

Importance of Wetlands and Rivers in Western Ghats



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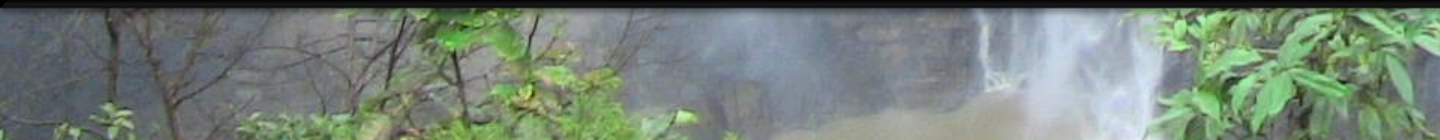
wetlands@ces.iisc.ernet.in





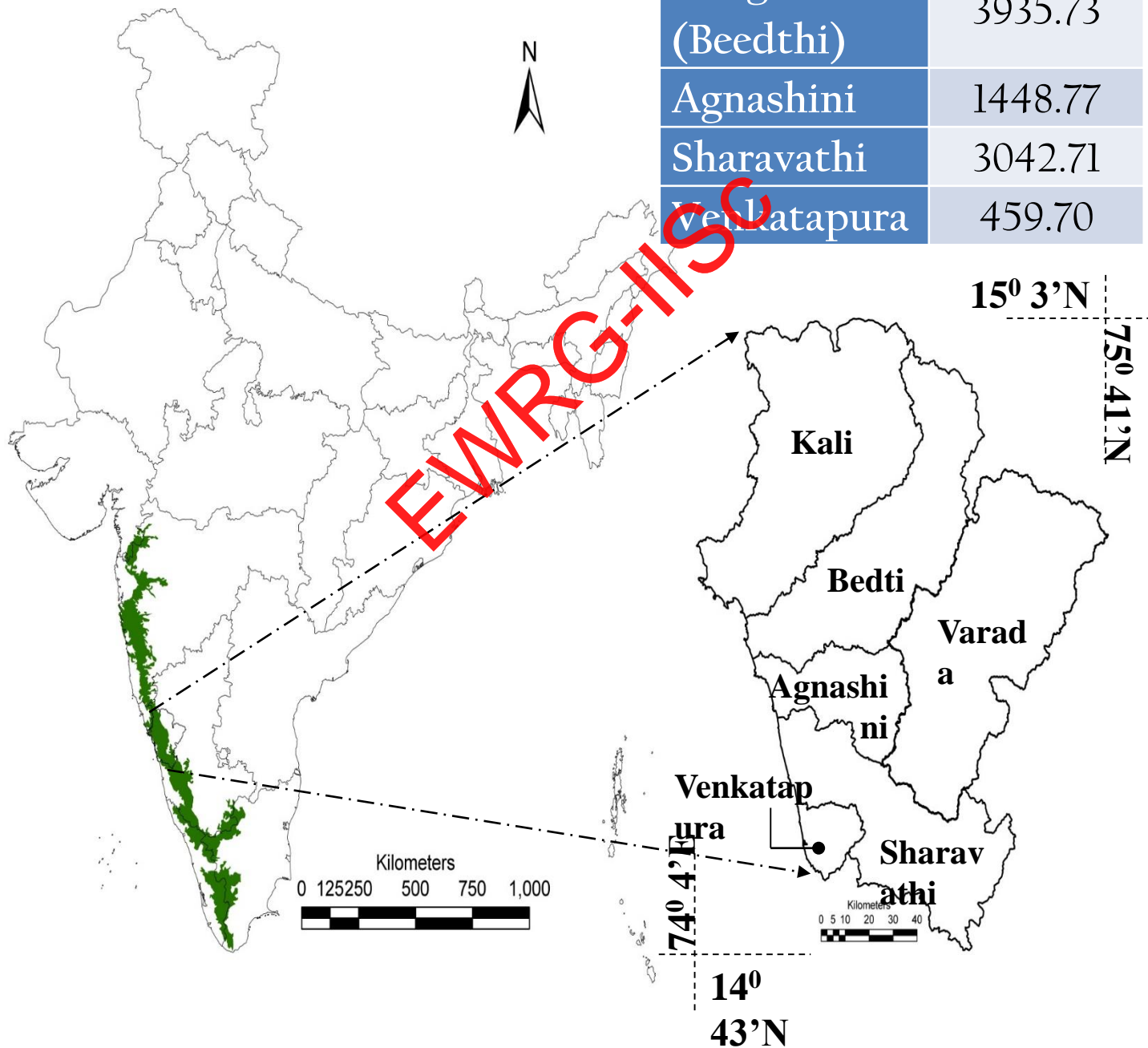
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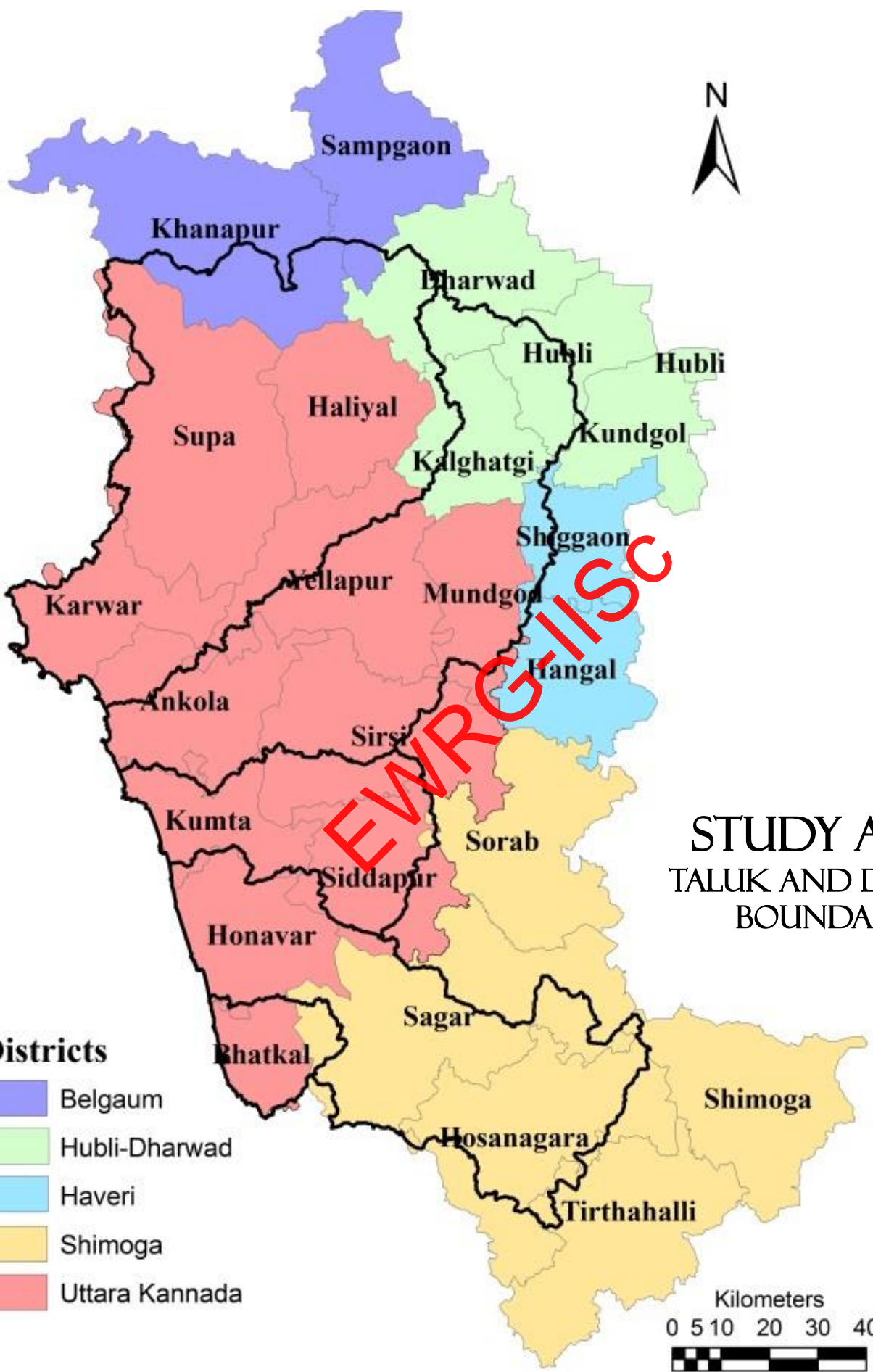
WESTERN GHATS
WETLANDS AND RIVERS-
FOOD & WATER SECURITY



Central Western Ghats, Study Regions

River Basin	Area (sq.km)
Kali	5085.93
Gangavali (Beedthi)	3935.73
Agnashini	1448.77
Sharavathi	3042.71
Venkatapura	459.70

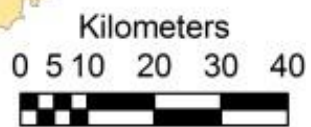




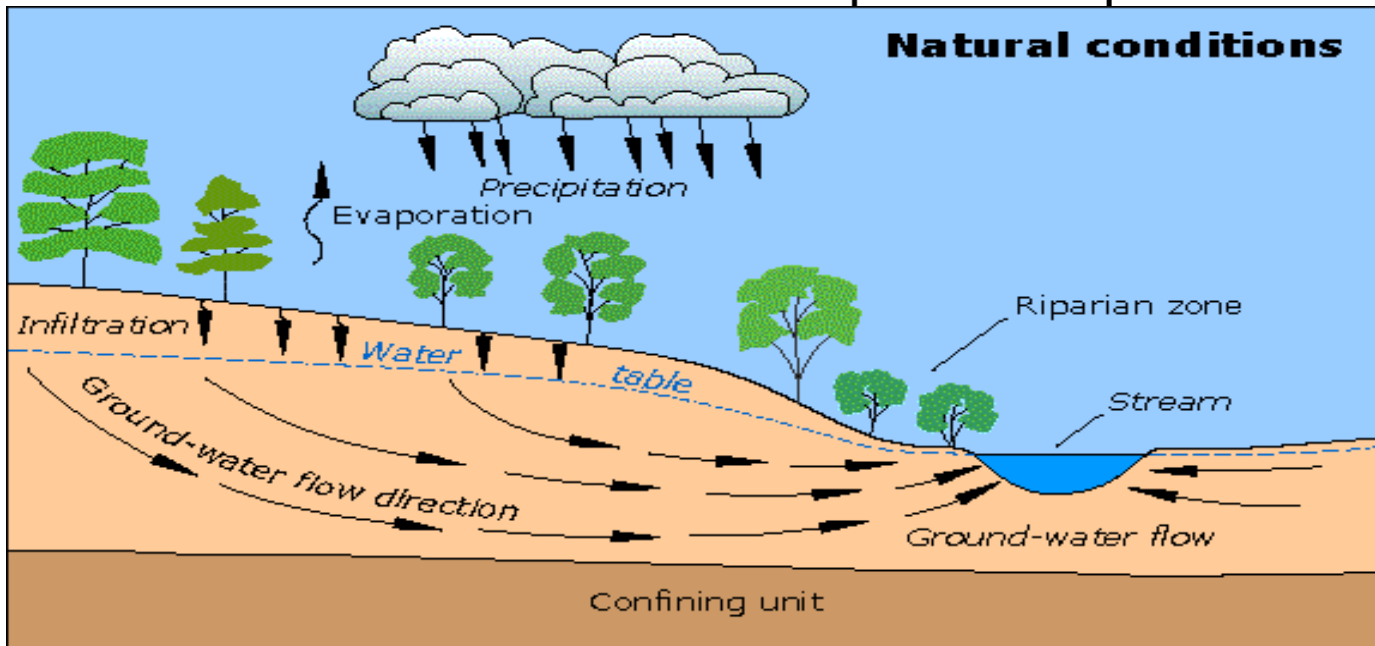
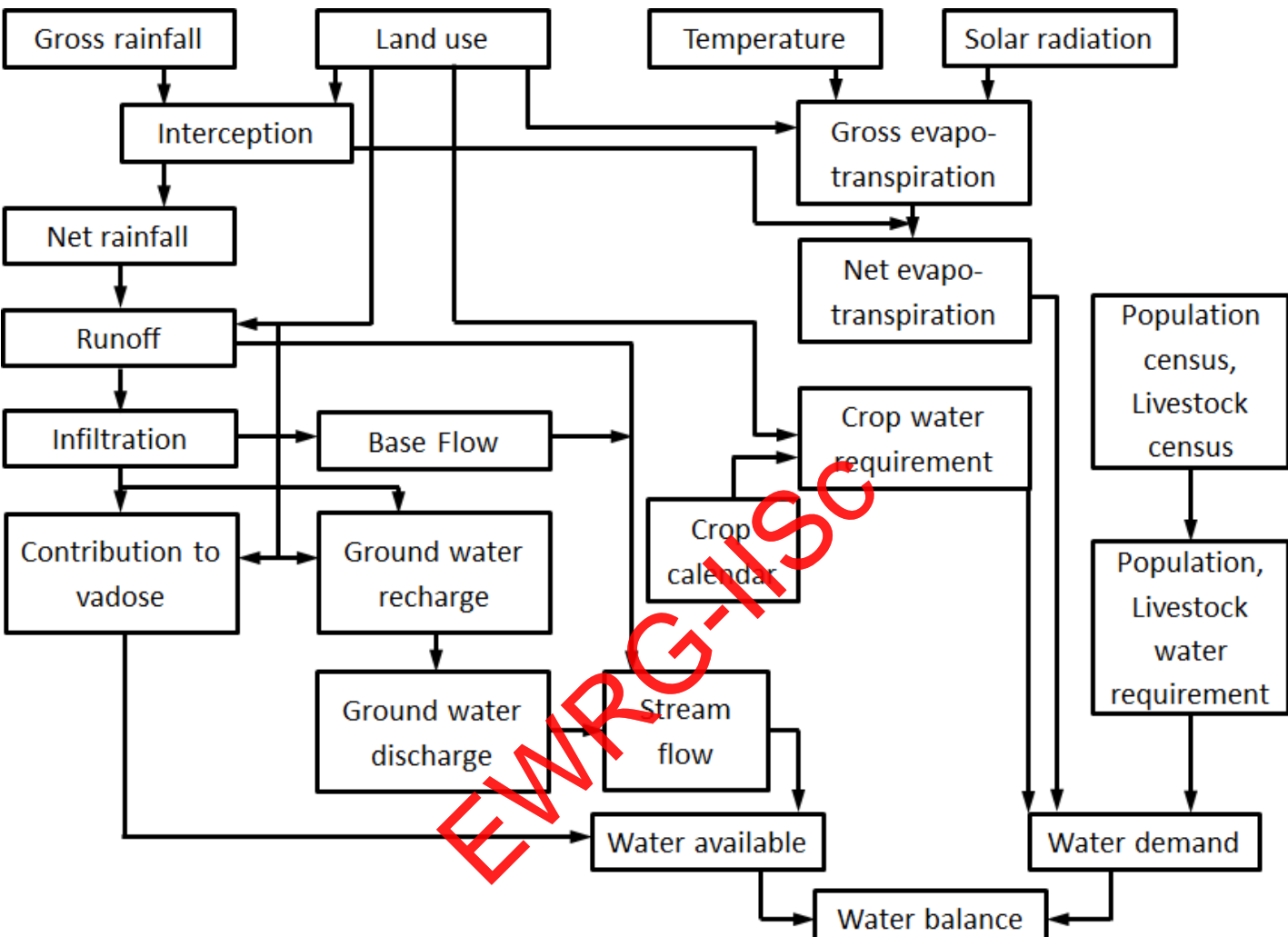
**STUDY AREA
TALUK AND DISTRICT
BOUNDARIES**

