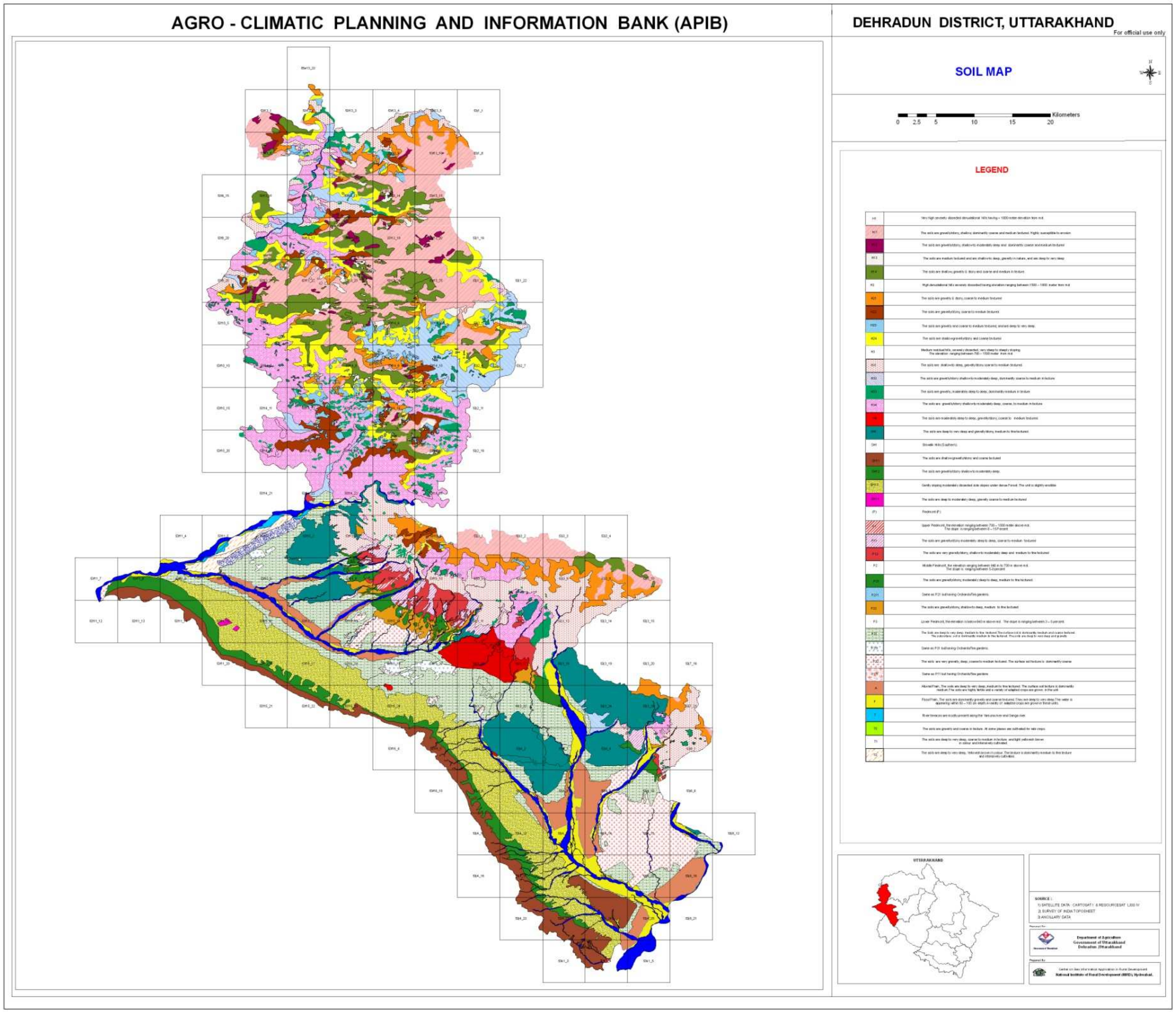
SOURCE:
1) SATELLITE DATA : CARTOSAT I & RESOURCESAT LISS IV
2) SURVEY OF INDIA TOPOSHEET
3) ANCILLARY DATA

Prepared For:

Department of Agriculture
Government of Uttarakhand
Dehradun ,Uttarakhand

Prepared By:

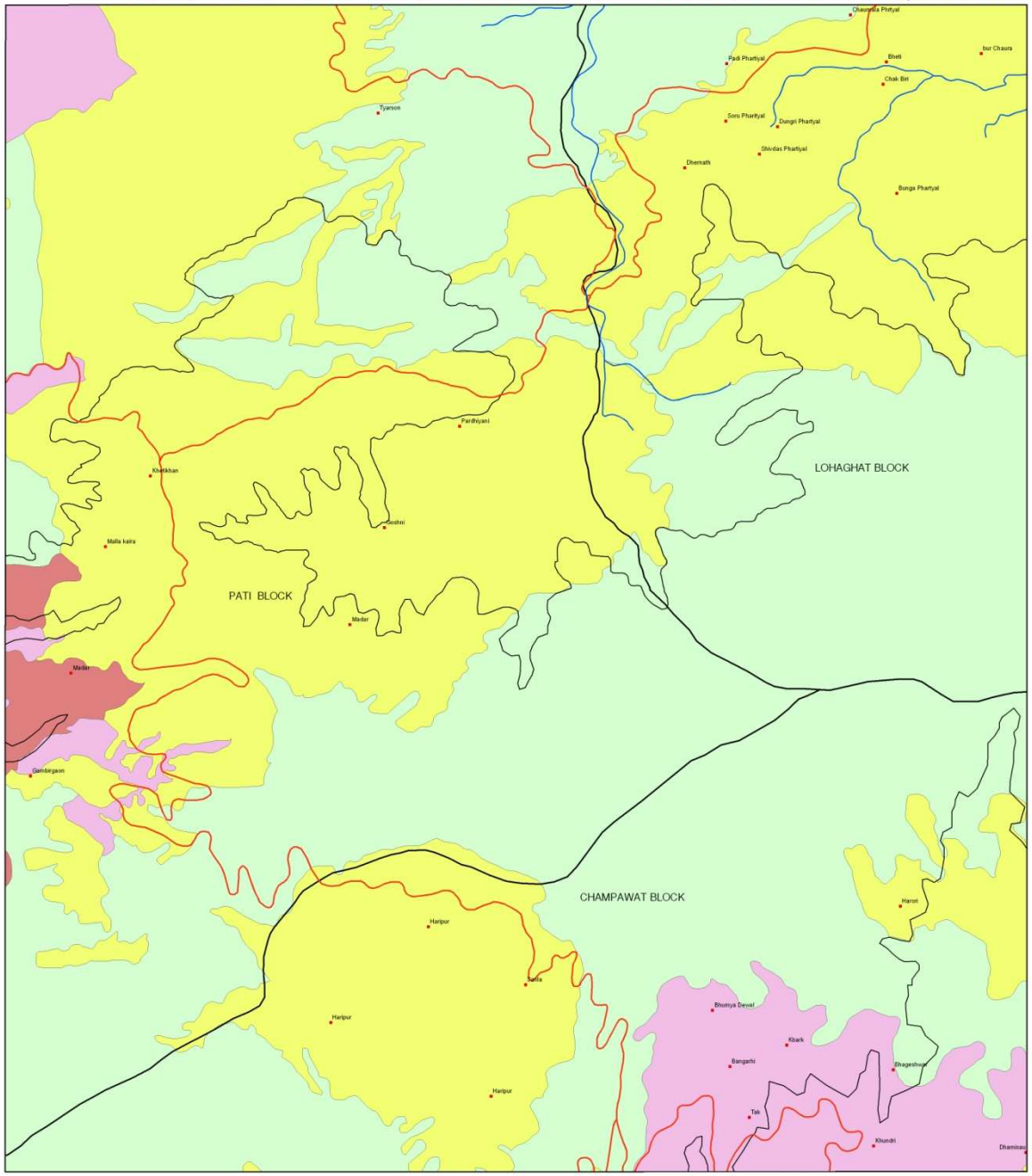
Center on Geo informatics Application in Rural Development
National Institute of Rural Department (NIRD), Hyderabad.
and
Remote Sensing Instruments(RSI), Hyderabad.



