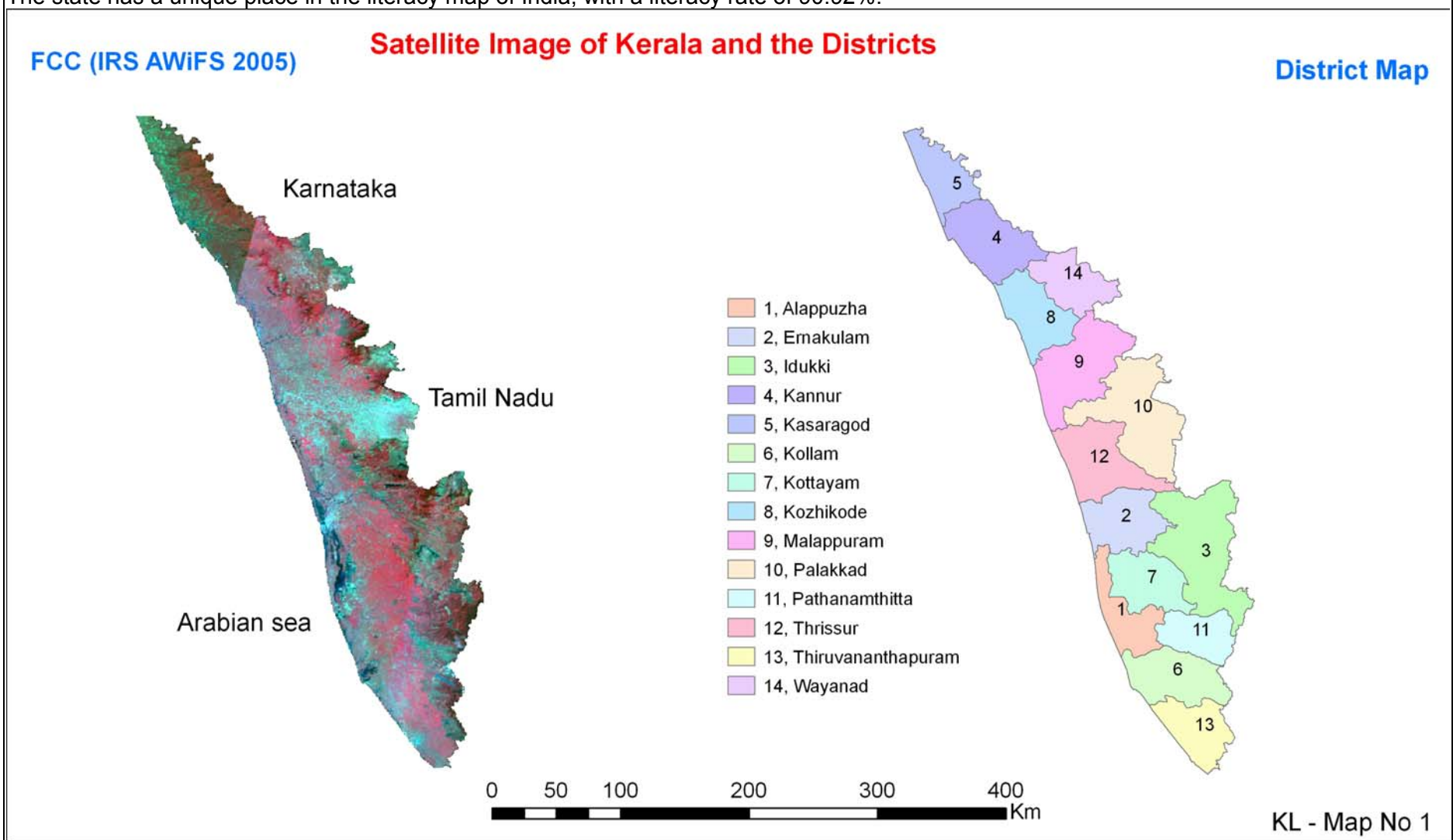
KERALA

INTRODUCTION

Location and Administrative Setup: Kerala state is a narrow stretch of land along a sun-drenched coastline, at extreme south west corner of the Indian peninsula, covering 3886.300 Th ha (38863 sq. km) area, bordering Lakshadeep Sea on the western side and Tamilnadu and Karnataka in the east. The length of the state from north to south is 560 km and the average width is 70 km with a maximum of 125 km. It lies between north latitudes 8°18' and 12°48' and east longitudes 74°52' and 77°22'. Kerala has 14 districts (Map 1) and all are the revenue divisions. The state consists of 59 tehsils and 119 blocks spread over 14 districts. Thiruvananthapuram is the state capital.

