REMOTE SENSING & GIS IN WATER RESOURCES

Paper code: 08MTRS32

Units–9 : Integrated Watershed Development and Management

Unit-10 : Case studies

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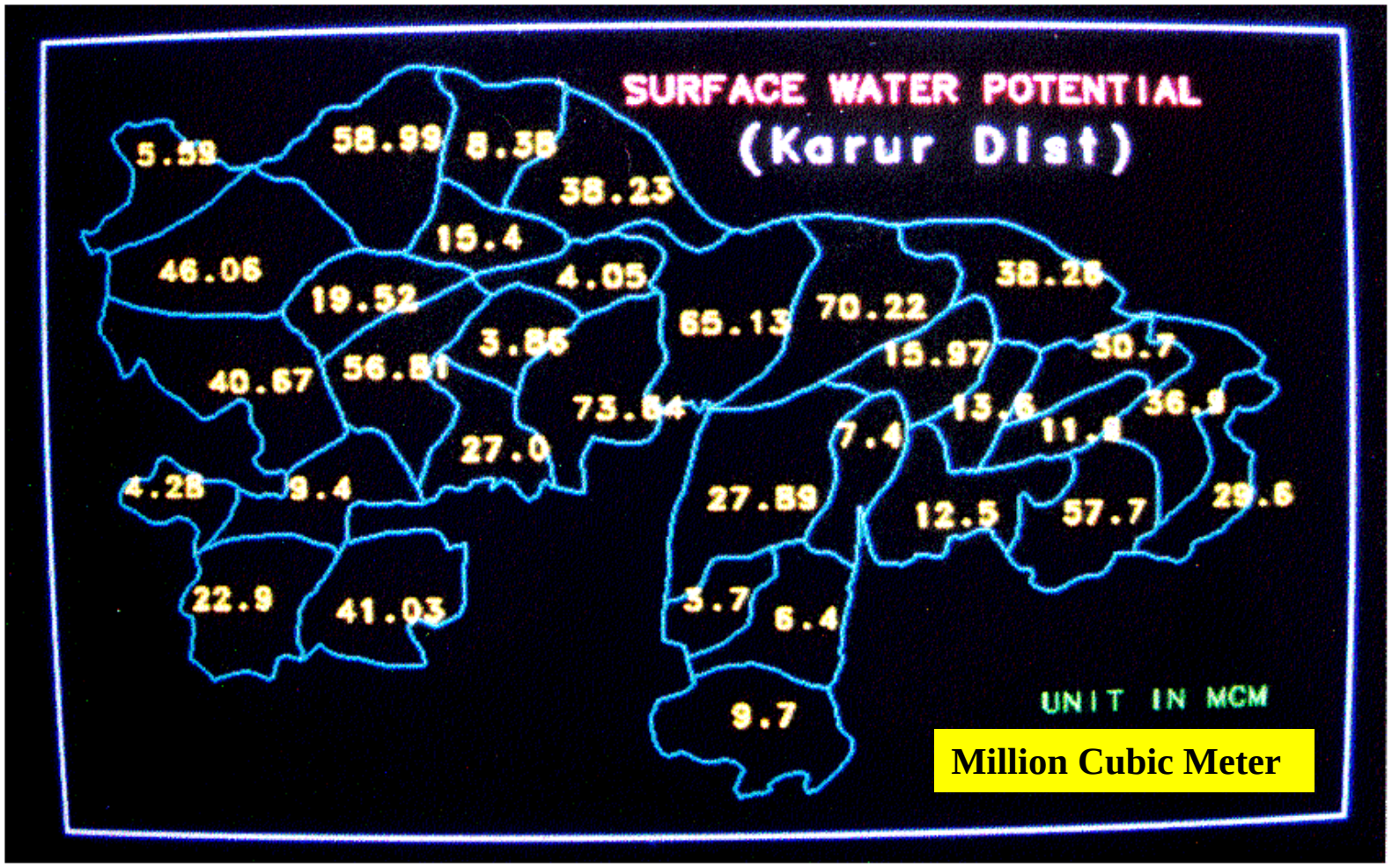
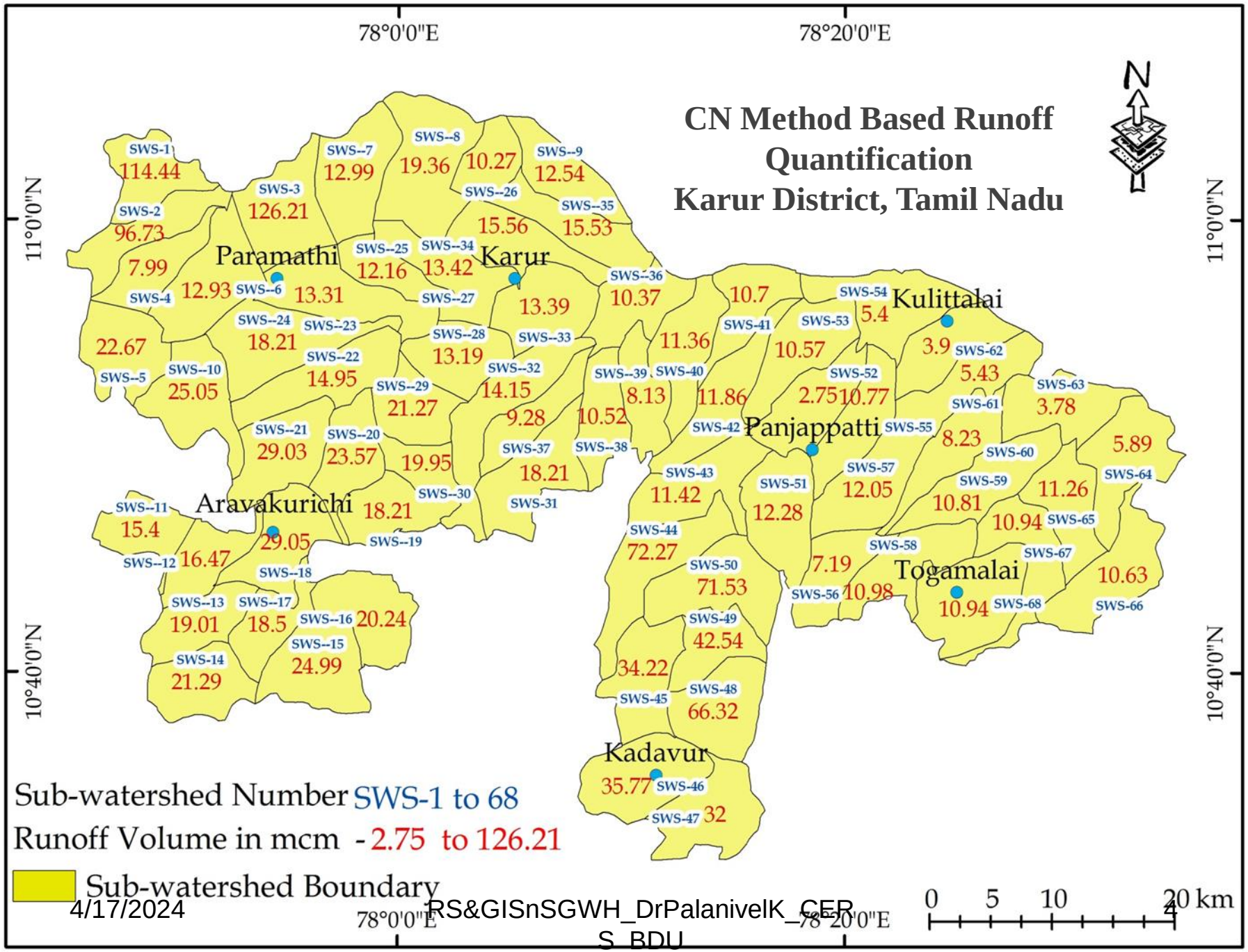
Tiruchirappalli

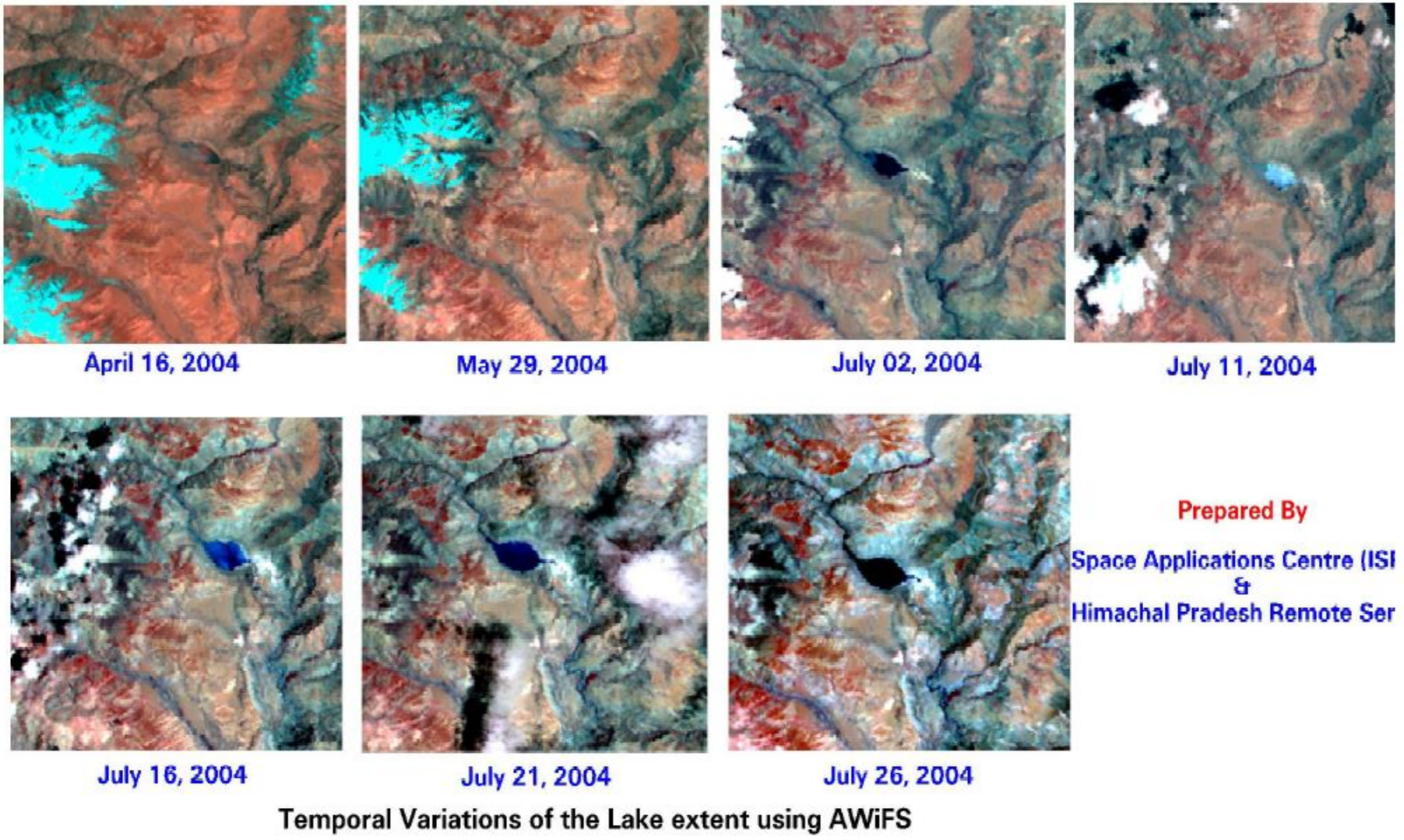
28 15:47

08MTRS-32: REMOTE SENSING & GIS IN WATER RESOURCES

1. **Surface Water Resources:** Hydrological Cycle: (Rainfall, Infiltration, Runoff, Evapotranspiration) – Global distribution of Surface Water bodies – Surface Water Budgeting/Quantification using Satellite Infrared data – Spectral Response Pattern of Water.
2. **Drainage morphometric analysis:** Drainage mapping and analysis (from Satellite data, Automated Drainage Mapping using DEM, Drainage Morphometric Analysis) Water Quality Mapping and Monitoring using Remote Sensing.
3. **Groundwater :** Basic Principles of Groundwater Hydrology
4. **Crystalline Aquifer Systems:** Characteristics, Mapping of Crystalline Aquifer Systems, Lithological, Regolith and Fracture Pattern Mapping and Modelling, Geophysical Surveys and GIS based Geospatial modelling of Crystalline Aquifer System
5. **Sedimentary Aquifer Systems:** Characteristics, Artesian and subarteisian conditions, Mapping Techniques using Geoinformatics.
6. **Geomorphic Aquifer System:** Hydro geomorphic mapping through Satellite Raw and Digitally processed data – Ground water quality (Rock – water interaction, pollution, etc).
7. **Natural and Artificial Recharge:** Site Selection for Natural and Artificial Recharge on Geological criteria, Detection of Site Specific Mechanism for recharge through GIS Applications)
8. **Groundwater Modelling:** Geospatial Modelling of Groundwater Systems – Stochastic – Flow – Linear – Finite - element Modelling.
9. **Integrated Watershed Development and Management:** Conjunctive analysis of Surface and Groundwater – GIS based Watershed wise Water budgeting – Integrated Watershed Planning – Water Resources Information System.
10. **Case studies:** Remote sensing and GIS in water resources – Case studies.


SURFACE WATER POTENTIAL
(Karur Dist)
5.59
58.99
8.38
38.23
15.4
46.06
19.52
4.05
38.28
70.22
65.13
3.86
15.97
30.7
40.67
56.81
73.84
13.6
36.9
11.8
7.4
27.0
4.28
9.4
27.89
12.5
57.7
29.6
22.9
41.03
3.7
6.4
9.7
UNIT IN MCM
Million Cubic Meter


CN Method Based Runoff Quantification
Karur District, Tamil Nadu
N
78°0'0"E
78°20'0"E
11°0'0"N
10°40'0"N
Paramathi
Karur
Aravakurichi
Kulittalai
Panjappatti
Togamalai
Kadavur
SWS-1 114.44
SWS-2 96.73
SWS-3 126.21
SWS-4 7.99
SWS--5 22.67
SWS--6 12.93
SWS--7 12.99
SWS--8 19.36
SWS--9 10.27
SWS-26 12.54
SWS--10 25.05
SWS--11 15.4
SWS--12 16.47
SWS--13 19.01
SWS--14 21.29
SWS--15 18.5
SWS--16 24.99
SWS--17 20.24
SWS--18 18.21
SWS--19 29.05
SWS--20 23.57
SWS--21 29.03
SWS--22 18.21
SWS--23 14.95
SWS--24 21.27
SWS--25 12.16
SWS--27 13.42
SWS--28 13.19
SWS--29 14.15
SWS--30 9.28
SWS--31 18.21
SWS--32 19.95
SWS--33 13.39
SWS--34 15.56
SWS--35 15.53
SWS--36 10.37
SWS--37 18.21
SWS--38 10.52
SWS--39 8.13
SWS-40 11.86
SWS-41 11.36
SWS-42 10.7
SWS-43 11.42
SWS-44 72.27
SWS-45 34.22
SWS-46 35.77
SWS-47 32
SWS-48 66.32
SWS-49 42.54
SWS-50 71.53
SWS-51 12.28
SWS-52 2.75
SWS-53 10.57
SWS-54 5.4
SWS-55 10.77
SWS-56 7.19
SWS-57 12.05
SWS-58 10.98
SWS-59 10.81
SWS-60 8.23
SWS-61 2.75
SWS-62 3.9
SWS-63 5.43
SWS-64 3.78
SWS-65 11.26
SWS-66 10.94
SWS-67 10.94
SWS-68 10.63
Sub-watershed Number SWS-1 to 68
Runoff Volume in mcm - 2.75 to 126.21
Sub-watershed Boundary
0 5 10 20 km



Temporal Variations of the Lake extent using AWiFS

The quantum of blocked water stored in this temporary reservoir was estimated later to understand the danger and the official were trained by the SAC, Ahmedabad on this methodology & how to safeguard the people in its downstream.

14th Aug. 2004

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STUDY - 6

Inter-Watershed Transfer

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- After working out the surface water potential, groundwater potential, natural recharge, artificial recharge was done to suggest strategies for inter-watershed transfer

- The aerial extent of rechargeable formations, volume of rechargeable formations total thickness of unsaturated zone, volume of recharge formations available for recharge, volume of allowable recharge etc were worked out.

- To workout the volume of rechargeable formations, the aerial extent of rechargeable formations was multiplied with the depth to bedrock data. The water level data was multiplied with the area of artificially rechargeable formations to arrive the volume of rechargeable formations available for recharge.

- As the area exposes mostly Gneisses, the storage coefficient of 0.23 or 23 % was taken as allowable storage. The data arrived at column 7 was multiplied with 0.23 to arrive the volume of allowable recharge (column 8)

- The total water potential available as run-off was less than the volume of allowable recharge (column 8) the said watershed was declared as deficit watershed. Instead, if the run-off was more than volume of allowable recharge, then it was declared as water surplus watershed

ANNEXURE - II

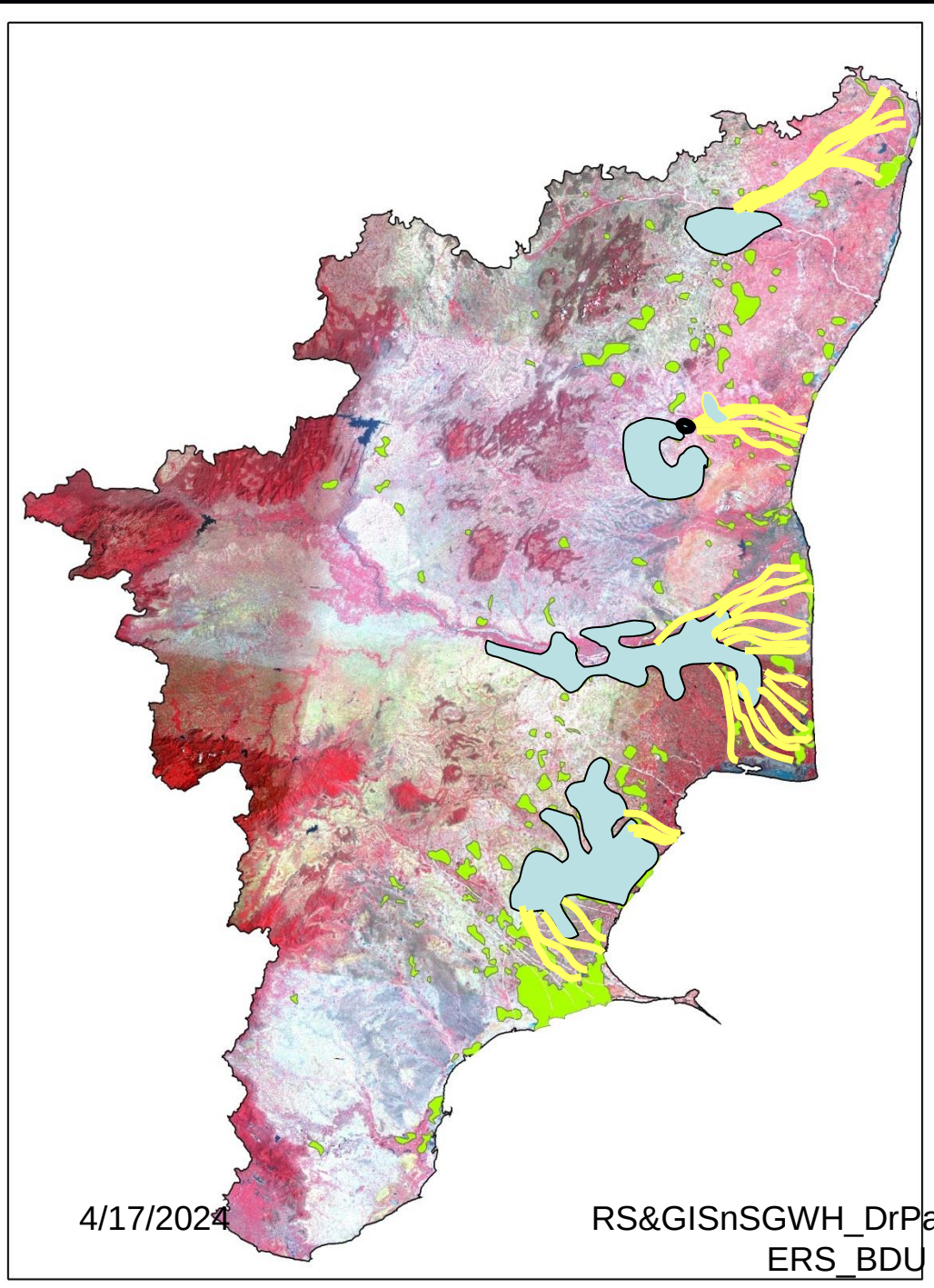
INTER WATERSHED TRANSFER

1 SL.No	2 WATER-SHED No	3 SURFACE WATER POTENTIAL	4 AREA OF ARTFICIAL RECHARGEABLE FORMATIONS IN MM^2	5 VOLUME OF RECHARGEABLE FORMATIONS IN MCM	6 THICKNESS OF UNSATU-RATED ZONE IN M	7 VOLUME OF RECHARGEABLE FORMATIONS AVAILABLE FOR RECHARGE IN MCM	8 VOLUME OF ALLOWABLE RECHARGE IN MCM (Storage coefficient)	9 REMARKS
1	1	5.590	58.834	2353.360	9.00	529.506	121.786	DEFICIT
2	2	58.990	24.613	246.130	8.50	209.211	48.119	SURPLUS
3	3	40.690	48.353	1160.472	4.90	236.930	54.494	DEFICIT
4	4	19.520	39.254	863.588	8.50	333.659	76.742	DEFICIT
5	5	56.810	20.481	491.544	7.50	153.608	35.330	SURPLUS
6	6	15.400	26.575	797.250	9.00	239.175	55.010	DEFICIT
7	7	46.060	71.908	2588.688	11.50	826.942	190.197	DEFICIT
8	8	4.280	22.798	1094.304	8.50	193.783	44.570	DEFICIT
9	9	9.400	24.909	647.634	10.00	249.090	57.291	DEFICIT
10	10	27.000	39.173	783.460	8.00	313.384	72.078	DEFICIT
11	11	22.900	4.233	186.252	11.00	46.563	10.709	SURPLUS
12	12	41.030	68.298	1434.258	11.50	785.427	180.648	DEFICIT
13	13	8.380	15.186	425.208	12.00	182.232	41.913	DEFICIT
14	14	38.230	15.074	361.776	14.00	211.036	48.538	DEFICIT
15	15	4.050	28.877	721.925	12.00	346.524	79.701	DEFICIT
16	16	3.860	12.925	361.900	9.50	122.788	28.241	DEFICIT
17	17	73.640	43.443	868.860	9.00	390.987	89.927	DEFICIT
18	18	65.130	51.270	1230.480	10.00	512.700	117.921	DEFICIT
19	19	70.220	39.181	940.344	9.00	352.629	81.105	DEFICIT
20	20	38.260	12.398	347.144	10.00	123.980	28.515	SURPLUS

ANNEXURE - II (Contd...)

INTER WATERSHED TRANSFER

1 SL.No	2 WATER-SHED No	3 SURFACE WATER POTENTIAL	4 AREA OF ARTFICIAL RECHARGEABLE FORMATIONS IN MM^2	5 VOLUME OF RECHARGEABLE FORMATIONS IN MCM	6 THICKNESS OF UNSATU-RATED ZONE IN M	7 VOLUME OF RECHARGEABLE FORMATIONS AVAILABLE FOR RECHARGE IN MCM	8 VOLUME OF ALLOWABLE RECHARGE IN MCM (Storage coefficient)	9 REMARKS
21	21	15.970	52.453	839.248	10.50	550.757	126.674	DEFICIT
22	22	13.600	44.320	975.040	11.00	487.520	112.130	DEFICIT
23	23	36.900	81.835	2618.720	10.50	859.268	197.632	DEFICIT
24	24	30.700	30.375	364.500	11.00	334.125	76.849	DEFICIT
25	25	11.900	27.099	541.980	12.50	338.738	77.910	DEFICIT
26	26	27.890	81.835	1964.040	8.50	695.598	159.988	DEFICIT
27	27	7.400	58.848	1647.660	9.00	529.605	121.809	DEFICIT
28	28	3.700	2.163	69.216	7.00	15.141	3.482	SURPLUS
29	29	6.400	50.991	1733.694	7.50	382.433	87.960	DEFICIT
30	30	9.700	3.908	132.872	6.50	25.402	5.842	SURPLUS
31	31	12.500	59.989	2159.604	9.50	569.896	131.076	DEFICIT
32	32	57.700	30.963	743.112	11.50	356.075	81.897	DEFICIT
33	33	29.600	5.325	127.800	9.50	50.588	11.635	SURPLUS



DIVERSION OF FLOOD THROUGH

BURIED RIVERS

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STUDY - 7

FLOOD WATER HARVESTING

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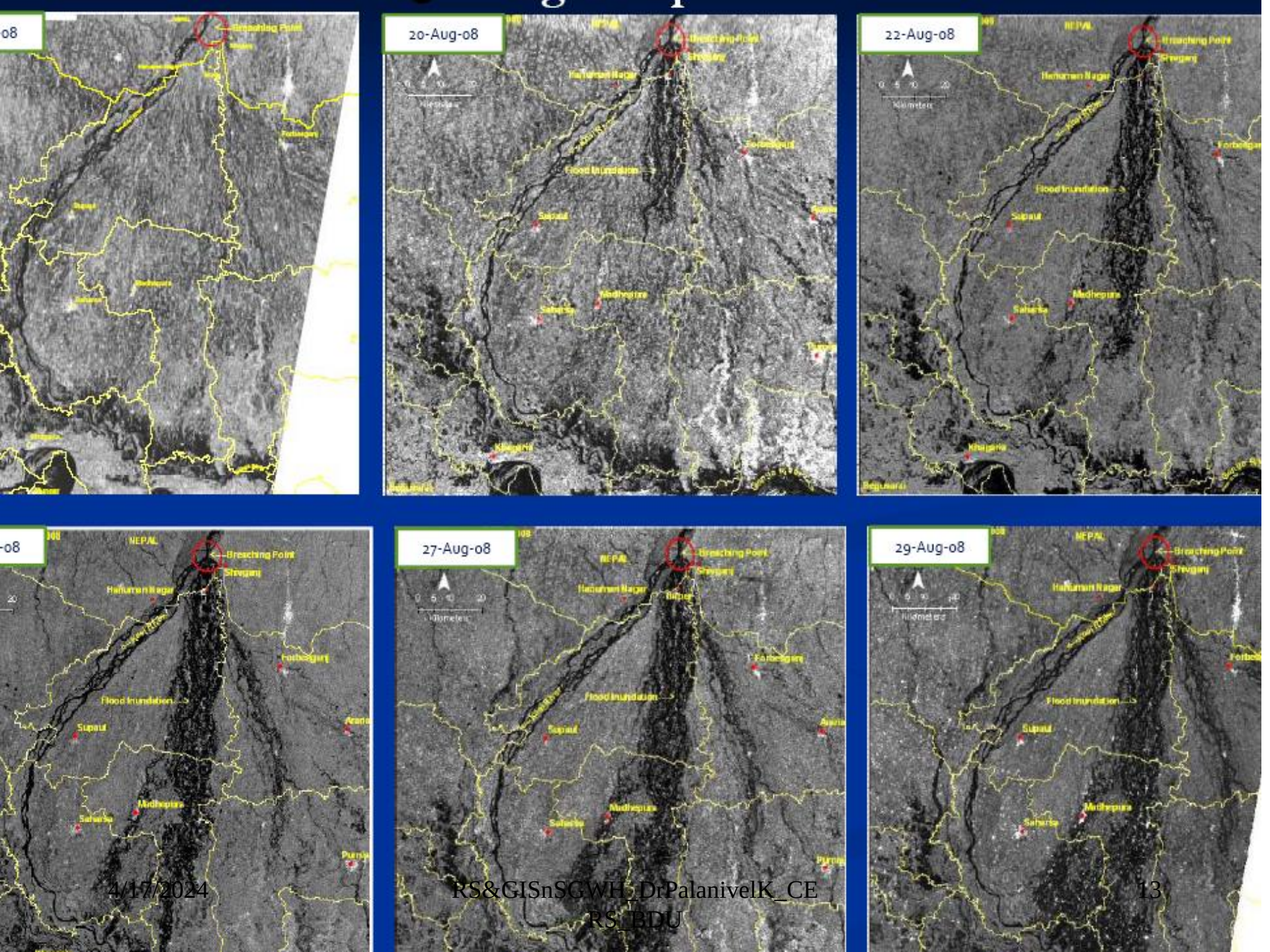
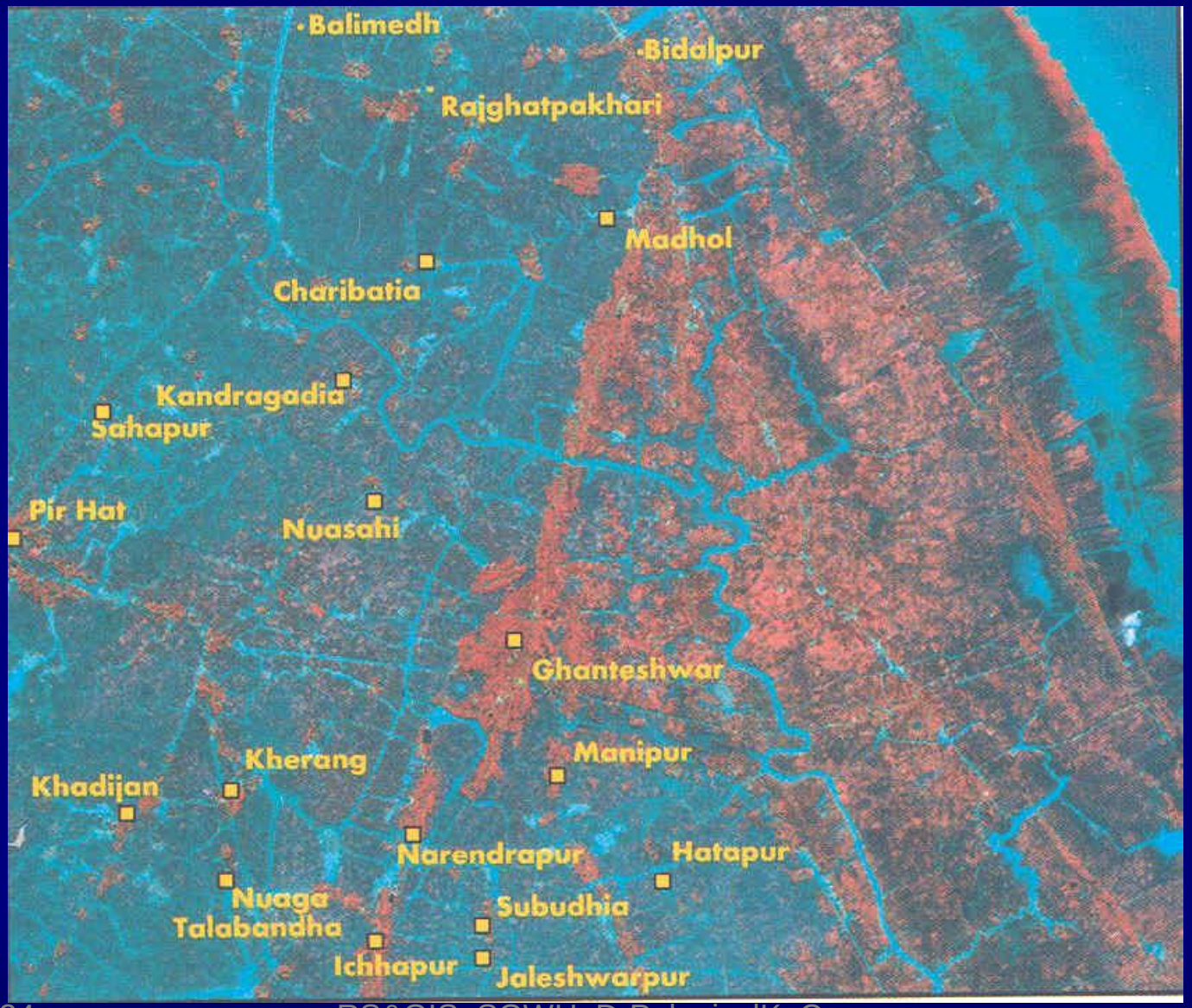

