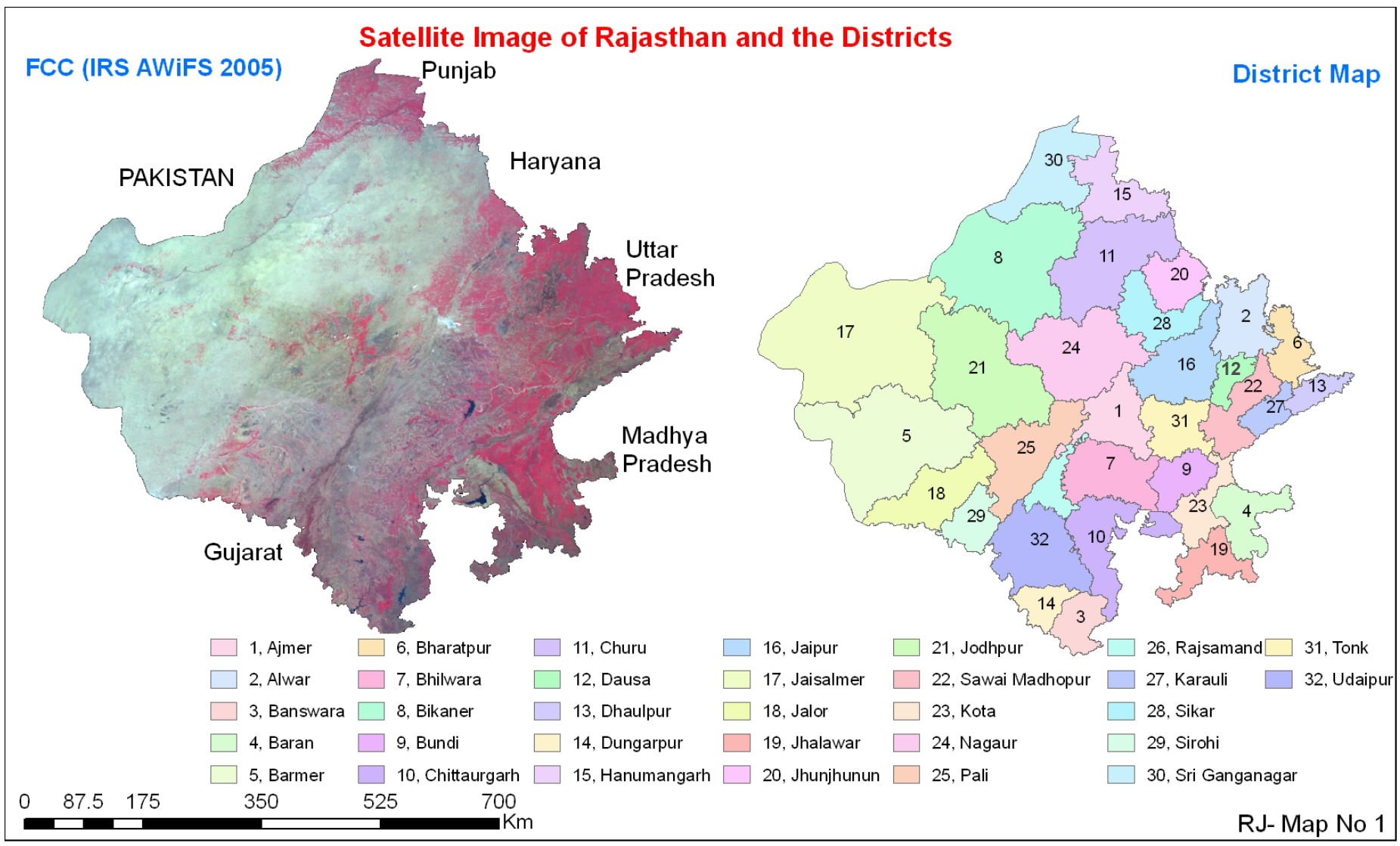
RAJASTHAN

INTRODUCTION

Location and Administrative Setup: Rajasthan, the largest state of India, is located between 23°00' to 30°15' N latitude and 69°29' to 78°20' E longitude covering an area of about 34223.900 Th ha (342239 sq. km). The state has a land boundary of 5920 km, out of which 1070 km is part of Indo-Pak International boundary. The State is bounded by Punjab and Haryana in the north, Uttar Pradesh in the east, Madhya Pradesh in the south-east and Gujarat in the south-west. The state is divided into 32 districts (Map 1), 30 zila Parishads and 241 tehsils. Jaipur is the state capital.

