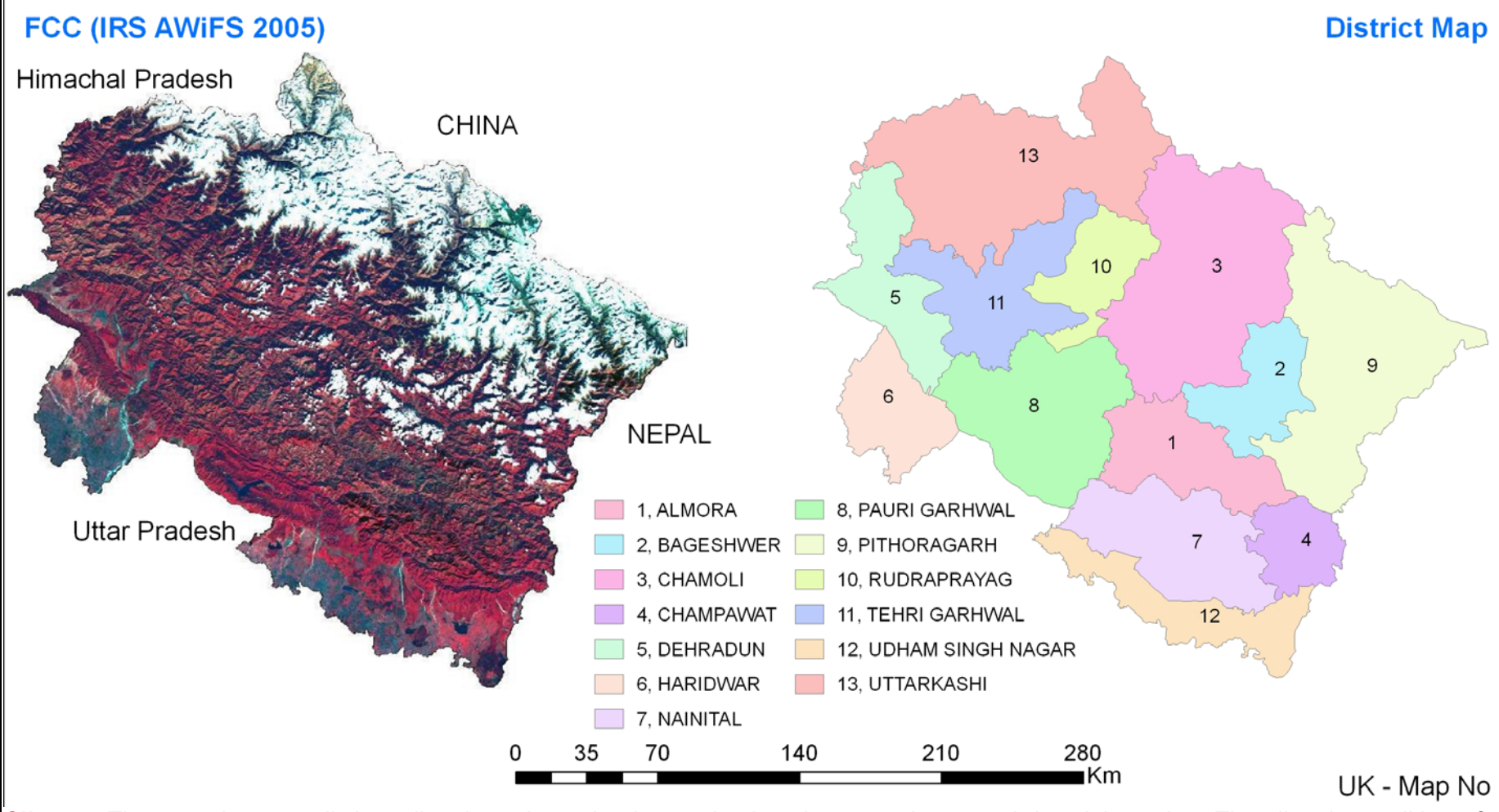
UTTARAKHAND

INTRODUCTION

Location and Administrative Setup: Uttrakhand is the 27th state among 28 state of the Republic of India. It was formed on 9th November 2000. It lies in the northern part of India amidst the magnificent Himalayas and dense forests. The state falls between 77º 34' E and 81º 02' E longitude and 28º 43' N and 31º28 N latitude. It has total geographical area of 5348.300 Th ha (53483.10 Sq Km). Uttrakhand is a part of the Western Himalayan ranges, which start from the Siwalik foothills to Greater Himalayas with Tibet as its north-eastern border. In the north-western corner of the state is Himachal Pradesh, Haryana in the west, Tibet China in north, Nepal in east and Uttar Pradesh surrounds western & southern boundary of the state. From the administration point of view the state is divided into 13 districts (Map 1), 78 tehsils and 95 development blocks and 16826 villages. Dehradun is the state capital.