20-Aug-08
22-Aug-08
27-Aug-08
29-Aug-08
NEPAL
Breaching Point
Shivganj
Hanuman Nagar
Supaul
Madhepura
Saharsa
Purnia
Araria
Forbesganj
Flood Inundation
Kilometers

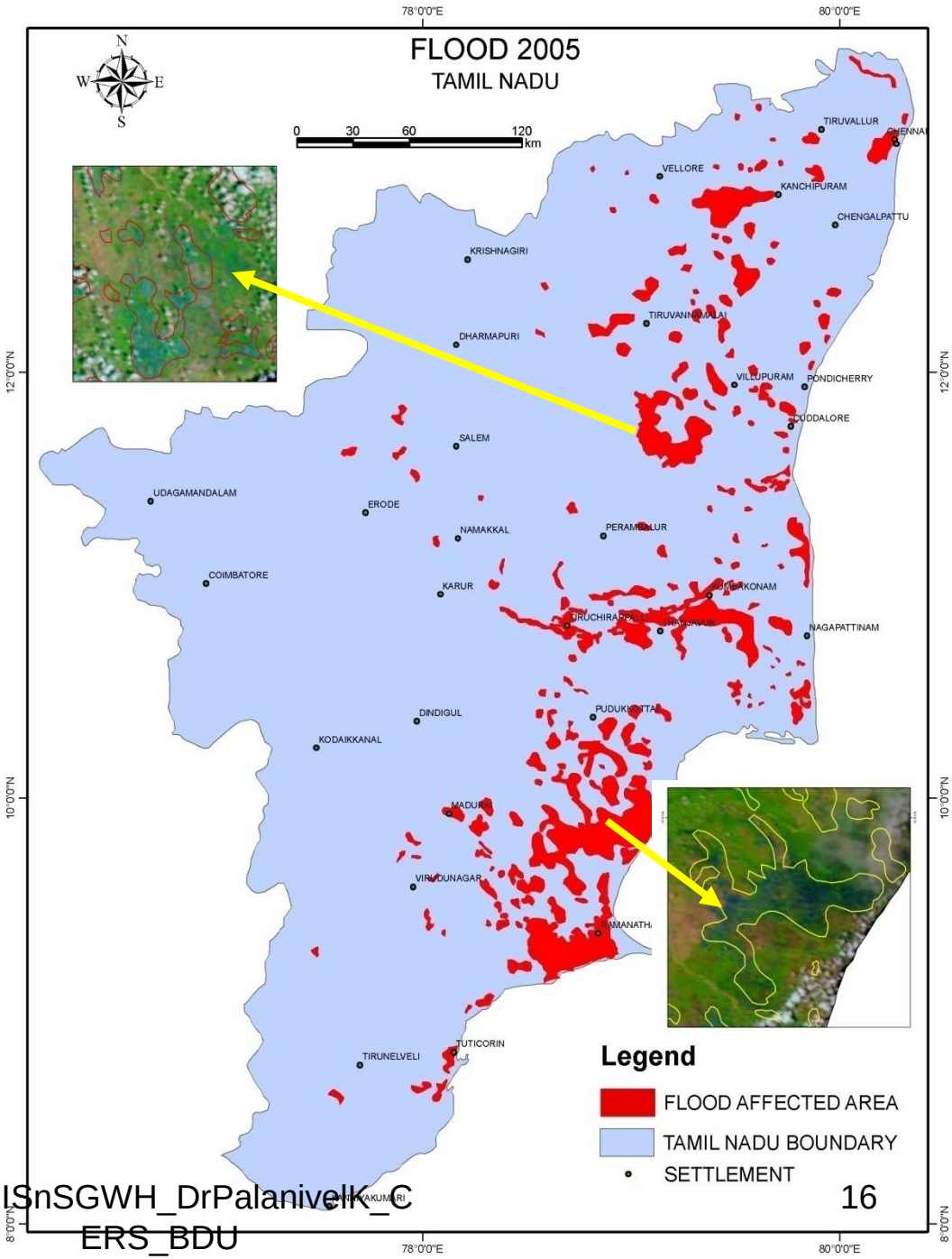
RADARSAT – ORISSA – POST – CYCLONE



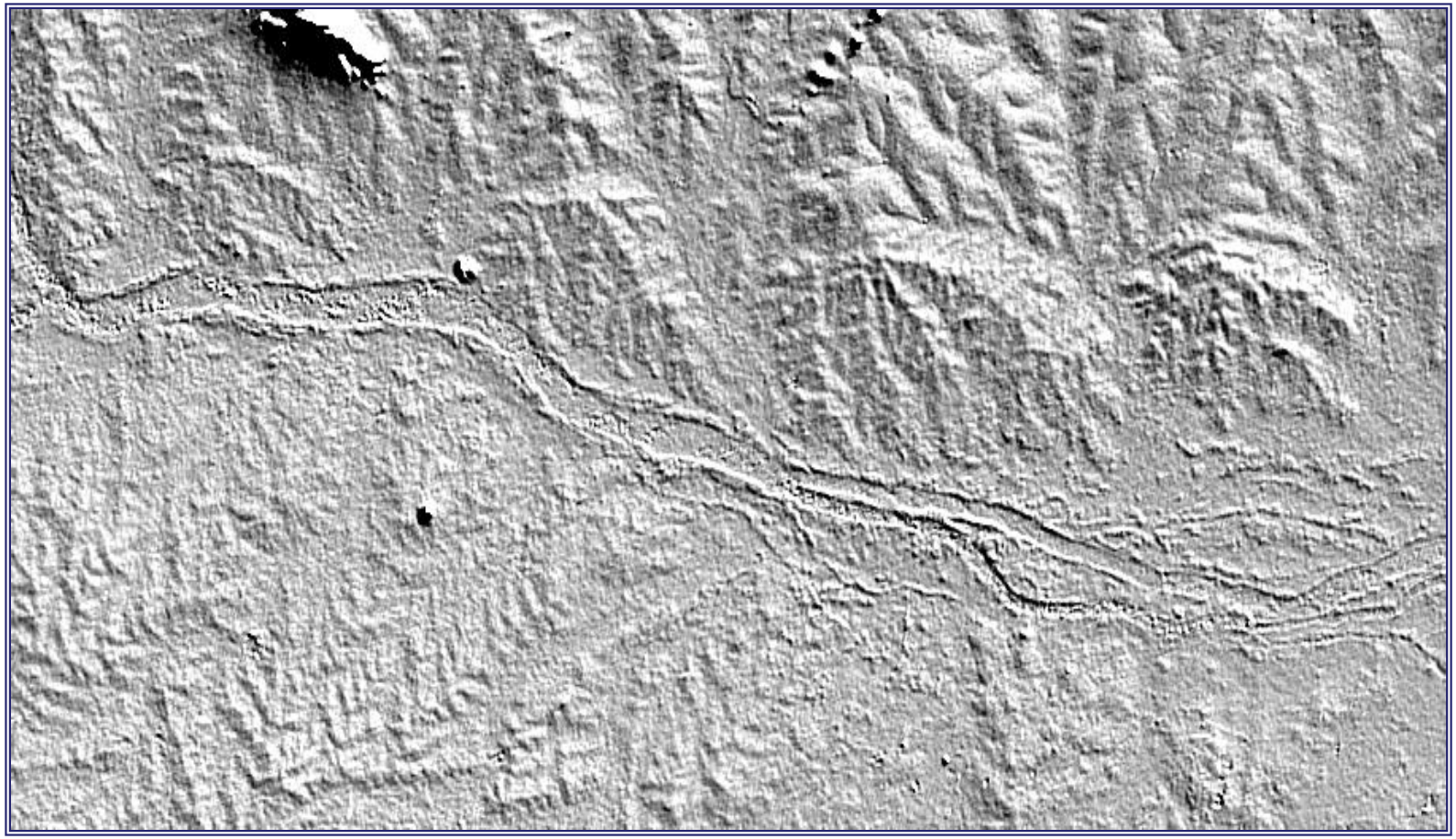
Disaster due to Flooding

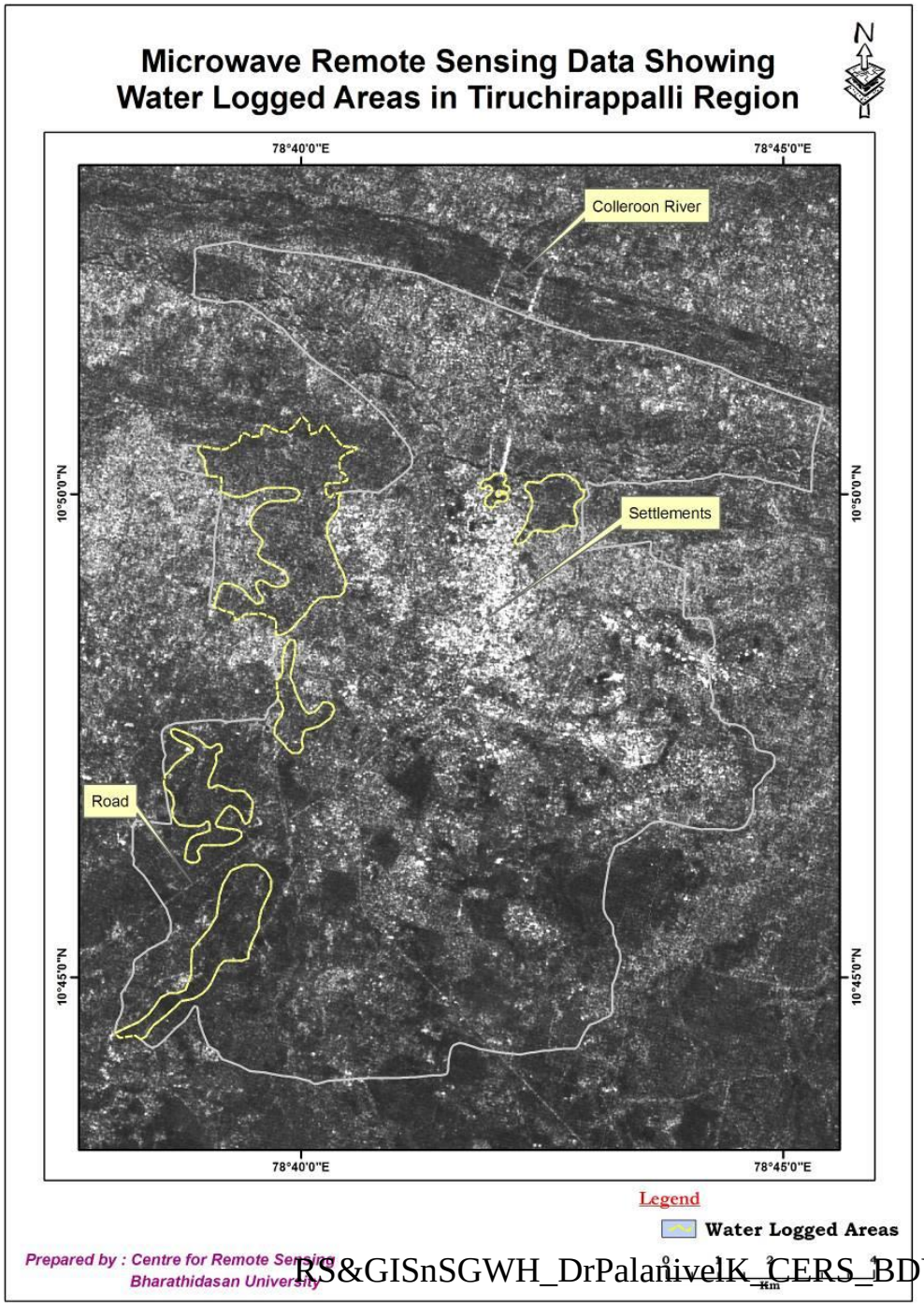
Flooded areas in Tamil Nadu

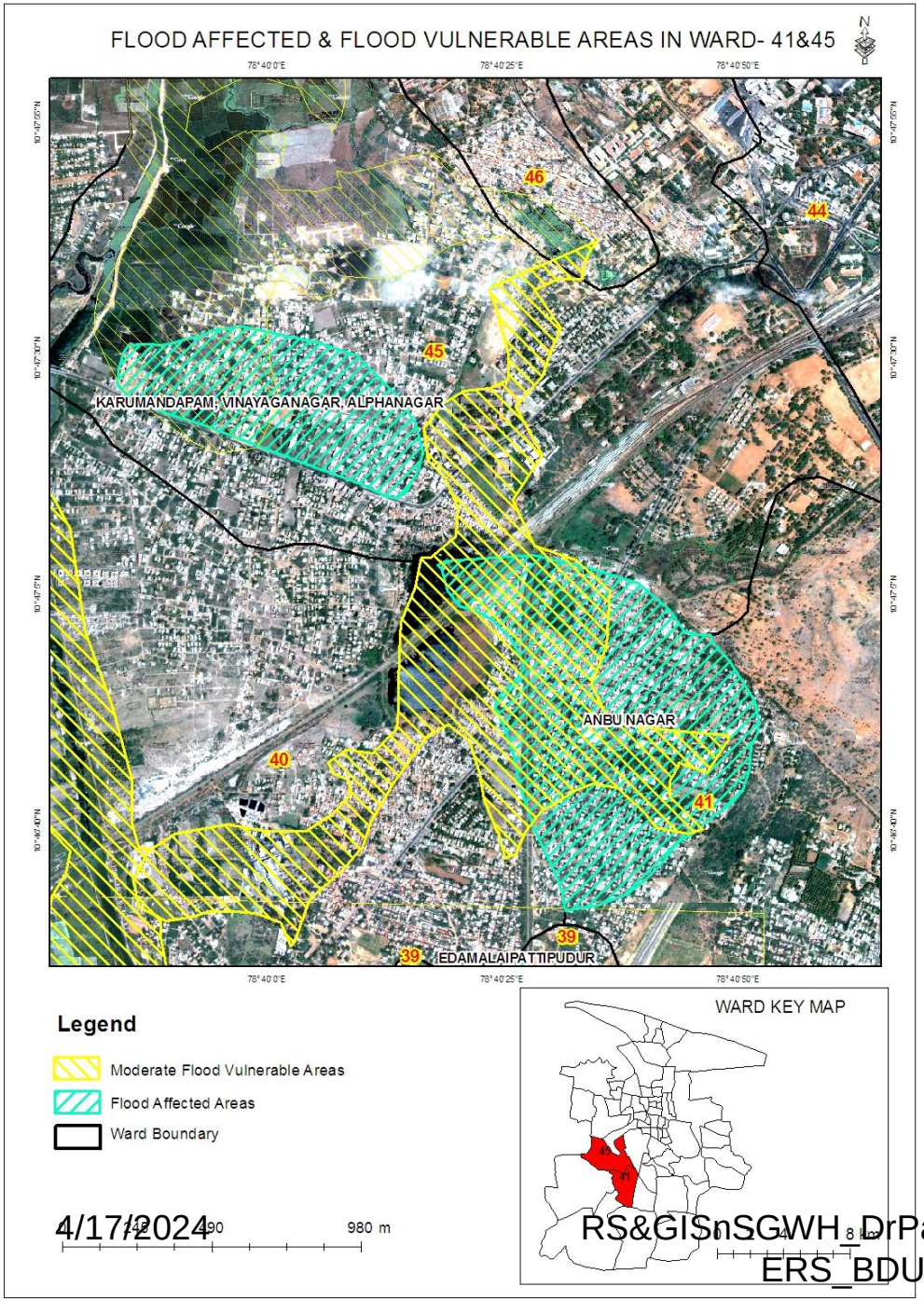
- Mapped using MODIS data



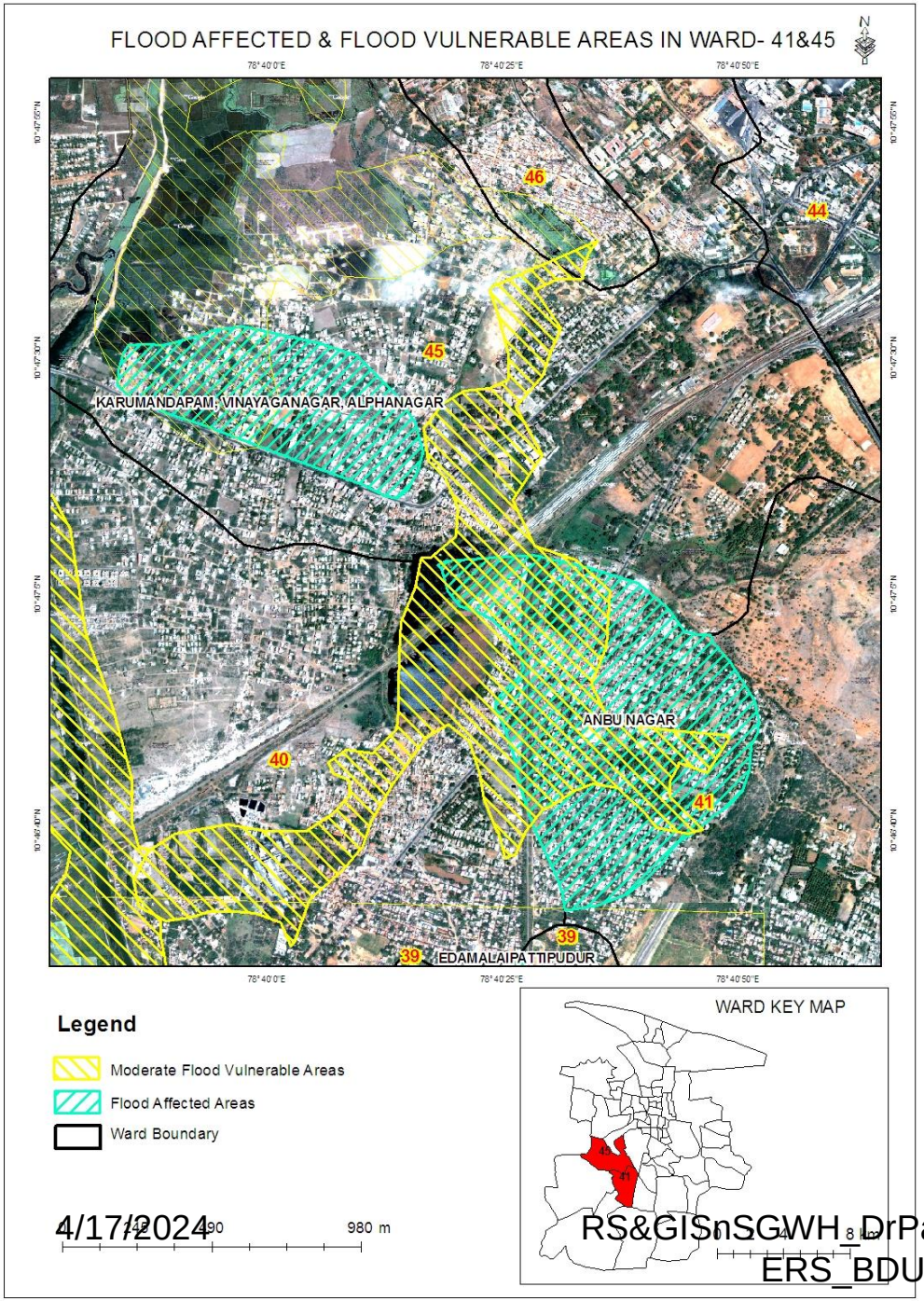
SHADED RELIEF MAP – Flood Vulnerable areas



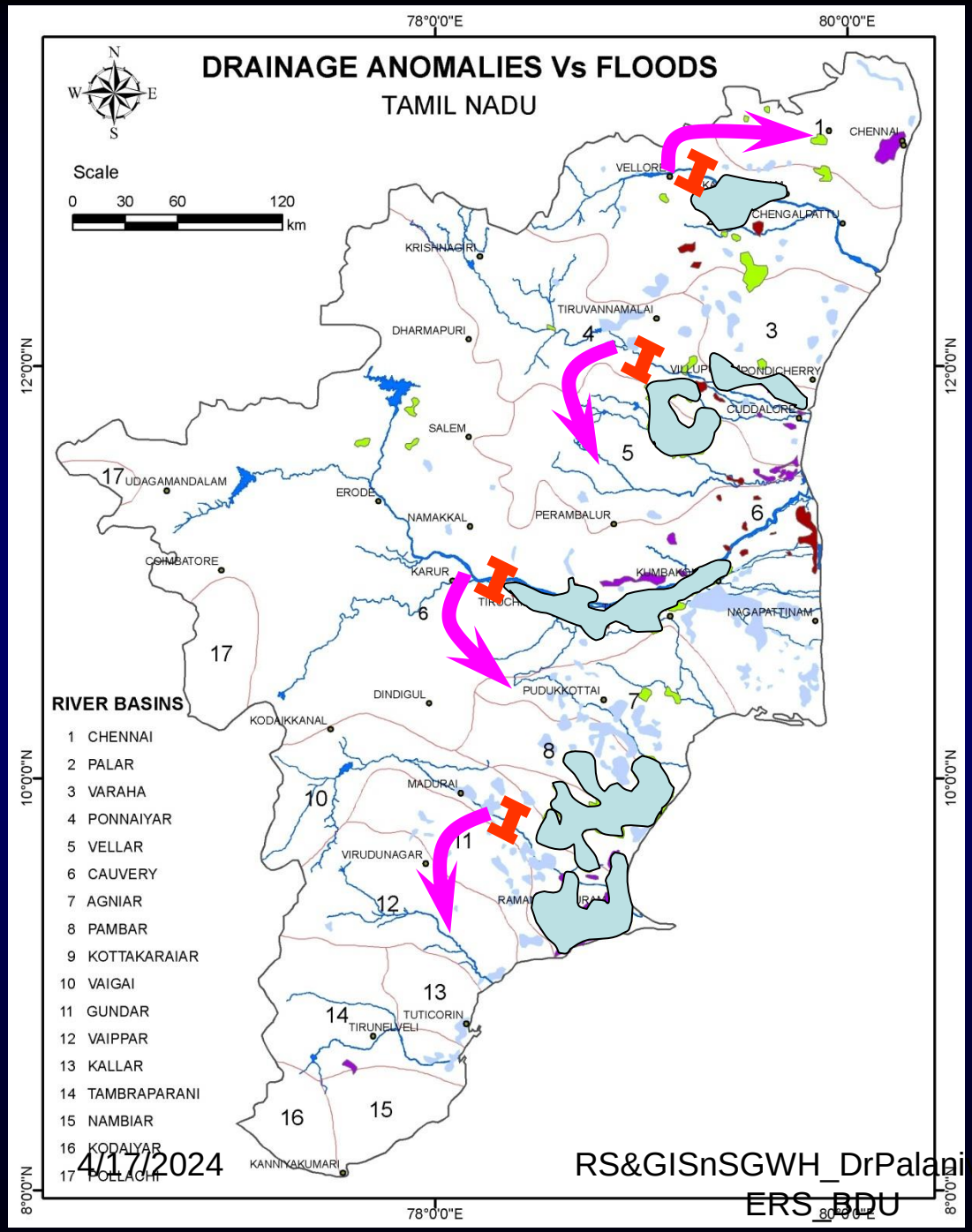

Microwave Remote Sensing Data Showing
Water Logged Areas in Tiruchirappalli Region
N
78°40'0"E
78°45'0"E
10°50'0"N
10°45'0"N
Colleroon River
Settlements
Road
Legend
Water Logged Areas
Prepared by : Centre for Remote Sensing
Bharathidasan University



Flood vulnerable areas and affected areas in Wards 26, 27&33, Tiruchirappalli Corporation

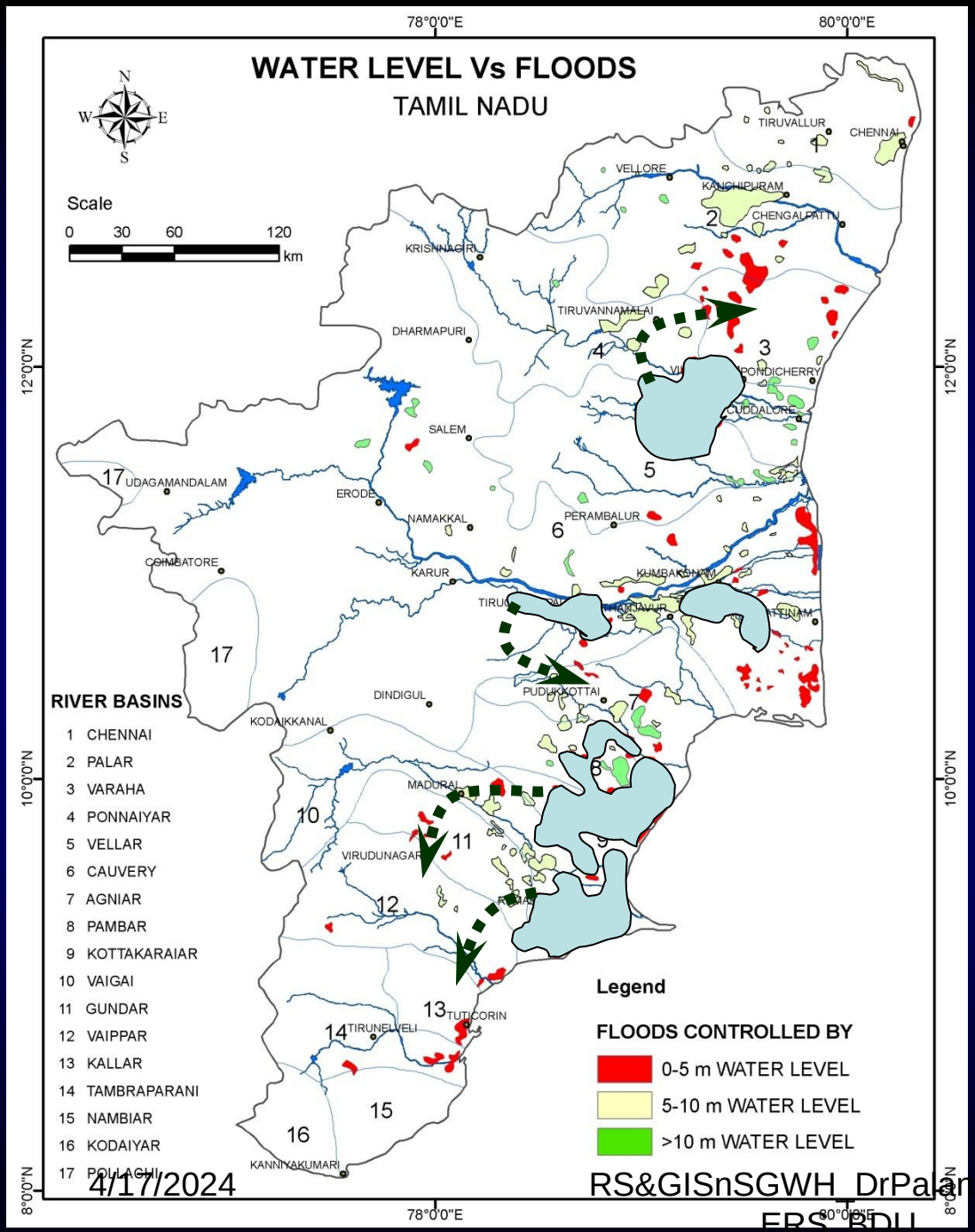


Flood vulnerable areas and affected areas in Ward 41&45, Tiruchirappalli Corporation



