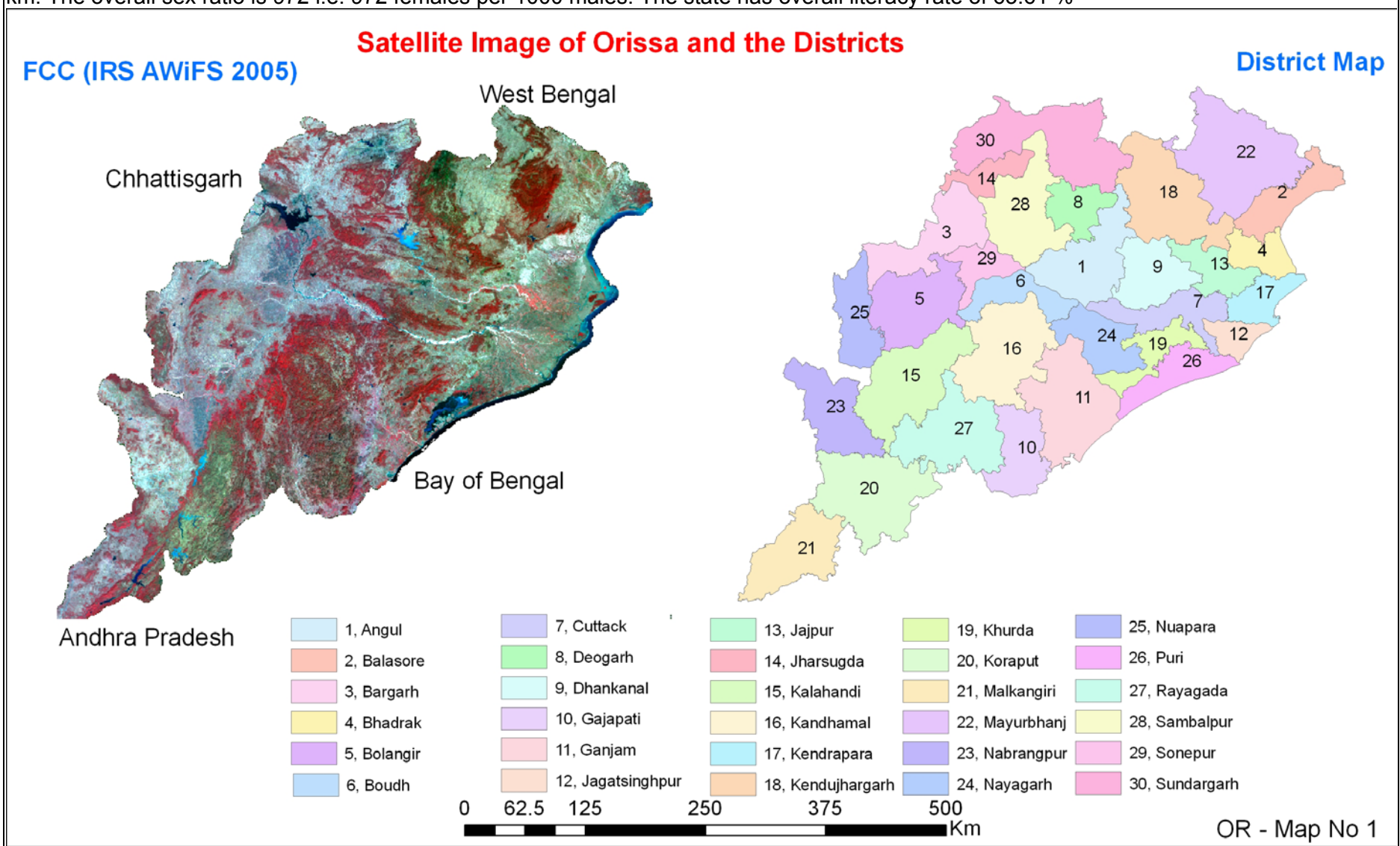
ORISSA

INTRODUCTION

Location and Administrative Setup: Situated on the coast along the Bay of Bengal, Orissa stands for its ancient glory and modern endeavour. Endowed with nature's bounty, a 482 km stretch of coastline with virgin beaches, serpentine rivers, mighty waterfalls, forest-clad blue hills of Eastern Ghats with rich wild life, Orissa is dotted with exquisite temples, historic monuments as well as pieces of modern engineering feat. The land, while retaining its pristine glory, also offers the visitors modern amenities. It is located between 17° 49' to 22° 34' N latitude and 81° 29' to 87° 29' E longitude covering an area of about 15570.700 Th ha (155707 sq. km) which is 4.74% of the total area of the country. The State of Orissa is like a bridge between northern and southern halves of India, representing multifaceted synthesis. Administratively, it has 30 districts (Map 1), 3 Revenue Divisions, 58 Sub-Divisions, 51,061 villages and 127 Urban Centres. Bhubaneshwar is the state capital.