AGRO - CLIMATIC PLANNING AND INFORMATION BANK (APIB)
DEHRADUN DISTRICT, UTTARAKHAND
For official use only
SOIL MAP
Kilometers
0 2.5 5 10 15 20
LEGEND
UTTARAKHAND

AGRO - CLIMATIC PLANNING AND INFORMATION BANK (APIB)

Map Sheet No : 62 C 3 / 11



CHAMPAWAT DISTRICT, UTTARAKHAND

For official use only

SUITABILITY MAP FOR VEGITABLES

N W E S

0 250 500 1,000 1,500 Meters

SCALE 1:10,000

LEGEND

- HIGHLY SUITABLE LAND
- MODERATELY SUITABLE LAND
- MARGINAL SUITABLE LAND
- CURRENTLY NOT SUITABLE LAND
- PERMANENTLY NOT SUITABLE LAND
- Forest

- Settlement
- Major Settlement
- River/Lake
- Canal
- Road
- Railway Line
- Block Boundary
- District Boundary
- Internatinal Boundary
- Stream
- 300m Contour
- 700m Contour
- 1200m Contour
- 1800m Contour

INDEX

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SOURCE :
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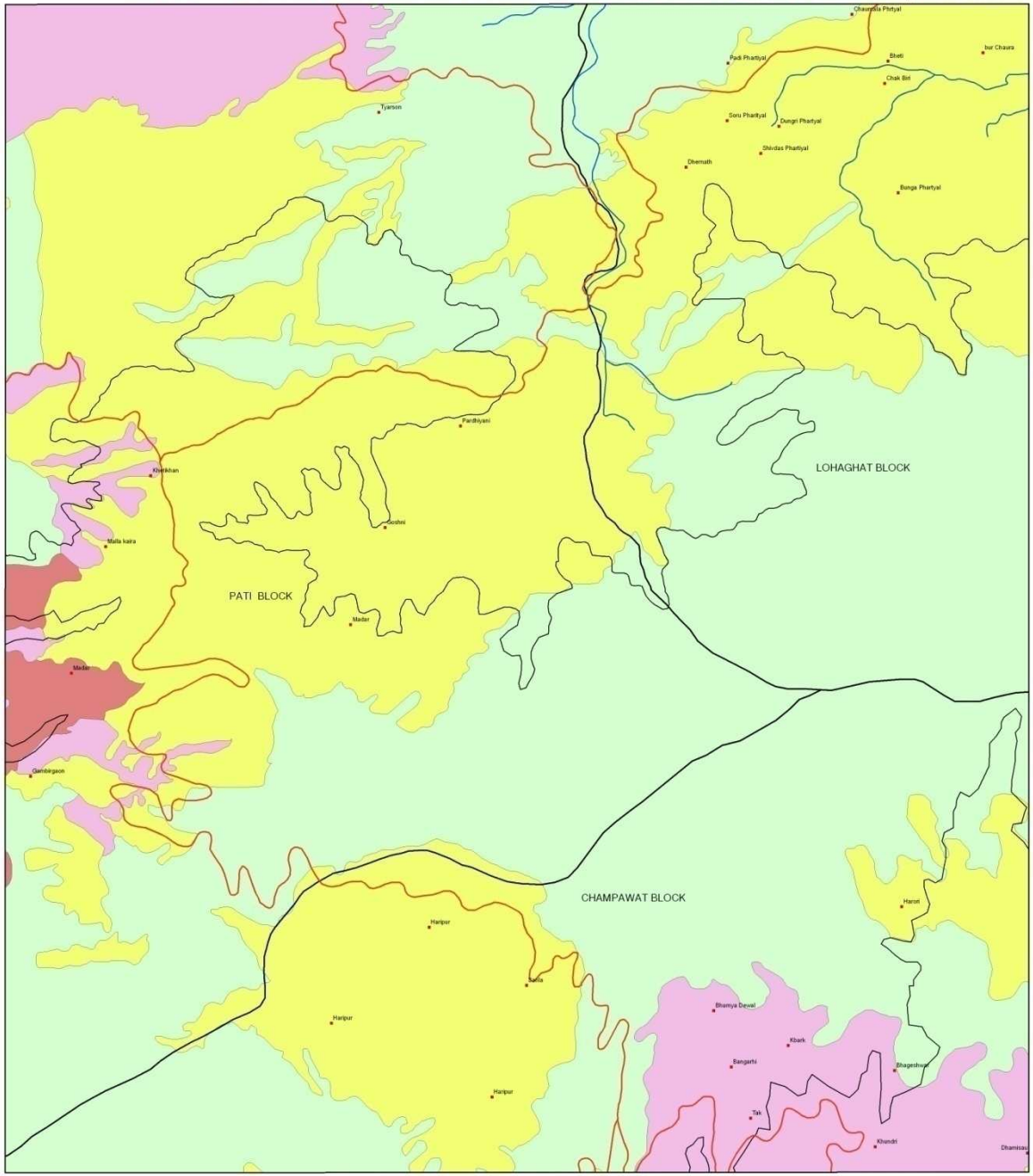
AGRO - CLIMATIC PLANNING AND INFORMATION BANK (APIB)

Map Sheet No : 62 C 3 / 11



CHAMPAWAT DISTRICT, UTTARAKHAND

For official use only

SUITABILITY MAP FOR WHEAT

N W E S

0 250 500 1,000 1,500 Meters

SCALE 1:10,000

LEGEND

- HIGHLY SUITABLE LAND
- MODERATELY SUITABLE LAND
- MARGINAL SUITABLE LAND
- CURRENTLY NOT SUITABLE LAND
- PERMANENTLY NOT SUITABLE LAND
- Forest

- Settlement
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and
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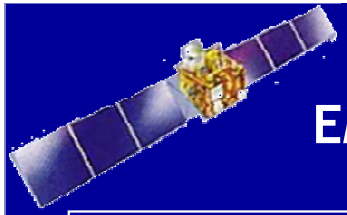
Geoinformatics Application in