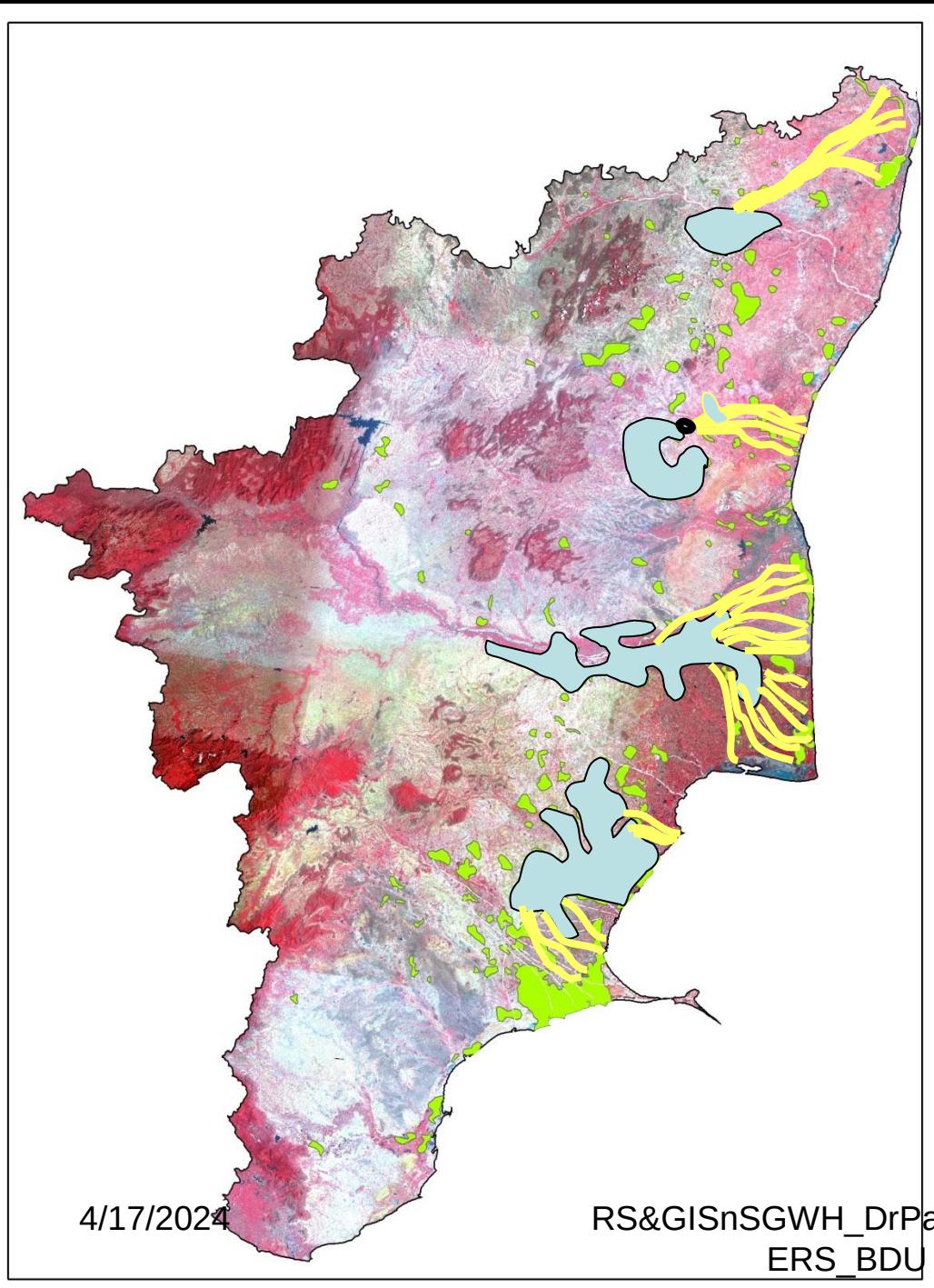
FLOOD CONTROLLED BY DRAINAGE ANOMALIES

- Check dam upper reaches
- Transfer to Other basins



FLOOD CONTROLLED BY WATER LEVEL

- Depress the water level
- Transfer to other basin



FLOOD WATER HARVESTING

DIVERSION OF FLOOD THROUGH BURIED RIVERS

Transfer of excess flood water to the adjacent water deficit (Grey / Black) watersheds through favourable routes

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STUDY - 8

GIS BASED DRAINAGE MORPHOMETRIC ANALYSES & RUNOFF ESTIMATION

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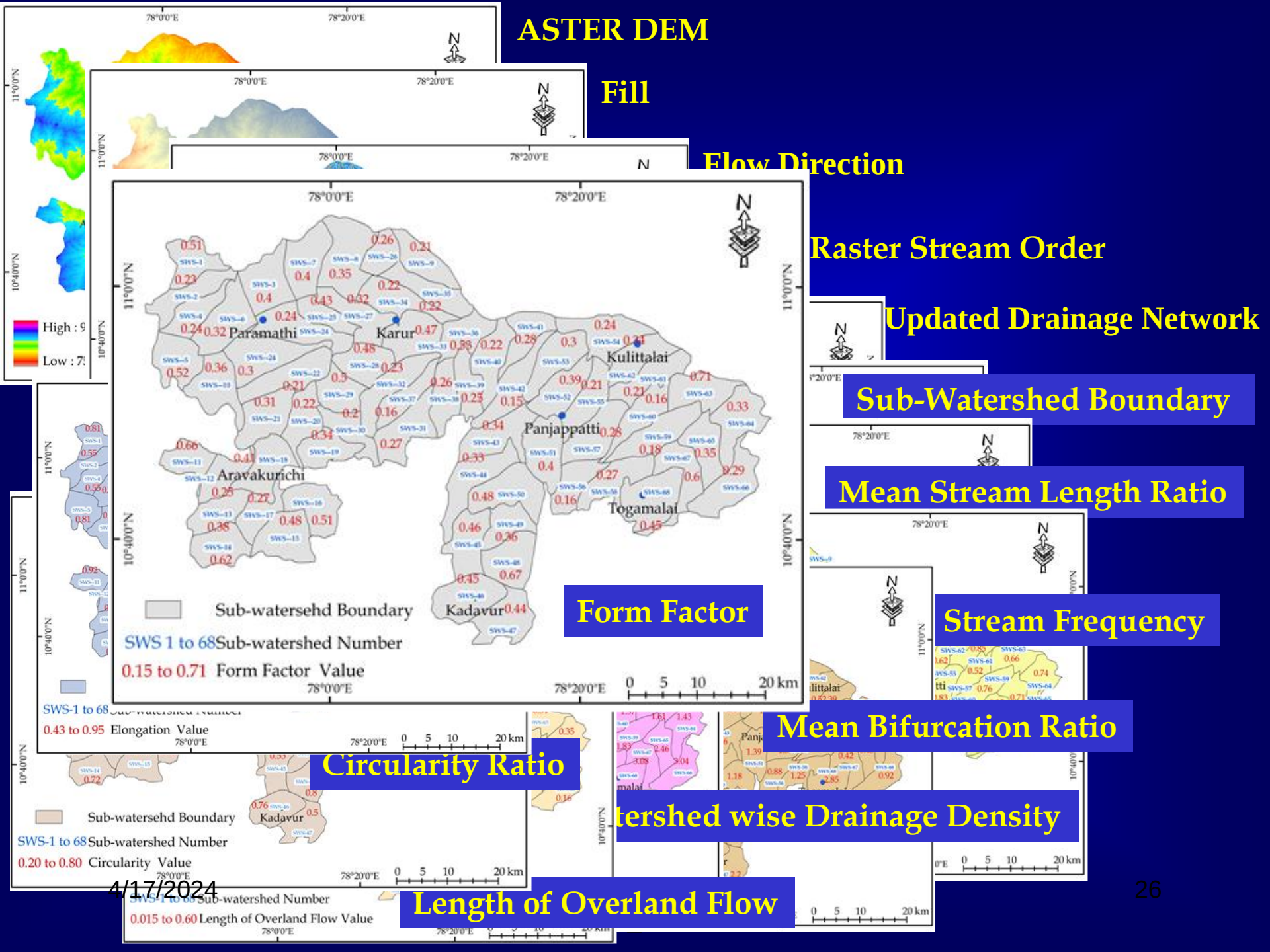
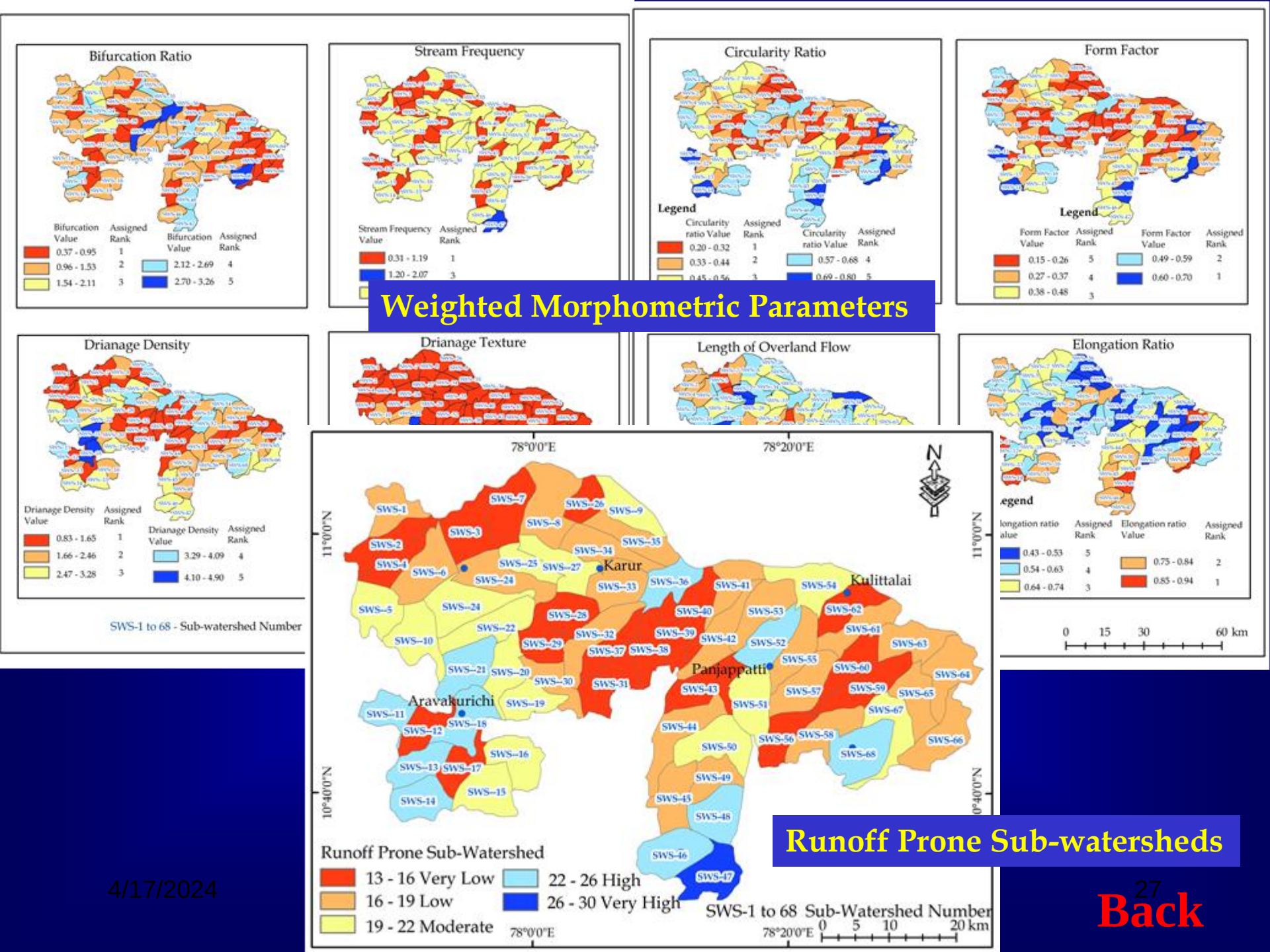

ASTER DEM
Fill
Flow Direction
Raster Stream Order
Updated Drainage Network
Sub-Watershed Boundary
Mean Stream Length Ratio
Stream Frequency
Mean Bifurcation Ratio
tershed wise Drainage Density
Length of Overland Flow
Circularity Ratio
Form Factor
Paramathi
Karur
Kulittalai
Panjappatti
Aravakurichi
Togamalai
Kadavur
Sub-watersehd Boundary
SWS 1 to 68 Sub-watershed Number
0.15 to 71 Form Factor Value
SWS-1 to 68
0.43 to 0.95 Elongation Value
Sub-watersehd Boundary
SWS-1 to 68 Sub-watershed Number
0.20 to 0.80 Circularity Value
Sub-watershed Number
0.015 to 0.60 Length of Overland Flow Value
78°0'0"E
78°20'0"E
11°0'0"N
10°40'0"N
0 5 10 20 km


Bifurcation Ratio
Bifurcation Value
Assigned Rank
0.37 - 0.95 1
0.96 - 1.53 2
1.54 - 2.11 3
2.12 - 2.69 4
2.70 - 3.26 5
Stream Frequency
Stream Frequency Value
Assigned Rank
0.31 - 1.19 1
1.20 - 2.07 3
Circularity Ratio
Legend
Circularity ratio Value
Assigned Rank
0.20 - 0.32 1
0.33 - 0.44 2
0.57 - 0.68 4
Form Factor
Legend
Form Factor Value
Assigned Rank
0.15 - 0.26 5
0.27 - 0.37 4
0.38 - 0.48 3
0.49 - 0.59 2
0.60 - 0.70 1
Weighted Morphometric Parameters
Drianage Density
Drianage Density Value
Assigned Rank
0.83 - 1.65 1
1.66 - 2.46 2
2.47 - 3.28 3
3.29 - 4.09 4
4.10 - 4.90 5
SWS-1 to 68 - Sub-watershed Number
Drianage Texture
Length of Overland Flow
Elongation Ratio
egend
Elongation ratio Value
Assigned Rank
0.43 - 0.53 5
0.54 - 0.63 4
0.64 - 0.74 3
0.75 - 0.84 2
0.85 - 0.94 1
0 15 30 60 km
78°0'0"E
78°20'0"E
11°0'0"N
10°40'0"N
N
Karur
Kulittalai
Panjappatti
Aravakurichi
Runoff Prone Sub-Watershed
13 - 16 Very Low
16 - 19 Low
19 - 22 Moderate
22 - 26 High
26 - 30 Very High
SWS-1 to 68 Sub-Watershed Number
0 5 10 20 km
Runoff Prone Sub-watersheds

STUDY - 9

Groundwater Prospecting

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GROUNDWATER DEVELOPMENT
Groundwater Prospecting

- For prospecting and developing of groundwater, a new methodology of assigning **Ranks and Weightages** to various geo-systems was adopted.

Sl.No.	Item	Rank (Maximum Weightages)
1	Lithology	2
2	Lineament Density	2
3	Geomorphology	2
4	Slope	1
5	Regolith	2
6	Landuse/Land Cover	1

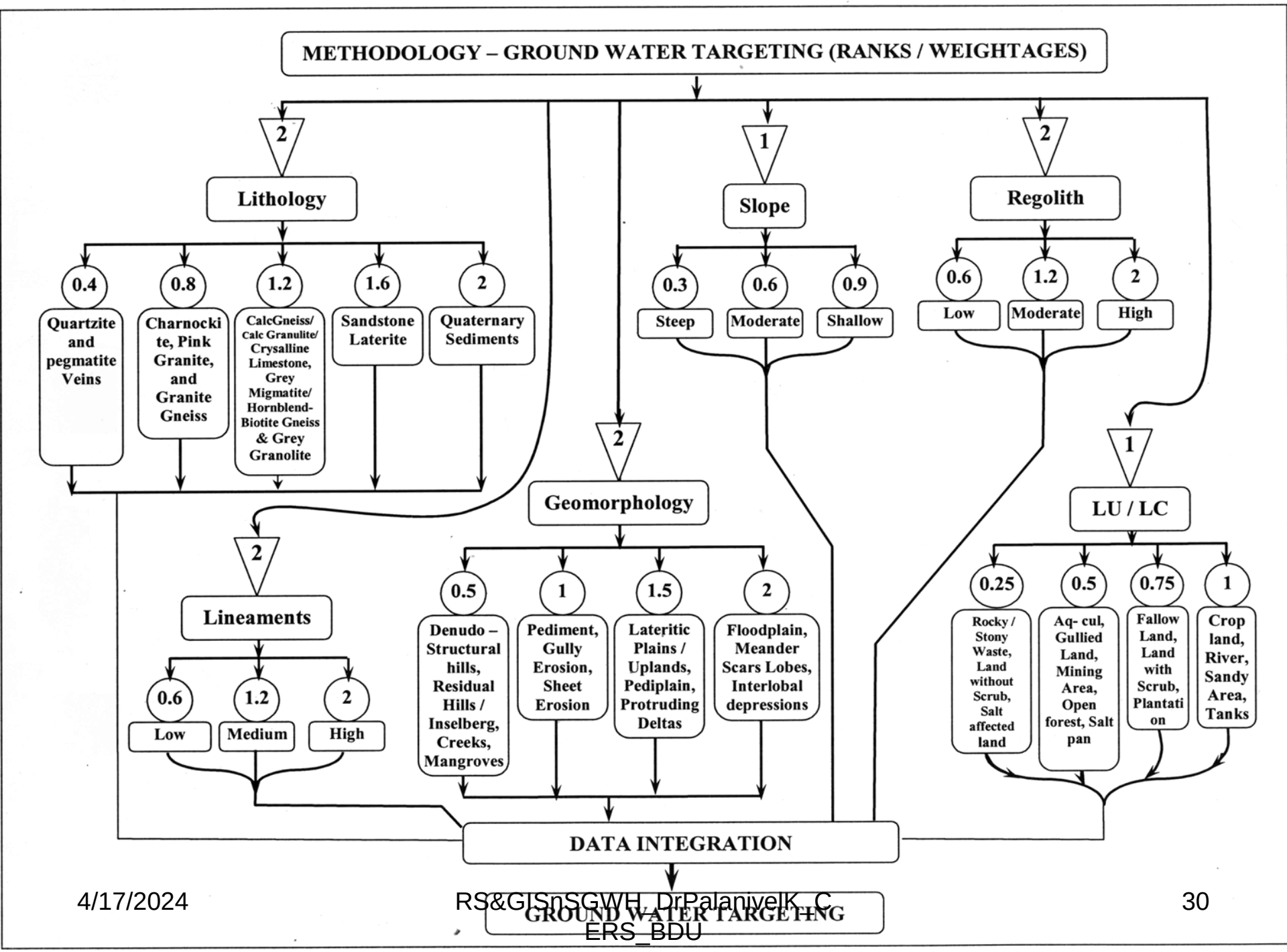

METHODOLOGY – GROUND WATER TARGETING (RANKS / WEIGHTAGES)
2
Lithology
0.4
Quartzite and pegmatite Veins
0.8
Charnockite, Pink Granite, and Granite Gneiss
1.2
CalcGneiss/ Calc Granulite/ Crysalline Limestone, Grey Migmatite/ Hornblend-Biotite Gneiss & Grey Granolite
1.6
Sandstone Laterite
2
Quaternary Sediments
1
Slope
0.3
Steep
0.6
Moderate
0.9
Shallow
2
Regolith
0.6
Low
1.2
Moderate
2
High
2
Lineaments
0.6
Low
1.2
Medium
2
High
2
Geomorphology
0.5
Denudo – Structural hills, Residual Hills / Inselberg, Creeks, Mangroves
1
Pediment, Gully Erosion, Sheet Erosion
1.5
Lateritic Plains / Uplands, Pediplain, Protruding Deltas
2
Floodplain, Meander Scars Lobes, Interlobal depressions
1
LU / LC
0.25
Rocky / Stony Waste, Land without Scrub, Salt affected land
0.5
Aq- cul, Gullied Land, Mining Area, Open forest, Salt pan
0.75
Fallow Land, Land with Scrub, Plantation
1
Crop land, River, Sandy Area, Tanks
DATA INTEGRATION
GROUND WATER TARGETING