As per 2001 census, total population of the state is 84,79,562, out of which 43,16,401 are male. Decadal growth of population is 19.20%. Its population density is 159 persons per sq. km. The sex-ratio recorded in this census is 964 females per 1000 males. Literacy rate is 71.6%.

Satellite Image of Uttarakhand and the Districts



Climate: The state has two distinct climatic regions viz. the predominantly mountainous and the plain region. The climatic condition of the plains is very similar to its counterpart in the Gangetic plain i.e. tropical. Summer is scorching with temperature reaching above 40°C added with high humidity. Winter is chilly with temperatures dropping below 5°C. The Himalayan region has Alpine conditions characterized by cold winters with snowfall for quite a long time, good rainfall in the monsoon and mild summers. In the Himalayan region, climate varies with altitude. At about 2,000 meters, the average summer temperature is 18°C; at 4,500 meters, it is rarely above 0°C. In the valleys, summer temperature varies between 32°C and 38°C. The eastern Himalayas receive 1000 to 2000 mm precipitation, which is more than received in Western Himalayas and flash floods are common. The annual rainfall in the region varies from 776 mm in Pithoragarh to 2536 mm in Nainital.

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

Table 1: Major Land Use (Th ha)

PARTICULARS	2004-'05
Forest	3465.057
Not Available for Cultivation	
A-Land put to Non Agriculture Uses	152.180
B-Barren and Uncultivable Land	311.817
Other Uncultivable Land Excluding Fallow Land	
A-Permanent Pastures & Grazing Land	228.944
B-Land under Misc. Tree Crops & Groves	248.979
C-Cultivable Wastelands	386.288
Fallow Land	
A-Current Fallow	41.683
B-Old Fallow	68.432
Cropped Area	
A-Net Area Sown	766.730
B-Area Sown More Then Once	-
Gross Cropped Area	766.730
Cropping Intensity (%)	-

(Source:gov.ua.nic.in)

Satellite Data: IRS P6 LISS III data of two different seasons namely, pre monsoon (April-May, 2005) and post monsoon (November-December, 2004) were used for delineation of waterlogged and salt affected areas of various commands of Uttarakhand.

WATER RESOURCES AND COMMAND AREAS

Water Resources: State is rich in water resources with many perennial rivers originating in the state. Ganges, Yamuna, Ramganga, Sharda and Kali are major river with many tributaries. Annual replenishable ground water resources are 2.27 BCM and stage of ground water development is 66%. Snow melt runoff has a major contribution in states water resources.

Command Areas: There are 12 irrigation commands areas in Uttarakhand state, which are medium in nature (Map 2).