Mahatma Gandhi NATIONAL RURAL EMPLOYMENT GUARANTEE SCHEME (NREGS) Digital Layer Generation

NIRD-NRSC Study



REMOTE SENSING & GIS INPUTS IN NATIONAL RURAL EMPLOYMENT GUARANTEE SCHEME (NREGS) NIRD-NRSC

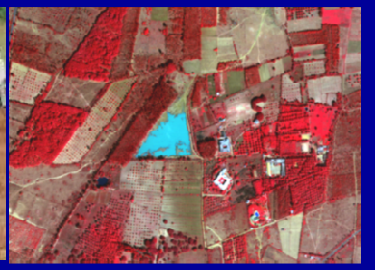
Spatial Technology

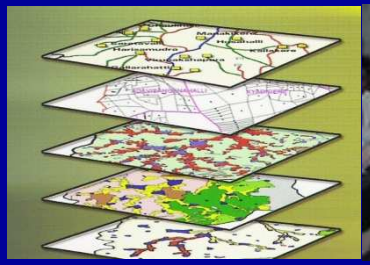
- Remote Sensing
- Geographical Information System

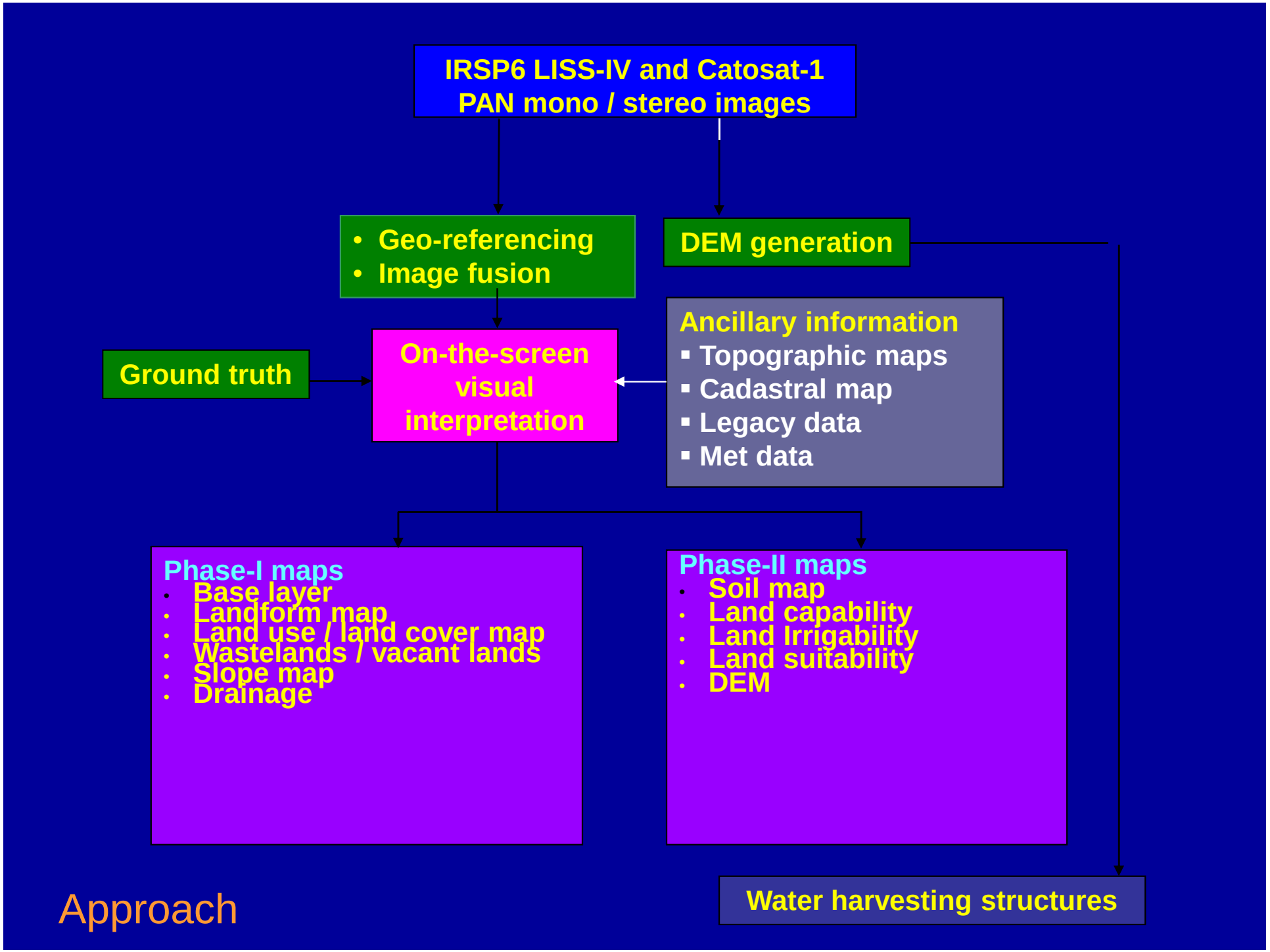
- Mapping
- Planning
- Monitoring & Evaluation
- Impact Assessment

Focus of NREGS

- Water conservation & water harvesting
- Drought proofing (afforestation etc.)
- Irrigation canals (micro & macro irrigation)
- Provision of irrigation to land owned by SC/ST/BPO
- Renovation of traditional water bodies/ desiltation
- Land development
- Flood control & protection works including drainage in waterlogged areas
- Rural connectivity to provide all-weather access and
- Any other work which may be notified by Central Govt. in consultation with the State Government.



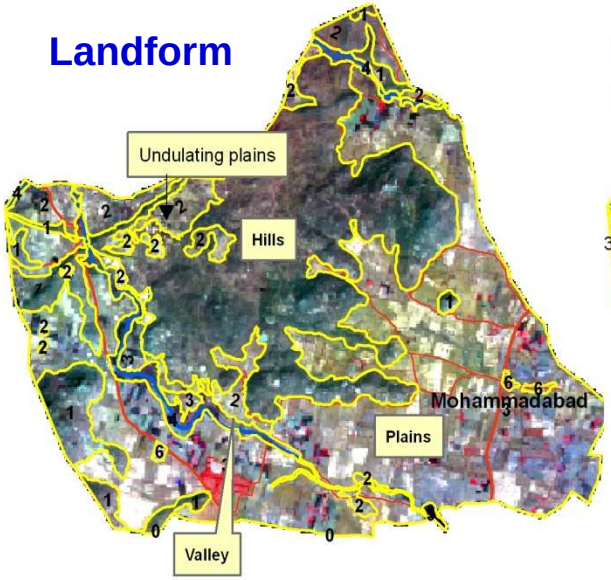



IRSP6 LISS-IV and Catosat-1
PAN mono / stereo images
• Geo-referencing
• Image fusion
DEM generation
Ancillary information
▪ Topographic maps
▪ Cadastral map
▪ Legacy data
▪ Met data
Ground truth
On-the-screen visual interpretation
Phase-I maps
· Base layer
· Landform map
· Land use / land cover map
· Wastelands / vacant lands
· Slope map
· Drainage
Phase-II maps
· Soil map
· Land capability
· Land Irrigability
· Land suitability
· DEM
Water harvesting structures

