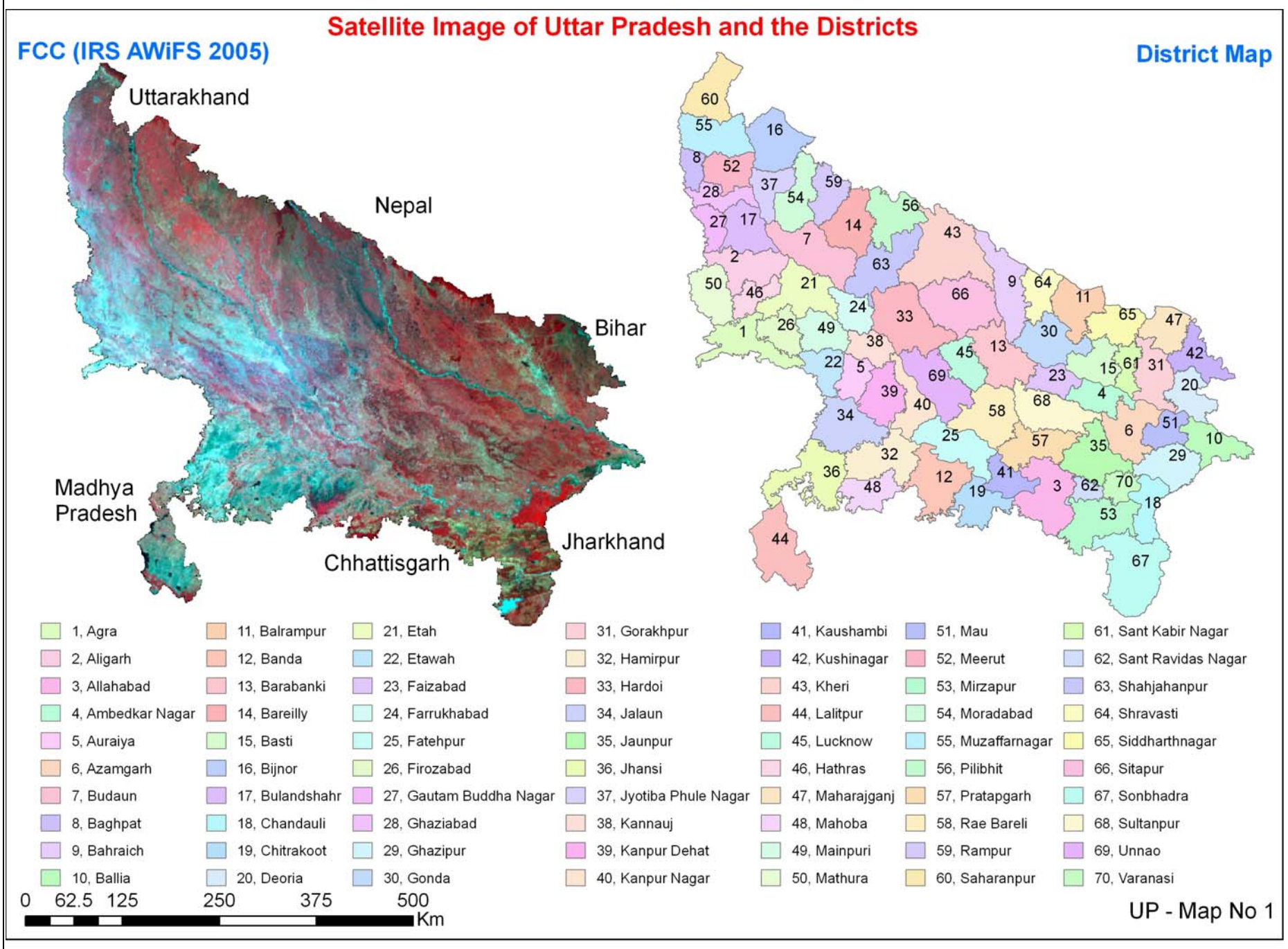
UTTAR PRADESH

INTRODUCTION

Location and Administrative Setup: Uttar Pradesh situated in the north eastern part of India is the fourth largest state and was separated in two states viz. Uttarakhand and Uttar Pradesh. Madhya Pradesh state in the South, Haryana, Rajasthan and Delhi in West, Nepal in the North, Uttarakhand in the North East and Bihar in the East bound Uttar Pradesh. The state is located between 23° 52' to 29° 45' N latitude and 77° 4' to 84° 38' E longitude covering an area of about 24092.800 Th ha (2,40,928 sq km). The state has 70 districts (Map 1), 17 divisions and 107,425 villages. Total number of towns in the state is 704 as per 2001 census. Lucknow is the state capital.
As per 2001 census, total population of the state is 16,61,97,921. Its population density is 690 persons per sq. km. The sex ratio recorded in this census is 898 females per 1000 males. Decadal growth of population is 19.37.