As per 2001 census, total population of the state is 3,18,38,619, which is nearly 3.44 per cent of the country's population. Decadal growth of population is 9.42%. Its population density is 819 persons per sq. km. The sex-ratio recorded in this census is 1058 females per 1000 males. The state has a unique place in the literacy map of India, with a literacy rate of 90.92%.



Climate: Kerala being situated in the tropical zone, experiences the typical humid tropical climate. Meanwhile, its extreme eastern fringes experience a drier tropical wet and dry climate. Kerala receives an average annual rainfall of 3107 mm. Parts of Kerala's lowlands receive only 1250 mm average annual rainfall, while the cool mountainous eastern highlands of Idukki district, comprising Kerala's wettest region, receive over 5,000 mm of average annual orographic precipitation. Kerala's rains are mostly the result of seasonal monsoons. As a result, Kerala averages some 120–140 rainy days per year. In summers, most of Kerala is prone to gale-force winds, storm surges, and torrential downpours accompanying dangerous cyclones coming in off the Indian Ocean. Kerala's average maximum daily temperature is around 36.7 °C; the minimum is 19.8 °C.

Land use: Land use statistics for the year 2000–'01 and 2001–'02 is given in Table 1.

Table 1: Major Land Use (Th ha)

PARTICULARS	2000-01	2001-02
Forest	1081.000	1081.000
Not Available for Cultivation		
A-Land put to Non Agriculture Uses	381.870	392.350
B-Barren and Uncultivable Land	29.320	29.730
Other Uncultivable Land Excluding Fallow Land		
A-Permanent Pastures & Grazing Land	164.000	233.000
B-Land under Misc. Tree Crops & Groves	15.400	13.600
C-Cultivable Wastelands	59.200	63.700
Fallow Land		
A-Current Fallow	77.800	79.200
B-Old Fallow	33.910	34.330
Cropped Area		
A-Net Area Sown	2206.100	2190.690
B-Area Sown More Then Once	815.550	801.560
Gross Cropped Area	3021.680	2992.250
Cropping Intensity (%)	137.00	137.00

(Source: www.indiastat.com)

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

WATER RESOURCES AND COMMAND AREAS

Water Resources: Kerala state is rich in water resources. There are 44 major rivers in the state, of which 41 originate from the Western Ghats and flow towards west into the Arabian Sea. Three tributaries of the river Cauvery originate in Kerala and flow eastward. These rivers and streams flowing down from the Western Ghats either empty themselves in to the backwaters in the coastal area or directly into the Arabian Sea. Major rivers are Valapattanam river, Chaliar, Kadalundipuzha, Bharathapuzha, Chalakudy river, Periyar, Pamba, Achancoil and Kalladayar. Most of these rivers are navigable up to the midland region for country crafts which provide a cheap and reliable transport system. The backwaters are especially attractive and economically valuable feature of Kerala. They include lakes and ocean inlets which stretch water into the Vembanad Lake, some 200 sq.km. in area, which opens out into the Arabian Sea at Cochin Port. Other important lakes are AnjuThengu, Edava, Nadayaram Paravoor, Ashtamudi (Quilon), Kayamkulam, Kodungallor, (Cranganore) and Cheruva. Canals link the lakes and backwaters to facilitate an uninterrupted inland water navigation system.

Command Areas: There are 24 irrigation commands in Kerala. Number of major and medium irrigation commands are 11 and 13, respectively (Map 2).