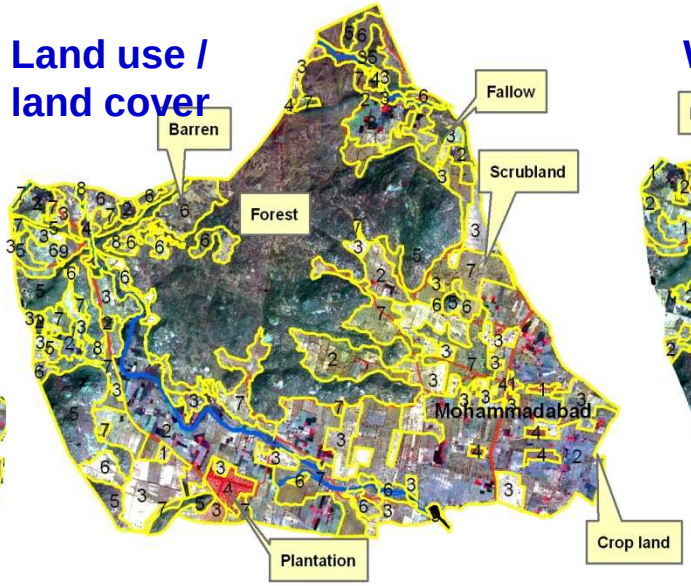
Approach

PRIMARY RESOURCE MAPS

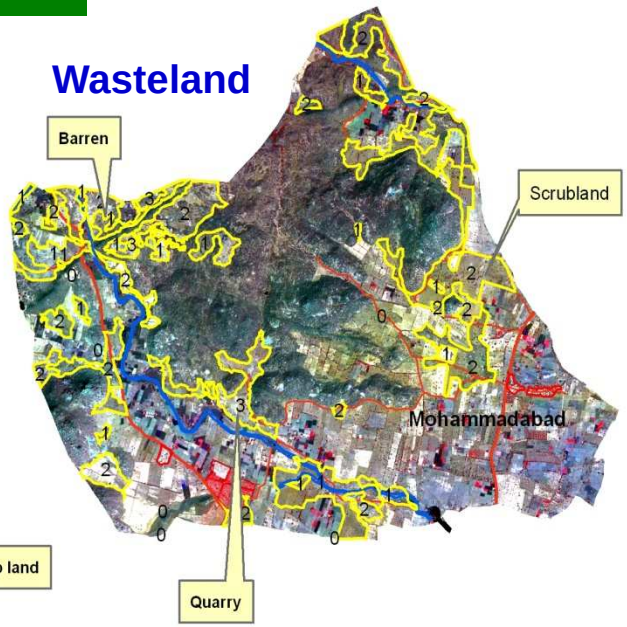
Landform



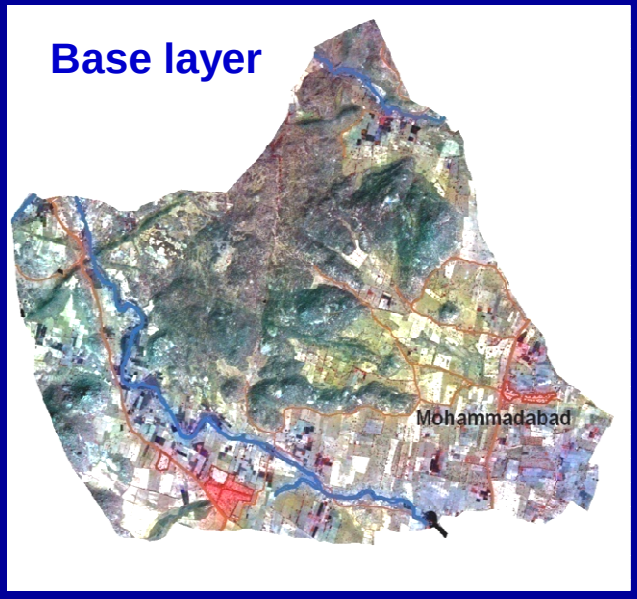
Land use / land cover



Wasteland



Base layer



SLOPE AND DRAINAGE MAP

Slope classes

1	Nearly level
2	Gently sloping
3	Moderately sloping
4	Mod. steeply to steeply sloping

- Drainage
- Road
- River / Stream
- Settlement

Land Use / Land Cover Map

Forest

Crop la

Plantation

Wasteland - Barren rocky

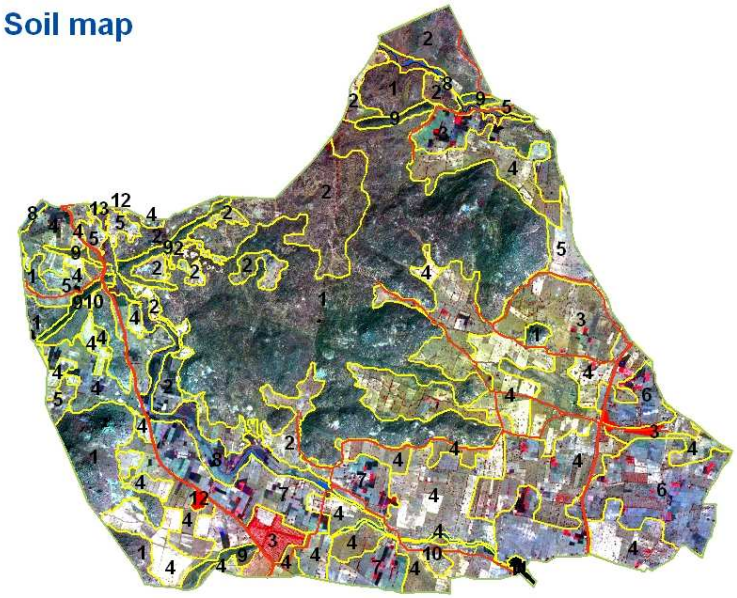
bland

LEGEND

Symbol	Land use
	Built up
	Agriculture – Crop land
	Agriculture – Fallow
	Agriculture – Plantation
	Reserved Forest
	Barren /Rocky
	Scrubland
	Quarry
	Waterbody

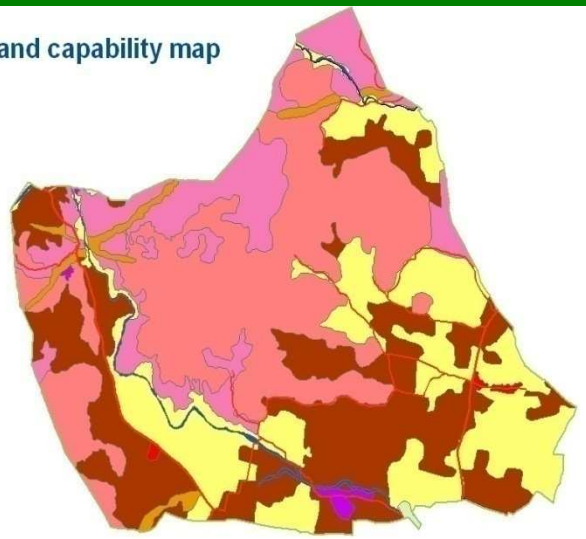
PRIMARY RESOURCE MAPS

Soil map



Map unit	Landscape unit	Taxonomic Classification
1	Hill	Loamy Skeletal Typic Ustorthents
2	Undulating plains	Loamy Skeletal Typic Haplustalfs
3	Slightly eroded plains	Fine Loamy Typic Haplustalfs
4	Moderately eroded plains	Coarse Loamy Typic Haplustepts
5	Severely eroded plains	Loamy skeletal Typic Haplustepts
6	Burried pediplain	Fine Vertic Haplustepts
7	Burried pediplain	Fine loamy Typic Haplustepts
8	Valley	Fine loamy Fluventic Haplustepts
9	Dyke	Loamy skeletal Lithic Ustorthents
10	Rock out crop	
11	Water body	
12	Settlement	
13	Quarry	