According to 2001 census total population of the state is 56,473,122 out of which 29,381,657 (52.02%) are male and rest female The state has a relatively lower population density (165 persons/sq. km) and higher percentage of rural population 43,267,678 (76.61%) indicating that it is predominantly rural and dependent upon agriculture as mainstay of livelihood. The overall sex ratio is 920 i.e. 920 females per 1000 males. The literacy is 18,279,511 (62.21%) and 9,806,590 (36.2%) for male and female respectively.



Climate: The annual rainfall varies significantly. There is very rapid and marked decrease in rainfall in the west of the Aravalli range. The average annual rainfall in this part ranges from less than 100 mm to 300 mm in Sri Ganganagar, Bikaner and Barmer districts, 300-400 mm in Nagaur, Jodhpur, Churu and Jalor districts and more than 400 mm in Sikar, Jhunjhunu and Pali districts. On the eastern side of the Aravalli, the rainfall ranges from 550 mm in Ajmer to 1020 mm in Jhalawar. In plains Banswara (920 mm), and Jhalawar (1020 mm) districts receive the maximum rainfall. Marked variations in diurnal and seasonal range of temperatures occur at all places in the state, exhibiting the most characteristic phenomenon of the warm-dry continental climate.

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

Table 1: Major Land Use (Th ha)

PARTICULARS	2004-'05
Forest	2674.961
Not Available for Cultivation	
A-Land put to Non Agriculture Uses	1823.361
B-Barren and Uncultivable Land	2438.899
Other Uncultivable Land Excluding Fallow Land	
A-Permanent Pastures & Grazing Land	1707.694
B-Land under Misc. Tree Crops & Groves	20.919
C-Cultivable Wastelands	4590.098
Fallow Land	
A-Current Fallow	1909.659
B-Old Fallow	2264.095
Cropped Area	
A-Net Area Sown	17432.400
B-Area Sown More Then Once	1137.100
Gross Cropped Area	18569.500
Cropping Intensity (%)	106.50

(Source: www.indiastat.com)

Satellite Data: IRS P4 LISS III data of two different seasons namely, pre monsoon (April-May, 2003) and post monsoon (November-December, 2002) were used for delineation of waterlogged and salt affected areas of various commands of Rajasthan.

WATER RESOURCES AND COMMAND AREAS

Water Resources: The State of Rajasthan is one of the driest states of the country and the total surface water resources in the state are only about 1% of the total surface water resources of the country. The rivers of the state are rainfed and identified by 14 major basins divided into 59 sub-basins. The surface water resources in the state are mainly confined to south and south-eastern parts of the State. State has 7 major reservoirs and 41 rivers. Total water resources are 44.09 BCM out of which 32.53 BCM are surface water resources. Chambal and Mahi are major rivers in the state. Annual replenishable ground water resources are 11.56 bcm and stage of ground water development is 125%.

Command Areas: There are 91 irrigation commands in Rajasthan. Number of major and medium irrigation commands are 23 and 68, respectively (Map 2).