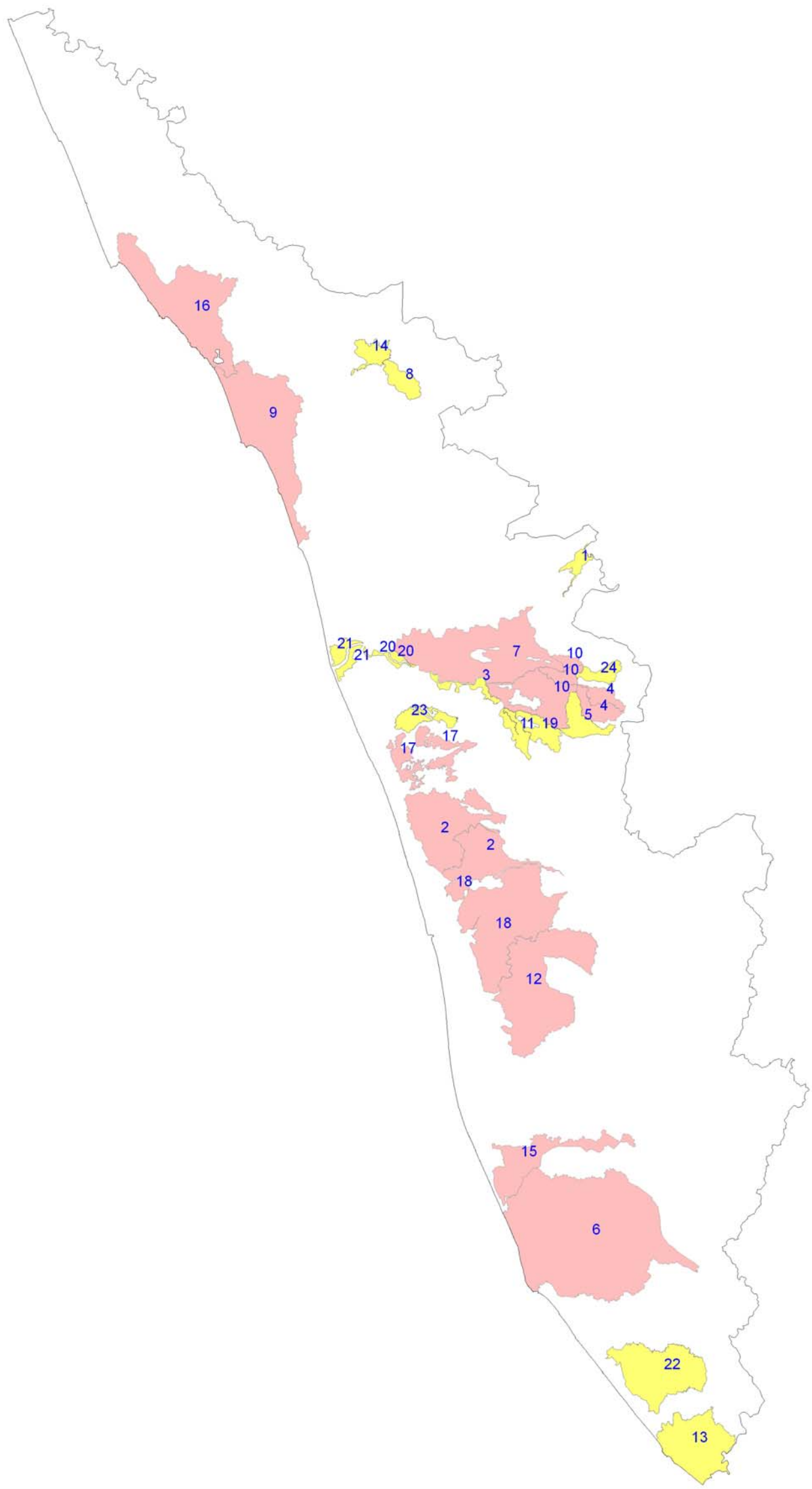
WATER LOGGING AND SALT AFFECTED AREAS IN MAJOR AND MEDIUM IRRIGATION COMMANDS BASED ON SATELLITE REMOTE SENSING

Total waterlogged area in the state is 12.330 Th ha out of which 2.436 Th ha is perennial and 9.894 Th ha is seasonal. Most of the commands have area under waterlogging category with highest seasonal waterlogging in Kallada command. Salt affected area covers 3.997 Th ha. Total 131soil 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 Kerala 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)
2	Chalakudy / Idamalayar Irrigation Project	Major	2.240	0.632
4	Chitturpuzha Project	Major	0.300	0.000
6	Kallada Irrigation Project	Major	3.396	0.284
7	Kanhirapuzha Irrigation Project	Major	0.102	0.000
9	Kuttiyadi Irrigation Project	Major	1.081	0.000
10	Malampuzha Project	Major	0.055	0.000
12	Muvattupuzha Irrigation Project	Major	0.691	0.197
15	Pamba Irrigation Project	Major	0.661	0.159
16	Pazhassi Irrigation Project	Major	0.000	0.347
17	Peechi / Chimoni Project	Major	0.310	0.000
18	Periyar Valley Irrigation Project	Major	2.314	1.424
1	Attappady Valley Irrigation Project	Medium	0.000	0.816
3	Cheerakuzhy Project	Medium	0.086	0.000
5	Gayathri Project	Medium	0.018	0.000
8	Karapuzha Irrigation Project	Medium	0.122	0.000
11	Mangalam Dam Project	Medium	0.127	0.000
13	Neyyar Irrigation Project	Medium	0.541	0.000
14	Padinjarthara / Banasura Sagar Project	Medium	0.052	0.000
19	Pothundy Project	Medium	0.028	0.000
20	Rcb, Thirthala	Medium	0.005	0.000
21	Rcb_Chamaravattom	Medium	0.023	0.140
22	Vamanapuram Irrigation Project	Medium	0.019	0.000
23	Vazhani Project	Medium	0.127	0.000
24	Walayar Project	Medium	0.031	0.000
	TOTAL		**12.330**	**3.997**