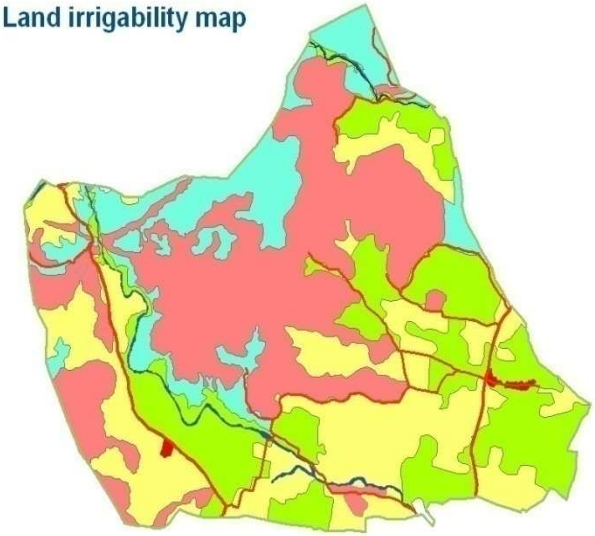
Land capability map



LEGEND

- Class II
- Class III
- Class IV
- Class VI
- Class VII
- Class VIII

Land irrigability map

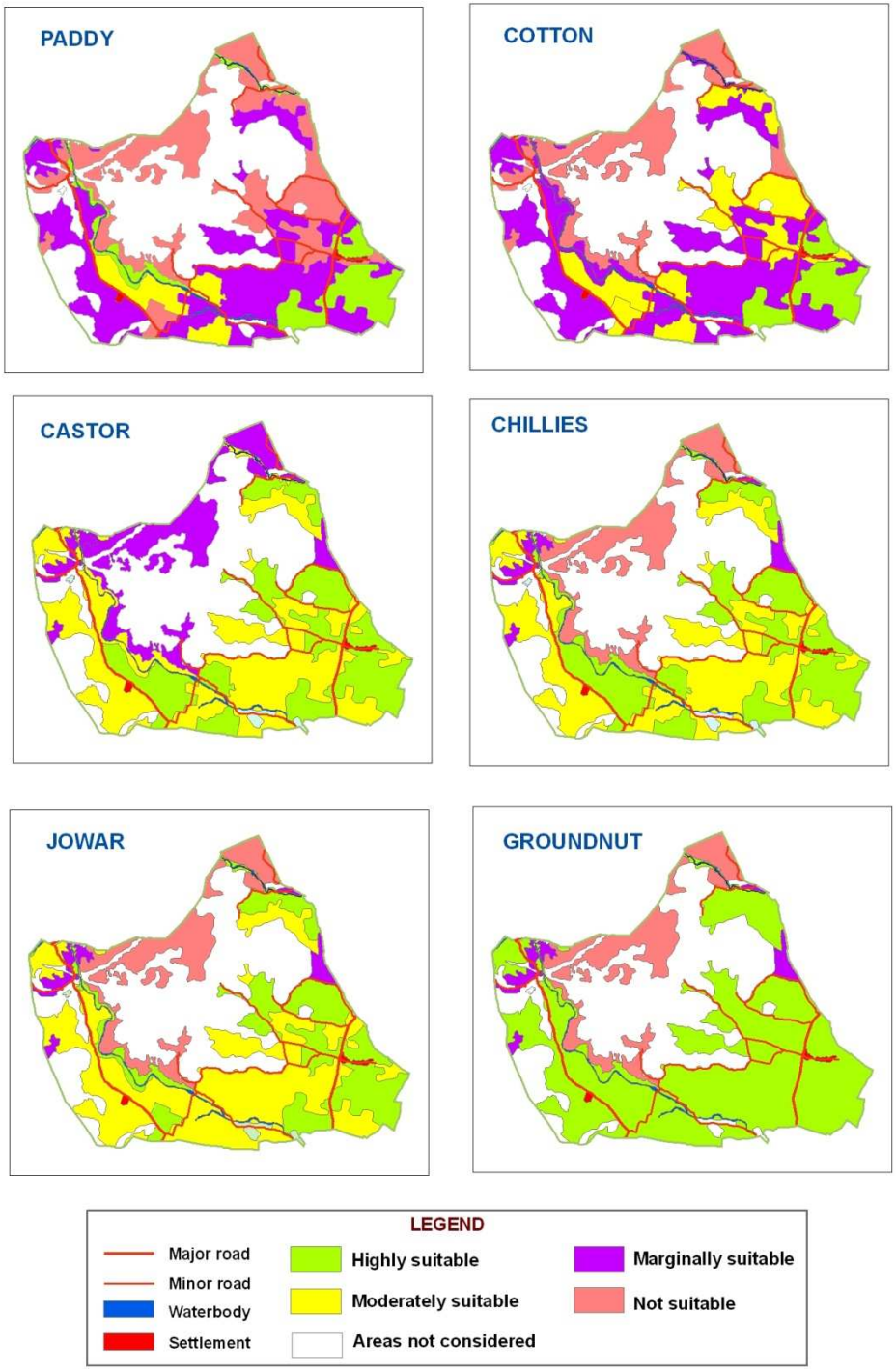


LEGEND

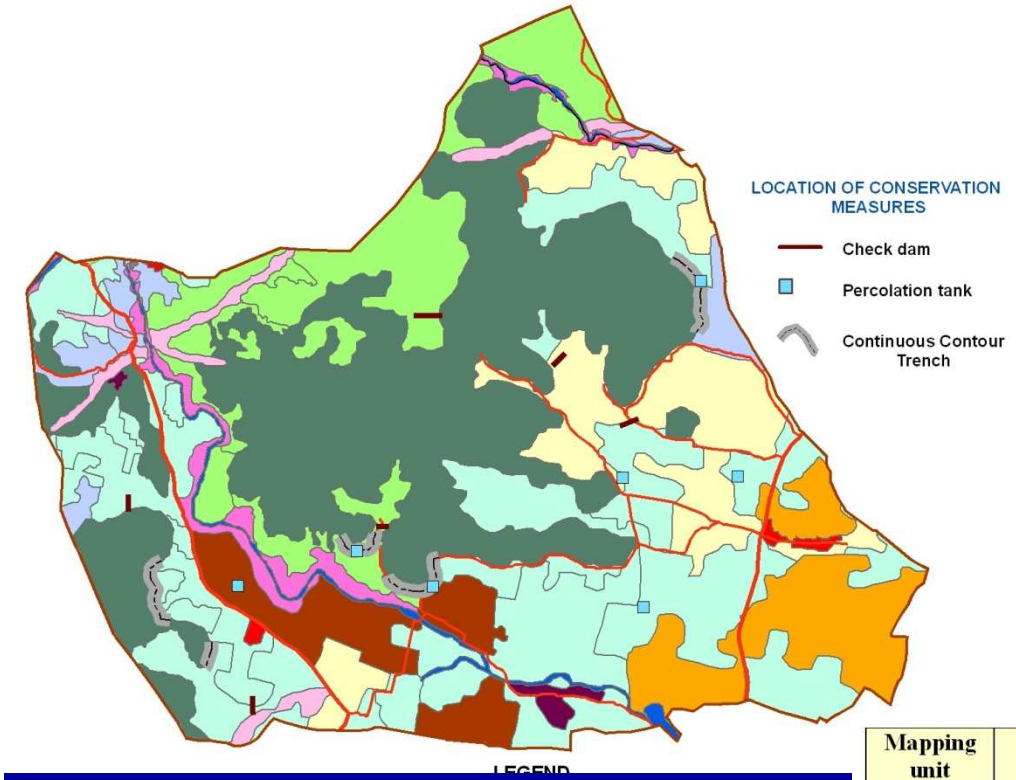
- Class-2: Sitable for Irrigation with slight limitation
- Class-3: Sitable for Irrigation with moderate limitation
- Calss 4: Unsuitable for Irrigable
- Class-6: Unsuitable for Irrigable

Waterbody — Major road

Settlement — Minor road


PADDY
COTTON
CASTOR
CHILLIES
JOWAR
GROUNDNUT
LEGEND
Major road
Minor road
Waterbody
Settlement
Highly suitable
Moderately suitable
Areas not considered
Marginally suitable
Not suitable

Suggested Intervention

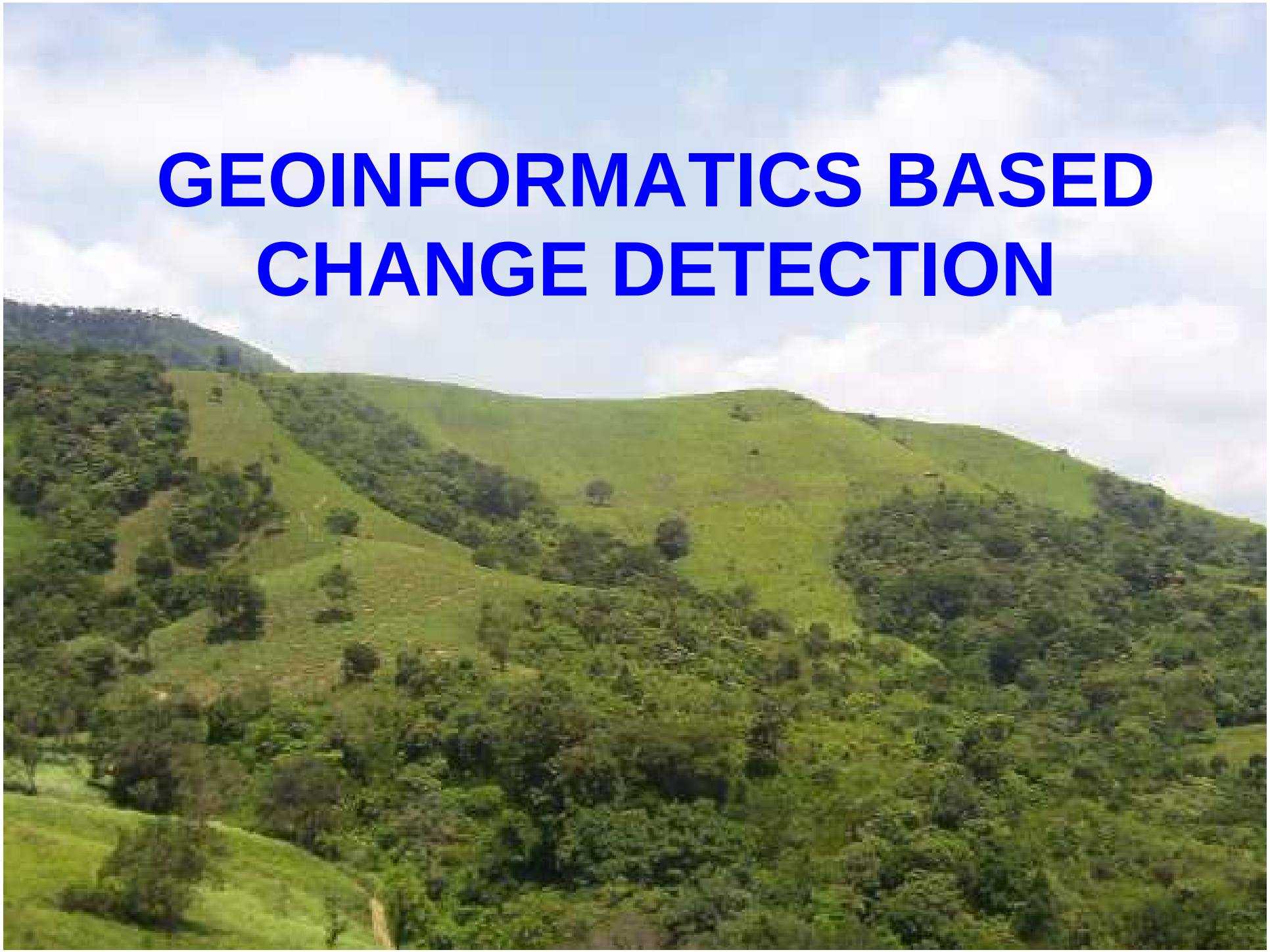


Mapping unit	Soil water conservation measures	Existing / alternate crops suggested
1	Afforstation, Silvipastue	Jatropha (S3)
2	Contour cultivation and bunding, percolation tanks	Castor (S3), Ley farming, Jatropha Plantation, Agro-forestry system, Agri-horticultural system
3	Crop rotation, strip cropping	Castor, Chillies, Jowar, Ground nut and Maize (S1) Cotton, Paddy, Red gram (S2)
4	Contour cultivation and bunding, percolation tanks	Ground nut (S1), Castor, Chillies, Jowar, and Maize (S2), Cotton, Paddy, Red gram (S3)
5	Contour cultivation and bunding, percolation tanks	Jatropha (S2), Castor, Chillies, Jowar, Ground nut, Red gram, Maize (S3), Agri-horticultural system, Jatropha Plantation, Ley farming
6	Crop rotation, strip cropping, ridge & furrow method	Castor, Chillies, Jowar, Ground nut, Maize, Cotton, Paddy, Red gram (S1)
7	Crop rotation, strip cropping, ridge & furrow method	Castor, Chillies, Ground nut and Maize (S1) Cotton, Paddy, Red gram, Jowar (S2), Agri-horticultural system
8	Crop rotation, strip cropping	Chillies, Paddy, Jowar, Ground nut (S1), Maize, Castor, Red gram (S2), Cotton (S3), Agri-horticultural system
9	Afforstation, Silvipastue	Jatropha Plantation, Agro-forestry system