Districts

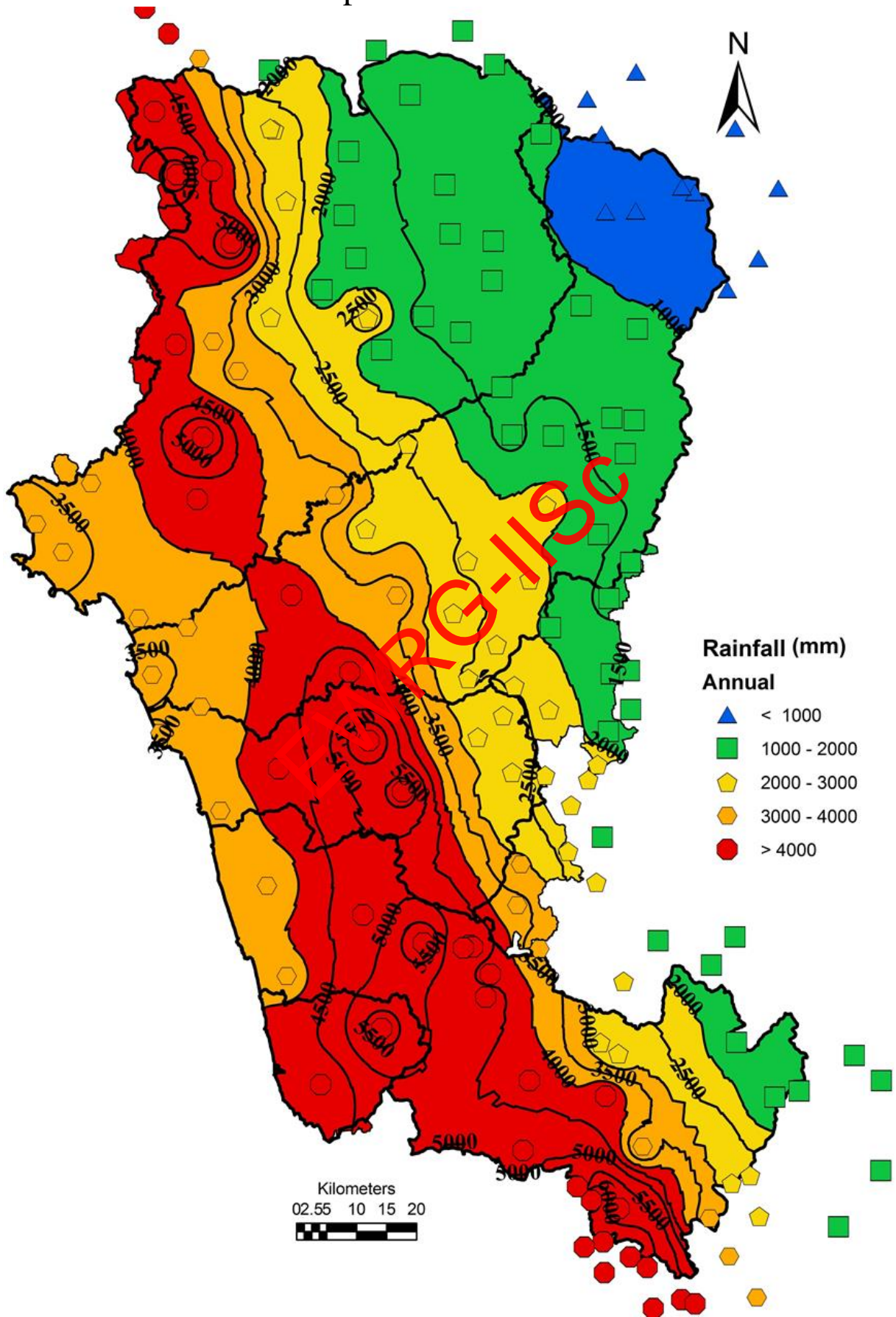
- Belgaum
- Hubli-Dharwad
- Haveri
- Shimoga
- Uttara Kannada



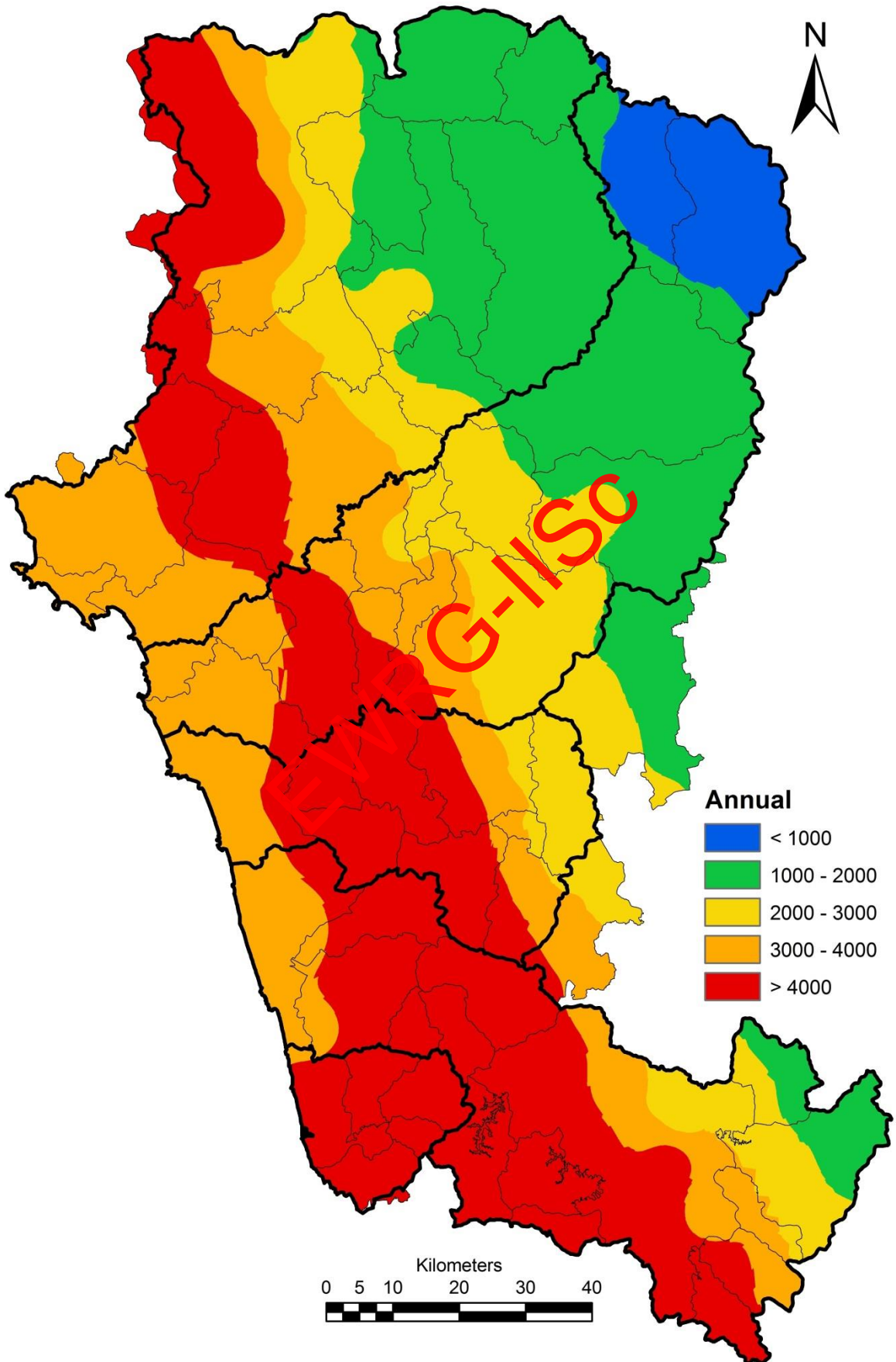
METHOD



Rain Gauge Stations, contours Indicating Annual Rainfall Intensity (*mm*) interpolated for the basins



Rainfall in mm in the river sub basins of the central western ghats





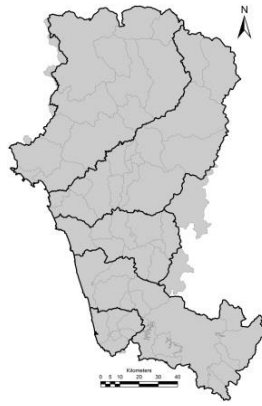
**RUNOFF, INFILTRATION,
BASE FLOW, GROUND
WATER RECHARGE**

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Runoff volume in million litres



