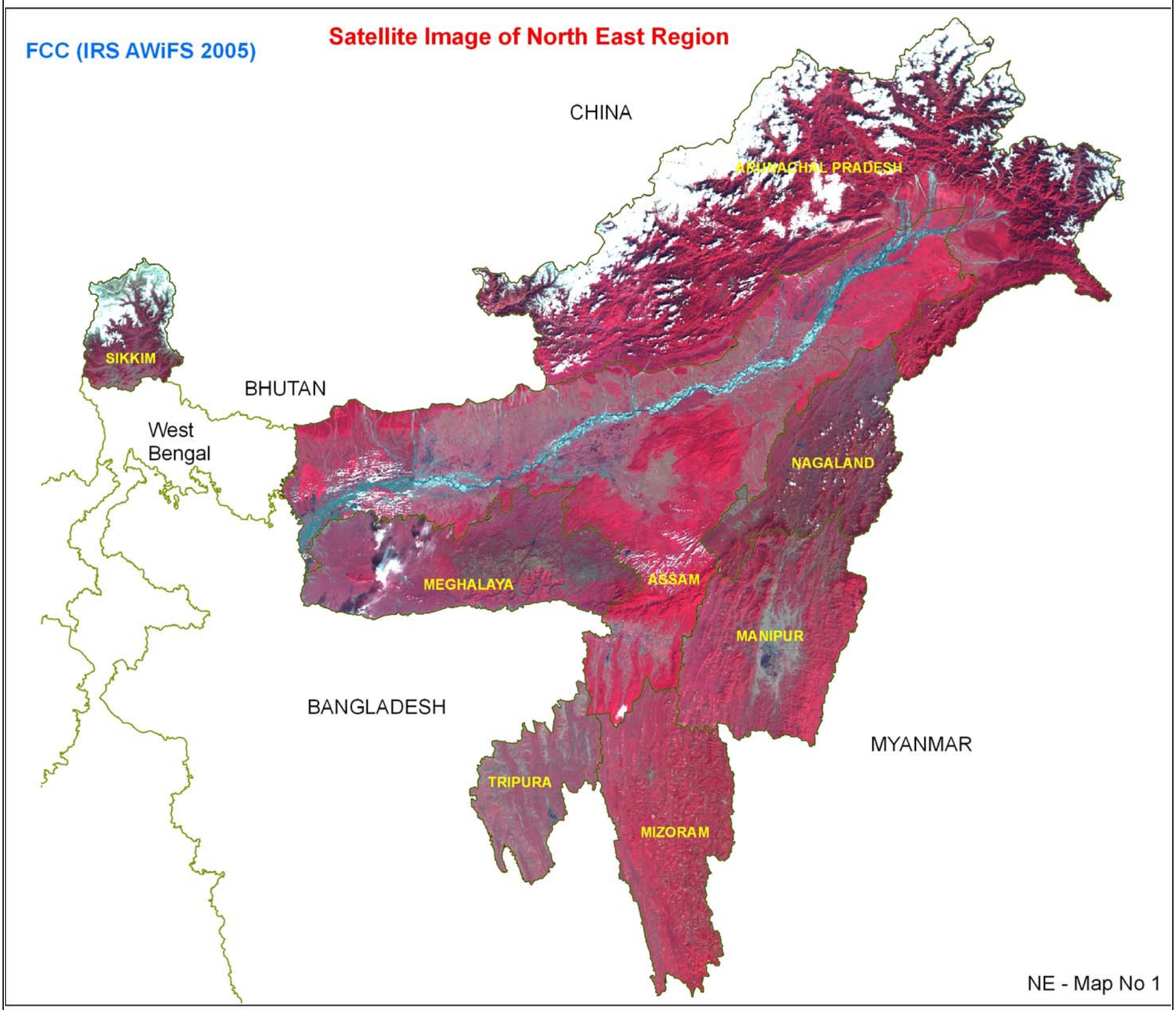
NORTH EAST REGION

Location and Administrative Setup: India's North Eastern region stretches from the foothills of the Himalayas in the eastern range and is surrounded by Bangladesh, Bhutan, China, Nepal and Myanmar. It includes the seven sisters - Arunachal Pradesh, Assam, Manipur, Meghalaya, Mizoram, Nagaland and Tripura, along with a small and beautiful cousin in the Himalayan fringes, namely, Sikkim. The region is rich in natural resources and covered with dense forests. It receives the highest rainfall in the country and with large and small river systems nesting the land. The eight states cover an area of 26217.900 Th ha (262179 sq. km) which is 7.9% of the total area of the country but have only 39 million people (3.8% per cent of the total population of the country) as per Census 2001. Total literacy rate in the region is 68.5% with a female literacy rate at 61.5%. Region has population density of 324.



Land use: Land use statistics for the states of North Eastern Region during the year 2005-'06 is given in Table 1.

Table 1: Major Land Use (Th ha)

PARTICULARS	2005-'06
Forest	13104.000
Not available for Cultivation	3412.000
Other Uncultivable Land Excluding Fallow Land	
A-Permanent Pastures & Grazing Land	170.000
B-Land under Misc. Tree Crops & Groves	581.000
C-Cultivable Wastelands	623.000
Fallow Land	
A- Old Fallow	488.000
B- Current Fallow	300.000
Cropped Area	
A-Net Area Sown	4207.000
B-Area Sown More Then Once	1178.000
Gross Cropped Area	5385.000
Cropping Intensity (%)	128.00

(Source: Statistical Abstract of India, 2005-'06)

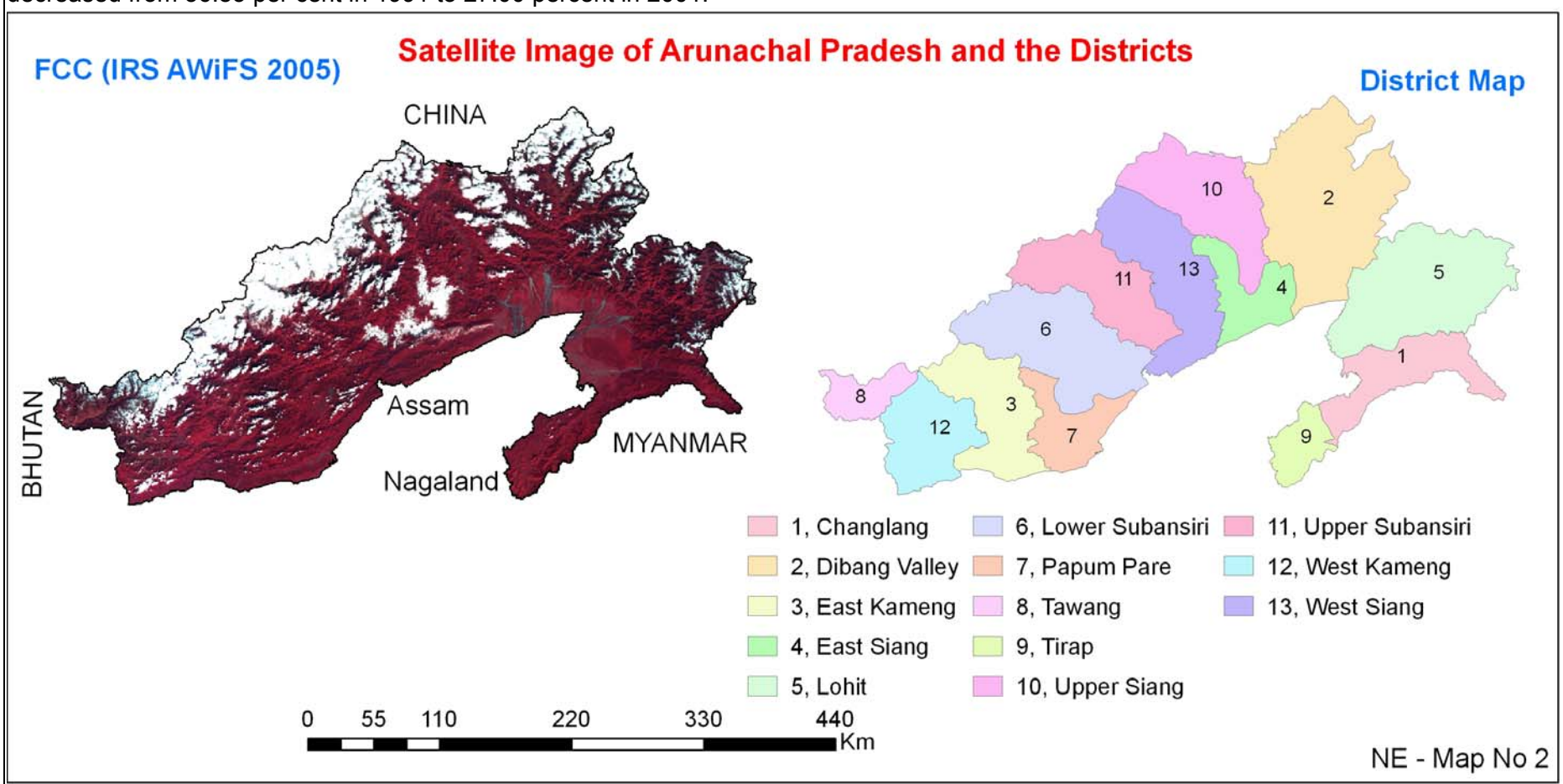
Satellite Data: IRS 1D/P6 LISS III data of two different seasons namely, pre monsoon (March-April, 2005) and post monsoon (November, 2004) were used for delineation of waterlogged and salt affected areas of various commands in North East region.