Fig 6.26

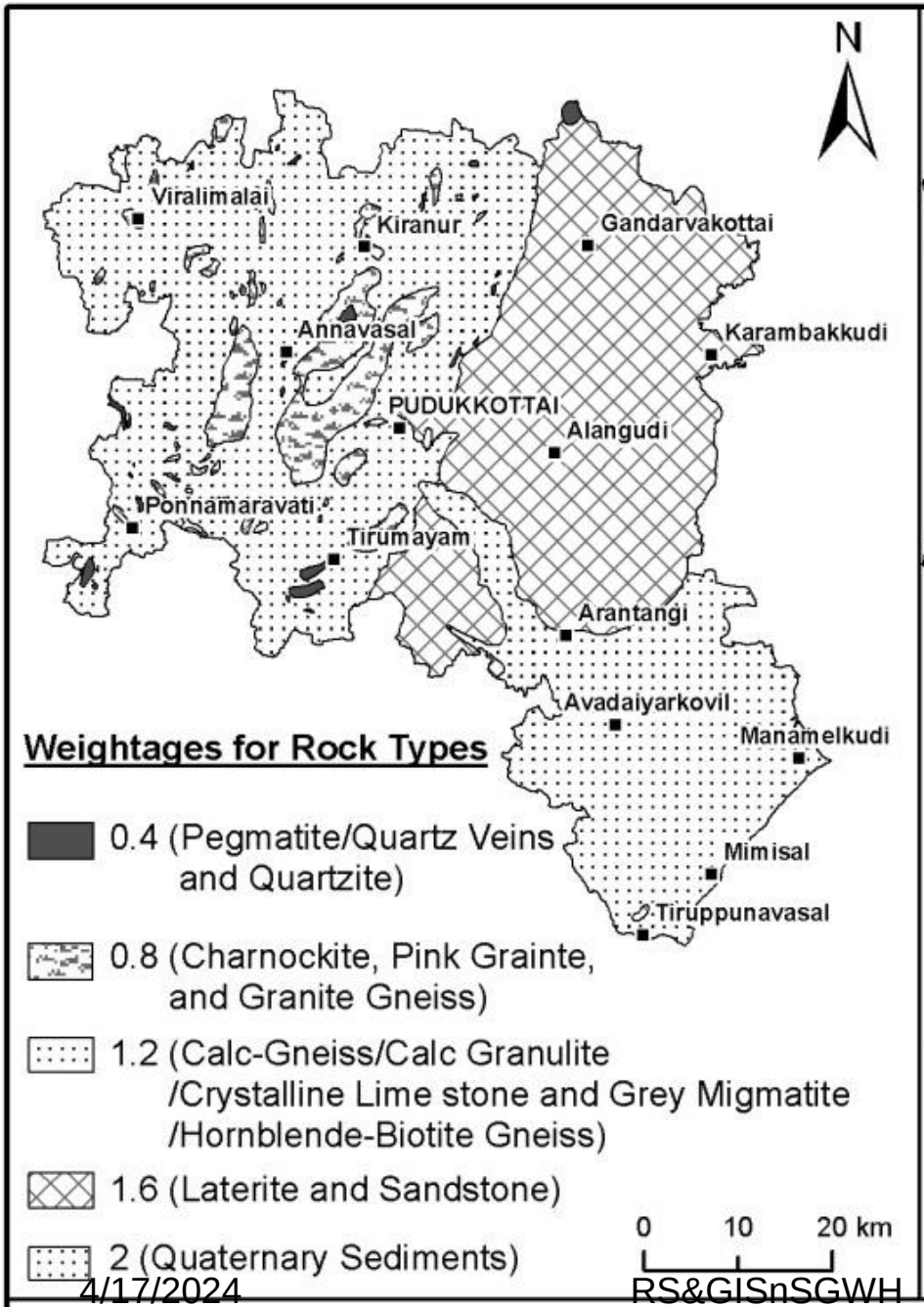


Fig.6.27 Lithology

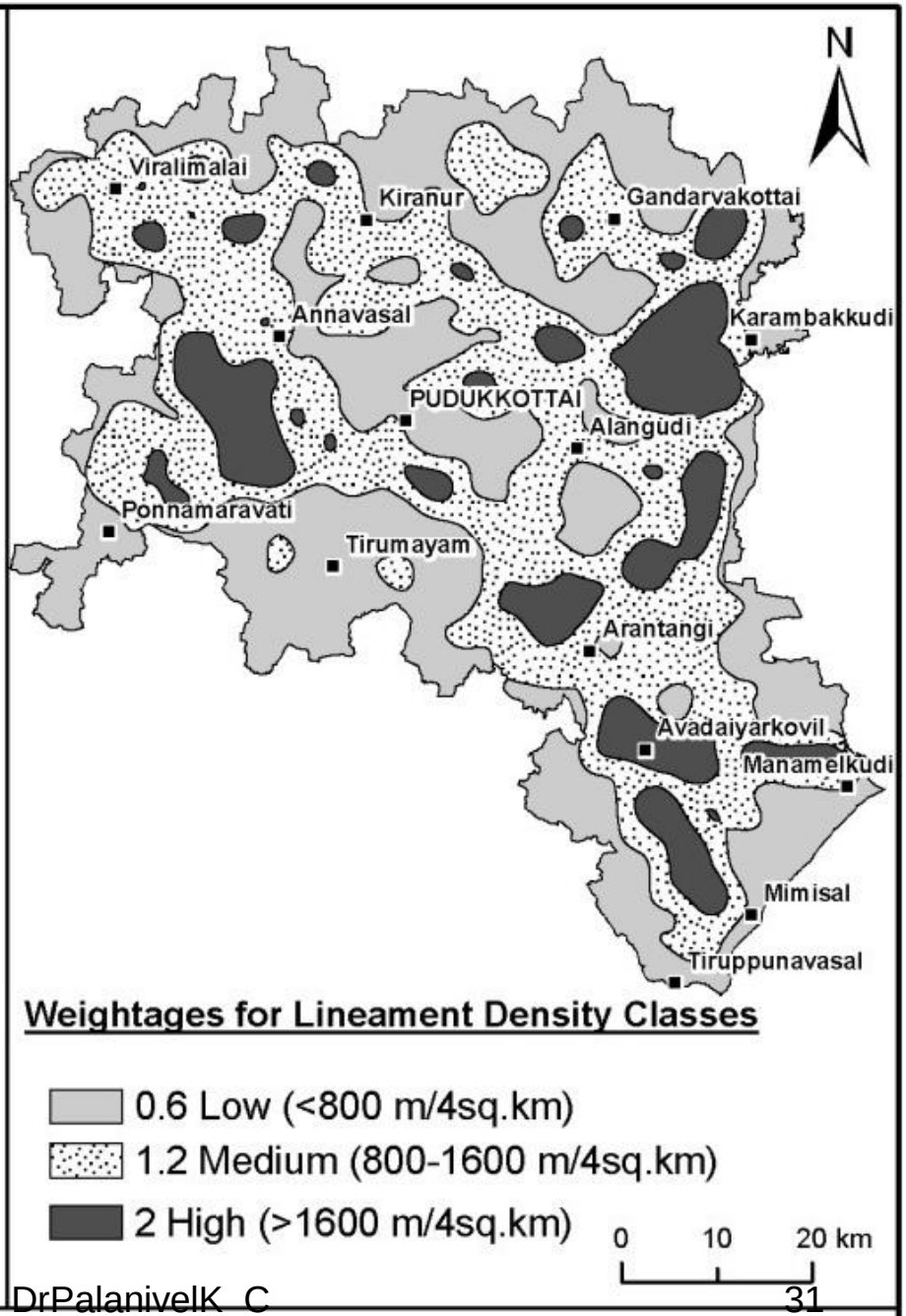


Fig.6.28 Lineament Density

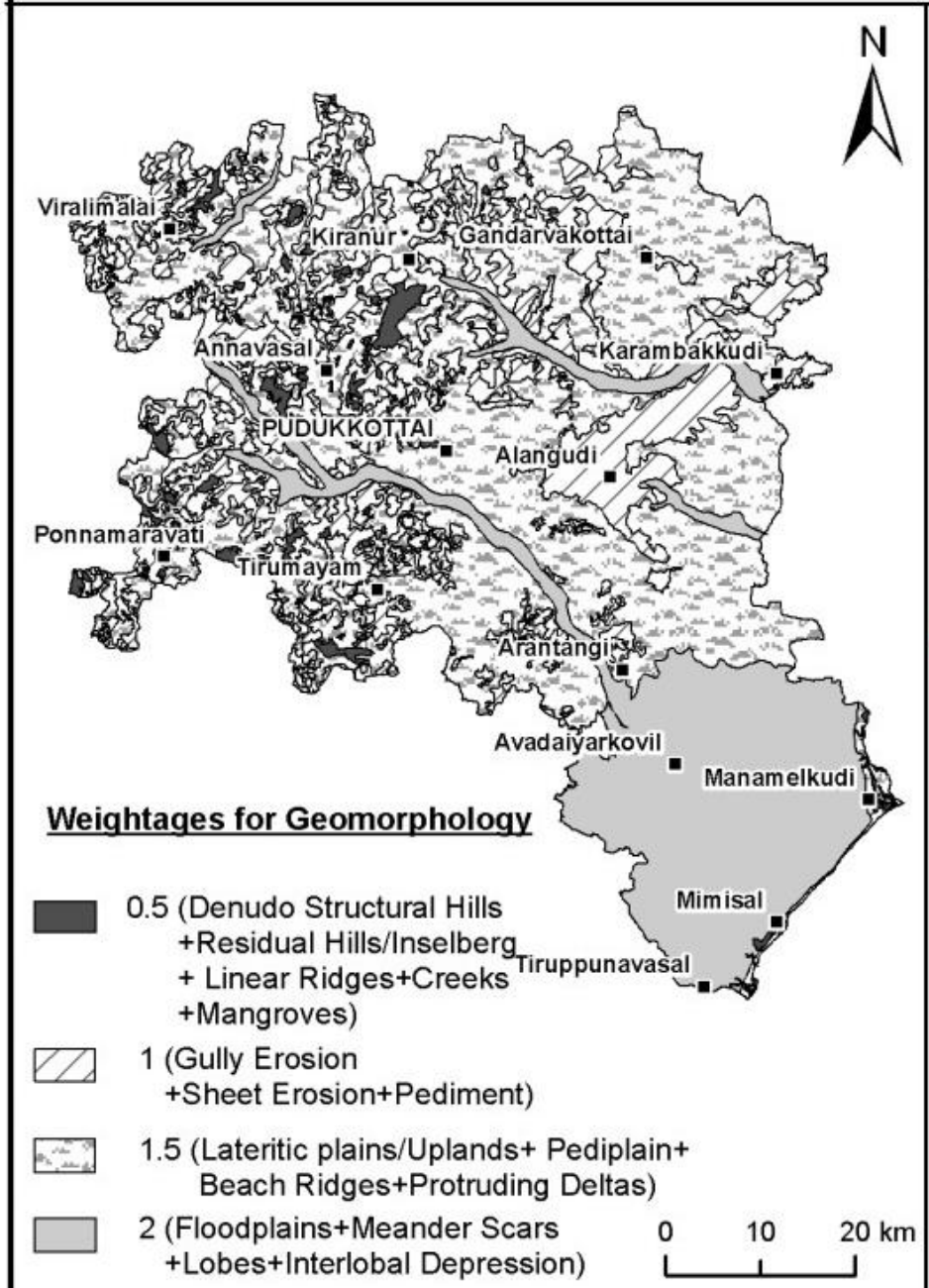


Fig.6.29 Geomorphology

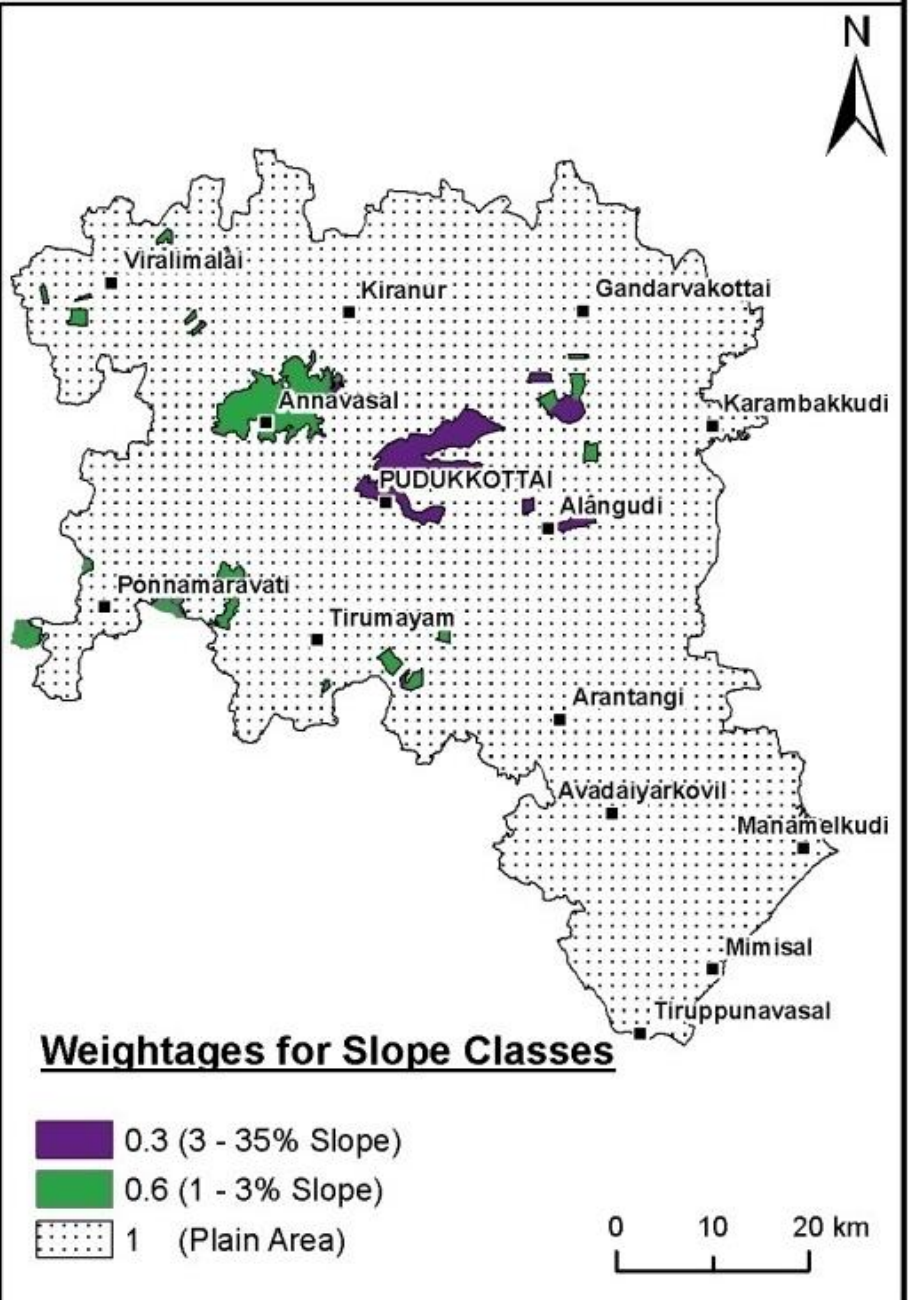


Fig.6.30 Slope

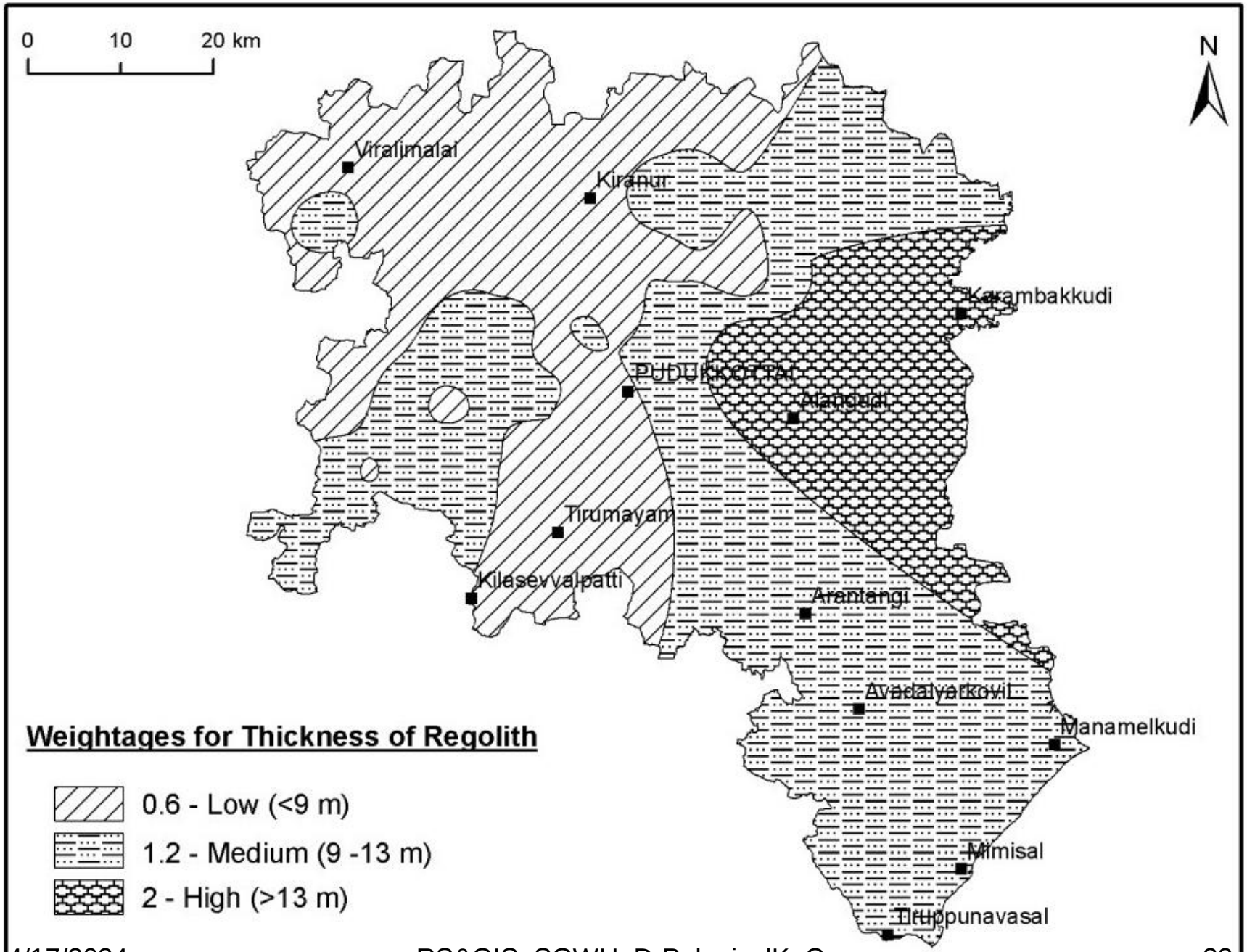


Fig 6.31 Regolith

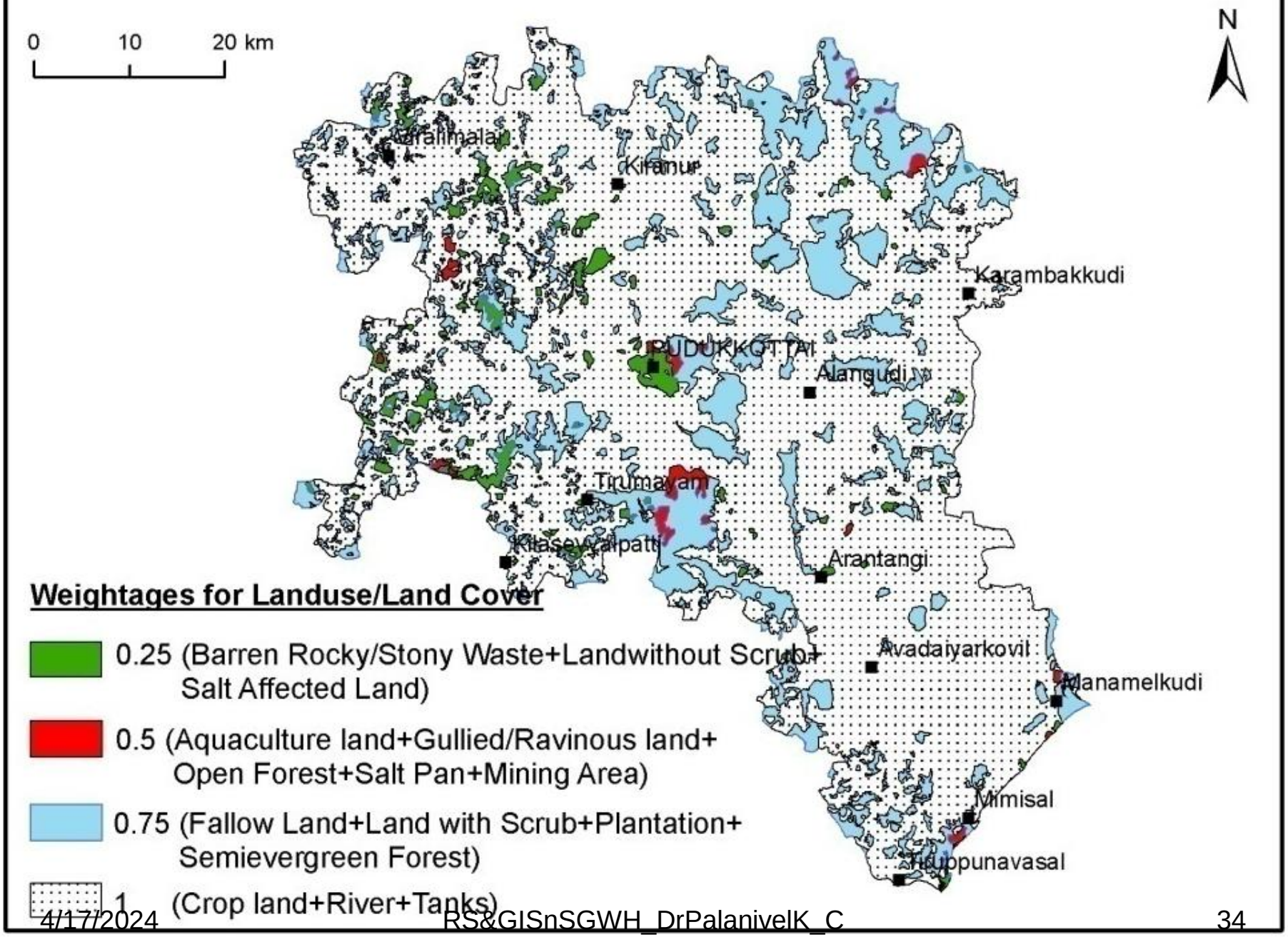


Fig.6.32 Land Use/Land Cover

Groundwater Prospects

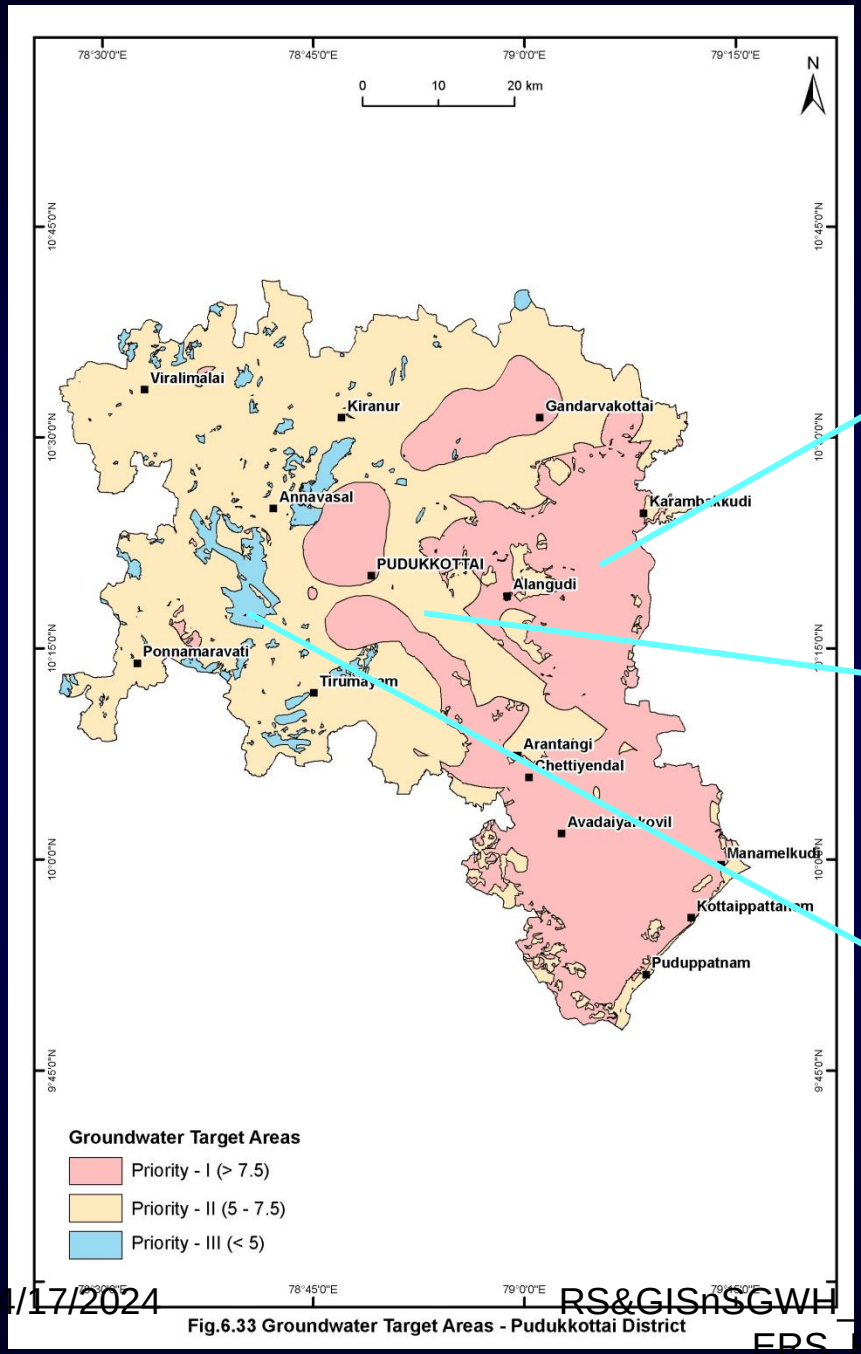


Fig.6.33 Groundwater Target Areas - Pudukkottai District

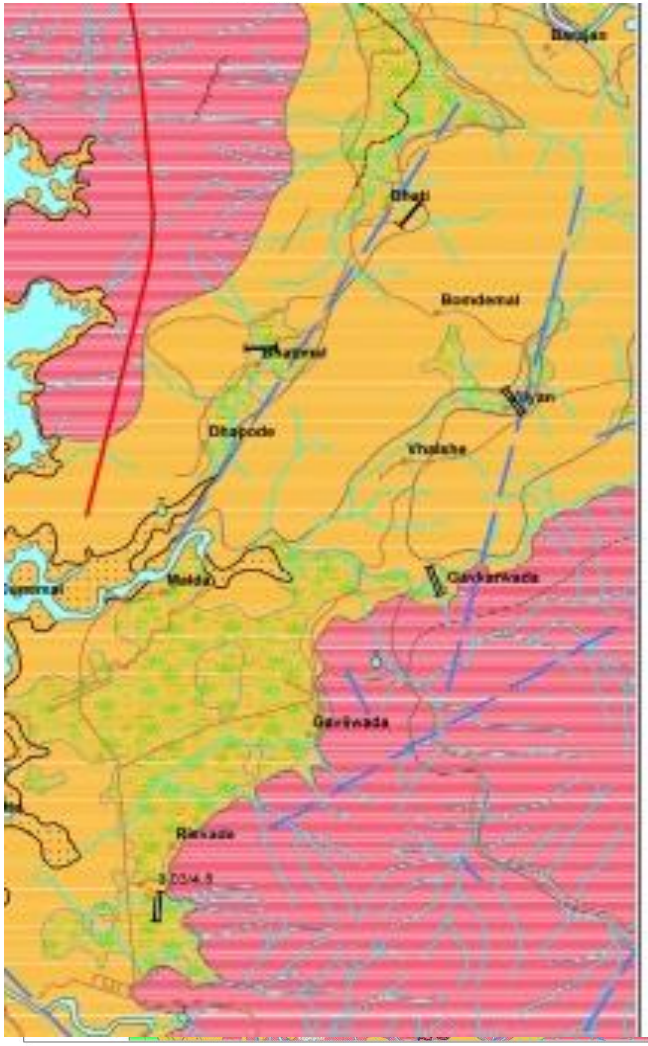
Priority Area – I (>7.5)

Priority Area - II (5-7.5)

Priority Area – III (<5)

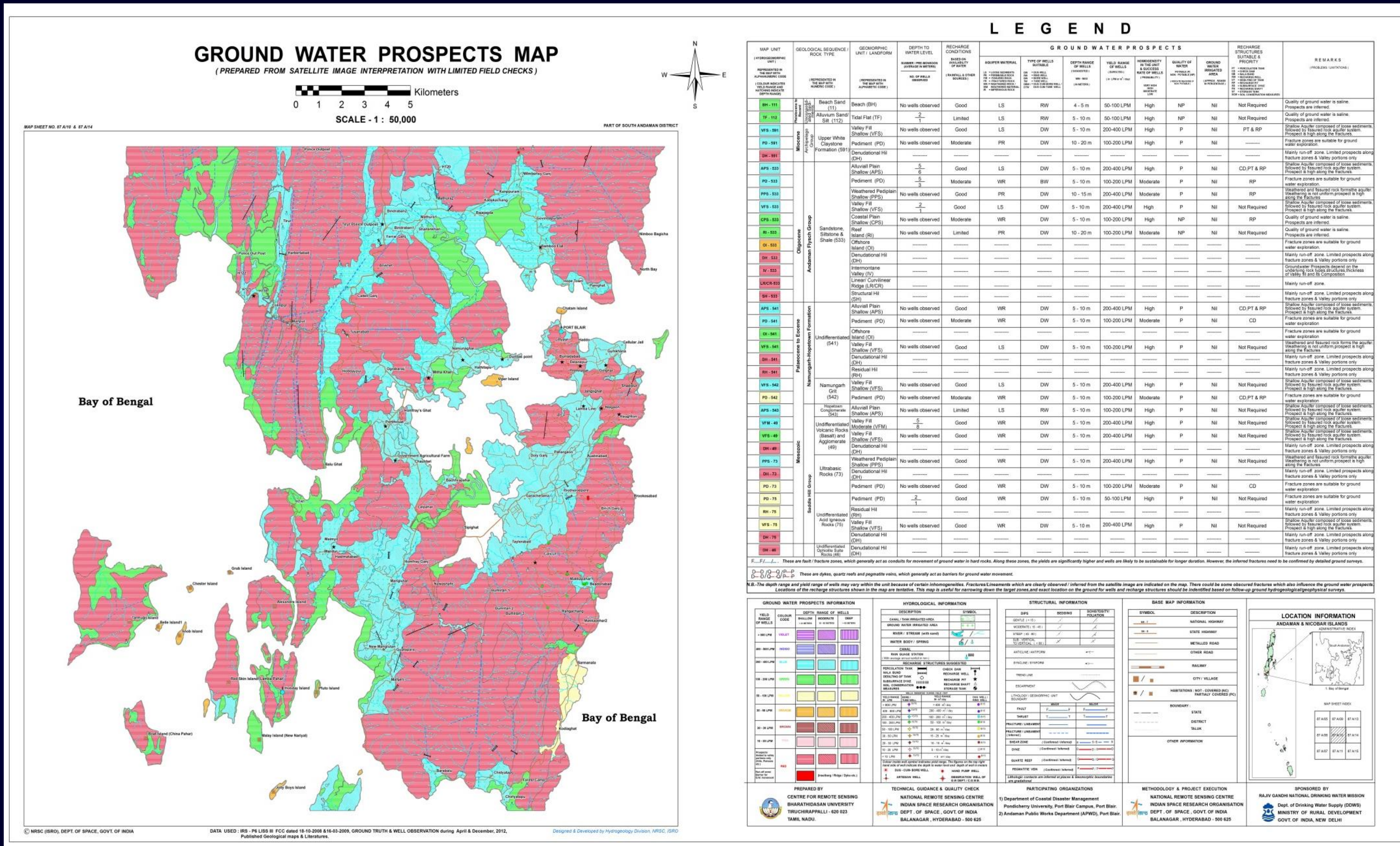
Groundwater Prospect and Groundwater Quality Maps prepared under RGNDWM scheme of NRSC & MoWR for Gundar Basin, Tamil Nadu, Maharashtra, Kerala, Goa, Andaman & Nicobar, Rajasthan

South Goa District

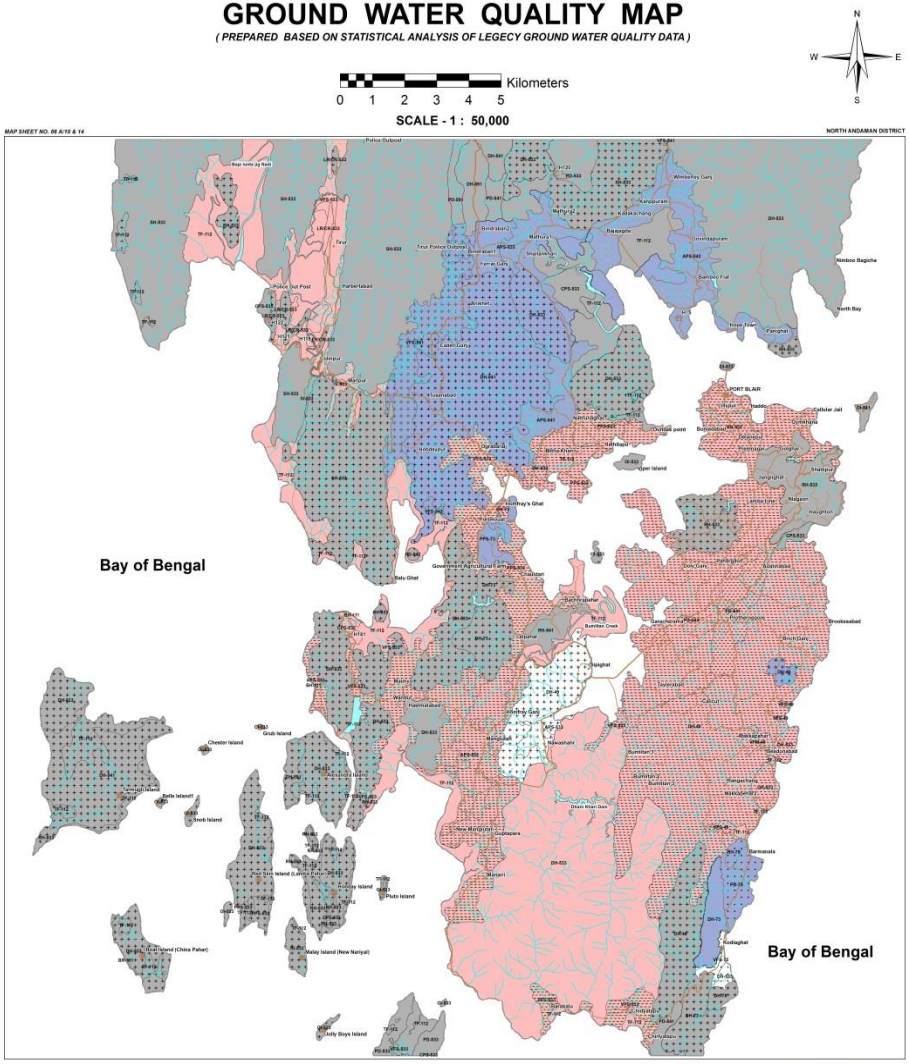


PLS - 982	Archaean to Lower Proterozoic	Sanvordem Formation	Greywacke with Conglomerates (982)	Plateau Highly Dissected (PLS)	No wells observed	Limited
DH - 982				Denudational Hill (DH)	----------	----------
V - 982				Valley (V)	----------	----------
PD - 952			Quartzite (952)	Pediment (PD)	No wells observed	Moderate
HS/DS - 952				Hill Slope / Denudational Slope (HS/DS)	----------	----------
APS - 924		Barcem Formation	Quartz-Chlorite Schist (924)	Alluvial Plain Shallow (APS)	No wells observed	Good
PD - 924				Pediment (PD)	No wells observed	Moderate
PPS - 924				Weathered Pediplain Shallow (PPS)	5/2	Moderate
DH - 924				Denudational Hill (DH)	----------	----------
HS/DS - 924				Hill Slope / Denudational Slope (HS/DS)	----------	----------
V - 924				Valley (V)	----------	----------
DH - 42			Meta acid volcanics (42)	Denudational Hill (DH)	----------	----------
V - 42				Valley (V)	----------	----------
PD - 41			Metabasalt / metagabbro / meta-anortho -sitic gabbro (41)	Pediment (PD)	No wells observed	Moderate
DH - 41				Denudational Hill (DH)	----------	----------
HS/DS - 41				Hill Slope / Denudational Slope (HS/DS)	----------	----------
V - 41				Valley (V)	----------	----------
CPS - 83	Archaean		Granites/Acidic Rocks (83)	Coastal Plain Shallow (CPS)	No wells observed	Good
APS - 83				Alluvial Plain Shallow (APS)	3/1	Good
OI - 83				Offshore Island (OI)	----------	----------
PD - 83				Pediment (PD)	3/1	Moderate
PLH - 83				Plateau Highly Dissected (PLH)	No wells observed	Moderate
PPC - 83				Weathered Pediplain Under Canal Command (PPC)	No wells observed	Moderate
PPS - 83				Weathered Pediplain Shallow (PPS)	No wells observed	Moderate

Part of South Andaman



Part of South Andaman



L E G E N D

MAP UNIT (HYDROGEOMORPHIC UNIT) REPRESENTED IN THE MAP WITH ALPHA-NUMERIC CODE	GEOLOGICAL SEQUENCE / ROCK TYPE (REPRESENTED IN THE MAP WITH NUMERIC CODE)	GEOMORPHIC UNIT / LANDFORM (REPRESENTED IN THE MAP WITH ALPHAMETIC CODE)	PRE-MONSOON GROUND WATER QUALITY	POST-MONSOON GROUND WATER QUALITY	PERCENTAGE OF MAP UNIT AREA	CONSTITUENTS ANALYSED	ANOMALOUS CONSTITUENTS	REMARKS
TF - 112	Miocene / Pliocene / Pleistocene / Holocene — Alluvium, Sand/ Silt (112) / Upper White Daytoma Formation (587)	Tidal Flat (TF)	Non-Potable Non-Potable	Non-Potable ----------	10 90	pH, Total Hardnes, Total Dissolved Solids, Iron, Chloride, Nitrate, Fluoride, Sulphate, Alkalinity, Manganese, & Arsenic	pH,Iron,Flouride Iron	Non-Potable / ---------- Desirable
VFS - 591		Valley Fill Shallow (VFS)	Desirable	Desirable	100			
APS - 533	Oligocene — Andaman Flysch Group — Sandstone, Siltstone & Shale (533)	Alluvial Plain Shallow (APS)	Desirable Non-Potable	---------- Non-Potable	20 80		pH,Iron,Flouride	Non-Potable / Non-Potable
PD - 533		Pediment (PD)	Non-Potable	Non-Potable	100		pH,Iron,Flouride	Non-Potable / Non-Potable
PPS - 533		Weathered Pediplain Shallow (PPS)	Non-Potable	Non-Potable	100		pH,Iron,Flouride	Non-Potable / Non-Potable
VFS - 533		Valley Fill Shallow (VFS)	Non-Potable Non-Potable	Non-Potable ----------	10 90		pH,Iron,Flouride Iron	Non-Potable / ---------- Non-Potable / ----------
CPS - 533		Coastal Plain Shallow (CPS)	Non-Potable	----------	100		Iron	Non-Potable / ----------
DH - 533		Denudational Hil (DH)	Desirable Non-Potable	Desirable ----------	10 90		Iron	Non-Potable / ----------
IV - 533		Intermontane Valley (IV)	Non-Potable	----------	100		Iron	Non-Potable / ----------
LR/CR -533		Lineal/ Curvilinear Ridge (LR/CR)	Non-Potable	----------	100		Iron	Non-Potable / ----------
RH - 533		Residual Hil (RH)	Non-Potable	Non-Potable	100		pH,Iron,Flouride	Non-Potable / Non-Potable
APS - 541	Palaeocene to Eocene — Undifferentiated Mithakhari Group — Undifferentiated (541)	Alluvial Plain Shallow (APS)	Desirable	----------	100			Desirable / ----------
PD - 541		Pediment (PD)	Non-Potable	Non-Potable	100		pH,Iron,Flouride	Non-Potable / Non-Potable
VFS - 541		Valley Fill Shallow (VFS)	Desirable	----------	100			Desirable / ----------
DH - 541		Denudational Hil (DH)	Desirable	Desirable	100			Desirable
VFS - 542	Namunghi Grit (542)	Valley Fill Shallow (VFS)	Desirable	Desirable	100			Desirable
APS - 543	Hopetown Conglomerate (543)	Alluvial Plain Shallow (APS)	Desirable	----------	100			Desirable / ----------
VFM - 49	Mesozoic — Saddle Hill Group — Undifferentiated Volcanic Rocks (Basalt) and Agglomerate (49)	Valley Fill Moderate (VFM)	Non-Potable	Non-Potable	100		Iron	Non-Potable / Non-Potable
VFS - 49		Valley Fill Shallow (VFS)	Non-Potable	Non-Potable	100		Iron	Non-Potable / Non-Potable
DH - 49		Denudational Hil (DH)	--------- Non-Potable	Desirable Non-Potable	10 90		Iron	Non-Potable / Non-Potable
PPS - 73	Ultrabasic Rocks (73)	Weathered Pediplain Shallow (PPS)	Desirable	----------	100			Desirable / ----------
DH - 73		Denudational Hil (DH)	Desirable	----------	100			Desirable / ----------
PD - 75	Undifferentiated Acid Igneous Rocks (75)	Pediment (PD)	Desirable	Permissible	100		Flouride	Desirable / Permissible
RH - 75		Residual Hil (RH)	Desirable	Permissible	100		Flouride	Desirable / Permissible
VFS - 76		Valley Fill Shallow (VFS)	----------	Permissible	100		Flouride	---------- / Permissible
BH,CPS,DH,IV,OL,PD,RH,SH,TF & VFS	On Different Lithological Formation		Legacy data not available			Mainly run-off Zone. Limited prospects along fractures & Valleys.		
BR,CPS,DH,LR/CR,OL,PD,PPS,RH,RL,SH & TF	On Different Lithological Formation		Run-off zone - No Habitation					