According to the 2001 census, it has a total population of 36,706,920 (3.57 percent of the total population of India), out of which about 18,612,340 are male and 18,094,580 are female. Decadal growth of population is 15.94%. The state has population density of 236 persons/sq km. The overall sex ratio is 972 i.e. 972 females per 1000 males. The state has overall literacy rate of 63.61 %



Climate: Orissa, on the eastern sea board of India, enjoys a tropical monsoon type of climate like most other parts of the country. Its annual average rainfall is about 1500 mm. There are three major seasons viz. summer (March to June), monsoon (July to September) and winter (October to February). The mean maximum and minimum temperature is 40°C (summer) and 7°C (winter). The annual cyclones from the Bay of Bengal influence it and bring copious rain with two seasonal peaks, July-August and October-November. Annual rainfall varies from 1200 mm in coastal plain to about 1700 mm in Northern plateau.

Land use: Land use statistics for the year 2003-'04 and 2004-'05 is given in Table 1.

Table 1: Major Land Use (Th ha)

PARTICULARS	2003-'04	2004-'05
Forest	5813.000	5813.000
Not Available for Cultivation		
A-Land put to Non Agriculture Uses	999.000	999.000
B-Barren and Uncultivable Land	843.000	843.000
Other Uncultivable Land Excluding Fallow Land		
A-Permanent Pastures & Grazing Land	443.000	443.000
B-Land under Misc. Tree Crops & Groves	482.000	482.000
C-Cultivable Wastelands	392.000	392.000
Fallow Land		
A-Current Fallow	370.000	426.000
B-Old Fallow	434.000	434.000
Cropped Area		
A-Net Area Sown	5795.000	5739.000
B-Area Sown More Then Once	2841.590	2979.000
Gross Cropped Area	8636.590	8718.000
Cropping Intensity (%)	149.00	152.00

(Source: www.indiastat.com)

Satellite Data: IRS 1D/P6 LISS III data of two different seasons namely, pre monsoon (April, 2004-'05) and post monsoon (November, 2003-'04) were used for delineation of waterlogged and salt affected areas of various commands of Orissa.

WATER RESOURCES AND COMMAND AREAS

Water Resources: Orissa is one of the few states in the country, which is endowed with abundant water It is blessed with excessive network of rivers and streams. Mahanadi and Subarnarekha are major rivers. Long term average annual precipitation in the state corresponds to 230.76 BCM. The total annual replenishable ground water resource of the state is 21.011 BCM, out of which 60% is safe and usable.

Command Areas: There are 67 irrigation commands in Orissa. Number of major and medium irrigation commands are 17 and 50, respectively (Map 2).