Climate: The climate of the state is tropical monsoon, but variations exist because of difference in altitudes. The average temperature varies in the plains from 3-4°C in January to 43-45°C in May and June. There are three distinct seasons - winter from October to February, summer from March to mid-June, and the rainy season from June to September. The rainfall in the plains is heaviest in the east and decreases towards the west. Floods are a recurring problem in the state, causing damage to crops, life and property. In the plains, the average temperature varies from 12.5 to 17.5 ˚C in January to 27.5 to 32.5 ˚C in May and June.

Land use: Land use statistics for the year 2003 – '04 is given in Table 1.

Table 1: Major Land Use (Th ha)

PARTICULARS	2003-'04
Forest	1686.000
Not Available for Cultivation	
A-Land put to Non Agriculture Uses	2594.000
B-Barren and to Uncultivable Land	548.000
Other Uncultivable Land Excluding Fallow Land	
A-Permanent Pastures & Grazing Land	66.000
B-Land under Misc. Tree Crops & Groves	359.000
C-Cultivable Wastelands	467.000
Fallow Land	
A-Current Fallow	1137.000
B-Old Fallow	594.000
Cropped Area	
A-Net Area Sown	16750.000
B-Area Sown More Then Once	8675.000
Gross Cropped Area	25425.000
Cropping Intensity (%)	151.79

(Source: www.indiastat.com)

Satellite Data: IRS P6 LISS III data of two different seasons namely, pre monsoon (April-May, 2006) and post monsoon (November-December, 2005) were used for delineation of waterlogged and salt affected areas of various commands of Uttar Pradesh.

WATER RESOURCES AND COMMAND AREAS

Water Resources: Major source of surface water in the state are rivers flowing from southeast to southwest direction. Major rivers include Ganges, Yamuna, Ghagra, Gomti, Gandak, Sone and Sarda. The Ganges being too large to be tamed, no major irrigation projects have been created on its mainstream. The irrigation needs are being met by canal projects constructed early this century. In recent years, some of the northern and southern tributaries of Ganges and their minor feeder streams have been tamed, creating a few reservoirs. Annual replenishable ground water resources are 76.35 BCM with stage of ground water development as 70%.

Command Areas: There are 140 irrigation commands in Uttar Pradesh falling in 17 canal systems. Number of major and medium irrigation commands are 62 and 78, 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 126.681 Th ha, out of which 11.295 Th ha is perennial and 115.386 Th ha is seasonal. Waterlogged area is found out within 17 canal systems (due to non availability of command maps) in which Uttar Pradesh state is divided. Salt affected area covers 283.146 Th ha. Total 1462 soil samples were collected and analysed to check salinity/alkalinity in the canal systems. Table 2 and Map 3 show the salt affected area and waterlogged areas in major and medium irrigation commands in Uttar Pradesh state.

Table 2: Waterlogged and Salt Affected areas in canal system and commands of state