Command Areas: There are 35 irrigation commands in North East region. Number of major and medium irrigation commands are 9 and 26, respectively (Map 10).

Waterlogged and Salt Affected Areas: Total waterlogged area in the region is 2.657 Th ha out of which 0.093 Th ha is perennial and 2.564 Th ha is seasonal. Out of 35 irrigation commands, 11 commands have area under waterlogging category. There is no area under salt affected category in the state. No soil sample could be collected in the state. Map 11 show the waterlogged areas in major and medium irrigation commands in North East region.

ARUNACHAL PRADESH

Location and Administrative Setup: Arunachal Pradesh formerly known as North Eastern Frontier Agency (NEFA) is called as "The Land of Rising Sun". The state is situated in the northeastern part of India, bounded by China in the north, Assam and Nagaland in the south, Myanmar in the southeast and Bhutan in the west covering a total land area of 8374.300 Th ha (83743 sq. km). The state has 13 districts (Map 2), 149 sub-districts, 56 CD Blocks, 4065 villages and 17 towns. The population of Arunachal Pradesh is 1097000 as per Census 2001. Density of population is 13 persons per sq. km. The highest sex ratio is recorded in East Kameng district with 985 females per 1000 males and the lowest sex ratio with 754 females per 1000 males. During the decade the 1981 – 1991 and 1991 – 2001 the population of Arunachal Pradesh has decreased from 36.83 per cent in 1991 to 27.00 percent in 2001.



Climate: The weather and the climate of Arunachal Pradesh are quite distinct from the rest of the country. The climate of the state is dominated by the Himalayan system and the altitudinal variations. The climate is highly hot and humid at the lower altitudes and in the valleys covered by swampy dense forest particularly in the eastern section, while it becomes exceedingly cold in higher altitudes. The rainfall of Arunachal Pradesh in amongst the heaviest in the country.The annual average rainfall is more than 3000 mm. Average temperature during the winter months range from 15°C to 21°C and 22°C to 30°C during monsoon. Between June and August the temperature may go up to 40-42°C.

Land use: Land use statistics for the year 2005-'06 is given in Table 2.

Table 2: Major Land Use (Th ha)

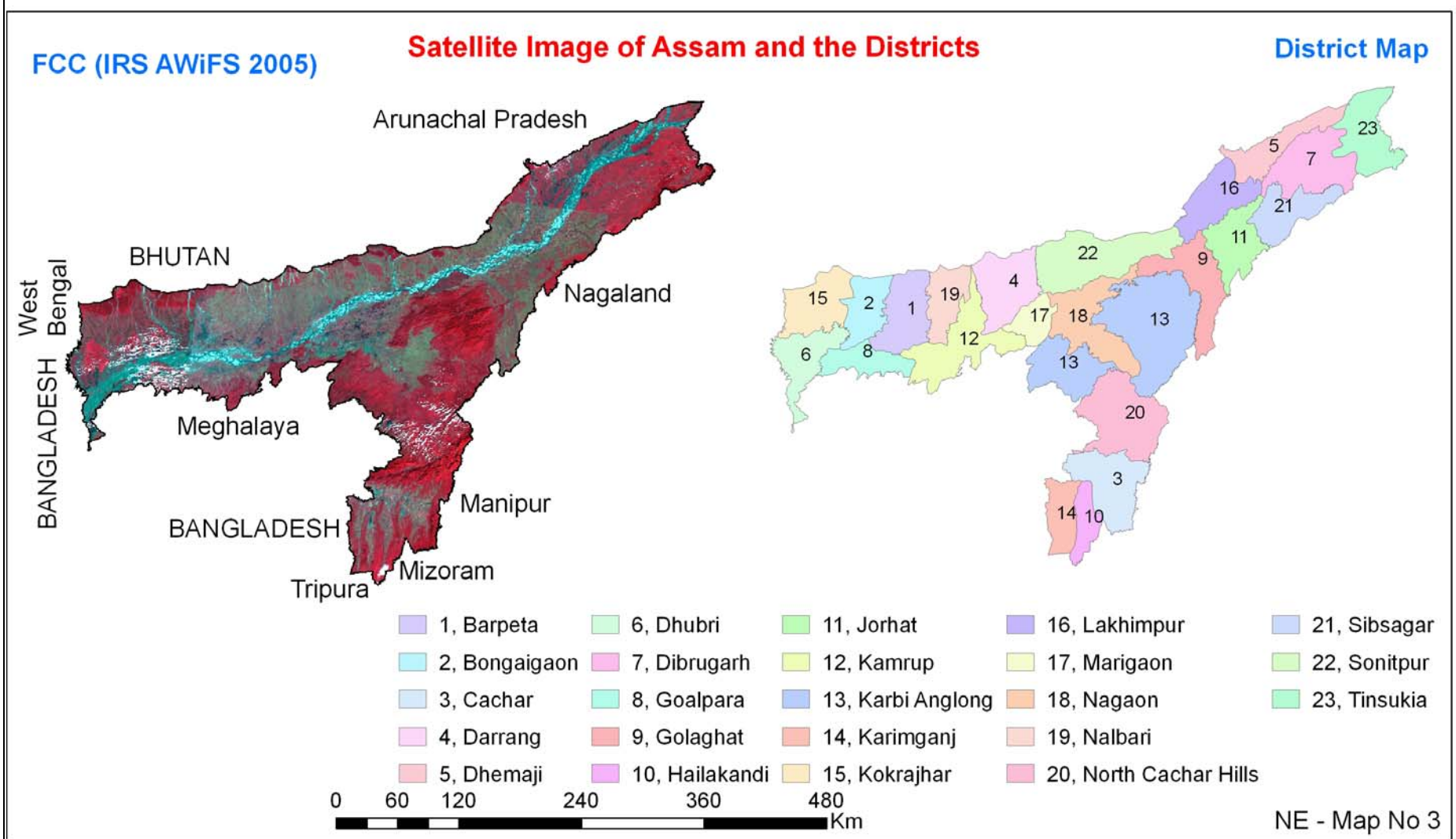
PARTICULARS	2005-'06
Forest	5154.000
Not Available for Cultivation	32.000
Other Uncultivable Land Excluding Fallow Land	
A-Permanent Pastures & Grazing Land	-
B-Land under Misc. Tree Crops & Groves	46.000
C-Cultivable Wastelands	28.000
Fallow Land	
A- Old Fallow	64.000
B- Current Fallow	23.000
Cropped Area	
A-Net Area Sown	200.000
B-Area Sown More Then Once	67.000
Gross Cropped Area	267.000
Cropping Intensity (%)	133.50

(Source: Statistical Abstract of India, 2005-'06)

Command Areas: There are no major and medium command areas in Arunachal Pradesh state.

ASSAM

Location and Administrative Setup: Assam is located between 24°13' and 28°00' N latitudes and 89°46' to 96°04' E longitude. It is bounded by the Kingdom of Bhutan and Arunachal Pradesh in the north and east, Manipur and Nagaland in the east, Mizoram in the south, Tripura, Meghalaya, West Bengal and Bangladesh in the west and south west. Assam is connected with the rest of the Indian Union by a narrow corridor in West Bengal that runs for 56 km below the foothills of Bhutan and Sikkim. As per Census 2001, the state has 23 districts (Map 3), 142 sub-districts, 219 CD blocks and 125 towns. There are 26312 villages in the state. The state covers an area of 7843.800 Th ha (78438 sq. km). Assam has a total population of 2,66,55,000 persons. The state has recorded a population density of 340 persons per sq. km. The sex ratio of the state is 935. The state has recorded 18.92% decadal growth rate during 1991-2001.



Climate: Assam has four well defined seasons in a year namely, winter, summer, monsoon and spring. The climate of the state is characterized by its extreme humidity. Its most distinguishing feature is the copious rainfall between March and May at a time when precipitation in upper India is at its minimum. The temperature is moderate. Winter sets in from around the end of October and lasts till the end of February. The temperature drops to a minimum of 6°C to 8°C, the nights and early mornings are foggy. The average temperature in January is 16°C. Summer arrives in the middle of May accompanied by high humidity and rainfall. The temperature reaches a maximum of 35°C to 38°C. The frequent rains however serve to push the mercury down. The average temperature in August is 28°C.

Land use: Land use statistics for the year 2005-'06 is given in Table 3.

Table 3: Major Land Use (Th ha)

PARTICULARS	2005-'06
Forest	1933.000
Not Available for Cultivation	2533.000
Other Uncultivable Land Excluding Fallow Land	
A-Permanent Pastures & Grazing land	160.000
B-Land Under Misc. Tree Crops & Groves	209.000
C-Cultivable Wastelands	77.000
Fallow Land	
A- Old Fallow	66.000
B- Current Fallow	99.000
Cropped Area	
A-Net Area Sown	2774.000
B-Area Sown More Then Once	957.000
Gross Cropped Area	3731.000
Cropping Intensity (%)	134.50

(Source: Statistical Abstract of India, 2005-'06)

Command Areas: There are 22 irrigation commands in Assam. Number of major and medium irrigation commands are 6 and 16, respectively (Map 10).