January



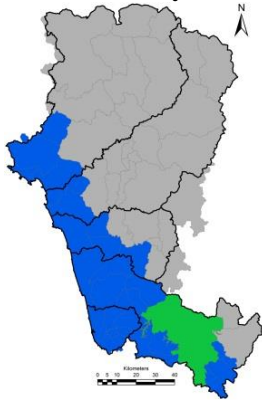
February



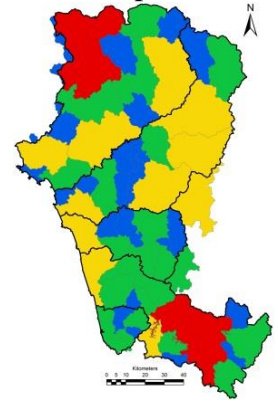
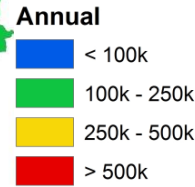
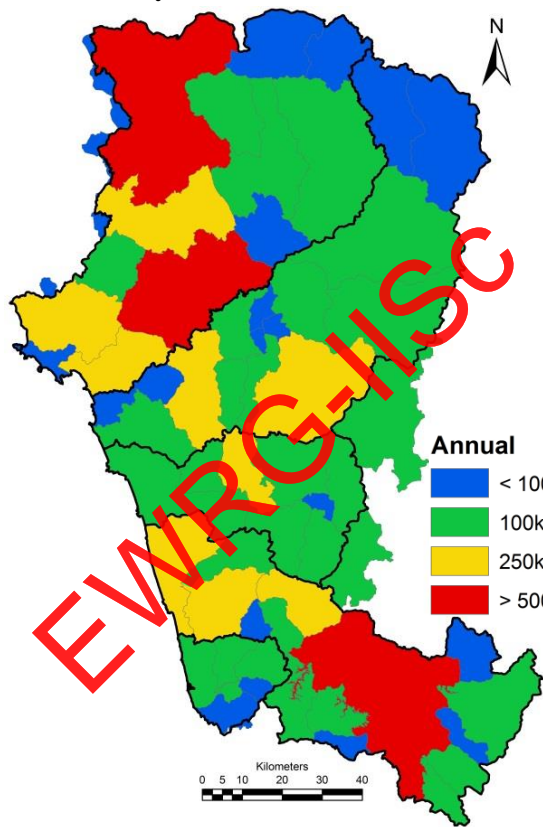
March



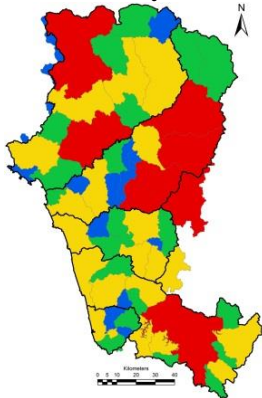
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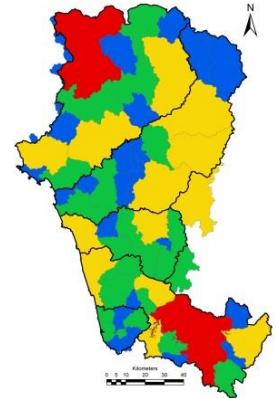
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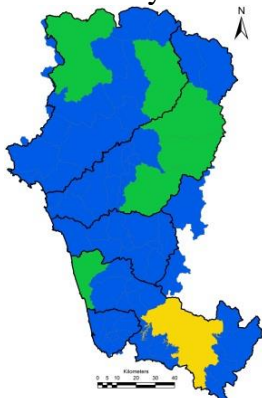
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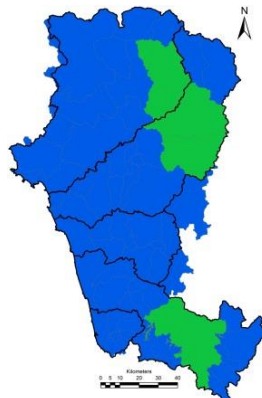
July



August



September



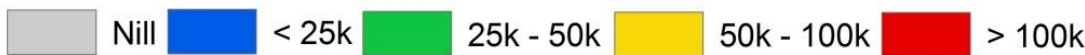
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November



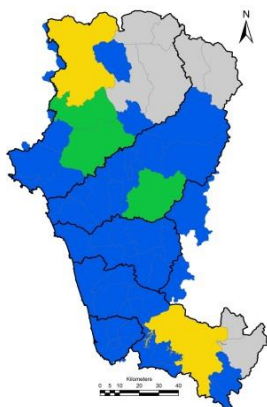
December



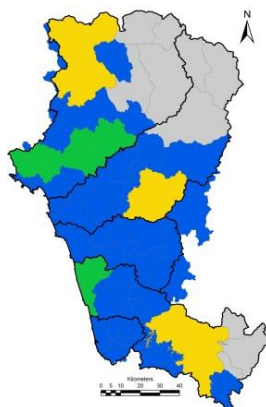
SUPPLY

Supply is a function of Runoff, Water in Vadose zone and the Ground water discharge

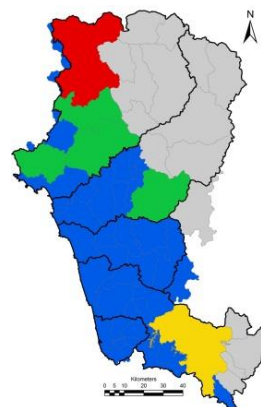
Monthly Supply in million litres



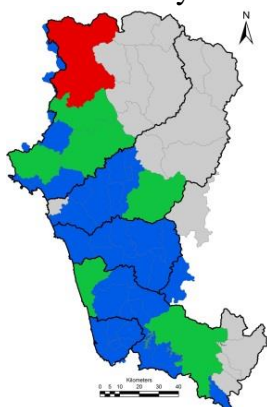
January



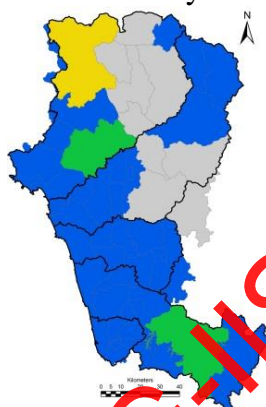
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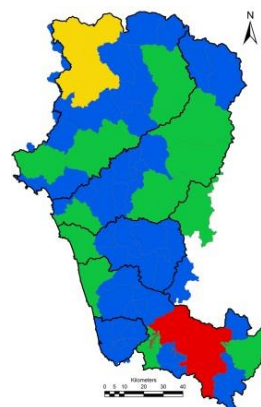
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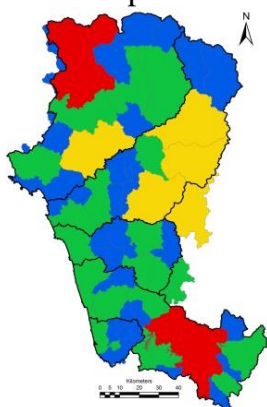
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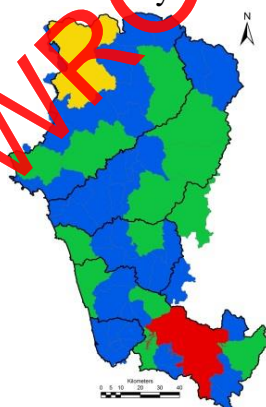
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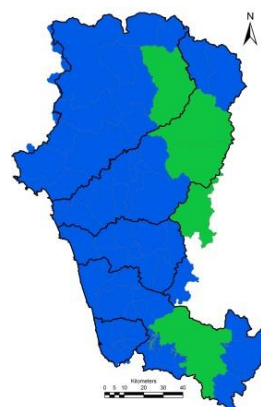
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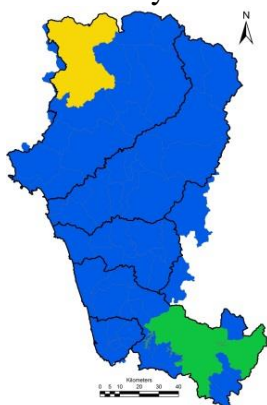
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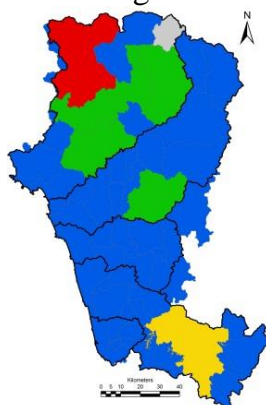
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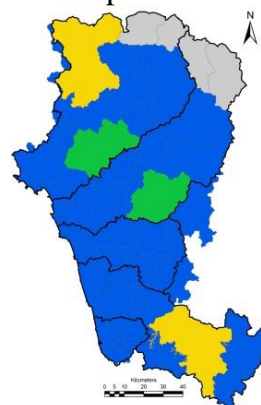
September



October



November



December

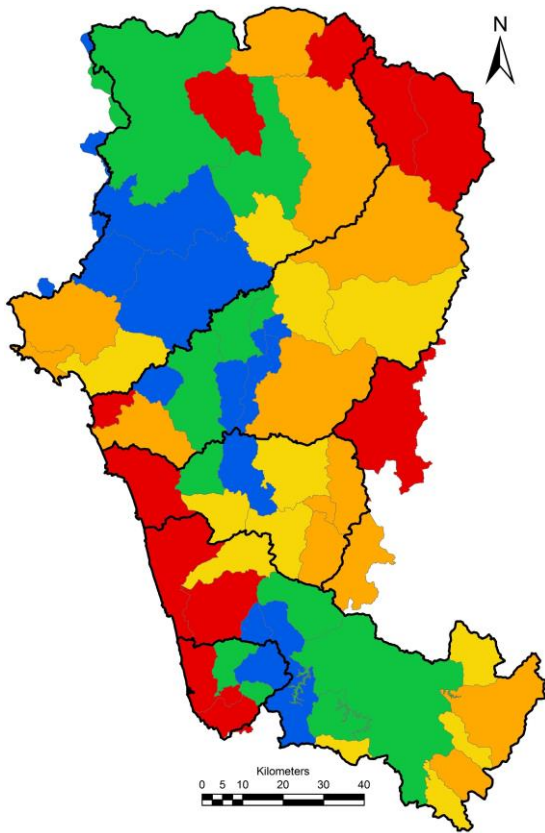


CROP WATER REQUIREMENT, DOMESTIC AND LIVE STOCK WATER REQUIREMENT

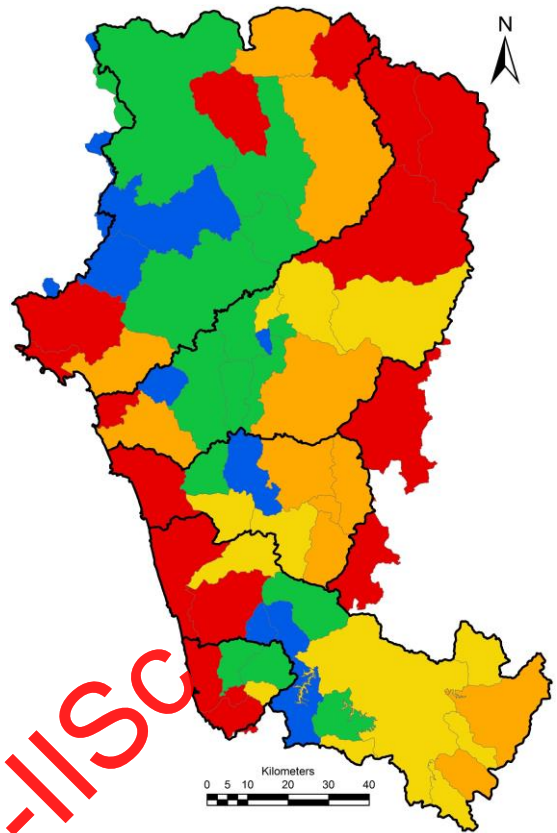
Demand is a function of Crop water requirement,
Livestock water requirement, Peoples water
requirement and evapotranspiration



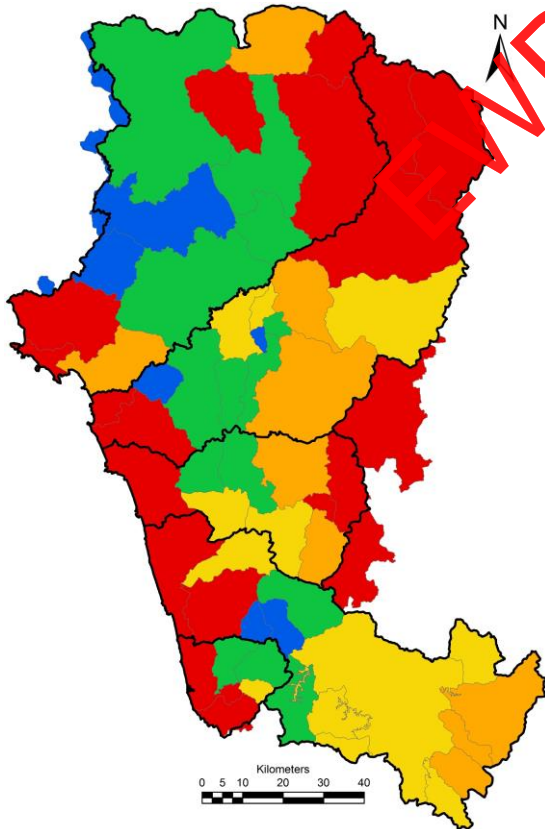
Population Density as Persons per square kilometer