Code	Canal system/ Command name	Type	Waterlogged area (Th ha)	Salt affected area (Th ha)
	Canal System			
1	Agra Canal	Major	10.819	0.822
2	Bansagar Canal	Major	1.073	14.84
3	Betwa Canal	Major	0.016	0.000
4	Dams in Bundelkhand	Major	0.363	0.065
5	Dams in Vindhyan Range	Major	0.893	1.417
6	Dohrighat Pump Canal	Major	0.076	0.786
7	East Yamuna Canal	Major	0.174	0.398
8	Eastern Ganga Canal	Major	1.186	0.000
9	Gandak Canal	Major	1.089	0.000
10	Ganga Canal	Major	1.36	0.208
11	Ken Canal	Major	0.002	0.000
12	Lower Ganga Canal	Major	31.643	85.65
13	Madhya Ganga Canal	Major	7.514	2.224
14	Sarda Canal	Major	12.126	64.076
15	Sarda Sahayak	Major	37.744	100.689
16	Saryu Canal	Major	5.650	4.266
17	Upper Ganga Canal	Major	14.954	7.718
			126.681	**283.146**
	Command name			
1	Adwa Dam	Major	0.000	0.000
2	Agra Canal	Major	5.553	0.402
3	Aliganj	Major	NA	NA
4	Augasi Pump Canal	Major	NA	NA
5	Belan Tons Canal	Major	0.028	0.006
6	Betwa Canal (Paricha Dam)	Major	0.000	0.000
7	Bewar Feeder	Major	NA	NA
8	Bhopauli Pump Canal	Major	0.000	0.013
9	Bijnor Canal	Major	NA	NA
10	Chambal Lift	Major	NA	NA
11	Chittorgarh Reservoir	Major	0.000	0.000
12	Dalmau Pump Canal Stage I & II	Major	NA	NA
13	Deokali Pump Canal	Major	0.531	3.133
14	Dhasan Canal(Lochura Dam)	Major	0.000	0.000
15	Dohrighat Pump Canal	Major	0.018	0.011
16	Dohrighat Sahayak	Major	0.104	0.170
17	Eastern Ganga Canal	Major	NA	NA
18	Eastern Yamuna	Major	NA	NA
	Canal			
19	Gandak Canal	Major	NA	NA
20	Garrei and Ghaggar Canal	Major	0.083	0.049
21	Ghaggar Pump Canal	Major	0.000	0.000
22	Gyanpur Pump Canal	Major	NA	NA
23	Haripur Dam	Major	0.000	0.000
24	Hindon Krishi Doab	Major	NA	NA
25	Jamrani Dam	Major	0.000	0.000
26	Jarauli Pump Canal	Major	NA	NA
27	Kanhar Irrigation	Major	NA	NA
28	Ken Canal	Major	NA	NA
29	Kishanpur Pump Canal	Major	NA	NA
30	Lower Ganga Canal	Major	28.655	58.517
31	Madho Tanda	Major	NA	NA
32	Madhya Ganga Canal Stage	Major	8.644	4.676
33	Matatila Dam	Major	0.000	0.000
34	Maudaha Dam/Bansagar	Major	0.000	0.000
35	Meja Reservoir	Major	NA	NA
36	Moosakhand Dam	Major	0.000	0.000
37	Nagwa Dam	Major	NA	NA
38	Nanak Sagar	Major	0.000	0.000
39	Naraini Gandak Canal	Major	NA	NA
40	Narainpur Pump Canal	Major	0.098	0.108
41	Nawgarh Dam	Major	NA	NA
42	Parallel Lower Ganga Canal	Major	NA	NA
43	Rajghat Dam	Major	0.000	0.000
44	Ram Ganga Dam	Major	NA	NA
45	Ramganga Pump Canal	Major	0.293	0.00
46	Rampur Canal	Major	NA	NA
47	Rangwan Dam	Major	0.000	0.000
48	Rohilkhand Canal	Major	NA	NA
49	Sahzad Dam	Major	0.000	0.000
50	Sarda Sagar Stage I	Major	0.503	0.002
51	Sarda Sagar Stage II	Major	NA	NA
52	Sarda Sahayak	Major	1.751	0.021
53	Sarju Nahar (Left Bank Ghagra Canal)	Major	NA	NA
54	Sarju Pump Canal	Major	0.000	0.000