GROUND WATER QUALITY PARAMETERS AS PER BIS STANDARDS

Sl.No.	CONSTITUENTS / QUALITY PARAMETERS	POTABLE: DESIRABLE LIMIT	POTABLE: PERMISSIBLE LIMIT	NON-POTABLE
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
4	Chlorides (as Cl) mg/l	< 250	250 - 1000	> 1000
5	Total Dissolved solids mg/l	< 500	500 - 2000	> 2000
6	Bicarbonate (as HCO_3) 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	Fluride (as F) mg/l	< 1.0	1.0 - 1.5	> 1.5
12	Manganese (as Mn) mg/l	< 0.1	0.1 - 0.3	> 0.3
13	Arsenic (as As) mg/l	< 0.01	0.01 - 0.05	> 0.05
14	Mercury (as Hg) mg/l	< 0.001	--	> 0.001
15	Cadmium (as Cd) mg/l	< 0.003	--	> 0.003
16	Selemium (as Se) mg/l	< 0.01	--	> 0.01
17	Copper (as Cu) mg/l	< 0.05	0.05 - 1.5	> 1.5
18	Lead (as Pb) mg/l	< 0.01	--	> 0.01
19	Zinc (as Zn) mg/l	< 5	5 - 15	> 15
20	Chromium (as Cr^{6+}) mg/l	< 0.05	--	> 0.05
21	Pesticides mg/l	0	0 - 0.001	> 0.001
22	Radioactive Alpha emitters pci/l	0	0 - 0.1	> 0.1
23	Radioactive Beta emitters pci/l	0	0 - 1.0	> 1.0
24	Alkalinity mg/l	< 200	200 - 600	> 600
25	Aluminium (as Al) mg/l	< 0.03	0.03 - 0.2	> 0.2

COLOUR CODE	GROUND WATER QUALITY: PRE MONSOON	POST MONSOON
	No Data	Desirable
	No Data	Permissible
	No Data	Non - Potable
	Desirable	No Data
	Permissible	No Data
	Non - Potable	No Data
	Desirable	Desirable
	Desirable	Permissible
	Desirable	Non - Potable
	Permissible	Desirable
	Permissible	Permissible
	Permissible	Non - Potable
	Non - Potable	Desirable
	Non - Potable	Permissible
	Non - Potable	Non - Potable
	No Data	No Data

HYDROLOGICAL INFORMATION

DESCRIPTION	SYMBOL
CANAL / TANK IRRIGATED AREA	
GROUND WATER IRRIGATED AREA	
RIVER / STREAM	
WATER BODY	
CANAL	
Base Layer Information	
NH - 7	NATIONAL HIGHWAY
SH - 9	STATE HIGHWAY
	METALLED ROAD
	OTHER ROAD
	RAILWAY
	CITY / VILLAGE
	HABITATIONS - NOT COVERED (NC) PARTIALY COVERED (PC)
BOUNDARY	
	STATE
	DISTRICT
	TALUK
Other Information	
	Aquifer Unit Boundary/Hydrogeomorphic Unit Boundary with Alpha-Numeric

LOCATION INFORMATION
ANDAMAN & NICOBAR ISLANDS
ADMINISTRATIVE INDEX
MAP SHEET INDEX

PREPARED BY
CENTRE FOR REMOTE SENSING
BHARATHIDASAN UNIVERSITY
TIRUCHIRAPPALLI - 620 023
TAMIL NADU.

TECHNICAL GUIDANCE & QUALITY CHECK
NATIONAL REMOTE SENSING CENTRE
INDIAN SPACE RESEARCH ORGANISATION
DEPT . OF SPACE , GOVT. OF INDIA
BALANAGAR , HYDERABAD - 500 625

PARTICIPATING ORGANIZATIONS
1) Department of Coastal Disaster Management
Pondicherry University, Port Blair Campus, Port Blair.
2) Andaman Public Works Department (APWD), Port Blair.

METHODOLOGY & PROJECT EXECUTION
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MINISTRY OF RURAL DEVELOPMENT
GOVT. OF INDIA, NEW DELHI

STUDY - 10

Groundwater Targeting

Back

STUDY - 10

Groundwater Targeting using Well Inventory data in GIS

5 Basic steps involved are:

- **Date base Generation**
- **Normalization / Standardization**
- **Rasterization**
- **Pixel based addition and**
- **Groundwater target delineation**

Through Pump Test/well inventory, calculate

- **Transmissivity (T)**
- **Permeability (K)**
- **Specific yield (S) and then**
- **Inverted Water level (1/WL)**

$$\frac{(X - X_{min})}{(X_{max} - X_{min})} * 99) + 1$$

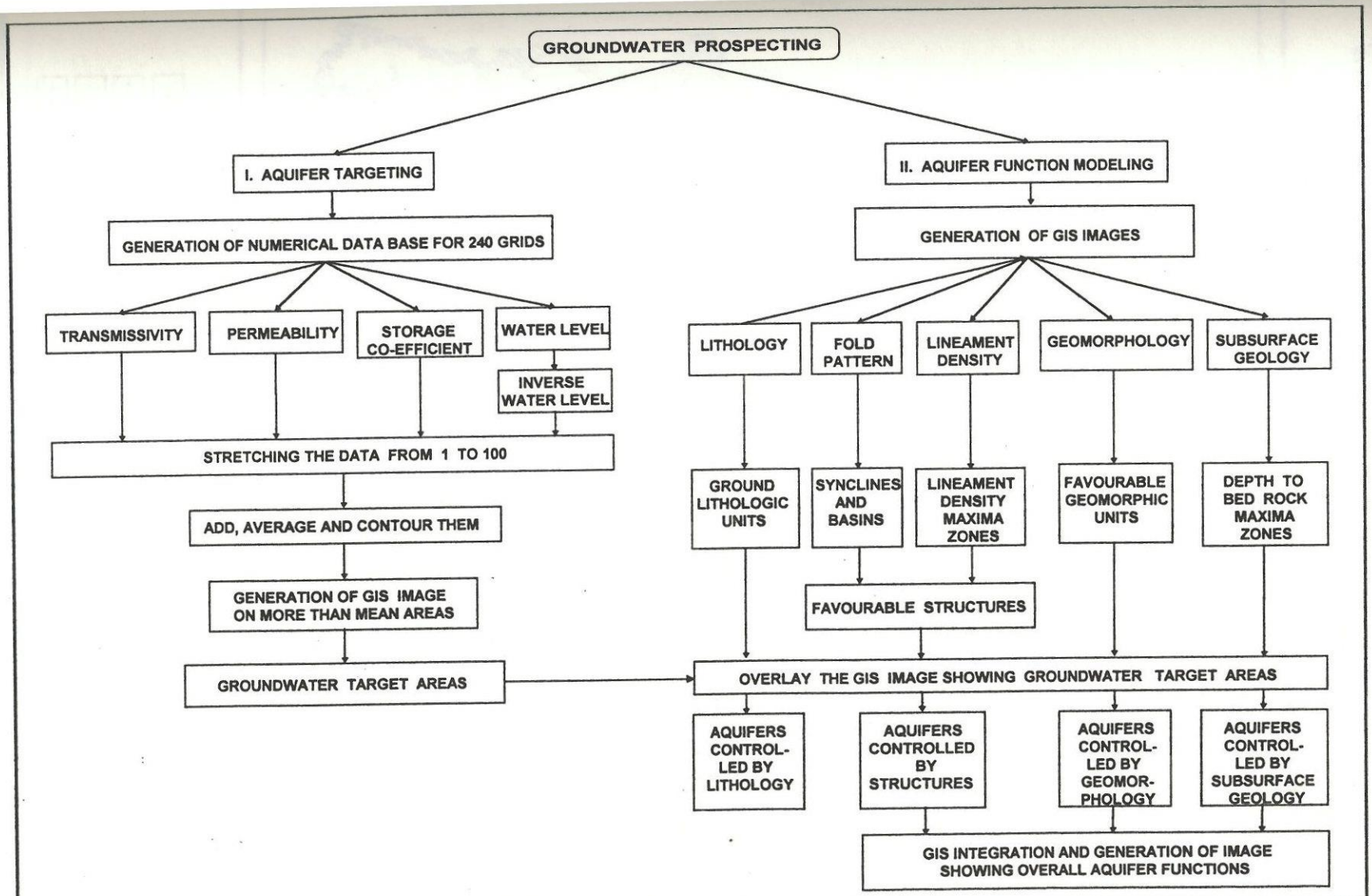


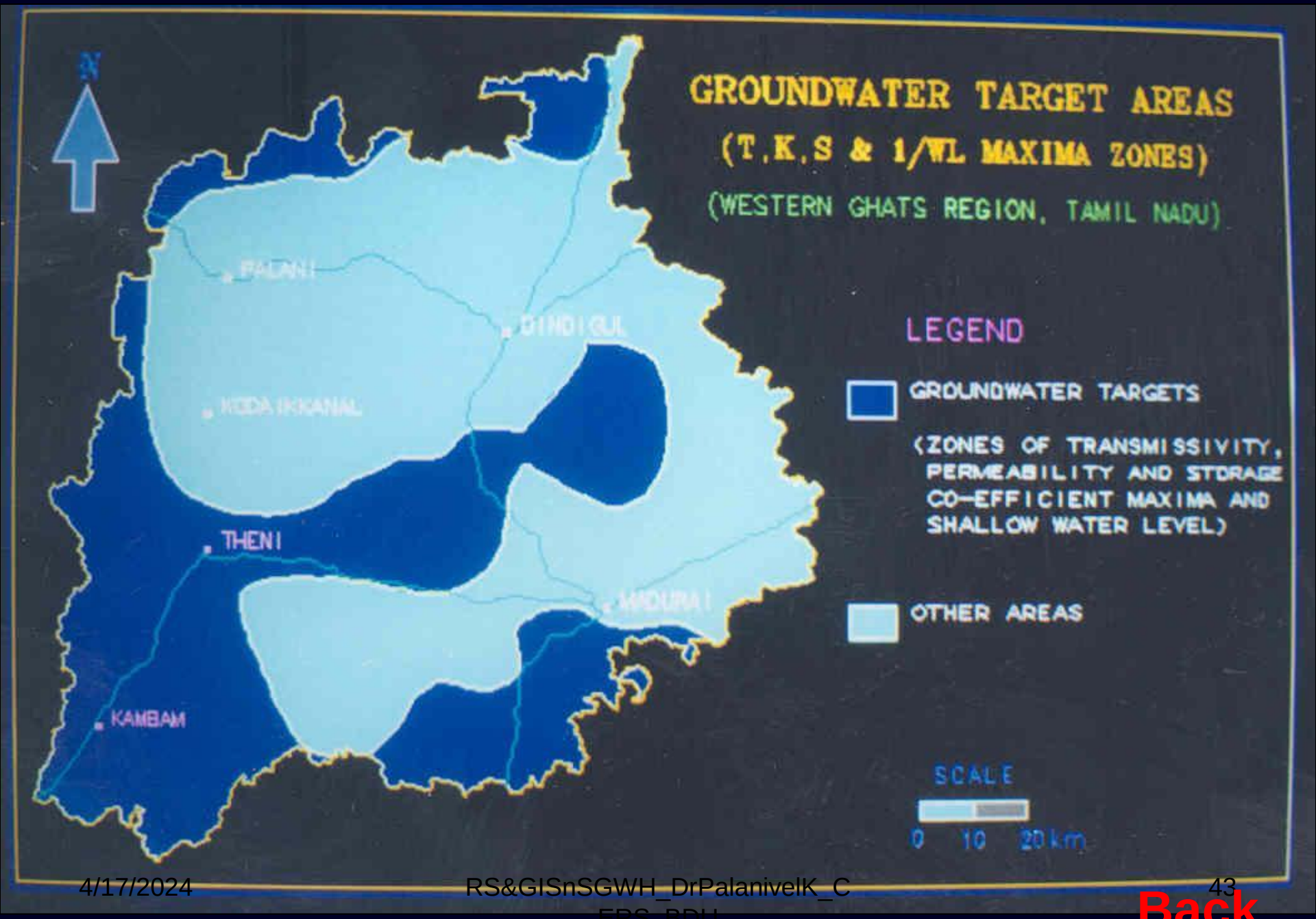
FIGURE 3.15 METHODOLOGY FLOW CHART

TABLE 4

TRANSMISSIVITY, SPECIFIC CAPACITY, PERMEABILITY AND WATER LEVEL DATA

(Sample Data)

1 GRIDNO	2 TRANSMI-SSIVITY	3 TRANSMI-SSIVITY STRETCH-ED DATA	4 SPECIFIC CAPACITY	5 SPECIFIC CAPACITY STRETCH-ED DATA	6 PERMEAB-ILITY	7 PERMEAB-ILITY STRETCH-ED DATA	8 WATER LEVEL	9 WATER LEVEL INVERSE DATA	10 WATER LEVEL INVERSE STRETCH-ED DATA
1	1.508	6	1.511	4	1.405	18	1.83	0.546	1
2	4.761	16	4.795	10	4.457	55	5.90	0.169	1
3	3.752	13	3.786	8	3.549	44	4.79	0.209	1
4	2.489	9	2.522	6	2.439	30	3.27	0.306	1
5	3.343	12	2.835	6	2.841	35	4.18	0.239	1
6	2.061	8	1.905	4	1.906	24	2.81	0.356	1
....	.....	..	.....	..	.....	..	....	.....	..
....	.....	..	.....	..	.....	..	....	.....	..
....	.....	..	.....	..	.....	..	....	.....	..
3130	0.445	2	0.273	1	0.014	1	1.12	0.893	2
3131	0.252	2	0.049	1	0.010	1	0.66	1.515	2
3132	1.248	5	0.250	1	0.050	2	2.78	0.360	1
3133	0.527	3	0.367	2	0.022	1	1.17	0.855	2
3134	0.646	3	0.320	2	0.019	1	1.05	0.952	2
3135	0.136	1	0.101	1	0.005	1	0.27	3.704	5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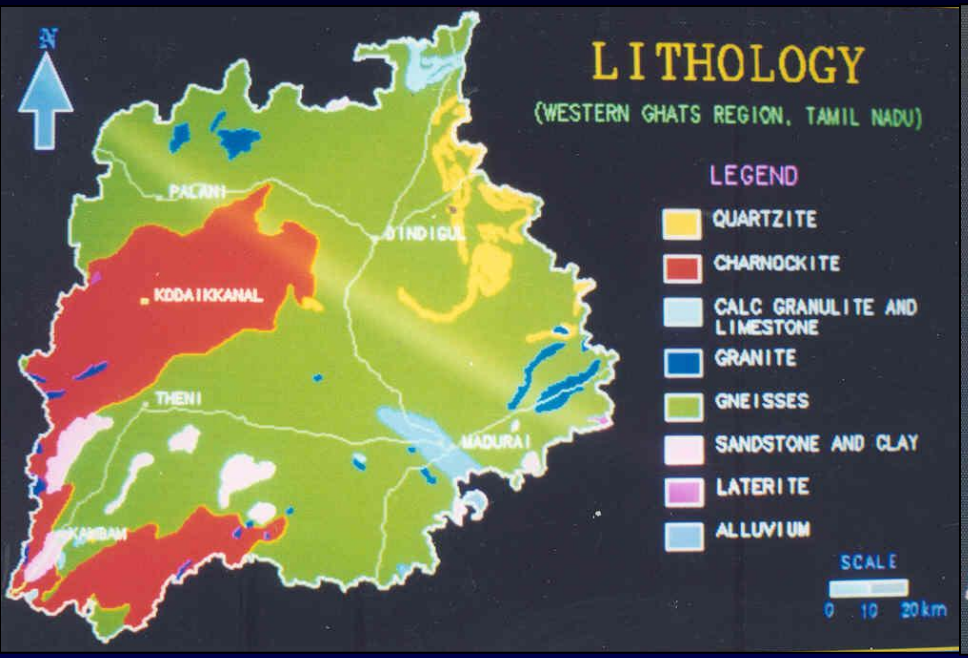
GROUNDWATER TARGET AREAS
(T,K,S & 1/WL MAXIMA ZONES)
(WESTERN GHATS REGION, TAMIL NADU)
PALANI
DINDIGUL
KODAIKKANAL
THENI
MADURAI
KAMBAM
LEGEND
GROUNDWATER TARGETS
(ZONES OF TRANSMISSIVITY, PERMEABILITY AND STORAGE CO-EFFICIENT MAXIMA AND SHALLOW WATER LEVEL)
OTHER AREAS
SCALE
0 10 20 km

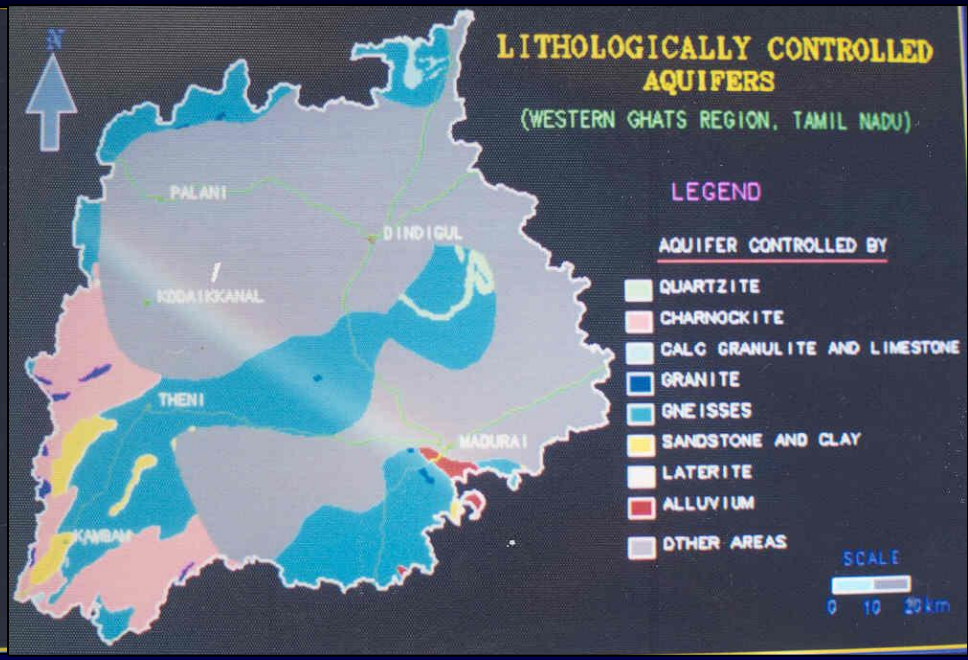
Back

STUDY - 11

AQUIFER FUNCTION MODELLING

Back


LITHOLOGY
(WESTERN GHATS REGION, TAMIL NADU)
LEGEND
QUARTZITE
CHARNOCKITE
CALC GRANULITE AND LIMESTONE
GRANITE
GNEISSES
SANDSTONE AND CLAY
LATERITE
ALLUVIUM
SCALE
0 10 20km
PALANI
DINDIGUL
KODAIKKANAL
THENI
MADURAI
KAMBAM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AQUIFER CONTROLLED BY
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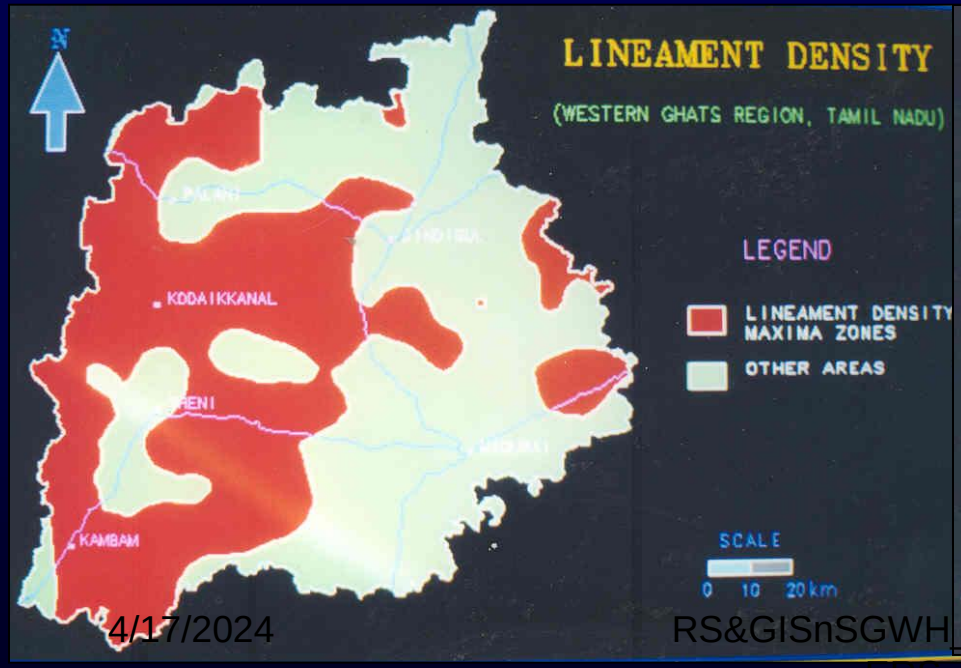
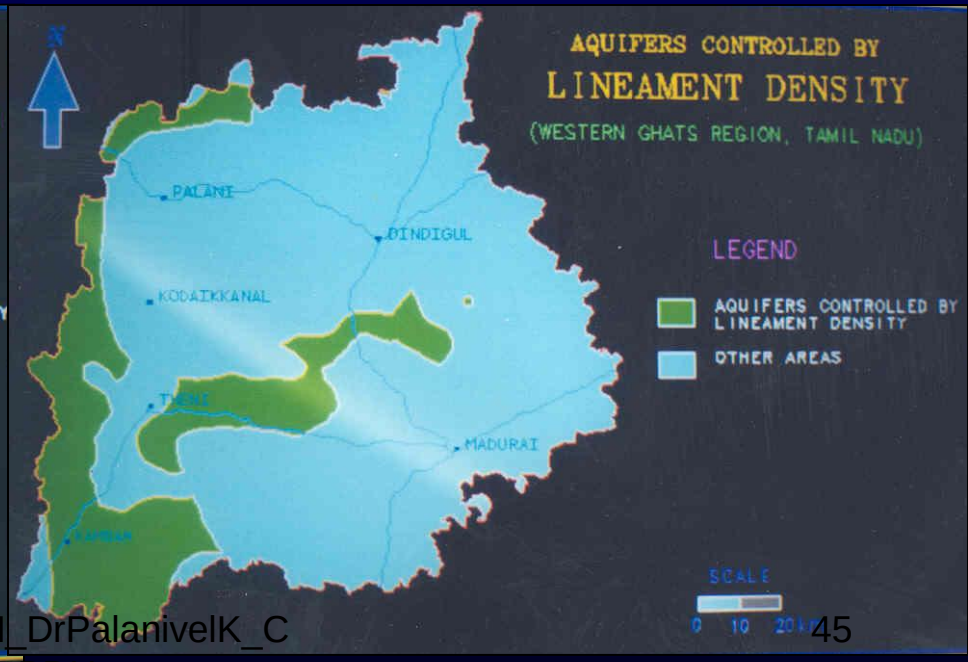
CHARNOCKITE
CALC GRANULITE AND LIMESTONE
GRANITE
GNEISSES
SANDSTONE AND CLAY
LATERITE
ALLUVIUM
OTHER AREAS
SCALE
0 10 20km
PALANI
DINDIGUL
KODAIKKANAL
THENI
MADURAI


LINEAMENT DENSITY
(WESTERN GHATS REGION, TAMIL NADU)
LEGEND
LINEAMENT DENSITY MAXIMA ZONES
OTHER AREAS
SCALE
0 10 20km
KODAIKKANAL
KAMBAM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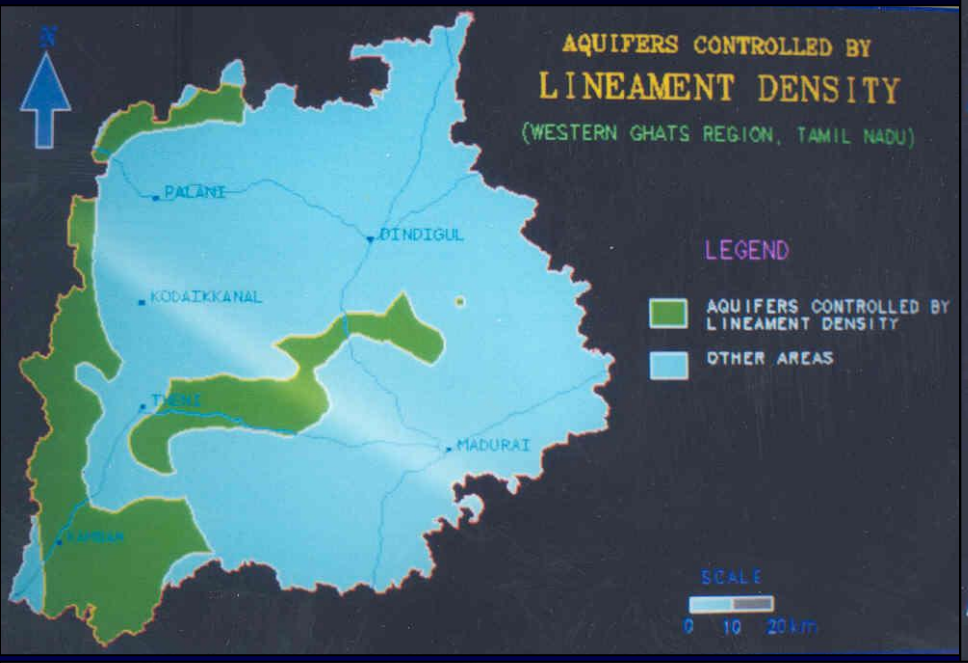
LINEAMENT DENSITY
(WESTERN GHATS REGION, TAMIL NADU)
LEGEND
AQUIFERS CONTROLLED BY LINEAMENT DENSITY
OTHER AREAS
SCALE
0 10 20km
PALANI
DINDIGUL
KODAIKKANAL
THENI
MADURAI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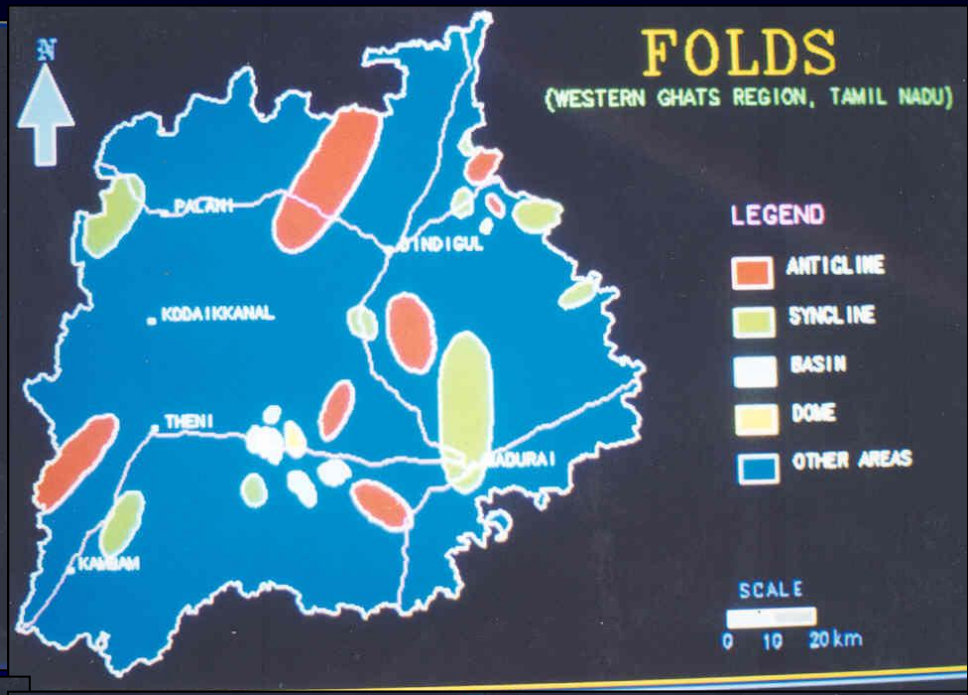
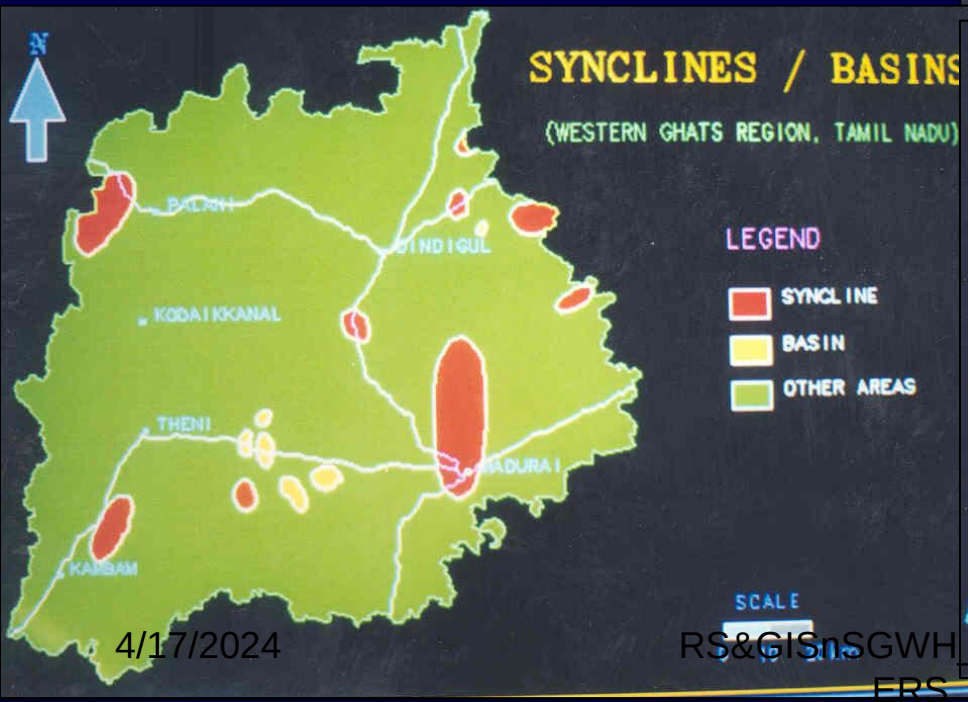
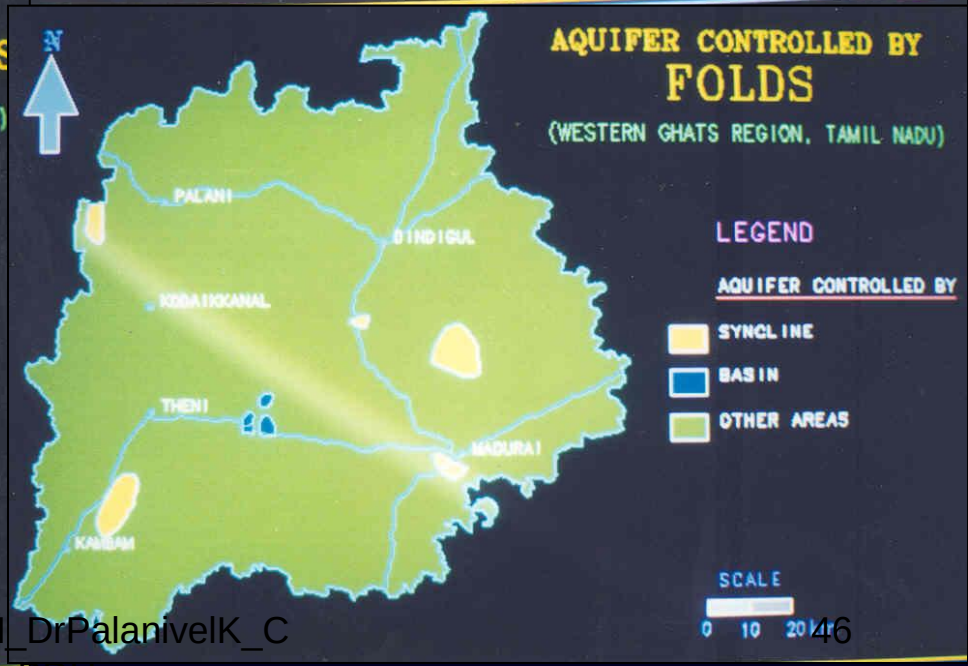
LINEAMENT DENSITY
(WESTERN GHATS REGION, TAMIL NADU)
PALANI
DINDIGUL
KODAIKKANAL
THENI
MADURAI
LEGEND
AQUIFERS CONTROLLED BY LINEAMENT DENSITY
OTHER AREAS
SCALE
0 10 20km