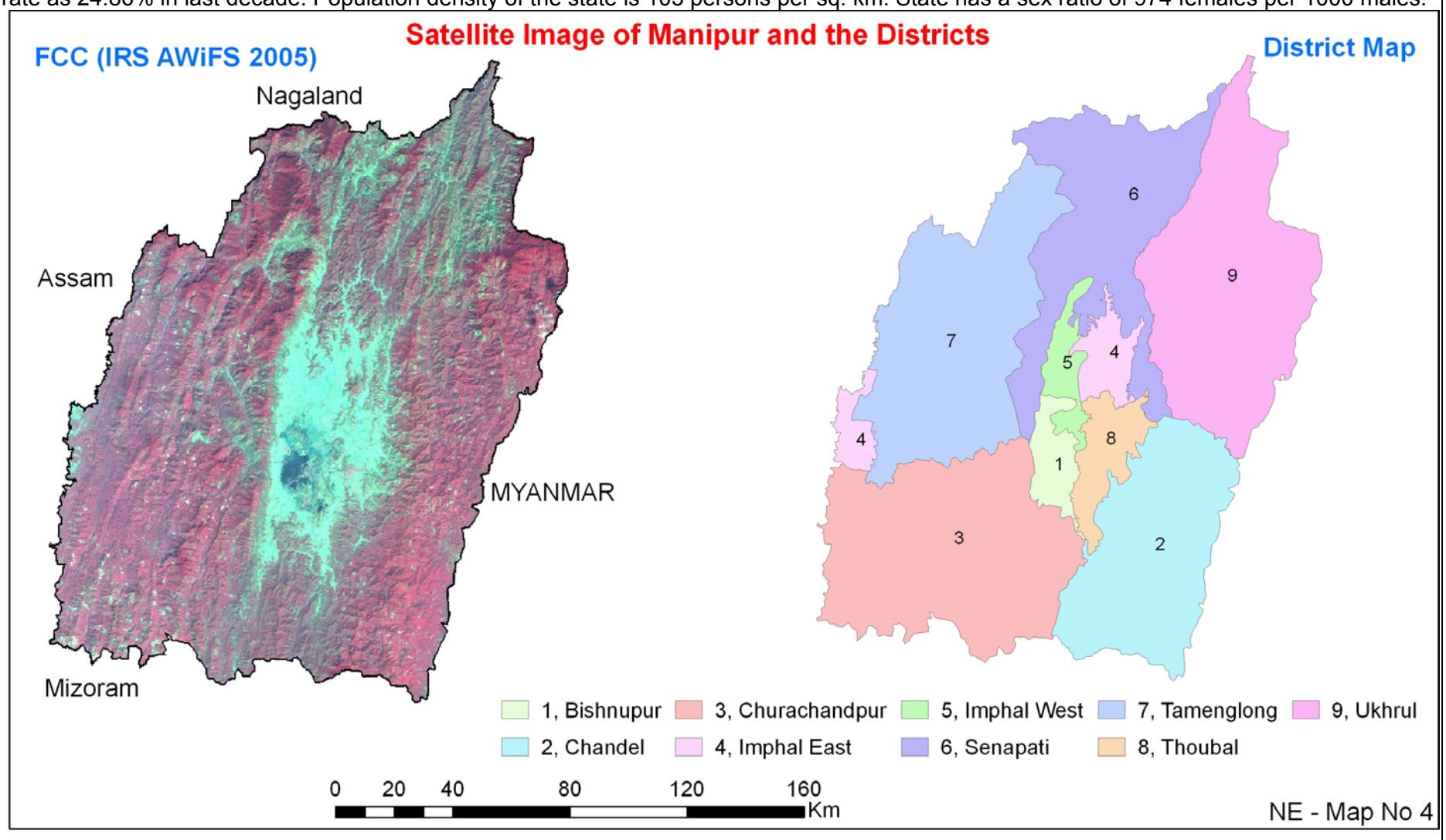
Waterlogged and Salt Affected Areas: Total waterlogged area in the state is 2.092 Th ha out of which 0.010 Th ha is perennial and 2.082 Th ha is seasonal. Out of 22 irrigation commands, 5 commands have area under waterlogging category. There is no area under salt affected category in the state. No soil sample could be collected in the state. Table 4 and Map 11 show the waterlogged areas in major and medium irrigation commands in Assam state.

Table 4: Waterlogged and Salt Affected Area in major and medium irrigation commands of state

Code	Command names	Type	Waterlogged area (Th ha)	Salt affected area (Th ha)
1	Bordikarai Irrigation Project	Major	1.501	0.000
2	Champamati Irrigation Project	Major	0.000	0.000
3	Dhansiri Irrigation Project	Major	0.000	0.000
4	Integrated Kallong Irrigation Project	Major	0.000	0.000
5	Jamuna Irrigation Project	Major	0.000	0.000
8	Sukla Irrigation Project	Major	0.000	0.000
10	Bhumki Irrigation Project	Medium	0.000	0.000
11	Borolia Irrigation Project	Medium	0.000	0.000
12	Buridehing Irrigation Project	Medium	0.000	0.000
13	Burisuti Irrigation Project	Medium	0.000	0.000
14	Dekadong Irrigation Project	Medium	0.000	0.000
15	Dikharu Irrigation Project	Medium	0.000	0.000
18	Garufella Irrigation Project	Medium	0.380	0.000
20	Harguti Irrigation Project	Medium	0.000	0.000
21	Hawaipur Lift Irrigation Project	Medium	0.000	0.000
23	Kailabor Irrigation Project	Medium	0.000	0.000
24	Kaldiya Irrigation Project	Medium	0.025	0.000
25	Kallonga Irrigation Project	Medium	0.000	0.000
28	Longa Irrigation Project	Medium	0.104	0.000
30	Pahumara Irrigation Project	Medium	0.000	0.000
31	Rangma Irrigation Project	Medium	0.000	0.000
33	Rupahi Irrigation Project	Medium	0.083	0.000
	TOTAL		**2.092**	**0.000**

MANIPUR

Location and Administrative Setup: Manipur is located in the north-eastern part of India and extends between 92° 58' and 94° 45' E longitudes and 23° 50' and 25° 42' N latitudes. It is bounded by Nagaland in the North, Mizoram in the South and Assam in the West. It faces the international boundary with Myanmar in the East. According to Census 2001, this state has 9 districts(Map 4), 38 sub-districts, 33 towns and 2391 villages. The total area of the state is 2232.700 Th ha (22327 sq. km). The population of Manipur is 22,93,000 persons with growth rate as 24.86% in last decade. Population density of the state is 103 persons per sq. km. State has a sex ratio of 974 females per 1000 males.



Climate: The climate of Manipur is moderate. Climate in the western part of the state is tropical whereas the rest part of the state experiences sub tropical climate with distinct summer, winter and rainy seasons. The valley gets the reflection of the heat of the summer and the cold of the winter from the neighboring hills. Average annual rainfall ranges from 1250 mm to 2700 mm. The months of November, December, January and February remain dry and the remaining eight months are more or less rainy. January is the coldest month and May-June are hottest months.

Land use: Land use statistics for the year 2005-'06 is given in Table 5.

Table 5: Major Land Use (Th ha)

PARTICULARS	2005-'06
Forest	1693.000

Not Available for Cultivation	27.000
Other Uncultivable Land Excluding Fallow Land	
A-Permanent Pastures & Grazing Land	1.000
B-Land under Misc. Tree Crops & Groves	6.000
C-Cultivable Wastelands	1.000
Fallow Land	
A- Old Fallow	-
B- Current Fallow	-
Cropped Area	
A-Net Area Sown	223.000
B-Area Sown More Then Once	-
Gross Cropped Area	223.000
Cropping Intensity (%)	100.00

(Source: Statistical Abstract of India, 2005-'06)

Command Areas: There are 8 irrigation commands in Manipur. Number of major and medium irrigation commands are 3 and 5, respectively (Map 10).