Waterbody
Rockout crop
Major road
Settlement
Quarry
Minor road

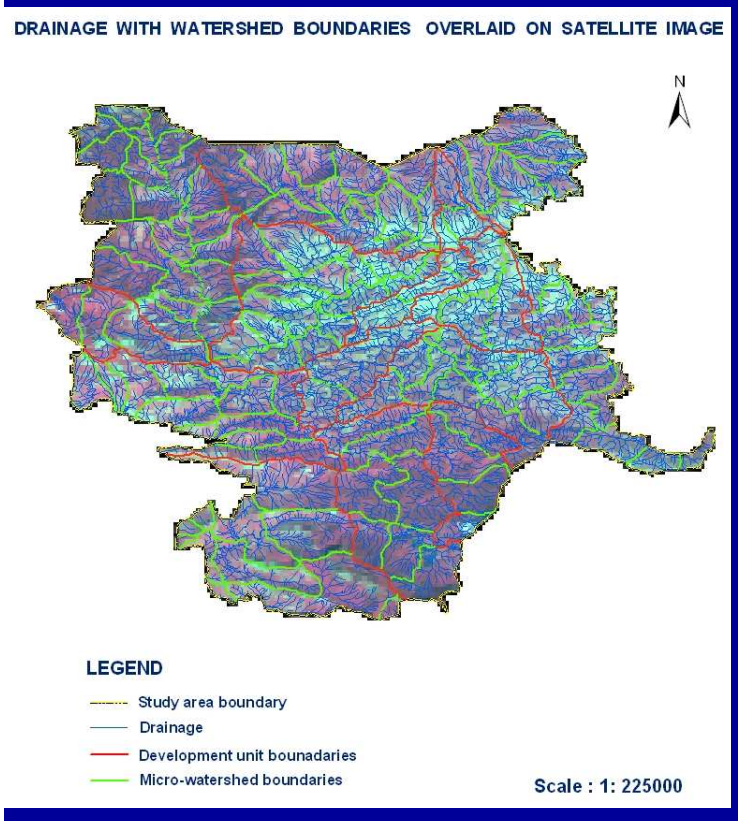
Interaction with local people

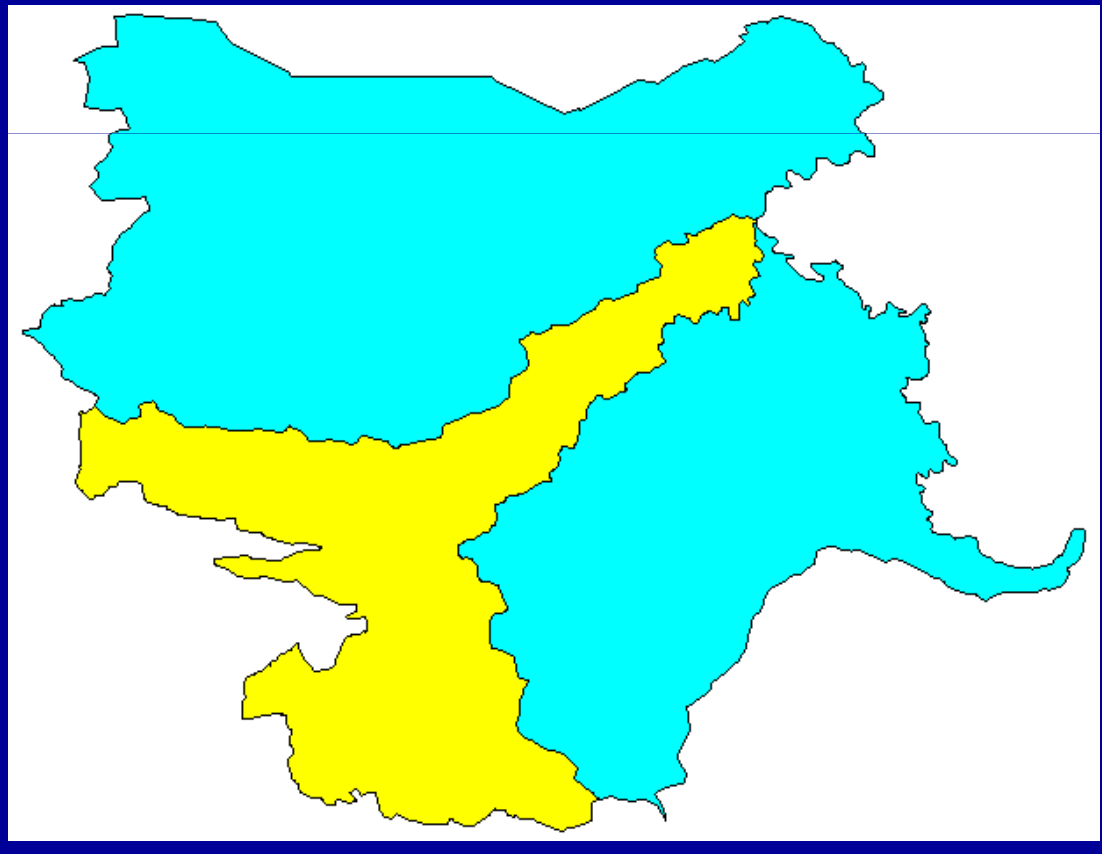
GEOINFORMATICS BASED CHANGE DETECTION



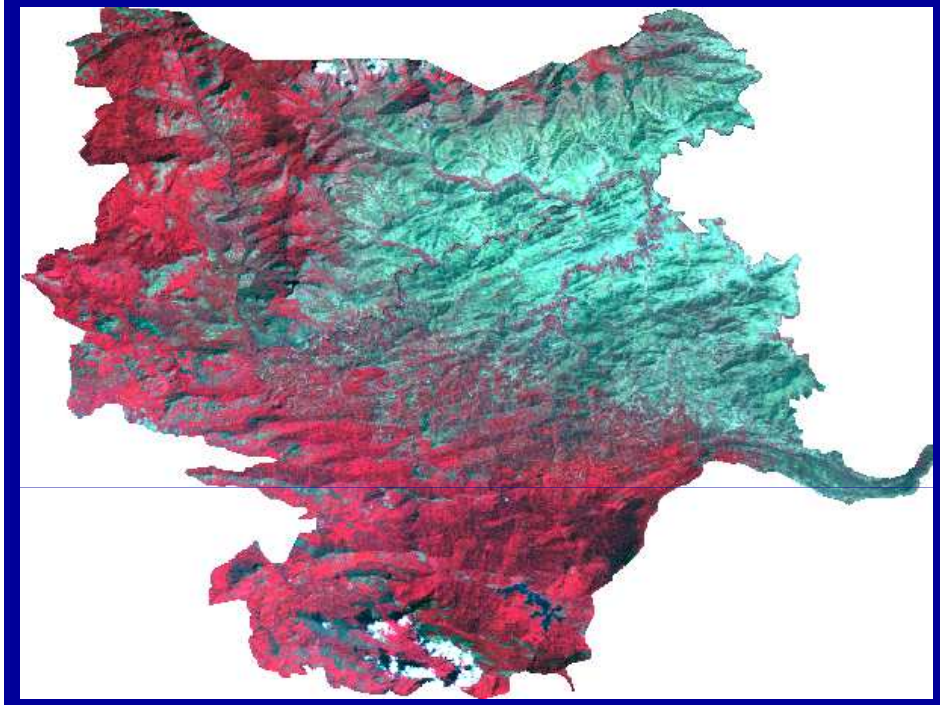
OBJECTIVES

- TO STUDY CHANGES IN VEGETATION AREAS IN ATTA PPADY BLOCK OF KERALA.
- TO IDENTIFY THE CHANGES IN DENSITY OF VEGETATION
- TO UNDERSTAND THE TEMPORAL CHANGES