FOLDS
(WESTERN GHATS REGION, TAMIL NADU)
PALANI
DINDIGUL
KODAIKKANAL
THENI
MADURAI
KAMBAM
LEGEND
ANTICLINE
SYNCLINE
BASIN
DOME
OTHER AREAS
SCALE
0 10 20km


SYNCLINES / BASINS
(WESTERN GHATS REGION, TAMIL NADU)
PALANI
DINDIGUL
KODAIKKANAL
THENI
MADURAI
KAMBAM
LEGEND
SYNCLINE
BASIN
OTHER AREAS
SCALE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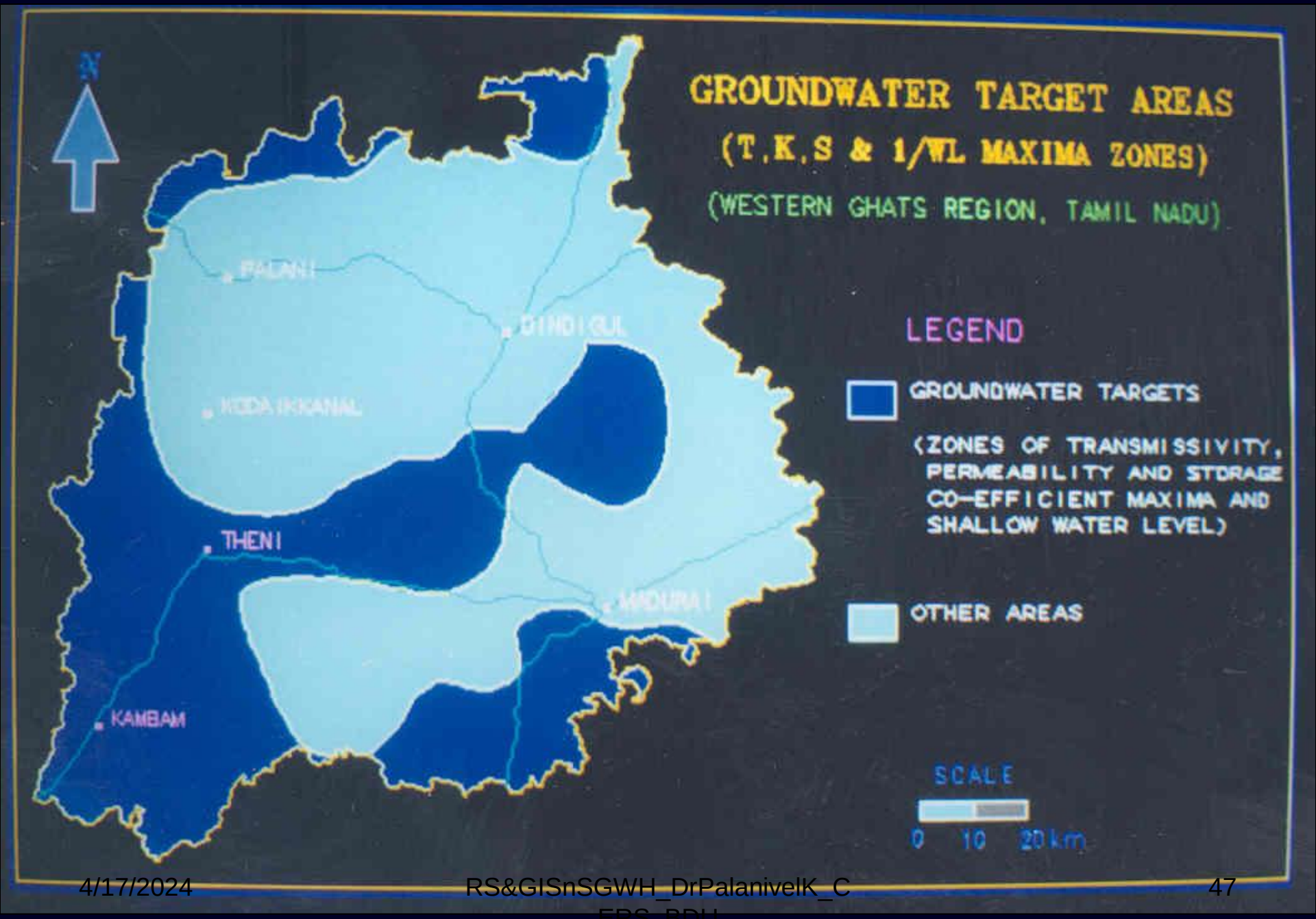
FOLDS
(WESTERN GHATS REGION, TAMIL NADU)
PALANI
DINDIGUL
KODAIKKANAL
THENI
MADURAI
KAMBAM
LEGEND
AQUIFER CONTROLLED BY
SYNCLINE
BASIN
OTHER AREAS
SCALE
0 10 20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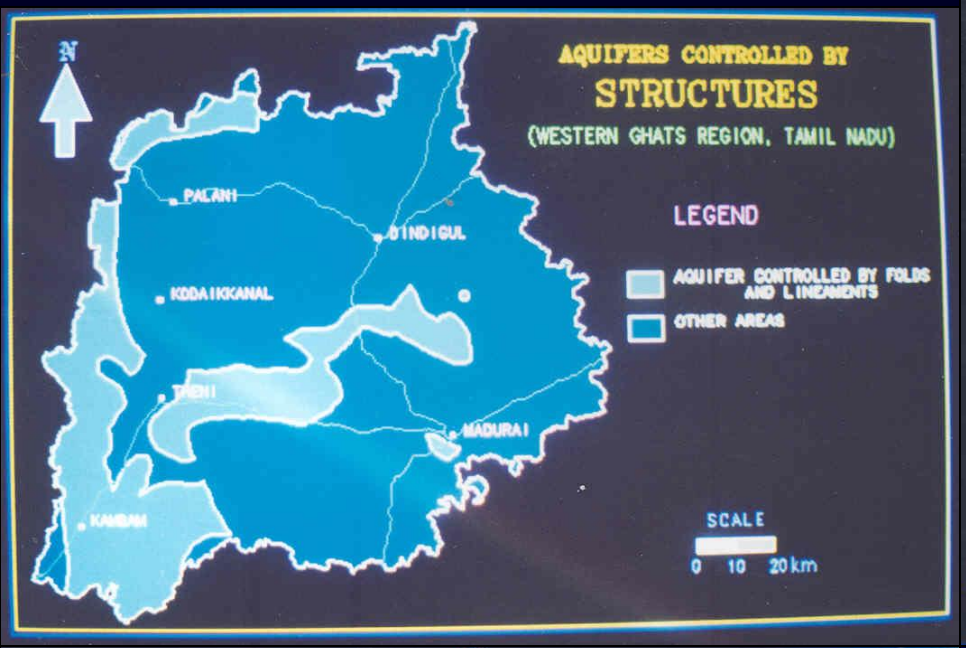
GROUNDWATER TARGET AREAS
(T,K,S & 1/WL MAXIMA ZONES)
(WESTERN GHATS REGION, TAMIL NADU)
PALANI
DINDIGUL
KODAIKKANAL
THENI
MADURAI
KAMBAM
LEGEND
GROUNDWATER TARGETS
(ZONES OF TRANSMISSIVITY, PERMEABILITY AND STORAGE CO-EFFICIENT MAXIMA AND SHALLOW WATER LEVEL)
OTHER AREAS
SCALE
0 10 20 km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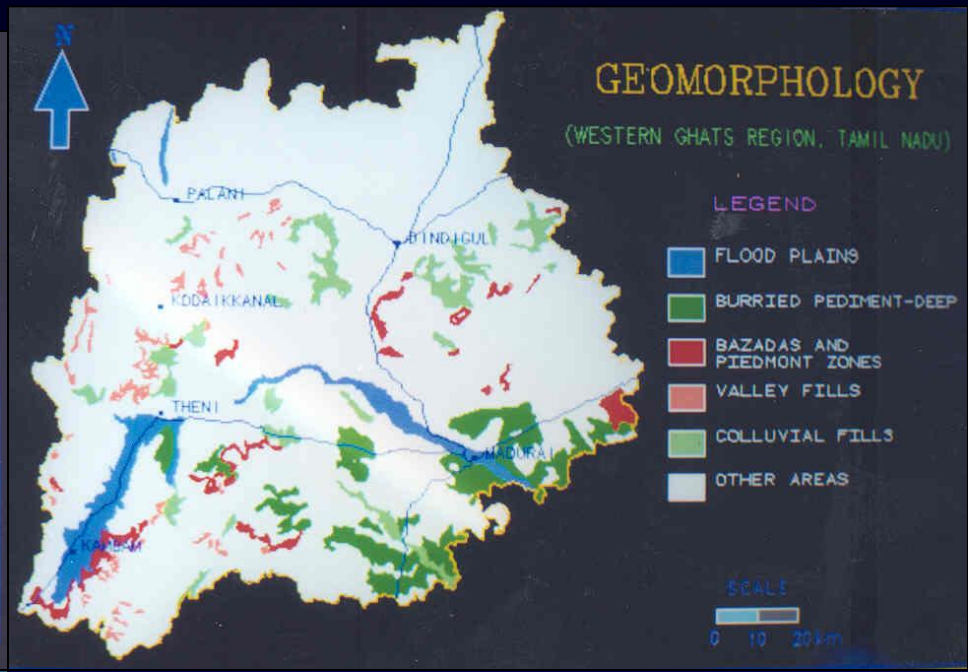
AQUIFERS CONTROLLED BY
STRUCTURES
(WESTERN GHATS REGION, TAMIL NADU)
PALANI
DINDIGUL
KODAIKKANAL
THENI
MADURAI
KAMBAM
LEGEND
AQUIFER CONTROLLED BY FOLDS AND LINEAMENTS
OTHER AREAS
SCALE
0 10 20km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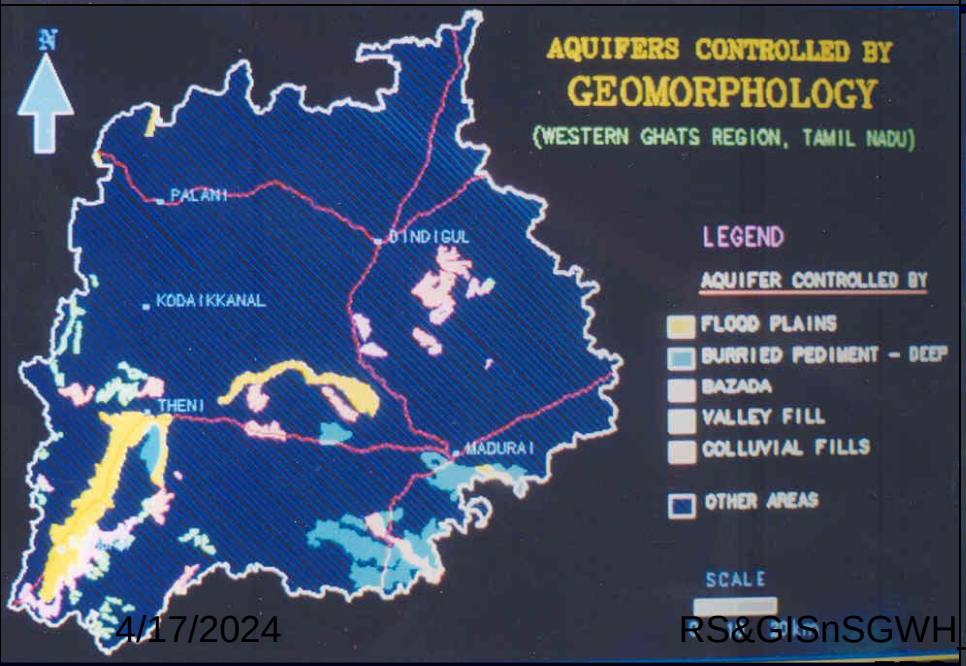
(WESTERN GHATS REGION, TAMIL NADU)
PALANI
DINDIGUL
KODAIKKANAL
THENI
MADURAI
LEGEND
FLOOD PLAINS
BURRIED PEDIMENT-DEEP
BAZADAS AND PIEDMONT ZONES
VALLEY FILLS
COLLUVIAL FILLS
OTHER AREAS
SCALE
0 10 20km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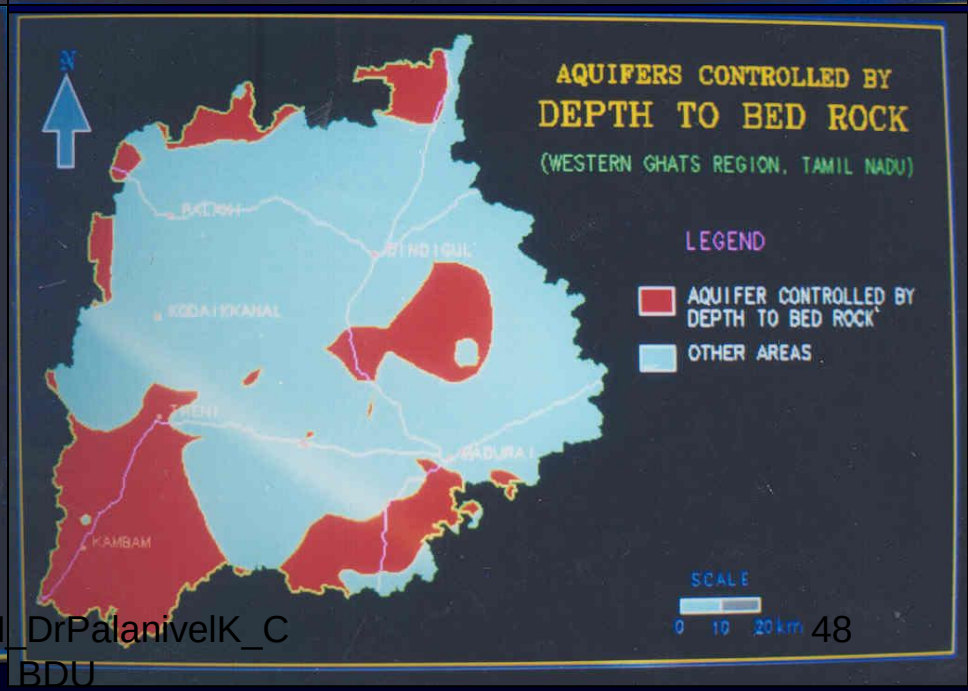
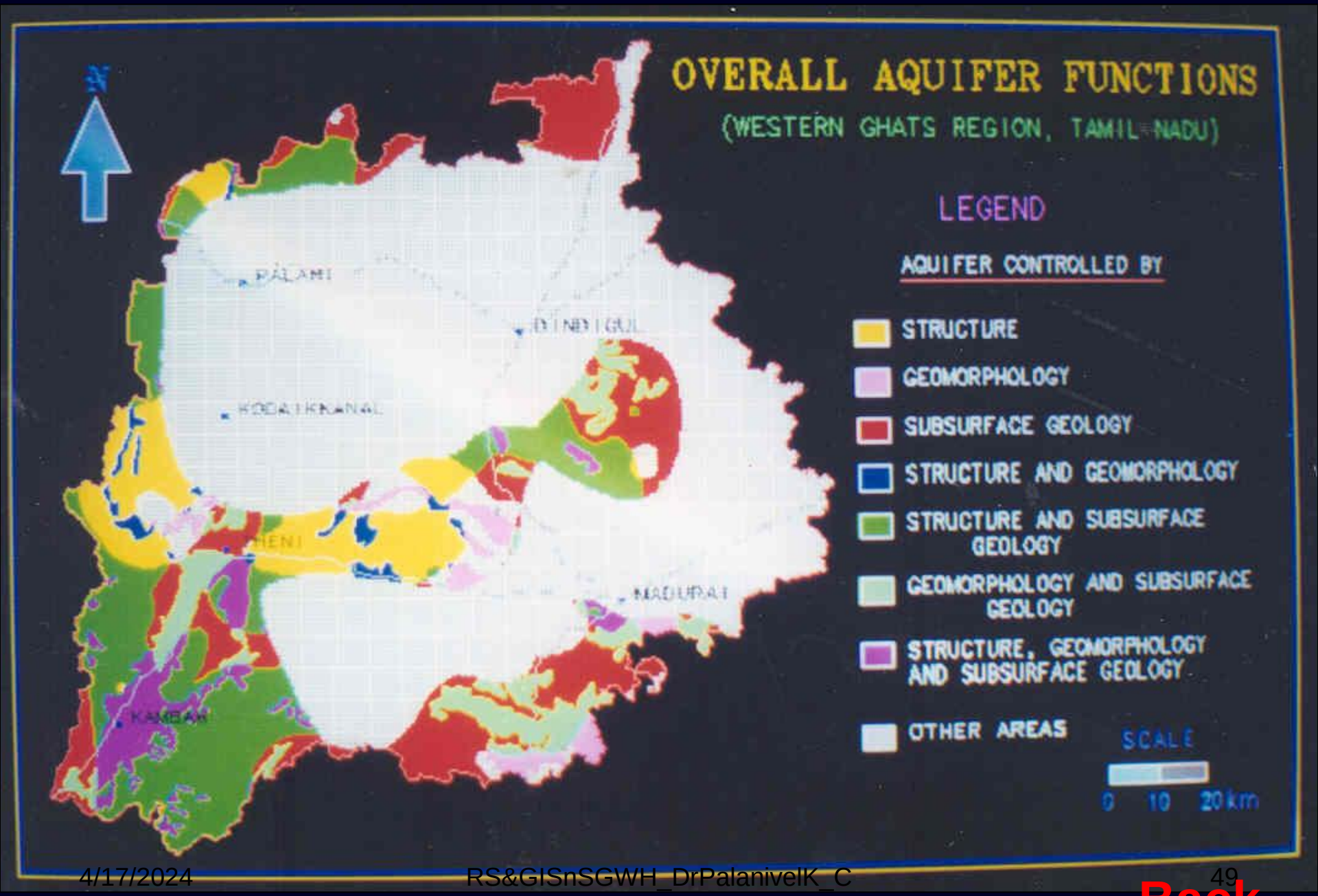
GEOMORPHOLOGY
(WESTERN GHATS REGION, TAMIL NADU)
PALANI
DINDIGUL
KODAIKKANAL
THENI
MADURAI
LEGEND
AQUIFER CONTROLLED BY
FLOOD PLAINS
BURRIED PEDIMENT - DEEP
BAZADA
VALLEY FILL
COLLUVIAL FILLS
OTHER AREAS
SCALE


N
AQUIFERS CONTROLLED BY
DEPTH TO BED ROCK
(WESTERN GHATS REGION, TAMIL NADU)
PALANI
DINDIGUL
KODAIKKANAL
THENI
MADURAI
KAMBAM
LEGEND
AQUIFER CONTROLLED BY DEPTH TO BED ROCK
OTHER AREAS
SCALE
0 10 20km

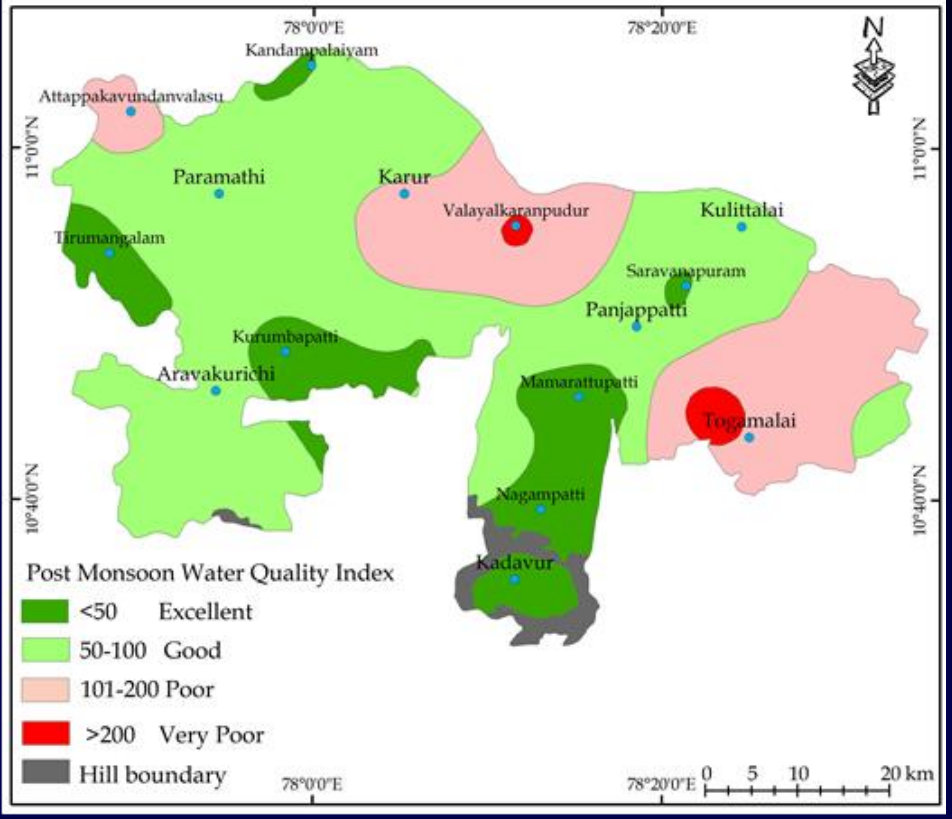

OVERALL AQUIFER FUNCTIONS
(WESTERN GHATS REGION, TAMIL NADU)
LEGEND
AQUIFER CONTROLLED BY
STRUCTURE
GEOMORPHOLOGY
SUBSURFACE GEOLOGY
STRUCTURE AND GEOMORPHOLOGY
STRUCTURE AND SUBSURFACE GEOLOGY
GEOMORPHOLOGY AND SUBSURFACE GEOLOGY
STRUCTURE, GEOMORPHOLOGY AND SUBSURFACE GEOLOGY
OTHER AREAS
SCALE
0 10 20 km
PALANI
KODAIKANAL
MADURAI
KAMBAM