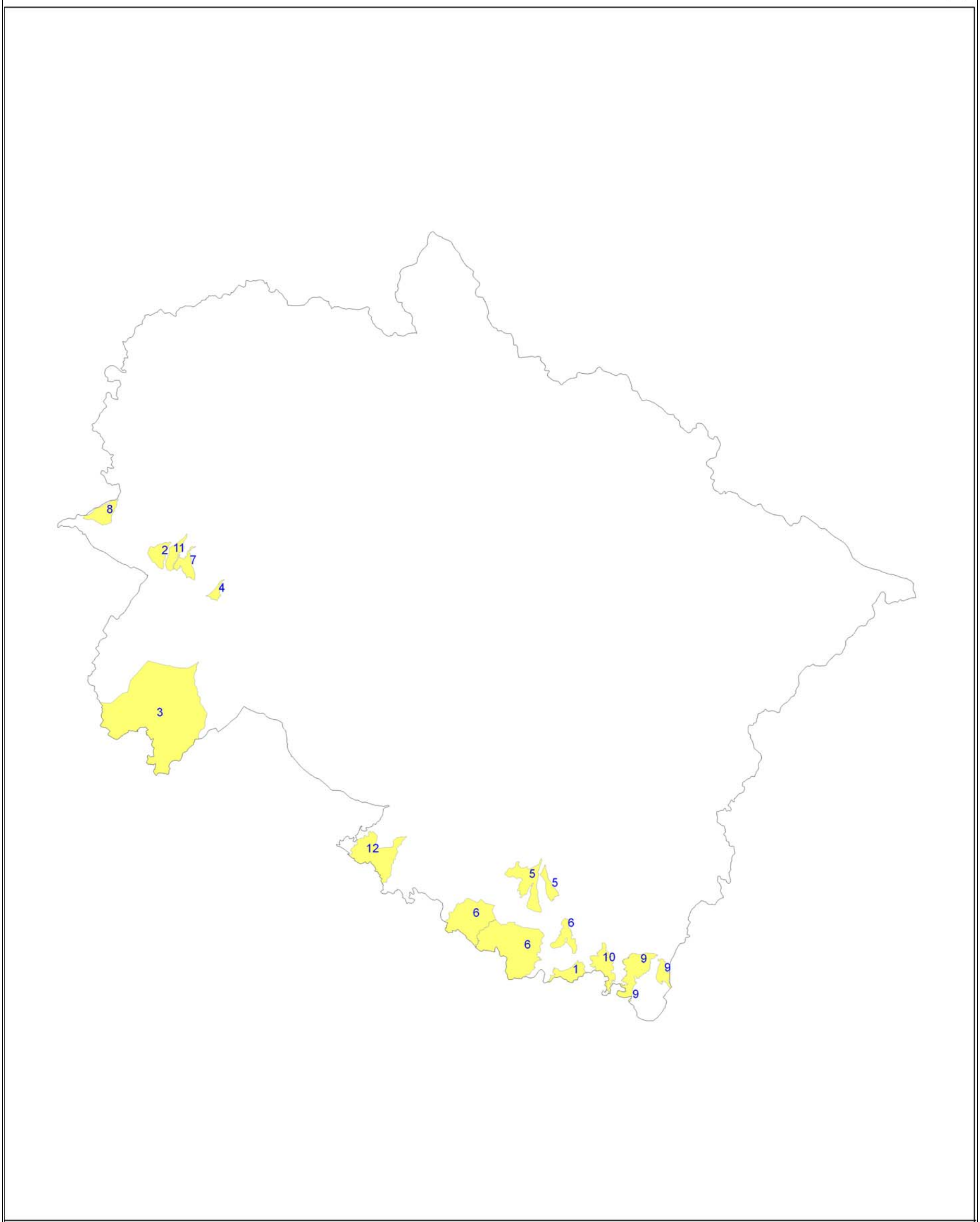
WATER LOGGING AND SALT AFFECTED AREAS IN MAJOR AND MEDIUM IRRIGATION COMMANDS BASED ON SATELLITE REMOTE SENSING

Total waterlogged area in the state is 0.225 Th ha out of which 0.076 Th ha is perennial and 0.149 Th ha is seasonal. Salt affected area covers 0.013 Th ha. Total 64 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 Uttarakhand state.