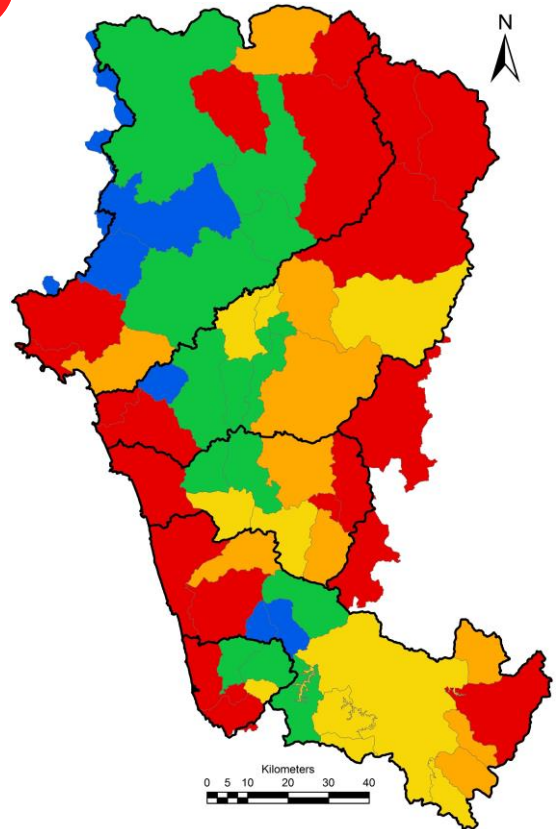
1991



2001



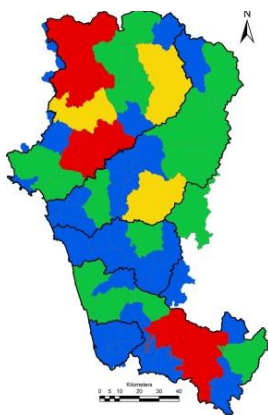
2011



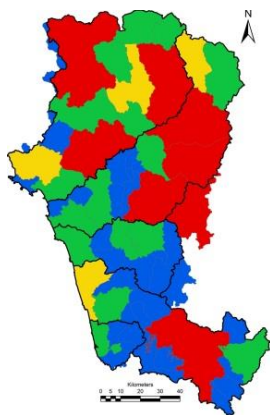
2013



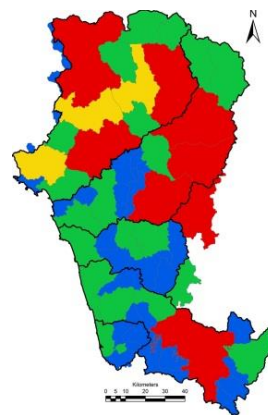
Monthly Demand in million litres



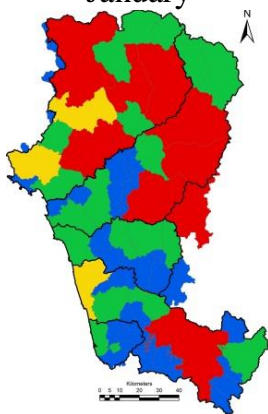
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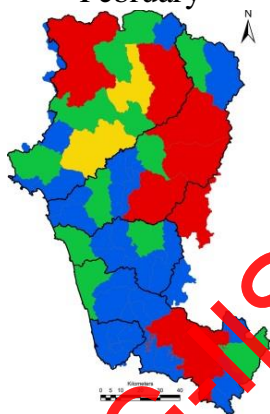
February



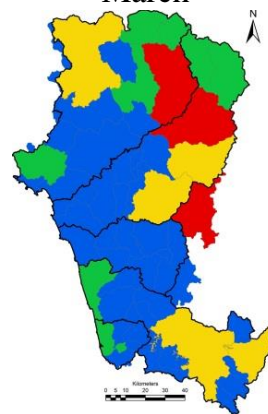
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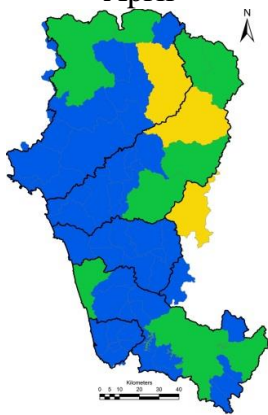
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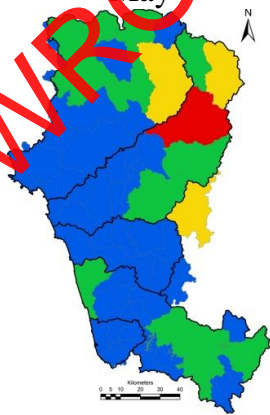
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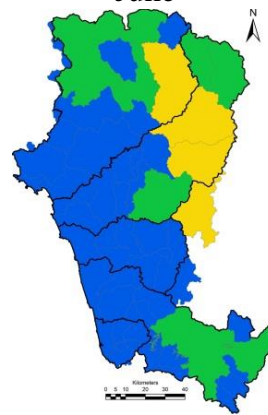
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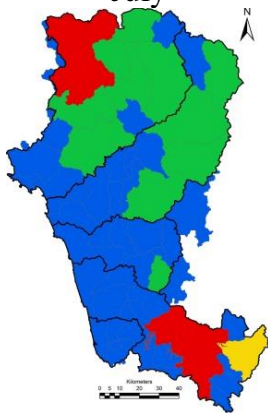
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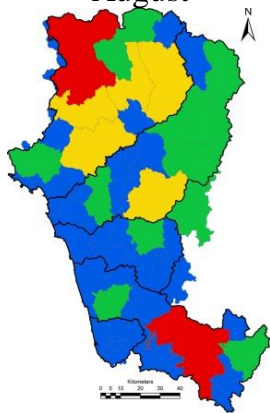
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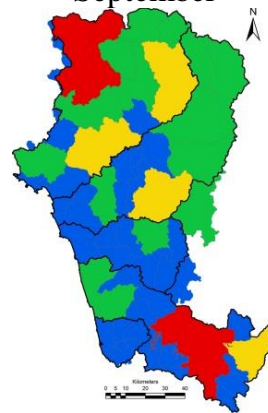
September



October



November



December



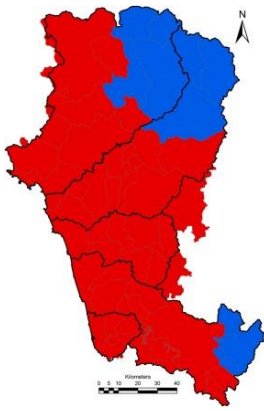
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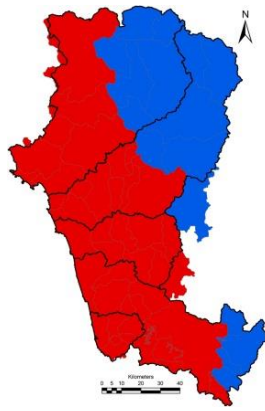
HYDROLOGICAL STATUS

Function of Supply and
demand

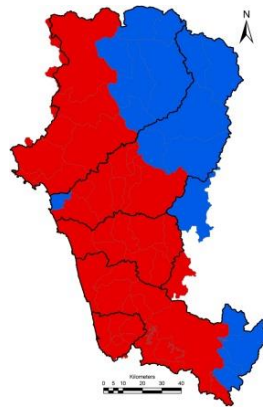
Hydrological status



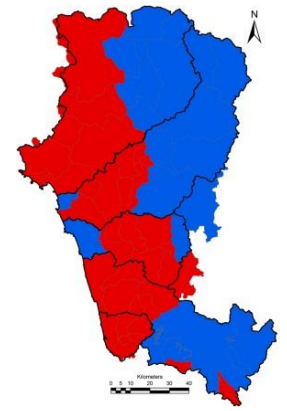
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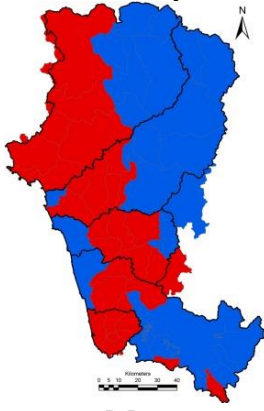
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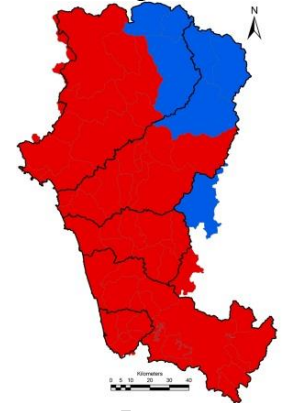
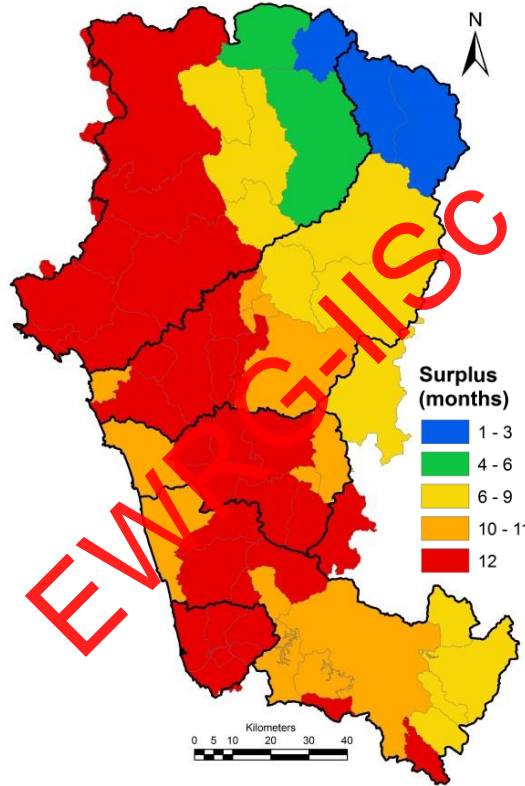
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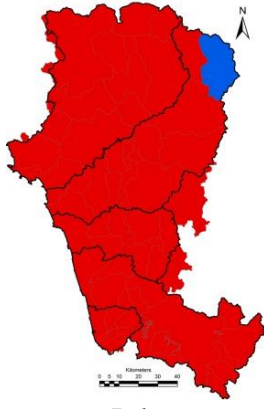
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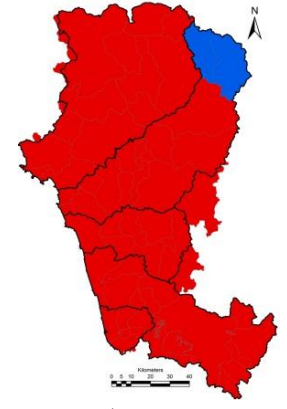


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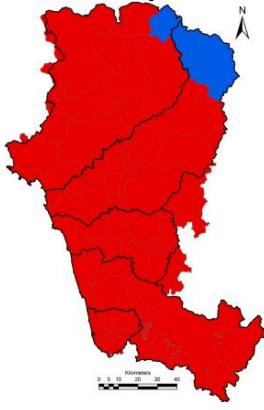


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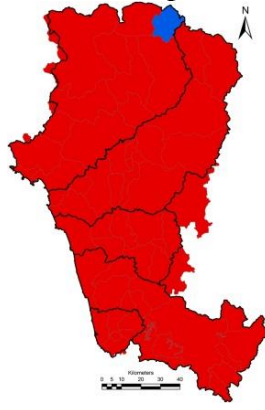
Water Surplus Months (Supply > Deficit)



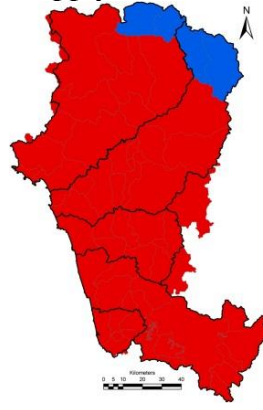
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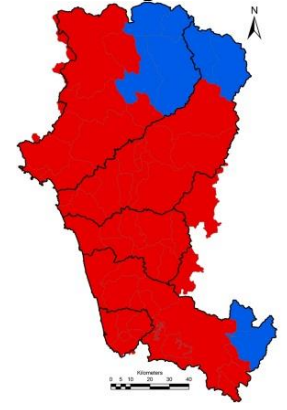
September