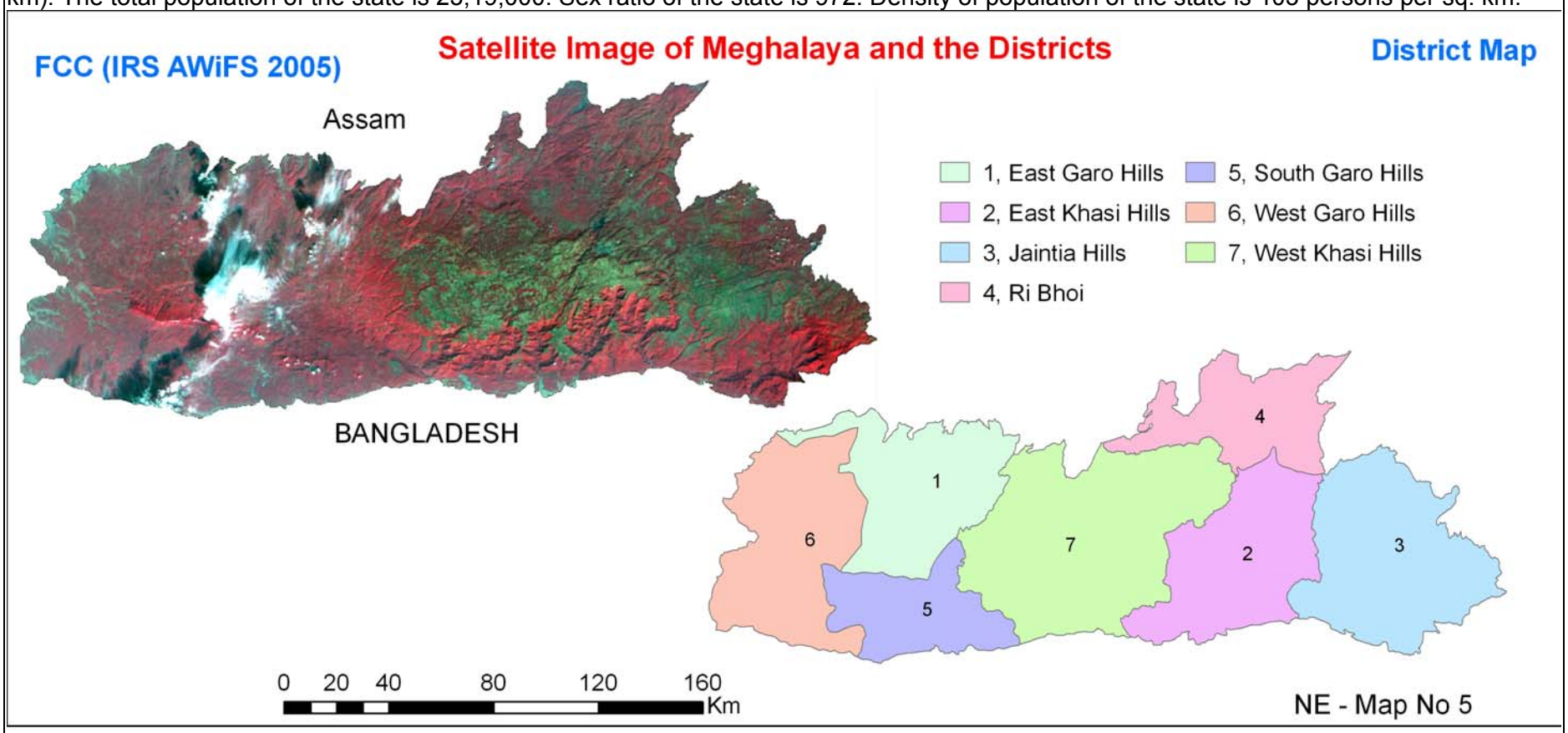
Waterlogged and Salt Affected Areas: Total waterlogged area in the state is 0.486 Th ha out of which 0.083 Th ha is perennial and 0.403 Th ha is seasonal. Out of 8 irrigation commands, 4 commands have area under waterlogging category. There is no area under salt affected category in the state. No soil sample could be collected in the state. Table 6 and Map 11 show the waterlogged areas in major and medium irrigation commands in Manipur state.

Table 6: Waterlogged and Salt Affected Area in major and medium irrigation commands of state

Code	Command names	Type	Waterlogged area (Th ha)	Salt affected area (Th ha)
6	Khuga Irrigation Project	Major	0.000	0.000
7	Loktak Lift Irrigation Project	Major	0.193	0.000
9	Thoubal Irrigation Project	Major	0.031	0.000
16	Dolaithabi Irrigation Project	Medium	0.000	0.000
22	Imphal Barrage	Medium	0.213	0.000
	Irrigation Project			
26	Khoupam Dam Irrigation Project	Medium	0.000	0.000
34	Sekmai Irrigation Project	Medium	0.048	0.000
35	Singda Irrigation Project	Medium	0.000	0.000
	TOTAL		**0.486**	**0.000**

MEGHALAYA

Location and Administrative Setup: Meghalaya state lies between 25°02' and 26°06' N latitudes and 89°48' and 92°50' E longitudes. The state is surrounded by Assam state in the north and east and by Bangladesh in the south and west. There are 7 districts (Map 5), 32 sub-districts and 6026 villages in the state as per Census 2001. There are sixteen towns. The state covers an area of 2242.900 Th ha (22429 sq. km). The total population of the state is 23,19,000. Sex ratio of the state is 972. Density of population of the state is 103 persons per sq. km.



Climate: Meghalaya literally means the 'Abode of Clouds'. As the name suggests the state is associated with clouds and rains. The climate of Meghalaya is generally very humid. It is directly influenced by the south west monsoon and the north east winter winds. The four main seasons of Meghalaya are Spring (March to April), Monsoon (May to September), Autumn (October to November) and Winter (December to February). The rainfall is heaviest in south eastern Garo hills and decreases in the central regions and in the north. Cherrapunji-Mawsynram region receives the heaviest rainfall with an annual average of 12670 mm. The average rainfall in the state is 12000 mm. The temperature starts warming up with the advent of spring and reaches the maximum in the summer (monsoon) months of May and June. The winter is quite severe

with minimum temperature coming down to as low as 2° C in the Khasi Hills. April and May are the warmest months and January is the coldest month.

Land use: Land use statistics for the year 2005-'06 is given in Table 7.

Table 7: Major Land Use (Th Ha)

PARTICULARS	2005-'06
Forest	942.000
Not Available for Cultivation	227.000
Other Uncultivable Land Excluding Fallow Land	
A-Permanent Pastures & Grazing Land	-
B-Land under Misc. Tree Crops & Groves	158.000
C-Cultivable Wastelands	453.000
Fallow Land	
A- Old Fallow	169.000
B- Current Fallow	66.000
Cropped Area	
A-Net Area Sown	212.000
B-Area Sown More Then Once	46.000
Gross Cropped Area	258.000
Cropping Intensity (%)	121.70

(Source: Statistical Abstract of India, 2005-'06)

Command Areas: There is 1 irrigation command areas in Manipur state, which is medium in nature (Map No 10).

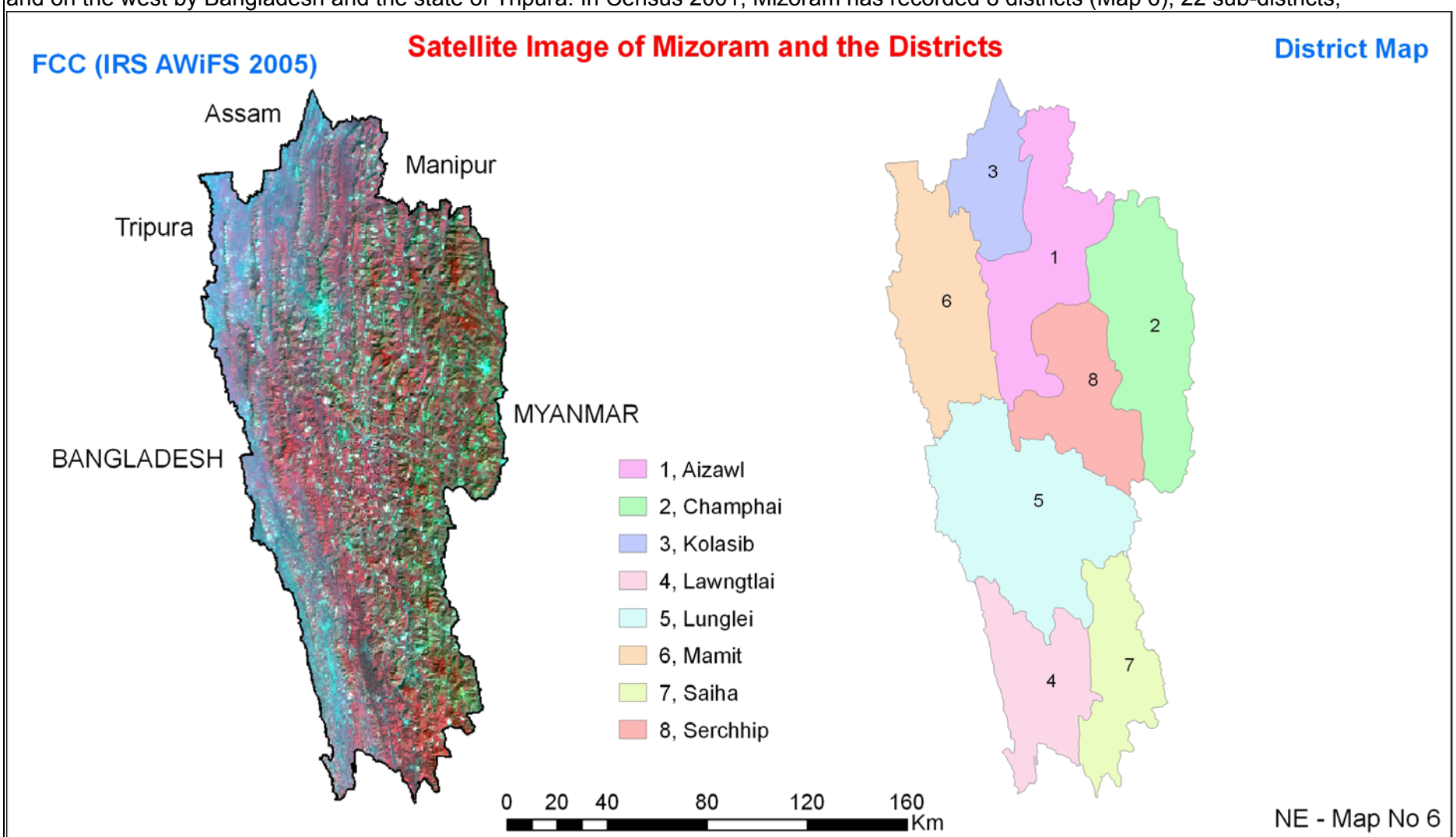
Waterlogged and Salt Affected Areas: Total waterlogged area in the state is 0.056 Th ha which is perennial. There is no area under salt affected category in the state. No soil sample could be collected in the state. Table 8 and Map 11 show the waterlogged areas in major and medium irrigation commands in Meghalaya state.