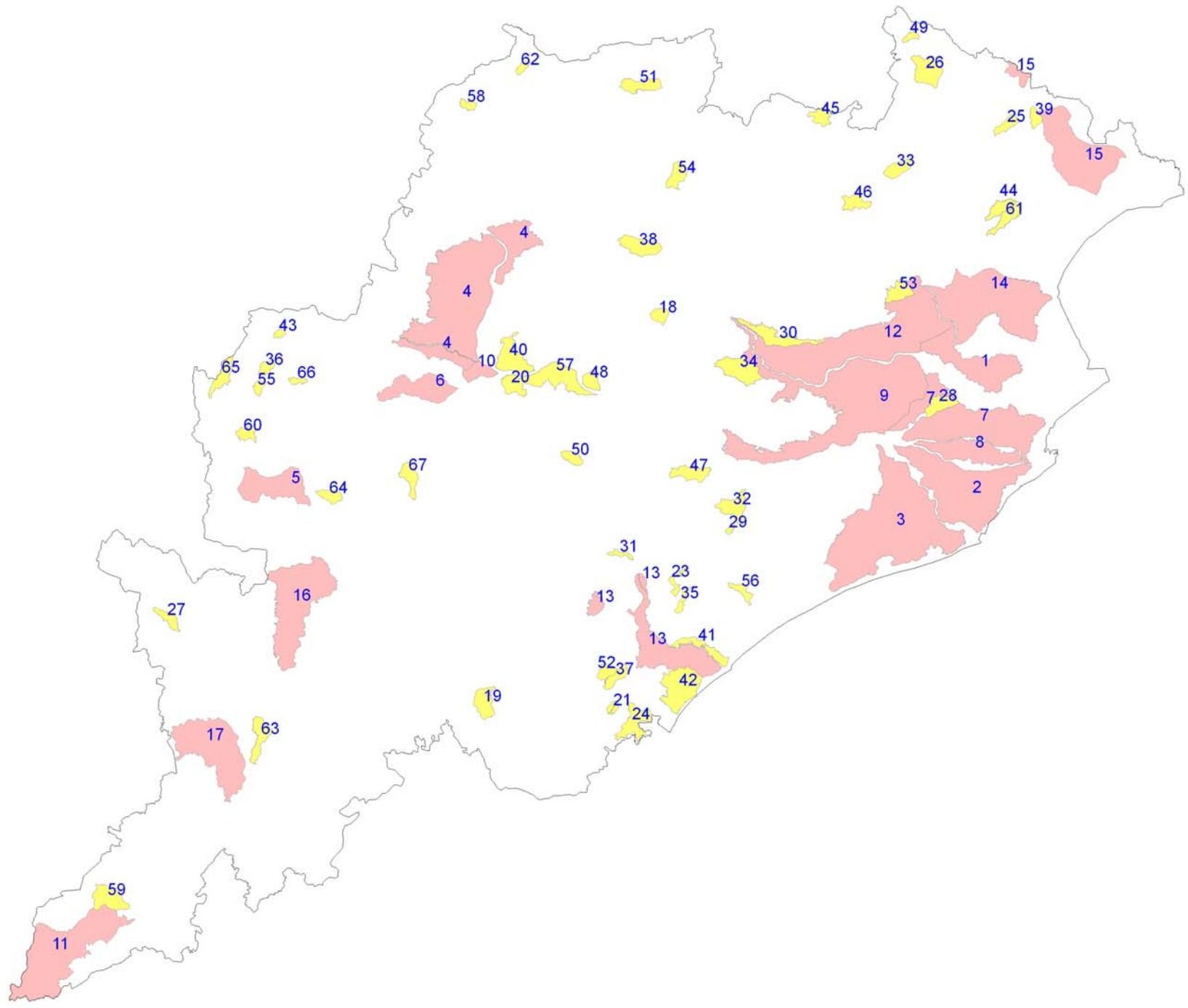
WATER LOGGING AND SALT AFFECTED AREAS IN MAJOR AND MEDIUM IRRIGATION COMMANDS BASED ON SATELLITE REMOTE SENSING

Total waterlogged area in the state is 85.990 Th ha out of which 1.270 Th ha is perennial and 84.720 Th ha is seasonal. Out of 67 irrigation commands, 7 commands have area under waterlogging category with highest in Delta stage II command. Salt affected area covers 34.780 Th ha. Total 909 soil samples were collected to check the salinity / alkalinity in the command. Table 2 and Map 3 show the salt affected area and waterlogged areas in major and medium irrigation commands in Orissa state.

Table 2: Salt Affected and Waterlogged areas in major and medium irrigation commands of state