October



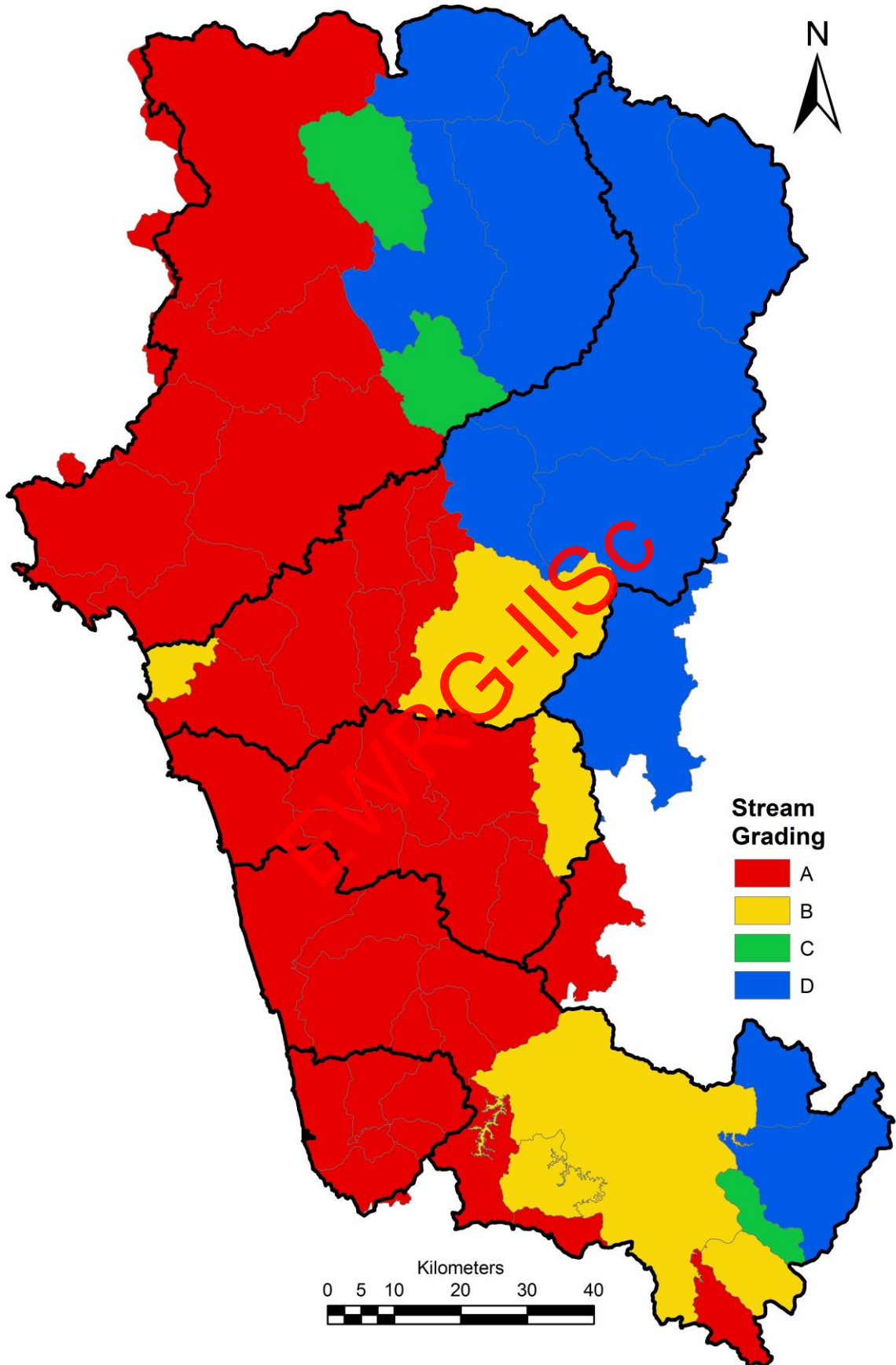
November



December

Deficit Surplus

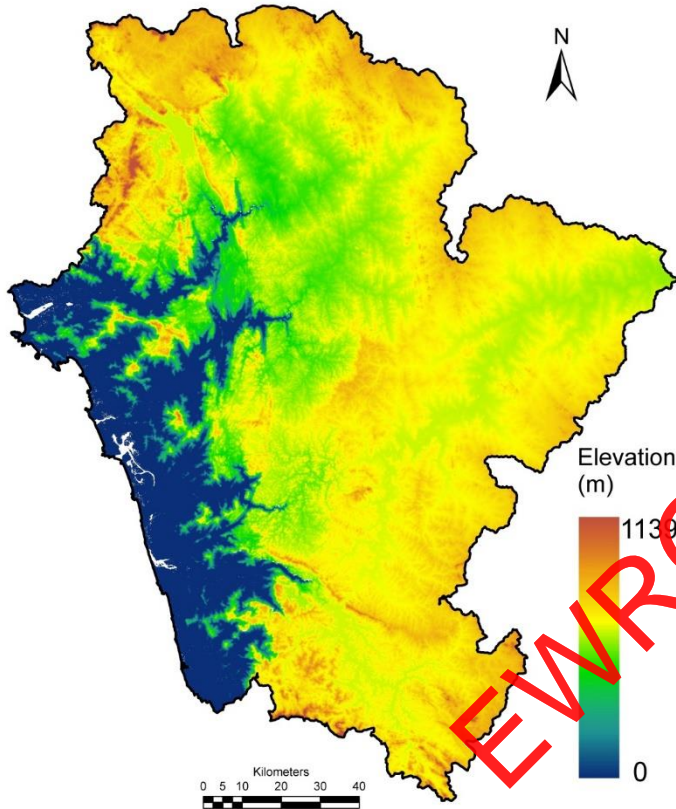
Stream flow



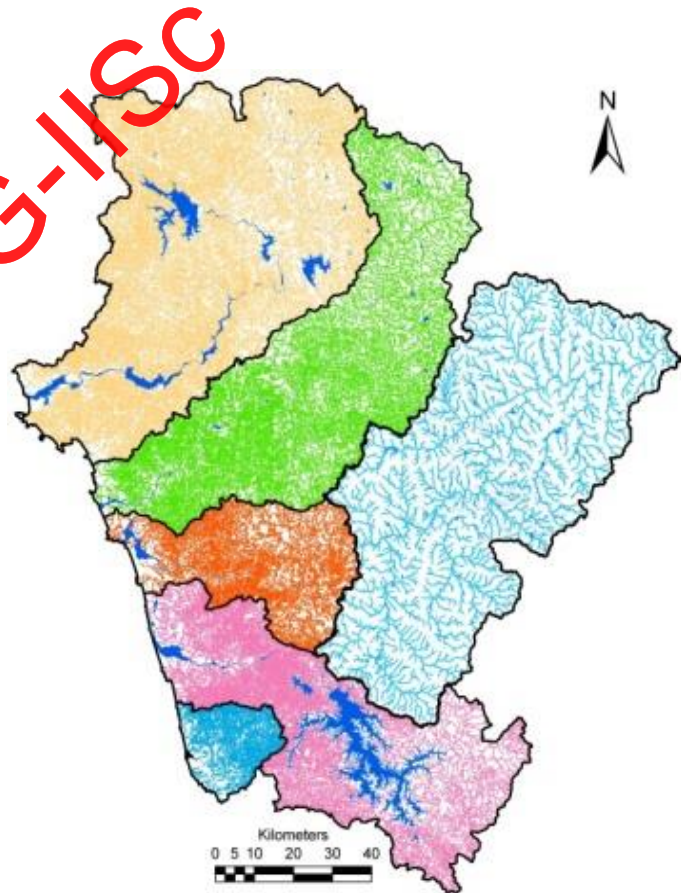
Stream Grading	A	B	C	D
Flow Months	12	9	6	3

Stream Network

Digital Elevation Model

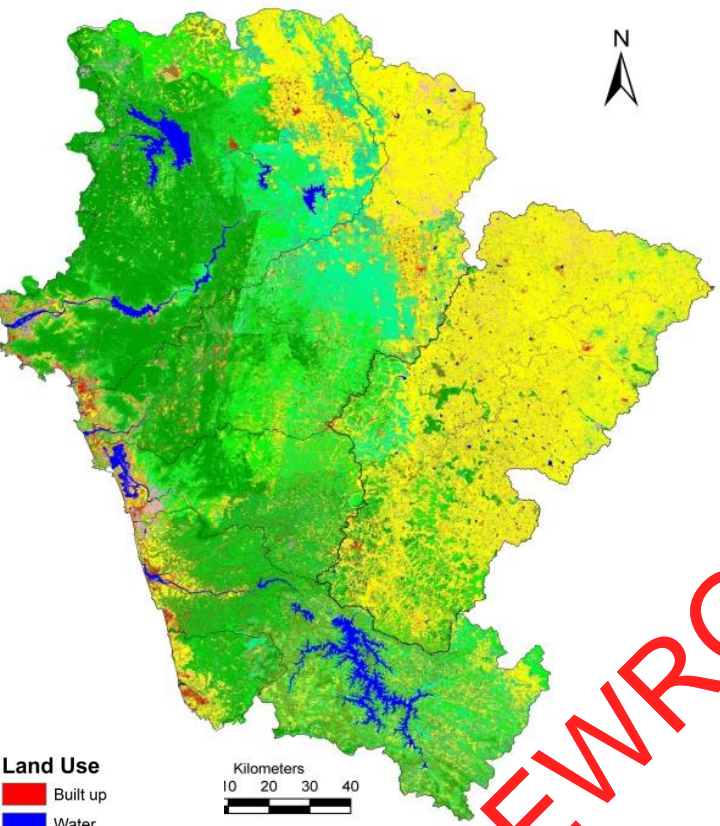


Drainage Network

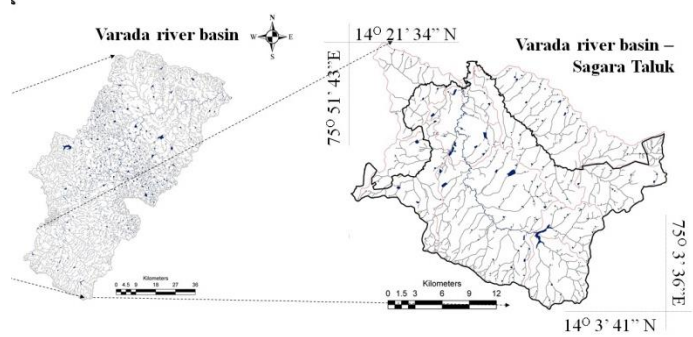
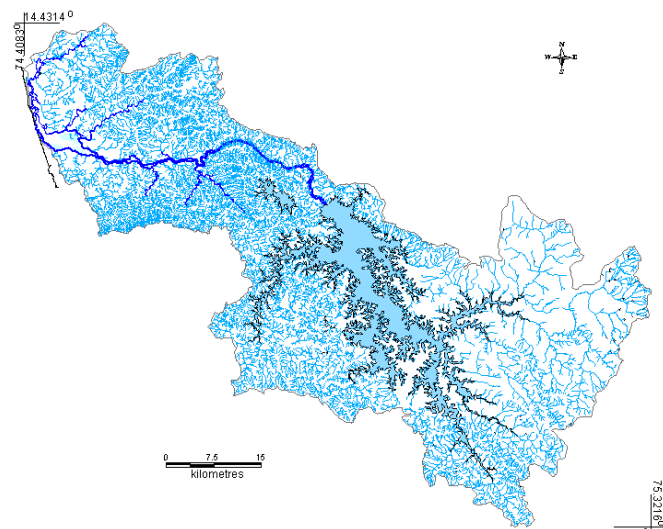
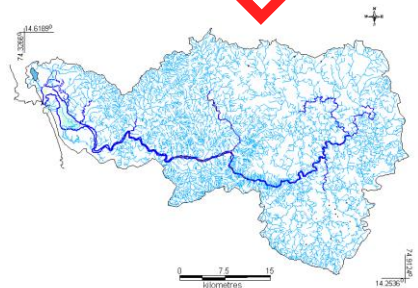
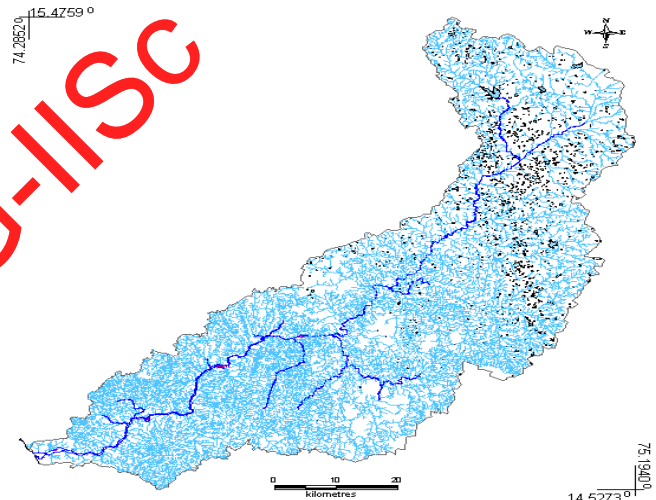
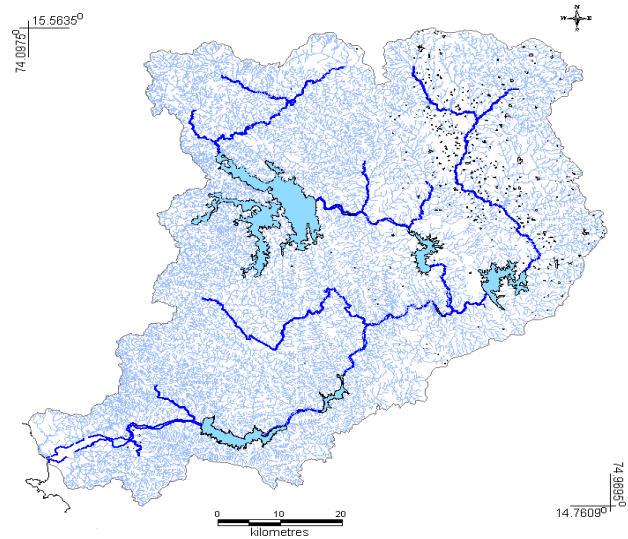