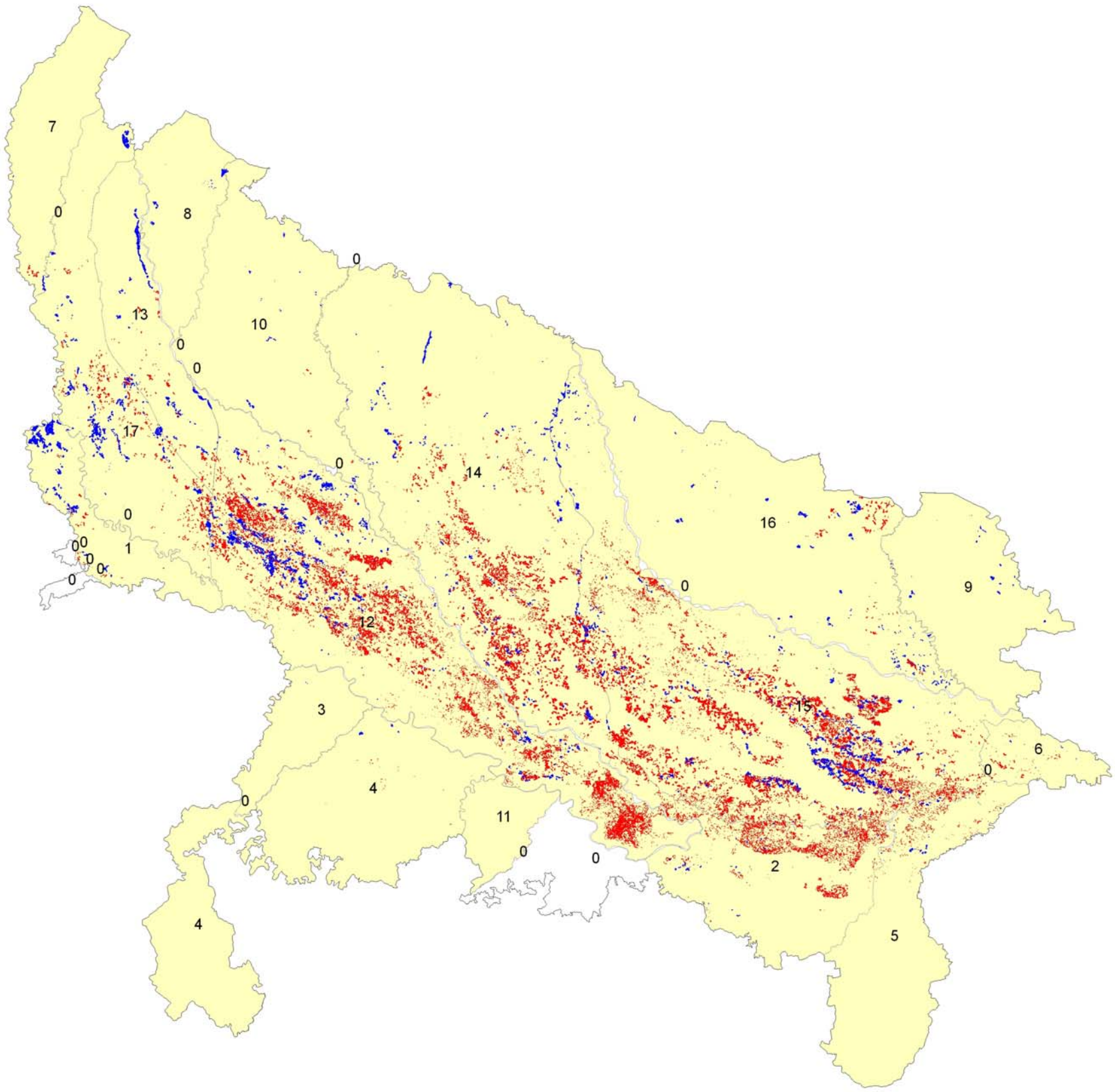
Code	Canal system/ Command name	Type	Waterlogged area (Th ha)	Salt affected area (Th ha)
55	Silahat Pump Canal	Major	0.000	0.000
56	Sone Pump Canal	Major	NA	NA
57	Suheli	Major	0.003	0.000
58	Tanda Pump Canal	Major	0.519	0.818
59	Tons Pump Canal	Major	NA	NA
60	Upper Ganga Canal	Major	2.417	0.000
61	Yamuna Pump Canal / Urmil Dam	Major	NA	NA
62	Zamania Pump Canal	Major	0.000	0.103
63	Afzalgarh Dam	Medium	NA	NA
64	Ahraura Dam	Medium	0.000	0.000
65	Arjun Dam	Medium	0.000	0.000
66	Bachara Dam	Medium	0.000	0.000
67	Baghelkhand Reservoir	Medium	0.000	0.000
68	Balmiki (Ohen) Sarovar	Medium	0.000	0.000
69	Banganga Canal	Medium	0.130	0.044
70	Banghogwa Reservoir	Medium	0.000	0.000
71	Bardaha Dam	Medium	NA	NA
72	Bariarpur Dam	Medium	0.000	0.000
73	Barwa Dam	Medium	NA	NA
74	Barwar Jheel	Medium	0.000	0.000
75	Basehwa Reservoir	Medium	NA	NA
76	Bekhar Marihan Feeder	Medium	NA	NA
77	Belan Bakhar Diversion	Medium	0.000	0.000
78	Bhagwanpur Reservoir	Medium	0.000	0.000
79	Bhainsora/Dhandhraul Dam	Medium	0.000	0.000
80	Bihar Barrage	Medium	NA	NA
81	Chandra Praabha Dam	Medium	0.000	0.000
82	Chandrawal Canal	Medium	0.000	0.000
83	Charkhari Pump Canal	Medium	NA	NA
84	Chillimal Pump Canal	Medium	NA	NA
85	Denkwa Dam	Medium	NA	NA
86	Dhoba Pump Canal	Medium	NA	NA
87	Dongri Dam	Medium	0.000	0.004
88	Ganeshpur Reservoir	Medium	0.000	0.000
89	Gangua Dam	Medium	0.000	0.000
90	Ghori Dam	Medium	NA	NA
91	Girgithi Reservoir	Medium	0.000	0.000
92	Govind Ballabh Pant Sagar	Medium	NA	NA
93	Gularia Dam	Medium	0.000	0.000
94	Guntanala Dam	Medium	NA	NA
95	Harrai Weir	Medium	0.000	0.036
96	Hinauti Bundh	Medium	0.000	0.023
97	Husain Pur Weir	Medium	NA	NA
98	Jahangirganj Branch	Medium	0.070	0.055
99	Jamni Dam	Medium	0.000	0.000
100	Jirgo Reservoir	Medium	0.000	0.017
101	Kabrai Lake	Medium	NA	NA
102	Karela Bagh Pump Canal	Medium	0.501	0.120
103	Keolari Dam	Medium	0.000	0.038
104	Khajuri Weir	Medium	0.000	0.000
105	Khaprar Dam	Medium	0.000	0.000
106	Khara Canal	Medium	NA	NA
107	Khirman Reservoir	Medium	0.000	0.000
108	Kohargaddi Reservoir	Medium	0.000	0.000
109	Kwano Pump Canal	Medium	NA	NA
110	Lalitpur Dam	Medium	0.000	0.000
111	Latifshah Weir	Medium	NA	NA
112	Lohra Pump Canal	Medium	NA	NA
113	Majhgawa Reservoir	Medium	0.000	0.000