Distribution of Major and Medium Irrigation Commands in Kerala



1 Major comamnd areas with code

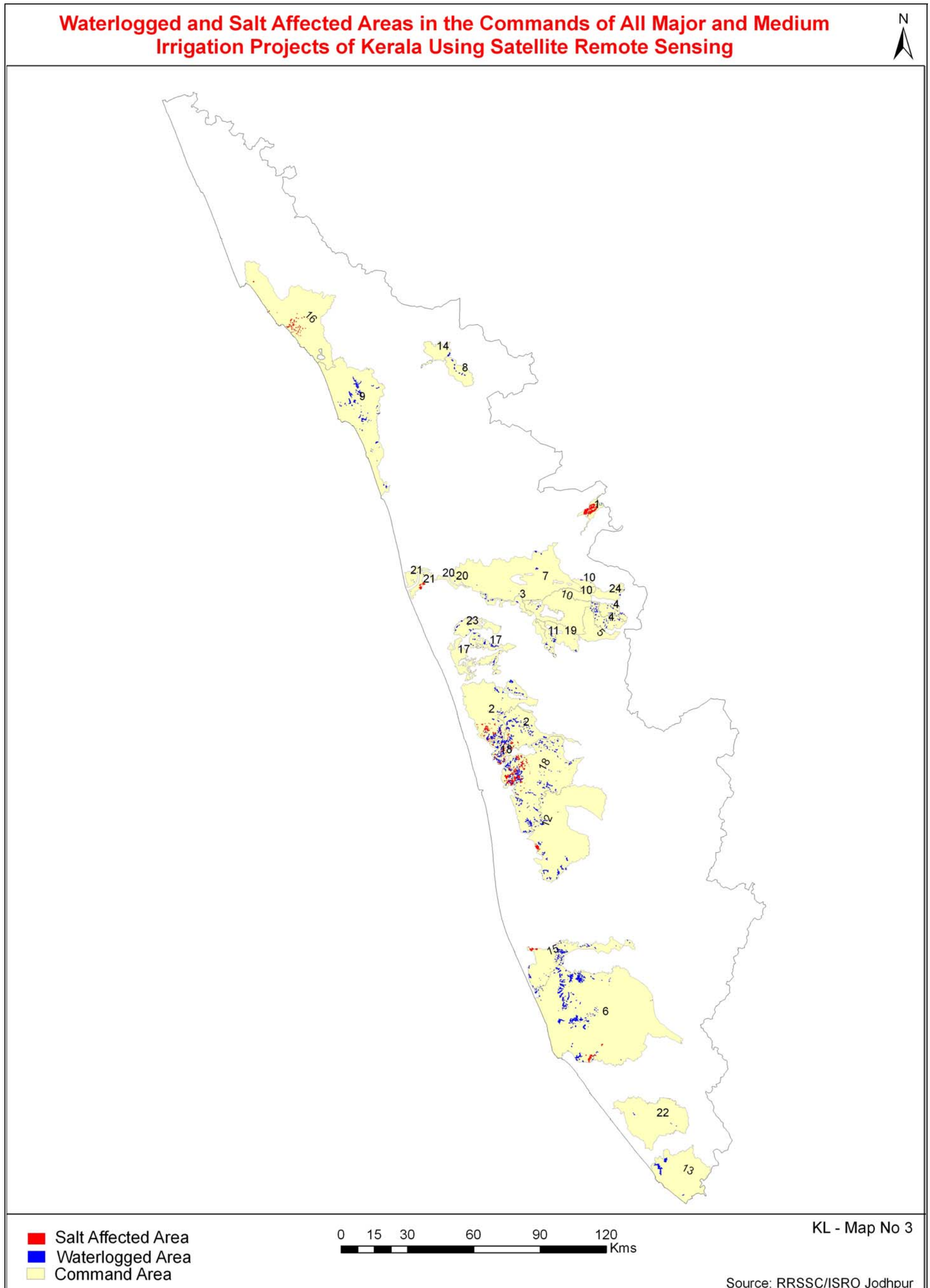
12 Medium comamnd areas with code

0 15 30 60 90 120 Kms

KL - Map No 2

Source: Irrigation Department, Kerala

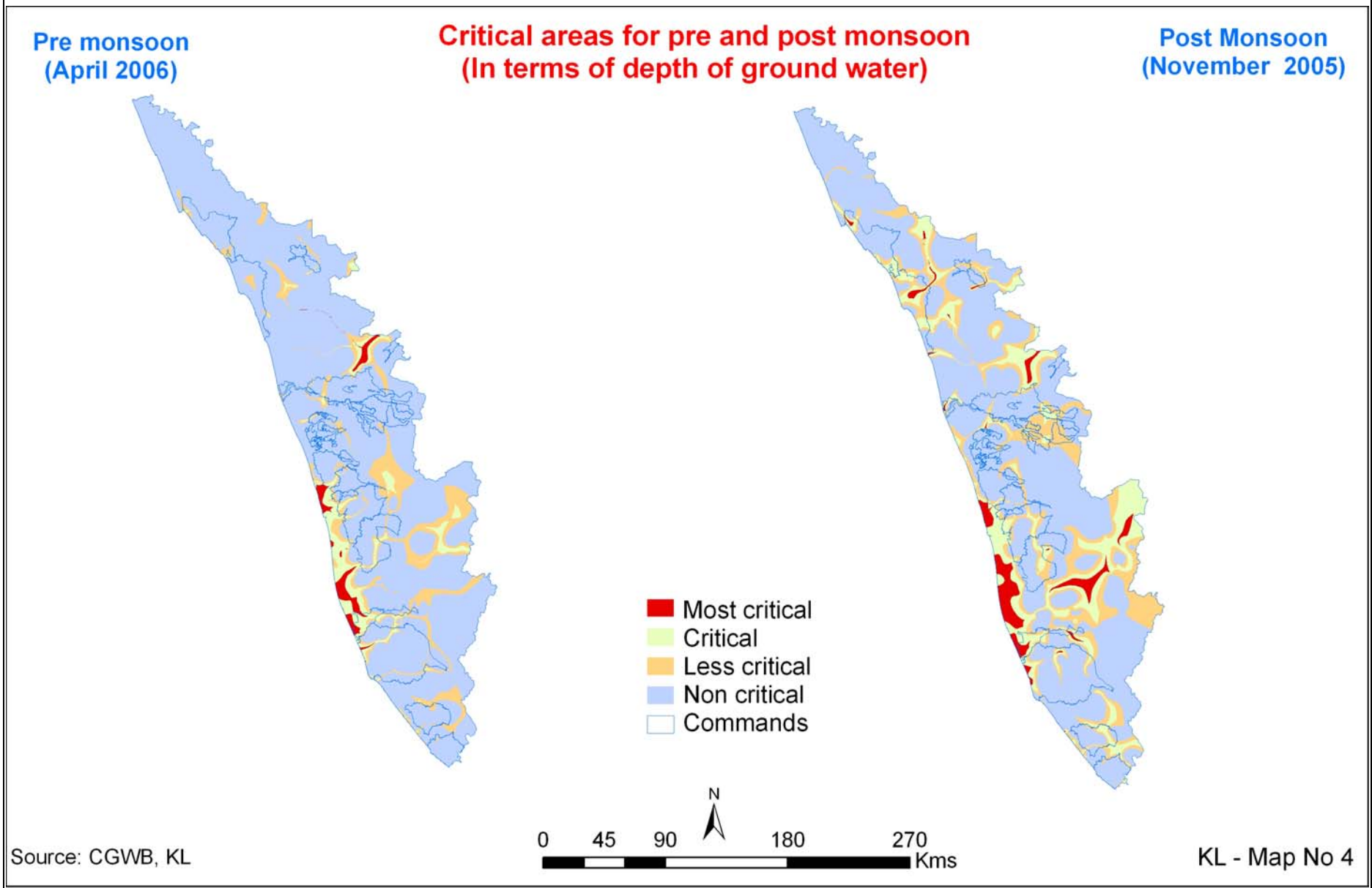
Waterlogged and Salt Affected Areas in the Commands of All Major and Medium Irrigation Projects of Kerala Using Satellite Remote Sensing



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

Table 3: Critical Area of Depth of Ground Water for Pre (April, 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 (April, 2006)	5.159	0.55	38.093	4.07	73.121	7.82	818.831	87.56
Post Monsoon (November, 2005)	16.179	1.73	116.347	12.44	174.338	18.64	628.340	67.19



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