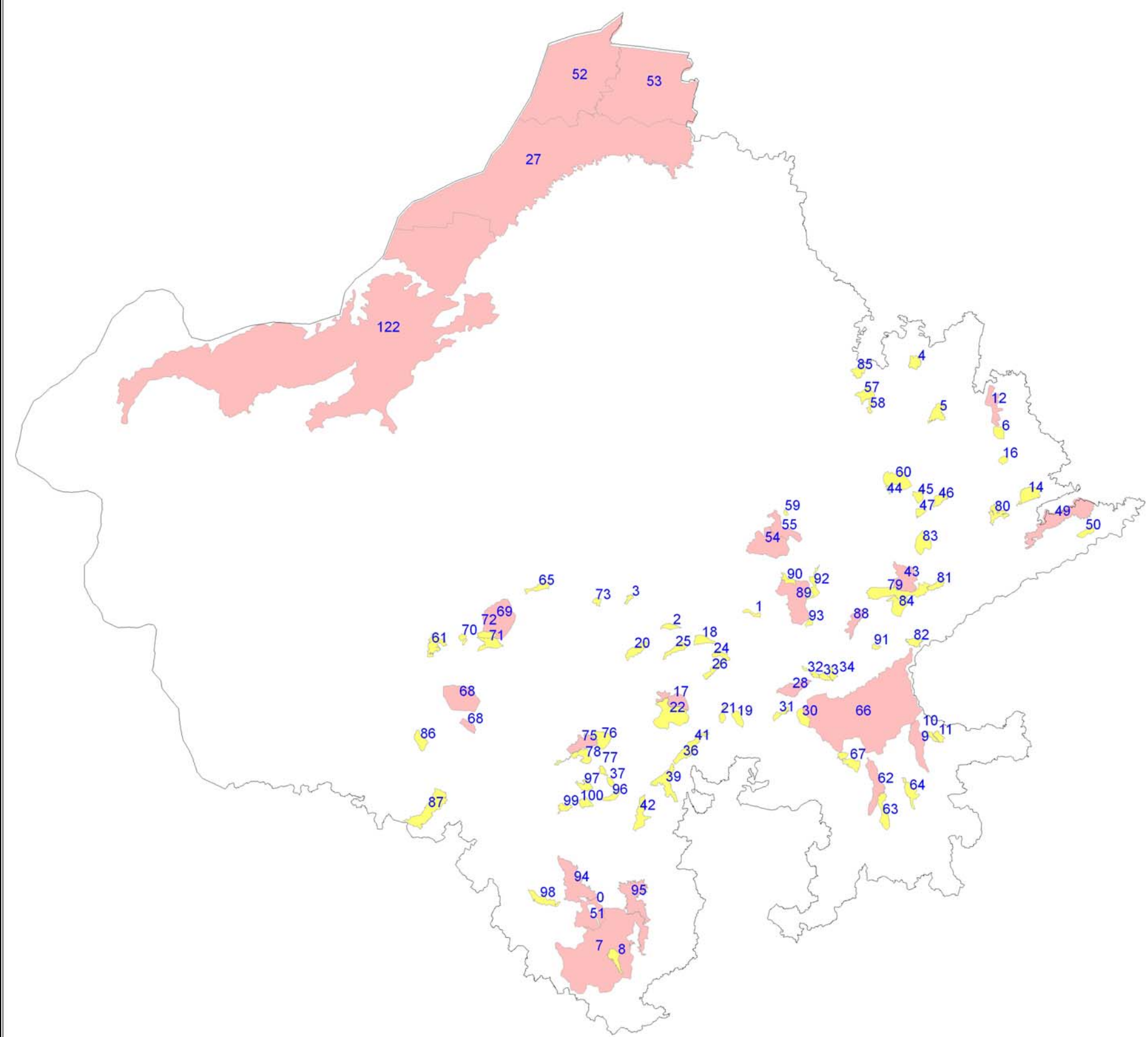
WATER LOGGING AND SALT AFFECTED AREAS IN MAJOR AND MEDIUM IRRIGATION COMMANDS BASED ON SATELLITE REMOTE SENSING

Total waterlogged area in the state is 8.409 Th ha out of which 0.715 Th ha perennial and 7.694 Th ha seasonal. Out of 91 irrigation commands, 71 commands have area under waterlogging category with highest seasonal waterlogging in Mahi Bajaj Sagar command and highest perennial waterlogging in IGNP stage II. Salt affected area covers 2.053 Th ha. Total 1748 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 Rajasthan state.