Code	Canal system/ Command name	Type	Waterlogged area (Th ha)	Salt affected area (Th ha)
	Majhgawa Tank	Medium	0.000	0.000
115	Manda Dam	Medium	NA	NA
116	Motipur Reservoir	Medium	0.000	0.000
117	Mujaffararpur Weir	Medium	0.000	0.000
118	Obra Dam	Medium	NA	NA
119	Pahuj Dam	Medium	0.000	0.001
120	Pathari Dam	Medium	0.000	0.000
121	Pathrai Dam	Medium	0.000	0.000
122	Pratapgarh Branch	Medium	NA	NA
123	Rampur Reservoir	Medium	0.002	0.000
124	Rapti Barrage	Medium	NA	NA
125	Rihand Dam	Medium	NA	NA
126	Rohini Dam	Medium	0.000	0.000
127	Sajnam Dam	Medium	0.000	0.000
128	Saprar Dam	Medium	0.000	0.000
129	Shahganj Dam	Medium	NA	NA
130	Sirsa Pump Canal	Medium	NA	NA
131	Sirsi Dam	Medium	0.000	0.000
132	Sukhra Dam	Medium	0.066	0.000
133	Tons Barrage	Medium	NA	NA
134	Trans Kalyani Schemes	Medium	8.923	23.312
135	Tumaria Reservoir	Medium	0.000	0.000
136	Umarahat Pump Canal	Medium	NA	NA
137	Upper Khajhuri Reservoir	Medium	0.000	0.000
138	Urmil Dam	Medium	0.000	0.000
139	Veerar Pump Canal	Medium	0.041	0.087
140	Virat Sagar Dam	Medium	NA	NA
	Within command area		**58.891**	**91.764**
	Remaining		**67.79**	**191.382**
	Within Canal System Area		**126.681**	**283.146**

NA: Command boundary not available

Distribution of Major and Medium Irrigation Commands on Canal System in Uttar Pradesh