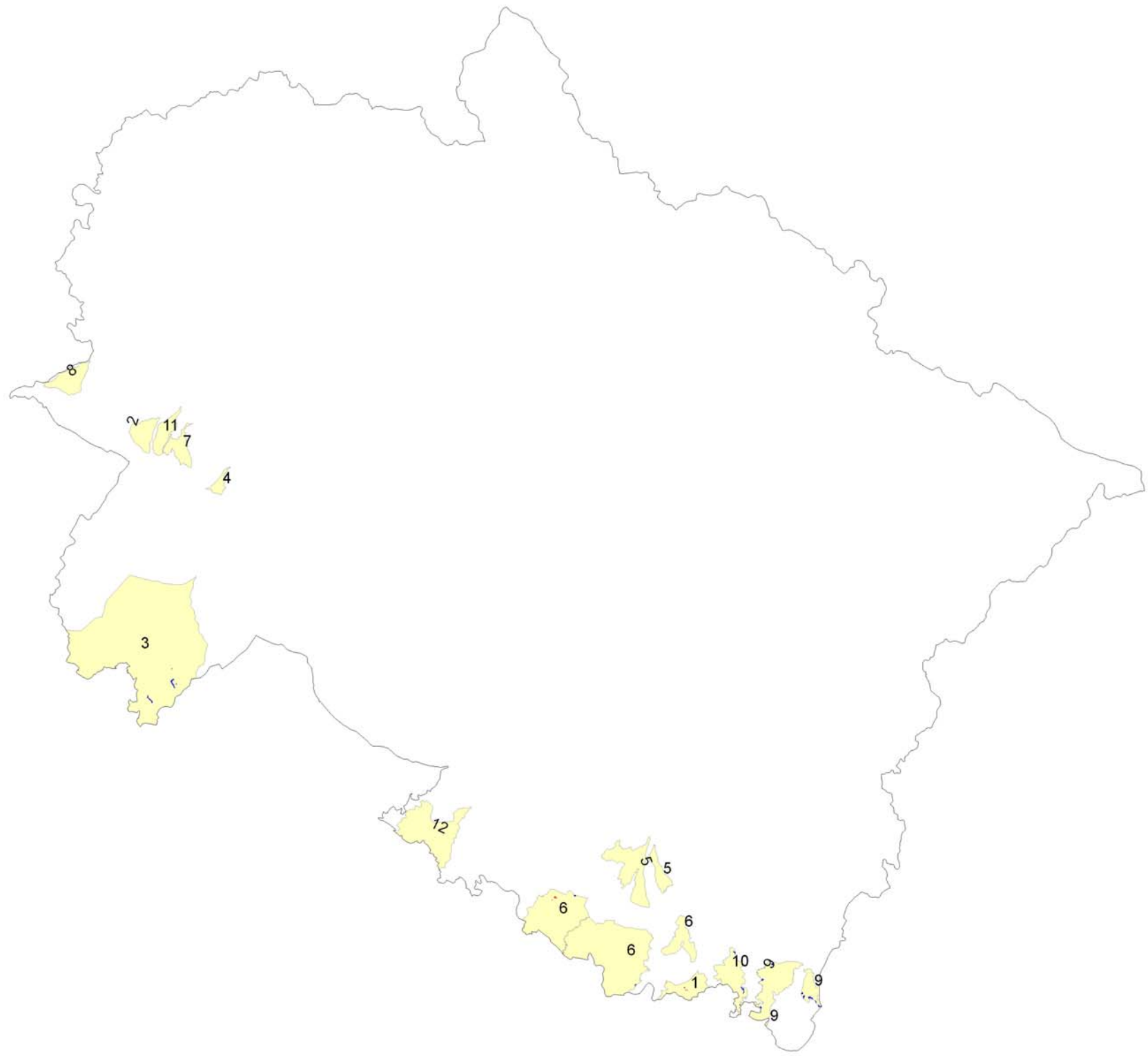
Table 2: Salt Affected and Waterlogged areas in major and medium irrigation commands of state

Code	Command name	Type	Waterlogged area (Th ha)	Salt affected area (Th ha)
1	Bagul	Medium	0.000	0.004
2	Bijapur	Medium	0.000	0.000
3	Ganga Canal	Medium	0.071	0.000
4	Jakhan	Medium	0.000	0.000
5	Jamrani Bhabar	Medium	0.000	0.000
6	Jamrani Tarai	Medium	0.009	0.010
7	Kalanga	Medium	0.000	0.000
8	Kata pathar	Medium	0.000	0.000
9	Khatima	Medium	0.111	0.000
10	Nanak Sagar	Medium	0.034	0.000
11	Rajpur	Medium	0.000	0.000
12	Tumaria	Medium	0.000	0.000
	TOTAL		**0.225**	**0.013**