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

Code	Command name	Type	Waterlogged area (Th ha)	Salt affected area (Th ha)
53	Bhakra Canal	Major	0.552	0.003
54	Chaparwara	Major	0.003	0.000
88	Galwa Bund	Major	0.000	0.003
52	Gang Canal	Major	0.090	0.198
28	Gudha	Major	0.001	0.000
62	Harish Chandra Sagar	Major	0.000	0.000
27	IGNP stage I	Major	1.515	1.398
122	IGNP stage II	Major	1.589	0.009
94	Jaisamand	Major	0.016	0.003
68	Jawai Dam	Major	0.003	0.000
95	Jhakham	Major	0.666	Negligible
55	Klakh Sagar	Major	Negligible	0.000
66	Kota Barrage	Major	0.124	0.331
7	Mahi Bajaj Sagar	Major	2.447	0.016
17	Meja	Major	0.030	0.000
43	Morel Bund	Major	0.000	0.000
49	Parbati	Major	0.001	0.000
9	Parbati Pickup	Major	0.001	0.000
75	Rajsamand	Major	0.225	0.000
69	Sardarsamand	Major	0.007	0.077
12	Sikri Bund	Major	0.015	0.000
51	Som Kamla Amba	Major	0.112	0.000
89	Tordi Sagar	Major	0.009	0.000
67	Alnia Irrigation	Medium	0.000	0.000
18	Arwar	Medium	0.000	0.000
96	Badgaon	Medium	0.078	0.000
97	Bagolia	Medium	0.004	0.000
30	Bardha	Medium	0.012	0.000
14	Baretha	Medium	0.003	0.001
36	Bassi	Medium	0.051	0.000
61	Baukali bund	Medium	Negligible	0.000
63	Bhim Sagar	Medium	0.042	Negligible
31	Bhimlat (Abeypur)	Medium	0.008	0.000
37	Bhupal Sagar	Medium	0.020	0.000
57	Buchara	Medium	0.012	0.000
32	Bundi Ka Gothara	Medium	0.001	0.000
76	Chandrabhaga	Medium	0.025	0.000
44	Chandrana	Medium	0.000	0.000
90	Chandsen Bheru s	Medium	0.001	0.000
58	Chhitoli	Medium	0.001	0.000
79	Dheel Sagar	Medium	0.001	0.000
33	Dugari	Medium	0.000	0.000
91	Galwania	Medium	0.000	0.005
39	Gambhiri	Medium	0.089	0.000
70	Giroliya	Medium	Negligible	0.000
10	Gopalpura	Medium	0.000	0.000
4	Harsora Bund	Medium	0.002	0.000
71	Hemawas	Medium	0.010	0.000
59	Hingoniya	Medium	0.000	0.000
5	Jaisamand Bund	Medium	0.012	0.000
65	Jaswant Sagar	Medium	0.000	0.000
19	Jetpura	Medium	0.015	0.000
80	Juggar	Medium	0.000	0.000
45	Kala kho	Medium	0.000	0.000
81	Kalisil	Medium	0.000	0.000
72	Kharda Bund	Medium	0.002	0.000
20	Khari	Medium	Negligible	0.000
21	Kothari Dam	Medium	0.006	0.000
1	Lasaria	Medium	0.003	0.000
46	Madho Sagar	Medium	Negligible	0.000
22	Mandal	Medium	0.071	0.000
82	Mansarovar	Medium	0.000	0.000
47	Maoroli Bund	Medium	0.004	0.000
92	Mashi	Medium	Negligible	0.000
77	Mata Ji Ka Khera	Medium	0.000	0.000
83	Moran Sagar	Medium	0.000	0.009
93	Moti Sagar	Medium	0.000	0.000
24	Nahar Sagar	Medium	0.010	0.000
78	Nandsamand	Medium	0.008	0.000
2	Narayan Sagar	Medium	0.000	0.000
86	Ora bund	Medium	0.003	0.000
41	Orai	Medium	0.015	0.000
34	Paibalpura	Medium	0.004	0.000
64	Parwan Pickup Weir	Medium	0.040	0.000
3	Phool Sagar Jail	Medium	0.000	0.000
73	Raipur Luni	Medium	0.000	0.000
85	Raipur Patan	Medium	0.016	0.000
60	Sainthal Sagar	Medium	0.043	0.000
25	Sareri	Medium	0.032	0.000
16	Sarsena	Medium	Negligible	0.000
98	Som Kagdar	Medium	0.009	0.000
84	Surwal	Medium	0.031	0.000
8	Surwania	Medium	0.065	0.000
6	Tasai	Medium	0.009	0.000
99	Udai Sagar	Medium	0.084	0.000
11	Umaid Sagar	Medium	0.003	0.000
26	Umaidsagar	Medium	0.016	0.000
50	Urmila Sagar	Medium	0.008	Negligible
100	Vallabhanagar	Medium	0.019	0.000
42	Wagol Project	Medium	0.091	0.000
87	West Banas	Medium	0.027	0.000
	Total		**8.409**	**2.053**