Streams and Land use

- LAND USE



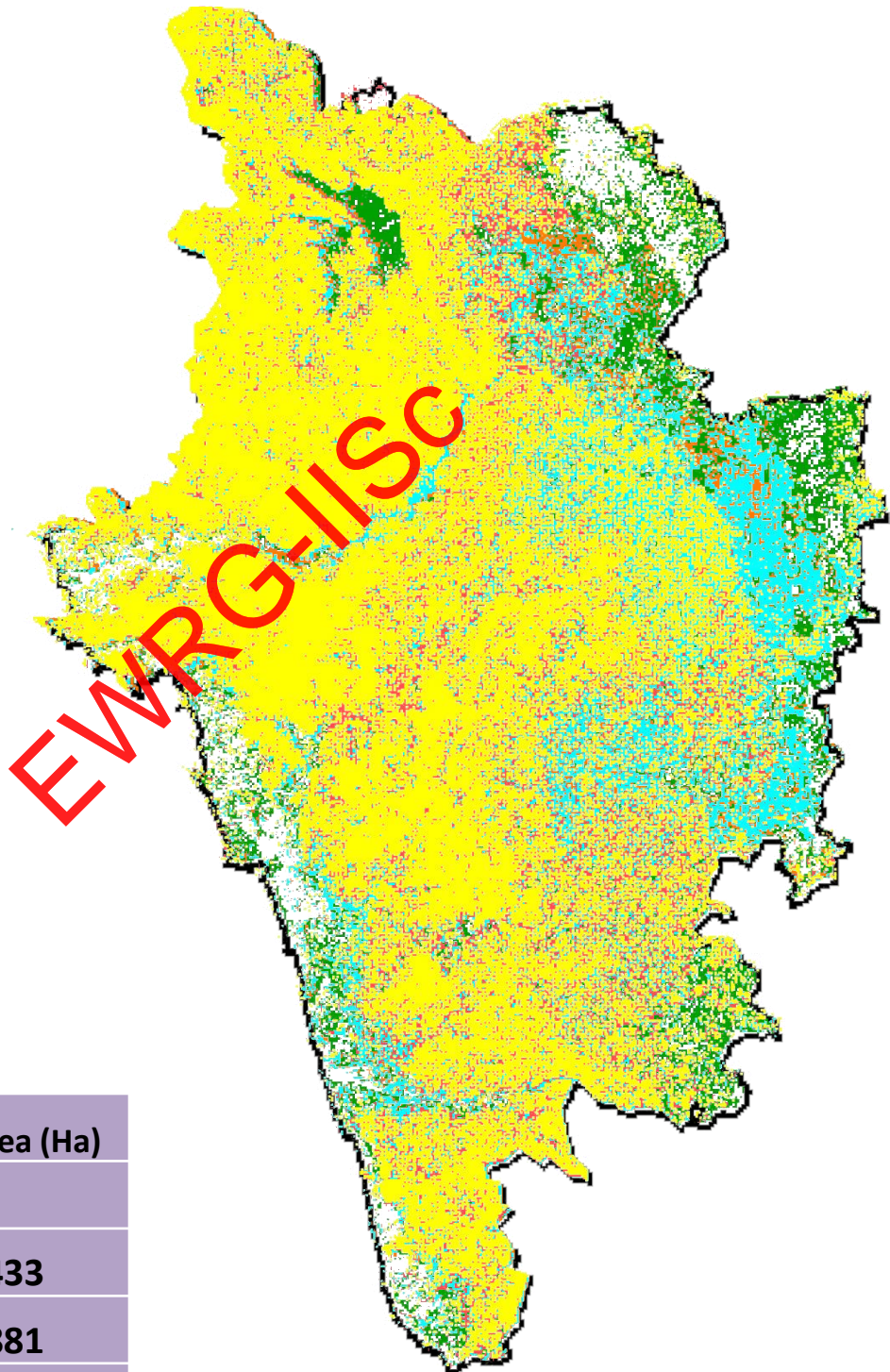
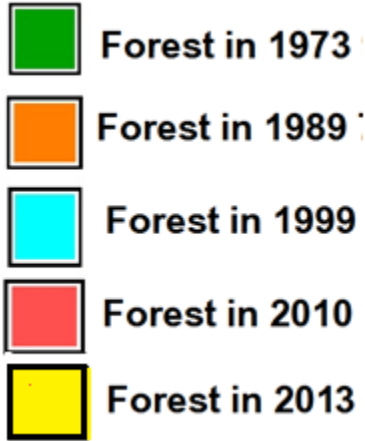
- Land Use**
- Built up
 - Water
 - Agriculture
 - Open Space
 - Deciduous Forest
 - Evergreen Forest
 - Scrubs and Grass land
 - Forest Plantation
 - Agriculture Plantation



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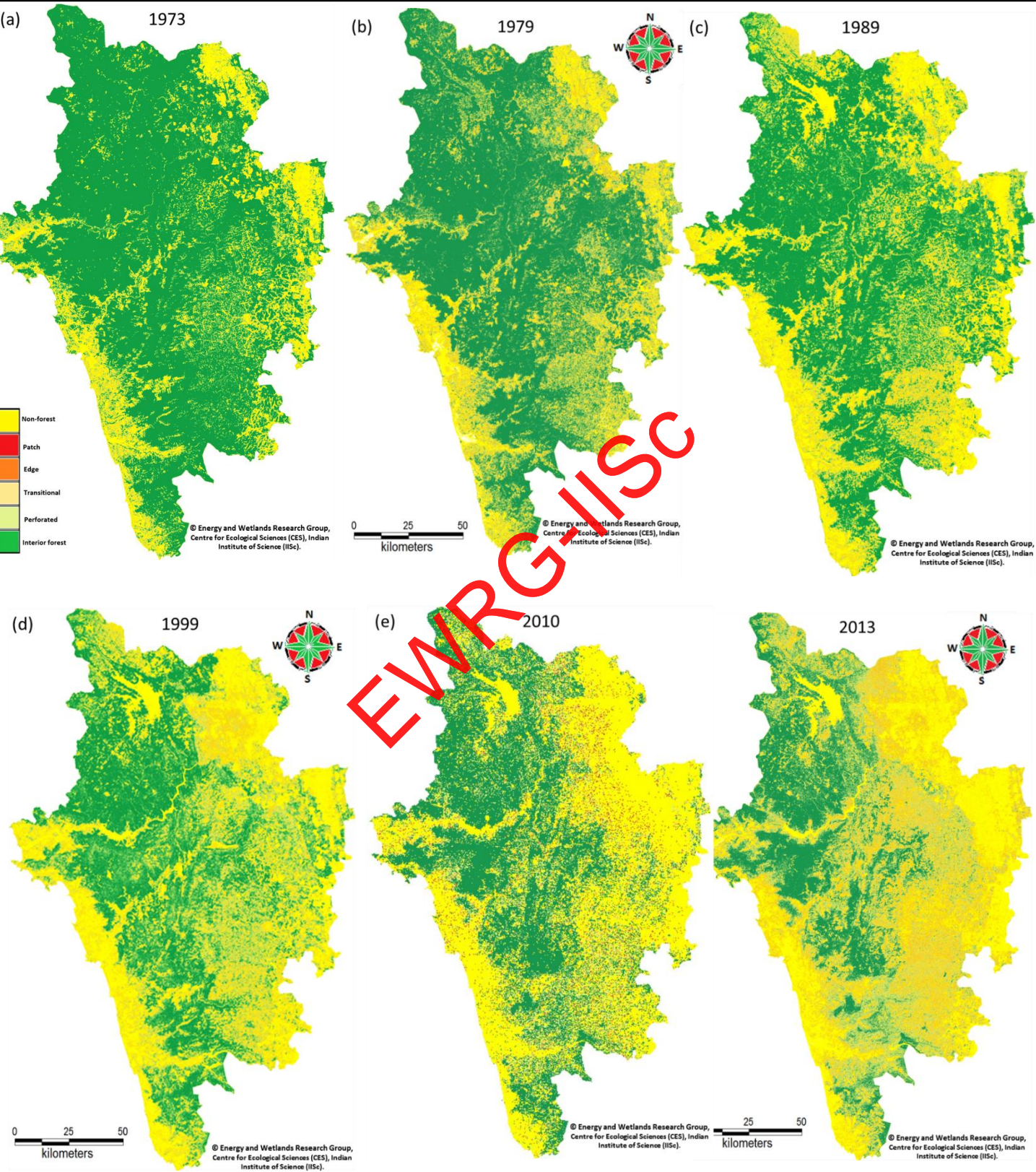
Year Category	1973		1979		1989		1999		2010		2013		Loss / Gain in area (1973- 2013) (Ha)
	Ha	%	Ha	%	Ha	%	Ha	%	Ha	%	Ha	%	
Built-up	3886	0.38	9738	0.95	12,982	1.26	21,635	2.10	28,491	2.77	31589	3.07	27703
Water	7,681	0.75	18527	1.80	16,604	1.61	32,983	3.21	26,119	2.54	28113	2.73	20432
Crop land	71,990	7.00	103163	10.02	121,167	11.77	138,458	13.45	148,187	14.40	145395	14.13	73405
Open fields	14071	1.37	15988	1.55	34,783	3.38	21,945	2.13	30,012	2.99	37660	3.66	23589
Moist deciduous forest	95,357	9.27	102967	10.01	143,849	13.98	179,075	17.40	166,266	16.15	161,996	15.74	66639
Evergreen to semi evergreen	696,978	67.73	589762	57.31	531,872	51.68	423,062	41.11	367,064	35.66	330,204	32.08	-366774
Scrub/grass	38,109	3.70	58936	5.73	44,123	4.30	47,366	4.60	35,158	3.42	40402	3.93	2293
Acacia/Eucalyptus/ hardwood plantations	40,905	3.97	50321	4.89	55,654	5.41	73,977	7.19	119,717	11.63	122927	11.94	82022
Teak/ Bamboo/ softwood plantations	13997	1.36	20896	2.03	21,937	2.13	38,588	3.75	44,794	4.35	67111	6.52	53114
Coconut/ Areca nut / Cashew nut plantations	20,702	2.01	29675	2.88	32,227	3.13	43,623	4.24	53,646	5.21	53,993	5.25	33291
Dry deciduous forest	25,410	2.47	29113	2.83	13,848	1.35	8374	0.81	9008	0.88	9873	0.96	-15537
Total	1029086												

Disappearing Forests



Year	Area (Ha)	Loss of area (Ha)
1973	910756	
1989	811323	99433
1999	770442	40881
2010	742007.00	28435.00
2013	737366.00	4641.00