Distribution of Major and Medium Irrigation Commands in Uttarakhand



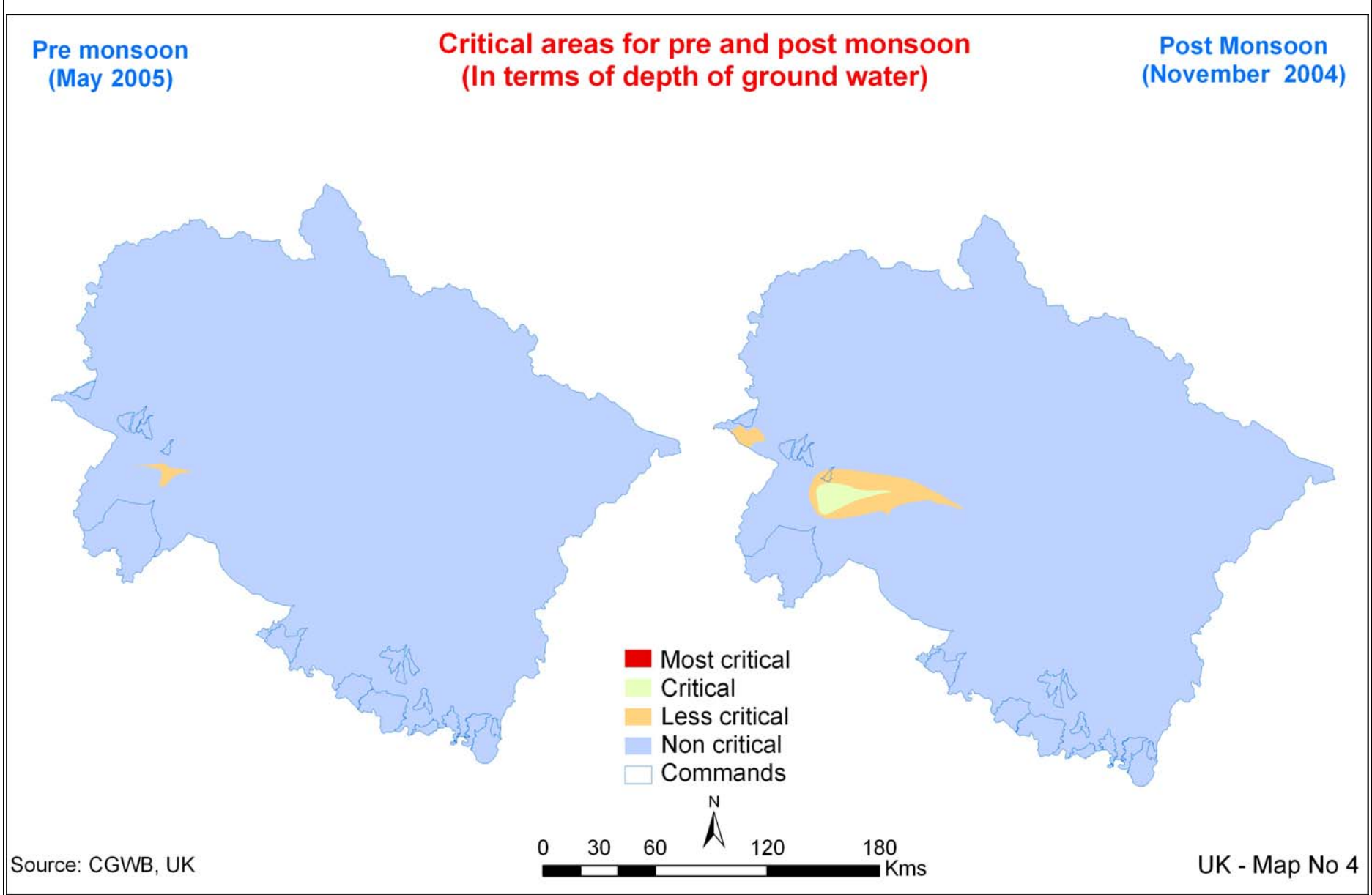
Waterlogged and Salt Affected Areas in the Commands of All Major and Medium Irrigation Projects of Uttarakhand Using Satellite Remote Sensing



For demarcation of critical waterlogged areas due to rise in water table depth, ground water table data of monitoring stations of CGWB were used. 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)	0.000	0.00	0.000	0.00	0.000	0.00	251.706	100.00
Post Monsoon (November, 2004)	0.000	0.00	0.000	0.00	1.691	0.67	250.015	99.33



Project Team

Dr. D. Dutta (PI), RRSSC, Jodhpur
Dr. M.P. Punia, Head (RS Division), BMBS & TC, Jaipur
Shri B.K. Singh, BMBS & TC, Jaipur
Shri Piyush Gourav, BMBS & TC, Jaipur
Shri Mukesh Kumar, BMBS & TC, Jaipur
Shri Rajeev Sharma, BMBS & TC, Jaipur
Ms. Neelam Pareek, BMBS & TC, Jaipur

Soil Sample Collection and Analysis support by BMBS & TC, Jaipur

Acknowledgements

Dr H. C. Pande, Member, Governing Body, BMBS & TC, Jaipur
Major Narpat Singh (Retd.), Secretary, BMBS & TC, Jaipur
Shri B.D. Pateria, Chief Engineer, CWC, New Delhi
Shri R.R. Sharma, CWC, New Delhi
Shri Sagar Chandra, HOD, Irrigation Deptt., Uttrakhand
Shri P. C. Gaur, Executive Engineer, Irrigation Deptt., Dehradun
Shri D. S. Ravat, Executive Engineer, Irrigation Deptt., Dehradun
Shri B. P. Thapliyal, Assist. Engineer, Irrigation Deptt., Dehradun
Shri A. K. Sharma, Executive Engineer, Irrigation Deptt., Haridwar
Shri D. C. Pandar, Executive Engineer, Irrigation Deptt., Rudrapur
Shri B. K. Pant, Executive Engineer, Irrigation Deptt., Kashipur
Shri A. M. Khan, Regional Director, CGWB, Uttrakhand