Code	Command name	Type	Waterlogged area (Th ha)	Salt affected area (Th ha)
1	Baitarani System HLC	Major	16.011	1.060
2	Delta Stage-I	Major	20.020	1.588
3	Delta Stage- II	Major	22.163	1.679
4	Hirakud	Major	0.401	4.101
5	Lower Indra	Major	0.000	0.00
6	Lower Suktel	Major	0.000	0.907
7	Mahanadi-Birupa Barrage	Major	14.437	1.470
8	Mahanadi-Chitrpala	Major	3.359	2.175
9	Naraj-Sapuabadjore-Derjan	Major	0.405	6.773
10	Ong Irrigation	Major	0.000	0.000
11	Potteru (Central)	Major	0.000	0.000
12	Rengali Irrigation	Major	1.694	3.194
13	Rushikulya System	Major	0.685	1.294
14	Salandi	Major	4.323	0.000
15	Subarnarekha	Major	0.112	0.000
16	Upper Indravati	Major	0.000	1.780
17	Upper Kolab	Major	0.006	2.080
18	Aunli	Medium	0.000	0.000
19	Badanalla	Medium	0.032	0.000
20	Bagh Barrage	Medium	0.000	0.000
21	Baghalati I	Medium	0.000	0.004
22	Baghlati II	Medium	0.000	0.001
23	Baghua Stage I	Medium	0.000	0.014
24	Bahuda	Medium	0.000	0.068
25	Baladia	Medium	0.000	0.000
26	Bankabahal-Kharkai	Medium	0.000	1.824
27	Bhaskel	Medium	0.000	0.156
28	Birupa-Genguti IIP	Medium	0.730	Negligible
29	Budhabudhiani	Medium	0.000	0.000
30	Dadaraghati-Ramiala	Medium	0.000	0.000
31	Daha	Medium	0.000	0.000
32	Dahuka	Medium	0.000	0.065
33	Deo	Medium	0.000	0.016
34	Derjang	Medium	0.039	0.069
35	Dhanei	Medium	0.000	0.002
36	Dumerbahal	Medium	0.000	0.000
37	Ghodahado	Medium	0.003	0.039
38	Gohira	Medium	0.000	0.000
39	Haladia	Medium	0.000	0.000
40	Hariharjore	Medium	0.000	0.300
41	Hiradhrabati	Medium	0.170	0.126
42	Jayamangal	Medium	1.261	0.089
43	Jharbandh	Medium	0.000	0.000
44	Kalo	Medium	0.000	0.000
45	Kanhupur	Medium	0.000	0.000
46	Kanjhari	Medium	0.000	0.011
47	Kuanria	Medium	0.000	0.356
48	Manjore	Medium	0.058	0.000
49	Nesa	Medium	0.000	0.000
50	Pilasalki	Medium	0.000	0.081
51	Pitamahal	Medium	0.000	0.059
52	Ramanadi	Medium	0.000	0.031
53	Remal	Medium	0.000	0.000
54	Rukura	Medium	0.000	1.069
55	Saipala	Medium	0.000	0.000
56	Salia	Medium	0.000	0.458
57	Salki	Medium	0.076	1.290
58	Sarapgarh	Medium	0.000	0.000
59	Satiguda	Medium	0.000	0.000
60	Sunder	Medium	0.000	0.000
61	Sunei	Medium	0.000	0.000
62	Talasara	Medium	0.000	0.000
63	Telengiri	Medium	0.000	0.000
64	Titlagarh (I& II)	Medium	0.000	0.000
65	Upper Jonk	Medium	0.000	0.000
66	Upper Suktel	Medium	0.000	0.000
67	Uttei	Medium	0.000	0.554
	TOTAL		**85.990**	**34.780**