Table 8: Waterlogged and Salt Affected Area in major and medium irrigation commands of state

Code	Command names	Type	Waterlogged area (Th ha)	Salt affected area (Th ha)
32	Rongal Valley Irrigation Project	Medium	0.056	0.000
	TOTAL		**0.056**	**0.000**

MIZORAM

Location and Administrative Setup: Mizoram is located in the north-eastern part of the country. It lies between 21 ° 57' and 24 ° 31' N latitudes and 92 ° 15' and 93 ° 22' E longitudes. It is bounded on the north by states of Assam and Manipur, on the east and south by Myanmar and on the west by Bangladesh and the state of Tripura. In Census 2001, Mizoram has recorded 8 districts (Map 6), 22 sub-districts,



22 statutory towns and 817 villages. It covers an area of 2108.100 Th ha (21081 sq. km). The state has a total population of 889000 according to the Census 2001. The decadal growth rate is 28.82 per cent in the decade 1991-2001 which is 10.88% lower than the growth rate of decade 1981-1991 (39.70%). The state has the population density of 42 persons per sq. km. The sex ratio of the state is 935.

Climate: The state receives good rainfall. During rains the climate in the lower hills is humid. Rainfall is generally evenly distributed. State receives an average rainfall of about 3000 mm. Temperature in the state varies from about 12°C in winter to about 30°C in summer. Winter is from November to February.

Land use: Land use statistics for the year 2000-'06 is given in Table 9.

Table 9: Major Land Use (Th ha)

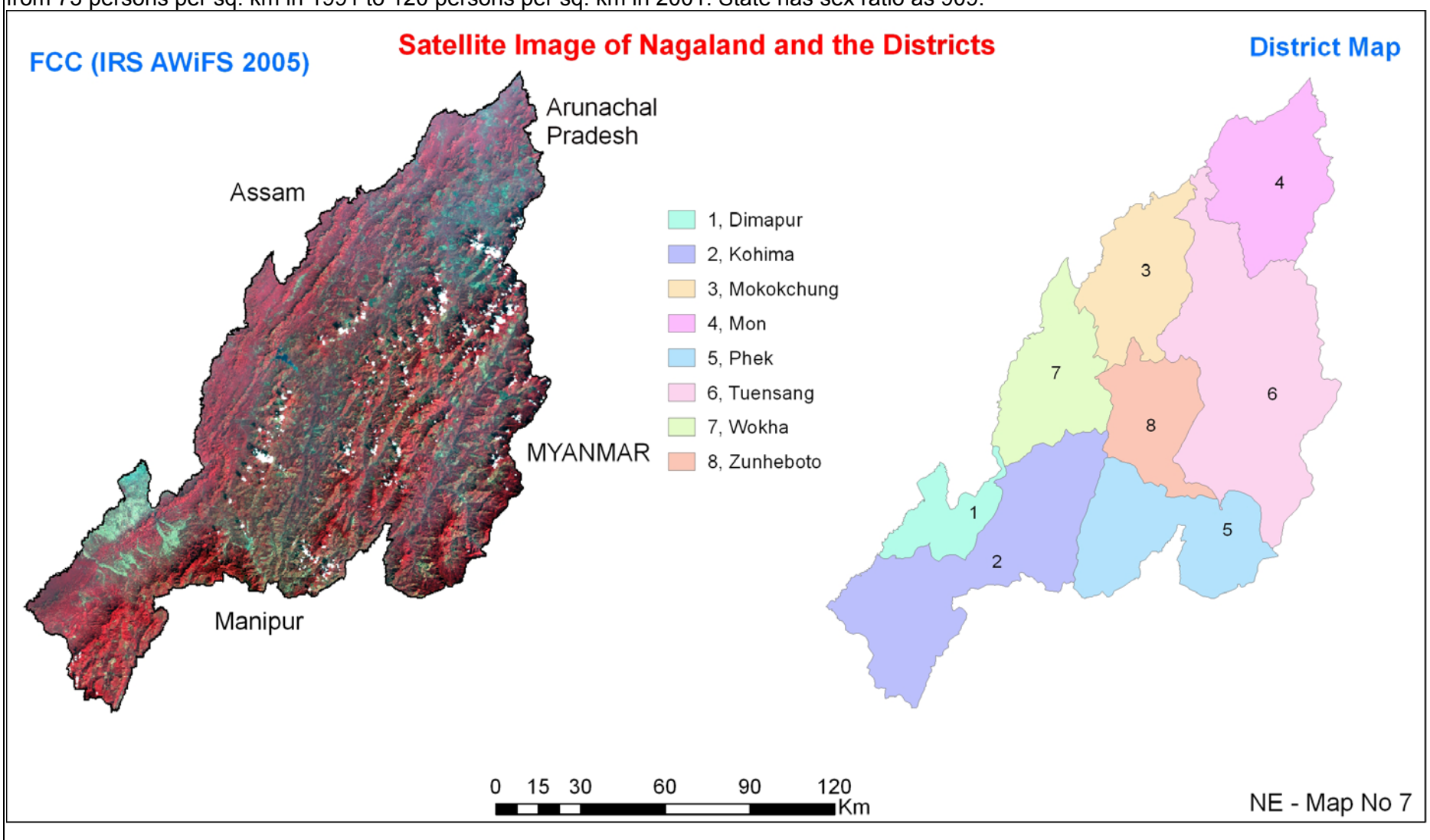
PARTICULARS	2005-'06
Forest	1594.000
Not Available for Cultivation	134.000
A-Permanent Pastures & Grazing Land	5.000
B-Land under Misc. Tree Crops & Groves	10.000
C-Cultivable Wastelands	5.000
A- Old Fallow	82.000
B- Current Fallow	24.000
A-Net Area Sown	97.000
	-
Gross Cropped Area	97.000
Cropping Intensity (%)	100.00

(Source: Statistical Abstract of India, 2005-'06)

Command Areas: There are no major and medium command areas in the Mizoram state.

NAGALAND

Location and Administrative Setup: Nagaland state lies between 25°11' and 27°02' N latitudes and 93°20' and 95° 17' E longitudes. The state is bounded by Myanmar in the east, Arunachal Pradesh in the north, Assam in the west and Manipur in the south. As per Census 2001, Nagaland has 8 districts (Map 7), 93 sub-districts and 52 CD blocks. There are 1317 villages and 9 towns. The state covers an area of 1657.900 Th ha (16579 sq. km). Nagaland has total population of 19,90,000 persons. Among all the states/union territories in the country, Nagaland has recorded the highest decadal growth rate of population (64.53%) according to Census 2001. Density of population has gone up from 73 persons per sq. km in 1991 to 120 persons per sq. km in 2001. State has sex ratio as 909.



Climate: The climate of Nagaland in general is controlled by its terrain features. It is hot to warm subtropical in areas with elevations of 1000 to 1200 m. The climatic environment is warm subtemperate in areas with elevations of 1200 m and above. The climate as such is typical of a tropical country with heavy rainfall. The average rainfall varies between 1750 to 2500 mm. Most of the heavy rainfall occurs during four months i.e. June to September. The rain during April to May is low. The temperature varies from 0°C in winter to about 40°C in summer depending on elevation. The average annual temperature ranges from 18°C to 20°C and 23°C to 25°C in the higher and lower elevations, respectively.

Land use: Land use statistics for the year 2005-'06 is given in Table 10.