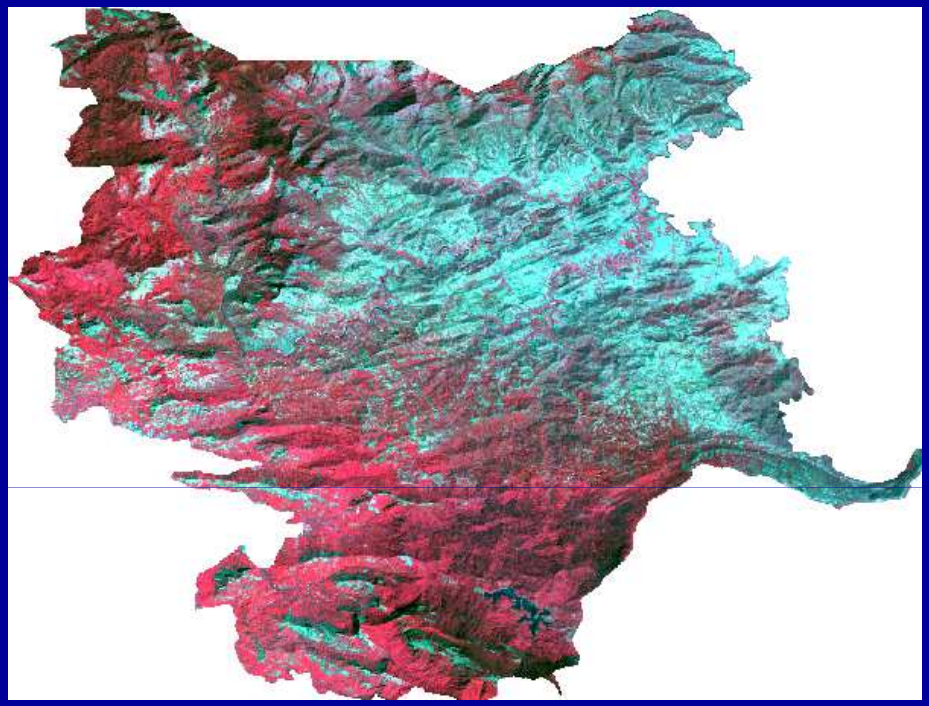




ATTAPPADY BLOCK, KERALA

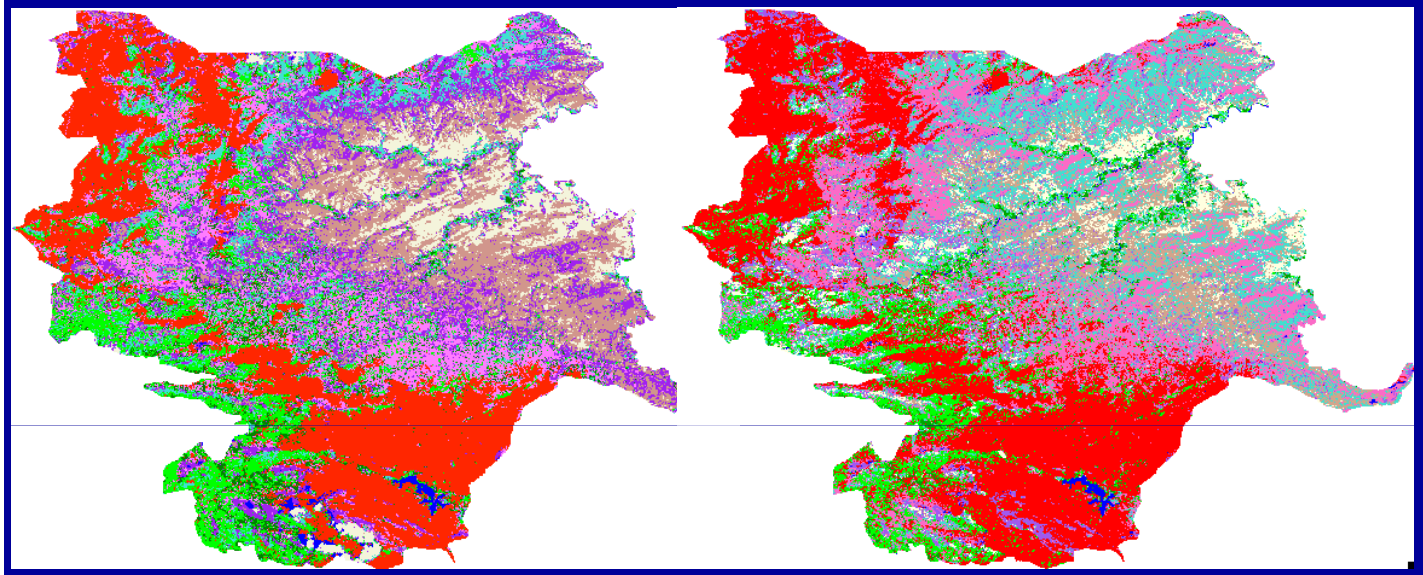


FALSE COLOR COMPOSITE OF ATTAPPADY
IRS IC LISS III ;1ST MARCH 2001
SCALE : 1:250000



FALSE COLOR COMPOSITE OF ATTAPPADY
IRS IC LISS III ; 8TH FEBRUARY 2005
SCALE : 1:250000

CLASSIFIED IMAGE OF ATTAPPADY 2001 & 2005



2001

2005

- DENSE FOREST
- OPEN FOREST
- DEGRADED FOREST
- AGRIL. CROPS
- AGRIL. PLANTATION
- LAND WITH SCRUB
- LAND WITHOUT SCRUB
- BARREN AREA WITH / WITHOUT ROCKS
- WATER

AREA UNDER DIFFERENT FEATURES IN ATTAPPADY

NAME OF THE CLASS	2001 - AREA IN SqKm.	2005 - AREA IN SqKm.	CHANGE
Agricultural crops	84.69	70.34	-14.35
Agricultural plantation	40.63	20.14	-20.49
Dense forest	190	234.84	+44.84
Open forest	105	156.77	+51.77
Degraded forest	127.87	51.27	-76.60
Land with scrub	61.24	135.33	+74.09
Land without scrub	124.23	73.37	-50.86
Water bodies	4	4.6	+0.60
Barren rocky area	52	43	-9.00
Total	789.66	789.66	


Thank you