Distribution of Major and Medium Irrigation Commands in Orissa



1 Major comamnd areas with code

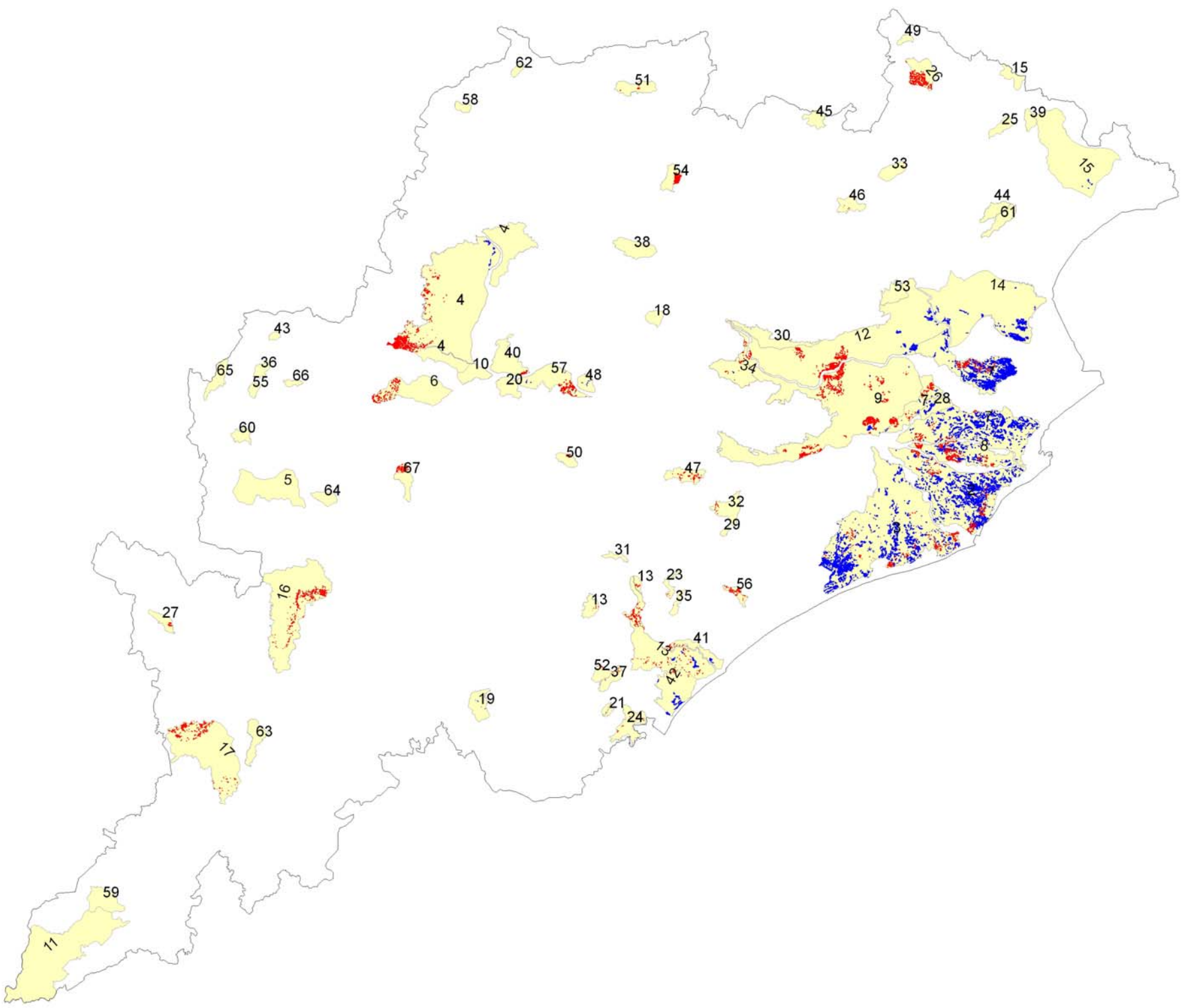
18 Medium comamnd areas with code

0 25 50 100 150 200 Kms

OR - Map No 2

Source: WRD, Orissa

Waterlogged and Salt Affected Areas in the Commands of All Major and Medium Irrigation Projects of Orissa Using Satellite Remote Sensing