Distribution of Major and Medium Irrigation Commands in Rajasthan



1 Major comamnd areas with code

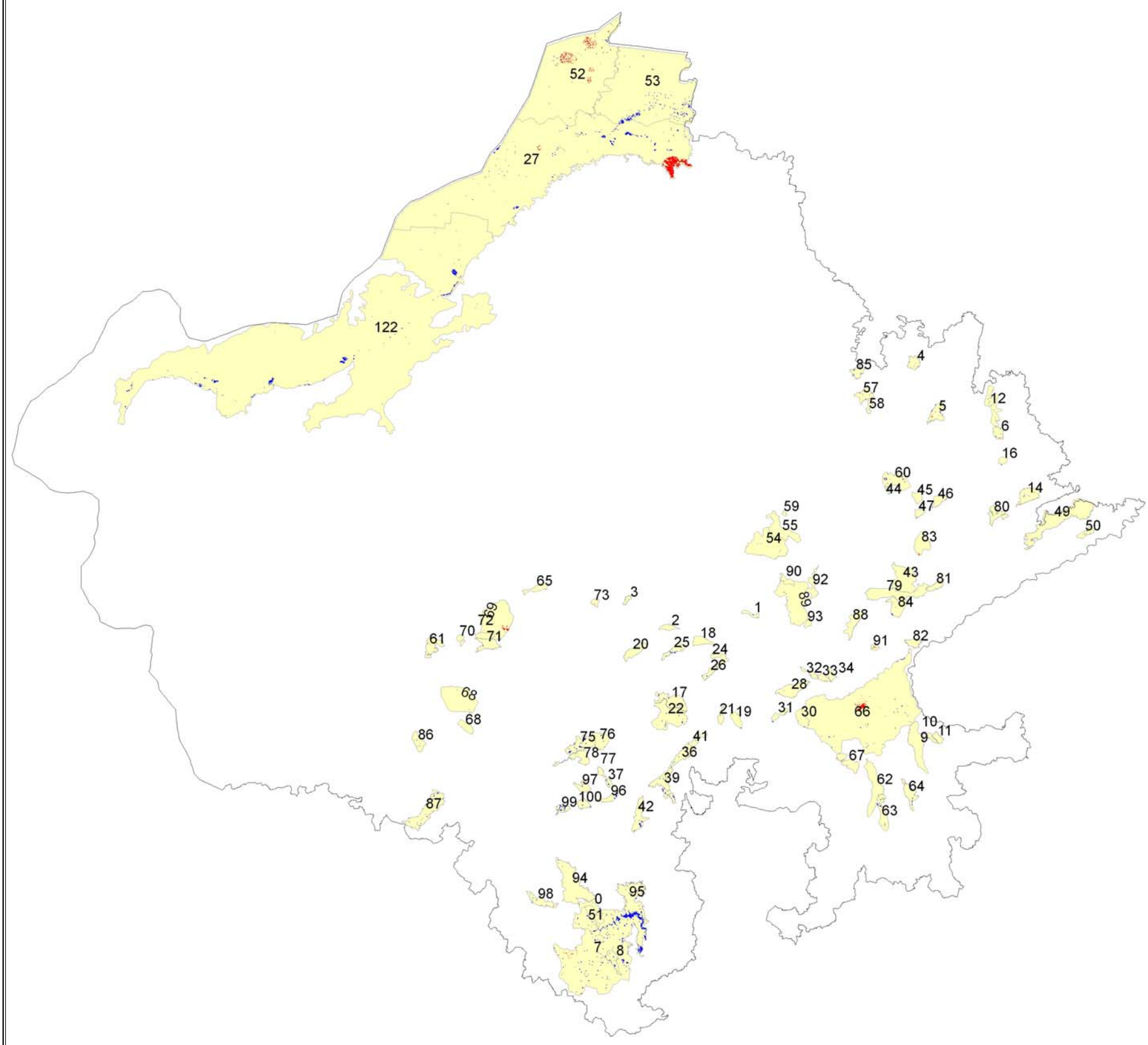
24 Medium comamnd areas with code

0 35 70 140 210 280 Kms

RJ - Map No 2

Source: Irrigation Department, Rajasthan

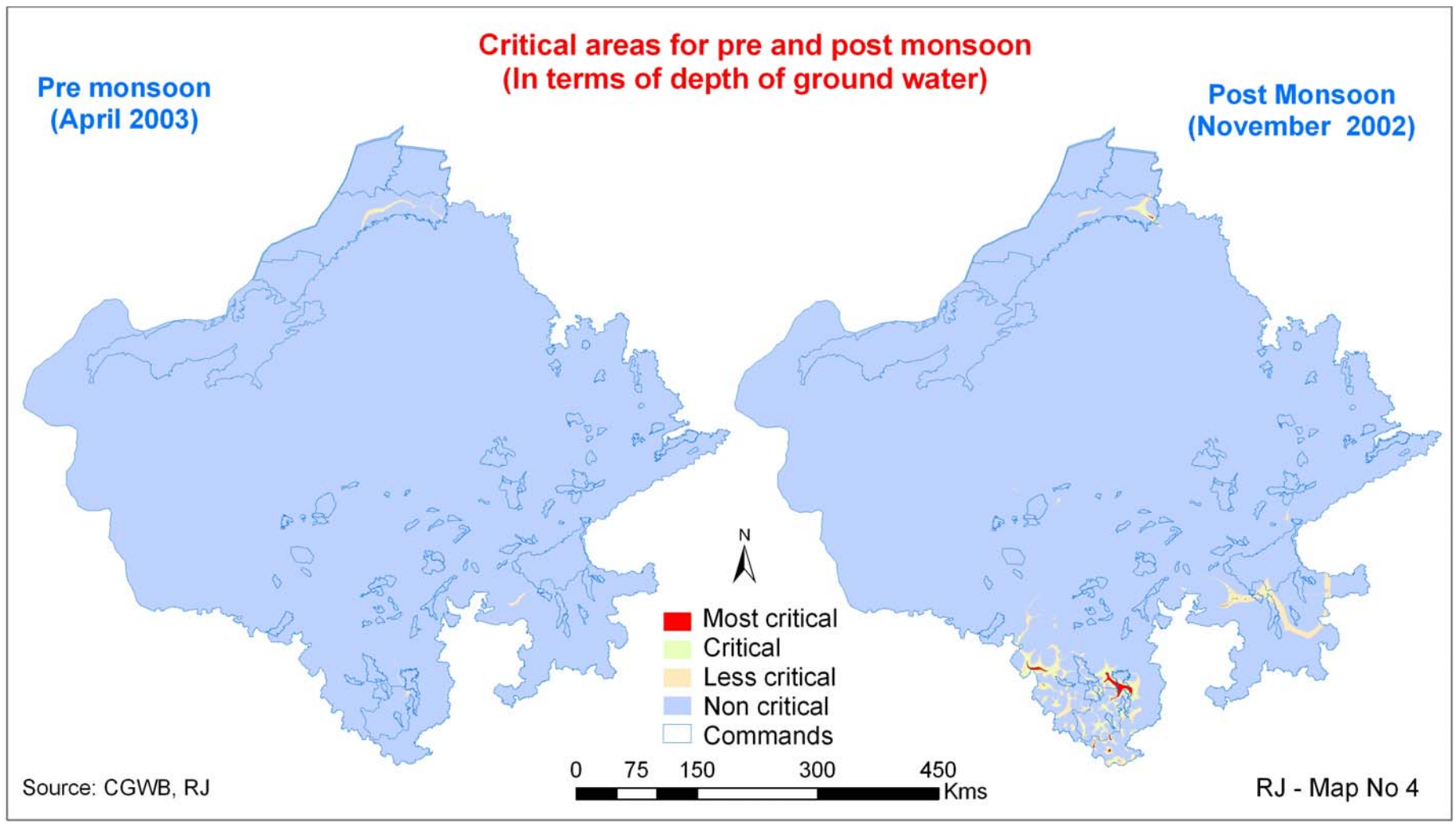
Waterlogged and Salt Affected Areas in the Commands of All Major and Medium Irrigation Projects of Rajasthan Using Satellite Remote Sensing



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 (April, 2003) and post (November, 2002) monsoon.

Table 3: Critical Area of Depth of Ground Water for Pre (April, 2003) and Post (November, 2002) 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 (April, 2003)	0.000	0.00	5.312	0.20	34.148	0.68	5012.43	99.21
Post Monsoon (November, 2002)	13.484	0.27	50.817	1.01	119.083	2.36	4868.506	96.36



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