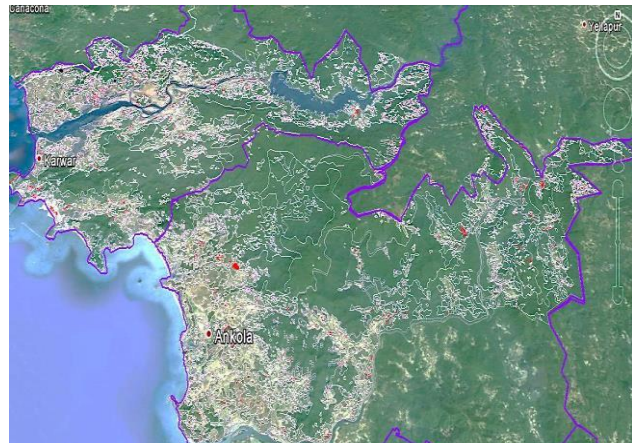
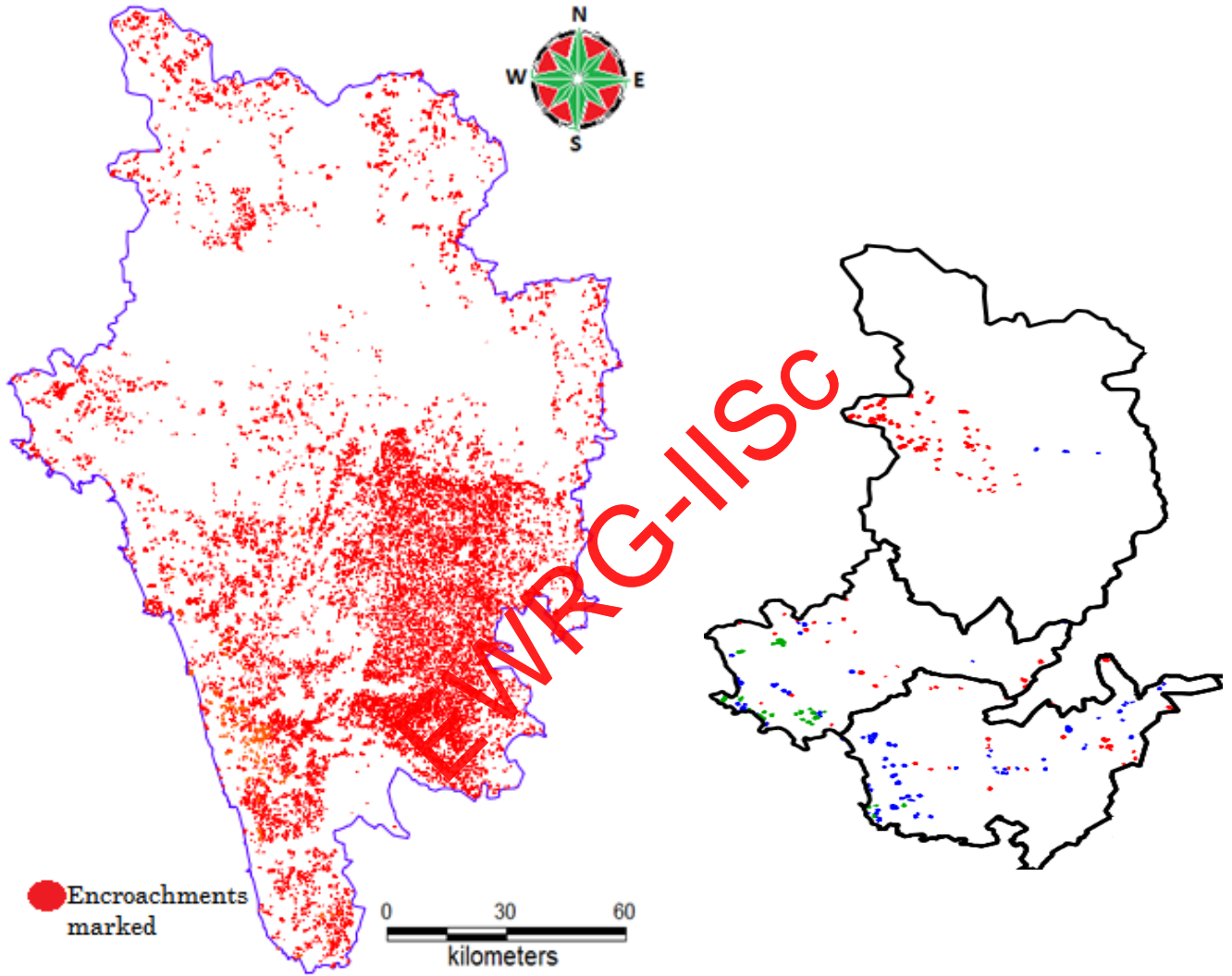
Forest Fragmentation



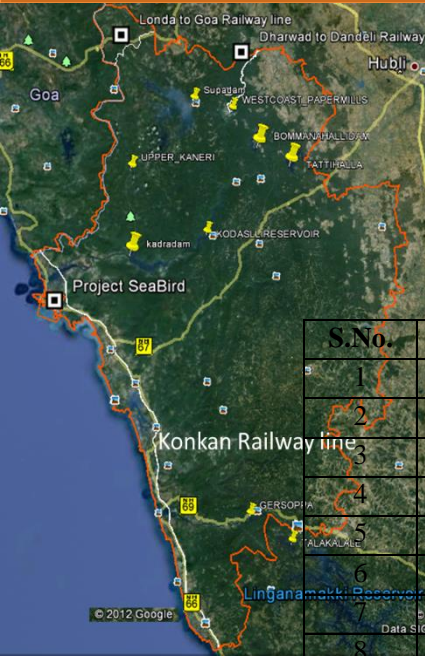
- Non-forest
- Patch
- Edge
- Transitional
- Perforated
- Interior forest

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Forest Encroachments

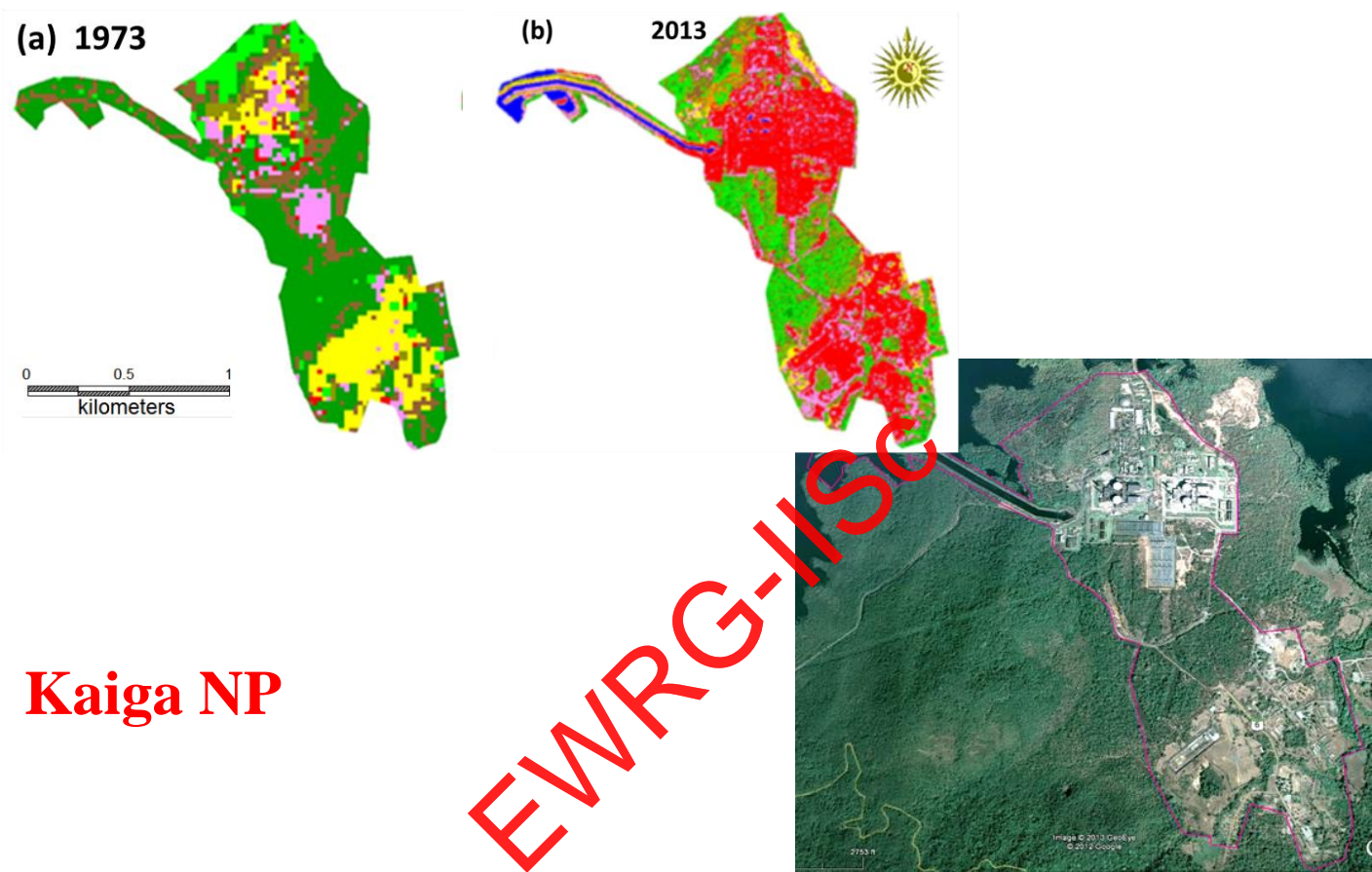


Developmental projects



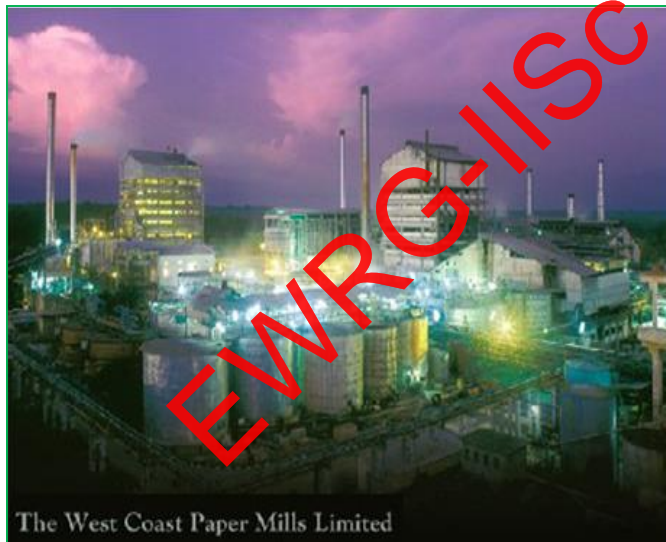
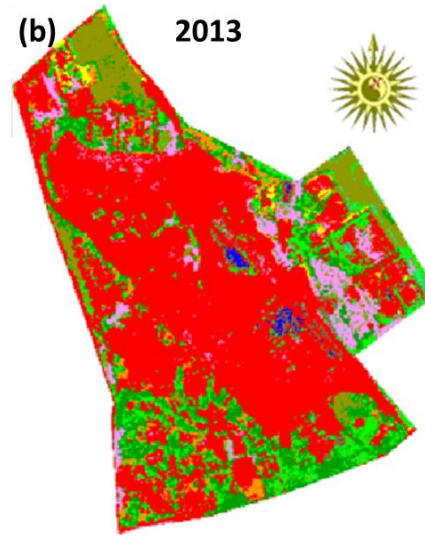
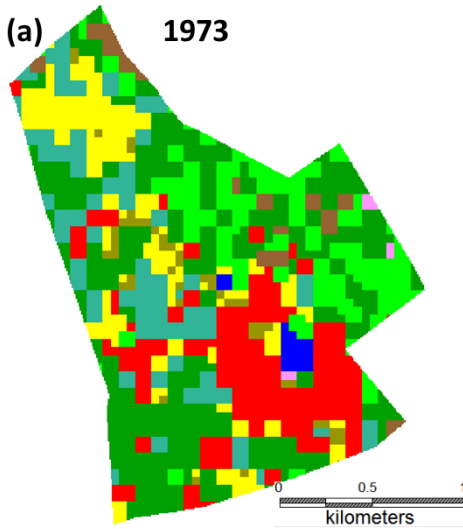
S.No.	Particulars.	Area in Ha.
1	The forest area released for cultivation by 3 men committee from 1964 to 1969	6042.500
2	Forest area released as per special G.O.No.AFD.116 of 16/4/69.	11593.342
3	Forest area released as per G.O.No.AFD-282-FGL74 of 17/19-12-1974.	3399.400
4	Forest area released for long lease.	162.100
5	Hangami Lagan in Notified area.	8034.450
6	Extension of Gouthana.	390.400
7	Forest area released for township.	1096.900
8	Mining area leased & area actually in operation.	1591.250
9	Released to House sites to Houseless (1972-1979)	366.000
10	Rehabilitation of Tibetans displaced Ryots of Sharavathi Ghataprabha & Malaprabha, Gowli families etc.	4548.170
11	Area under submersion & other Project. 1. Kali Hydro Project. 2. Bedti Project (for colony) 3. Other irrigation tanks etc.	14602.000 300.000 303.365
12	Released to KSFIC for Napier Hybrid grass cultivation (Sirsi Division)	441.450
13	Released to KAMCO (Dairy & fruit processing Unit)	153.993
14	Released to KSFIC for Pineapple cultivation.	163.320
15	Karnataka State Veneers Ltd.	24.000
16	Power transmission lines.	677.979
17	For establishment of Industries.	95.000
18	Area released to Horticulture department (1969-70).	71.847
19	Released to Agricultural University, Dharwad.	214.000
20	Sharavathi Tail Race.	700.000
21	Kaiga Atomic Power Project.	732.000
22	Sea Bird Naval Base Project.	2259.000
23	Rehabilitation of Sea Bird out seas.	643.720
24	Area released for non-agriculture & other purposes.	394.870
25	Konkan Railway.	272.140
26	Area released for improvement & widening of Ankola-Hubli Road.	49.431
27	Area released for rehabilitation of displaced persons of KHEP & Kaiga Project.	316.410
28	Area released to regularise the encroachments, which have taken place before 27-04-1978.	2845.446
29	Area released to construction of 400 KVDC alternate transmission line between Kaiga NPP and 200 KV sub-station at Narendrain favour of M/s. P.G.C.I.L, Karnataka.	330.00
	TOTAL	62814.483