Salt Affected Area
Waterlogged Area
Command Area

0 25 50 100 150 200 Kms

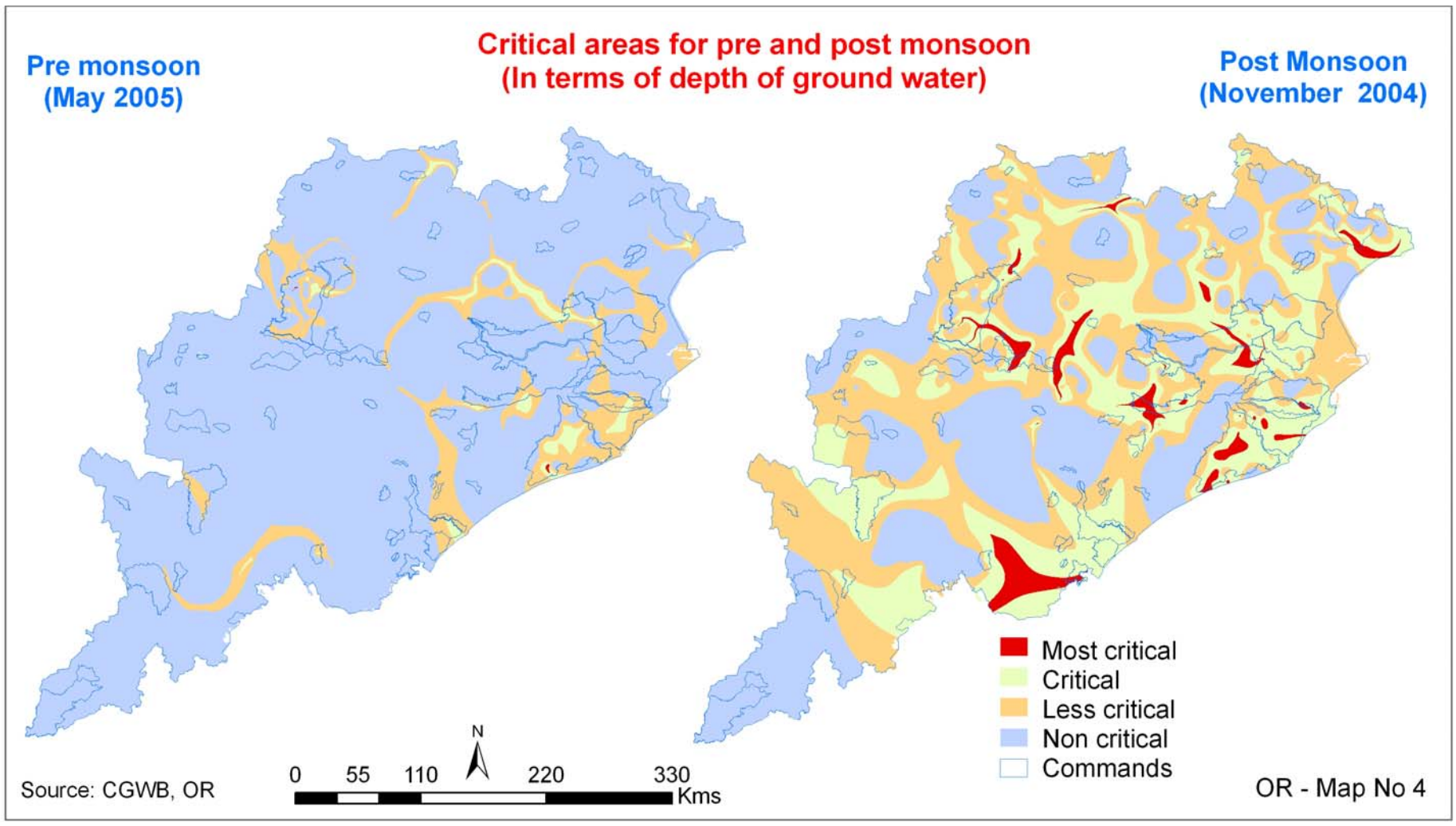
OR - Map No 3

Source: RRSSC/ISRO Jodhpur

For demarcation of critical waterlogged areas due to rise in water table depth, ground water table data of monitoring stations of CGWB were used. Table 3 and Map 4 show the critical area of depth of ground water for pre (May, 2005) and post (November, 2004) monsoon.

Table 3: Critical Area of Depth of Ground Water for Pre (May, 2005) and Post (November, 2004) Monsoon

	Most critical (< 1m)		Critical (1 – 2 m)		Less critical (2 – 3 m)		Non-critical (> 3 m)	
	(Th ha)	(%)	(Th ha)	(%)	(Th ha)	(%)	(Th ha)	(%)
Pre Monsoon (May, 2005)	2.060	0.08	118.790	4.50	633.840	24.00	1886.080	71.42
Post Monsoon (November, 2004)	137.460	5.21	1127.060	42.68	769.610	29.14	606.640	22.97



Project Team

Dr. D. Dutta (PI), RRSSC, Jodhpur
Dr. A.K. Bera, RRSSC, Jodhpur
Ms. A. Vijaya Banu, RRSSC, Jodhpur
Shri S.K. Singh, CWC, New Delhi

Soil Sample Collection and Analysis support by IN-RIMT, Hyderabad

Acknowledgements

Er C.V. Prasad, Chief Engineer (PP & F)
Shri B.M. Jha, Chairman, CGWB, Bhubaneshwar
Shri S.K. Jain, CGWB, Bhubaneshwar
Shri Sisirkar, RD (CGWB), Bhubaneshwar
Er Nirmal Chandra Pradhan, XEN, Mahanadi South Division, Cuttack
Er G.P. Roy, AEE, Cuttack
Shri Baren Jena, Cuttack
Shri Hemant Kr Doloi, Cuttack
Chief Engineer (PP&F), Department of Water Resources, Govt. of Orissa, Bhubaneshwar
CGWB, Bhubneshwar