Table 10: Major Land Use (Th ha)

PARTICULARS	2005-'06
	863.000
	75.000
w Land	
A-Permanent Pastures & Grazing Land	
B-Land under Misc. Tree Crops & Groves	120.000
	56.000
Fallow Land	
A- Old Fallow	76.000
	82.000
Cropped Area	
A-Net Area Sown	309.000
B-Area Sown More Then Once	78.000
Gross Cropped Area	387.000
Cropping Intensity (%)	125.24

(Source: Statistical Abstract of India, 2005-'06)

Command Areas: There is 1 irrigation command areas in Nagaland state, which is medium in nature (Map No 10)

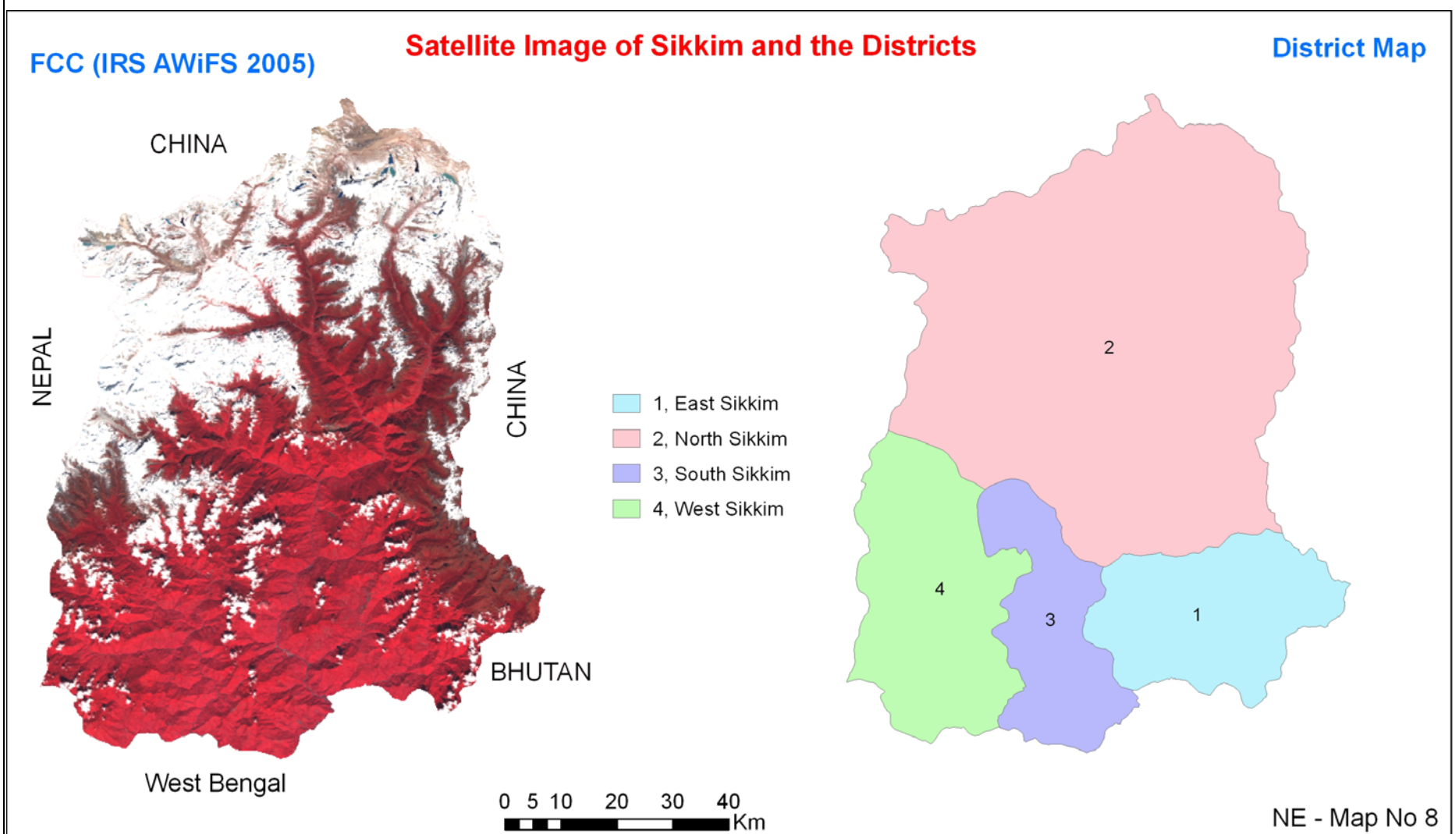
Waterlogged and Salt Affected Areas: There is no area under waterlogging in the state. There is no area under salt affected category in the state. No soil sample could be collected in the state. Table 11 shows the waterlogged areas in medium irrigation commands in Nagaland state.

Table 11: Waterlogged and Salt Affected Area in major and medium irrigation commands of state

Code	s	Type	Waterlogged area	Salt affected area (Th ha)
17	rrigation Project	Medium		0.000
	TOTAL		**0.000**	**0.000**

SIKKIM

Location and Administrative Setup: Sikkim is a hilly state and situated in the north-eastern region of India. It lies between 27°04' and 28°07' N latitude and 88°00' and 88°55' E longitude with an area of 709.600 Th ha (7096 sq. km). The state is divided into the 4 districts (Map 8), 9 sub-divisions, 32 constituencies, 92 Zilla Panchayats, 159 Gram panchayats and 452 villages. Sikkim has a total population of 5,41,000 according to the Census 2001. Population density is 76 persons per sq km. The overall sex ratio in the



state is 875 females to 1000 males. The state has recorded 33.06 per cent decadal growth during 1991-2001 as against decadal growth rate of 21.54% at the National level. . Literacy rate of the state is about 69.68%.

Climate: The climate of the state varies from cold temperate and alpine in northeast to subtropical in the south. Areas with altitude below 610m above mean sea level have tropical climate, between 610 m and 1524 m is sub-tropical climate, between 1524 m and 2743 m is temperate climate, between 2743 m and 3962 m is aub-alpine climate; and above 3962 m is considered as the alpine climate. Rainfall is heavy and well distributed during the months from May to early October. July is the wettest month in most of the places. The intensity of rainfall during south-west monsoon season decreases from south to north, while the ditribution of winter rainfall is in the opposite order. The highest annual rainfall for the individual station may exceed 5000 mm and average number of rainy days (days with rain of 2.5 mm. or more) ranges from 100 at Thangu to 184 at Gangtok. The mean temperature in the lower altitudinal zone varies from 1.5^{o}C to 9.5^{o}C. Temperature varies with altitude and slope. The maximum temperature is recorded usually during July and August, and minimum during December and January.

Land use: Land use statistics for the year 2005-'06 is given in Table 12.

Table 12: Major Land Use (Th ha)

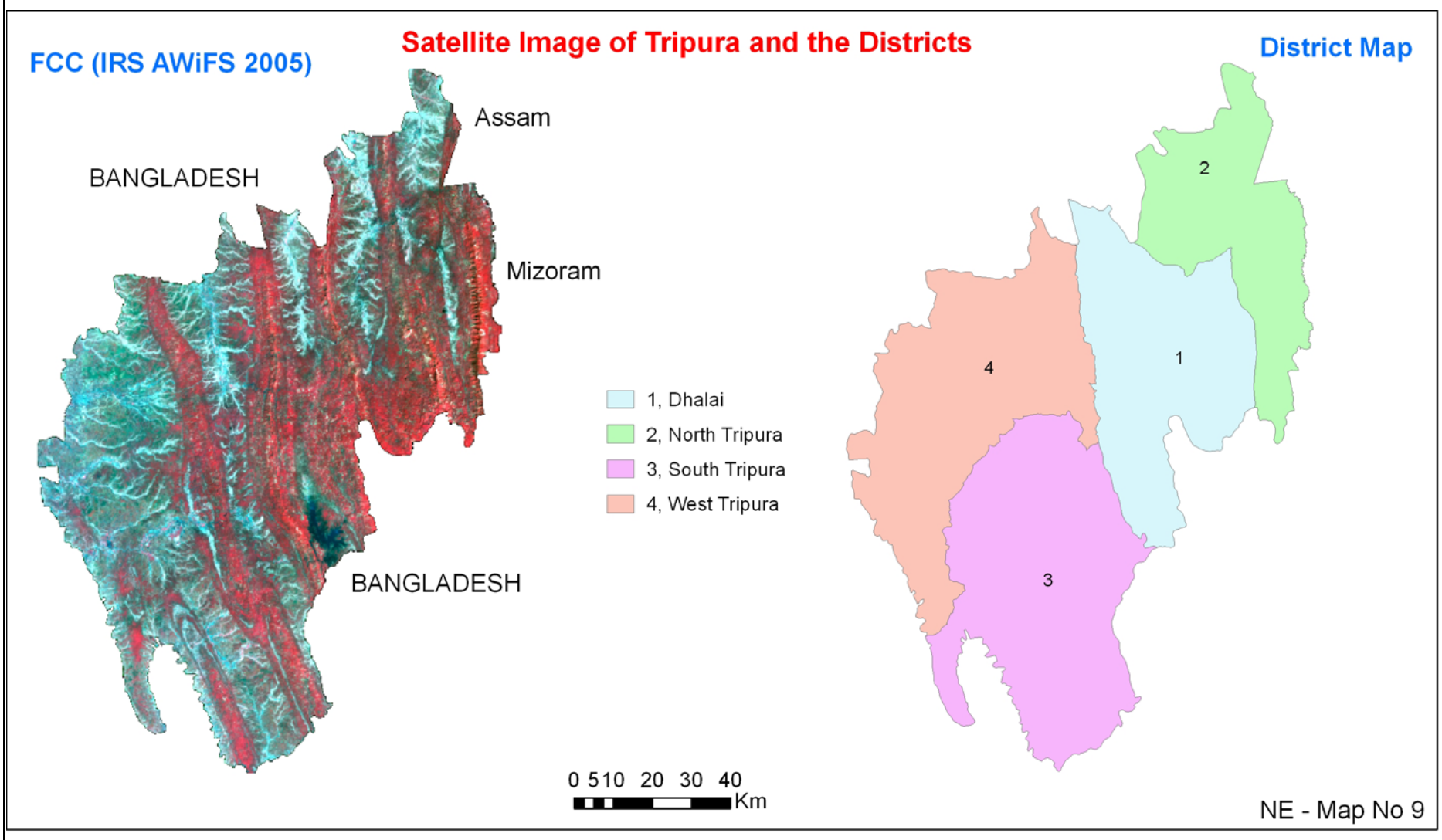
	2005-'06
	319.000
	250.000
Other Uncultivable Land Excluding Fallow Land	
A-Permanent Pastures & Grazing Land	4.000
B-Land under Misc. Tree Crops & Groves	5.000
C-Cultivable Wastelands	2.000
Fallow Land	
A- Old Fallow	30.000
B- Current Fallow	5.000
Cropped Area	
A-Net Area Sown	112.000
B-Area Sown More Then Once	11.000
Gross Cropped Area	123.000
Cropping Intensity (%)	109.80