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



Salt Affected Area
Waterlogged Area
Command Area

0 30 60 120 180 240 Kms

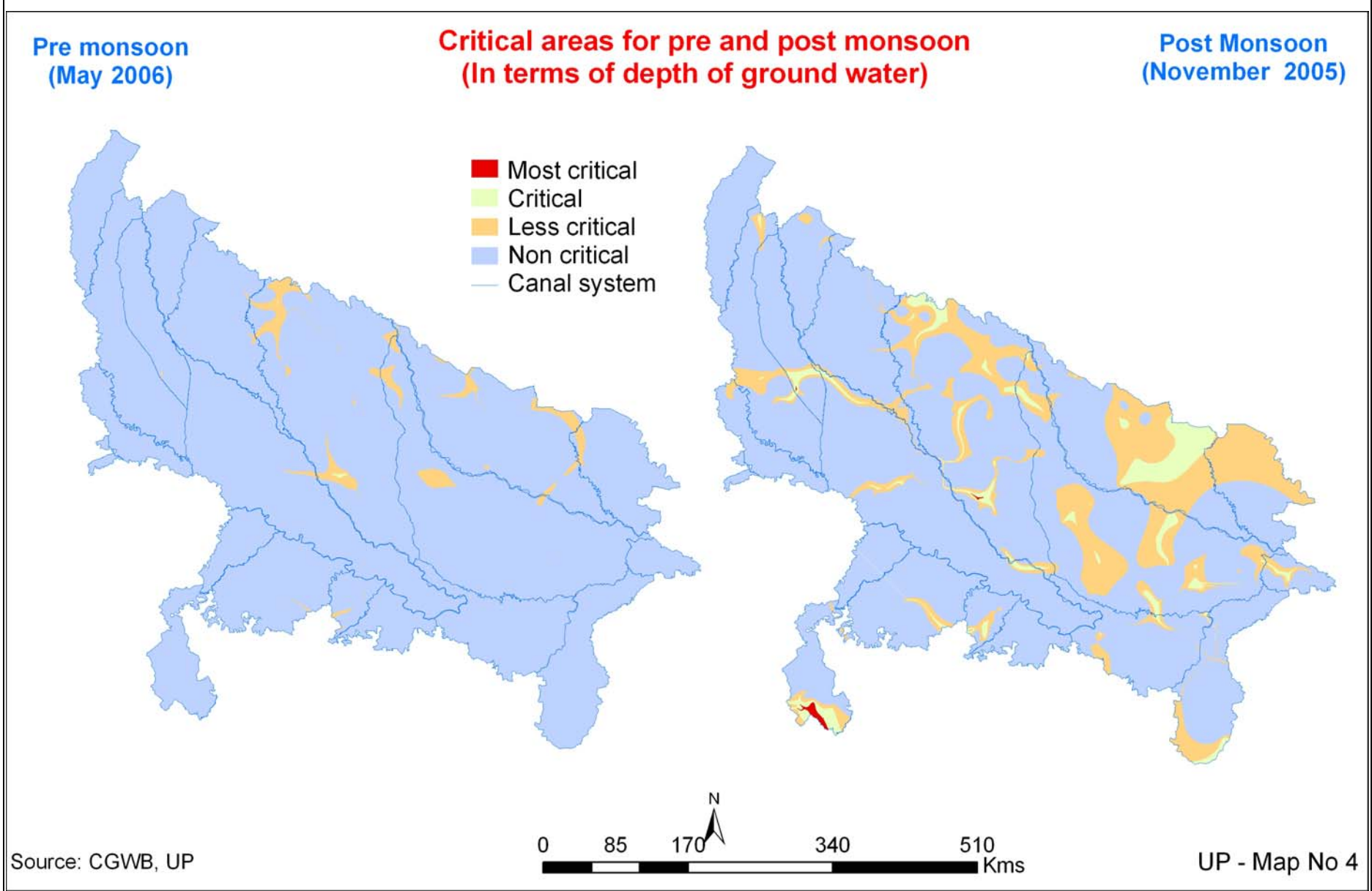
UP - Map No 3

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, 2006) and post (November, 2005) monsoon.

Table 3: Critical Area of Depth of Ground Water for Pre (May, 2006) and Post (November, 2005) 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, 2006)	0.000	0.00	5.847	0.02	608.136	2.60	22786.770	97.38
Post Monsoon (November, 2005)	29.592	0.13	919.346	3.93	4092.568	17.49	18359.250	78.45



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