Back

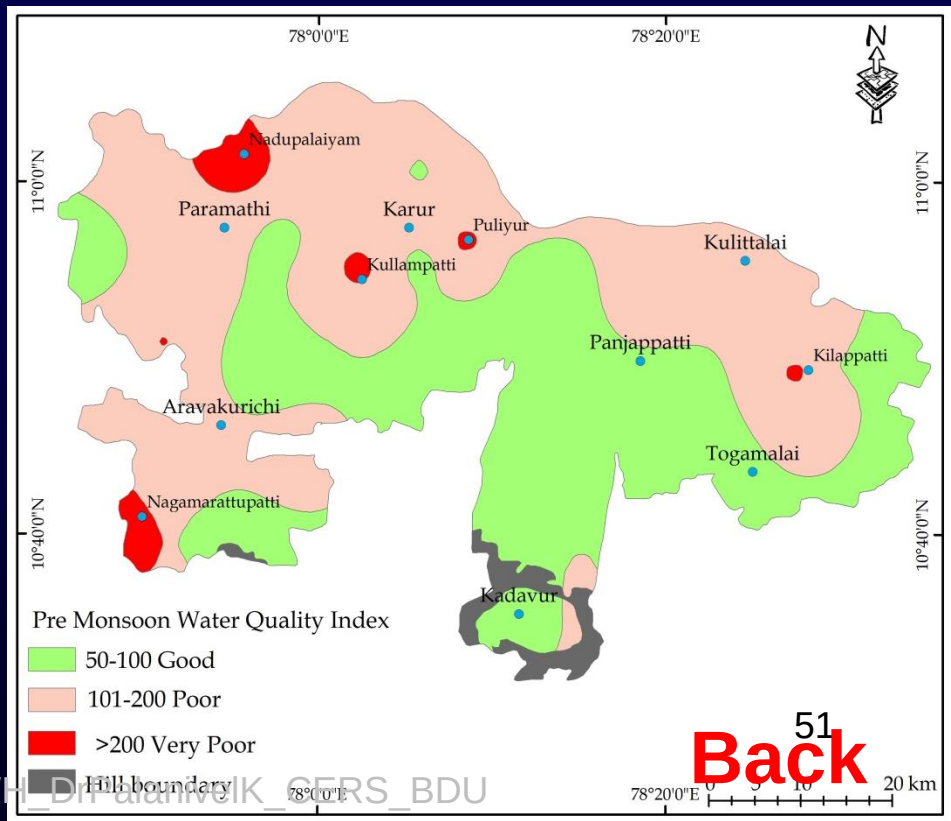
STUDY - 12

Groundwater Quality Modelling

Back



Post monsoon Water Quality Index



Pre monsoon Water Quality Index

STUDY –17

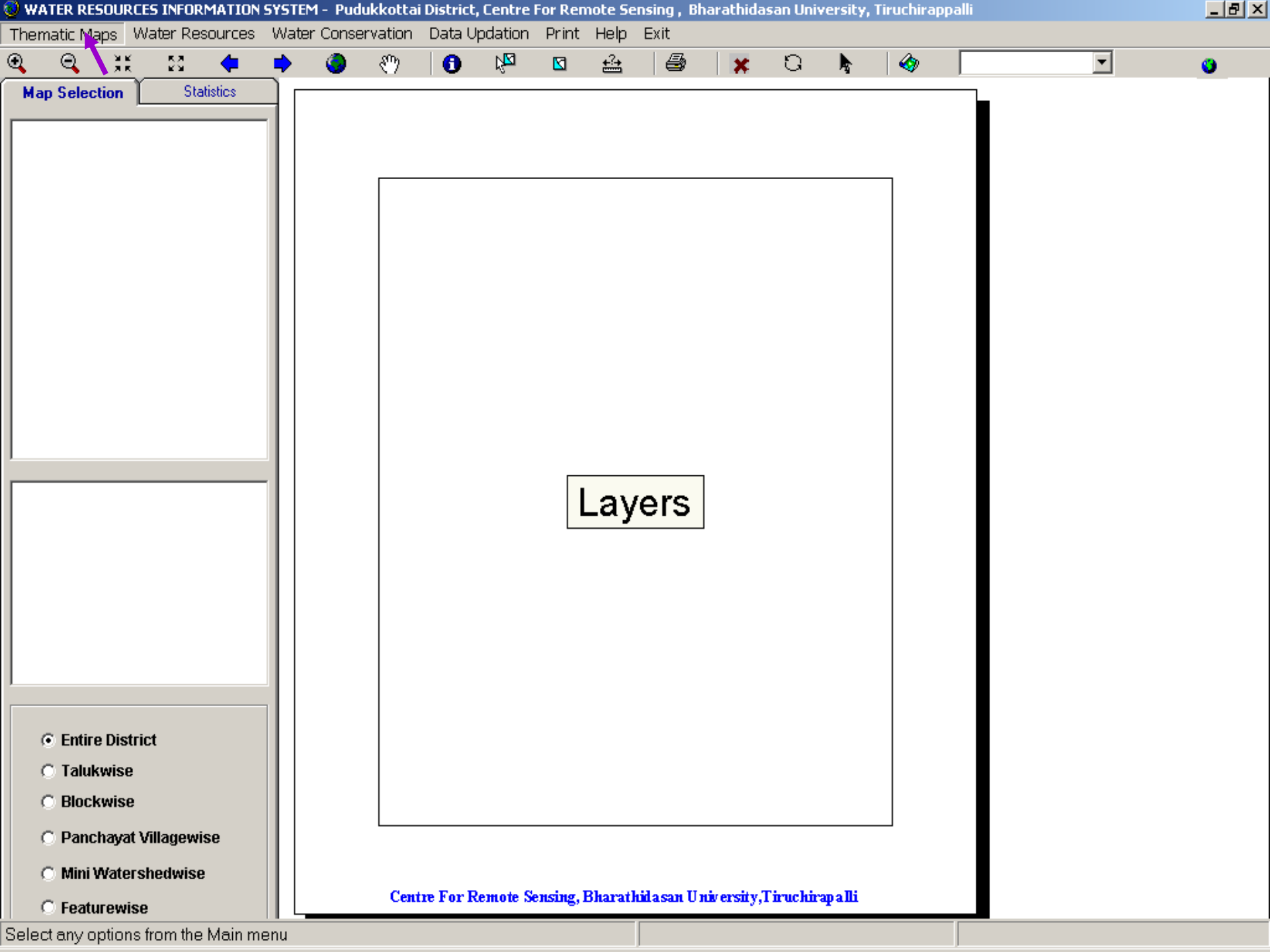
WATER RESOURCES INFORMATION SYSTEM

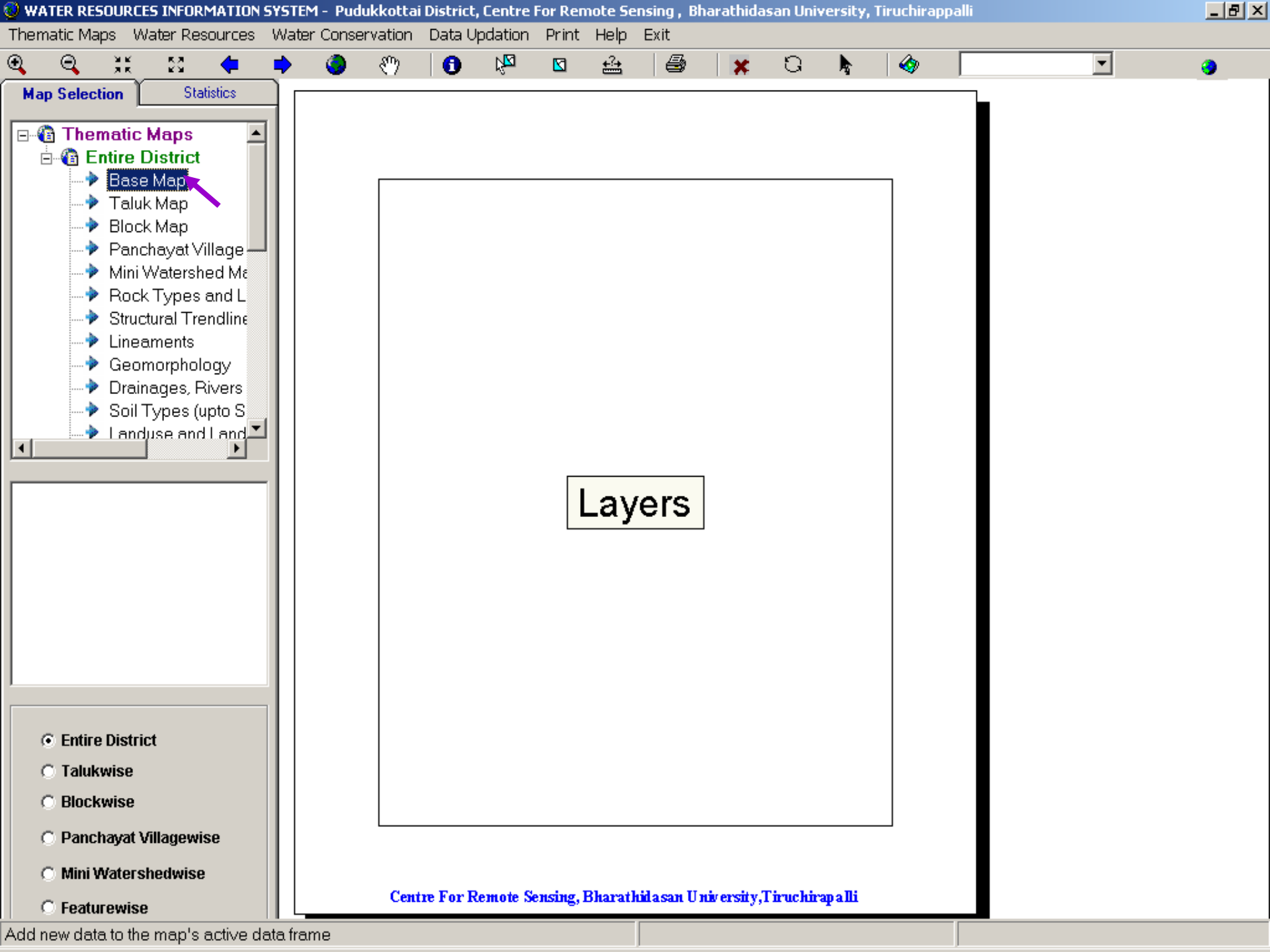
SPATIAL DECISION SUPPORT SYSTEM - SDSS

Back

Credibility of WRIS

- Easy to access and readily available information in a single mouse click or two.
- More useful for Planners, Administrators and users having no knowledge on GIS.
- Simple to make any type of spatial queries and
- Useful in quick and easy Decision Making spatially.


WATER RESOURCES INFORMATION SYSTEM - Pudukkottai District, Centre For Remote Sensing , Bharathidasan University, Tiruchirappalli
Thematic Maps
Water Resources
Water Conservation
Data Updation
Print
Help
Exit
Map Selection
Statistics
Entire District
Talukwise
Blockwise
Panchayat Villagewise
Mini Watershedwise
Featurewise
Layers
Centre For Remote Sensing, Bharathidasan University,Tiruchirapalli
Select any options from the Main menu


WATER RESOURCES INFORMATION SYSTEM - Pudukkottai District, Centre For Remote Sensing , Bharathidasan University, Tiruchirappalli
Thematic Maps
Water Resources
Water Conservation
Data Updation
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Exit
Map Selection
Statistics
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Base Map
Taluk Map
Block Map
Panchayat Village
Mini Watershed Ma
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Structural Trendline
Lineaments
Geomorphology
Drainages, Rivers
Soil Types (upto S
Landuse and Land
Entire District
Talukwise
Blockwise
Panchayat Villagewise
Mini Watershedwise
Featurewise
Layers
Centre For Remote Sensing, Bharathidasan University,Tiruchirapalli
Add new data to the map's active data frame

WATER RESOURCES INFORMATION SYSTEM - Pudukkottai District, Centre For Remote Sensing , Bharathidasan University, Tiruchirappalli

Thematic Maps | Water Resources | Water Conservation | Data Updation | Print | Help | Exit

1:886312

Map Selection | Statistics

- Thematic Maps
  - Entire District
    - Base Map
    - Taluk Map
    - Block Map
    - Panchayat Village
    - Mini Watershed Ma
    - Rock Types and L
    - Structural Trendline
    - Lineaments
    - Geomorphology
    - Drainages, Rivers
    - Soil Types (upto S
    - Landuse and Land

- Entire District
- Talukwise
- Blockwise
- Panchayat Villagewise
- Mini Watershedwise
- Featurewise

BASE MAP

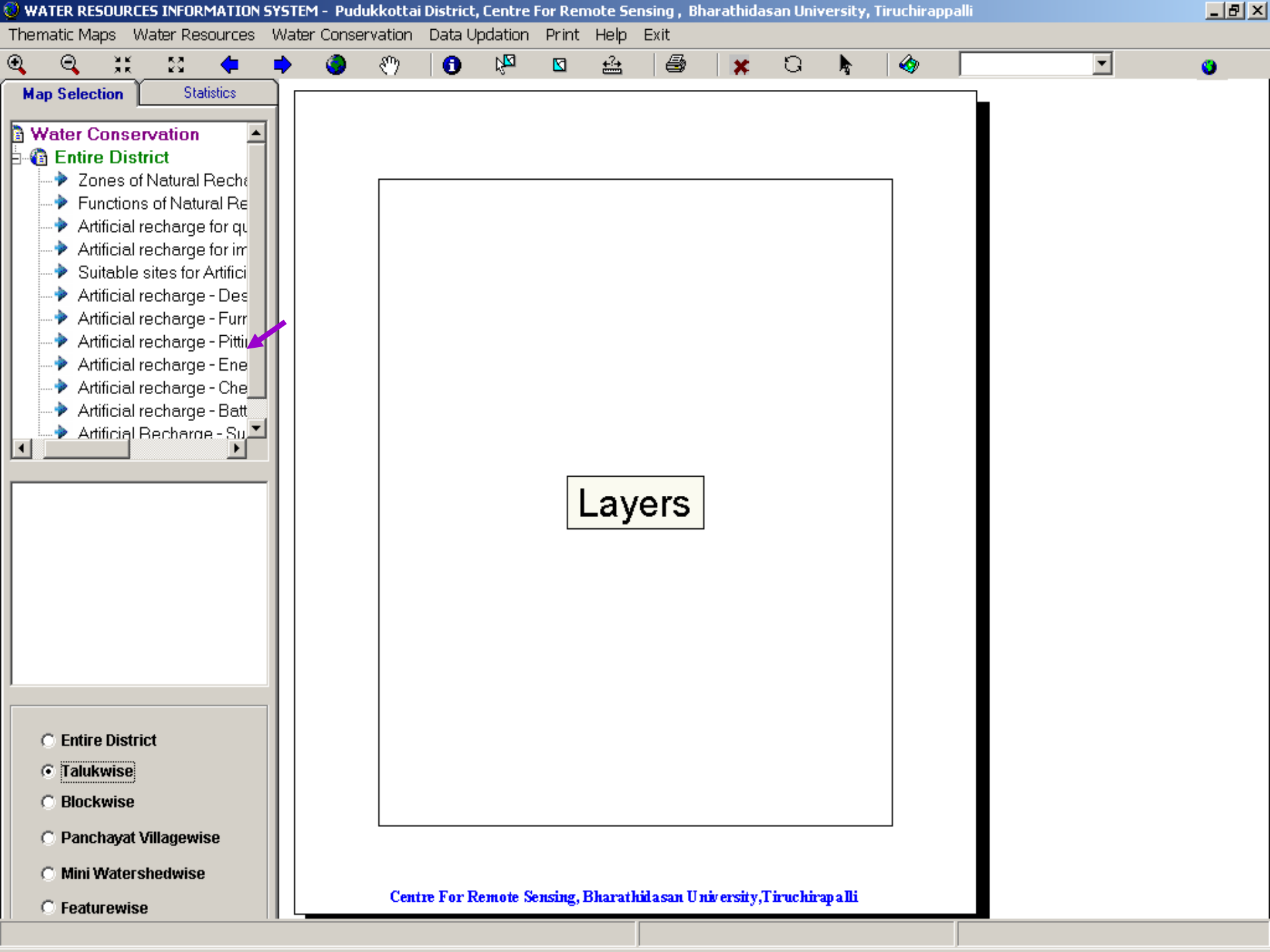
Pudukkottai District , Tamil Nadu

Centre For Remote Sensing, Bharathidasan University,Tiruchirapalli

Legend

- Settlement
- River
- Railway line
- Major_Road
- Tanks
- Pudukkottai District

Add new data to the map's active data frame


WATER RESOURCES INFORMATION SYSTEM - Pudukkottai District, Centre For Remote Sensing , Bharathidasan University, Tiruchirappalli
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Centre For Remote Sensing, Bharathidasan University,Tiruchirapalli

WATER RESOURCES INFORMATION SYSTEM - Pudukkottai District, Centre For Remote Sensing , Bharathidasan University, Tiruchirappalli

Thematic Maps | Water Resources | Water Conservation | Data Updation | Print | Help | Exit

Map Selection | Statistics

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  - Artificial recharge - Batt
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Taluk Names
- ALANGUDI TALUK
- ARANTANGI TALUK
- AVUDAIYARKOIL TALUK
- GANDARVAKOTTAI TAL
- ILUPPUR TALUK
- KULATHUR TALUK
- MANAMELKUDI TALUK

- Entire District
- Talukwise
- Blockwise
- Panchayat Villagewise
- Mini Watershedwise
- Featurewise

ARTIFICIAL RECHARGE - PITTING

Pudukkottai District , Tamil Nadu

N W E S

Layers

125 0 125 250 km

Centre For Remote Sensing, Bharathidasan University,Tiruchirapalli

Legend

Choose any Resource Map then select the Taluk Names

WATER RESOURCES INFORMATION SYSTEM - Pudukkottai District, Centre For Remote Sensing , Bharathidasan University, Tiruchirappalli

Thematic Maps | Water Resources | Water Conservation | Data Updation | Print | Help | Exit

1:387406

Map Selection | Statistics

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  - Functions of Nature
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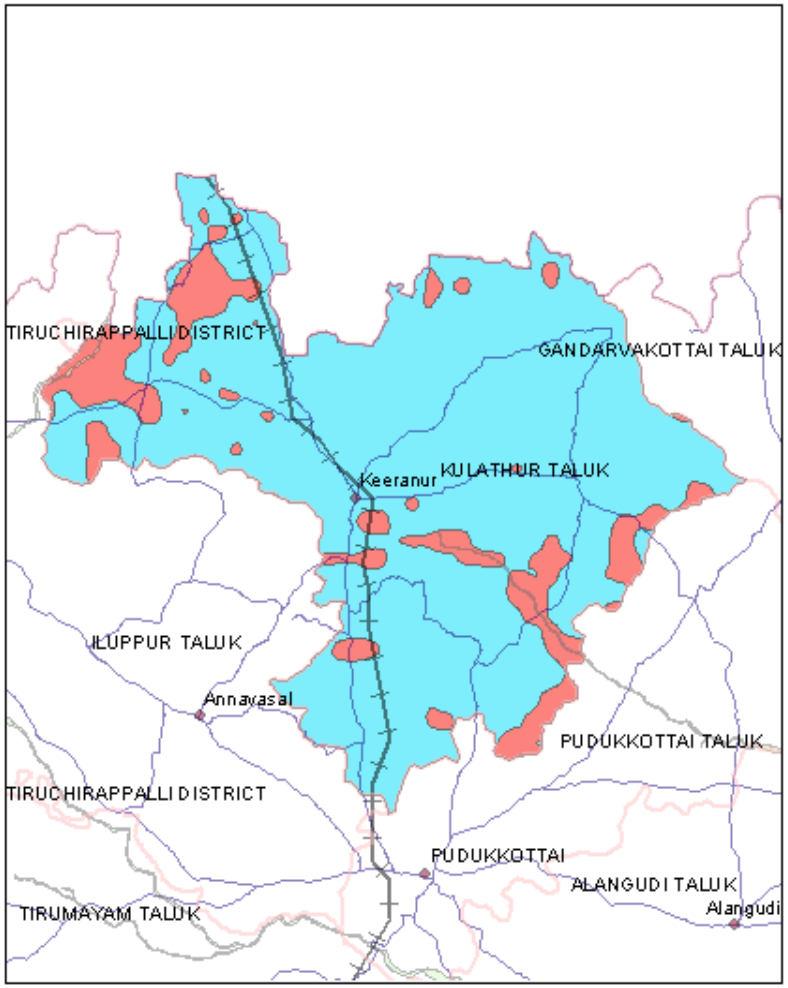
  - Artificial recharge -
  - Artificial Recharge

- ARANTANGI TALUK
- AVUDAIYARKOIL TALUK
- GANDARVAKOTTAI TAL
- ILUPPUR TALUK
- KULATHUR TALUK
- MANAMELKUDI TALUK
- PUDUKKOTTAI TALUK
- TIRUMAYAM TALUK

- Entire District
- Talukwise
- Blockwise
- Panchayat Villagewise
- Mini Watershedwise
- Featurewise

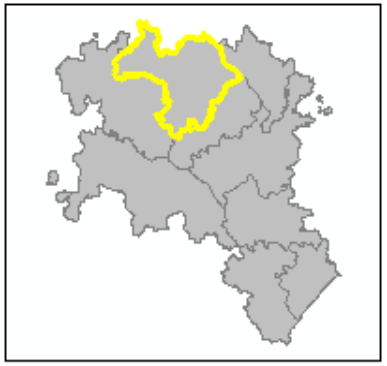
ARTIFICIAL RECHARGE - PITTING - KULATHUR TALUK

Pudukkottai District , Tamil Nadu



Legend

- Taluk map
- Settlement
- River
- Railway line
- Major_Road
- Other Areas
- Suitable Sites for Pitting



Centre For Remote Sensing, Bharathidasan University,Tiruchirapalli

Choose any Resource Map then select the Taluk Names

78°31'25.60"E 10°28'52.64"N

WATER RESOURCES INFORMATION SYSTEM - Pudukkottai District, Centre For Remote Sensing , Bharathidasan University, Tiruchirappalli

Thematic Maps | Water Resources | Water Conservation | Data Updation | Print | Help | Exit

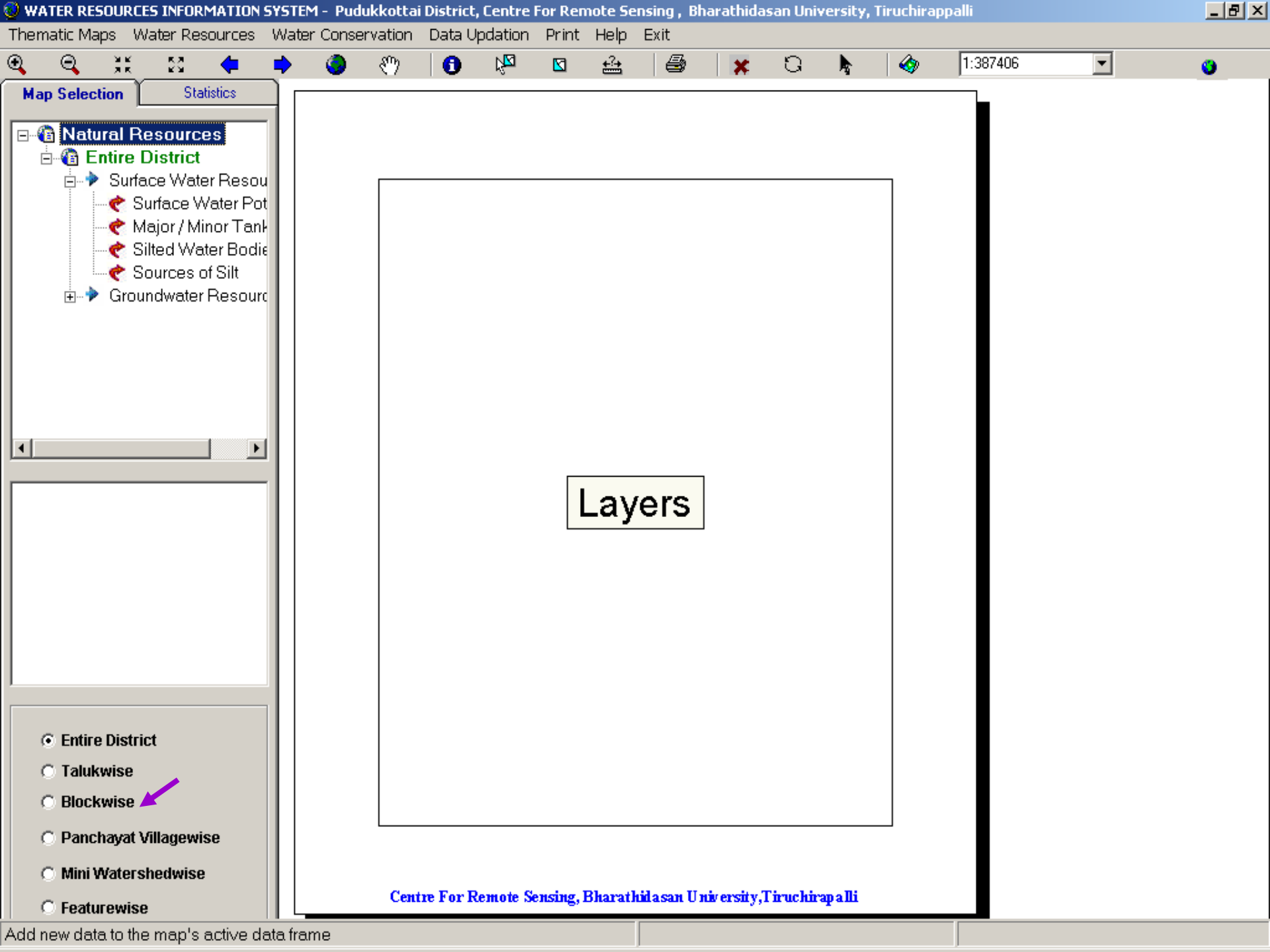
Map Selection | Statistics

- Natural Resources
  - Entire District
    - Surface Water Resou
    - Groundwater Resourc

Layers

- Entire District
- Talukwise
- Blockwise
- Panchayat Villagewise
- Mini Watershedwise
- Featurewise

Centre For Remote Sensing, Bharathidasan University,Tiruchirapalli


WATER RESOURCES INFORMATION SYSTEM - Pudukkottai District, Centre For Remote Sensing , Bharathidasan University, Tiruchirappalli
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Blockwise
Panchayat Villagewise
Mini Watershedwise
Featurewise
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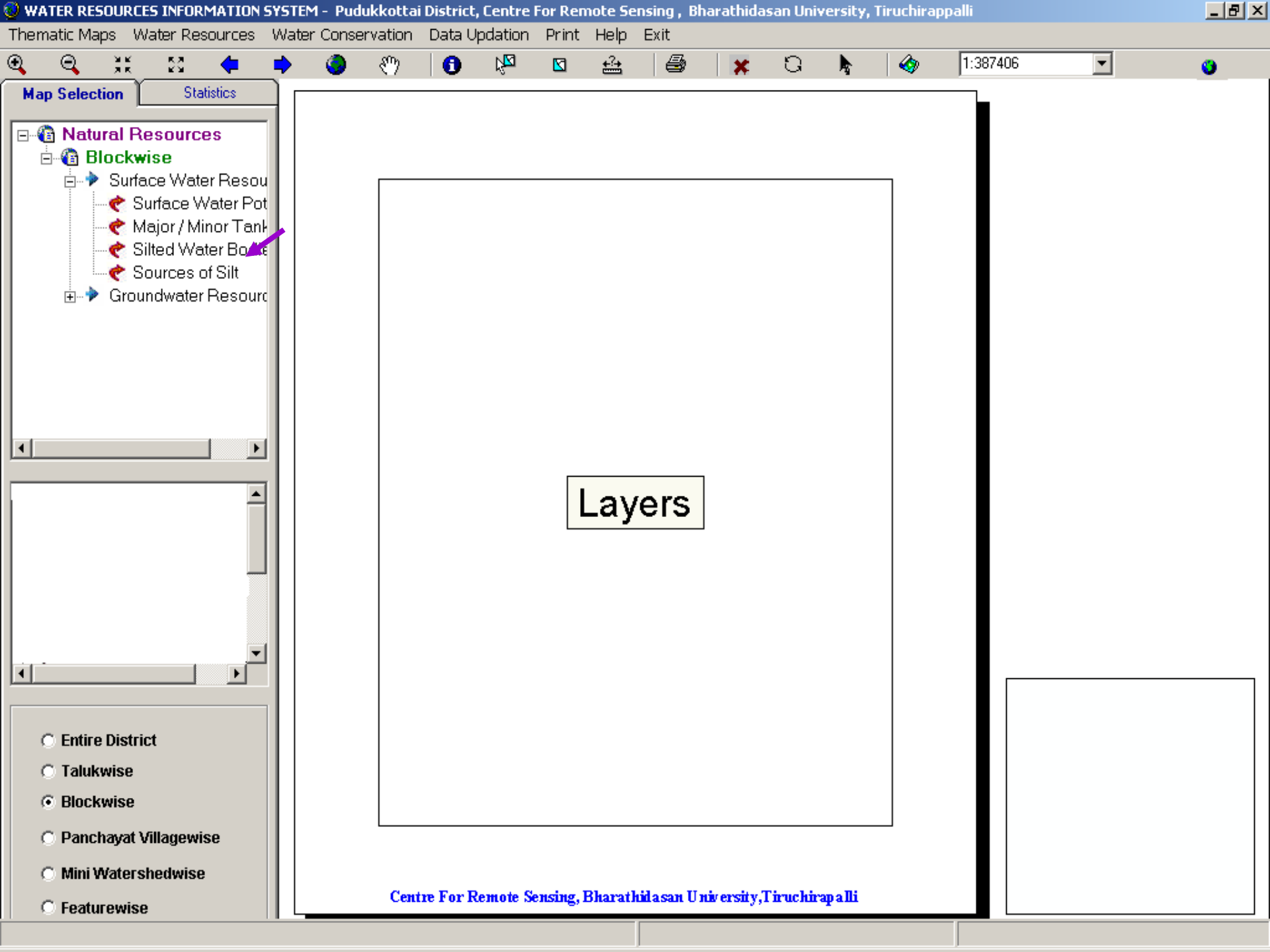
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Water Conservation
Data Updation
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Blockwise
Panchayat Villagewise
Mini Watershedwise
Featurewise
Layers
Centre For Remote Sensing, Bharathidasan University,Tiruchirapalli

WATER RESOURCES INFORMATION SYSTEM - Pudukkottai District, Centre For Remote Sensing , Bharathidasan University, Tiruchirappalli

Thematic Maps | Water Resources | Water Conservation | Data Updation | Print | Help | Exit

1:886313

Map Selection | Statistics

- Natural Resources
  - Blockwise
    - Surface Water Resou
      - Surface Water Pot
      - Major / Minor Tank
      - Silted Water Bodies
      - Sources of Silt
    - Groundwater Resourc

- ARANTANGI BLOCK
- ARIMALAM BLOCK
- AVUDAIYARKOIL BLOCK
- GANDARVAKOTTAI BLC
- KARAMBAKUDI BLOCK
- KUNNANDARKOIL BLOC
- MANAMELKUDI BLOCK
- PONNAMARAVATHI BLC

- Entire District
- Talukwise
- Blockwise
- Panchayat Villagewise
- Mini Watershedwise
- Featurewise

SURFACE WATER RESOURCES - SILTED WATER BODIES

Pudukkottai District , Tamil Nadu

N W E S

Layers

125 0 125 250 km

Centre For Remote Sensing, Bharathidasan University,Tiruchirapalli

Legend

Choose any Resource Map then select the Block Names

WATER RESOURCES INFORMATION SYSTEM - Pudukkottai District, Centre For Remote Sensing , Bharathidasan University, Tiruchirappalli

Thematic Maps | Water Resources | Water Conservation | Data Updation | Print | Help | Exit

1:188044

Map Selection | Statistics

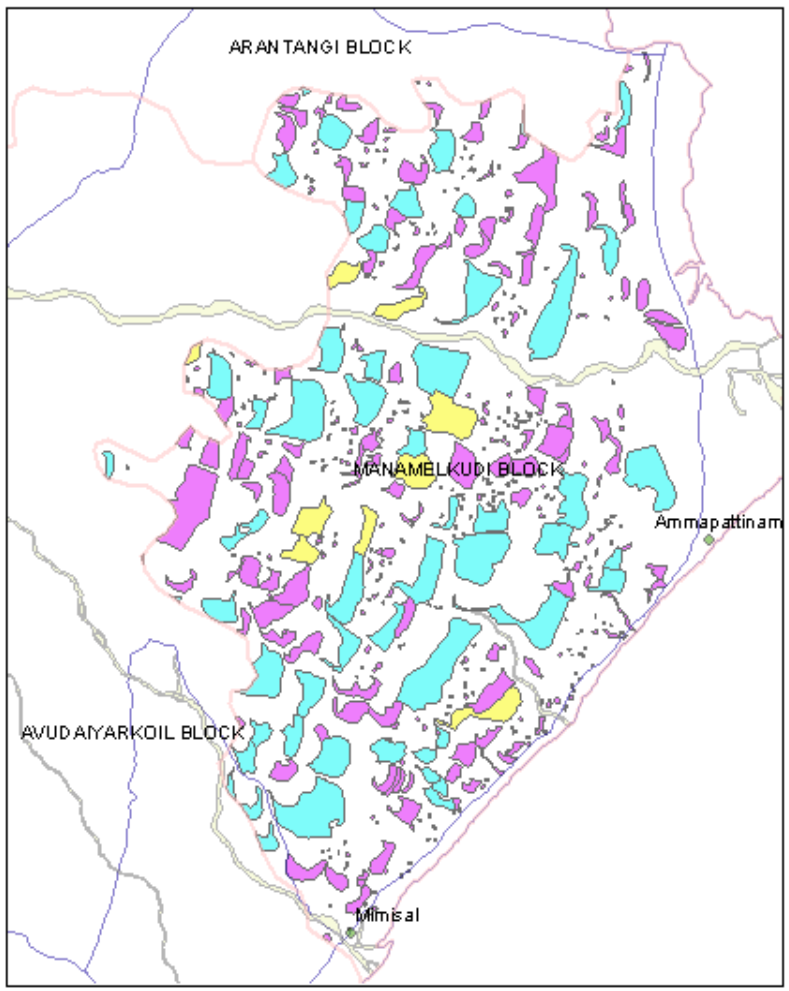
- Natural Resources
  - Blockwise
    - Surface Water Resou
      - Surface Water Pot
      - Major / Minor Tank
      - Silted Water Bodie
      - Sources of Silt
    - Groundwater Resourc