(Source: Statistical Abstract of India, 2005-'06)

Command Areas: There are no major and medium command areas in the state.

TRIPURA

Location and Administrative Setup: The state of Tripura lies between 22°56' and 24°32' N latitudes and 91°09' and 92°21' E longitudes. The total area of the state is 1048.600 Th ha (10486 sq km). The state is bordered with Assam and Mizoram in the east and Bangladesh mainly in the north, west and south as land locked in three directions. There are 4 districts (Map 9), 38 CD blocks and 870 villages and 23 towns in the state as per the Census 2001. The state has a total population of 31,99,000 persons. The state has recorded 16.03% decadal growth of population during 1991-2001. The density of population in the state is 305 persons per sq. km, which is less than India's average of 313 persons per sq. km. Overall sex ratio in the state is 948 females for 1000 males.



Climate: The climate of the state is humid sub-tropical characterized by high rainfall. The annual rainfall ranges from 2000 – 3000 mm. The humidity ranges from 100 – 42%. The monsoon starts generally in April and continues upto September. The state also receives winter and summer showers to a limited extent. Summer starts in March and continues upto May and is followed by rainy season extending over about four months (May - August). The average maximum temperature is 35°C in May - June and the average minimum temperature is 10.5°C in December-January.

Land use: Land use statistics for the year 2005-'06 is given in Table 13.

Table 13: Major Land Use (Th ha)

PARTICULARS	2005-'06
Forest	606.000
Not Available for Cultivation	134.000
A-Permanent Pastures & Grazing Land	-
B-Land under Misc. Tree Crops & Groves	27.000
C-Cultivable Wastelands	1.000
A- Old Fallow	1.000
B- Current Fallow	1.000
A-Net Area Sown	280.000
B-Area Sown More Then Once	19.000
Gross Cropped Area	299.000
Cropping Intensity (%)	106.70

(Source: Statistical Abstract of India, 2005-'06)

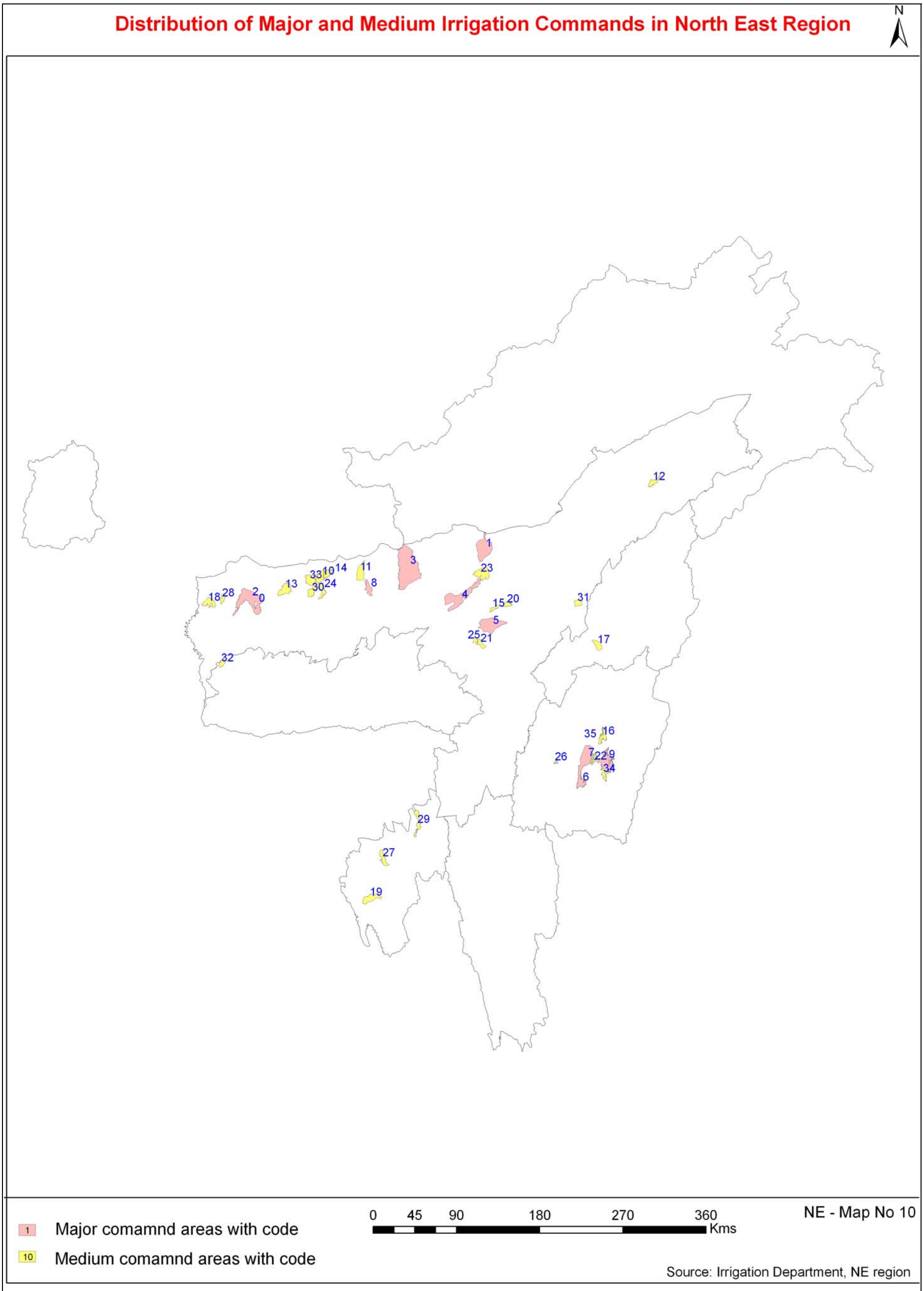
Command Areas: There are 3 irrigation command areas in Tripura state, which are medium in nature (Map No 10)

Waterlogged and Salt Affected Areas: Total waterlogged area in the state is 0.024 Th ha which is seasonal. There is no area under salt affected category in the state. No soil sample could be collected in the state. Table 14 and Map 11 show the waterlogged areas in major and medium irrigation commands in Tripura state.