Forest Loss due to developmental projects



Land use Category \ Year	Project area			
	1973		2013	
	Ha	%	Ha	%
Built-up	32.50	1.75	165.41	8.91
Water	60.65	3.27	128.77	6.94
Agriculture	95.67	5.15	88.27	4.75
Open space	74.76	4.03	133.02	7.16
Moist deciduous forest	191.79	10.33	441.96	23.80
Evergreen to Semi evergreen forest	1174.72	63.27	407.23	21.93
Scrub/Grass lands	183.50	9.88	110.97	5.98
Acacia/Eucalyptus plantations	42.94	2.31	273.66	14.74
Teak / Bamboo plantations	0.00	0.00	0.00	0.00
Coconut/Areca nut plantations	0.00	0.00	107.30	5.78
Dry deciduous forest	0.09	0.00	0.00	0.00
Total area	1856.62			

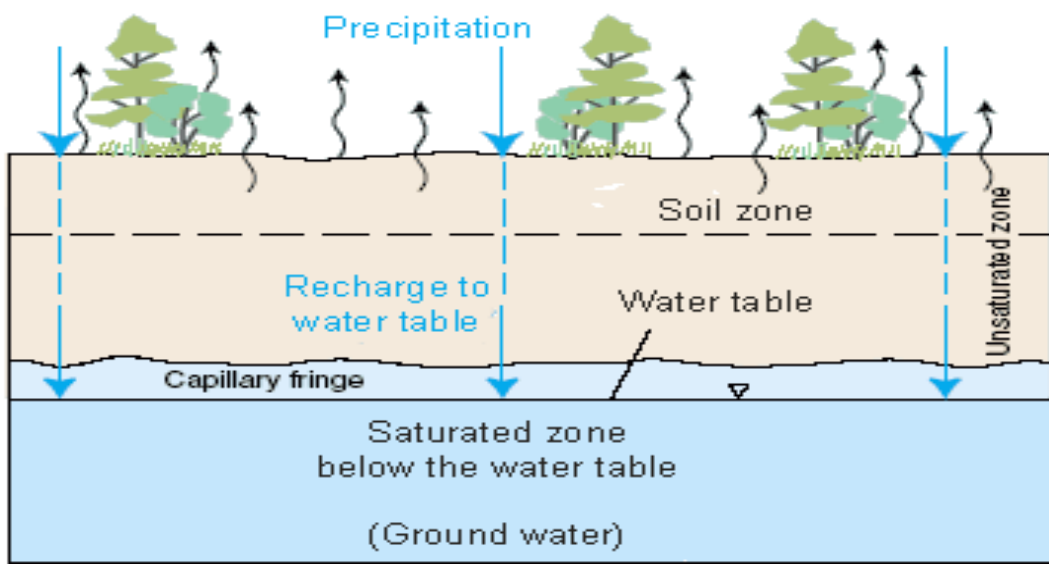
Dandeli paper mill



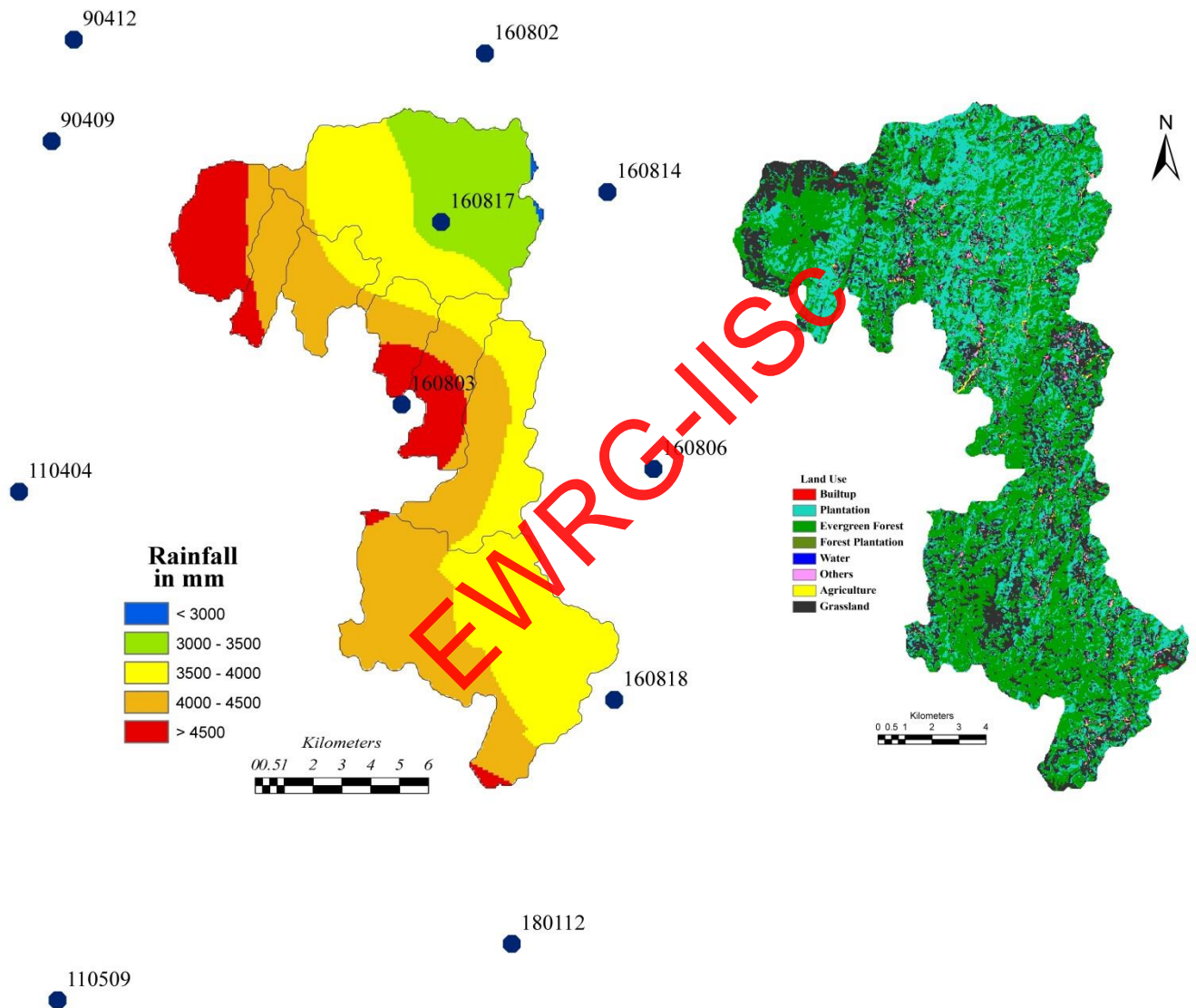
Year Land use Category	Project area			
	1973		2013	
	Ha	%	Ha	%
Built-up	30.42	17.17	78.04	44.04
Water	2.07	1.17	3.24	1.83
Agriculture	21.15	11.94	23.58	13.31
Open space	0.63	0.36	20.61	11.63
Moist deciduous forest	23.58	13.31	3.87	2.18
Evergreen to Semi evergreen forest	52.21	29.46	3.96	2.24
Scrub/Grass lands	4.68	2.64	19.53	11.02
Acacia/Eucalyptus plantations	14.50	8.18	19.86	11.21
Teak / Bamboo plantations	5.00	2.82	0.45	0.25
Coconut/Areca nut plantations	0.00	0.00	4.05	2.29
Dry deciduous forest	22.95	12.95	0.00	0.00
Total area	177.21			

Threats

- Deforestation in WG threatening food and water security, hence threatening livelihood of local people
- Unplanned Developmental Activities
- Lack of knowledge about the importance of Western Ghats and Himalaya to India
- Irresponsible Decision making



Tale of River Diversions- Yettinholé – for whom??

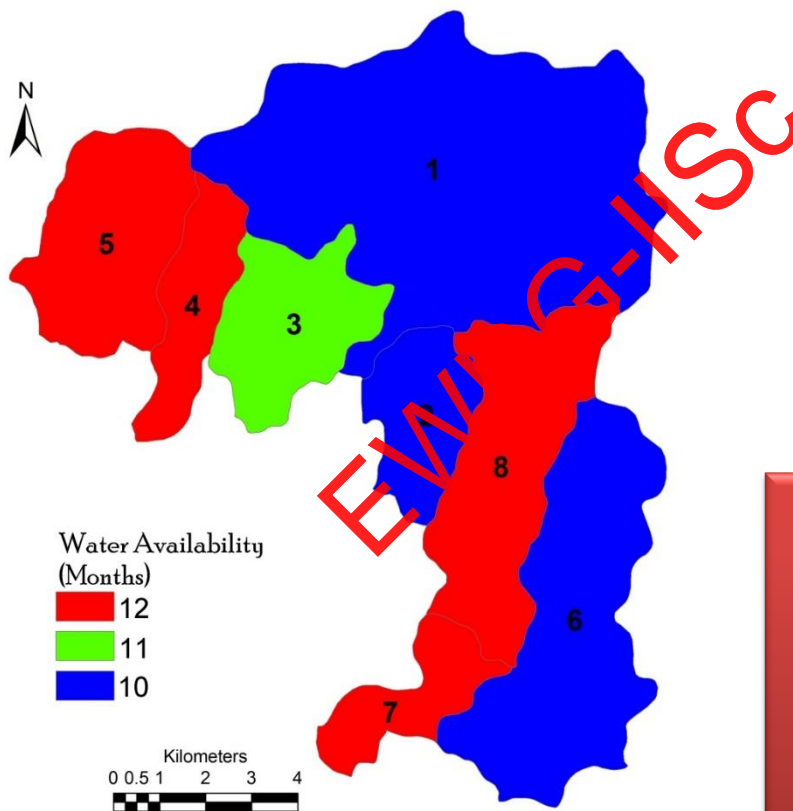


- Area : 179.68 km²,
- Average rainfall : 3750mm
- Forest : 45%, Horticulture : 30%

Yettina Holé

Flaw in the DPR

- Rainfall 6000 mm,
- Water available 24 TMC,
- Discharge measurements assumed to be similar to other gauged stations of Netravati river



Runoff Water
Yield in the
catchment :
6.8 TMC

*Water Availability with
current land use*

Yettina Holé - will be another Telugu Ganga

River Diversions and Regional Conflicts – Telugu Ganga Canal

EMRC-IISC



The Telugu Ganga Canal

Too Many Dams Chasing very Little Water-

- Initiated in **1977**
- The Telugu Ganga project (TGP) is a water supply scheme to provide drinking water to Chennai city from Krishna river in Andhra Pradesh.
- The scheme consists of 406 KMs long canal from Srisaillam Reservoir to Andhra Pradesh—Tamilnadu border with the following four balancing reservoirs :
 - ❖ Velugodu Balancing Reservoir.
 - ❖ S.P.V.B. (Sri Potuluri Veera Brahmendra Swamy) Reservoir.
 - ❖ Somasila Reservoir.
 - ❖ Kandaleru Reservoir.
- ❖ Water is drawn from the Srisaillam reservoir and diverted towards Chennai through a series of inter-linked canals, over a distance of about 406 kilometres (252 mi), before it reaches the destination at the Poondi reservoir near Chennai.
- Though initiated in 1977 but effective supply has started in 2006.



Treachery of Public Money

- According to the agreement, each of the three riparian states were to contribute 5 TMC of water annually, for a total supply of **15 TMC**. This number was revised down to 12 TMC (3.4 TMC) in 1983 after accounting seepage and evaporation losses.
- The supply of water to Chennai city in 2006 was **3.7 TMC**.

Table: Water supply to Chennai city (1996- 2002)

Dates	Quantity in mcft	In TMC
29 Sep 1996 to 28 October 1996	185.000	0.185
July 1997 to June 1998	565.211	0.565
July 1998 to Feb 1999	3298.826	3.299
July 1999 to Jan 2000	1907.124	1.907
May 2000 to June 2000	104.235	0.104
August 2000 to May 2001	6594.077	6.594
July 2001 to August 2001	9.654	0.009
March 2002 to July 2002	3260.696	3.261
Total	15924.823	15.924

Source : Telugu Ganga , Krishna Water Supply project reports (confidential)

THANK
YOU

ENRG-ISC