- KARAMBAKUDI BLOCK
- KUNNANDARKOIL BLOC
- MANAMELKUDI BLOCK
- PONNAMARAVATHI BL
- PUDUKKOTTAI BLOCK
- THIRUVARANGULAM B
- TIRUMAYAM BLOCK
- VIRALIMALAI BLOCK

- Entire District
- Talukwise
- Blockwise
- Panchayat Villagewise
- Mini Watershedwise
- Featurewise

SILTED WATER BODIES - MANAMELKUDI BLOCK

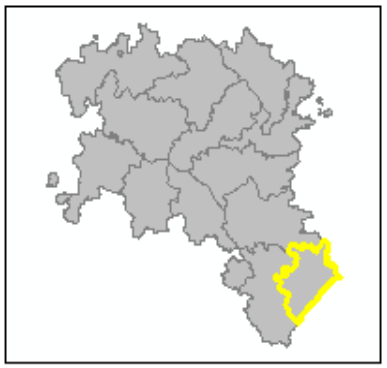
Pudukkottai District , Tamil Nadu



Centre For Remote Sensing, Bharathidasan University,Tiruchirapalli

Legend

- block map
- Settlement
- River
- Railway line
- Major_Road
- <30% SILTED TANKS
- 60 - 30% SILTED TANKS
- >60% SILTED TANKS



Choose any Resource Map then select the Block Names

78°29'50.79"E 10°32'36.58"N

WATER RESOURCES INFORMATION SYSTEM - Pudukkottai District, Centre For Remote Sensing , Bharathidasan University, Tiruchirappalli

Thematic Maps | Water Resources | Water Conservation | Data Updation | Print | Help | Exit

1:188044

Map Selection | Statistics

- Mini Watershed Ma
- Rock Types and L
- Structural Trendline
- Lineaments
- Geomorphology
- Drainages, Rivers
- Soil Types (upto S
- Landuse and Land
- Slope Map (in %)
- Lineament Density
- Drainage Density (
- Observation Wells
- Rainfall (in mm)
- Water Level (in me

Village Names

- 9A-NATHAMPANNAI
- 9B-NATHAMPANNAI
- ADHANOOR
- AGARAPATTI
- AKKACHIPATTI
- ALAMPATTI
- ALANGUDI - VIRALIMAL

- Entire District
- Talukwise
- Blockwise
- Panchayat Villagewise
- Mini Watershedwise
- Featurewise

Layers

Centre For Remote Sensing, Bharathidasan University,Tiruchirapalli

Choose any Resource Map then select the Village Names

WATER RESOURCES INFORMATION SYSTEM - Pudukkottai District, Centre For Remote Sensing , Bharathidasan University, Tiruchirappalli

Thematic Maps | Water Resources | Water Conservation | Data Updation | Print | Help | Exit

1:886313

Map Selection | Statistics

- Drainages, Rivers
- Soil Types (upto S
- Landuse and Land
- Slope Map (in %)
- Lineament Density
- Drainage Density (
- Observation Wells
- Rainfall (in mm)
- Water Level (in me
- Thickness of Top S
- Thickness of Weat
- Depth to Bed rock
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- Permeability (in g/c

Village Names

- 9A-NATHAMPANNAI
- 9B-NATHAMPANNAI
- ADHANOOR
- AGARAPATTI
- AKKACHIPATTI
- ALAMPATTI
- ALANGUDI - VIRALIMAL

- Entire District
- Talukwise
- Blockwise
- Panchayat Villagewise
- Mini Watershedwise
- Featurewise

DRAINAGE DENSITY (IN M/1 SQ.KM)

Pudukkottai District , Tamil Nadu

N W E S

Layers

125 0 125 250 km

Centre For Remote Sensing, Bharathidasan University,Tiruchirapalli

Legend

Choose any Resource Map then select the Village Names

WATER RESOURCES INFORMATION SYSTEM - Pudukkottai District, Centre For Remote Sensing , Bharathidasan University, Tiruchirappalli

Thematic Maps | Water Resources | Water Conservation | Data Updation | Print | Help | Exit

1:47285

Map Selection | Statistics

- Lineaments
- Geomorphology
- Drainages, Rivers
- Soil Types (upto S
- Landuse and Land
- Slope Map (in %)
- Lineament Density
- Drainage Density (
- Observation Wells
- Rainfall (in mm)
- Water Level (in me
- Thickness of Top S
- Thickness of Weat
- Depth to Bed rock

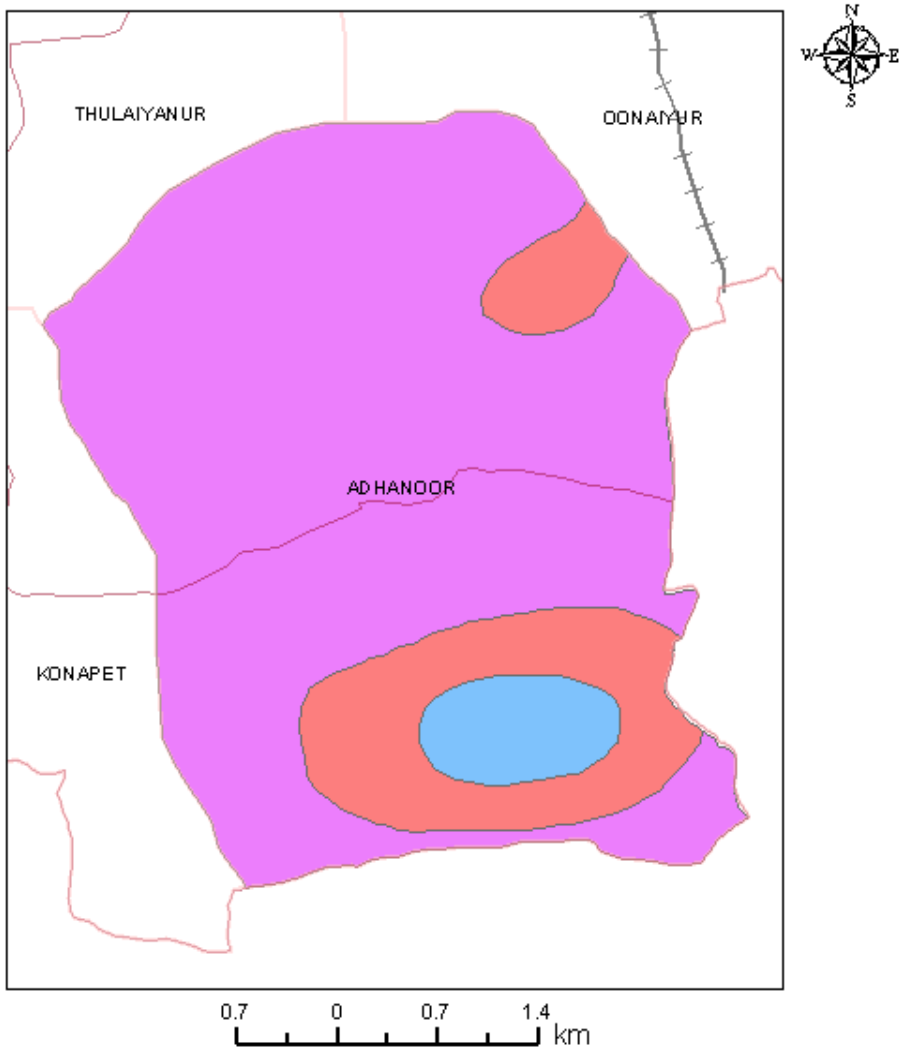
Village Names

- 9A-NATHAMPANNAI
- 9B-NATHAMPANNAI
- ADHANOOR
- AGARAPATTI
- AKKACHIPATTI
- ALAMPATTI
- ALANGUDI - VIRALIMAL

- Entire District
- Talukwise
- Blockwise
- Panchayat Villagewise
- Mini Watershedwise
- Featurewise

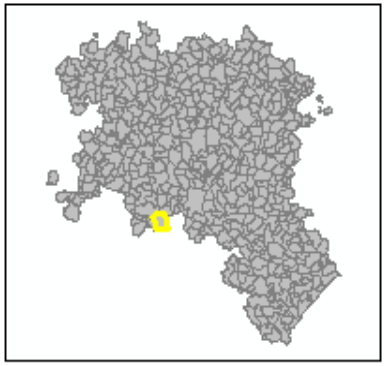
DRAINAGE DENSITY (IN M/1 SQ.KM) - ADHANOOR

Pudukkottai District , Tamil Nadu



Legend

- village
- Settlement
- River
- Railway line
- Major_Road
- HIGH (m/1 sq.km)
- MEDIUM (m/1 sq.km)
- LOW (m/1 sq.km)



Centre For Remote Sensing, Bharathidasan University,Tiruchirapalli

Choose any Resource Map then select the Village Names

78°42'56.25"E 10°9'55.57"N

WATER RESOURCES INFORMATION SYSTEM - Pudukkottai District, Centre For Remote Sensing , Bharathidasan University, Tiruchirappalli

Thematic Maps | Water Resources | Water Conservation | Data Updation | Print | Help | Exit

1:886313

Map Selection | Statistics

- Natural Resources
  - Featurewise
    - Surface Water Resou
    - Groundwater Resourc
      - Potential Groundw
      - Groundwater Suita
      - Groundwater Suita
      - Groundwater Suita
      - Zones of Poor Gro
      - Poor Groundwater
      - Poor Groundwater

Features

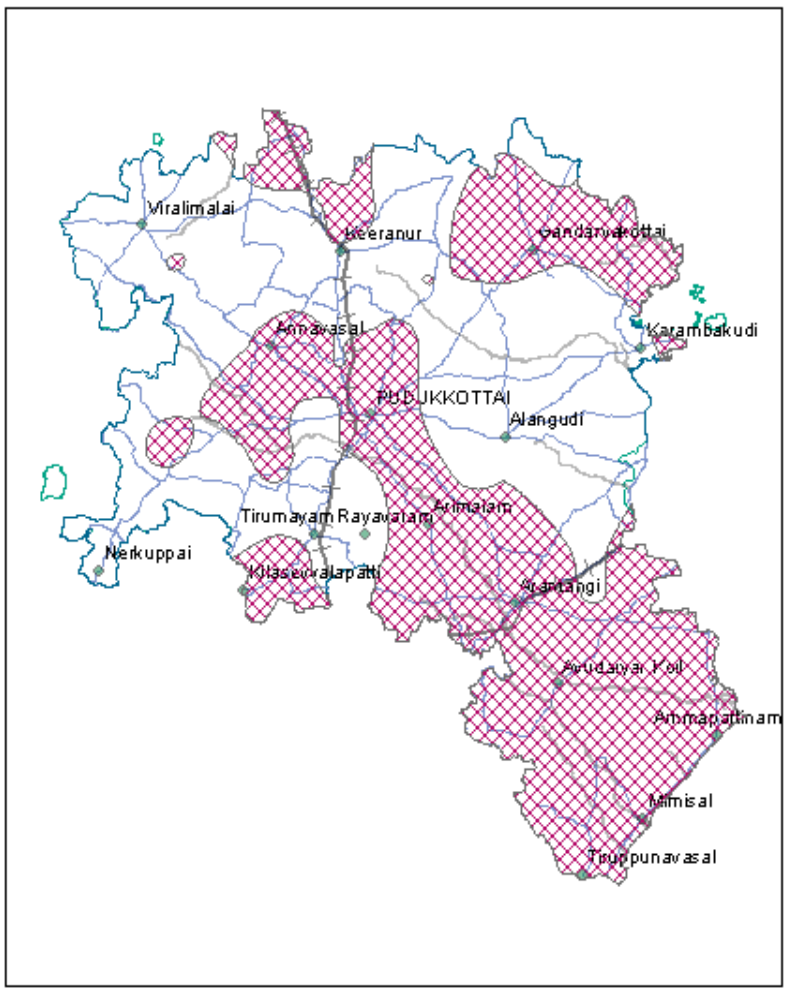
- PRIORITY AREA - I
- PRIORITY AREA - III
- PRIORITY AREA - II

- Entire District
- Talukwise
- Blockwise
- Panchayat Villagewise
- Mini Watershedwise
- Featurewise

GROUNDWATER RESOURCES

Potential Groundwater Zones

Pudukkottai District , Tamil Nadu



Centre For Remote Sensing, Bharathidasan University,Tiruchirapalli

Legend

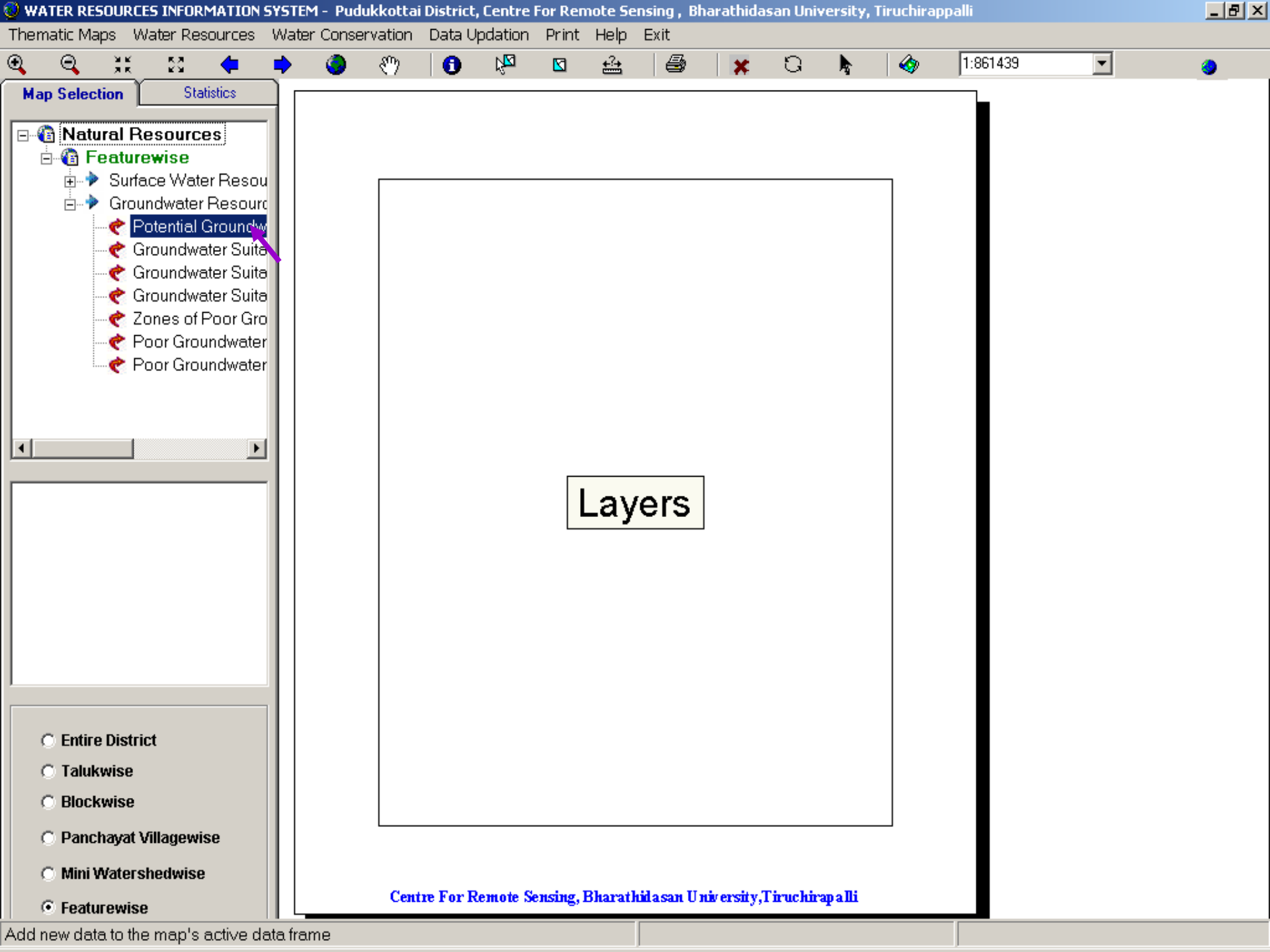
- Settlement
- River
- Railway line
- Major_Road

Legend

PRIORITY AREA - I

Choose any Resource Map then select the Features

78°14'9.82"E 9°56'7.40"N


WATER RESOURCES INFORMATION SYSTEM - Pudukkottai District, Centre For Remote Sensing , Bharathidasan University, Tiruchirappalli
Thematic Maps
Water Resources
Water Conservation
Data Updation
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Map Selection
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Surface Water Resou
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Zones of Poor Gro
Poor Groundwater
Poor Groundwater
Layers
Entire District
Talukwise
Blockwise
Panchayat Villagewise
Mini Watershedwise
Featurewise
Centre For Remote Sensing, Bharathidasan University,Tiruchirapalli
Add new data to the map's active data frame

WATER RESOURCES INFORMATION SYSTEM - Pudukkottai District, Centre For Remote Sensing , Bharathidasan University, Tiruchirappalli

Thematic Maps | Water Resources | Water Conservation | Data Updation | Print | Help | Exit

1:861506

Map Selection | Statistics

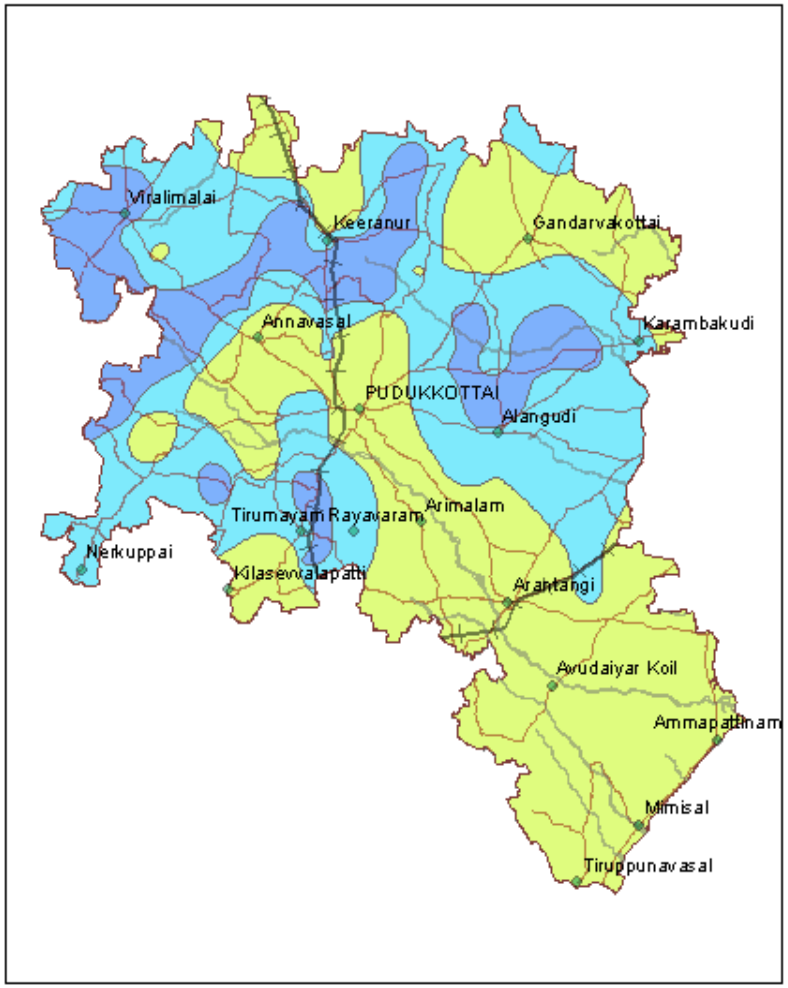
- Natural Resources
  - Entire District
    - Surface Water Resou
    - Groundwater Resourc
      - Potential Groundw
      - Groundwater Suita
      - Groundwater Suita
      - Groundwater Suita
      - Zones of Poor Gro
      - Poor Groundwater
      - Poor Groundwater

- Entire District
- Talukwise
- Blockwise
- Panchayat Villagewise
- Mini Watershedwise
- Featurewise

GROUNDWATER RESOURCES

Potential Groundwater Zones

Pudukkottai District , Tamil Nadu



Legend

- Settlement
- River
- Railway line
- Major_Road
- PRIORITY AREA - I
- PRIORITY AREA - III
- PRIORITY AREA - II

Centre For Remote Sensing, Bharathidasan University,Tiruchirapalli

78°43'27.74"E 10°31'45.61"N

WATER RESOURCES INFORMATION SYSTEM - Pudukkottai District, Centre For Remote Sensing , Bharathidasan University, Tiruchirappalli

Thematic Maps | Water Resources | Water Conservation | Data Updation | Print | Help | Exit

1:31635

Map Selection | Statistics

Layers for Wrapping

Clear Wrapping

Spatial / Non - Spatial Data

List Data

Select by Attributes

Query Builder

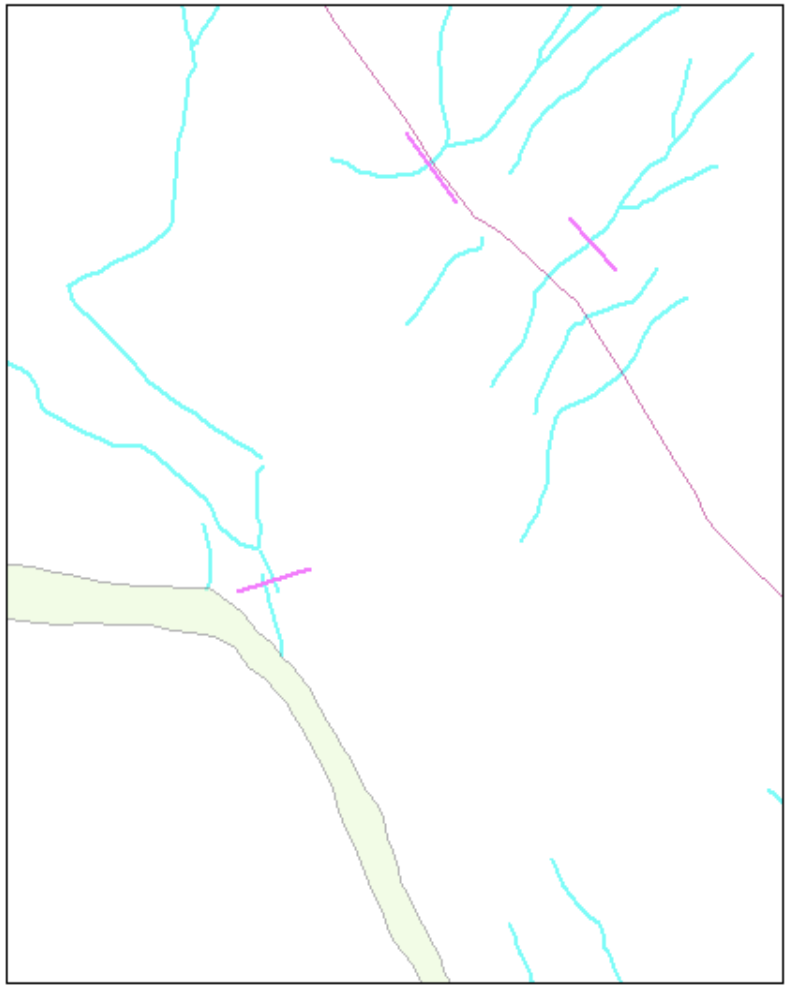
Feature layer Properties

Settlement
River
Railway line
Major_Road
ar_cdam

Visible

ARTIFICIAL RECHARGE - CHECK DAM

Pudukkottai District , Tamil Nadu



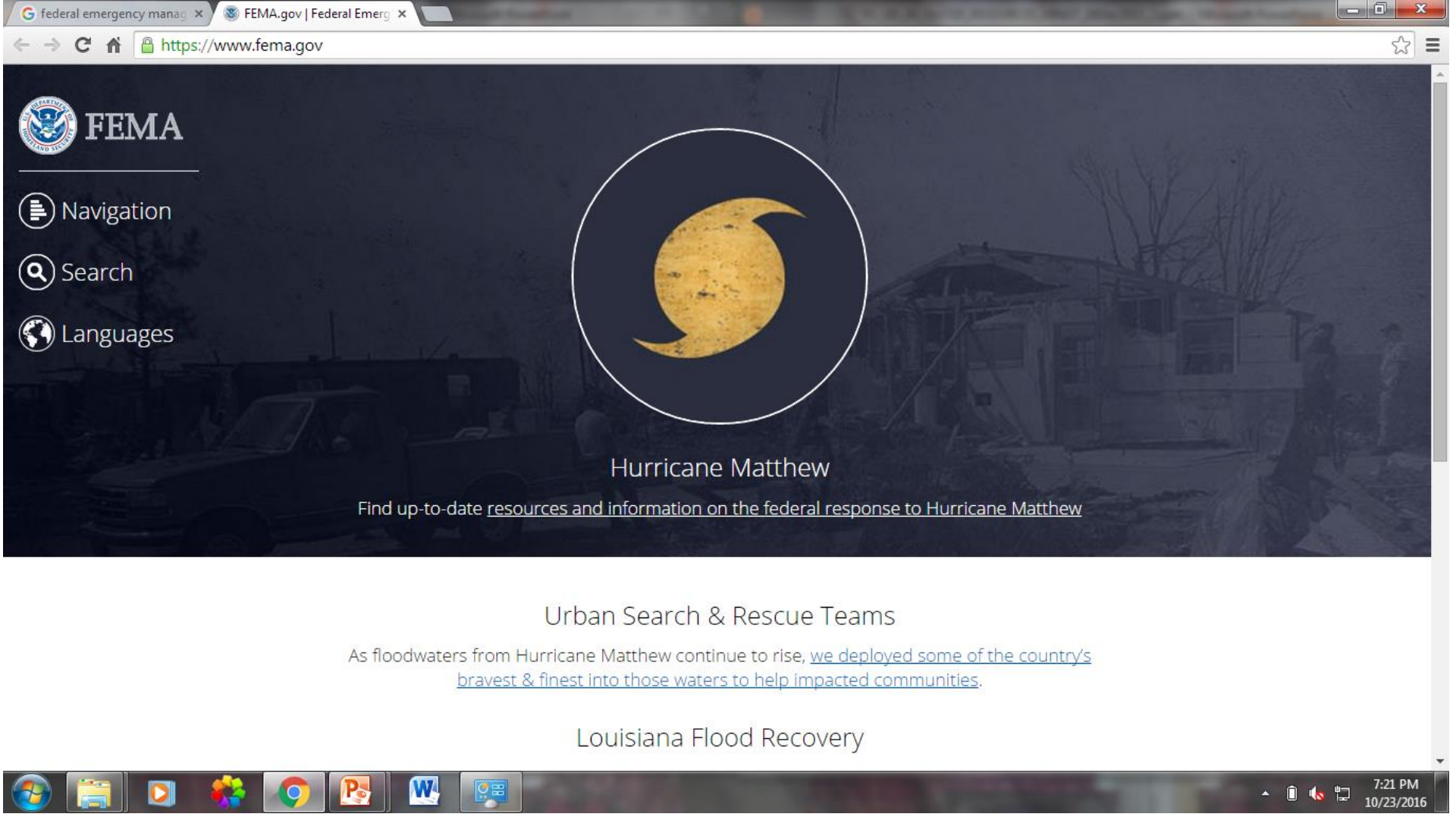
Legend

- Settlement
- River
- Railway line
- Major_Road
- Suitable sites for Check Dams

Centre For Remote Sensing, Bharathidasan University,Tiruchirapalli

Select any layer then use the check boxes to change the layer's properties

78°52'32.80"E 10°16'49.80"N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Find up-to-date resources and information on the federal response to Hurricane Matthew
Urban Search & Rescue Teams
As floodwaters from Hurricane Matthew continue to rise, we deployed some of the country's bravest & finest into those waters to help impacted communities.
Louisiana Flood Recovery
7:21 PM
10/23/2016

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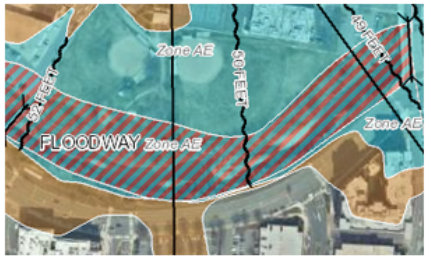

Looking for more than just a current flood map?

Visit **Search All Products** to access the full range of flood risk products for your community.

About Flood Map Service Center

The FEMA Flood Map Service Center (MSC) is the official public source for flood hazard information produced in support of the National Flood Insurance Program (NFIP). Use the MSC to find your official flood map, access a range of other flood hazard products, and take advantage of tools for better understanding flood risk.

FEMA flood maps are continually updated through a variety of processes. Effective information that you download or print from this site may change or become superseded by new maps over time. For additional information, please see the Flood Hazard Mapping Updates Overview Fact Sheet

7:23 PM
10/23/2016

CONCLUSIONS:

Geoinformatics technology is a very efficient and cost effective one for,

- **Surface and Ground water resources targetting,**
- **Runoff and Aquifer Volume estimation,**
- **Aquifer function modelling**
- **Surface water Pollution mapping and monitoring and**
- **Planning for conservation and management.**

Many more applications have also been tried and succeeded such as, Modelling of Groundwater level modifications, Harvesting of Flood water, Water Resources Information System using Geoinformatics Technology.

It is also being effectively used for implementation and monitoring phases too.