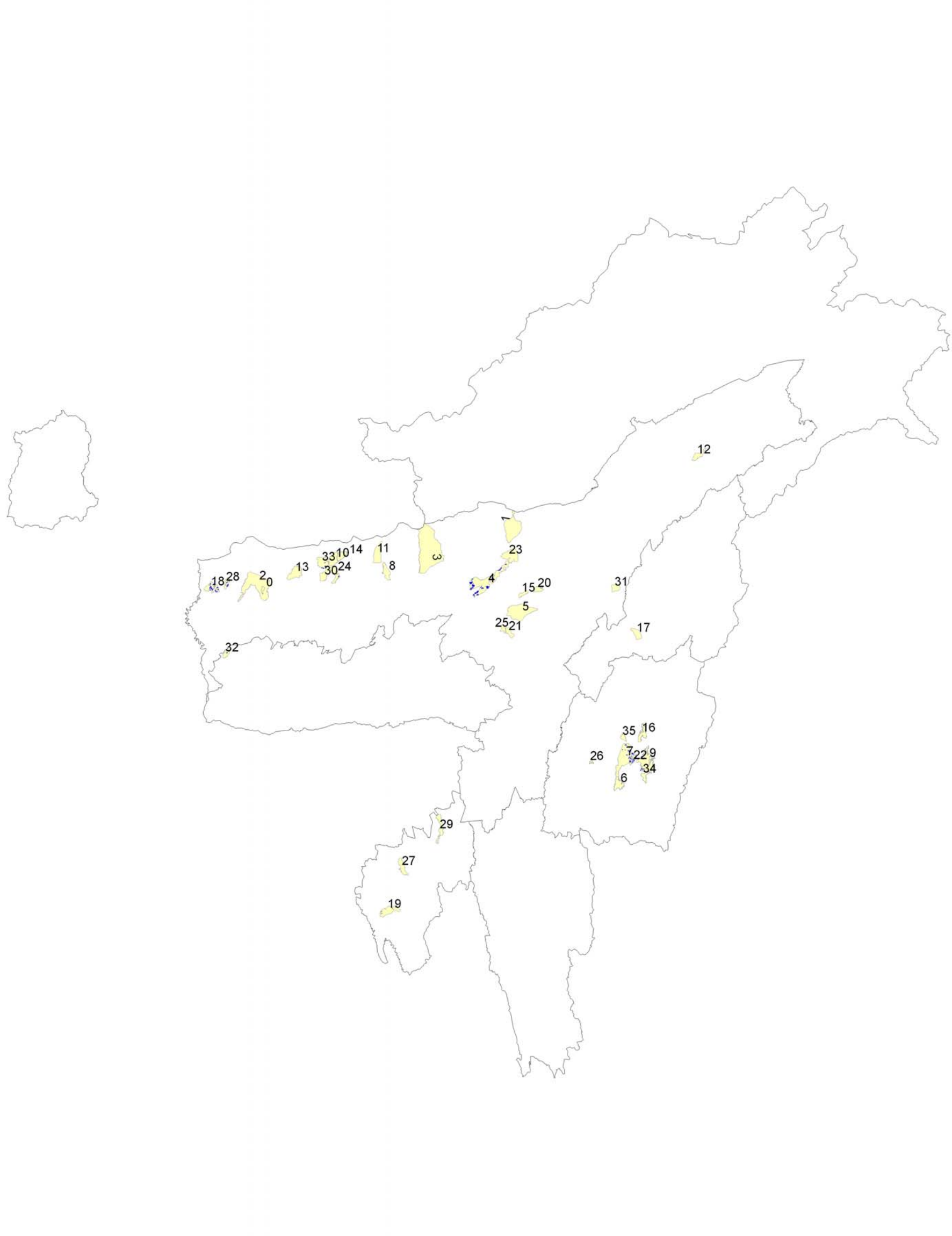
Table 14: Waterlogged and Salt Affected Area in major and medium irrigation commands of state

Code	Command name	Type	Waterlogged area)	Salt affected area (Th ha)
	Gumti Irrigation Project	Medium	0.024	0.000
27	Khowai Irrigation Project	Medium	0.000	0.000
29	gation Project	Medium		0.000
	TOTAL		**0.024**	**0.000**

Distribution of Major and Medium Irrigation Commands in North East Region



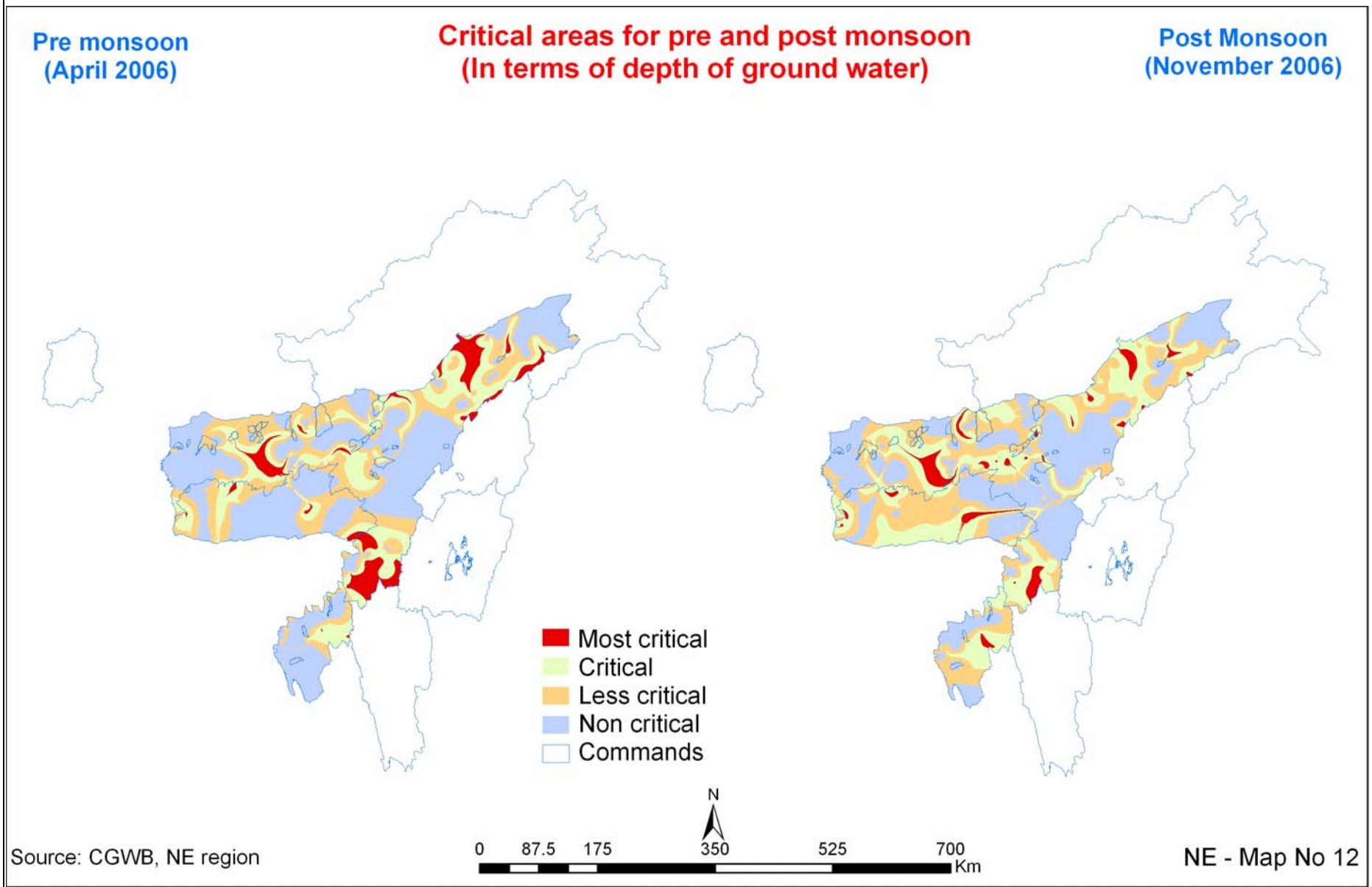
Waterlogged and Salt Affected Areas in the Commands of All Major and Medium Irrigation Projects of North East Region Using Satellite Remote Sensing



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 15 and Map 12 show the critical area of depth of ground water for pre (April, 2006) and post (November, 2006) monsoon. Well data was available for few states only.

Table 15: Critical Area of Depth of Ground Water for Pre (April, 2006) and Post (November, 2006) 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)	0.398	0.09	58.360	13.58	158.126	36.79	212.878	49.54
Post Monsoon (November, 2006)	3.975	0.92	71.955	16.74	158.346	36.85	195.486	45.49



Project Team

Dr. A.K. Bera (PI), RRSSC, Jodhpur
Dr. D. Dutta, RRSSC, Kharagpur
Smt. Rajashree V. Bothale, RRSSC, Jodhpur
Dr. M.P. Punia, BMBS&TC, Jaipur
Shri B.K.Singh, BMBS&TC, Jaipur
Shri Rishi Pareek, BMBS&TC, Jaipur
Ms. Neelam Pareek, BMBS&TC, Jaipur
Ms. Kaushal Panwar, BMBS&TC, Jaipur
Shri Piyush Gourav, BMBS&TC, Jaipur

Acknowledgements

Assam
Shri Anamel Haque, Chief Engineer, Irrigation Department, Assam
Shri Robin Das, Director Design, Irrigation Department, Assam
Shri R.U. Hazarika, Deputy Director, Irrigation Department, Assam
Shri S. K. Shukla, CWC, Guwahati
Shri C.K.L. Dass, CWC, Guwahati
Shri Lalit Kumar, CWC, Guwahati
Dr. D.B. Shah, Regional Director, CGWB
Dr. S. S. Singh, Hydrogeologist, CGWB
Shri U. Shrivastava, CGWB
Shri R.K. Kalita , Hydrologist, CGWB

Manipur
Sh A.H. Khan, Chief Engineer, IFC Department,Manipur

Meghalaya
Mr. E. M. Scott, Sup.Engineer, CWC, Shillong

Nagaland
Mr.S. Skyam, IFC Department,Nagaland

Sikkim
Dr. M. L. Arrawatia, Secretary, Dept. of Science and Technology
Shri D.G. Shrestha, DST
Shri Narpati Sharma, DST

Tripura
Mr. U. Roybarman, Sup. Engineer, CWC, Tripura

Arunachal Pradesh
Chief Engineer Office, Irrigation Department, Arunachal Pradesh

Mizoram
Chief Engineer Office, Irrigation Department, Mizoram

and

Dr. H.C. Pande, Member, Governing Body, BMBS&TC, Jaipur

Major Narpat Singh (Retd.), Secretary, BMBS&TC, Jaipur